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THE ALDER MANAGERS:
THE CULTURAL ECOLOGY OF A VILLAGE IN NAGALAND, N.E. INDIA

MALCOLM CAIRNS

A thesis submitted for the degree of

Doctor of Philosophy

at the Australian National University

March, 2007

Dissertation Committee:

Nicholas Tapp, Chairman
Harold Brookfield
Andrew Walker
R. Michael Bourke
Bryant Allen
David Thomas

Except where otherwise acknowledged, this thesis represents my original research. It has not been submitted in whole or in part for a higher degree to any other university or institute of tertiary education.

Malcolm Foster Cairns

Malcolm Foster Cairns

Dedicated to Tossaporn Kurupunya,
whose assistance and careful attention to detail
are evident throughout this dissertation.

CONTENTS

APPENDICES

NOTE: The Appendix numbers (below) correspond with the chapters of the Thesis, with two exceptions: Appendix 3, entitled Khonoma and its People, relates to the historical sections covered by Thesis chapters 3, 4 and 5. Appendix 6, entitled Allocation of Land and Labor, and the Returns that Farmers Receive: Conclusions relates to Thesis Chapters 8 and 9.
In all but the original copy of this dissertation, the Appendices are recorded on an accompanying compact disc, and are not included in the printed volume.

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ACKNOWLEDGEMENTS

A research project of this scope is never a solo effort. It involves dozens of advisers, supporters, assistants, friends, and enthusiasts. This project was particularly complex since I was based as a Research Fellow at The World Agroforestry Center's Chiang Mai office in Thailand, using Canadian funding to pursue research in Northeastern India, while under the administration of an IDRC project officer in Singapore, and the intellectual guidance of panel members at the Australian National University in Canberra. It is, therefore, very hard to know where to start, and I worry that these few paragraphs will hardly begin to acknowledge the assistance of all those who have played a helpful role, and important names will be missed.

Let me start at the beginning of a long and fond relationship with the people at the heart of this study – the people of Khonoma. I first heard the name Nagaland in relation to a Canadian-funded project called Nagaland Environmental Protection and Economic Development, or NEPED. Khrieli Kevichusa was the project's leader and it was he who took me to his home village of Khonoma on a fine autumn day in November 1995 and introduced me to the dispersed alder system that his ancestors had developed. NEPED's work in improving the economy of the area's shifting cultivators was to attract me to Northeastern India many more times before the project became the host institution for my own fieldwork for this study. It is difficult to overstate the value of NEPED's support, from arranging the vitally-important restricted area permits (RAPs) that gave me access to the state, to simply granting me the local recognition that made me persona grata among the various underground factions that were always present in the study area. Without NEPED, this study may never have been undertaken.

On that first visit in 1995, I was so intrigued by the alder management that I returned to Khonoma's jhum fields a second time some days later, to take a closer look. A forester by the name of Amenba Yaden was assigned to be my guide. Over the years, Amenba always kept a close eye on my movements, and seemed determined to help me see through to the end what we started on that visit. As the ethnobotany component of my fieldwork grew, we often huddled together, trying to identify herbarium specimens. Even his lovely wife, Asenla, got into the act by inviting me over for some of her fabulous cooking whenever she fancied that I was looking a bit gaunt. It was Amenba who introduced me to Khrieni Meru, a village leader who was to become like a brother to me. As the project got underway, Khrieni became the farmer-coordinator for the research activities in Khonoma. There is much for which I have to thank Khrieni – for acting as the interface between the project and the village and ensuring that no misunderstandings arose about the project's activities, for helping with more tasks than I can begin to list, but most of all, for his advice and friendship. I stayed with Khrieni, his wife, Gongu and their lovely family during my time in Khonoma and we worked closely together as a team. A side room was converted into a temporary office and I was able to totally immerse myself in village life.

The second person who played a major role in the success of the Khonoma work was Carolin (Zeroni-ü) Meru, the young woman that I hired as a research assistant. Carolin was fresh out of university, but more than made up for her lack of working experience with her sincerity and dedication. We climbed many mountains, slipped about on rain-soaked slopes and often crashed down in a tangle while trying to protect the cameras, pried many blood-gorged leeches from between our toes, and often worked late into the night – with never a word of complaint from Carolin.

Then there were the many friends in Khonoma who shared their knowledge and experience during hundreds of conversations. Like Avino Khate (now Meyase), the younger sister of Khrieni's wife, Gongu, who brightened up many a Sunday afternoon with our chats about village life in Khonoma. She also introduced me to Kaka and Easterine Iralu, who were to deepen my understanding of the Angami people and Nagaland's struggle for independence. Both are prolific authors, Easterine publishing poetry and short stories, while Kaka is a hardhitting political writer who passionately argues the case for Naga sovereignty.

But perhaps the most important group was made up of the ten farming households who were my core collaborators. By maintaining daily diaries on their monitored jhum and wet rice fields, they supplied much of the hard data on labor inputs and crop yields that are unique to this study. In the final year of fieldwork, I added to their book-keeping burden by asking them to also keep financial diaries so that we could capture a better understanding of household economies. They were: Vilazosie and Vivino Punyü, Vitsolie and Kuolhoutono Meyase, Selie and Sano Chase, Pelhuhu and Avino Chase, Khrieni (also farmer coordinator) and Gongu Meru; Vingulie and Khrievor Viprü; Nirüdo and Vilakhrieü Khate, Visesielie and Meno Meyase, Lhuyazo and Khrielevono Talie, and Vipiahu Chücha (then Khonoma's most eligible bachelor, but now married to Cukhu-ü). These were my co-researchers, and much of the data presented in this thesis belongs to them.

There was a parallel group of farmer-collaborators in Tsiesema, but because it was included in the study principally for comparative purposes, my visits there were much less frequent. Kouli Mere played the role of research assistant there, and Zapuvi Mere was the farmer coordinator. My valued farmer-collaborators were: Kipfelie and Neilie-ü Dzüvichü, Mhasizolie and Neisalie-ü Mere, Rüduoui-o and Vilhoukho-ü Yhor, Visalie and Thenuse-ü Mere, Rüluotsü and Vizohu-ü Mere, Zapuvi (also farmer coordinator) and Neikuo-ü Mere, Ketounei and Keduorhie-ü Mere, Neichutuo Chietsü, Vikelie and Vizovonud Khro, and Dieseketuo and Khriesale-ü Khro.

Other young Naga graduates were recruited at various times to assist with specific components of the fieldwork. Avino Tase (formerly of Jakhama village) and

Amay Tetso (also from Jakhama) both assisted with the ethnobotanical work, and Teisozhavi Theünuo (Kohima village) conducted a wider survey of other villages' use and perceptions of the alder tree. Ateu Chücha assisted in gathering data on Khonoma's land tenure system and Nijasielie Terhüja (both from Khonoma village) compiled some of the ecological indicators known to villagers. All belong to the Angami subgroup of Nagas. Thanks are also owed to Dr. Supong Keitzar, who, although preoccupied with his duties as Director of Nagaland's Department of Agriculture, chipped in with regular advice and arranged for soil analyses at the department's labs in Kohima and Medzephema. Orchids from the study sites were identified by Dr. Sapu Changkija, Reader at the School of Agriculture and Rural Development of Nagaland University in Medzephema, and author of *Orchids of Nagaland* (1992). For technical backstopping, I invariably turned to Dr. Zavei Hiese, Senior Scientific Officer of Nagaland's Department of Science and Technology. Zavei also helped me to stay in contact with the outside world through e-mail access at the Community Information Centre that he ran.

My understanding of Naga culture was greatly assisted by marathon conversations with Dr. Anungla Aier, who teaches anthropology at the Kohima Science College. Another favorite conversation partner was Thepfulhouvi Angami, the former Director of Nagaland's Forest Department. Thepfulhouvi had taken a special interest in alder during his long career and was always very thoughtful and reflective as we exchanged ideas. He taught me much about the ecology of alder in Nagaland. Another who was always amongst the first that I would ring upon arrival in Kohima was Dr. Viu Meru, a medical doctor who worked as a Surveillance Medical Officer with the World Health Organization's National Polio Surveillance Project. Viu, a son of Khonoma's Merhümia khel, took a personal interest in ensuring that my research in his home village progressed without problems. Although I have already noted NEPED's central role in facilitating the research, special homage is owed to Chozhüle Kikhi in particular for her outstanding assistance. Chozhüle, who hails from Viswema village, a sister village of Khonoma but in the southern Angami area, is a prolific writer. I have not only referenced her writings extensively but I am also grateful for her prompt and gracious responses to my many e-mails seeking follow-up details.

Now to my many supporters and helpers in other parts of the world. It was Canada's International Research Development Centre (IDRC) that made this research possible, initially by inviting my involvement in its Nagaland program and then later providing generous funding support for me to undertake my own fieldwork. Its Singapore office oversaw my project, and for this I owe my eternal gratitude to Dr. John Graham, who was a valuable mentor and friend throughout this work. It was a sad day for me personally and for the development community in Asia in general when John retired from IDRC early in 2004. It would also be amiss not to single out his assistant, Elaine Tang, for special thanks for her efficiency and dedication in helping to make my work easier in so many ways.

Although there have been many struggles along this journey, I have had the immensely good fortune of being guided by an extremely dedicated and supportive supervisory panel at the Australian National University (ANU). As my primary supervisor, Dr. Nicholas Tapp (Dept. of Anthropology at the ANU's Research School of Pacific and Asian Studies [RSPAS]) shouldered the lion's share of the work. Years from now, I will always remember Nick for his dedication to his students, his generosity with his time, and his often uphill battle to mold me into an anthropologist. I probably owe him not only gratitude, but also my apologies for being such a headache! Back in the early 1990s when completing a Master's degree in Environmental Studies at York University in Canada, I recall my primary supervisor at that time, Dr. Bill Found, urging me to consider PhD studies and enthusing about how great it would be if I could work under the renowned geographer, Harold Brookfield. It's strange how life unfolds. About five years later, I found myself sitting in a hotel in Bogor, Indonesia, having a beer with Drs. Harold Brookfield and Michael Bourke, and listening to their advice about applying to the ANU. I have considered it a special privilege to have had Harold (Professor Emeritus, Dept. of Anthropology, RSPAS) sitting on my panel. I have always been acutely aware that whatever expertise I could summon for Asia, Harold could more than match the feat in the global arena. Drawing from such rich experience, his counsel could be counted on to be frank – sometimes brutally so – and usually right on target.

Later, after the thesis had been examined and I was required to make a number of changes in order to improve presentation, I unfortunately suffered a stroke while this task was still far from complete. Nick Tapp and Harold Brookfield undertook a major task in helping me to finish this job, which I was then physically unable to do by myself.

Dr. Andrew Walker (Resource Management in Asia-Pacific (RMAP) Program, RSPAS) was a stabilizing influence on my panel, with his delightful dry sense of humor and quiet reassuring advice, even in the eye of a storm. Even before he officially joined my panel, Andrew was always helpful and had a wonderful habit of pushing interesting reading material in my direction. Perhaps because of the parallels with the Casuarina management in the swiddens of Papua New Guinea that he is so familiar with, Dr. Michael Bourke (Dept. of Human Geography, RSPAS) has always taken a keen interest in my work with alder in Nagaland, and has gone out of his way to be helpful. As someone with immense field experience, Mike always paid close attention to the practical aspects of fieldwork and made sure that my backpack was stuffed with a compass, altimeter, clinometer, a 50-metre tape and other tools of the trade that proved to be so useful in collecting much of the geographic data presented in this thesis. Dr. Bryant Allen (Dept. of Human Geography, RSPAS) played a similar role in making sure that I had bought a global positioning system (GPS) and knew how to use it before departing for the field. The heavy use of maps in this thesis shows how important GPS and geographic information systems (GIS) became in the study as tools to explain land use. After completion of the fieldwork, Bryant again worked with me in examining the data and discussing how it should be logically organized into a thesis. But not least, I'm grateful to Bryant for sharing the warmth of his family and home, helping to provide an important balance to someone who otherwise spent most of his waking hours with his nose stuck in a book or computer. I consider myself very privileged to have been able to work under the collective guidance of this panel and view it as the single biggest asset that I reaped when I decided to make ANU my academic home. I thank them for always making their time available, for their advice and patience, their friendship, and for trusting me to pursue the fieldwork in Nagaland in the best way that I knew how.

Warm thanks are also owed to Jenny Sheehan in the ANU's Cartography Unit for the many maps that she created for me; to Fay Castles for patiently guiding me through all the university's bureaucratic hoops and paperwork; and to Ria van de Zandt and then later, Ben Cauchi, for their computer support. Stephen Meatheringham later assisted in a remarkable way in formatting the revised thesis while such work was beyond my damaged abilities.

For their generous assistance during my archival research in London, I must thank Dr. Ian Macfarlane at Cambridge's Department of Social Anthropology and Jocelyne Dudding, who helped me sort through the archives at the Photograph and Manuscript Collections of Pitt Rivers Museum. Then there were my supporters in my home base, Chiang Mai. One of my first stops upon returning to Thailand was always to debrief Dr. David Thomas, Senior Policy Analyst at the Chiang Mai office of The World Agroforestry Centre (formerly called The International Center for Research in Agroforestry, ICRAF), and a member of my academic advisory panel. David was always full of insights and had a talent for posing provocative questions that often forced me to rethink my assertions. I always came away from these sessions re-energized, and am much indebted to David for playing multiple roles as supervisor, sounding board, and friend.

There was a small team of people in Chiang Mai whose talents and hard work made invaluable contributions to the project. Tossaporn Kurupunya played the leading role, doing most of the tedious work of entering raw data into a computer and transforming them into attractive graphs and figures that made my job of interpretation and writing so much easier. Jaisinee (Kittima) Kidarn worked with me on the GIS component of the study that generated most of the maps that added a powerful spatial understanding of the Nagas and their land use systems. Her husband, Sorapeth Kidarn, guided me in the audio-visual aspects of my data collection. The soil and vegetative samples were analyzed by Dr. Kanokphan Phansombat and his team at the Department of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University (CMU). Amidst a stream of good-natured abuse and growling about the often poor shape of the herbarium specimens that I brought to him, Dr. J.F. Maxwell at the Herbarium of CMU's Biology

Department always took time to identify my plants (forensic botany, as he called it). Max is a bit of a legend as one of the region's foremost botanists and one of the last of the old guard that spends extensive amounts of time in the field, publishing extensively. In order to dismiss the complaints of non-specialist readers, that scientific books usually do not include enough illustrations to help explain the subject matter and break up endless pages of text, I am grateful for the contributions of Paradorn Threemake, one of the most talented artists working out of Chiang Mai's night bazaar. Wiyono, an artist based in Bogor, Indonesia, chipped in to contribute many of the botanical sketches. Most of the writing stage was spent in Chiang Mai. As chapters were slowly churned out, Lynley Capon, David Mann, and Bob Hill kindly looked through them with careful editorial eyes and corrected my grammatical blunders. Bob also acted as a go-between with Canberra during my illness, and helped me in many ways at that time.

I owe thanks to a couple of other people who, although not officially members of my panel, reviewed my work and made suggestions for improvement. This is the advantage of living in an era of e-mail. Dr. Hugh A. McAllister from the School of Biological Sciences at Liverpool University has been immensely helpful in providing me with alder references and reviewing those chapters most focused on the alder tree and its management. Dr. Eklabya Sharma, now Head of the Mountain Farming Systems Division at the International Centre for Integrated Mountain Development (ICIMOD) in Kathmandu, Nepal, is probably one of the region's foremost experts on Alnus nepalensis. With this shared interest, Eklabya and I have enjoyed many a lengthy and animated discussion about alder – usually to the complete boredom of others around us – and he kindly furnished me with copies of all his publications based on his research in Sikkim on alder managed as a canopy over cardamom. Finally, though very far away, I owe much gratitude to my family that continues to cultivate the same land that our ancestors settled when they emigrated from Scotland to Canada in 1832 and set roots on Prince Edward Island (then known as Isle St. Jean to earlier French Acadian settlers, or Abegweit, meaning "cradled in the waves", to the local Mi'kmaq natives). Before I went overseas, while I was still farming with my brother, James, we constituted the 7th generation of our family to farm this land. This long association with the land probably best equipped me to work with farming communities elsewhere in the world, and to easily identify with their sense of attachment to ancestral land. Throughout my PhD program, my family has remained a bedrock of support and encouragement – not quite certain what I was doing in a remote corner of India, but sure that it should be done well.

There are probably many more whose contributions should be acknowledged, but this is already too long. Perhaps more so than other PhD candidates, I feel compelled to express thanks to the cast of so many that has contributed to this work. None have contributed more than Tossaporn Kurupunya, and for that reason, this thesis is dedicated to her. However, all errors or omissions remain my sole responsibility.

ABSTRACT

Although shifting cultivation has long been condemned as a wasteful land use practice, research has failed to identify alternative models suitable to the conditions under which shifting cultivators work. The failure of outside interventions suggests that attention should be directed to cases where, faced with land shortages, shifting cultivators have successfully developed their own innovations for intensified cultivation.

This dissertation explores a striking exception to the general collapse of shifting cultivation systems in the Asia-Pacific region, in Nagaland, a remote corner of N.E. India where, for centuries, Naga farmers have managed a local alder tree (*Alnus nepalensis*) in their swidden fields. The study focuses on Khonoma, a long-established Angami Naga village in Kohima District with a reputation for particularly intensive use of alder in its dryland cultivation. A nearby Angami village, Tsiesema, does not practice alder management. It was thus adopted as a secondary research site that provided a benchmark of swiddening in the absence of alder, and through comparisons between the two study villages, allowed the study to better gauge the costs and benefits associated with alder management.

The study explores the cultural ecology of Khonoma, with special emphasis on the role of alder in its swidden fields. It carefully documents how alder is being managed, examines the evidence for what benefits it provides, and seeks to reconstruct the historical reasons underlying alder's magnified importance in Khonoma. It shows alder to be a pioneer tree that thrives in the study area, and how through centuries of trial and error, Khonoma has become extraordinarily skillful in managing it as an improved fallow species. By accelerating fallow functions, alder has allowed Khonoma to dramatically intensify its cultivation without slipping into the downward spiral of degradation typically seen when swidden systems are pushed beyond their ecological resilience.

The thesis demonstrates how interwoven history, culture, the environment, the landscape and livelihood strategies are in Khonoma, and how they led to it managing alder more intensively than neighboring societies. The Khonoma experience provides a compelling example of farmers using a multipurpose tree as a "bridge" that allowed them to effortlessly make the transition from shifting to permanent cultivation. This was achieved through small, incremental changes to their existing cultivation practices – an approach vastly more acceptable to farmers than the completely new technologies that projects often attempt to parachute into swidden communities.

GLOSSARY OF LOCAL TERMS[1]

Angami	the Naga subgroup to which the people of Khonoma and Tsiesema belong
apfü	the name given to their mothers by members of Angami society's younger Thekronomia moiety
apo	the name by which members of Angami society's older Thevomia moiety refer to their fathers
apvu	the name given to their fathers by members of Angami society's younger Thekronomia moiety
aren	the "soul force" that the Nagas believed to exist in the head, just beneath the scalp
azo	the name given to their mothers by members of Angami society's older Thevomia moiety
baze	circular stone sitting place that is not attached to a male dormitory
Cacü	lunar month of May-June
Cadi	lunar month of June-July
cagwi	stick used in pushing aside undergrowth, to enable a clear swing at its stems with a dao
Chakhesang	a Naga subgroup so closely allied to the Angami that it was formerly known as the "Eastern Angami"
dahu	khel forts within a village
dao	a large knife used as a farm tool and weapon
dhan	unhusked rice
dobashi	an interpreter linking the British administration with village leaderships
Doshü	lunar month of January-February
gaonbura	a village chief recognized by the British administration
genna	the taboo concept in Angami traditional belief, on which a day's work is banned and contact with the outside world forbidden for ritual reasons genna is also used to convey the meaning of the following Angami words: kenna : a prohibition applying to a person or household; penna : a non-working day, similar to a Sabbath, on which the entire village is forbidden for to work in the fields or interact with strangers; and nanü : a taboo and the entire ceremony connected with it.
gwi	mithun
gwiki	outlying sheds in which mithun herders camp
gwükhwemia	those who watch over mithun
hicha	a metal container in which alcoholic drinks are taken into the field or forest
jarü	a winnowing tray
jhum	a term used widely in N.E. India for a swidden field
jhumia	a farmer who cultivates a jhum field
kehi	to be cursed by a priest
kehou krotho	a church group
kejü	a spade
kekinyi	cross-visits between allied villages, usually in March
kelhou	the two ancestral divisions of the Angami tribe

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[1] Tenyidie terms are indicated here, and within the chapters, by underlining. Words of other origins, but in common use among the Angami, are not underlined. Considerable variation exists in how Tenyidie terms are spelled in everyday use.

kelu	insect larvae that attack alder trees
kelu bo	worm manure that gathers at the base of trees under insect attack
kemevo	village headman
Kenei Krotho	a Khonoma self-help group; the name translates literally as, *“Joyous Fellowship”*
Kenuo	lunar month of November-December
Kera	lunar month of March-April
kerilakecü	remarriage
kesia meruo	a ritual for the dead during which meat is distributed to relatives and clansmen of the deceased
kesitsiekrü	an old man elected as the ritual sower of a season’s first Job’s tears
ketsa	forests
Ketshie	lunar month of April-May
ketsu	a buffalo horn used to summon mithun
Kezei	lunar month of February-March
khadu	pathways to the fields
khel	a segment of a village usually occupied by a single major clan or thino
khophi	an intricate basket design unique to Khonoma (also known as mekho)
khrüsele	“three months” – the name of a fast-growing millet variety planted in times of food shortage.
khupo	the vertical walls of ponded fields
khupone	applying mud to reinforce bunds of wet rice terraces
khuporhe mu haphieda	cleaning weeds from bund walls and field perimeters
khuthotieki	planting season
khwehou	a sitting place made of stone, usually located outside male dormitories
Khwünomia	the people of Khwünoria
Khwünoria	the original Angami name for Khonoma; finding it too difficult to pronounce, colonial rulers changed it to Khonoma
kichüki	a place for sleeping, part of a morung
kichüjü	a communal bed in a male dormitory
kihiekimhuze	kitchen gardens
kika	the wooden horns that decorate the houses of prestigious people
kikrakrü	age group parents
kikru	a family unit, or household
kila	the name given to colonies within a khel, most of which were centred on a water source
kimianupfü kevaketie	divorce
kipfükhro and kilo room	the first two rooms of a traditional house, normally occupied by livestock at night
kiputsie	symbolic totem stones for worshipping the creator deity, laid next to village gates
kishü kiya	marriage
kuchü	*Urena lobata*, which has copious, heavy panicles of seed and is used in rituals to seek heavy crops of paddy
kwunya	*Erthesina fullo* – an insect that feeds on the tips of young alder coppices
lieda	a bamboo flail used for threshing rice and Job’s tears
liede	a ritual marking the start of the harvest, and performed by an elderly woman called Liedepfü
Liedenyi	an Angami festival held in October to mark the start of harvest of paddy and Job’s tears
Liedepfü	an elderly woman who performed the first harvest ritual (liede)
liehe	winnowing

liekhro	:	bunching rice plants to prevent lodging and facilitate faster harvesting
Liekhwenyi	:	an Angami festival held in September or October, during which villagers build scarecrows and take other measures to protect their maturing paddy crop
liekro	:	meaning “uncultivated”, the fallow phase of a jhum cycle
lienyü	:	threshing
liephiezhü	:	a hoe
liere	:	harvesting
lierha	:	releasing water from ponded rice field and then weeding
lieyietieki	:	harvest season
lophie	:	a necklace made from twisted cotton, symbolic of young love
luchü	:	insect larvae that attack alder trees
medo	:	the process of measuring newly-harvested rice, before carrying it back to the village
mego	:	*Albizia stipulata*, a leguminous tree that Khonoma maintains scattered throughout its wet rice terraces
meketho	:	a ritual genna following the Thekranyi festival to ensure that the paddy crop will ripen at the same time
Merhümia	:	one of Khonoma’s three khels
miphubu	:	a combined kitchen and bedroom
mithun	:	*Bos frontalis*, semi-domesticated livestock, usually allowed to roam in the forests
mekhela	:	a woman’s skirt (Assamese)
merü	:	an axe
morung	:	communal dormitories, separated by gender for males or females
moshu	:	pride and competitive spirit in performing better than others
Mvüsa	:	lunar month of July-August
Ngonyi	:	an Angami festival held in April to mark completion of sowing the newly-opened jhum fields
nhalie	:	jhum cultivation
niekrovü	:	breaking up soil lumps while preparing a field for planting
ni-kerei	:	elopement
nuokhrienuo	:	the only sons of wealthy households
panchayat	:	village hall used for village-level meetings
pelhu	:	a plantation of perennial crops
peli	:	a system of communal labor for members of age groups
pejü	:	a shield
peyumia	:	village elders
phesemia	:	the original settlers of a village, who performed the rituals of village settlement
Phesevu	:	ritual for consecrating the founding of a new village
pfü	:	carrying the harvest back to the village
pfüdono	:	cousins, the children of a father’s siblings (see pfünomia)
pfünomia	:	cousins, the children of a mother’s siblings (also known as zonomia)
Pfütsanako	:	followers of traditional Angami religious beliefs
Pfütsana Krotho	:	Angami traditional religion
pfutsano	:	a patrilineage
pieketho	:	a ritual genna following the Thekranyi festival to ensure that the paddy will yield a heavy crop uniformly throughout the fields
rasa	:	the first year of cropping on a swidden plot
rase-o	:	the ritual rainmaker
rhe	:	leveling soil in flooded terraces in preparation for rice transplanting
rie	:	burning the rice straw in winter, in preparation for the first tillage

rohi	:	a liquor distilled from sticky rice, Job's tears and millet
rü pruo	:	alder (*Alnus nepalensis*) (also known as rüpo)
Rüde	:	lunar month of December-January
rüffüno	:	a force of a village's ablest and most experienced warriors, ready for combat
rügu tei	:	supplemental millet planted in jhums on communal land
rüna	:	a village
rünapeyu	:	a council of clan leaders
rüngu	:	a spear
rünyügei	:	"heaven" in the traditional religion of the Angami
rüpu	:	soil from a termite mound
Rüyo	:	lunar month of September-October
sekekhe	:	turning over piles of weeds to assist drying
Sekrenyi	:	the festival of spiritual regeneration and sanctification for the men, celebrated in February (also known as Phousanyi)
seli	:	the swearing of an oath to have told the truth by one party to a dispute
Semomia	:	one of Khonoma's three khels
sepuhi	:	second puddling of rice fields
seü	:	the swearing of oaths to have told the truth by both parties to a dispute
shükhie-u	:	the spirit that controls all wild animals
sigei	:	a crosscut saw
Sütsiekrü	:	a person chosen as the ritual first sower of millet
Süliede	:	the ritual first reaper of millet
tapfü-kerei	:	a simple form of marriage where a bride simply follows her groom home after working in the fields
Teitho	:	also known as the "sky ceremony", this Angami festival was held in September or October to seek divine help in providing favorable weather and protecting the ripening crops from hailstorms and other natural calamities
tekhuhi	:	turning over the soil with a spade
tekhulie	:	irrigated rice terraces
tekhunyie	:	first puddling of rice fields
tekhuse	:	transplanting rice seedlings into terraces
Tekhusekhrü	:	a ritual for the blessing of rice transplantation
tekhwie	:	wet rice terraces
temvüke	:	a ritual genna following the Thekranyi festival in which a pig is slaughtered and distributed
Tenyidie	:	the language of the Angami and closely allied Naga subgroups
Tenyimia	:	the name by which the Angami originally referred to themselves
tenyimiaki	:	houses of traditional Tenyimia design
Terhase	:	an Angami festival held in late July to make peace with the spirit world
Terho	:	deities in traditional Angami religious beliefs (also known as Terhomia)
Terhüliede	:	the festival of reaping paddy
Terhünyi	:	festival of thanksgiving for paddy harvest, celebrated in December
terhürhapfü	:	a man recently wounded in war
thakra nyhü	:	a woman allowing her hair to grow long before marriage
thehou	:	single men's dormitory and daily meeting place
Thekralieyie	:	celebration of the paddy harvest
Thekranyi	:	the festival of youth, involving feasting on large quantities of rice brew and meat in late May or June at the start of paddy transplanting (also known as Kerunyi)
Thekronomia	:	the younger of two divisions in Angami society
thema	:	marriage price

Thenyie	:	lunar month of October-November
thepfü	:	the sub-clan of a thino (khel)
therie	:	the second year of cropping on a jhum plot
thesa	:	a cock presented by a woman to her age group as a bride price
thesü	:	an age group
thesu kru-u	:	the host father of an age group. (also called kikra kru-u)
thesula	:	broadcasting seeds into the rice nursery bed
thesulihi	:	hoeing the field that will be used as a rice nursery
thesuphe	:	uprooting rice seedlings from the nursery
Thevomia	:	the older of two divisions in Angami society, and one of Khonoma's three thino, or khels
thevonyhü	:	a more elaborate form of marriage celebrated by the slaughter of pigs
thevünyhü	:	a simpler form of marriage in which only fowls are slaughtered
Thezukepu	:	rat-chasing ritual performed during Tsünyi festival in August or September
thicatieki	:	off-season
thiguda	:	cutting down the straw after the rice has been harvested
thiphivü	:	pruning dead outer leaves from rice plants in the later stages near harvest
thino	:	the major clan to which a household belongs, commonly known as a 'khel'; also the territory which the major clan occupies in a village
tholi-khwütho	:	a compound word indicating two different children's games; the tholi is a long dried bean (*Entada scandens*) used by girls at play, and the khwütho was a locally made top that boys liked to spin
thukhwemia	:	cattle herders
Tiekede	:	an Angami festival held in late November to mark completion of the crop harvests (also known as Kevakete)
tisotieki	:	dry season
tize	:	permanent gardens
Tsierie	:	lunar month of August-September
tsochü	:	earthworm castings
tsüla	:	the ceremonial headdress of Angami warriors
Tsünyi	:	an Angami festival in which all field paths were cleared and graves were cleaned; it was held in late August or September to mark completion of the millet harvest (also known as Chadanyi)
ujieshose	:	stubbornness or crudeness
Ukepenuopfü	:	the Supreme Goddess in traditional Angami religious beliefs
ukhurino	:	livestock
yami	:	a hornbill feather, earned in war and used by warriors as a head ornament (also known as teyhamei)
zhiecha	:	a large style of dao, designed for heavier cutting
zhiekhwino	:	a sickle
Ziephie	:	lunar month of November-December
Zievo-u	:	a village priest that presided over traditional religious beliefs
zhügwü	:	a fieldknife
zu	:	rice beer

CONVENTIONS

Weights and Measures

cm : centimetre(s)
dbh : diameter at breast height
g : gram(s)
ha : hectare(s)
kg : kilogram(s)
m : meter(s)
m asl : meters above sea level
maund : a unit of weight equal to about 37 kilograms
mensem: once a month – a measure of frequency
mg : milligram(s)
mo : month(s)
pH : scale for acidity or alkalinity (7 is neutral, lower more acid, higher more alkaline)
ppm : parts per million
seer : an Indian weight measure of widely ranging quantity, but officially about 2 pounds
sq m : square meters
tin : a measure of paddy equal to about 13.5 kilograms
tsa : a measure of paddy equal to about 6 kilograms

Currencies

Anna : formerly a coin of India, Pakistan and Bangladesh, equal to one-sixteenth of a rupee
Pice : a former monetary unit in India equal to one-sixty-fourth of a rupee
Rs (or R): rupees

Abbreviations

ave : average
aka : also known as
C : carbon
Ca : calcium
CEC : cation exchange capacity
DTM : digital terrain model
DW : dry weight
ERDAS : Earth Resources Data Analysis System, geospatial imaging software
Fe : iron
GIS : geograpahic information systems
GPS : global positioning system
ICIMOD: International Centre for Integrated Mountain Development
ICRAF : World Agroforestry Centre
IDRC : International Development Research Centre
IFM : indigenous fallow management
IIRR : International Institute for Rural Reconstruction
K : potassium
N : nitrogen
N-fixation: nitrogen fixation

NEPED : Nagaland Environmental Protection and Economic Development project (second phase of project became known as “Nagaland Empowerment for the People through Economic Development”)

OC : organic content

OM : organic matter

P : phosphorus

RSPAS : Research School of Pacific and Asian Studies (at the Australian National University)

SARS : State Agricultural Research Station (Nagaland)

WWII : World War Two

PREFACE

As the immediately following Chapter 1 makes clear, this thesis began life as a study in agronomy, not anthropology. The large village of Khonoma remains the site of one of the most remarkable innovations in 'improved fallow' to be found in the literature on shifting cultivation. Studying it, I soon found that Khonoma was also and more widely famed in other ways. It was the focus of the Nagaland independence movement that arose in the period when India was obtaining its national independence from the British Empire in the 1940s. In the 19th century it was infamous as the origin of repeating raiding and head-taking into the villages and estates of British-controlled Assam, leading the British to mount a military campaign for its conquest in the 1870s, just as the Indian army did again in 1956. Even among the generally recalcitrant Angami Nagas, its people acquired a reputation of being especially proud and aggressive among their neighbors. There was more to explain than just the distinctive intensification of their agricultural system and of one part of it in particular.

Pressure on limited natural resources seemed to be the recurrent key to explanation of what has happened in this village during at least the last two or three hundred years of what, by legendary report, has been a 600-700 year history. In setting out to write a cultural ecology of Khonoma, my guiding hypothesis became that the relatively scant endowment of the Khonoma valley with good irrigable and cultivable land in the altitude band most suitable for use in a mountainous terrain was a constraint that led Khonomans both to intensify their land use practices, and to dominate neighboring and other accessible communities for extraction of tribute and booty. In this, they had a further singular advantage in possession of a very good defensive site not closely threatened by others of comparable strength. When their military power was curbed by the British and they became open to the doctrines of Christianity, they were able to substitute trade for aggressive plunder of weaker neighbours. When their power was more decisively smashed by the Indian army and Khonoma itself was partly destroyed and dispersed, the resulting opening of the economy relieved long-lasting pressures and is now leading to what seem likely to be lasting transformations in society, economy and agriculture alike.

This quite simple theoretical postulate has clear links to Boserup's (1965) arguments, but the Angami Naga situation also has links with another argument. The internal characteristics of Khonoma society, (and that of other Angami villages) without ranking between descent groups or individuals, and without hereditary chieftainship, are in a considerable degree parallel to the *gumlao* communities of the Kachin of northern Burma, of whom those in the Hukawng valley neighbor the Naga to the east. Leach (1954) first described an oscillation between hereditary chieftainship societies with strong stratification between aristocrats, commoners and slaves (the Shan system) and the egalitarian, often virtually republican (*gumlao*) in northern Burma. The actual situation in Kachin society was more widely *gumsa*, an intermediary between these two ideal types (Leach 1954: 9). Leach showed that there were contradictions in the *gumsa* rules which gave senior rank to wife-giving lineages as opposed to wife-taking lineages, on the one hand, and on the other inheritance of chiefly title through ultimogeniture (youngest sons), leaving other sons to shift for themselves, often by settlement in a new area. Both forms of privilege came with obligations, but it often happened that the privileged chiefs came to treat the underprivileged, including aristocrats, as their serf-like tenants. Revolts overturned these chiefs and created societies without inherited rank (*gumlao*) which in turn evolved back into a *gumsa* order over time. Re-analyzing these contradictions from a Marxist perspective, Friedman (1975) put great weight on the deterioration of land under shifting cultivation arguing that shortened cycles due to population growth would trigger both the oppression and the revolts.

Leach (1954: 292) concluded his monograph by drawing attention to the *gumlao*-like characteristic of Angami Naga social organization, which contrasts with the *gumsa*- like organization of some other Naga sub-groups, as this thesis also notes in chapter 4. He therefore queried whether, historically, Naga have gone through the same alternation between hierarchical and egalitarian modes as he found among the Kachin. Some writers, particularly Friedman (1986), have interpreted the Naga evidence to be positive that there has been such an oscillating cycle. Both he and Leach (1983) rejected an alternative interpretation of the patchy 19th century data by Nugent (1982), who found fault with Leach's recognition of *gumlao* in Burma before the 1880s, and instead proposed a political-economy interpretation under which the disruptions of China-Burma trade from the 1850s to the 1880s broke down the conditions under which *gumsa* chiefs could sustain their authority, so that *gumlao* did not appear before the 1880s. Nugent's interpretation also rested heavily on a supposed early adoption of opium as a cash crop in wide areas of upper Burma, not just in Yunnan and on the border as is well attested. Leach reacted very negatively to Nugent's revision, in a heated correspondence that rested more on interpretation of detail than on principle (Leach and Nugent 1983). As this thesis was being completed, the topic has been revisited in the Nagaland context by Bouchery (2007).

Nothing in the ethnohistorical record I encountered in Khonoma suggests that there might have been anything like *gumsa* organization, or revolts, in a remembered past. While the Naga polity was certainly greatly disrupted in the same period as in upper Burma, all available ethnohistoric record suggests that in the Angami villages, though not in all parts of Nagaland, a form similar to *gumlao* has prevailed for centuries. In any case, whatever the applicability of Leach's reasoning may be, there is no likelihood that the Marxist re-interpretation of the Kachin oscillation by Friedman (1975) is applicable. Friedman's highly determinist model relies absolutely on a long-cycle shifting cultivation regime to create periodic shortages of available land to trigger revolt against the gumsa chiefs and precipitate the more egalitarian distribution under gumlao. Intensification of practices as described in this thesis has no place in Friedman's model; it destroys the basis of Friedman's structure of explanation. Nor, incidentally, did my exploration into Khonoma's past uncover any indication that opium became an important cash crop in any part of the last two centuries.

There is therefore no discussion of these contentious issues in the pages that follow, and most certainly I do not wish to enter into the kind of disputation carried on by Leach, Nugent and Friedman. This thesis is almost wholly about Khonoma, in which I spent a total period of almost two years spread over four years, for reasons described in Chapter 1. It relies on observation and measurement, and on information obtained from the Khuwomina, a people who place great value on remembered history, even over so long a period that a good part of it must be classed more as myth than as record. But it is their experience, and their report that is relied upon in the pages that follow.

Sources

Khonoma and the Nagas have a substantial literature, detailed in the bibliography at the end of the thesis. This literature includes a substantial body of colonial records from the 1840s to the 1940s, which provided the main basis for the historical material presented in this thesis. Most of the colonial records were located during archival research at the State Museum in Kohima, and photocopied with the kind assistance of staff there. Additional reports and photographs were accessed from a CD compiled by Dr. Ian Macfarlane and Sarah Harrison at the Department of Social Anthropology, Cambridge University, from materials collected as part of the Cambridge Experimental Videodisc Project on the Nagas of Assam.

Several Khonoma scholars who have gone on to complete higher degrees also based their dissertations on their home village are Punyü, 1995; Sanyü, 1987; and Meyase, S., 1985, 2001. These are particularly valuable because of the authors' intimate knowledge of the village and the reliability of their data. Another valuable record of Khonoma's ritual past was compiled by the Baptist Church as part of its centenary celebrations in 1997 (Terhuja et al., 1997). After the fieldwork in Nagaland was completed, photograph archives at the Oriental and India Office Collections of the British Library in London, and the Photograph and Manuscript Collections of Pitt Rivers Museum in Oxford, were searched for prints that provided glimpses of Khonoma and its people during the years under British administration. These, along with photographs taken by the villagers themselves, are presented in the photograph gallery. Upon the generous invitation of Dr. Macfarlane, a visit was also made to Cambridge University to review materials that he had collected during his own research on the Nagas.

Base maps at both state- and village-levels were digitized in the early stages of the research. I first focused only on Kohima District, the main territory of the

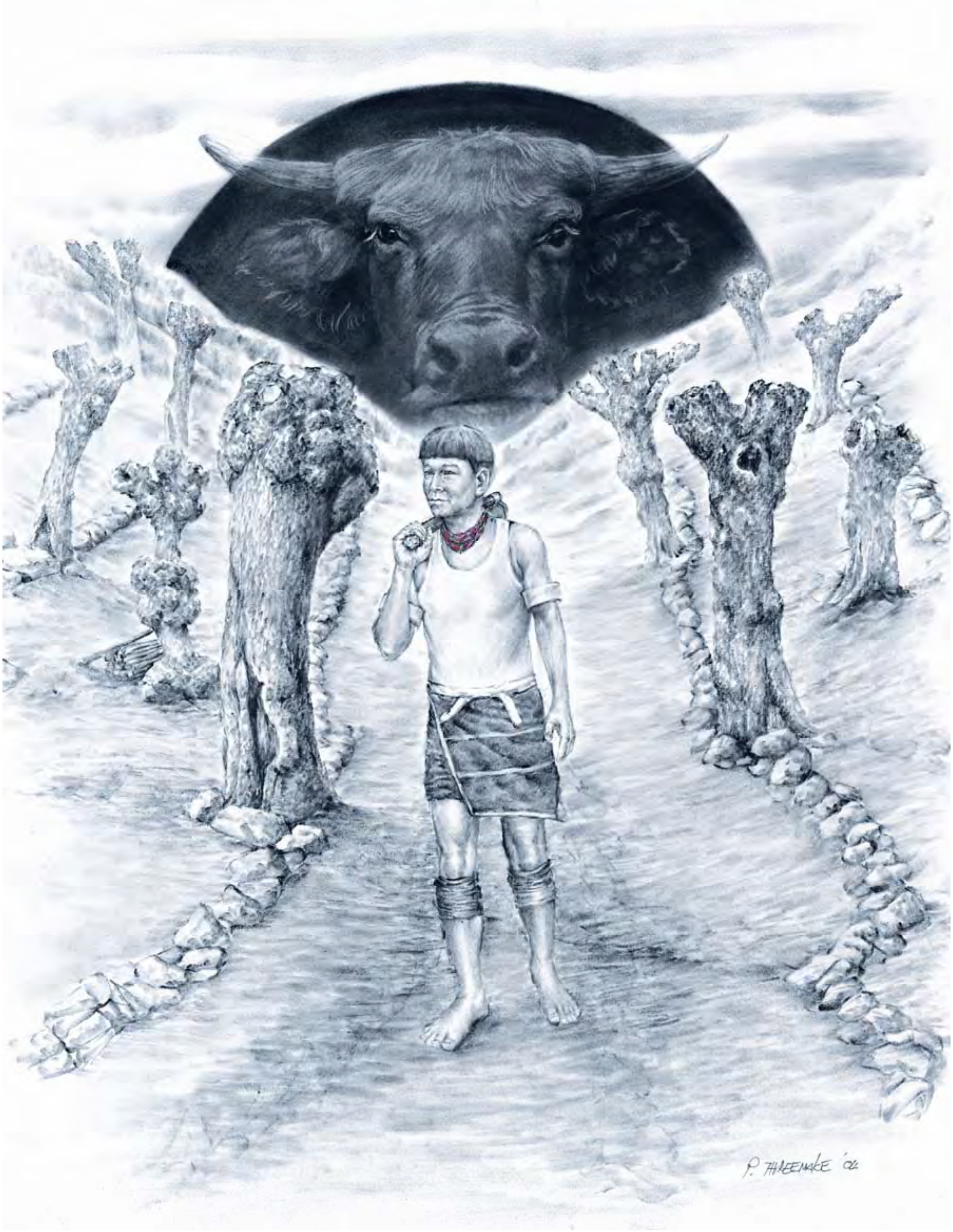
Angami Nagas, although to be more precise, the maps show the area of the old Kohima District, before Dimapur was segregated as a separate district in 1997. According to the newer boundaries, Angami villages are now spread across both districts. Digital elevation models were then generated, and using ArcView, additional data layers were overlaid on the base map to generate thematic maps on Hutton's grouping of the Angami Nagas, migration routes, and current locations of Angami villages.

At the village level, maps were used to examine residential patterns of kinship groups, and how this was related to church membership. While undertaking a census, each household was marked as a waypoint on a GPS, and additional data recorded on its major clan (thino), sub-clan (thepfü), daily meeting place (thehou), patrilineage (pfutsano), and religion. The waypoints were overlaid on the village base map and by then linking with the database, maps were generated for each of the parameters recorded.

Finally, an artist in Chiang Mai, Paradorn Threemake, was contracted to develop line and charcoal sketches to help convey a stronger sense of Khonoma's people and their lives.

CHAPTER 1

Introduction: How the Research Trail Led to the Naga Hills



As the sun rises behind him, an Angami villager threads his way through an alder jhum on his way to his field. The beginning of his day is an appropriate place to begin our exploration of who the alder managers are, their ingenuity in maximizing the benefits of useful trees in their farming systems, and what spurred these innovations.

"Shifting cultivation is not only a backward type of agricultural practice. It is also a backward stage of culture in general. In all respects, it corresponds to the Neolithic period through which humanity passed between the years 13,000 and 3,000 B.C., considering that the substitution of iron tools for polished stone has made no substantial difference in the way of life. … Where man has to deal with a rapid destruction of soil fertility under conditions of denudation for the purpose of cultivating annual crops, and where he possesses no other means of restoring soil fertility than natural green fallow, he lives in too narrow a dependency on the natural order, without being able to take it under his social and technical control." (FAO, 1957)

THE PAN-TROPICAL PROBLEM OF SHIFTING CULTIVATION

That the Food and Agriculture Organization (FAO) felt compelled, half a century ago, to publish the above condemnation of shifting cultivation, or swiddening, is eloquent evidence of how long the practice has been generating official alarm. Shifting cultivation is probably as old as agriculture itself, practiced by our ancestors some 10 to 12 thousand years ago when they took their first tentative steps towards intentional husbandry of useful plants. National governments across the Asia-Pacific region now see it as one of the major causes of tropical deforestation, a primitive and inefficient remnant of the past, and in need of reform. Practitioners are commonly regarded as backward and incapable of adopting better farming methods. The corollary of this rationale is that shifting cultivation is "unscientific", static and unchanging, so official policy has long been focused on finding ways to discourage it and persuade resource-poor farmers to adopt more permanent forms of agriculture. Yet shifting cultivation still supports an estimated 300-500 million people around the world (Brady, 1996), and a large proportion of them comprise the diverse cultural minorities that populate the montane areas of the Asia-Pacific region.

The original impetus for this study came from the strong consensus that a human and environmental tragedy was unfolding in the uplands of Asia-Pacific, where rapidly expanding populations and lost access to large tracts of land are forcing shifting cultivators to shorten fallows and lengthen cropping periods in order to grow sufficient food on less land. The consequences are endemic environmental degradation and deteriorating living standards for groups of people already on the economic, political and geographic fringes of society. This study was part of a wider research initiative that sought solutions to this "swidden degradation syndrome" by looking at success stories where farmers, faced with rising land use pressures, had developed ways to modify their fallow vegetation, allowing them to progressively intensify their land use. The project hoped that lessons learned from these farmer innovations would have extrapolation potential for other areas where shifting cultivation systems were under stress but local solutions to stabilize them had not yet been identified. That the direction of the study gradually evolved to focus on the cultural ecology of just one village is explained later in this chapter.

The relationship between foresters and shifting cultivators has long been characterized by mutual antagonism, deep suspicion, and open conflict. The very terminology is symptomatic of a bad reputation. "Shifting cultivation" emphasizes the movement of cropped fields, and misleadingly suggests not only nomadism, but also that agriculture is periodically imposed on permanent forestlands. The logic appears to be that since these lands are intermittently covered with trees, they should properly fall within the domain of forestry and agriculture should be discouraged. "Slash-and-burn" focuses on the fire phase – only one technique of many used in rotational forest fallows – while "swidden" refers rather vaguely to a burnt clearing. All three terms fail to see shifting cultivation as a system, let alone recognize its values. They all presuppose that these are forest lands, periodically despoiled by forest dwellers.

Rotational shifting cultivation is essentially a system that applies natural vegetative processes as a means of replenishing soil fertility in lieu of either chemical fertilizers or the very intensive techniques needed to manipulate organic matter in chemical-free systems. Both these alternatives are knowledge- and energy-intensive and human-driven, as opposed to the natural processes harnessed by rotational fallowing, and nature is effectively cut out of the game. "Rotational" is an important qualifier in describing shifting cultivation, in that it distinguishes it from the more destructive "pioneering" type that continues cropping until an area is completely exhausted.

A much more favorable assessment of shifting cultivation than the reputation espoused by officialdom has arisen from detailed anthropological studies, starting with Conklin's (1954, 1957) pioneering work in the Philippines. These studies have presented persuasive evidence that it is a rational farming system in the context of the constraints and opportunities inherent in remote upland areas, and have pointed to its long history as evidence of sustainability. Far from being wanton destruction of forests, they have argued that shifting cultivation is a land-use practice that reflects both indigenous knowledge accumulated through centuries of trial-and-error and an intricate balance between product harvest and ecological resilience. It also supports an impressive level of agrodiversity. Recent literature (for example, de Foresta and Michon, 1997) also points to the custodial role often played by shifting cultivation communities in preserving forest ecosystems and natural species.

It is unlikely that these two extremes of opinion will be reconciled in the near future. Most states pursue policies to replace shifting cultivation with “scientific” farming methods, but research and development efforts have a disappointing track record in providing alternatives appropriate to the conditions under which shifting cultivators work. Often, insufficient attention is paid to the tradeoffs that inevitably accompany new technologies. If, for example, farmers are no longer permitted to shift their cropping fields, then many will be forced to rely on chemicals to substitute for the natural regenerative processes performed by the fallow. What are the implications in terms of distribution of costs, benefits and risks? Will farmers accept them or not? If it is forced upon them, will they suffer? Experience has shown that many of the “scientific” agricultural solutions imposed from outside can actually be far more damaging to the environment. Moreover, these external solutions often fail to recognize the extent to which a culture is intimately associated with the sustainability and continuity of its agricultural systems.

Researchers and farmers typically stand on opposite sides of a gaping chasm of cultural, economic and geographic differences, making it difficult to work as collaborative partners and fostering a “top down” approach. In what can only be described as arrogance, researchers have often claimed to know the solutions, if only “backward” shifting cultivators could be educated to abandon their “primitive” ways and adopt them. Interventions have usually focused on the cropping phase, while the fallow has been ignored as a period of “abandonment” in which nothing happens. We are only now beginning to fully realize the fallacy of some of these presumptions.

The Asia-Pacific region’s expansive forests and sparse populations once allowed mountain-dwelling communities to live in relative harmony with their environments (figure 1-1), but the preconditions that underpinned the sustainability of “traditional” forms of shifting cultivation are now rare. They have been lost to dramatically increasing population densities arising from both endogenous growth and in-migration by large numbers of lowlanders, lost access to large tracts of land that have been gazetted as protected wildlands, and other competing land uses.

In the face of increasing land-use pressures, shifting cultivators can no longer afford the luxury of long fallow periods that allow recovery of secondary forest and rejuvenation of exhausted soils. The resulting trends of shortening fallows, lengthening cropping periods, and rapidly degrading environments are endemic throughout the Asia-Pacific region. As weeds proliferate and crop yields plummet, swiddeners earn decreasing returns to labor invested and food security is threatened. Badly degraded fields are often abandoned to *Imperata* grass infestation and farmers move further upslope to clear more forested land and crop the more fertile soils. The transition from sustainable, long-fallow shifting cultivation to increasingly shorter cycles and eventually permanent land use can be seen in the accompanying photograph gallery (plates 1-1 to 1-58).

Figure 1-1. Variations of swidden cultivation continue to be the main land-use system of many ethnic minorities in the uplands of Asia-Pacific.

Exacerbating the problems of upland communities is the fact that many of the consequences of their degrading environments are felt in the lowlands, in changes to water flows in streams and rivers, silting of reservoirs, water quality loss through erosion-sourced contamination, and degraded air quality because of smoke pollution from fires that are deliberately lit to clear swiddens. The lowlands are the seat of a much larger and more influential population, which is either enamored with an inviolable ideal for upland forest preservation or keen to exploit forests for monetary return. This dominant population adheres to a formalized and inflexible system of land ownership, is unable to bridge a stark division between agriculture and forestry, and is largely convinced that upland forest dwellers are neither capable of adopting "acceptable" sedentary agricultural practices nor becoming a part of mainstream society. In human terms, the relevant issue is not whether shifting cultivation should be allowed or prohibited, but how it can be intensified and its output improved in the reality of more mouths to feed from a dwindling land base. The formidable pool of swidden-related literature compiled by Robison and McKean (1992) shows how much research has focused on shifting cultivation since Conklin's ground-breaking work on the Hanunóo. However, despite the large investment in this research, it has been unable to identify solutions widely adoptable by resource-poor farmers. This has led to a shift in research direction, towards building on indigenous practices to achieve intensified production, rather than imposing "outside" solutions that have a high probability of failure.

Redirecting Scientific Attention to Farmer-Developed Solutions

While on assignment for the World Agroforestry Centre (ICRAF) in the mid-1990s, I developed an interest in how shifting cultivators were manipulating fallow vegetation to favor species that they found most useful. At that time I was researching two shrub-based systems – *Tithonia diversifolia* in Mindanao, the Philippines (Cairns et al., 1998) and *Austroeupatorium inulaefolium* in West Sumatra, Indonesia (Cairns, 2007c). Both were cases of fast-growing Asteraceae that farmers had discovered could provide fallow functions in situations where land shortages allowed them to rest their land for only a few years.

While engaged in this work it became clear that, scattered across the region, many other researchers were also looking at farmer-developed technologies for managing their fallowed lands more productively. They held a common concern about the upland communities of Asia-Pacific, the sustainability of their farming systems and their environments, but their work was uncoordinated and isolated; many were unaware of similar or parallel studies being conducted close by, across a border, or at the opposite end of the region. Efforts began in the mid-1990s to bring this group of scattered and disparate workers together and to coordinate regional research into indigenous innovations in fallow management (IFM).

ICRAF organized a workshop entitled "*Indigenous Strategies for Intensification of Shifting Cultivation in Southeast Asia*" in Bogor, Indonesia, in June 1997. It brought together about 120 scientists, practitioners and policy-makers from across the region to review a compelling array of 65 case studies where shifting cultivators, faced with increasing land-use pressures, had developed effective innovations in fallow management that provided economic and ecological benefits, and intensified their land use.

Conceptualizing How Farmers Manage their Swidden Fallows

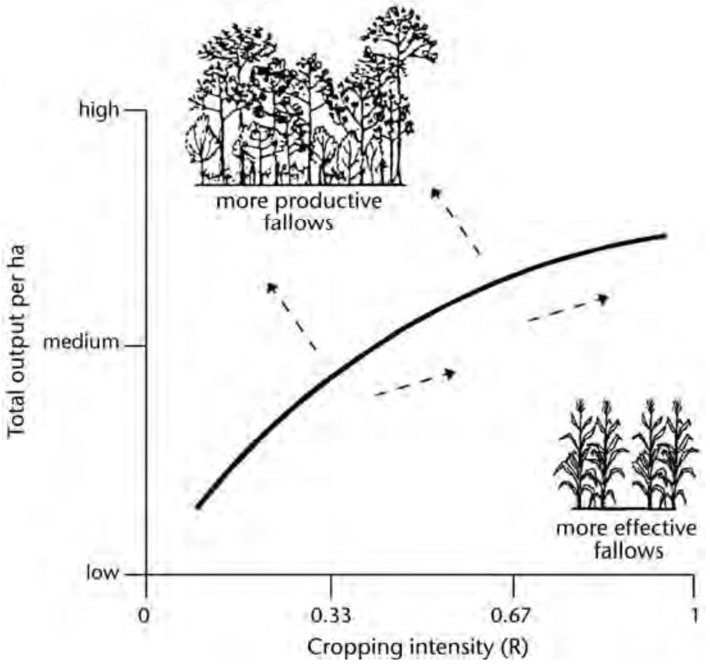
As organization of the ICRAF workshop brought more and more case studies to my attention, it became necessary to develop a conceptual framework for thinking about farmer strategies to impose increased management on their fallowed lands. The scope of the case studies was very wide, from growing viny legumes as dry season fallows lasting just a few months to incremental inclusion of more and more economic perennials into the fallow phase until what was once a swidden field became a long-term complex agroforest. Between these extremes was a broad array of successful farmer-generated strategies.

As illustrated in figure 1-2, farmer approaches to fallow management may generally be classified as innovations to achieve the following:

- <u>more effective fallows</u>, where the biological efficiency of fallow functions is improved and the same or greater benefits can be achieved in a shorter time frame;

- more productive fallows, in which fallow lengths stay the same or actually lengthen as the farmer adds value to the fallow by introducing economic perennial species; and
- combinations of the two, where both biophysical and economic benefits may be accrued (Cairns, 2007b).

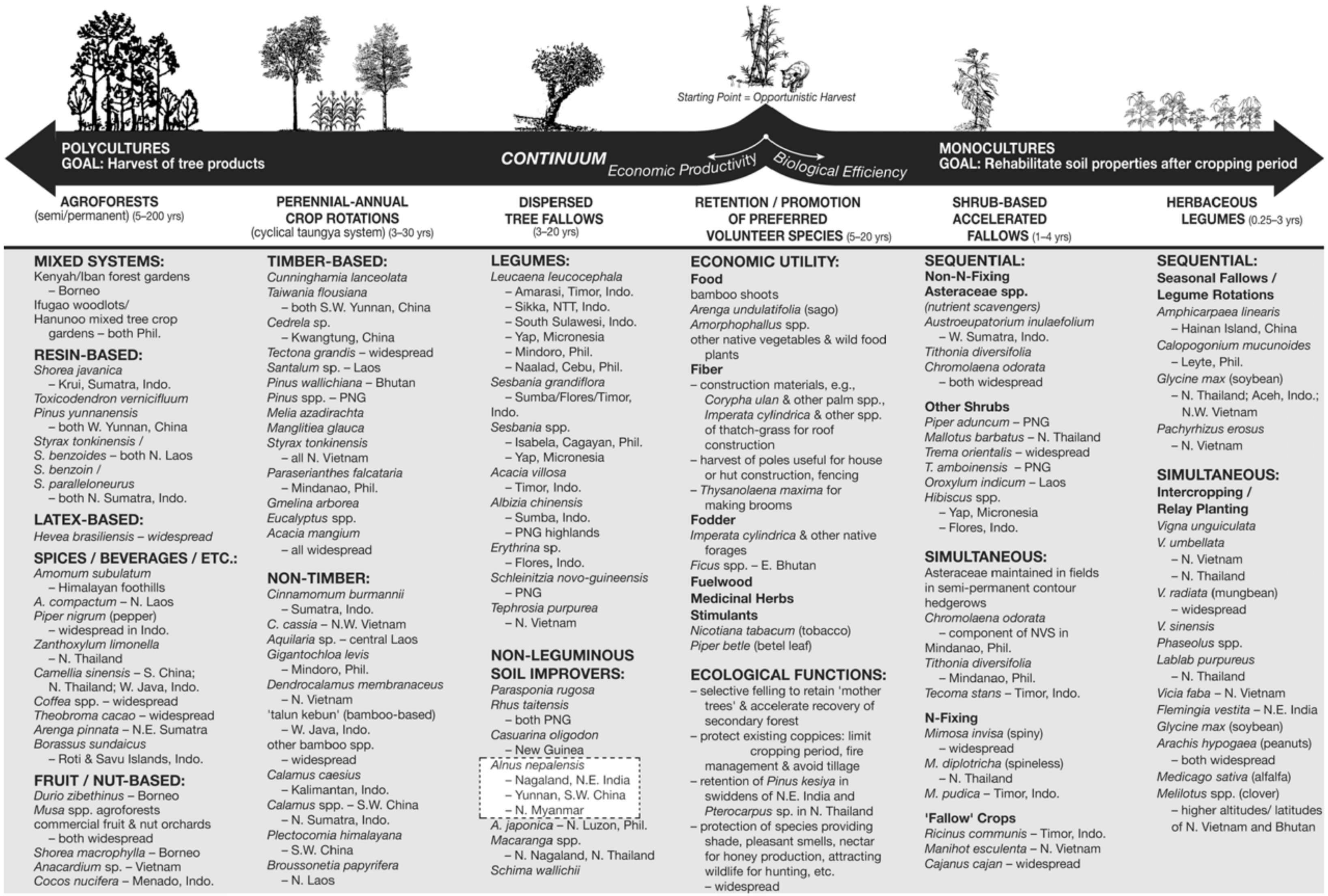
Figure 1-2. Evolution of Intensifying Swidden Systems
(Source: Cairns, 2007b)



The implications for land use of these major pathways toward swidden intensification are obviously profound. More effective or accelerated fallows often provide an intermediate step in a transition to permanent cultivation of annual crops. Alternatively, in more productive fallows, the phase of reopening a swidden and cultivating annuals may eventually be forgone altogether as the farmer chooses to protect valuable perennial vegetation, allowing it to develop into semi-permanent agroforests.

Figure 1-3 attempts to categorize indigenous strategies for fallow management along a continuum of typologies. This continuum provided the framework upon which both the Bogor workshop and its resulting proceedings (Cairns [ed], 2007a) were organized. Although it provides a useful framework for conceptualizing indigenous fallow management strategies, it does not suggest that farmers will necessarily move in a linear direction along the continuum. They may or may not – but the dynamism of factors that shape farmers' land use decisions defy such easy prediction.

Figure 1-3. A Continuum of Typologies of Farmer Innovations to Manage their Swidden Fallows more Productively
(The alder-based systems that became the focus of this study are highlighted by a white background.)
Adapted from Cairns, 2007b



AGROFORESTS
(semi/permanent) (5–200 yrs)

MIXED SYSTEMS:
Kenyah/Iban forest gardens
– Borneo
Ifugao woodlots/
Hanunoo mixed tree crop
gardens – both Phil.

RESIN-BASED:
Shorea javanica
– Krui, Sumatra, Indo.
Toxicodendron vernicifluum
Pinus yunnanensis
– both W. Yunnan, China
Styrax tonkinensis /
S. benzoides – both N. Laos
S. benzoin /
S. paralleloneurus
– both N. Sumatra, Indo.

LATEX-BASED:
Hevea brasiliensis – widespread

SPICES / BEVERAGES / ETC.:
Amomum subulatum
– Himalayan foothills
A. compactum – N. Laos
Piper nigrum (pepper)
– widespread in Indo.
Zanthoxylum limonella
– N. Thailand
Camellia sinensis – S. China;
N. Thailand; W. Java, Indo.
Coffea spp. – widespread
Theobroma cacao – widespread
Arenga pinnata – N.E. Sumatra
Borassus sundaicus
– Roti & Savu Islands, Indo.

FRUIT / NUT-BASED:
Durio zibethinus – Borneo
Musa spp. agroforests
commercial fruit & nut orchards
– both widespread
Shorea macrophylla – Borneo
Anacardium sp. – Vietnam
Cocos nucifera – Menado, Indo.

PERENNIAL-ANNUAL CROP ROTATIONS
(cyclical taungya system) (3–30 yrs)

TIMBER-BASED:
Cunninghamia lanceolata
Taiwania flousiana
– both S.W. Yunnan, China
Cedrela sp.
– Kwangtung, China
Tectona grandis – widespread
Santalum sp. – Laos
Pinus wallichiana – Bhutan
Pinus spp. – PNG
Melia azadirachta
Manglitiea glauca
Styrax tonkinensis
– all N. Vietnam
Paraserianthes falcataria
– Mindanao, Phil.
Gmelina arborea
Eucalyptus spp.
Acacia mangium
– all widespread

NON-TIMBER:
Cinnamomum burmannii
– Sumatra, Indo.
C. cassia – N.W. Vietnam
Aquilaria sp. – central Laos
Gigantochloa levis
– Mindoro, Phil.
Dendrocalamus membranaceus
– N. Vietnam
'talun kebun' (bamboo-based)
– W. Java, Indo.
other bamboo spp.
– widespread
Calamus caesius
– Kalimantan, Indo.
Calamus spp. – S.W. China
– N. Sumatra, Indo.
Plectocomia himalayana
– S.W. China
Broussonetia papyrifera
– N. Laos

DISPERSED TREE FALLOWS
(3–20 yrs)

LEGUMES:
Leucaena leucocephala
– Amarasi, Timor, Indo.
– Sikka, NTT, Indo.
– South Sulawesi, Indo.
– Yap, Micronesia
– Mindoro, Phil.
– Naalad, Cebu, Phil.
Sesbania grandiflora
– Sumba/Flores/Timor,
Indo.
Sesbania spp.
– Isabela, Cagayan, Phil.
– Yap, Micronesia
Acacia villosa
– Timor, Indo.
Albizia chinensis
– Sumba, Indo.
– PNG highlands
Erythrina sp.
– Flores, Indo.
Schleinitzia novo-guineensis
– PNG
Tephrosia purpurea
– N. Vietnam

NON-LEGUMINOUS SOIL IMPROVERS:
Parasponia rugosa
Rhus taitensis
– both PNG
Casuarina oligodon
– New Guinea
Alnus nepalensis
– Nagaland, N.E. India
– Yunnan, S.W. China
– N. Myanmar
A. japonica – N. Luzon, Phil.
Macaranga spp.
– N. Nagaland, N. Thailand
Schima wallichii

RETENTION / PROMOTION OF PREFERRED VOLUNTEER SPECIES (5–20 yrs)

ECONOMIC UTILITY:
Food
bamboo shoots
Arenga undulatifolia (sago)
Amorphophallus spp.
other native vegetables & wild food plants
Fiber
– construction materials, e.g., *Corypha ulan* & other palm spp., *Imperata cylindrica* & other spp. of thatch-grass for roof construction
– harvest of poles useful for house or hut construction, fencing
– *Thysanolaena maxima* for making brooms
Fodder
Imperata cylindrica & other native forages
Ficus spp. – E. Bhutan
Fuelwood
Medicinal Herbs
Stimulants
Nicotiana tabacum (tobacco)
Piper betle (betel leaf)

ECOLOGICAL FUNCTIONS:
– selective felling to retain 'mother trees' & accelerate recovery of secondary forest
– protect existing coppices: limit cropping period, fire management & avoid tillage
– retention of *Pinus kesiya* in swiddens of N.E. India and *Pterocarpus* sp. in N. Thailand
– protection of species providing shade, pleasant smells, nectar for honey production, attracting wildlife for hunting, etc.
– widespread

SHRUB-BASED ACCELERATED FALLOWS (1–4 yrs)

SEQUENTIAL:
Non-N-Fixing
Asteraceae spp.
(nutrient scavengers)
Austroeupatorium inulaefolium
– W. Sumatra, Indo.
Tithonia diversifolia
Chromolaena odorata
– both widespread

Other Shrubs
Piper aduncum – PNG
Mallotus barbatus – N. Thailand
Trema orientalis – widespread
T. amboinensis – PNG
Oroxylum indicum – Laos
Hibiscus spp.
– Yap, Micronesia
– Flores, Indo.

SIMULTANEOUS:
Asteraceae maintained in fields in semi-permanent contour hedgerows
Chromolaena odorata
– component of NVS in Mindanao, Phil.
Tithonia diversifolia
– Mindanao, Phil.
Tecoma stans – Timor, Indo.

N-Fixing
Mimosa invisa (spiny)
– widespread
M. diplotricha (spineless)
– N. Thailand
M. pudica – Timor, Indo.

'Fallow' Crops
Ricinus communis – Timor, Indo.
Manihot esculenta – N. Vietnam
Cajanus cajan – widespread

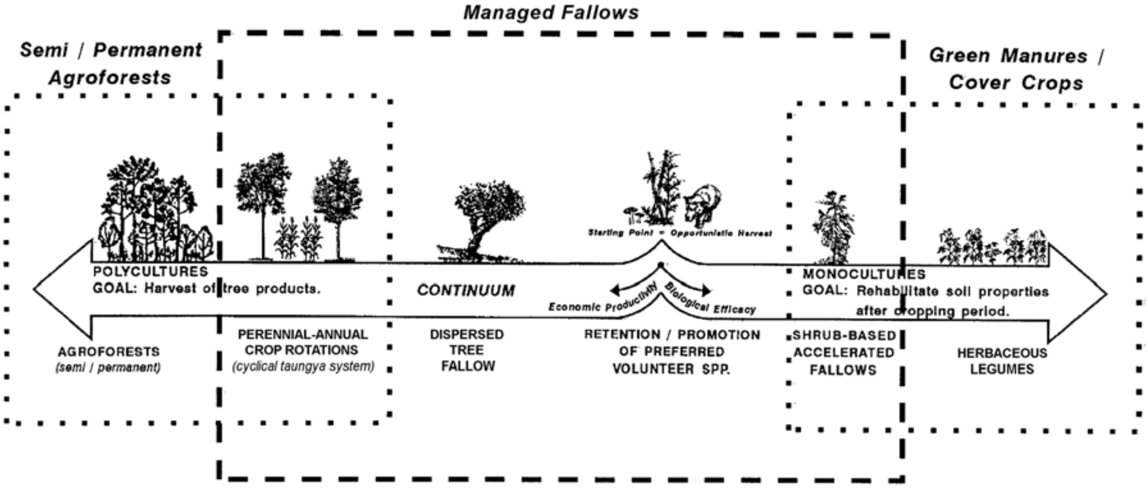
HERBACEOUS LEGUMES (0.25–3 yrs)

SEQUENTIAL:
Seasonal Fallows / Legume Rotations
Amphicarpaea linearis
– Hainan Island, China
Calopogonium mucunoides
– Leyte, Phil.
Glycine max (soybean)
– N. Thailand; Aceh, Indo.;
N.W. Vietnam
Pachyrhizus erosus
– N. Vietnam

SIMULTANEOUS:
Intercropping / Relay Planting
Vigna unguiculata
V. umbellata
– N. Vietnam
– N. Thailand
V. radiata (mungbean)
– widespread
V. sinensis
Phaseolus spp.
Lablab purpureus
– N. Thailand
Vicia faba – N. Vietnam
Flemingia vestita – N.E. India
Glycine max (soybean)
Arachis hypogaea (peanuts)
– both widespread
Medicago sativa (alfalfa)
Melilotus spp. (clover)
– higher altitudes/ latitudes
of N. Vietnam and Bhutan

Many might justifiably argue that the continuum extends far beyond any reasonable definition of shifting cultivation - and that the emphasis on trees in systems on the left pole places them squarely within the domain of semi-permanent agroforests, while the frequency of cultivation on the right pole should be classified as semi-permanent cultivation, with green manures or cover crops used to substitute for the ecological services formerly provided by a fallow (figure 1-4). In both cases, land management has arguably intensified beyond "shifting cultivation" and by extension, "fallow management" is then no longer the appropriate term to describe farmers' modification of the vegetation[1].

Figure 1-4. Suggested Subdivision of Continuum into More Narrowly-Defined Categories



The salient point is that in creating the continuum we were trying to understand the array of farmer-generated solutions that had successfully permitted an intensification of shifting cultivation in the face of increasing land-use pressures. It does not suggest a need to redefine terms that are fundamental to this discussion, such as “shifting cultivation”, “fallow” and “fallow management”. Indeed, wide interpretation of these terms makes it debatable where vertical lines should be drawn through each side of the continuum to indicate the points at which a “managed fallow” becomes a crop and, by extension, when “shifting cultivation” has intensified into permanent land use. That debate is left to others. The fact remains that the innovations listed under the continuum, and discussed at the Bogor workshop, are all farmer-developed and farmer-tested strategies that assist in the sustainable intensification of shifting cultivation systems, regardless of what they are called. They are essentially a collection of success-stories, initiated by farmers using knowledge gleaned from generations of closeness to the soil and an intimate knowledge of their environment.

The impressive array of case studies reviewed at Bogor showed that these fallow management systems did not occur in only one place, but that variations

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[1] See Cairns 2007b for a more detailed regional overview of how shifting cultivation can evolve into other types of land use as farmers begin to manipulate fallow vegetation.

could be found across the Asia-Pacific region – independently discovered by farmers. This resolutely shattered any illusion that shifting cultivators were static, or incapable of change. The concepts underlying many of their innovations obviously had wide applicability. Not only did they deserve scientific attention, but they also needed to be shared with the wider community of shifting cultivators still searching for ways to cope with rising land-use pressures and market economies.

While encouraging a more farmer-focused and participatory approach to identifying solutions to swidden degradation, the workshop also sought to empower shifting cultivators by validating in the eyes of government policymakers the potential of indigenous knowledge and innovations to manage fallow land in more productive ways.

Focus on the Promise of Dispersed Tree Systems

Among the more promising approaches that fell squarely within the realm of fallow management were "dispersed tree fallows" (see figure 1-3) that introduced soil-building trees into swidden lands, either sequentially or simultaneously, to both accelerate fallow functions and to provide useful products. This typology alone encompassed a broad collection of intensification practices across the Asia-Pacific region. One of the most widely-used species was *Leucaena leucocephala.*[2] Other tree species being used by farmers included *Sesbania grandiflora* (Kieft, 2007) and *Casuarina oligidon* (Thiagalingam and Famy, 1981; Ataia, 1983; Askin et al., 1990; Bino and Kanua, 1996; Bourke, 2007).

The Emergence of Alder as a Useful Fallow Management Species

Within the "dispersed tree fallows" category, several case studies from the Eastern Himalayas drew attention to the promise of *Alnus nepalensis* D. Don, commonly known as Nepalese alder, as a promising fallow species (Cairns et al., 2007; Guo et al, 2007; Sharma, 2007). Scientists from Nagaland, in Northeastern India, who attended the workshop, presented details of an alder-based fallow management system in what turned out to be a highlight of the Bogor meetings.

The system described by the Naga presenters incorporated alder into what they called their "jhums" – a term used throughout Northeast India for swiddens and consequently used throughout this dissertation. However, unlike other systems using alder as a fallow species, these trees were ancient; some were claimed to be more than 150 years old. When opening a jhum field for cultivation, the farmers would pollard the alders down to bare, gnarled stumps fairly regularly spaced

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[2] For analysis of the "Amarasi system" in Timor, Indonesia, see Metzner, 1981, 1983; Jones, 1983; Piggin and Parera, 1985; Field, 1991a, 1991b; Field and Yasin, 1991; Surata, 1993; Yuksel, 1998; and Piggin, 2007. The "Naalad system" in Cebu, Philippines, is discussed by Eslava, 1984; Subere et al., 1985; Kung'u, 1993; Lasco and Suson, 1997; and Lasco, 2007. A comparable *L. leucocephala*-based practice in Sulawesi, Indonesia, is described by Agus, 2007 and in Mindoro, the Philippines by MacDicken, 1990a, 1990b, 1991 and 2007.

throughout their neatly-terraced jhums. After pollarding, the stumps would coppice again vigorously. At the middle of the first cropping year, and then again at its end, these coppices were pruned back to a small collection of the strongest. These were allowed to develop further as the second year of cropping took place at the feet of the ancient stumps. After the second year's crops were harvested, farmers turned their livestock onto the crop residues and the jhums returned to fallow. The rapidly-growing coppices soon formed a closed canopy, beneath which weeds were suppressed. The alders, which are non-leguminous nitrogen-fixers, rejuvenated the soil over as little as a two-year fallow, with the aid of copious litterfall. Then, as the jhum field was re-opened, the coppices were lopped again, providing a generous crop of firewood.

I was already familiar with farmer management of *Alnus nepalensis* in Nagaland through periodic consultancies for the Canadian-supported "Nagaland Empowerment for the People through Economic Development" project (NEPED). The project's primary objective was to stabilize swiddening and earn other economic and environmental benefits by encouraging farmers to plant fast-growing economic trees in their swidden fields as "fallow crops" (for timber, spices, aromatic woods, herbal medicines, etc.). These could then be harvested after 8-12 years when the "fallow" was reopened for arable cropping. This concept was inspired by the local use of *A. nepalensis* as described above. It stood out as a compelling example of an indigenous innovation that had defied the global trend of collapsing swidden systems. The manipulation of *A. nepalensis* had, in fact, permitted some of Nagaland's Angami farmers to intensify swiddening into a cycle of two years of cropping and two years of fallow, with a total cycle length of four years – a remarkably intense 1:1 ratio of cropping to fallow periods. Yet, other than manure deposited by livestock grazing crop residues, no external inputs were applied in the system and crop yields were reported to be as high as at any time within memory.

Implications for the Wider Community of Shifting Cultivators

Not only did the Nagas' system of managing alder defy global trends, it also appeared to refute commonly-held beliefs about upland communities and their swiddening. Accounts of shifting cultivation invariably conclude with a warning that, whatever its problems, it will not easily be suppressed. The rationale suggests that since it is an age-old practice integral to the cultural fabric of its practitioners, the leap from shifting cultivation to sedentary agricultural systems is too wide to be attempted successfully. But is this necessarily true – or have we simply failed to identify the correct "bridges" to assist farmers in moving towards a sustainable intensification of land use? The case of *A. nepalensis* fallow management in Nagaland suggested that the gap between shifting cultivation and permanent land use may not be as insurmountable as usually assumed, and some farmers were bridging it effortlessly. It thus offered an instructive case study that could provide both technical insights and policy implications useful for other areas where shifting cultivation is under pressure to intensify.

Furthermore, other ethnic groups in northern Burma and southwestern Yunnan had also developed their own fallow management practices based on the same alder species. The fact that isolated and disparate swidden communities had independently developed deliberate practices to integrate *A. nepalensis* into fallows implied both wide farmer consensus on the value of alder and that its use in managed fallows was not overly site-specific.

Although the intricate system of *Alnus* management had evolved in isolated pockets in Nagaland, it seemed to be of much wider scientific significance to the entire Himalayan foothills, where *A. nepalensis* is an endemic pioneer species. If proven to offer significant benefits, *Alnus* fallow technologies could potentially be disseminated across the Eastern Himalayan ecoregion where swidden systems are under pressure to intensify.

The implications were even wider than this. *Alnus* is a large genus spanning tropical and temperate latitudes. Anecdotal evidence from northern Luzon, the Philippines, reported that some farmer innovators there had begun experimenting with the introduction of *Alnus japonica* as a preferred fallow species, presumably based on observations of tree-crop-soil interactions (Anonymous, 1997a; Rice, 2003). The simultaneous existence of *Alnus*-based fallow management technologies on the Asian mainland, honed through centuries of farmer experimentation, while other swiddeners on the Philippine archipelago were in the most rudimentary stages of conceptualizing a means to harness its agronomic benefits as an improved fallow not only reinforced scientific interest in the genus, but also pointed to exciting potential for farmer-to-farmer transfers of indigenous technologies enabling a stabilization of declining swidden systems.

The intriguing agronomic properties of the *Alnus* genus had also captured the attention of ICRAF researchers in Africa (ICRAF, 1993; Okorio et al., 1994). In the highlands of Uganda, *A. acuminata* was being evaluated in a hypothesized management system that bore striking similarities to the indigenous system long ago developed by Naga swidden cultivators:

> “*Alnus* is therefore being evaluated - along with *Calliandra calothyrsus* - for its ability to restore fertility on the upper portions of terraces, many of which have become depleted as topsoil has moved down the slope. The idea is to plant the trees as rotational woodlot fallows on the degraded upper terraces. Both species coppice well, and poles or firewood can be harvested after the fallow. The coppiced trees can then be left in the soil and managed to reduce competition while a crop is growing around them. Once the fallow effect diminishes, and crop yields start to decrease, the woodlot can be allowed to regenerate naturally, either by leaving one coppice sprout for poles or many for firewood production. (ICRAF, 1996)

There was therefore a considerable weight of evidence pointing to the usefulness of the *Alnus* genus in agroforestry systems, including managed fallows. Although virtually no research had been done on Nagaland's system of managing alders dispersed throughout its jhum fields, the little descriptive information that was available suggested that something very unusual was happening there. The Nagas' innovations had been hidden from scientific scrutiny by the area's geographic isolation and half a century of warfare that had kept it closed to outsiders. But if the anecdotal evidence was correct and the alder jhums worked as well as reported, then it appeared that the Nagas had something very exciting to teach us. They appeared to have found a way of building on the strengths of shifting cultivation and improving it, offering an exciting alternative to the usual outside interventions that sought to replace shifting cultivation with something else. This was how the research trail led to the Naga Hills.

A FOCUS ON NAGALAND

Nagaland is a mountainous, heavily forested state on the northeastern fringe of India (25°6'-27°4' N, 93°20'- 95°15' E). It is bordered by Assam on the west and north, Manipur on the south, Arunachal Pradesh on the northeast, and shares an international border with Burma on the east (map 1-1). With a total area of 16,579 km^2, it is one of India's smallest states. It is part of the secluded frontier where South Asia merges with Southeast Asia, and is thus an area of transition and diversity. Anthropologically, it is best known from von Fürer-Haimendorf's writing about the Konyak Nagas (1962 [first published in 1939]; 1976), and just across the Patkoi Mountain Range, Leach's work on the Kachin in northern Burma (1954)).

It is the ancestral homeland of 16 major tribal groups of Mongoloid stock, known collectively as Nagas, each with their own distinctive culture and mutually unintelligible dialect of the Sino-Tibetan language family. A pidgin form of Assamese called "Nagamese" is spoken as the *lingua franca* between the Naga subgroups. They were renowned chiefly as warriors and headhunters, and fiercely resisted British penetration into their territory in the 19th century. Work by American Baptist missionaries, beginning in the mid-1800s, contributed greatly to the pacification of the Naga Hills and today, the large majority are Christian.

The land is of sharp relief, with hills cultivated to over 2000 m asl, interspersed with valleys and a fringe of foothill plains. This variability of terrain supports a rich biological diversity that is currently threatened by rapid deforestation. The climate is monsoonal, with an average of 1755 mm of rain falling in the state capital of Kohima between April and November.[3]

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[3] Based on 1980-2000 records of the Directorate of Soil and Water Conservation, Kohima, Nagaland.

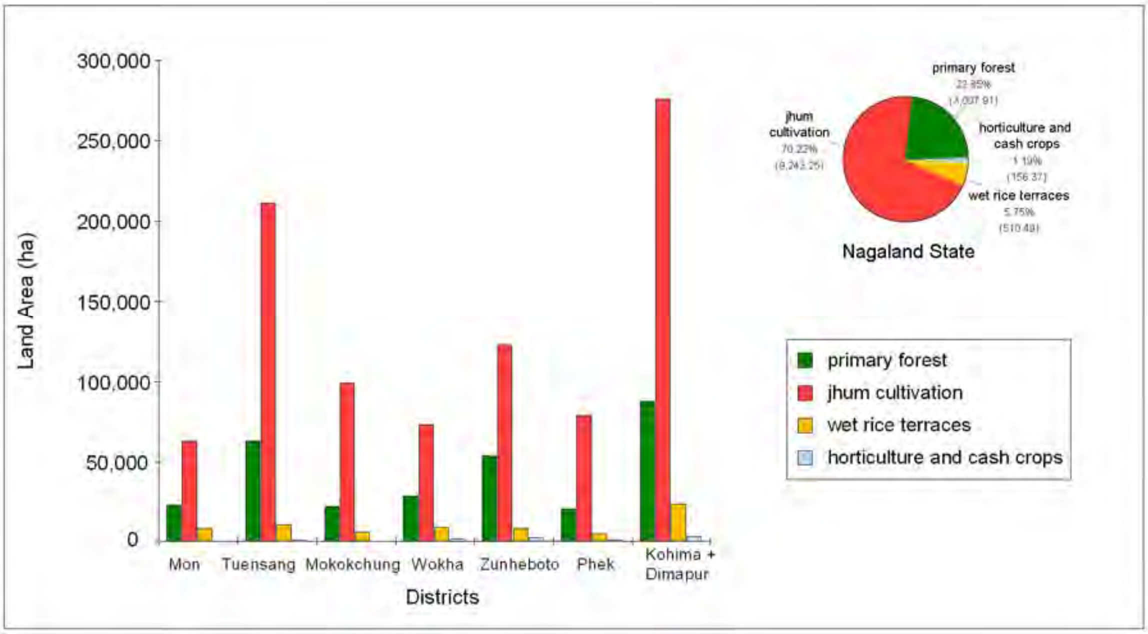
Map 1-1. The Nagaland Study Site, at the Interface between Northeast India and Mainland Montane Southeast Asia
(See appendices 1-1 to 1-19 for numerous thematic maps.)

Diversity and isolation do not always contribute to political stability however, and Nagaland has been in turmoil and cut off from the outside world for much of the time since India gained independence in 1947. Today, it clings to a fragile peace and market forces are rapidly reshaping its previous subsistence economy. The 2001 census found a population of 1,988,636; this was a staggering 64.41% increase over the previous ten years, making it the fastest-growing state in India (Ao, M., 2002).

A remarkable 88.3% of Nagaland's forests are owned by individuals or communities. This is in sharp contrast to India as a whole, in which 90% of forest lands are state-owned. Despite recent growth of off-farm sectors, agriculture remains the backbone of Nagaland's economy and engages about 80% of its work force. Although the Angami and Chakhesang Nagas developed extensive rice terraces, shifting cultivation is by far the dominant land use across the state (figure

1-5).[4] An estimated 7200 km^2, about 45% of Nagaland's total area, comes under shifting cultivation (Husain, 1988, 115) [5]. This amounts to roughly 750 km^2 that are cleared annually, cropped for usually two years, and then allowed to lapse back into fallow.[6]

Figure 1-5. Primary Land-Uses in Nagaland: Breakdown by District
(See also appendices 1-15 and 1-16.) (The study site is in Kohima district, shown here combined with Dimapur.) Source: Kikon et al., 2002



The abundant land and low population densities that formerly underpinned the sustainability of jhum cultivation in the Naga Hills are fast disappearing (Nakro, 2001). Fallow periods are being shortened to the point where their intended ecological functions can no longer be achieved before the land is again cultivated, causing yields to decline over time. Food security is threatened and farmers struggle to bring more forest land under cultivation to feed themselves. This accelerates deforestation and threatens Nagaland's remaining biodiversity. Already, seasonal water shortages are becoming more of a problem, blamed on the loss of forests and their hydrological functions in upper watersheds. The Indian Council for Agricultural Research estimates rates of soil erosion of 40.9 tonnes per ha from shifting cultivation on steep slopes in Northeastern India (ICAR, 1983). We thus have serious degradation of soil, water and forest resources, with shifting cultivation at its nexus.

Although widespread across much of Asia-Pacific, the implications of the swidden degradation syndrome are magnified in Nagaland by virtue of its sheer

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[4] See also appendices 1-15 and 1-16.

[5] There has been no careful analysis of land use in Nagaland, however, and figures cited by different sources can vary significantly. Data from a 2002 Department of Agriculture report (Kikon et al.), for example, show Nagaland to have 924,325 ha of jhum land, which amounts to 55.7% of its total land area (presented as graphs in appendices 1-15 and 1-16).

[6] A more detailed picture of Nagaland's geography can be found in appendices 1-1 to 1-19.

prevalence in the landscape. It is not a new problem to Nagaland. Stracey (1963, 712), then Director of Forests for Nagaland, termed it a “vicious cycle” in describing the phenomenon over 40 years ago.

Khonoma Village: The Main Study Site

Within this landscape of stressed shifting cultivation, the dispersed alder system stood out as unusual in terms of the dramatic intensification of land use it had permitted. It was seen at its best in the jhum fields of a village called Khonoma, in the territory of the Angami, one of the largest and historically most warlike of the Naga subgroups. Khonoma was therefore the natural choice as the main site for this study.

The village is about 20 km to the west of the state capital, Kohima, placing it in the extreme west of Angami territory. For much of its history, Khonoma was militarily dominant in the Naga Hills. It thus owed much to its highly defensible position perched on a spur descending from the Barail Range, with a backdrop of majestic cliffs. One can speculate that its founders were also attracted to its plentiful streams, fertile soil and scope for cultivation. At 1550 m asl, it had a cool bracing climate and could expect about 1300 mm of rainfall well distributed throughout the year, with a dry season from November to January. As they began to clear fields from the forest, the village’s founders would also have been attracted by the abundance of stones for construction and proliferation of the soil-building alder tree.

Oral history dates the village’s founding as occurring six to seven hundred years ago. Khonoma is said to have grown to over 700 households prior to the arrival of the British. Today, with a population of 2,180 spread over 391 houses (author’s census), Khonoma is only a shadow of its former splendor. Many houses stand empty, their owners having moved away.

A nearby Angami village, Tsiesema, which does not manage alder like its Khonoma neighbors, was included as a secondary study site to provide insights into the relative advantages of jhum cultivation with and without alder, and farmer rationale in deciding whether or not to manage it in their jhum fields. The research set out to understand the reasons underlying farmers’ practices, so parallel studies were carried out in both villages. As the study evolved to focus increasingly on the cultural ecology of Khonoma, most of the Tsiesema results were relegated to the appendices, as noted in each chapter. However, they are used substantially in chapters 7 and 8, where they provide useful comparisons with the Khonoma data.

Although the research set out with a clear focus on Khonoma’s use of soil-building trees in its agricultural systems and the reasons behind these innovations, it gradually widened to consider the more holistic picture of its people and how they were interacting with their environment. The focus on alder remained and, in fact, became more significant, because the development of intensive alder management helped to explain how Khonoma became so dominant, but – especially after I gained a scholarship in the Department of Anthropology in the Australian National University's Research School of Pacific and Asian Studies – the research inevitably evolved into a study of the village's cultural ecology.

Like the other major tribal groups of Nagaland, the Angami are thought to be of Mongoloid stock. Their dialect falls within the Tibeto-Burman subfamily of languages. However, they never had a written script and their early history is shrouded in uncertainty. Their territory currently extends north from Manipur and occupies the southeastern part of Nagaland's Kohima District. Up to the turn of the 20th century, the Naga Hills was a place of shocking brutality and violence, arising from incessant warfare between villages and the widespread practice of headhunting. Even by prevailing standards of violence at that time, the Angami were considered to carry hostilities to excess. However, despite their warlike reputation, theirs was essentially an agricultural society and their chief concern was the prosperity of their crops and the fullness of their granaries. First and foremost, they were – and still are – wet rice cultivators. Hutton's 1921 treatise (1969 Reprint), which built on the earlier work of Mills (1854), Butler (1875a), Davis (1891a), Johnstone (1896 [1971 Reprint]) and other British predecessors, still remains the benchmark anthropological text on the Angami.

As the most powerful and warlike of all the Angami villages, Khonoma has often taken centre stage in the annals of the Naga Hills. At one time, smaller villages over wide distances were obliged to secure their safety by paying annual tributes of cloth, fowl, cows and pigs to their Khonoma overlords (Hutton 1969). After the British defeated Burmese invaders and took control of Assam in 1826, Khonoma led many murderous raids on the lowlands, eventually forcing *Pax Britannia* to also subjugate the Naga Hills (Allen, 1981). And when a newly independent India tried to assert its authority on the Nagas in 1956, it was Khonoma that gave birth to the Naga National Council and led the struggle for Naga independence. Khonoma has thus long been known as a centre of political activities and fierce resistance to outside invaders.

Although large by Naga standards, much of Khonoma's 104.4 km^2 territory is extremely rugged and unsuitable for agriculture. Cultivation is therefore generally limited to the sub-catchment area immediately surrounding the village, covering about 30.5 km^2. By the time the British began making inroads into the Naga Hills in the second half of the 19th century, Khonoma was already being described as desperately short of agricultural land (Allen, 1981. 80-81). Therefore, the land use pressures now being felt by the rest of Nagaland were felt much earlier and more acutely in Khonoma. In that sense, it probably had a couple of hundred years' head start in innovating ways to intensify land use, and this is vital to understanding why its ancestors developed such an intricate system for managing alder in their jhum fields.

Visitors to Khonoma's remarkable swidden landscape are invariably impressed, but often leave with more questions than answers. If this fallow management innovation really provides tangible benefits, then why has it not been replicated by neighboring villages? To add to the puzzle, a parallel set of questions arises from Khonoma's wet rice terraces, where another N-fixing tree, *Albizia stipulata*, is similarly managed. What was it about this village that led it to be so innovative in integrating soil-building trees into its farming systems? Was this a site-specific anthropological curiosity with no relevance elsewhere? Or did it offer valuable lessons for other areas where shifting cultivators had been less successful in intensifying their land use? I felt compelled to undertake an anthropological study to uncover the answers to these questions, and to learn the rationale and views of the farmers who were successfully practicing Khonoma's managed-fallow system.

Research Constraints

The research in Nagaland was constrained by a number of problems. The most serious of these was its status as a restricted state, which meant that a continuous long-term presence was not possible. Rather, the research had to be built around repeated short-term visits, each approximately a month or two in length. These broken periods totaled slightly over 12 months of intensive fieldwork over three years. The time and budget needed to continually travel between the Nagaland field site and my institutional base at ICRAF's office in Chiang Mai, Thailand, added greatly to the cost of the research.

Since Nagaland had been at war, or in varying states of turmoil, since the departure of the British in 1947, little research had been done in the area and even the most basic of secondary data were often unavailable or unreliable. This scarcity of reliable information even extended to maps. Since the state was considered a highly sensitive area and border disputes were common, a map easily became a highly political document.

The genesis of the problem lay in a separatist struggle that had been waged almost since India's independence. Gandhi had promised Nagaland the right to choose its future after British departure from India – a commitment that was not honored after his assassination. Since it lay in a sensitive area near India's border with China, Nagaland became a pawn in the struggle between the two giants; China encouraging the rebellion by providing the Nagas with military training and arms, and India responding by flooding the small state with troops. Post-independence has been a period characterized by ongoing military operations, punctuated by ceasefires. Western missionaries were expelled in the early 1950s, accused of fomenting the

Nagas into revolt. A cloak of secrecy was then thrown over Nagaland. It was declared a restricted state and outsiders were required to apply for special restricted area permits for entry and movement within the state.

Beyond the practical difficulties of access to the field, I felt constrained to avoid issues that could be construed as politically sensitive, such as Nagaland's relationship with post-independence India. To do otherwise would have jeopardized continued access to the state. For the survival of the work, it was also necessary to distance myself from activist groups protesting human rights and political issues.

My day-to-day activities in the field were subject to the peace and security situation. There were times when visits to certain parts of the state – and even to Khonoma itself – were inadvisable and my schedule had to be rearranged accordingly. To overcome these constraints, the fieldwork had to draw on a variety of methods to complement the on-the-ground ethnographic component in Khonoma.

A final problem worth noting, given its defining influence on Khonoma's cultural ecology, was the difficulty of tracing history in the pre-1840 era. Very few outsiders – who otherwise might have recorded what they had seen – ventured into the hostile Naga Hills in the early pre-British period, and the Nagas themselves had no written script. The lack of written material or archaeology forced a heavy reliance on oral history, with all its attendant problems. The evolutionary discussion on the pre-1840 period reflects an interpretation by Khonoma's people's of how things came about, and this is very far from certain. The following chapters provide numerous examples of favorable stories being perpetuated, while the story-tellers conveniently forget others.[7]

OVERVIEW OF METHODS

This study focused on the cultural ecology of an historical Angami village, Khonoma, with Tsiesema as a secondary site. Parallel fieldwork was carried out in these two villages over three years, from December 1999 to December 2002. The focus of analyses, however, ranged from statewide to the minutiae of a single jhum field in trying to gain a more complete understanding of the myriad factors influencing Khonoma people and their management of the landscape (figure 1-6).

Field visits to Nagaland were timed to coincide with key activities in the management of alders in swidden fields over one complete two-year cropping phase, so that practices could be carefully documented and inputs and yields recorded. This was necessary because management practices and crop yields changed significantly from the first to the second years of cultivation. The two-year recording period also provided greater reliability of data.

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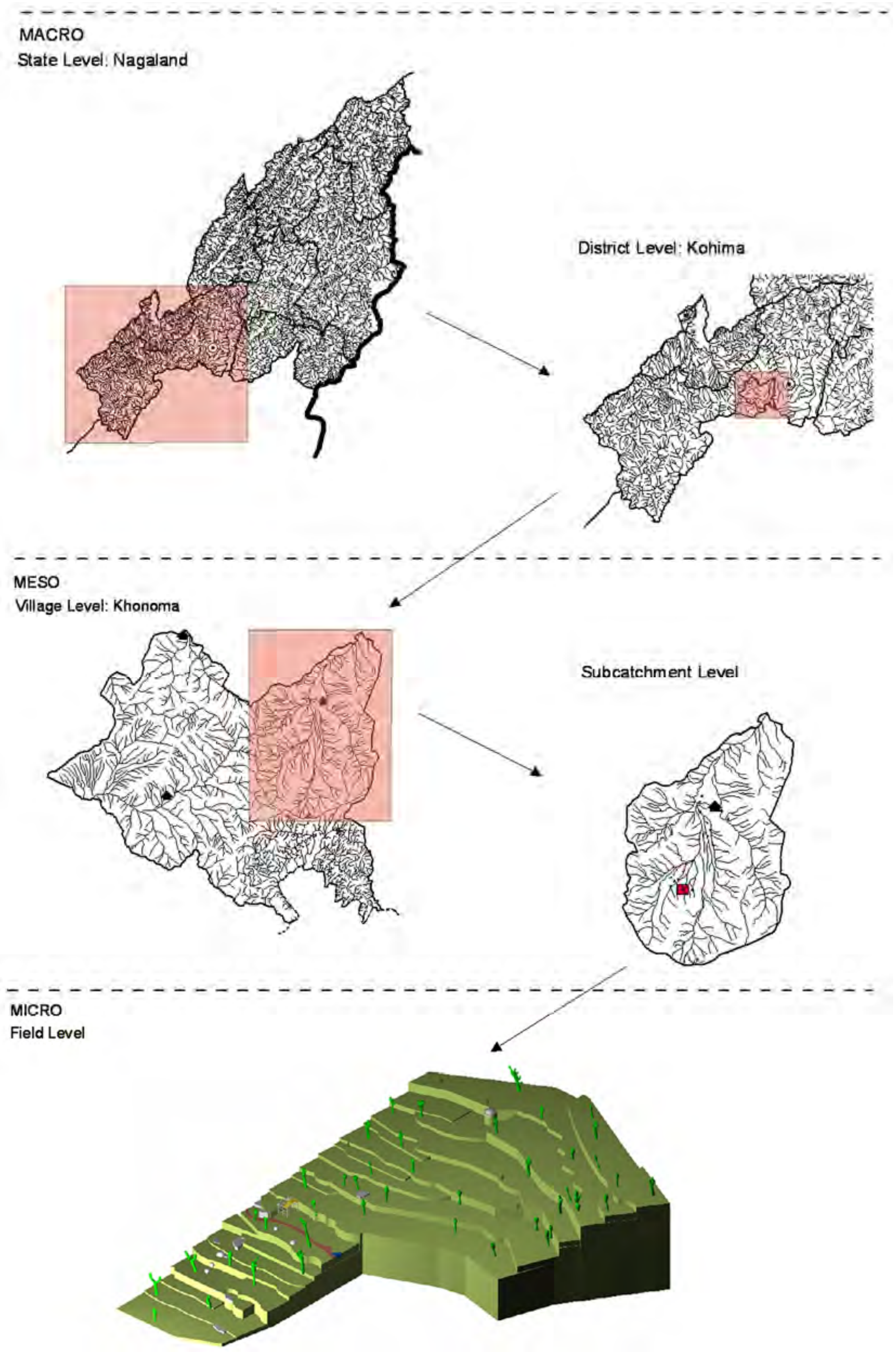
[7] In matters of land occupancy in particular, where oral history establishes a case for ownership, such "editing" of history is not only possible but somewhere between highly likely and certain.

Figure 1-6. Telescoping the Research Focus, from Macro (State) Down to Micro (Individual Jhum Plots) Levels of Analyses



The study set out with a typical anthropological approach, with me living in the community and frequently accompanying farmers to their fields. The original inquiry into the alder system relied mainly on informal interviews, supported by field observations, to build a detailed understanding of Khonoma's jhum cultivation practices and the role played in them by *A. nepalensis*.[8]

Anthropological inquiry then began to probe the historical and cultural dimensions of the system. Village elders were asked to elaborate on the underlying indigenous knowledge that accounted for the way *Alnus* had been incorporated into their swidden system. Particular attention was paid to historical "triggers" that led to these innovations and whether these were dependent on unique historical, cultural or ecological features, so that their potential for wider dissemination could be assessed.

Early in the field work, groups of 10 collaborating households were appointed by village leaders in both Khonoma and Tsiesema. Their role was to act as councils of experts for the project and to assist in generating quantitative data on the performance of their land-use systems. Each group had a farmer-coordinator to advise the project and facilitate its research activities. Each of the collaborating families kept detailed diaries of material and labor inputs and harvested outputs from the jhum and wet rice fields that they were monitoring. The farmer-coordinators and local research assistants in each village were vital forces for continuity, keeping the research moving between my repeated field trips.

The process of documentation often highlighted key agronomic questions about how the technology worked and these were then addressed by field experiments. As work progressed, it became clear that land and its management were central to the total organization of Khonoma society, so the mapping and GIS components of the study were expanded to explore these relationships, adding a rich visual understanding of Khonoma's landscape and how it was being managed.

Two important additional elements of Khonoma's wider livelihood system were also recognized and included. These were the collection and use of wild forest plants for a wide range of economic and household purposes, and the off-farm economy, including the flow of goods and services both into and out of Khonoma. Systems for accurately measuring both elements, which were vital to Khonoma's village and household economies, were devised with village leaders and the collaborating households.

As the study progressed, it widened beyond its original focus on the alder jhums to look more comprehensively at the relationship between Khonoma's people and their environment. The research thus evolved away from more formal economic anthropology to become cultural ecology. It followed no model, but instead pioneered

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[8] Herbarium specimens were deposited at the Biology Dept. Herbarium of Chiang Mai University, Thailand, and the Royal Botanic Gardens of Kew in England.

an approach that combined the most rigorously detailed field inquiry with good historical detail and interpretation, mainly of the political history that was very important to Khonoma's story.

This is only a broad overview of how the study was approached. Each of the chapters contains its own Methods section to provide more details on how data were acquired.

STRUCTURE OF THE THESIS

The Preface that preceded this chapter outlines the broad hypothesis underlying this thesis. Its examination is structured as follows.

The substantive thesis begins in chapter 2 by focusing intently on the alder jhums that attracted research interest to Khonoma in the first place. It provides a detailed description of the alder system in a jhum block in the most intensively managed area to the south of the village. It focuses on one particular field to illustrate the terraced nature of the fields with alders scattered throughout, the planting patterns, and how they change from the first cropping year to the second. This chapter is intended to open up many issues that are dealt with later in the thesis.

Chapter 3 discusses the social and political organization of Khonoma, and its social institutions, principally as they were in a recent past. History is of major importance to the Naga people, and two chapters are devoted to this history. Chapter 4 begins with the legendary origins somewhere between 1300 and 1400, and then extrapolates speculatively from the origins to around 1840, when written records began to appear. More detailed historical material then becomes available, and the chapter continues through the conflict with the British in 1879 and the subsequent history of Khonoma under British rule, including the inter village warfare of this period. Chapter 5 then discusses the modern conflict with the Indian army, which is discussed in detail, and then treats rather more briefly the post-1964 period. The chapter ends with an overview of recent changes..

This is followed in chapter 6 by an examination of the land and its ownership. It describes a varied and difficult natural environment, and then takes up the probable evolution of land tenure down to recent times, where it is described in detail. Chapter 7 then moves on to Khonoma's wider livelihood system, and examines the wet rice fields that are the central component of Angami farming systems. It introduces the Tsiesema comparison in a discussion of Khonoma's land management, and how this has changed from headhunting days before 1905, through the modern introduction of new crops and opening of a market economy. A final section of this chapter takes up trading and the now-substantial growth of a non-farm economy as Nagaland opens up to the outside world.

Chapter 8 analyses in-depth data on inputs into and productivity from the agricultural economy of Khonoma and Tsiesema. It demonstrates the dominant role of women in farming, and returns to the context of official disregard for shifting cultivation in all its forms. It shows how, in its elaborated form at Khonoma, dryland cultivation can be both sustainable and profitable.

Finally, chapter 9 concludes the thesis.

The thesis is illustrated and supported by appendices and a photograph gallery, both of which are separate from the main document.

CHAPTER 2

Planting Amongst the Alders: How the System Works

The alder stumps managed in Khonoma's jhum fields are reported to last well over a hundred years and are passed between generations like family heirlooms. Their management thus evokes memories of ancestors that preceded them in cultivating these fields.

"Khonoma could only exist because of alder trees. It fertilizes the soil very quickly so we could cultivate it again and again. We depended on alder for both firewood and fertilizer. Khonoma only had a small land, but alder allowed it to support a large population. Other villages very near, such as Secüma, Jotsoma and Mezoma didn't pick it up much, but they had plenty of land."

(former Chief Minister of Nagaland, Jasokie Zinyü, summing up alder's role in supporting a large population on a limited land base in his home village, 2001)

INTRODUCTION

The collapse of shifting cultivation now endemic across much of Asia's uplands, and its threat to both the livelihood of its practitioners and their environment, have been outlined as serious problems in the first chapter. With that backdrop, this chapter now turns to Nagaland's dispersed alder system as a remarkable exception to this trend. It sets out to provide a rich description of how the system works and how it creates a landscape unlike any other I have encountered in all my years of work on upland farming systems in Asia. Following chapters will then step back to explore the Angami innovators, their environment, and how alder management fits into their wider livelihood system.

This chapter builds on earlier cursory descriptions of Naga alder management (Kevichusa et al., n.d.; Gokhale et al., 1985; Dhyani, 1998; Changkija et al., 2000, 2003; Cairns et al., 2007) and adds new data and insights gained throughout three years of fieldwork. It synthesizes knowledge gained from a wide range of methods described more fully elsewhere in the thesis. But participant observation was the most useful method. I lived in the village, accompanied my neighbors to their fields, and watched their work on a daily basis, providing many opportunities for informal conversations to probe their management practices. This was supplemented by simple field experiments designed to generate quantitative data and test key farmer assertions of how the system works.

Visits to the field were timed to witness the entire spectrum of activities throughout the agricultural year. Photography was used to try to capture the temporal dimension of changing activities and landscapes. For instance, photographs of the same trees, fields and landscapes throughout the period of fieldwork offer a clear picture of how they change. Some of these series are presented in the accompanying photograph gallery.

Finally, where available, comments from old British tour diaries have been referenced where they provide historical insights into how Nagas were managing alder almost a century ago, to build up an understanding of how the practice has changed in that time, and why.

THE JHUM CYCLE

This detailed account of how the dispersed alder system is managed begins with pollarding the alders in November, marking the onset of a new jhum cycle. The steps in first-year jhum cultivation are discussed under five categories: 1) Wood Harvest, 2) Field Preparation, 3) Planting, 4) Plant Management, and 5) Harvest. A more detailed chronology of activities, dates and tools used is presented in appendix 2-1 for Khonoma and, for comparative purposes, in appendix 2-2 for Tsiesema. The analysis is further assisted by focusing on a specific field (map 2-1) and tracing its management through a two-year cropping phase in 2000 and 2001. Sketches are scattered throughout the text to illustrate the main alder-related activities throughout the swidden calendar (figure 2-1). They are backed up by a rich selection of photographs in the photograph gallery. The numbers of photographs relevant to each section can be found after each heading.

Map 2-1. 3-Dimensional View of Representative Jhum Field
(see later maps 2-2 and 2-4 for planting patterns in this same field)

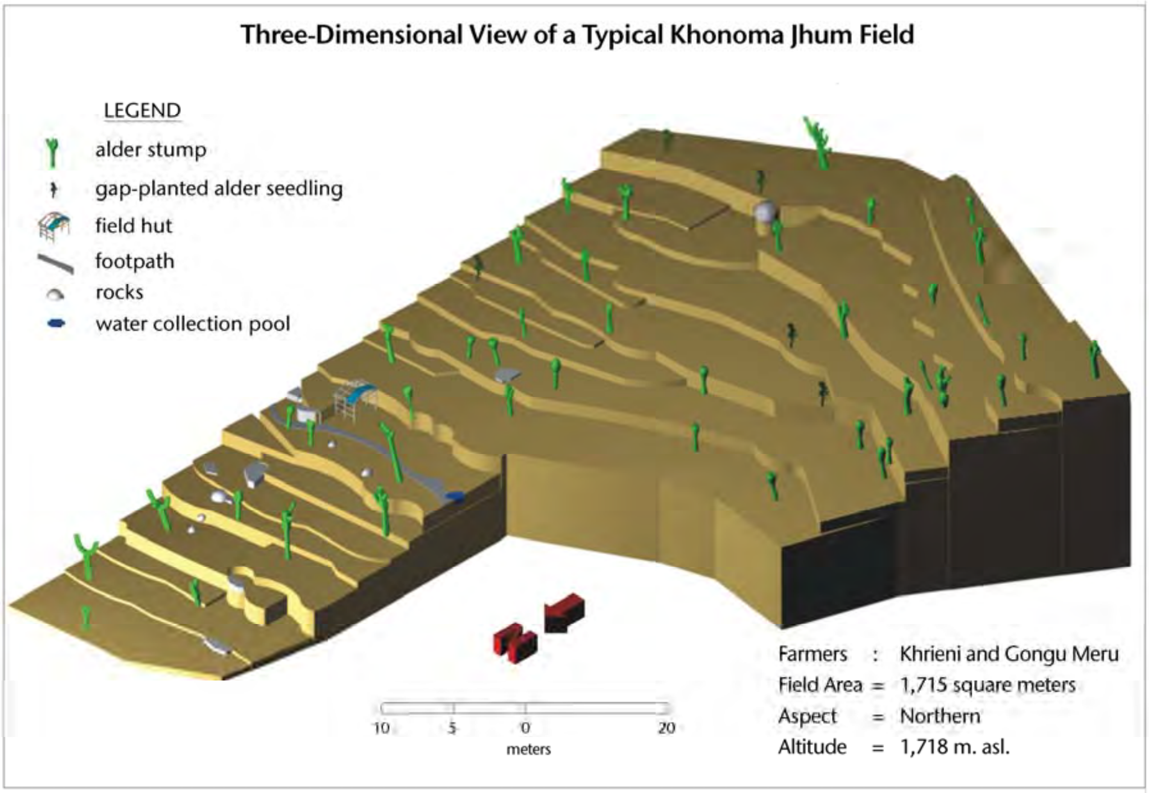
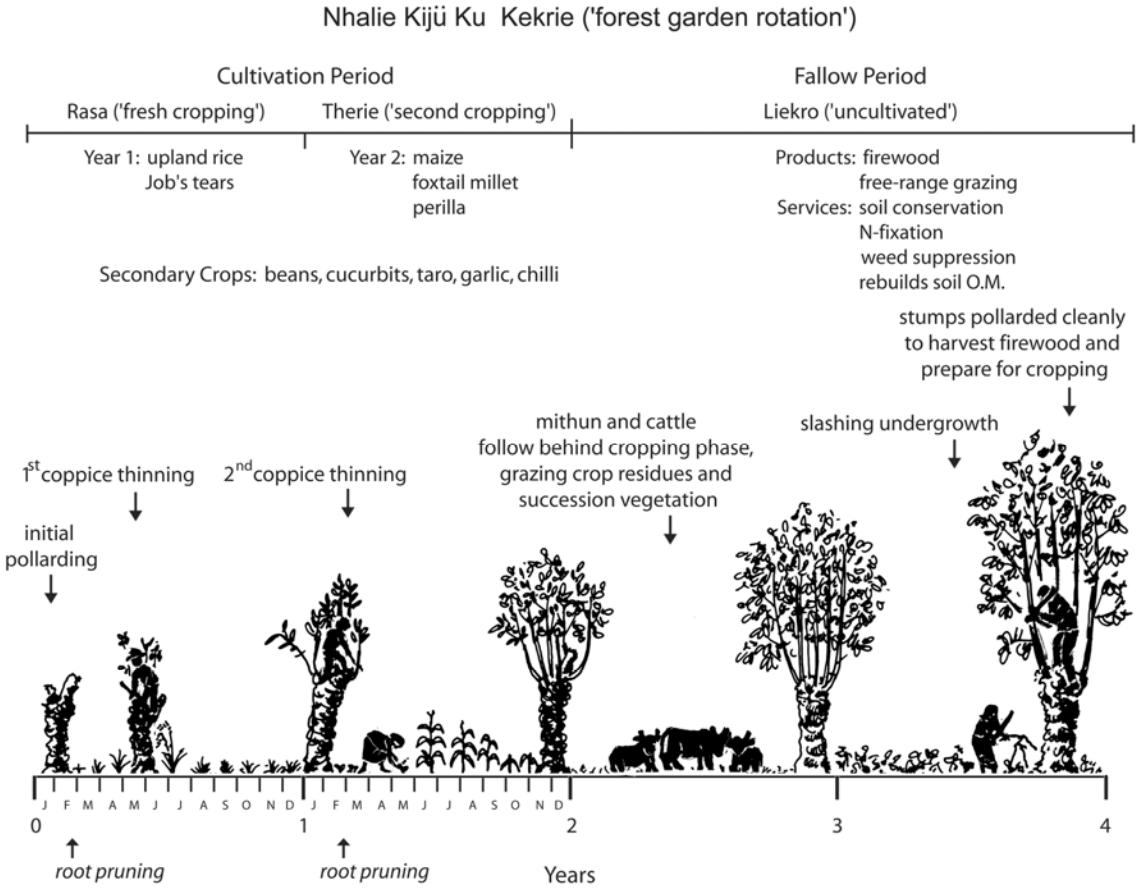


Figure 2-1. Schematic Representation of Phases of Alder-Based Jhum Cycle



1) **Wood Harvest** (plates 2-1 – 2-12)

Reopening the Alder Fallow

Slashing the Undergrowth

The last rice is harvested from the terraces in November and lugged up the hill to Khonoma's granaries. For many of the villagers, the pause between harvesting last year's crops and preparing for next year's is very brief and there may even be an overlap. The jhum cycle begins anew by mid-November when farmers begin to slash the underbrush in fallows to be opened for next year's cropping. This is primarily done by women. Much of the undergrowth is thorny[1] (see table 2-1) and must be pushed aside with a stick (cagwi) held in one hand, providing a clear swing at the base of the stems with a fieldknife (zhügwü) wielded in the other (figure 2-2). Few pioneer trees get established in this weedy understory because the fallow period is

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[1] Besides being common associates with *A. nepalensis* in the Himalayan foothills, *Rubus* spp. (Rosaceae) are also amongst the most ubiquitous undergrowth associates of *A. rubra* on North America's west coast – *R. leucodermis* (thimbleberry), *R. parviflorus* (dewberry), *R. ursinus* (trailing blackberry), *R. procerus* (Himalaya blackberry), and *R. spectabilis* (salmonberry) (Newton and Cole, 1994, 108, 111; Harrington et al., 1994, 5).

not long enough for them to establish and produce seeds.[2] When the interior of the field is completed, they work around its perimeter, cleaning brush from the stone walls and access paths, and throwing the slash on to the field for later burning. Up to this point, all work is done under the canopy of the dispersed alders.

Table 2-1. Undergrowth Associates of Alder Fallows in Khonoma

Khonoma Dialect	Scientific Name	Family
penie	*Artemisia* sp.	ASTERACEAE - Sunflower Family
tsunha	*Eupatorium adenophorum* Spreng.	ASTERACEAE - Sunflower Family
gauri	*Trichosanthes* sp.	CUCURBITACEAE - Cucumber Family
shuzhabitse	*Coleus amboinicus* Lour.	LAMIACEAE - Mint Family
runü	*Elsholtzia* sp.	LAMIACEAE - Mint Family
mehya	*Gomphostemma* sp.	LAMIACEAE - Mint Family
tsünyütsethu	*Plectranthus* sp.	LAMIACEAE - Mint Family
niki	*Sida rhombifolia* L. ssp. *rhombifolia*	MALVACEAE - Mallow Family
kuchü	*Urena lobata* L.	MALVACEAE - Mallow Family
thegasero	*Neillia thyasiflora* D. Don	ROSACEAE - Rose Family
pfupo	*Rubus* sp.	ROSACEAE - Rose Family
mvüyha	*Rubus ellipticus* Sm.	ROSACEAE - Rose Family
khwüpo	*Smilax zeylanica* L.	SMILACACEAE - Catbrier Family
chükrü	*Solanum khasianum* C.B. Clarke	SOLANACEAE - Potato Family
tekhupfemhu	*Boehmeria* sp.	URTICACEAE - Nettle Family
temieu kecu	*Boehmeria clidemioides* Miq.	URTICACEAE - Nettle Family
temieu kezhau	*Boehmeria hamiltoniana* Wedd.	URTICACEAE - Nettle Family
lovie / tekwilovie	*Girardinia heterophylla* Decne.	URTICACEAE - Nettle Family

Figure 2-2. Opening a new jhum begins with slashing the undergrowth beneath the alder trees, usually in mid-November to December.

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[2] It is not unusual, however, for farmers to interplant a few fruit (e.g., *Elaeagnus conferata*, *Docynia indica*) or timber (e.g., *Melia composita*, *Hovenia dulcis*) trees amongst the alders. These are protected through subsequent jhum cycles, with only pruning of side branches to reduce shading on nearby crops.

Pollarding

The next step is pollarding the alder trees.[3] Given the context of women performing 75% of swidden labor (see chapter 8), it is striking that management of the alder trees is viewed as the sole domain of men. The men explain this as evidence of their claim that they do most of the physically demanding work, while the easier but more onerous tasks are left to the women. There may be more than altruistic motives at play here, though. The hooting and war cries that often accompany pollarding hint that cutting the soft alder branches is also considered good fun. Moreover, it would be considered immodest for women to be climbing trees. Wherever the weight of reason lies, the male monopoly on alder management fits a broad pattern of bursts of activity by men during times of peak demand in the agricultural calendar.

Time of Pollarding. Traditional knowledge dictates that the optimum time for pollarding is late January to early February. There may have been a couple of factors supporting this time frame. Firstly, pollarding a bit late allows that year's seed to ripen and disperse in December before the seed-bearing branches are chopped off the stumps. This helps to ensure a sufficient seed rain[4] and that wildlings will be available wherever conditions are conducive for germination. Secondly, when trees are pollarded during the dormant winter season, the supply of carbohydrates stored in the roots is high, providing the necessary energy to support coppicing. Finally, farmers are also aware that if cutting trees or bamboo is not done before the windy season in March to April, then insect damage will be much greater. This leaves a window of time, after the alder catkins ripen and disperse their seed in late December, but before the windy season begins in March. This schedule also allows some of the most strenuous activities to be completed in the cooler winter months when there is no rain, leaches or bothersome insects, and field preparation can be complete in time for planting in March.[5] Regardless of whether trees are

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[3] Our definition of "pollarding" follows that of Oxford's Dictionary of Plant Sciences (Allaby, 1998, 352). It refers to the lopping of a tree, usually at about 2 m above ground level, in order to rejuvenate the top and produce a dual crop of firewood/poles from the new stems, and in some management systems, larger timber from the trunk after several rotations. The sprouting of new growth above the lopping is termed "coppicing", and the new sprouts, "coppices". As a silvicultural technique, pollarding offers the advantages of preserving the tree's root system from one cycle to another so that this supports rapid coppice regrowth, and elevation of the tender new sprouts safely beyond the reach of browsing livestock and deer.

[4] There is a widespread perception amongst farmers however, that seeds from pollarded trees are less viable than those from unpollarded trees. It is likely that *A. nepalensis* is self-incompatible so any one tree depends on pollen from another for fertilization (McAllister, 2004). Regardless of the source, the viability of alder seed falls steeply after about four months (i.e., by the end of April). Trials by Nagaland's Forest Dept. have found that the highest germination rates of 70+% are in February, making it the optimum sowing time (Gokhale et al., 1985). Villagers assert that the viability of alder and many other tree seeds can be tested by throwing a few in the fire to see if they crackle (Kevichusa, 1995).

[5] Although trials by the Pakhribas Agricultural Centre in Nepal (1985) concluded that the best coppice regrowth is obtained from pollarding alder at the start of the monsoons, that of course is the time for planting jhum crops. That means that alders need to be pollarded several months beforehand to allow sufficient time to harvest the firewood and prepare the seedbeds.

pollarded early or late, the coppices will begin to resprout at the same time in March. Pollarding is probably being done a little earlier these days, with the popularity of semi-temperate vegetables that benefit from an earlier planting season.

Figure 2-3. Male family members climb up each alder stump and with a large dao, carefully chop off each coppice flush with the trunk.

Pollarding Technique. Using the burls as footholds, men effortlessly scramble to the top of the stumps and position themselves amongst the four to six main coppices that dominate each tree. Bracing themselves in a comfortable swinging position, they use a heavier style axe (zhiecha) to chop off each branch flush with the trunk, sending it crashing to the ground (figure 2-3). With the branches thus removed, they turn their attention to trimming off any side branches and all the ferns, orchids and other epiphytes that established on the stumps during the fallow period. Hacking as they go, they work their way back down the stump and move on to the next tree. In this way, the alder fallow is quickly opened up, leaving bare stumps and the ground strewn with large branches.

First Pollarding of Young Alder Trees. Up to this point, the management described has been for alder trees that have been pollarded in previous jhum cycles. But we now need to digress briefly to examine what happens when young trees establish in an existing alder stand and must be pollarded for the first time.

Proper age for first pollarding. New seedlings, whether self-sown or intentionally planted, are invariably established during the first cropping year of the jhum cycle (see later discussion on propagation). It is then that the soil is disturbed and conditions become right for seeds to germinate, or alternatively, farmers make a decision to do some gap-planting to replace dying trees or otherwise thicken up the stand. These new trees grow rapidly during the first eight to nine years, easily reaching 70-80 cm in diameter and 10 meters in height. Their growth then begins to slow and the previously smooth bark becomes rough and fissured. This indicates the optimum age for first pollarding. Premature pollarding might leave the trunk too small to support the weight of developing coppices and vulnerable to wind breakage, i.e., splitting between the coppices and main trunk. But it is also widely known that if first pollarding is delayed too long, alders lose their ability to coppice and there is also a risk that the stumps will die.[6]

Beyond these general guidelines, the actual age of first pollarding is determined by the jhum cycle. We can take as an example the intensive four-year cycle that Khonoma's Merhümia khel[7] formerly practiced when its jhum land was under heavy pressure (figure 2-1). Assuming an alder seedling is established in the first cropping year of a given cycle, then it will be four years old by the time that plot is reopened for cultivation again. Since this is clearly still too young for pollarding, the farmer will only trim away side branches to reduce shading. When he next returns to reopen that fallow, the tree will be eight years old and almost the proper age for pollarding. If he decides that the tree is still too small, he will do so in the knowledge that pollarding will be delayed until the following cycle when the tree will be 12 years old. Potential pollarding ages are thus only in increments of the jhum cycle length, in this case four years.

Height of Pollarding. Khonoma farmers emphasize the importance of cutting height to both the longevity of alder stumps and the vigor of coppice regrowth. They often point to insufficient pollarding height as a key reason why other villages are less successful in managing alder in their jhum fields. Most suggest that alders should be cut at seven to eight feet the first time they are pollarded.[8] There are a number of reasons associated with this. Most critically, this cutting height is sufficient to ensure the continued vigor of the tree and strong coppice growth. As detailed later, the coppices that spring from the pollarded stumps are thinned twice in the first cropping year of the jhum cycle. Measurements taken on a sample of trees during both coppice thinning operations confirmed a direct correlation between

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[6] There are a couple of possible explanations for this declining coppicing capacity. It may simply be that as alder grows older, most of the active lateral buds are higher in the crown. The lower buds that remain on the stump after pollarding may have lost the capacity to regenerate new shoots. It may also be that with age, it becomes more difficult for buds to burst through alder's thickening bark (Banks, 2003).

Other authors note a similar loss of coppicing ability with *A. rubra* on North America's west coast (Burns and Honkala, 1990, 118; Haeussler et al., 1990, 38; Gordon, 1978, 322). Troup (1952, 129) also confirmed that stools of large size do not coppice in most tree species.

[7] 'Khel' is an Assamese word commonly used to signify a residence quarter of a village inhabited by an exogamous group. In the Tenyidie language (used by the Angami and closely allied Naga subgroups), this is known as 'chienuo'. The Khel is discussed in more detail in Chapter 3.

[8] In 1934, Hutton, then Deputy Commissioner of the Naga Hills, noted for the Tizu valley:

> "Eight or at most ten feet above ground is generally the best height; then when they are cut again, they can be cut a foot or so above the old place. If cut at 16 ft. to start with, the tree is likely to get top heavy and subsequent pollardings to become inconveniently high." (Hutton, July 13, tour diary entry, 1934c)

the height of alder stumps and the biomass of trimmed coppices. The first (figure 2-4a) and second thinnings (figure 2-4b) were examined separately, and then both data sets aggregated (figure 2-4c). In all cases, the trend of more coppice thinnings from taller stumps was highly significant. As the trees grow older, their physically larger stumps offer more room for sprouting coppices and their expanding root systems can support increased coppice growth. It is interesting that this trend showed no sign of tapering off as trees got older (i.e., bigger), as one might have expected them to become less vigorous. It brought to mind an observation often heard in Khonoma – "Rüpo-u vichü motha puorhie cüpuo mu puo bie kemezü cü puo bielie." This translates roughly to "*When you pollard the alder tree, it will grow young again.*" Farmer observations that alders pollarded too low result in poor coppicing are supported by Khan and Tripathi (1986, 1989) who also demonstrated a positive correlation between stump height and coppice vigor. A more complete list of variables that farmers cite as influencing coppice vigor is given in table 2-2.

Table 2-2. Farmer-Cited Variables Affecting Coppice Vigor

- tree age
- stump height / diameter
- time of pollarding
- soil fertility
- altitude / aspect
- stump health, i.e., presence of mechanical or biological damage
- coppice management, i.e., number of times thinned, number of coppices retained per stump
- stimulation of roots by hoeing

Higher cutting height also elevates the stump above the crop. This vertical separation helps to minimize shading and competition for horizontal space as the crop develops and the stump begins to coppice. Equally important, it also raises the coppices above the reach of the cattle and mithun[9] that routinely free-graze jhum fields after the last crops are harvested.[10] Having thus determined the approximate cutting zone, some informants described then searching for evidence of lateral buds within the chosen area and cutting just above them. Farmers point out that alder stumps will continue to grow in height and diameter throughout the life of the tree. Field measurements taken during the study confirmed a strong correlation between the dbh and height of alder stumps (figure 2-5). That was expected, since we knew that with each passing jhum cycle, these stumps gained both height and diameter.

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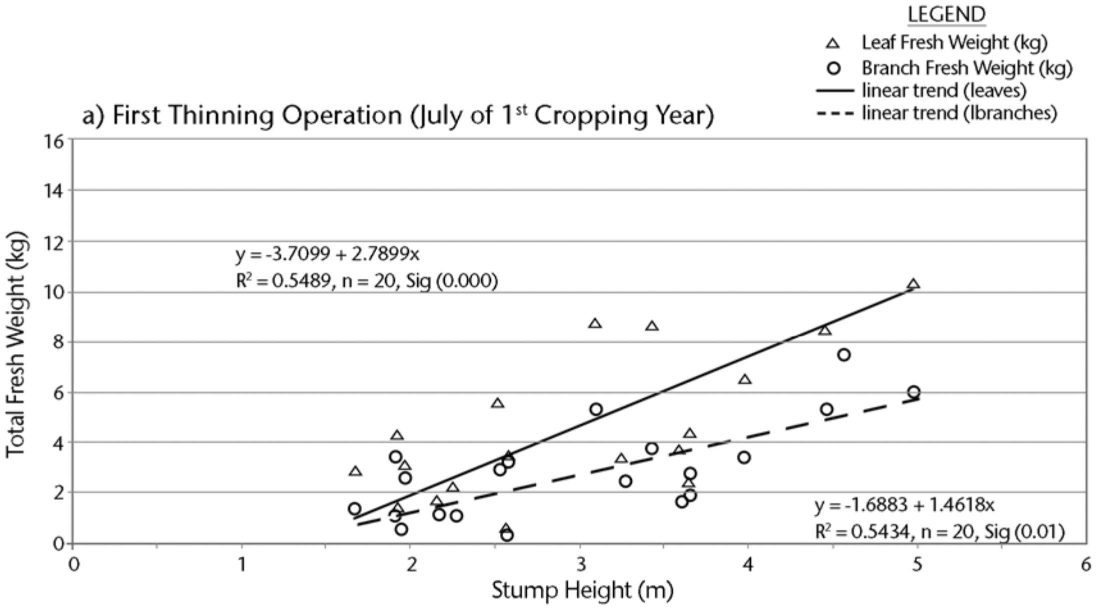
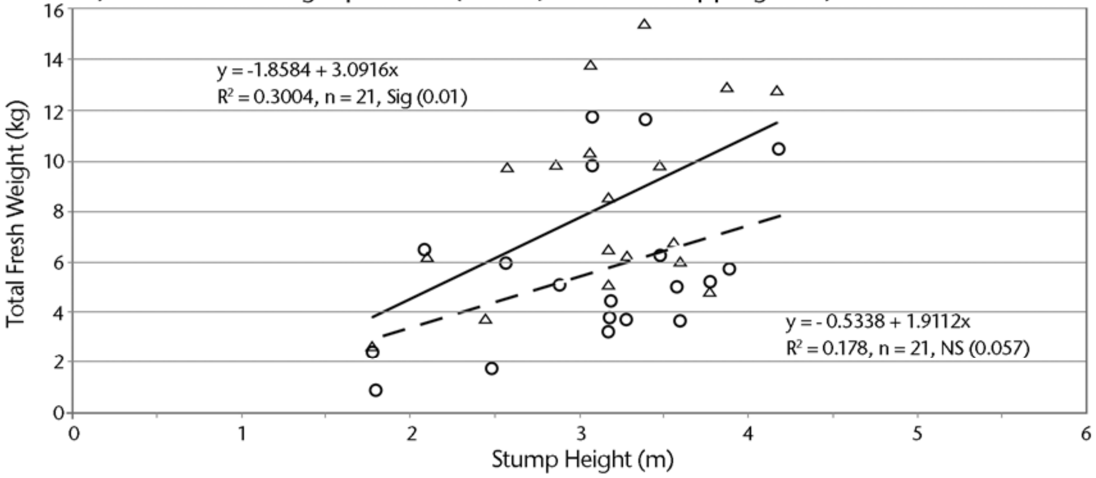
[9] *Bos frontalis*. Semi-domesticated livestock that are usually allowed to roam in the forests.

[10] One village elder described another method of determining pollarding height that he had heard from his forefathers (Terhüja, 2000). Standing at the base of the tree, a man would grip one end of his shawl, and throw the other up against the tree trunk as far as it would reach. The highest point touched by the shawl was selected as the cutting height. This height was reportedly sufficient that one could scale an alder stump and be out of reach of any passing tiger. This would suggest a considerably higher cutting height than is seen today.

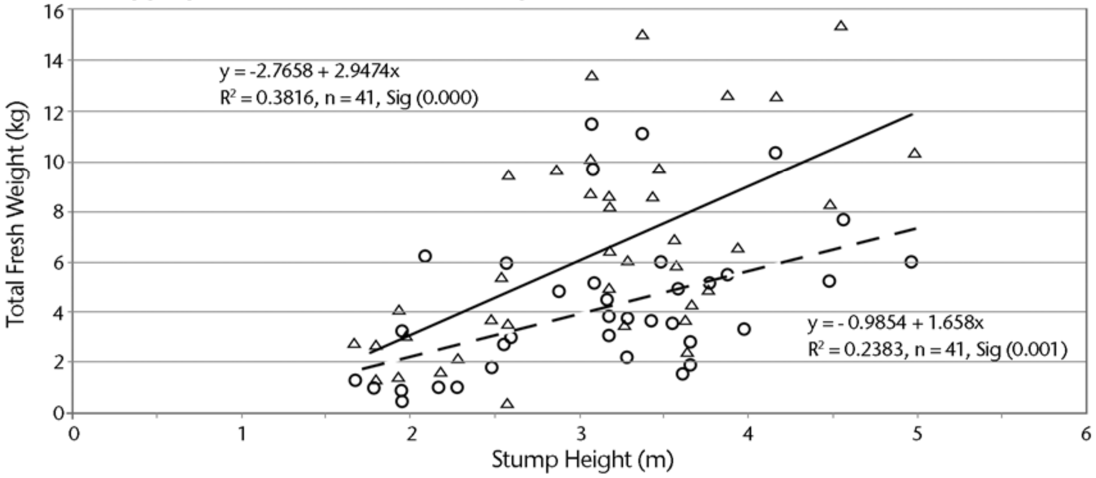
Figure 2-4. Relationship between Stump Height and Biomass of Thinned Coppices: Broken Down into Leaf and Branch Components



a) First Thinning Operation (July of 1st Cropping Year)



b) Second Thinning Operation (Nov. - Jan. of 1st Cropping Year)

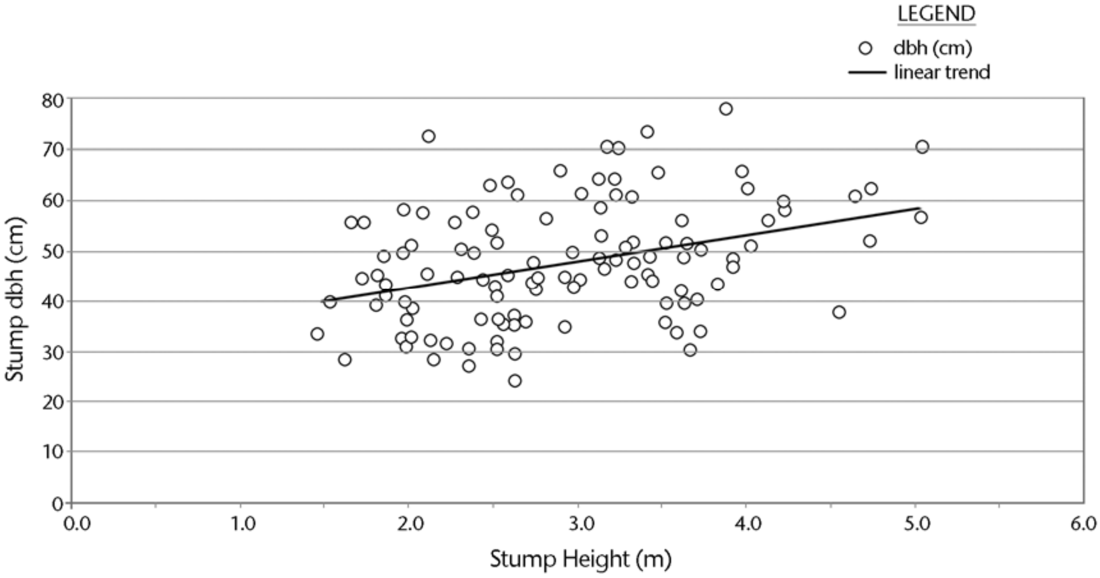


c) Aggregation of 1st and 2nd Thinning

The size of the tree can thus be used as a surrogate indicator of age.[11] If the initial pollarding height is too high, then by the time the tree becomes older, the stump will have grown excessively tall. This requires more climbing and labor to manage the tree, and its coppicing vigor declines.

Given that proper pollarding techniques are regarded as vital to the alder fallow system, the job is reserved for skilled hands. Mistakes could inflict long-term damage on the old stumps and compromise their performance in future jhum cycles. Therefore, a field owner preparing to rent jhum land might clinch the agreement with a curt reminder that he expects the alders to be properly pollarded and the stumps left undamaged.

Figure 2-5. Correlation between dbh and Height of Alder Stump



Technique for Pollarding and Dressing the Wound. When preparing to pollard a tree for the first time, the farmer first erects a makeshift scaffold to bring him within comfortable swinging range of the desired cutting height (figure 2-6). The tree is then cut horizontally across the main trunk with an axe (<u>merü</u>), crosscut saw (<u>sigei</u>), or even a heavy fieldknife (<u>zhiecha</u>). It is important that the cutting instrument is kept sharp to keep the cut clean and avoid cracking the stump. All auxiliary branches are stripped off. The wound is then smoothed off to remove any cracks, plastered with mud and dried leaves to prevent drying and cracking, and finally a stone slab is placed on top (figure 2-7). The stone is intended to protect the wound from desiccating frost, sunlight and wind, and to ensure that new coppices

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[11] It is questionable whether the rings observable in the cross-section of an alder bole are a reliable indicator of age, although Stewart (1986) suggests they are. However, to be confident that such rings are annual, the more seasonal climates found at 38°N and higher latitudes are generally required.

sprout from all sides, resulting in a better horizontal spread of canopy regrowth. This allows healthy coppicing directly below the cut.[12]

Failure to dress the wound might mean that roughly the top foot of the stump will dry out and die, and coppices will sprout only below that. The stone is generally used only for the first pollarding. When coppices are cut back again in subsequent swidden cycles, the wounds are smaller and less vulnerable to frost damage and coppices are spaced by selective pruning.[13]

Figure 2-6. When young alder trees are pollarded for the first time, a makeshift scaffold is erected to provide the farmer with a comfortable swing at the selected cutting height.

Figure 2-7. After first pollarding, the wound is covered with soil and grass, and then capped off with a flat stone to prevent desiccation.

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[12] While on a field visit to Ximeng County in western Yunnan Province, China, I noted that Wa shifting cultivators also placed stones on freshly-cut alder stumps, but usually only on a couple of the larger stumps in each field. This had nothing to do with silvicultural management, but was seen as a way of placating resident spirits that might be offended by the felling of the alder stand. In this case the stumps were cut just above ground level and Wa farmers actually tried to kill them out during the cropping period. The dead stumps were then removed for firewood and new alder seedlings taungya-planted into the field as a planted fallow (see also Dao et al., 1997; Fu, 2003; and Guo et al., 2007 regarding Wa management of alder as an improved fallow. See also Majumdar (1961, 72)).

[13] In warmer and drier areas of Nagaland where alder is less common, *Schima wallichii* and *Quercus* spp. are often pollarded and maintained in dispersed tree systems very similar to those of alder. Elsewhere in the region, comparable pollarding practices are used with *Quercus* spp. on the west flanks of the Gaoligong Mountains in Yunnan, on *Cassia siamea* in Shan State of Myanmar, in Northern Lao P.D.R. and further north by Dai farmers in Xishuangbanna. All species are managed for firewood production.

Harvesting the Firewood

Everyone capable of using a fieldknife, including the very young and old, helps strip the fallen branches of foliage and cut them into firewood lengths (figure 2-8). Larger branches are often thrown across makeshift frames and cut into lengths with crosscut saws (figure 2-9), and later split by axe.[14] Some may be set aside as small-diameter poles suitable for construction purposes. Smaller branches are stacked near the intended fieldhut site, set aside for cooking noon meals while working in the jhum field over the coming summer (figure 2-10). Trucks are often hired these days to transport firewood from the fields to the village, or sometimes directly to markets in Kohima town. But much firewood is still carried back to the village in basketloads (figure 2-11). This is a gradual process. The women usually take a load home with them at the end of each day.

2) **Field Preparation** (plates 2-13 – 2-26)

Preparing the Seedbed

Women, either working individually or in communal labor groups, do most of the field preparation. The remaining slash is raked into piles at safe distances from the alder trunks and burned in late February (figure 2-12). These fires are relatively small and controlled, so there is no need to synchronize burning, construct fire lines or take other precautions against escape. It is essential though, to keep the fire away from any young (<8 yrs.) alder trunks that have not yet developed the rough bark that gives older alders their fire resistance. With most of the slash burnt, the ashes are scattered around, and then a second, more careful, pass is made over the field. This time the women hoe as they go, turning over the soil and pulling out all roots (figure 2-13). Much careful attention is given to dislodging vegetation from the stone walls that divide the terraces. Through time, internal erosion between these walls has created natural terraces, providing level alleyways for cultivation. Farmers are well aware that extra time invested in dislodging weeds and achieving a good burn that will kill most of their seeds will pay dividends in terms of requiring less weeding later in the cropping year.

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[14] Unlike other woods, alder splits easiest while it is still green, and burns well even when not fully dry.

Figure 2-8. After being felled, coppices are then trimmed of small branches and cut into manageable lengths.

Figure 2-9. Alder poles are often thrown across a frame and bucked into firewood lengths with a crosscut saw.

Figure 2-10. Smaller branches are stacked near the fieldhut for cooking noon meals over the coming growing season.

Figure 2-11. Much of the firewood is transported to the village on the backs of women, although trucks are now being used more as Khonoma's road network expands.

Hoeing causes nodule turnover and although less evident, it is in effect a second pruning operation – this time subterranean. The alder root system is shallow and spreads horizontally, making it ideal for stabilizing sloping jhum land. Deep hoeing trims many fine rootlets and nodules that then contribute to the flush of N released when alder fallows are reopened. Farmers observe that the deeper the hoeing, the better the performance of the crop to be planted. They emphasize that soil tillage, and the root pruning that it entails, plays a role in ensuring robust coppice regrowth. They claim that if cut by a hoe, the roots and nodules will regrow, and if the trees are growing well below the ground – i.e., the roots and nodules – then the above-ground growth – the coppices – will also be good. The implication is that the more the tree is disturbed – to the point of chopping all branches from the stump, completely opening the canopy to full sunlight, churning leaf litter and topsoil, and injuring shallow roots – the more vigorously alder will produce coppices.[15] It is also possible, but untested, that pollarding of alder may cause dieback of additional root nodules that the hoe does not reach, again contributing to the flush of nitrogen released at the time of planting.

After this second pass, the roots and residual slash are raked into piles for re-burning (figure 2-14). In some cases, these final piles are covered with soil and burnt in anaerobic conditions strikingly similar to the 'pangshing' system practiced in central Bhutan (Roder et al., 1993; Dukpa et al., 2007).[16] The burnt soil turns a brick-red as all the organic matter is burnt off and most of the N is lost with it (figure 2-15). There is a dramatic jump in pH from roughly 5 to 7+. The cation exchange capacity drops by half, while there is a big jump in phosphorus, and potassium remains fairly stable. Given that most biomass from the fallow vegetation is harvested as firewood, this slow anaerobic burning under piles of soil may be designed to reduce nutrient loss from the remaining slash. The intensity of the burn also helps to destroy the soil seedbank and other roots that might resprout, both reducing weeding labor in the coming year. The piles are later spread out and the advantageous conditions provided by these micro-niches are often exploited by using them as nurseries.[17]

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[15] Alder trees have a reservoir of buds on their boles. As shown in plate 2-60, the foliage in a tree's crown normally produces a hormone that inhibits these buds from sprouting. If the crown, and thus the source of the inhibitor, is lost through pollarding, then the tree goes into survival mode and buds on the stump will sprout to recover the crown. The buds highest on the stump have dominance over those below (Banks, 2003).

[16] This method of burning slash under piles of soil is standard practice in some rain shadow areas in Nagaland such as Chakhaba Village in Kohima District, where fallow biomass is limited and farmers appear to be trying to reduce nutrient losses through volatilization.

[17] Not all crops are suitable for these heavily burnt soils. Cabbage, chilli, brinjal, onion, pumpkin and cucumber all grow well – but herbs such as sweet basil or thick-leaved lavender grow miserably, if at all. Kikhi (1999) describes this same practice in Viswema, a Southern Angami village, where it is known as mimo. It is popularly used in both home gardens and swidden fields where cultivation frequency is high.

In this way, the dark tangled fallows are opened up and gradually transformed into neat manicured terraces on which hardly a stray blade of grass can be found. Stone walls that had been damaged by cattle and mithun clambering over them during the previous fallow are carefully rebuilt. Bamboo fences are thrown up around field perimeters and fieldhuts erected. The impression is one of tremendous care and pride in work.

Figure 2-12. After firewood harvest, the remaining small slash is raked together and torched in small controlled burns.

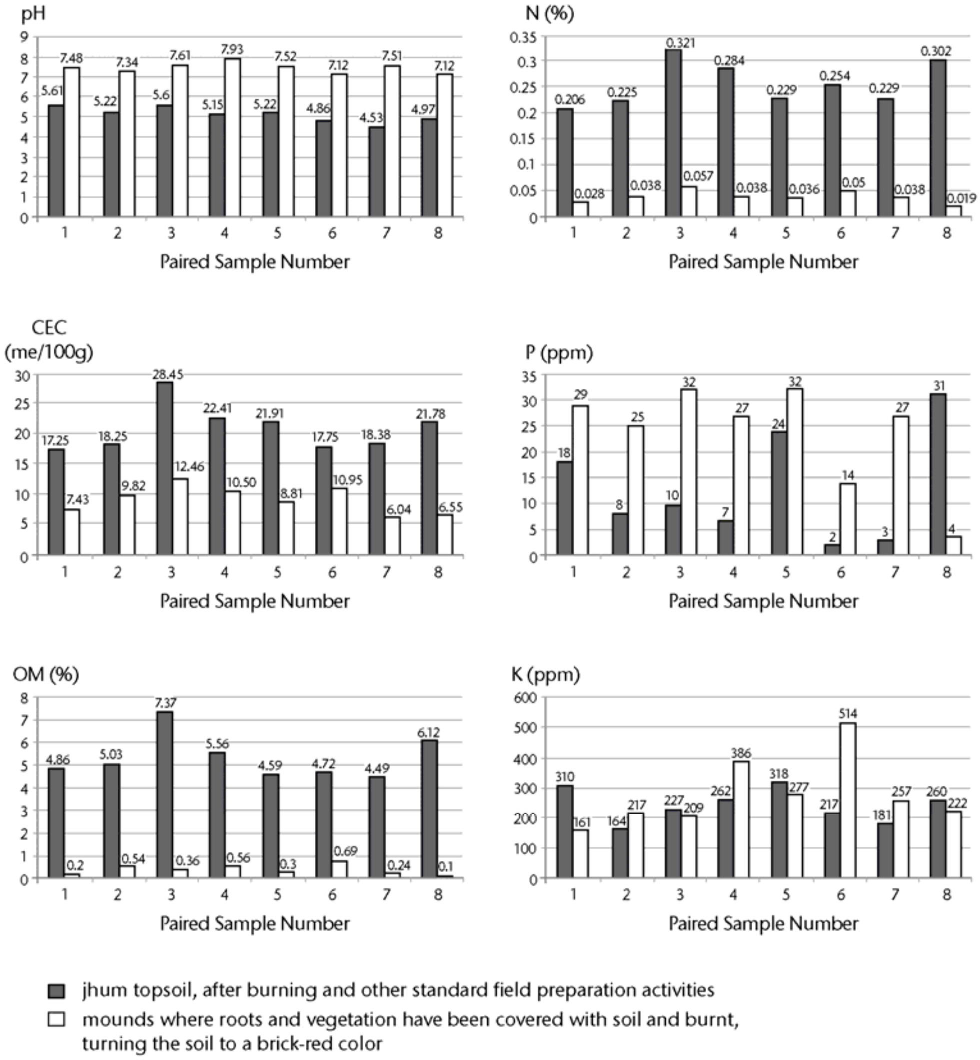
Figure 2-13. Tillage both prepares the seedbed and trims shallow roots and nodules of alder trees, most of which are within 20 cm of the soil surface.

Figure 2-14. Roots and other debris unearthed by the first tillage operation are then raked together into piles and reburnt.

3) PLANTING (plates 2-27 – 2-30)

The steps in firewood harvest and field preparation described so far probably haven't changed much in recent history. But the planting methods that follow have undergone a complete metamorphosis. Since the 1964 cease-fire lessened hostilities in the Indo-Naga war, Nagaland has at first slowly and then more rapidly opened up to increased participation in the cash economy. Since the 1970s, new market opportunities have increasingly led many farmers to convert their jhum fields from subsistence cereals into cash crops. This commercialization of shifting cultivation has been particularly dramatic in villages like Khonoma, where cooler temperatures and market access provide a competitive advantage in producing semi-temperate crops for lowland markets.

Figure 2-15. Effect of Mounding and Burning on Soil Chemical Properties (see appendix 2-3 for data)



In the pre-Christian era, a rice beer called ‘zu’ was a staple food amongst the Angami (Hutton, 1969, 97; see also Teramoto et al., 2002). Many villagers worked hard in the fields all day with only a gourd of zu to sustain them. More potent liquors (rohi) were distilled from sticky rice, Job’s tears and millet. These crops were thus given great importance in jhum fields, as evidenced by cultural elaboration in the form of rituals and festivals. Agricultural rituals are less strictly followed now that most of Khonoma has embraced Christianity and followers of the traditional religion (Pfütsanako) have become a dwindling minority. Nevertheless, most Catholics and some Baptists are reported to still follow the old ways and wait for the prerequisite rituals to be performed before working in their fields.[18]

Before planting can begin, a “first sowing” ritual has to be performed by an elderly man that the village has elected as its kesitsiekrü (first sower of Job’s tears). In the second lunar month of kese (February - see Naga lunar calendar in appendix

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[18] See also Chapters 3, 4 and 5 below.

5-1), a few days after celebrating Sekrenyi, the kesitsiekrü announces in his local thehou[19] one evening that he will perform the first sowing ritual the following morning – and the news is then yelled from one thehou to the next, spreading throughout the village. On the following morning, his wife hands him his hicha[20] full of an alcoholic drink, some lunch, a hoe, and some seeds mixed together ready for planting. The seeds should include whatever crops he is planning to plant in his field that year, but Job's tears, maize, millet, soybean and perilla are considered most important. He usually invites a younger man to join him for company, and together they set off early in the morning for the field. In the event of deaths or births in the village on that day, the ritual must be postponed. He should also refrain from speaking to anyone from outside the village. So although there is no specific time for performing this ritual, it is prudent to go early before hearing news of deaths or births and when others are less likely to be met along the pathway. As he ceremoniously broadcasts the seed, he prays to Terho (deities in Angami traditional religious beliefs) for a successful crop. He may sow as much or as little of the field as he wishes before returning to the village. Only on the following day will the rest of the village begin planting their fields that have already been prepared.[21] After completing this ritual, the kesitsiekrü must remain within the village's territory for the next five days (Tho-ü, 2000).[22]

Cropping patterns were much simpler in the pre-Christian era. The first year after a field was opened from fallow, it would be planted almost totally with Job's tears, with only small patches of minor crops for kitchen use. On the second year, it would be switched to a mixture of foxtail millet and perilla. In both years, the seeds were simply broadcast and then the soil recultivated and leveled with a hoe (liephiezhü). At any given time, every household cultivated both first- and second-year jhums and the swidden landscape was thus divided equally between these two patterns.

Farmers also talk about a special synergy between Job's tears and alder that was seen as important in those earlier times. This relates to their earlier-discussed view that soil tillage and pruning roots are beneficial to alder's performance. After harvest in November, the remaining stalks of Job's tears were pulled up while cleaning the field for replanting the following year. Farmers say that Job's tears are relatively deep-rooted and this disturbed the alder roots in a similarly beneficial way to the deep hoeing in field preparation. Hence, in their view, not only did Job's tears

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[19] Male bachelors' dormitory.

[20] Metal container used for taking alcoholic drinks to the field or forest.

[21] In villages where followers of traditional beliefs still hold considerable sway over village matters, their insistence that planting cannot proceed before the first sowing ritual can discourage innovations in cropping practices. This was highlighted by a case in Viswema village, in which one family broke from traditional practices and planted potatoes as a winter crop (Kikhi, 2000).

[22] Miekonyü Tho-ü, from Merhümia khel, was elected as the kesitsiekrü five years ago, and will retain this responsibility for the remainder of his life.

perform better with alder trees, but the alders also gained from Job's tears; the benefits were mutual. Furthering this relationship, Job's tears was one of the most adaptable of the traditional jhum crops to the colder, higher-altitude slopes where alder thrived best.[23] These fields were too high and cold for local rice cultivars, and, in any case, most Angami villages relied on their irrigated terraces to supply them with rice.[24] Finally, as discussed later in the chapter, the physiology of Job's tears and millet probably makes them more effective than rice in exploiting the improved fertility generated by alder and converting it into harvestable yields.

The jhum fields took comparatively less attention than today in that they were planted with crops considered easy to grow, virtually the entire field received the same treatments, and everything was harvested at once during the first year (November – Job's tears) and twice during the second (August – foxtail millet; October-November – perilla). In this way, jhum fields were managed in simple patterns similar to those in the wet rice terraces in the valley below. Despite their former cultural importance to the Angami, both Job's tears and foxtail millet[25] are low-yielding and low-value crops. The arrival of Christianity in Khonoma in 1897, with its prohibition of drinking alcohol, blunted their importance.[26] And when higher-value crops such as potatoes were introduced in the late 1930s, they fell further from favor and have been losing ground ever since. Farmers needed cash and only from higher-value crops could they recoup their investment in clearing, fencing and cultivating jhum fields.

While many new vegetable crops have been introduced since the end of World War Two, potatoes continue to play a dominant role in Khonoma's jhums. Even before Nagaland became a battleground in 1944 (Rooney, 1992), Khonoma was already growing bumper potato crops for sale as far away as West Bengal. After early successes, there was a problem with the only train capable of getting the potatoes to market, and an entire crop spoiled. Although largely abandoned by 1944, potatoes later began to regain popularity. However, there were then problems in obtaining replacement seed from Simla, in Himachal Pradesh.[27] But as market

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[23] This was prior to introduction of potatoes in the 1930s.

[24] Previous (pre-1956) pressure to plant rice in these less suitable jhums was effectively removed by declines in the village's population during the Indo-Naga war and later, the purchase of highly productive rice land in the Medzephema area. With these changes, most of Khonoma's rice needs could be grown in the irrigated terraces in the valley and the warmer jhums (essentially the western and eastern blocks in figure 5-3). With growing market contacts, the colder southern jhum blocks were thus poised to become the vegetable belt of Khonoma. Although still commonly used for wet rice nurseries, there is practically no dryland rice planted in this jhum area today.

[25] Millet is also more vulnerable to bird damage than other cereals.

[26] See Chapters 4 and 5. A further example of church influence on cropping patterns occurred during a religious revival movement that swept Nagaland in the 1970s. There was suddenly strong moral pressure to discontinue planting areca nut, tobacco, betel vine and other 'crops of vice'.

[27] Seed potatoes should be replaced by new stock at least every couple of years to maintain vigor and prevent disease buildup. Nagaland currently lacks a regulated system to cull any virus-infected or diseased plants that would allow it to produce its own quality seed potatoes.

links have become more reliable, Khonoma has again become a major potato-producing area, and the popularity of potatoes has been regained at the expense of traditional subsistence crops such as Job's tears and millet.[28] The Angami prefer rice as their staple food and the cash earned from potato sales can be used to purchase rice, if there is any shortfall in production. Poorer households are, however, handicapped by the relatively high cost of imported potato seed – about Rs 17-18/kg, plus spoilage. This is likely to cause further wealth stratification as the more affluent invest in lucrative potatoes, while their struggling neighbors are forced to grow subsistence crops whose seed can be selected from the previous year's harvest.

The complexity of current cropping patterns can perhaps be best illustrated by returning to the jhum field that was introduced at the beginning of the chapter (map 2-1). This plot is typically small, about 1715 m^2, with 41 mature alders scattered throughout the field, a density of about 245 trees per ha (see appendix 2-4 for details of each tree). It has clay loam soils that are very strongly acid and low in N P, and K (table 2-3). Maps 2-2 and 2-4 show crop arrangements in this field over the two years that it was planted (2000-2001). In the pre-market economy, this entire field would have been broadcast to Job's tears, with a few pockets of chilli, ginger, beans and other vegetables near the field hut. Today, the cultivator is a dedicated member of the Baptist church and follows its teachings to abandon all forms of alcohol. He thus no longer needs large quantities of Job's tears – but still requires an assortment of vegetables and herbs for kitchen use and, of increasing importance, surpluses that can be sold to buy meat and clothing, pay for the education costs of his three children, the electricity bill, and other household expenses. The subsistence function of jhum cultivation still remains, but now low-value cereals whose major role was alcohol production have been replaced with high-value cash crops. This transformation is much less in fields cultivated by the roughly 35 households in Khonoma that have not adopted Christianity.

Table 2-3. Chemical Properties of Soil in Example Jhum Field * (see maps 2-1, 2-2 and 2-4)

Sampling Depth	pH [‡]	OM [♣]	N [†]	P_20_5 [‡]	K_2O [‡]	CEC [♣]	Ca[♣]	Mg[♣]	sand[♣]	silt[♣]	clay[♣]
cm		*%*	*kg/ha*	*kg/ha*	*kg/ha*	*(me/100g)*	*ppm*	*ppm*	*%*	*%*	*%*
0-15	4.53	5.79	152.67	15.98	174.46	19.44	450.00	77.50	32.48	38.96	28.56
15-30	4.76	3.19	120.50	10.80	114.80	16.99	275.00	48.75	26.60	41.20	32.20

[‡] Analyses conducted at the Agricultural Chemistry Lab, Dept. of Agriculture, Medzephema, Nagaland on Nov. 11, 2001.
[†] Analyses conducted at the Directorate of Soil Conservation, Kohima, Nagaland in Nov., 2001.
[♣] Analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University on May 21, 2001.
* Methods used for soil analyses:

pH: soil to water ratio 1:2
OM: Walkley and Black 1934
N: Alkaline Permanganate Method
P: Brays Method No. 1
K: Turbidimetric Method
CEC: Distillation
Ca: Titration Method - EDTA
Mg: Titration Method - EDTA
Texture: 5% Calgon Solution

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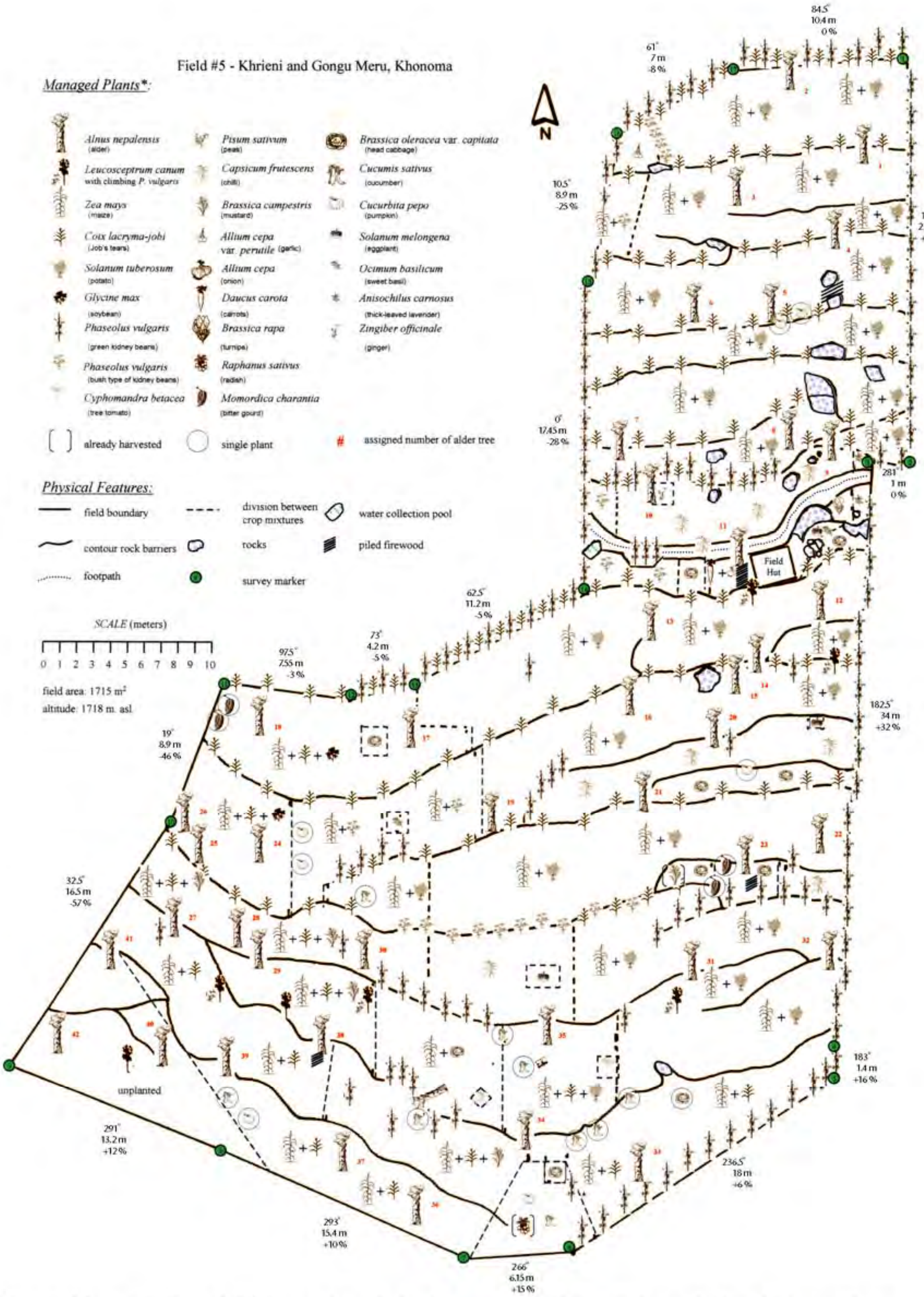
[28] Potatoes are also grown in the rice terraces, but these are considered to be less tasty and to have inferior keeping qualities to potatoes from the jhums.

The intensity of planting patterns also depends on labor availability and other on- or off-farm options that compete for time and labor. A farmer short in labor but wanting to get a crop off his jhum may simply broadcast it to a maize monoculture. But a farmer in a neighboring field may rely more heavily on his jhum for income generation, and his field may be a mosaic of crops, planted in a complex combination of crop rotations, intercropping and relay-cropping patterns. Harvesting, clearing away the crop residues, and replanting thus become a continuous process throughout the two-year cropping phase. Even though one crop is harvested, others are still being attended, so labor input is higher and more evenly-distributed throughout the year. This is reflected in farmer observations that although cultivating only 50% of the jhum area that their ancestors once did, the labor input is similar and profits higher. In view of the diversity of farmer management strategies, it thus becomes difficult to speak of a 'typical' jhum field in Khonoma.

The example field shown in maps 2-2 and 2-4 is representative of a jhum field balanced against household and market demands. It is immediately striking that Khonoma does not follow the common swidden practice of mixing different crop seeds together and broadcasting them in a shotgun fashion. There is a much more deliberate arrangement of crop varieties into separate combinations and seedbeds. The terrace walls provide natural boundaries for these sub-plots and add to the appearance of an intensively groomed garden. Planting density is uniform and not influenced by proximity to alder trees. There is generally no use of inorganic fertilizers to compensate for nutrients lost through crop harvest, soil erosion or leaching.

Map 2-2. Example of Swidden Field with Managed *Alnus nepalensis*: 1st-Year Cropping Pattern (2000) (see map 2-1 for a 3-D representation of this field)



* *Does not include opportunistic harvest of wild food sources. Amongst the above domesticated crops, a wide assortment of unmapped wild vegetables (ganyanyü, khanhü, gatha, gakra, garie, gagei, time, gapa, gara and merie), wild mushrooms (pinya) growing on a decaying alder trunk, a wild fruit (rieza), and some small fauna (sego [crab] and sonhe [grub]) were also harvested, all for home consumption (K. and G. Meru, pers. com.).*

Twenty-three crop types were planted in this field in the first year[29], and they were supplemented by roughly another ten native plants harvestable as wild vegetables.[30] The planting pattern was carefully arranged to ensure that distinctive niches within the field were planted to the most suitable crops. The field was dominated by maize intercropped with potatoes[31] and a few other low-stature crops such as mustard and soybeans.[32] This double-strata approach allowed the farmer to exploit the vertical dimensions of his field. Particularly as the faster-maturing understory crops such as potatoes, peas, radish or mustard leaf were harvested, they could again be relay-planted into the maize, or alternatively, planted in rotation after the maize was harvested and the residue cleared away. At other times, even after the maize cobs were harvested, the stalks were retained as trellises for interplanted beans. Other less shade-tolerant crops such as chilli, cabbage and radish were assigned to separate terraces. As is often the practice, garlic was component-planted with mustard leaf so that its pungent smell repelled aphids and other insects from the latter. Maximum use was made of fence posts by planting climbing kidney beans and a few bitter gourds at their base to use them as trellises. In other places, stems of *Leucosceptrum canum,* purposely retained when the fallow was cleared, were similarly used to support kidney beans. Job's tears were scattered throughout the field, both as line plantings along the fence and terrace walls, and sometimes intersown with maize. Pumpkins and cucumbers were generally targeted at areas with extra ash where slash had been repiled and burnt. The greatest agrodiversity was around the fieldhut, where small patches of basil, chilli, carrots, turnips and assorted other vegetables were planted for kitchen use. They were conveniently located for the women who, at the end of the day, would grab a few handfuls of whatever was needed for that night's dinner before returning to the village.

While this briefly describes the initial crop arrangement seen in this field, it must be kept in mind that planting in Khonoma's jhums is no longer a one-time event. The fieldscape is dynamic and changes as mature crops are harvested and replaced with new plantings. However, extension of the cropping season is discouraged somewhat by a traditional village regulation that allows cattle and mithun into the jhum areas after the Tiekede festival in the closing days of

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[29] Although Keitzar reports counting up to "*57 different crops, both cultivated and conserved naturally grown crops*" (1998, 61, 65) in a single field in Khonoma, such extreme levels of crop diversity were never encountered during this study. This may reflect a trend towards dwindling agrodiversity as Khonoma becomes more market-oriented and focuses on the most remunerative cash crops. Other Naga authors also report up to 64 different crops in Nagaland jhum fields (Kikhi, 1999; Nakro, 2001, 5), but these should probably be interpreted as extremes, and not the norm. But cf. Husain (1988).

[30] *Zanthoxylum acanthopodium*, *Pogostemon* sp., *Houttuynia cordata*, *Oenanthe linearis*, *Fagopyrum cymosum*, *Polygonum plebeium*, *Gnaphalium affine*, *Plantago major*, *Centella asiatica*, *Dryopteris* sp.

[31] Thick soils are a prerequisite for root crops. But potatoes are planted in well-drained areas, taro in wet depressions, and sweet potatoes in sites with high ash content.

[32] Soybeans are usually planted in less fertile areas of the field where nodulation and yields are better.

November and the owners bear no liability for damage to remaining crops. This regulation worked well under the traditional cropping system when all crops were harvested by then and large livestock could graze the residues without causing any damage. It in fact constituted a supplementary harvest from the jhum fields, this time of fodder, and added to their total contribution to the village economy. But as cultivators have begun experimenting with extending their growing season, they have been drawn into increasing conflict with livestock owners that view jhum land as winter grazing grounds.[33] Although efforts are made to fence the fields, it takes something sturdier than a bamboo fence to stop a hungry mithun with its eye on greenery on the other side, especially during the dry season when succulent fodder is scarce.

4) **PLANT MANAGEMENT** (plates 2-31 – 2-65)

In managing their time, the Angami give priority to their wet rice terraces above all else. Labor inputs are not continuous but come in peaks when particular operations must be completed quickly. The best example of this is during rice transplanting in June.

Outside of bursts of peak labor demand in the irrigated terraces (field preparation, transplanting, harvesting) when all else is set aside, fieldwork generally goes on at a more relaxed pace. When villagers rise in the morning during the growing season, it is primarily the weather that determines if they descend into the valley to spend the day working in the irrigated terraces or trek upslope to their jhum fields. The general rule is to work in the wet rice terraces on rainy days, and reserve sunny days for the jhum fields. They try to avoid working in jhum fields on dark or rainy days when it is harder to kill weeds. Thus villagers often talk of the complementarity of dryland and wetland fields, and insist that everybody should have both.

The jhum fields are elastic in that they can absorb and offer a return to whatever surplus labor a household can muster. As described in the preceding section, labor investment can be minimized by broadcasting traditional subsistence crops that require less care, maximized through adoption of complex patterns of intensively managed cash crops – or anywhere between these two extremes. Plant management varies accordingly. The Job's tears that formerly dominated first-year swiddens were given two early intertillage operations with a spade (kejü) in May, during which the seedlings were thinned to the desired density. This was followed by hilling in June, and then up to another four weeding operations until harvest in late October to early November.[34] In contrast, the polycultures of cash crops found

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[33] See also Chapter 7.

[34] As fallow periods shorten in response to increasing land use pressures, Naga farmers are increasingly resorting to sodium chloride (salt) to keep proliferating weeds under control (Kikhi, 1999; Keitzar, 1993, 1998, 59). About 2 kg of common table salt are mixed with 15-20 litres of water, and applied at a rate of 100 kg of salt/ha (Ao, N.T., 2004). Although the long-term implications for soil health are unknown, the practice is

in swiddens today do not have such a well-defined and sequential management regime. Rather, any and all operations can be going on simultaneously as crops are staggered over time and space.

Recruiting New Alder Seedlings

Figure 2-16. Trees preserved as seed sources are not pollarded, but side branches instead heavily pruned to minimize shading on nearby crops**.**

While arable crops have quickly come and gone according to the whims of market pressure, alder trees have remained a relatively permanent fixture across Khonoma's landscape. Other than fluctuating fallow lengths, their basic management has remained unchanged. Since these are mixed aged stands, there are always trees at various stages of decline that need replacement. Usually they succumb to the relentless burrowing of *Batocera* sp. (kelu), *Holotrichia* sp. (luchü) and other larvae that eventually hollow them out to the point that they collapse under their own weight. Badly affected trees can easily be identified by the piles of 'kelu bo' (literally 'worm manure') that accumulate at the base of their hollowed trunks.[35] As they climb the trees to work on them, farmers are aware of their increasing unsteadiness and waning coppice vigor. If they don't collapse themselves, these dead or dying trees are eventually cut down and chopped into firewood.[36]

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effective against broadleaf weeds in dryland rice. (Farmers suggest hopefully that under Nagaland's heavy monsoon rains, the salt will quickly wash away and not accumulate.) The use of salt as a weedicide has less potential in Khonoma however, where vegetables would also be damaged by saline spray.

[35] In some small compensation, farmers praise kelu bo as one of the best fertilizers available and often collect it for potting soil. Samples collected for chemical analyses at Chiang Mai University (n = 6) averaged 9.505 pH, 67.846 g/100g OM, 1.004 g/100g total N, 0.094 g/100 g P, 2.167 g/100 g K, 1.603 g/100 g Ca, 1.154 g/100 g Mg and 7,146 mg/kg Fe (see appendix 2-5 for analyses of individual samples). The kelu bo is notably high in K, in which Khonoma's soils are generally low; this may explain in part why farmers notice a good plant response. A local woodpecker (seidu) that formerly fed on *Batocera* sp. larvae and kept its numbers in check has itself been decimated by uncontrolled hunting and is now rarely seen.

[36] The older alder stumps are prized as the best firewood, although tough to cut. Khonoma elders often refer to this in a metaphor used to teach persistence to youngsters. "*Even though it is so difficult to cut*", they urge, "*just keep chipping away and you will surely succeed*." It is often used in advising a would-be suitor how to win the heart of a reluctant village belle.

Conscious of the need to maintain alder populations on the landscape, farmers often retain a few 'mother trees' in their fields for seed dispersal.[37] These are not pollarded but lateral branches are trimmed back to reduce shading (figure 2-16).[38] Although pollarded trees also bear seed during the fallow period, farmers are adamant that it is less viable. Fruit from young alders that have not yet been pollarded for the first time (usually <9 years) is similarly thought to be inferior. Seeds, farmers claim, should preferably be collected from straight mature trees that have never been pollarded – thus the need for mother trees.[39]

With a source of viable seed thus assured, the next step is creating the requisite conditions for germination. Although soil nearby alder trees is soft and fertile, alder seedlings seldom establish there. In fact, alder seeds do not germinate abundantly anywhere in jhum fields where there is a thick humus layer. Rather, they require low-carbon soils such as that found on landslides, along road cuttings or at other disturbed sites where the red subsoil is exposed. Well aware of this, Khonoma's ancestors reportedly used it as an easy way to encourage alder germination in desired locations. During the first cropping year, they would turn over the soil in areas where they wanted alder to grow, thus exposing the red subsoil. This minimalist approach was all that was needed to create the microclimate needed for alder to germinate.

Perhaps as part of the wider trend of land-use intensification since then, most farmers now dig up alder wildlings and transplant them into their jhum fields (figure 2-17). They are often planted against the lower side of terrace walls, where they interfere less with the cropping area and later provide support for the walls. This gap-planting is done during the first cropping year, usually in May to June when there is abundant rainfall and few desiccating winds.[40] Wildlings are abundantly available along roadsides or anywhere there is freshly cut earth (figure

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[37] This is the exact opposite strategy of foresters who want to eliminate *A. rubra* from conifer stands on the west coast of North America (Harrington et al., 1994, 10). The Nagas, purposely maintain alder seed trees on the landscape and turned over soil, exposing mineral subsoils, at specific spots where they wanted to encourage germination.

[38] Hutton referred to this practice in a 1926 tour diary, in the context of suggesting the Khonoma model as a way of halting forest degradation in Zunheboto:

> "For about every half dozen or so pollarded, it is desirable to leave one with a straight clipped pole and just a tuft of leaves at the top. This tuft bears abundant seed and helps to sow the neighboring ground with seedlings, particularly where *Coix* is cultivated as they grow up admirably among the *Coix* stalks. This method is practiced in Khonoma and works admirably there." (Hutton, 1926a)

[39] In nearby Kohima, elders talk about their ancestors broadcasting alder seed into their jhum fields on windy days (akin to Troup's (1921) account of Kachin practices). The seedlings would later be thinned out to the desired density. Some suggest that 'rü pruo', the Angami term for alder, means 'seeds flying' and was derived from this practice (Llezie, 2001).

[40] See also Hutton (1926a) on propagation techniques.

2-18). They are dug up as bare-root stock and transplanted within the same day.[41] Spacing need only be sparse, perhaps about 5-7 meters between trees, for properly managed coppices to achieve a full canopy during the fallow phase. Sample fields monitored during the study averaged 192 alder trees/ha, or roughly 7 meters spacing between trees.[42]

Figure 2-17. New alders are usually self-sown or transplanted during the first cropping year, and thus benefit from routine maintenance operations directed at the crops.

Figure 2-18. Collecting alder seedlings from roadside to transplant into jhum fields.

First Thinning of Alder Coppices

As already described, the jhum fields are largely deserted during June when all efforts are focused on the wet rice terraces in the valley. As rice transplanting finishes, the villagers rush back to the jhums in July to pull the weeds that proliferated in their absence. Potatoes and other early maturing crops such as radish, coriander, beans and peas are by this time nearly ready to harvest.

Trials in nearby Sikkim found that N-fixation by alders peaks around July in response to increased soil temperature and root nodule moisture (Sharma and Ambasht, 1984; Sharma, 1988). It may, therefore, be well synchronized with the crops' uptake demands. Accelerated decomposition of remaining litter in the warm rainy season further augments soil fertility (Sharma and Ambasht, 1987).

By this time, the alder stumps have each sprouted 150 to 300 coppices. Left unmanaged, these sprouts would choke each other out and none would gain the dominance required for good growth. Selective thinning is needed to retain only a

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[41] The Khonoma valley, sheltered by surrounding mountains that trap clouds and rain, is akin to a large mist chamber that provides ideal conditions for transplanting. People in Porba and other Chakhesang villages interviewed during this study described much more elaborate transplanting methods.

[42] This resonates nicely with the recommendations of Hibbs and DeBell (1994, 213), who suggest 7 m as the effective dispersal distance for the nitrogen fixed by *A. rubra* planted in mixed stands with conifers. The Nagas, like North American foresters, seek to balance the conflicting factors of needing enough alders to adequately improve soil throughout the field, but not so many as to create a shading problem that reduces yields of the companion crops (be they trees or food crops). It's interesting that they appear to have reached similar conclusions about the proper alder density to achieve that balance.

small number of healthy coppices per stump. In late July to early August, the men return to the fields to climb the alder stumps for the second time that year. All side branches are hacked off (figure 2-19) as they work their way to the top of the stumps and position themselves within the thickets of new coppices. Each stump is appraised for its size and health in deciding how many coppices should be retained. They err on the high side during this first thinning, usually leaving 10 to 15, with the expectation of some mortality from winds, and the *Erthesina fullo* (kwünya) insect that sucks the tender growing tips of young alder coppices. Excessive numbers can always be trimmed back during the second thinning later in December, and usually only four to six will dominate and form major coppices during the subsequent fallow.

Figure 2-19. When farmers approach alder trees to conduct the first thinning operation in July, they begin by trimming away all side branches.

In choosing which to retain, the men look for particularly tall and straight coppices evenly distributed around the top of the stump.[43] Each retained coppice is pruned of all its side branches and foliage, leaving only a few leaves at the tip (figure 2-20). These coppices are then left to grow, creating a canopy during the approaching fallow. The remainder are cut flush with the trunk. Special care is taken to make the cuts as cleanly as possible and avoid splitting the trunk or leaving depressions that could collect water. Any reestablishing epiphytes are again cut away. Finished, they climb back down and spread the pruned coppices around before moving on to the next tree (figure 2-21).

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[43] Wind damage is probably the biggest threat to these soft young coppices, particularly during the windy season in March and April. Although not reported in Khonoma, elders in neighboring Kohima village took wind direction into account when selecting which coppices to retain. Since winds usually blow from west to east, they favored coppices on the west side of the stump with the belief that they are less easily damaged (Llezie, 2001). This may be less critical in Khonoma where surrounding mountains provide some shelter against winds.

How do Alder Trees Influence Nearby Soils and Crop Performance?

Beyond its importance to firewood yields, farmers also emphasize that timely coppice management helps prevent yield reductions in crops around the base of the tree. Coppices left unthinned, they observe, lead to excessive vegetative growth in nearby crops, but little fruiting. This raises the critical issue of tree-crop dynamics in the dispersed alder system. We usually associate tree-crop interactions with competition for scarce growth resources (sunlight, water, nutrients), but alder stands out as unusual in that farmers talk about its synergy with crops.

Figure 2-20. The farmer then climbs to the top of the stump, and with swift strokes of his dao, thins the coppices until only 10-15 remain, evenly distributed over the stump.

Figure 2-21. After the coppices are thinned, the cuttings are then scattered as a green manure.

The coppice thinnings themselves represent a significant input of biomass, which further concentrates fertility in the soil immediately surrounding trees. The chemical composition of the leaves and branches are presented in table 2-4, and the flow of biomass and contained nutrients returning to the soil through coppice thinnings are shown in table 2-5 (see appendices 2-6 and 2-7 for raw data). As expected, there is a very close relationship between the ratio of leaf to branch weight in the thinned coppices (1.53 leaves : 1 branches, fresh weight basis) (figure 2-22a-c), with most nutrients contained in the leaves. It can also be seen that the taller the stumps, the greater the coppice biomass that was returned to the soil by thinning (figure 2-23a-c). Together, the two thinning operations contribute about 1187.35 kg/ha of mulch (dry weight) back to the soil, containing 32.91 kg of N, 2.54 kg of P, 15.46 kg of K, 17.97 kg of Ca, 3.29 kg of Mg, and 5.09 kg of Fe. This partially explains the phenomenon outlined over the next few pages and highlighted in figures 2-24 to 2-26, in which rice performance nearby alder trees is found to be superior in those fields where native fertility has been reduced.

Figure 2-22. Relationship between Leaf and Branch Biomass of Thinned Coppices

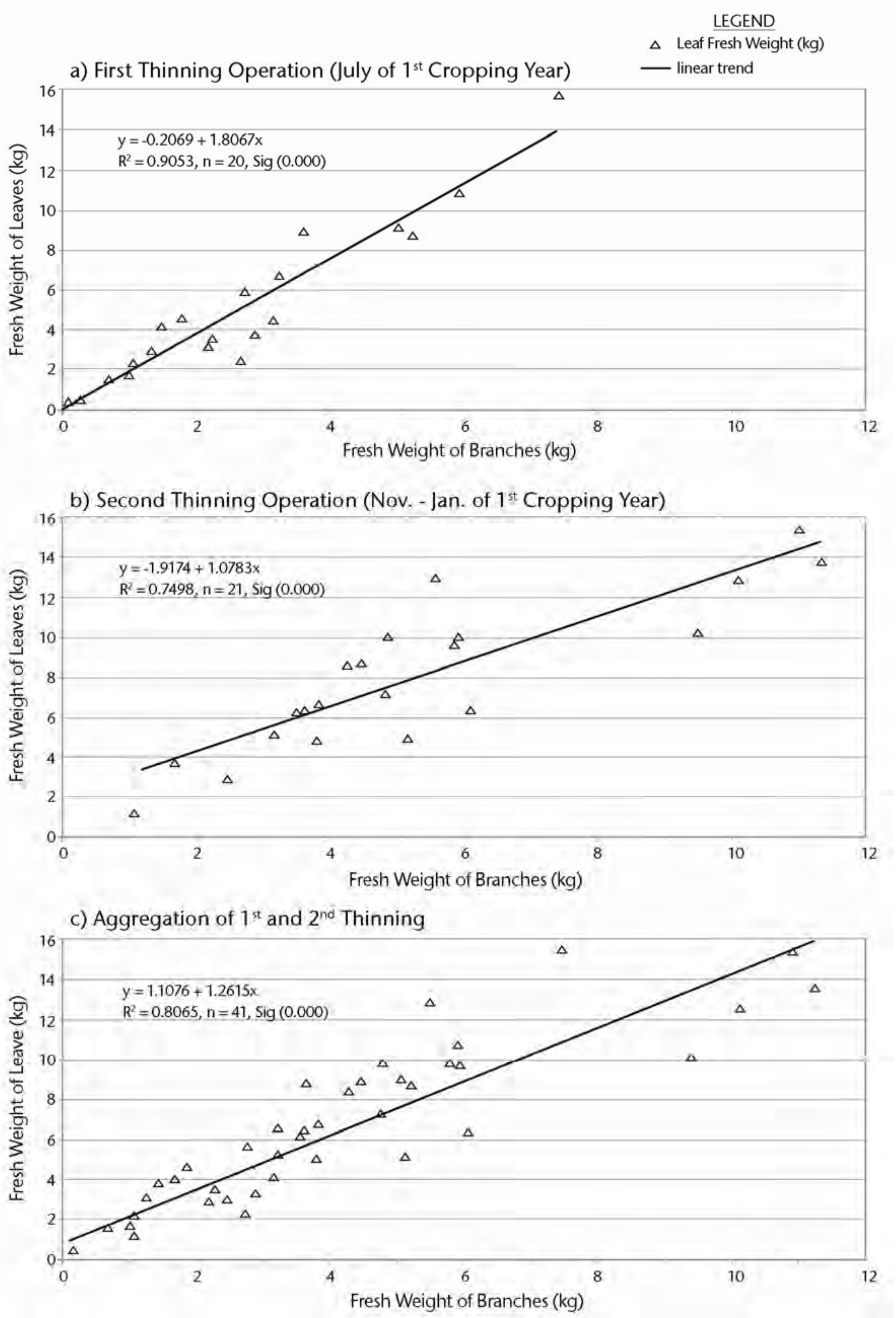


Figure 2-23. Relationship between Stump Height and Biomass of Thinned Coppices

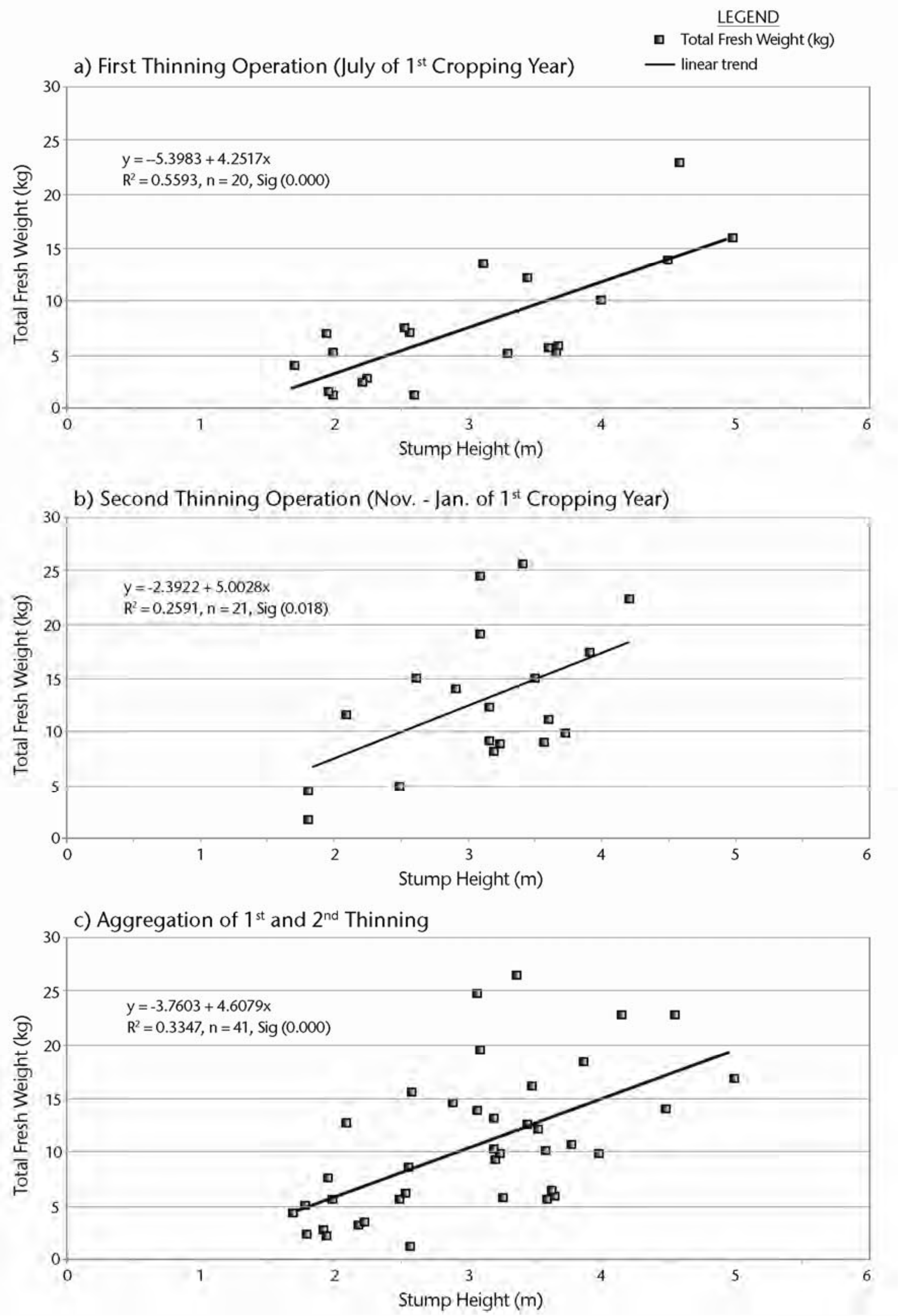


Figure 2-24 to 2-26. Effect of Distance from Alder Stumps on Crop Performance

Figure 2-24. Higher Fertility Sites

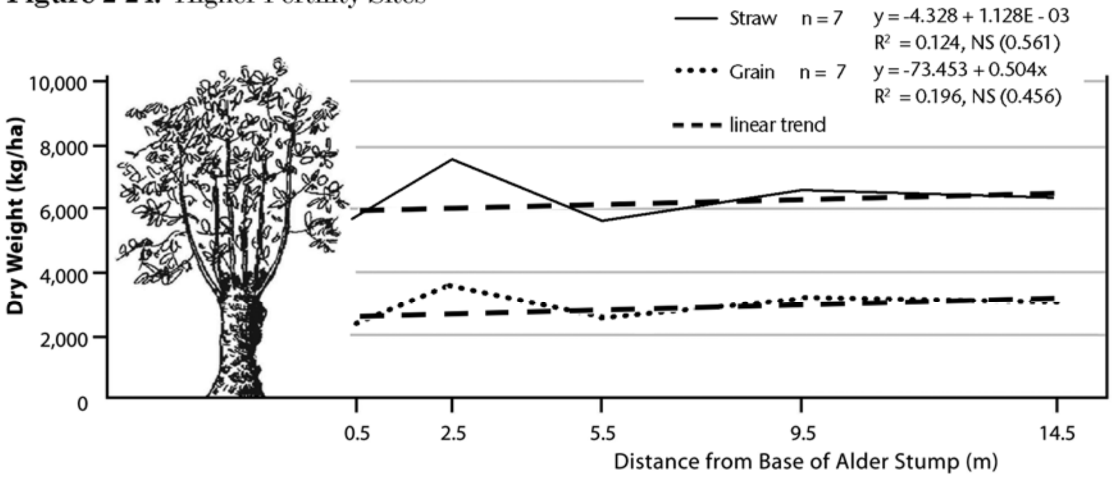


Figure 2-25. Lower Fertility Sites

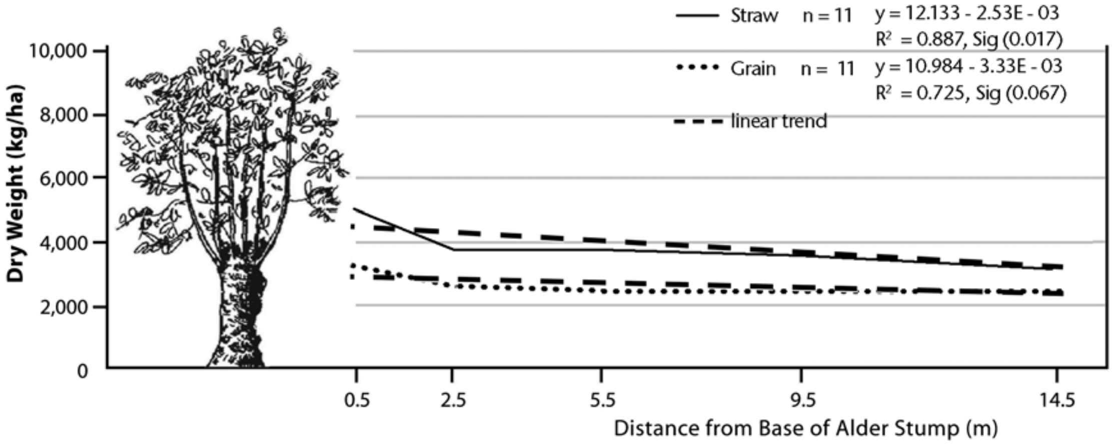


Figure 2-26. Straw : Grain Ratio of Rice Crop as Influenced by Distance from Alder Stumps

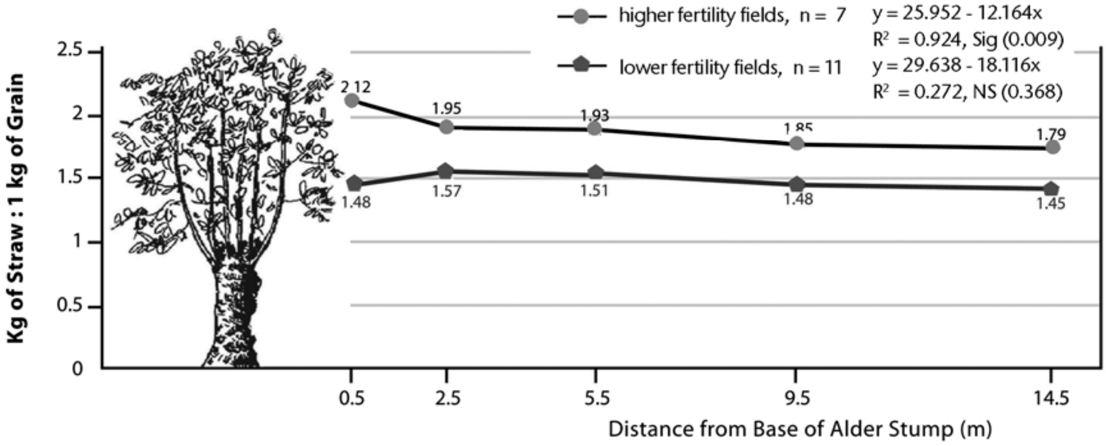


Table 2-4. Chemical Composition of Coppice Thinnings (dry weight basis) †‡*

	N	**P**	**K**	**Ca**	**Mg**	**Fe**
	%	*%*	*%*	*%*	*%*	*mg / kg*
1st Thinning (July):						
leaves (60.86% of total DW)	3.354	0.254	1.586	1.056	0.301	578.73
branches (39.14% of total DW)	1.395	0.182	1.143	0.739	0.199	723.89
total (100% of total DW)	**2.587**	**0.226**	**1.412**	**0.932**	**0.261**	**635.54**
2nd Thinning (Dec.-Jan.):						
leaves (55.78% of total DW)	3.921	0.253	1.650	1.718	0.323	442.23
branches (44.22% of total DW)	1.501	0.154	0.758	1.814	0.238	213.77
total (100% of total DW)	**2.851**	**0.209**	**1.255**	**1.760**	**0.285**	**341.21**
Aggregate of Both Coppice Thinnings:						
leaves (56.69% of total DW)	3.637	0.254	1.618	1.387	0.312	510.48
branches (43.31% of total DW)	1.448	0.168	0.951	1.276	0.219	468.83
total (100% of total DW)	**2.689**	**0.217**	**1.329**	**1.339**	**0.272**	**492.44**

‡ 2 trees randomly sampled in each of 10 monitored jhum fields (n=20) for each thinning (see appendix 2-6).

† Plant analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University on Jan. 11, 2002. (See appendix 2-7)

***** Methods used for plant analyses:

Total N:	Micro-Kjeldahl Method	Ca:	EDTA Titration
P:	Brays Method No. 2	Mg:	EDTA Titration
K:	Flame Photometry	Fe:	o-Phenanthroline

Table 2-5. Nutrients Returned to Soil from Coppice Thinnings

	Lopped Biomass (DW)	**N**	**P**	**K**	**Ca**	**Mg**	**Fe**
Per tree:	*g*	*g*	*g*	*g*	*g*	*g*	*mg*
1st thinning	1,843.07	47.68	4.16	26.02	17.18	4.81	1,171.34
2nd thinning	4,341.06	123.76	9.07	54.48	76.40	12.37	1,481.21
aggregate	**6,184.13**	**171.44**	**13.23**	**80.5**	**93.58**	**17.18**	**2,652.55**
Per hectare: †	*kg*	*kg*	*kg*	*kg*	*kg*	*kg*	*g*
1st thinning	353.87	9.15	0.80	5.00	3.30	0.92	224.90
2nd thinning	833.48	23.76	1.74	10.46	14.67	2.37	284.39
aggregate	**1,187.35**	**32.91**	**2.54**	**15.46**	**17.97**	**3.29**	**509.29**

† Calculated from table 2-4 and assuming a tree density of 192/ha.

Transect measurements taken in rice jhums on the lower slopes of Khonoma's eastern jhum blocks (map 2-3) revealed that higher crop yields near alder trees are not unequivocal, but rather the level of ambient soil fertility is pivotal in determining the net impact of alder on adjacent crop yields. Although unplanned, it turned out that our transects were taken in two areas that were qualitatively quite different:

1. an area closer to the village that was a bit higher in altitude, cooler, had not been cultivated as a jhum for a long time, had good populations of vigorous-looking alder and black soils (shown as red stars) – conditions similar to those in the southern jhum blocks; and
2. an area more distant from the village, that was further downslope, undoubtedly warmer, with reddish soils, only sparse alder, and had been cultivated more regularly (green stars).

Based on these observed differences, we tentatively titled them as 'higher' and 'lower' fertility areas, but when the soil analysis later became available, the contrast was not as significant as expected (table 2-6). Perhaps in concert with other environmental influences, they were nevertheless sufficiently dissimilar to lead to consistently different patterns of influence by the alder on nearby crops.

Table 2-6. Average Chemical Analyses† of 'Higher' and 'Lower' Fertility Fields where Transect Measurements were Taken †‡*

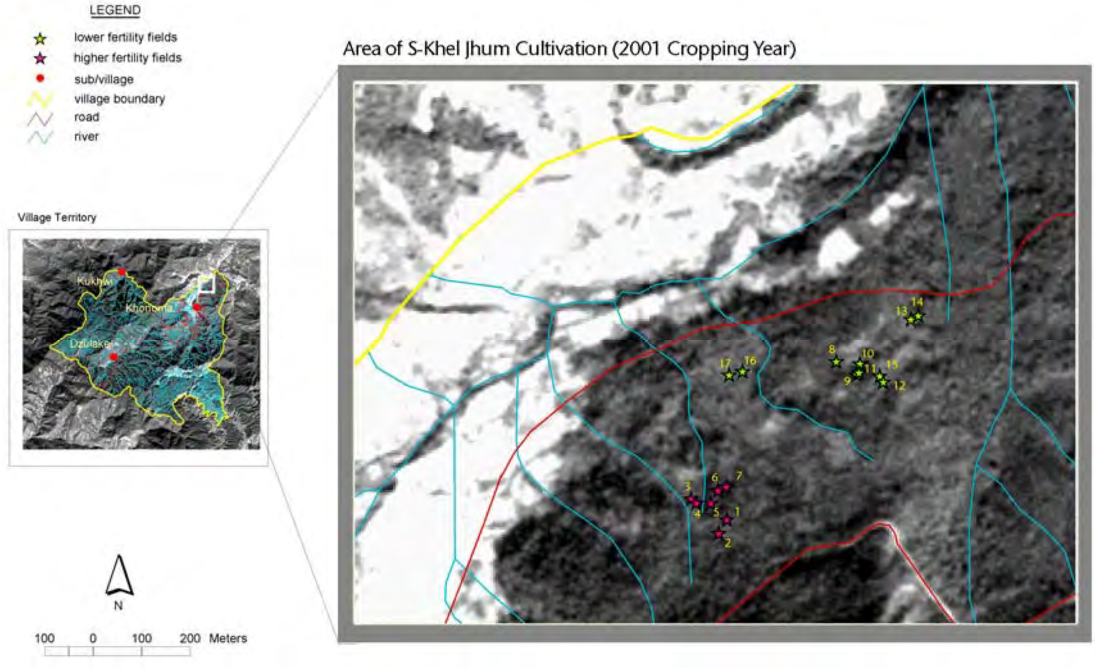
Fertility Status	No.	Sampling Depth	pH	N	$P_2 0_5$	K_2O	OC
	transects	*cm*		*kg/ha*	*kg/ha*	*kg/ha*	*%*
Higher	7	0-15	4.55	362.18	47.14	144.93	1.43
		15-30	4.57	363.08	48.43	130.84	0.96
Lower	11	0-15	4.52	308.23	43.97	118.74	1.14
		15-30	4.51	307.02	40.91	148.30	1.23

† Soil analyses conducted at the Directorate of Soil Conservation, Kohima, Nagaland in July, 2002.
‡ Related to figures 2-24 – 2-29.
* Methods used for soil analyses:

pH:	soil to water ratio 1:2	K:	Turbidimetric Method
N:	Alkaline Permanganate Method	OC:	Walkley and Black 1934
P:	Brays Method No. 1		

In more fertile fields, rice encircling alder stumps exhibited lush vegetative growth but many unfilled husks – classic symptoms of excessive nitrogen. It remained dark green, even while the remainder of the field had already turned a golden yellow and was ready for harvest. Our measurements confirmed slightly lower grain and straw yields immediately at the base of alder trees, but that yields jumped a couple of meters out, and then plateaued as we moved away from the tree's sphere of influence (figure 2-24). The pattern was remarkably different in lower fertility fields, where highest yields were found immediately next to the alders (figure 2-25). Comparing the two graphs, it is striking that the fields with superior fertility produced a lot of extra straw, but little additional grain.[44] This is seen in consistently higher straw : grain ratios in the more fertile fields (figure 2-26). Our visual observations of strong vegetative growth but reduced grain formation at the base of alders in conditions of higher fertility are also verified by an elevated straw : grain ratio that gradually declines as we move away from the trees.

Map 2-3. Location of Transects Testing Effects of Alder on Crop Performance and Soil Properties



Analyses of soils sampled[45] along these same transects showed that litterfall and coppice thinnings were creating black organic soils with reduced bulk density under the alder canopy (figure 2-27). As new coppices grew and provided increasing shade from direct radiation, soils nearby the trees remained cooler (figure 2-28). In the following discussion, both the reduced sunlight and high nitrogen content of these organic soils are posited as important factors in reducing rice yields. Moisture content was generally uninfluenced by closeness to alder trees, with an unexplained exception of transects taken in the higher fertility fields that showed a drying trend as trees were approached (figure 2-29). The increased soil humus near alders (high O.M. % and low bulk density) should theoretically improve moisture retention, as more rainfall percolates into the soil and less flows away as surface run-off.

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[44] Although there are significant varietal differences, in general rice does not always respond to very fertile soils with high yields. One of the thrusts of the Green Revolution was to breed rice that could channel improved fertility into higher grain yields rather than vegetative growth. This may be the explanation behind an intriguing entry that Hutton made in his travel diary while touring in Tuensang area in 1926:

> "15th May, 1926. To Yekura. The terraced jhums through which the path goes are the acme of scientific jhumming. …. Sometimes three crops in succession are taken off these jhums before letting them go fallow again, but the secret of this cultivation apparently is to put no rice on these jhums – only millet and Job's tears." (Hutton, 1926b, 1-2)

[45] Analyses of soil chemical properties is still continuing at the time of writing this chapter.

Figure 2-27 to 2-29. Effect of Distance from Alder Stumps on Soil Physical Properties

Figure 2-27. ... Bulk Density

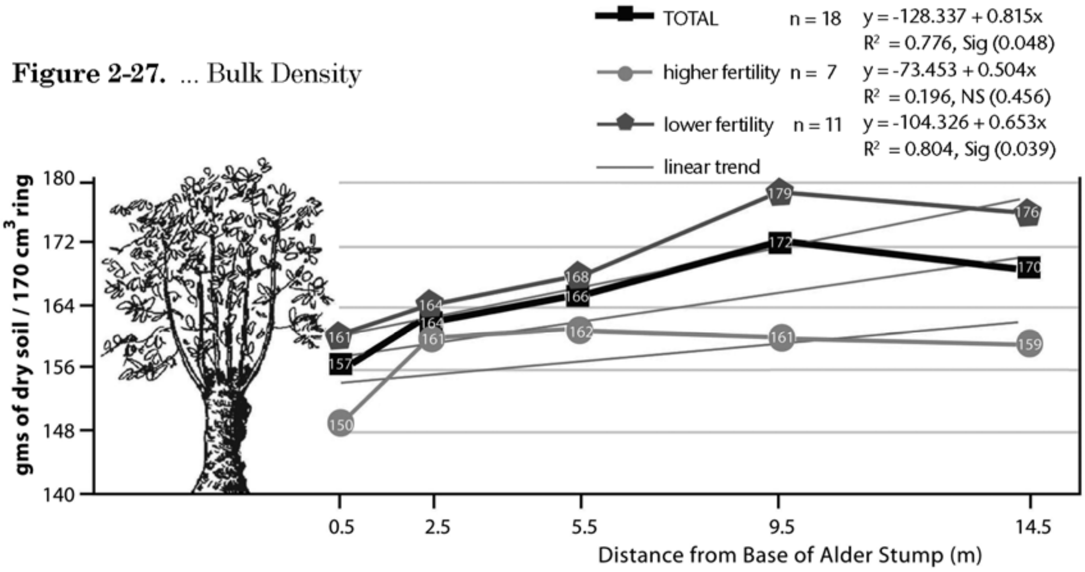


Figure 2-28. ... Temperature

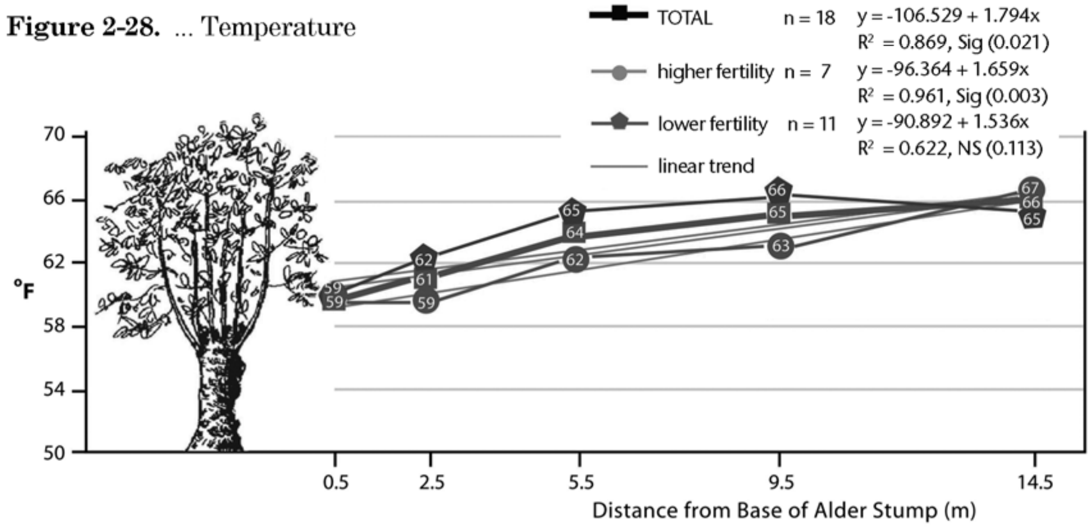
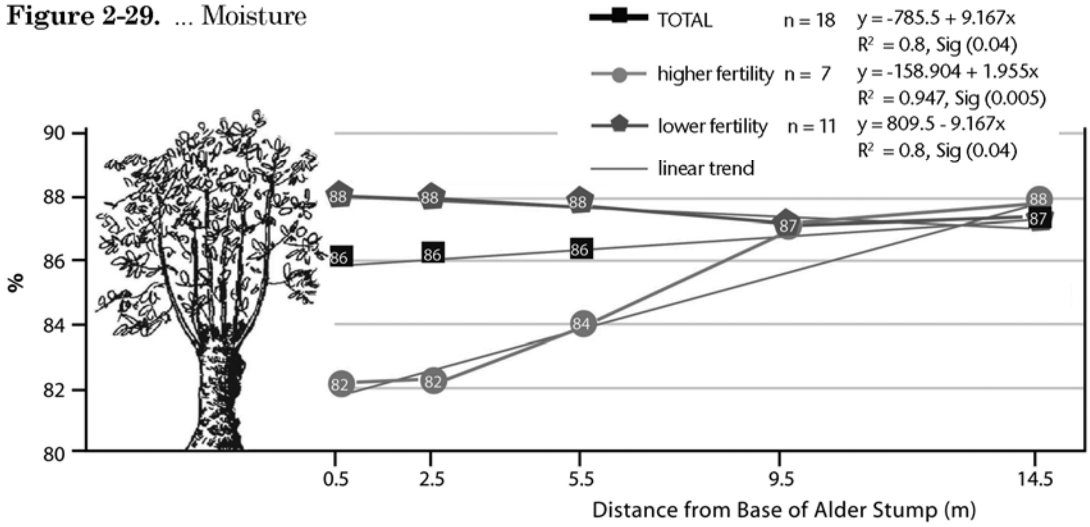


Figure 2-29. ... Moisture



Discussing these findings with Khonoma's farmers triggered their recollection of ancestral teachings that if the soil is already fertile, the added effect of alder does not help much – but it helps a lot in less fertile soils.[46] This confirmed the exciting potential of alder as a fallow species that can 'prop up' degrading swidden systems. Although farmers claim that all crops perform well in association with alder[47], further research is needed to explore which are better able to channel improved fertility into higher yields. Khonoma's experience suggests that Job's tears and maize are physiologically better able than rice to translate higher field fertility into full granaries. But even here, there can be problems with lodging, and farmers speak of qualitative differences in crops growing adjacent to alder, describing them as 'weaker' or 'softer', even if yields are good. Maize growing next to alder, for example, has a softer husk and inferior taste compared to that from elsewhere in the field.

The only crops that farmers generally advise against planting around alder are cucurbits, beans and other climbers that would use the stumps as a trellis. They felt that the vines might interfere with the sprouting coppices, but more importantly, would certainly hinder access to the trees for proper coppice management. This, in turn, would depress cereal yields around the trees. The importance that farmers attach to timely thinning of the coppices probably reflects the need to minimize shading. Rice is a particularly thermo-sensitive plant, and photosynthetic activity during the fertilization and dough stage is very important to yields. Khonoma is already cool and cloudy much of the time and the added shading of unthinned coppices would be likely to reduce yields.[48] Farmers intervene through pruning to prevent the detrimental effects of competition from outweighing the beneficial effects of N-fixation. Their management is aimed at capturing the benefits while minimizing the problems.

If these data do not present a clear picture of significantly better yields nearby trees, then at least they disprove any serious problems with competition. This shows that farmers can keep these alder stumps dispersed throughout their jhum fields without paying a price in terms of negative impact on adjacent crops. The area of the field occupied by alder stumps – and thus unavailable for cropping –

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[46] Disappointing rice yields are often reported from highly fertile organic soils (Nakro , 2001, 5). In conditions of high fertility, rice yields often improve in the second cropping year. This stands in contrast to the scenario of plummeting yields (and proliferating weeds) that we usually associate with shifting cultivation and accept as the reasons why farmers must shift to new fields.

[47] Bhatt and Todaria (1990) claim however, that *A. nepalensis* exhibits an allelopathic effect on soybean. Certainly most upland farmers usually prefer red laterite soils for planting soybean – very different to the black organic soils usually found under alder. Field trials in Meghalaya also reported reduced soybean yields when intercropped with *A. nepalensis* and other multi-purpose tree species on degraded acid alfisols (Dhyani and Singh, 1995).

[48] The cereals traditionally planted in Khonoma's jhums – Job's tears, millets and maize – are C4 plants that have a higher demand for light. Rice, which is grown in warmer areas, is a C3 plant.

is adequately compensated for by the firewood harvested and accelerated soil rejuvenation.

5) **HARVEST** (plates 2-66 – 2-73)

As harvest season approaches, shortening day length and cool evening temperatures serve notice that winter is approaching. The wet rice terraces are harvested in October, and then by mid-November it is time to return to the first-year jhums to harvest Job's tears.

Unlike paddy and millet, there is no "first reaper" assigned to perform rituals to initiate harvesting of Job's tears. It may be that the villagers consider that the first-reaping rituals already performed for the wet rice crop suffice for all other crops harvested thereafter, because Job's tears are generally harvested almost immediately after the wet rice.[49]

Angami celebrate the Tiekede festival in late November to mark completion of the jhum harvest. This is the end of the agricultural year, after which livestock are allowed into the jhum area to graze crop residues.

The harvest schedule has obviously become much more complicated as Khonoma's jhums have increasingly been transformed into diverse market gardens. Harvesting now begins with earlier-maturing crops in May to June, and continues until the Job's tears and pumpkins are harvested in November. Women seldom return from the fields empty-handed. In contrast to the marked seasonality of the wet rice terraces, there is a continual flow of inputs and outputs to and from the jhum fields.

Harvest is also the time when superior seed is selected for planting the following year. It is carefully threshed and dried and stored in containers safe from insects and rats. Procedures for handling planting materials obviously vary, depending on the crop.[50]

Second Thinning of the Coppices

That winter, the coppices are thinned for the second time (figure 2-30). Those retained during the first thinning are now up to two metres tall and the hardened wood is not as easily cut as last time. The technique is essentially the same as before, but more selective. All new regrowth is first trimmed away, and then any of the originally retained coppices that are now judged to be inferior. About eight to twelve branches are finally preserved, depending on the size and health of the stump. From

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[49] When the "first reaper of paddy" (terhüliede) performs her rituals in the wet rice terraces, this is considered to also encompass dryland rice grown in the jhum fields – so one ritual covers both.

[50] See Keitzar (1998, 85-86) or Kikhi (1997, 60-61) for brief descriptions of seed selection and handling procedures by Naga jhum cultivators.

these, only four to six will gain apical dominance and form the canopy in the subsequent fallow. The pruned coppices are later piled and burnt along with crop residues in preparation for sowing the second-year crops. This is the third and final handling of the alders within the jhum cycle. They receive no further attention until the next cycle begins and it is time to reopen the fallow.

Figure 2-30. A second and final thinning operation is done that autumn after crop harvest. The coppices are now almost a year old and up to two metres high.

Second Cropping Year

(plates 2-74 – 2-91)

By now, everyone is busy opening a new jhum field elsewhere, and fields entering their second cropping year are given far less attention. They offer no firewood harvest this time, but little land preparation is needed and soil fertility is still sufficient to support another crop. Foxtail millet is a less demanding crop that provides a harvest from second-year fields with minimal labor inputs. Part of millet's appeal probably also lies in its early harvest, in July, providing food to bridge farmers over what is traditionally the lean period when the previous year's crop is finished but the current year's is not yet mature.

By January, farmers return to the fields to clean up and burn residues from the previous year's crops (figure 2-31). The residues are carefully raked away from any new alder seedlings that established during the previous cropping year to keep them at a safe distance from the fire. In some cases, a sheath from a wild banana stem may also be fitted around the seedling as a protective shield (figure 2-32). Any damage inflicted by free-ranging cattle and mithun is repaired, primarily mending fences and replacing any stones knocked from the terrace walls.

Those villagers who continue to follow the traditional religion must wait for the elderly man elected as "first sower of millet" (sütsiekrü) to perform his rituals before planting can begin. This is usually done on the second day after the Terhünyi festival in December. The procedure is similar to that followed the previous year for first sowing rites for Job's tears. It is announced the previous night through the thehous. Although a death in the village should theoretically cause its postponement, in practice, there is flexibility on this; if the family of the deceased doesn't wail too loudly, then the ritual may go ahead – and the death won't be publicly announced until afterwards.

Figure 2-31. Farmers return to their jhum fields that winter to clear away crop residues from the previous year and prepare the seedbed for the following year's crop. This 2nd-year tillage again trims back alder roots and nodules.

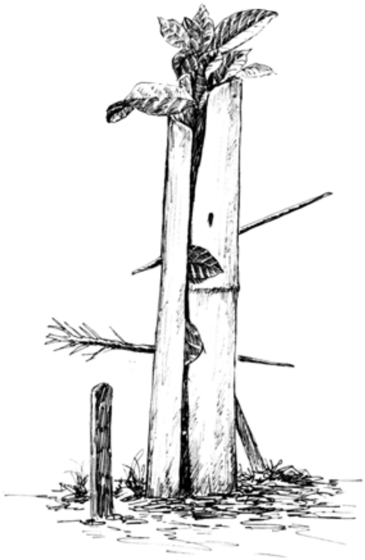

Figure 2-32. Before burning crop residues and weeds, newly-established alders must be protected from fire, sometimes by placing a sheath from a wild banana stem around them.

The sütsiekrü recruits two young boys to assist him who, unlike him, are still "*clean* [virgin] *and not yet married*". The boys sleep at his home the previous night and early the next morning, his wife prepares for them a packet of millet, perilla, maize and garlic seeds mixed together. After praying over the seeds and asking Ukepenuopfü's[51] intervention for a successful crop, the sütsiekrü sends the boys off to the jhum field to ritually plant the seeds.[52] They are usually accompanied by many young friends, and on that day only, they have the right to collect firewood from anyone's field or even take it from others' stacks to burn at the thehou that evening. The sütsiekrü himself won't go outside the village gates that day, and must neither leave the village territory nor entertain guests for the next five days. Nor should the fire in his hearth be permitted to die over this time. But the rest of the villagers can begin to sow millet, as well as maize and garlic, on the day following the ritual (Whiso, Z., 2000).[53]

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[51] The Supreme Goddess in Angami traditional religious beliefs, considered to be the mother of all things.

[52] These customs are less strictly followed these days, and this is probably a sign of the decline of traditional beliefs. The boys may not bother to go to the jhum field, but instead dig a hole and bury a handful of seeds anywhere outside the village gates. However, they should first seek permission from the owner of the land chosen, since one should not "*steal the land to plant seeds*".

[53] Zaseu Whiso, from Thevomia khel, has been sütsiekrü in Khonoma for the past 10-15 years. He was chosen as the oldest male follower of customary religion in his clan, and will continue in this role for the rest of his life.

Millet, usually mixed with perilla, is broadcast in February before soil tillage. The soil is then hoed, any lumps broken up and the seedbed leveled. The field preparation is just as meticulous as it was in the first year.

The crop is well established by March, when it is hoed and thinned for the first time. Further weeding operations take place in both April and May, and by July to August, the foxtail millet is ready for harvest.

Again, those who follow traditional beliefs must wait for the "first reaper of millet" (süliede) to perform the necessary ritual before harvest can begin. The ritual is preceded by three gennas[54] that are observed on consecutive days after the Tekrenyi festival: 1) pieketho – so that paddy will yield a heavy crop uniformly throughout the field; 2) meketho – so that the crop will ripen at the same time; and finally, 3) temvüke – for which a pig is slaughtered and the meat distributed. On the fourth day, the elderly woman elected to represent the village as its süliede packs her lunch, takes some ash from the hearth, and departs for the field in the company of a young boy. Upon arriving, she cuts a clean banana leaf and uses it to wrap the ash, and often adds bits of rüpu (soil from a termite mound), tsochü (earthworm castings), and leaves of kuchü (*Urena lobata*).[55] While uttering a prayer, this mixture is then tied onto some millet plants. The süliede then turns her attention to harvesting some millet, maize and garlic, but leaves untouched those plants from which the banana leaf packet now hangs. On her way back to the village, she pauses midway to declare, "*Come and help me. I've already started harvesting.*" The entire village can then begin harvest on the fifth day. When the Tietede genna is later observed, then the süliede will return to her field to complete its harvest (Whiso, K., 2000).[56]

The Tsünyi festival celebrates the millet harvest in August, and this again marks the time after which livestock are permitted entry into second-year jhum fields without liability for damage to remaining crops. The perilla is not harvested until later in October to November, but is apparently not damaged by livestock. By then, the access paths will be mostly overgrown, the alders forming a canopy, and weedy undergrowth quickly covering any trace of the previous crop. The transition from field to forest is seamless.

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[54] The taboo concept in Angami traditional belief, on which a day's work is banned and contact with the outside world forbidden for ritual reasons.

[55] Since everything harvested from the fields is cooked over the fireplace, it is respected as playing almost a paternal role in Angami households. The rest are used to symbolically represent desirable qualities in the crop. Earthworm castings denote fertile soil, and are commonly used by shifting cultivators as an indicator when choosing a site to open for cultivation. Moreover, the earthworm is considered to be the richest animal because it eats the soil and thus its food is always in abundance. It is hoped that the crop to be harvested will be equally plentiful. Both the worm castings and the termite mounds are believed to contain the purest soil, again relating to the hoped-for purity of the harvest.

[56] Kevilhu-ü Whiso, from Thevomia khel, has been süliede in Khonoma for the past three years. She was elected because she was the oldest woman in her khel amongst those who retain the old religious beliefs. There are two women senior in years to her, but both are Christians.

Like Job's tears, millet has fallen from popularity as jhum cultivation has become more commercialized. The field that we've been discussing as an example (maps 2-1 and 2-2), had a second-year cropping pattern much more complicated than the traditional millet-perilla intercrop just described, but still a great deal simpler than it was in the first year (map 2-4). The number of crops planted had dropped from 23 to 12, or by almost 50%. This was a field in transition, in which the farmer had integrated new cash crops with old subsistence standbys that he still valued.[57] Small pockets of potatoes, garlic, peas and chilli were scattered throughout the millet-perilla mix that dominated the field. Elsewhere, maize had been interplanted with faster-maturing potatoes and peas, again mixing crops in spatial and temporal patterns that maximized land use.

Also noteworthy was work that had been done on the tree component of the field. Alder seedlings had been gap-planted to fill holes in the alder's distribution and a few wild apple (*Docynia indica*) and neem (*Melia azedarach*) interplanted as investments in fruit and timber respectively. Because alder is only moderately shade tolerant, other large trees can only be planted sparingly in alder fallows, or the alder will die.

Continuing with our close monitoring of the sample field, we returned at the end of the second cropping year to measure the stumps and coppice growth of all 42 alder trees scattered across the field (appendix 2-4). Our sample size was too small to establish significant trends, but a tendency to retain more coppices on larger stumps was nonetheless apparent (figure 2-33).[58] It could also be seen that the more coppices that were retained per stump, then the slower they grew as they competed for the tree's resources (figure 2-34). Plates 2-102 – 2-111 in the photograph gallery show an individual alder tree from the time of its initial pollarding in late 1999 and trace its rapid coppice growth until the end of the two-year cropping phase in late 2001. This helps to illustrate the close integration between crops and trees, and that forest regeneration is already well underway while the crops are still in the field.

This brings us to the conclusion of the cropping phase. There may be occasional revisits to cut broom grass, or forage for wild fruits and vegetables, but the fields are now generally surrendered to wandering cattle and mithun for the duration of the fallow. The livestock can find the best grazing in young fallows, where crop residues remain and succession species have not yet turned woody. As the animals follow closely behind cultivation, young fallows provide a pasture phase that is often overlooked in analyses of swidden productivity.

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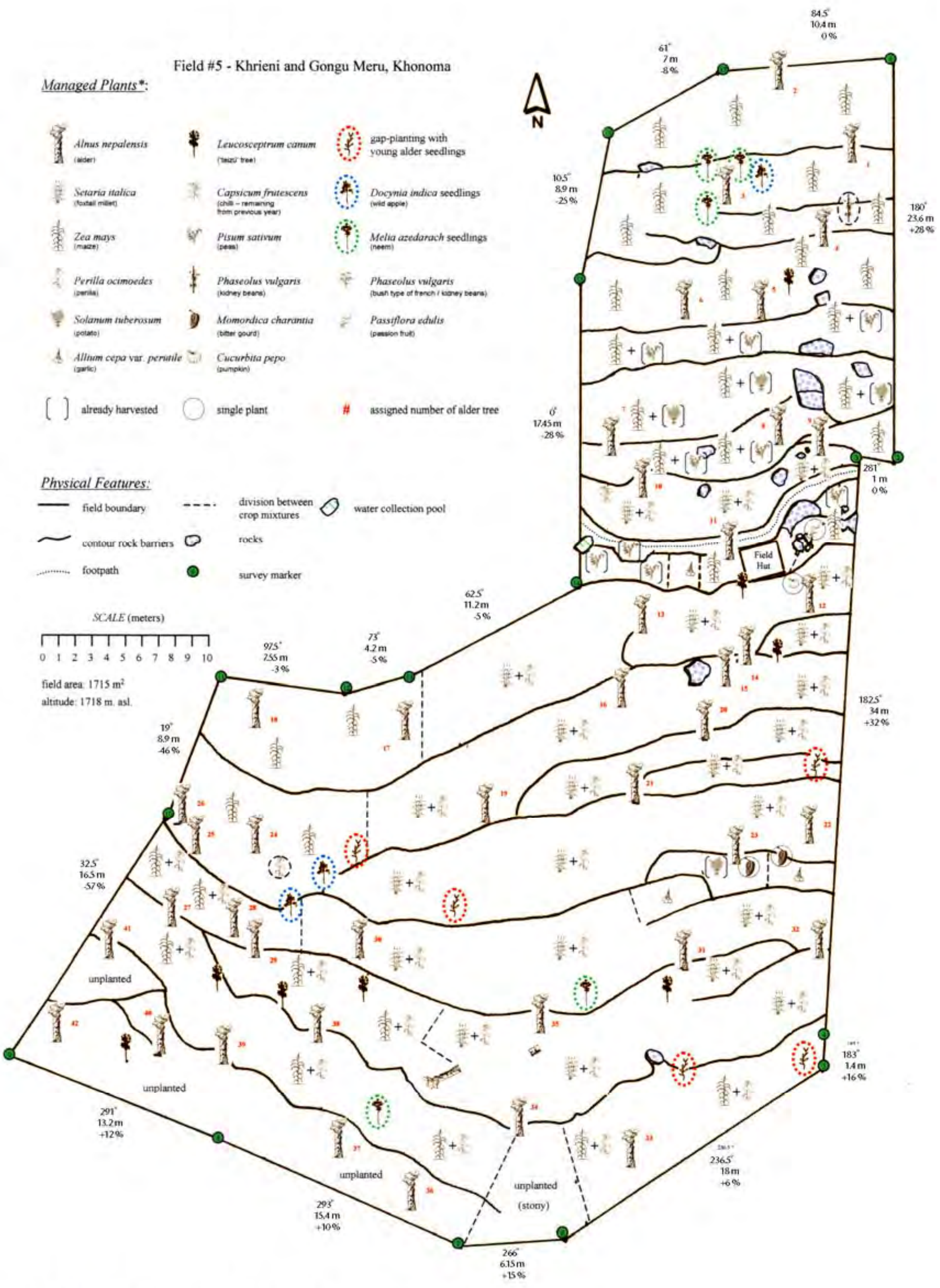
[57] While not a profitable crop, villagers value the aesthetic beauty of foxtail millet inflorescences waving in the breeze, and greatly enjoy the bread and snacks made from its grain.

[58] The farmer had retained far more coppices per stump (average 16.2) than was usually reported. This meant there would be more natural competition to determine which 4 to 6 of them would gain apical dominance and form the canopy in the approaching fallow.

Map 2-4. Example of Swidden Field with Managed *Alnus nepalensis*: 2nd-Year Cropping Pattern (2001)
(see map 2-1 for a 3-D representation of this field)



** The maize at the northern end of the field probably would have been interplanted with potatoes or peas, but for the purpose of an experiment, was left as a pure stand to provide a test crop.*

Figure 2-33. Relationship between Coppices Retained and Diameter at Breast Height (dbh) of Alder Stumps Managed in Example Field

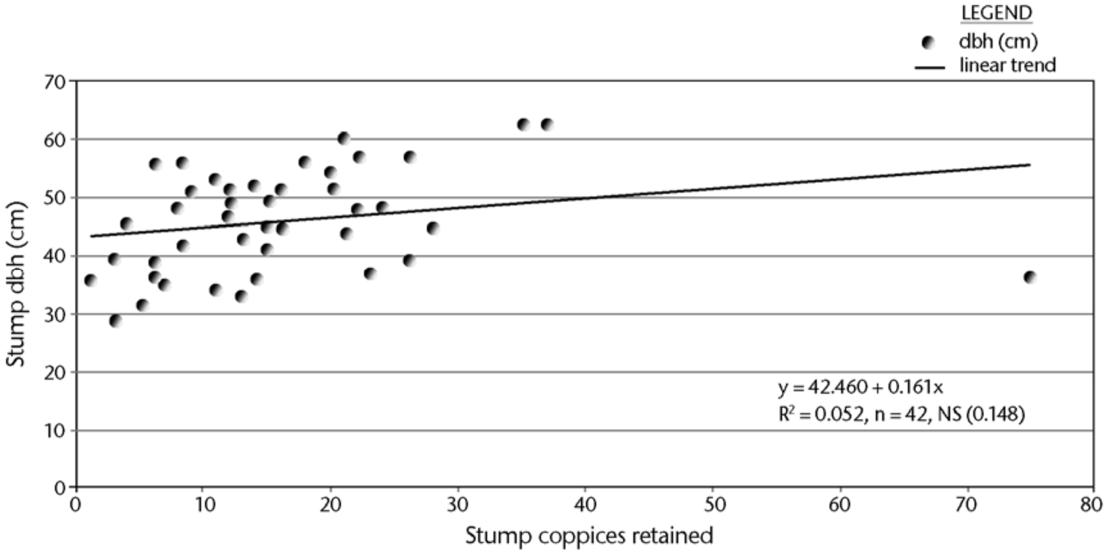
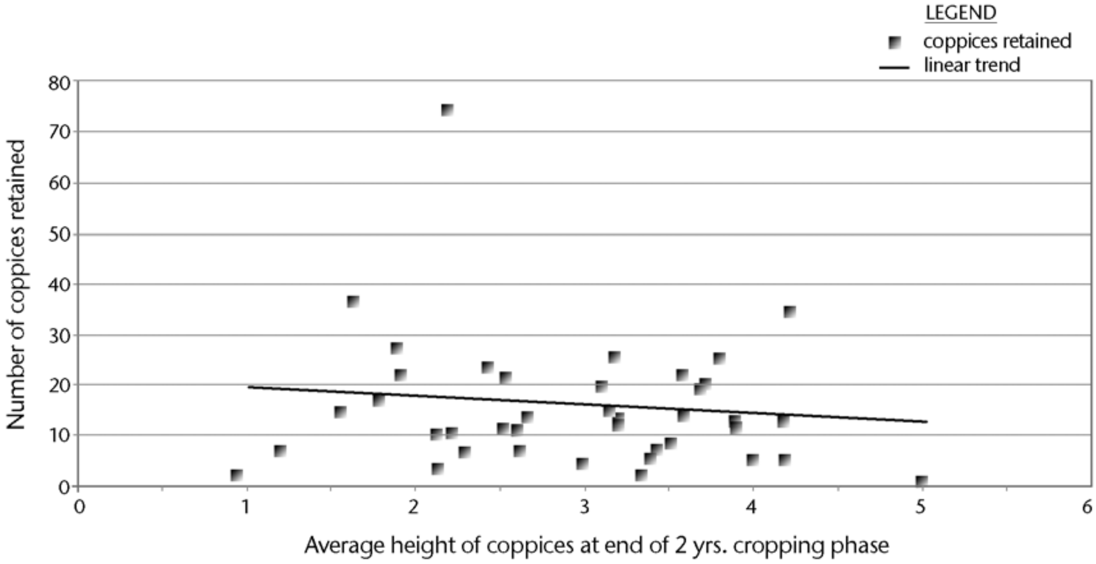


Figure 2-34. Relationship between Number of Coppices Retained and Average Height of Coppices at End of Cropping Phase: Measurements Taken from Alder Stumps Managed in Example Field



Fallow / Firewood Phase (plates 2-92 – 2-97)

By the time that perilla and other lingering crops were finally harvested, the field was already being reclaimed by the first flush of pioneer plants. But these early light-demanders did not last long. The alder coppices, already several metres tall at the end of the cropping phase, rapidly formed a closed canopy that inhibited light penetration. This ushered in a new community of successional species adapted to the now shaded, moist environment of the alder understory (table 2-1).[59] Grassy weeds that proliferated during the previous cropping phase were quickly suppressed.

Fire is rarely a problem in alder fallows because of the scarcity of flammable debris. Heavy litterfall soon resumes after regeneration of the canopy and the rapid nutrient cycling – previously broken when the field was reopened for cultivation – begins anew. Alders thus suppress weeds and regenerate soil fertility so effectively that even short fallow periods are sufficient to perform these key biological functions.

During the two-year fallow period, the coppices may reach up to 6 m in length and 15 cm in diameter (Gokhale et al., 1985), eventually forming a thick canopy (figure 2-35). One observant village elder pointed to his mature alder fallow and noted that each of the coppices was just as large as a nearby alder of the same age as the coppices, but which had never been pollarded (Khate, 1999). He pragmatically concluded that nothing was lost by pollarding since stem growth was not diminished, and each pollarded tree yielded five to six poles, compared to a single pole from an unpollarded tree. Total production was thus much greater when alders were pollarded. Such rapid growth rates, he pointed out, were not achieved by alder saplings planted in afforestation schemes.

Figure 2-35. Crown reclosure is rapid during the fallow phase, quickly smothering out light-demanding weeds.

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[59] Measuring alder's contributions to fallow functions would require careful agronomic trials to separate the often confounded effects not only of understory plants, but also environmental effects, slope position, and many other variables.

The superior growth rate of coppices demonstrates the benefits of pollarding as a silvicultural procedure that maintains extensive root systems through successive harvests. It is clear that the continued presence of alders in the swidden fields accelerates nutrient cycling (Ramakrishnan, 1993). Their extensive roots draw on nutrients from a large soil area, and return them to the surface in high volumes of nutrient-rich litterfall (Puri, 1959; Sharma and Ambasht, 1987).

When asked to explain why Khonoma felt alder management worthwhile, another elder dwelt on the question overnight and summoned me back the following day – to provide a very eloquent response that is summarized in figure 2-36. It admirably captures the essence of the system. He compared two alder trees throughout a 60-year time frame – one pollarded at 10-year intervals and the other left unpollarded. His conclusion was that when both trees are finally harvested at 60 years of age, their wood yield would be equal – despite the fact that the managed tree had already been harvested five times previously (Dolie, 2001). The pollarding system thus allows them to increase the wood productivity of their alder trees dramatically, in addition to its fertility benefits.

Cyclical pollarding not only allows crop cultivation two out of every four years, but it is also a strategy to increase the total net productivity of the alder stand. Although it is not well understood, it is possible that pollarding may stimulate other beneficial changes in alder physiology. In comparative studies of different aged alder stands, Sharma and Ambasht (1988) have shown that, as the trees get older, N-fixation decreases with the trees' diminishing N demand. They also recorded declines in other parameters, including net energy fixation, net primary production rates, production efficiency, energy conversion efficiency, and energy efficiency in N-fixation (1991). No work has yet been done to test whether these declines are in any way mitigated by cyclical pollarding. Similar questions apply to the longevity of the alder. Curiously, Lamichhaney (1995, 9) described *A. nepalensis* as a relatively short-lived species in Nepal that "*often dies for no apparent reason before the tree obtains a useful height*". This clearly does not reconcile with the Naga experience in managing individual trees over many generations, raising questions of whether the differences are genotypic, phenotypic, or the result of farmer manipulation.[60]

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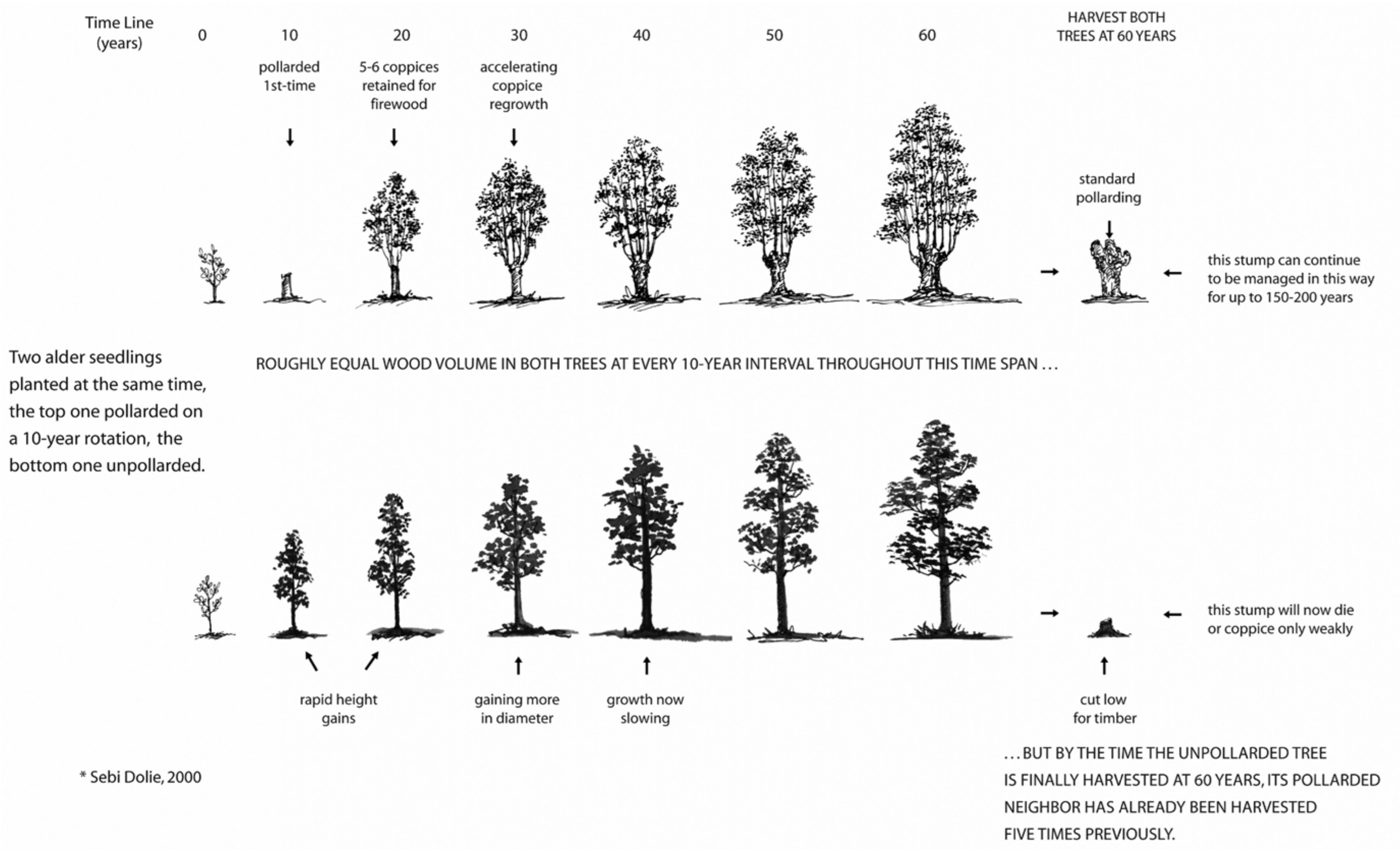
[60] This is not unique to alder. Pollarding causes rejuvenation – a bonsai effect – and is well known in Europe to allow trees to survive much longer than their tall forest counterparts (McAllister, 2004).

Figure 2-36. Schematic Representation of Village Elder's* Explanation of How Productivity of Alder Trees is Increased through Pollarding



Two alder seedlings planted at the same time, the top one pollarded on a 10-year rotation, the bottom one unpollarded.

ROUGHLY EQUAL WOOD VOLUME IN BOTH TREES AT EVERY 10-YEAR INTERVAL THROUGHOUT THIS TIME SPAN …

… BUT BY THE TIME THE UNPOLLARDED TREE IS FINALLY HARVESTED AT 60 YEARS, ITS POLLARDED NEIGHBOR HAS ALREADY BEEN HARVESTED FIVE TIMES PREVIOUSLY.

* Sebi Dolie, 2000

Although alder fallows are sometimes reopened in two years, farmers often choose to allow the coppices to grow bigger and harvest them for poles. However, several negative repercussions may arise from this practice. Firstly, if the coppices are allowed to become too large, their combined weight might split the main trunk in heavy winds. Secondly, farmers observe that soil N accretion is excessive in longer fallows, contributing to lodging problems in cereal crops.[61] Studies conducted in the eastern Himalayas confirm that soils under *A. nepalensis* stands have high levels of organic C and total N that increase with the age of the trees (Sharma et al., 1985). Lastly, since erection of physical fences is expensive and not entirely effective, farmers also rely on coordinating their swidden sites so that everyone is cropping in the same area at the same time. It is then easier to keep cattle away from the cropped area through community vigilance. But any farmer who alters his swidden cycle will fall out of synchrony with his neighbors and expose his crops to cattle damage.

This description of the dispersed alder system closes with a summary of alder's role in Khonoma's jhum fields, shown in figure 2-37, and the attributes that qualify it as such an effective fallow species, listed in table 2-7.

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[61] Potatoes and other vegetables that have become popular jhum crops in recent years are not subject to lodging and respond more favorably to higher soil fertility. High N promotes leaf growth and is therefore good for leaf crops, in which most N is in chloroplasts.

Figure 2-37. Schematic Representation of Alder's Role in Jhum Cultivation System

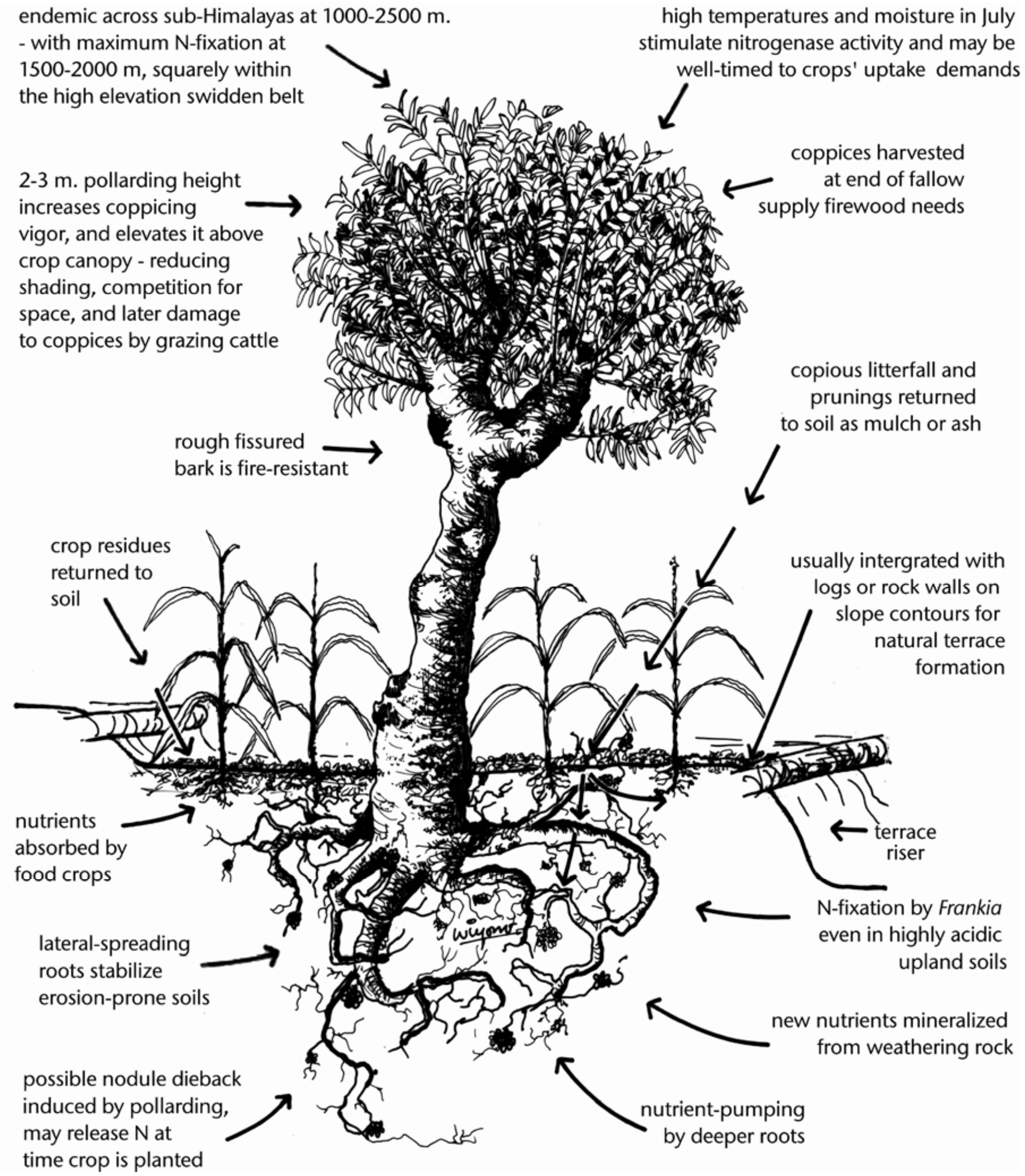

Table 2-7. Attributes of *Alnus nepalensis* as an Effective Fallow Species

- Widely distributed, from Pakistan in the west through Northwest India, Nepal, Bhutan, Northeast India, and eastwards through Northern Myanmar, Southwestern China and into Indochina;
- Wide ecological amplitude (soil types and rainfall zones), covering the major swidden belt between 1,000 and 2,000 m above sea level;
- Able to grow on highly degraded, unstable soils;
- Extensive lateral root system with heavy concentrations of *Frankia* around nodules that fix atmospheric N;
- Unlike most N-fixing trees, has the ability to thrive and fix N even in very acidic soils;
- N-fixation peaks around July in response to increased soil temperature and root nodule moisture and may be synchronized with the crop's uptake demands;
- Synergistic, non-competitive relationship with intercrops;
- Quick decomposing leaf litter;
- Favorable C/N ratios in underlying soils;
- Multi-purpose, with an attractive combination of ecological and economic benefits;
- Provides poles, firewood and numerous secondary products such as wood for constructing tea boxes, pulp for newsprint, tannins for tanning leather, and juice of crushed leaves has medicinal properties;
- Rapid colonizer of disturbed lands. Grows well in full light and is moderately shade-tolerant;
- Easily established either naturally or artificially through direct sowing, polybag or bare-root stock. Prolific production of wind-borne seeds with a high germination rate, and not recalcitrant;
- Fast rate of growth, with annual increments of 2.7 m in height and 2.9 cm in diameter recorded in Nepal. Harvestable for firewood within 5-7 years;
- Withstands frequent pollarding and coppices profusely;
- Rough burls make the stumps very easy to climb;
- Coppice regrowth is most profuse when pollarding is done before the start of the monsoon season, dovetailing neatly with the jhum cultivation calendar;
- Develops rough fissured bark that is fire-resistant;
- No serious pest and disease problems reported in Nagaland;
- Long-lived, particularly when pollarded on a systematic basis. Some individual trees have been managed over the past 100-200 years; and
- Its bitter leaves are relatively unpalatable, making it less vulnerable to grazing by free-ranging livestock so protective fencing is unnecessary.

(Cairns et al., 2007)

CONCLUSIONS

It is common for shifting cultivators to practice conservation-oriented strategies, such as cutting trees at waist-height, retaining mother trees, avoiding soil tillage, protecting seedlings of valued trees that emerge within the crop, limiting cultivation to a single year, and controlling fires. These are all aimed at assisting rapid regeneration of a forest composed of useful species. The ancestors of Khonoma village took these concepts several steps further in developing a dispersed alder system that provides an attractive combination of fuel and fertility benefits. In doing so, they also effectively demonstrated how fallow management could provide a seamless transition from shifting to permanent cultivation.

Although this account highlights Khonoma's use of the alder tree, it is only one aspect of a wider package of intensified jhum management. The stone walls and the terracing created in Khonoma's jhum fields are equally unusual in swidden environments. The careful burning of slash under mounds of soil suggests an awareness of the need to reduce nutrient losses, and perhaps stimulate P release. The intensive field-cleaning and tillage are uncharacteristic of shifting cultivation, which is more noted for dibbling or broadcasting seeds directly into untilled soils. The shortening of the fallow period to as little as two years contradicts observations by Ramakrishnan (1993), that as a general rule, swidden land must be fallowed for at least ten years for a shifting cultivation system to remain sustainable. And of course it falls far outside most definitions of shifting cultivation provided by Ruthenberg (1980)[62] and others.

All this points toward a conclusion that Khonoma's management of its dryland fields has intensified far beyond what can realistically be termed 'jhum' or 'shifting cultivation'. Rather, it should more accurately be considered a permanent land use, in which wood and food crop components yield successively. The term used by Khonoma's people for the system - 'nhalie kijü ku kekrie' translates to '*forest garden rotation*'. However, the importance of this system lies far beyond academic argument over semantics or definitions. Asian governments generally couch their disapproval of shifting cultivation in terms of its inefficient use of land, that crops are grown for only a year or two and then the land is 'abandoned' and thus left unproductive for extended periods. These concerns are swept aside by evidence that these 'abandoned fallows' are in fact highly managed and productive, especially if their full suite of economic products and ecological services are taken into account.

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[62] Ruthenberg suggested a relatively simple formula to quantify the intensity of shifting cultivation systems:

$$I = \frac{R \times 100}{L}$$

Where I = swidden intensity, R = number of years cultivated, L = length of the swidden cycle (number of years of arable farming + number of fallow years). He considered that when the R value reached or exceeded 33, then land use had intensified beyond the point that it could still be termed 'shifting cultivation' – but should more accurately be viewed as semi-permanent cultivation (Ruthenberg, 1980, 15-16).

By more accurately portraying these as permanent land-use systems, misinformed stereotypes fall away and they resonate favorably with state polices.

Although the productivity of shifting cultivation is usually thought of in terms of food crops, this case study also highlights the importance of firewood in cool mountain environments. It is by far the most valuable product harvested from Khonoma's jhums. Visitors never fail to be impressed by the fact that crop productivity has remained stable even after fallow periods have been shortened to as little as two years. But the other side of this equation is equally remarkable – that such short fallows continue to produce large amounts of high quality firewood and the swidden vegetation does not degenerate into *Imperata*, *Miscanthus*, and other coarse grasses, as has happened elsewhere over large expanses of Asia. Both the food crop and firewood phases of the system are sufficiently robust to retain productivity even under short rotations.

In the opening quotation of this chapter, Jasokie Zinyü made the point that alder has been critical in allowing Khonoma to grow into a large village, despite having only limited land suitable for agriculture. What he left unsaid was that alder, in turn, depends equally on Khonoma's farmers for its preservation and continuity. Left to the natural course of succession, the alder pioneers would eventually be overtaken by new communities of shade-tolerant trees. But the farmer management described in this chapter retains it at an arrested stage of succession. In this sense, there is a symbiotic relationship between Khonoma's farmers and their alders, with each benefiting from the presence of the other.

CHAPTER 3

Khonoma and its People

Khonoma was widely feared across the Naga Hills as a powerful warrior village that smaller villages had to appease through tributes. Most of its power came from a highly defensible position on a mountain spur and early acquisition of guns, probably from Manipur. When a strong British force attacked Khonoma on November 22, 1879, four out of the nine European officers and 25% of their native ranks were wounded or killed in trying to overrun the most powerful fortress they had ever encountered in the Naga Hills (Johnstone, 1987, pp. 168-174). The hornbill is regarded by all Nagas as the emblem of bravery, and only proven warriors that had taken heads had the right to wear its tail feathers.

Nagas from the Zeliangrong subgroup have historically been neighbours of the warlike Angami. Arguably, this has been their misfortune. They have a saying:

"*Ma gade kideu aide ga tingkai kaidi heriak tingdan ga eh lei cai,nah egumziurengwame ga eh lei cai, kideuaide ga lung yi gwa kera ge.*"

(“*If there were no strong winds in the spring season, nor Khonoma warriors to disturb us on this earth, it would be a better place to live.*”)

(Translated by Ayite Nampeung, Benreu Village. There are variations of the saying, in which cyclones are replaced by mosquitoes or leeches, but Khonoma warriors are consistently regretted.)

INTRODUCTION

As one nears Khonoma, perched defiantly on a spur and surrounded by rugged peaks, it is hard not to ponder its place in history. Early visitors had not arrived to study the village and its people, and the alders scattered across its slopes, as I had. Rather, they would have been under heavy military escort, and would have approached the village with extreme wariness – their eyes probing the underbrush for signs of an ambush, muskets at the ready and ears straining for the sounds of boulders being rolled down from above, or a war cry that would signal an attack. This was the infamous Angami village that had defied the British by continually leading attacks on their subjects in the Cachar Hills and Assam plains. These raids eventually forced the British to annex the Naga Hills and put an end to the defiance spearheaded by Khonoma. When, a century later, a newly-independent India tried to assert its authority over the Nagas, it was again Khonoma that stood in the forefront of resistance to Indian rule. The Naga independence movement was born there, and Khonoma’s people played key roles in both the political and military arms of the struggle. The separatist leader who was later to become widely known as the “Father of Naga Nationalism”, A.Z. Phizo, was from Khonoma’s Merhümia khel – the very same khel (major clan) that stands out in Chapter 2 for its mastery in alder management.

Visitors to Khonoma are usually left puzzling over what it was that made this village so special that it excelled in warfare and its people earned fame as traders; what influences underlay its traditions of hyperpride and patriarchy, such that they were considered extreme even by Angami standards; and of central importance to this study, what was it that led to such intricate management of alder in Khonoma's jhum fields? Was there a common thread that held them all together? Khonoma shares a common ancestry with other Angami villages in that most of them trace their early migrations back to Kigwema village, so they would have begun with the same customary practices. But after Khonoma's founders left Kigwema roughly 600 to 700 years ago, what took place at their new village site that might account for Khonoma's current reputation?

Culture co-evolves with environment to create viable food procurement systems. We would thus expect patterns of agriculture to vary with the opportunities of the locality and the traditions of the people (Burling, 1965, 59). Although they earned notoriety for their warfare and headhunting, the Nagas were essentially farmers. Embree and Thomas emphasized this in a 1950 publication:

> "The Naga is first and foremost an agriculturalist. Nine-tenths of his thought and his life are devoted to his fields, and the things that mean most to him are the state of his crops, the weather at harvest time, and the number of rice baskets in his granaries." (1950, 41)

It is therefore hardly surprising that their customary laws, religious practices, songs and stories, the timing of their festivals and marriages, and most other aspects of Naga culture are all tightly interwoven with their agricultural practices.

Having described alder management in the previous chapter, this chapter and the two which follow it set out to look at who the alder managers are, and explore how historical and social influences impacted on their agricultural systems and how resources in general were managed. They will present evidence that scarcity of agricultural land was the main factor that pushed Khonoma to not only intensify its cultivation practices, but also look beyond its borders for ways to augment its scarce resources. The ethnographic focus of these three chapters will be followed by a detailed look at the biophysical environment in chapter 6, and then chapter 7 will examine how culture and environment have influenced Khonoma's livelihood strategies.

METHODS OF DATA COLLECTION AND PRESENTATION

This section of the thesis builds its arguments on three general categories of data:

Historical Data

Since the Nagas had no written script, it was not until the British began penetrating the Naga Hills, starting with their first expedition in 1832, that substantial written records became available. Colonial accounts of the Nagas increased in number and detail as the British first struggled to pacify them (1832-1850) and then finally annexed the Naga Hills as part of Assam (1866–1947). Many British officers were clearly fascinated by the Nagas and left a wealth of tour diaries, published accounts, and various other reports on their observations. As the British imposed law and order, the missionaries followed closely behind and contributed their own accounts of those early years.

These colonial records provided the main basis for the historical overview.in chapter 4.[1] Together with remembered accounts, they also provide the basis for much of the material presented in this chapter. However, these sources of historical data came to an abrupt end when British administrators left Nagaland at the dawn of India's independence in 1947 and foreign missionaries, accused by Delhi of encouraging the Naga rebellion, were expelled shortly after (by 1955).

Although the outbreak of war in 1956 further sealed the Naga Hills from outside observation, there have since been many books published on the Naga political problem, the war, and violations of human rights. Most of these are first-hand accounts – either by Nagas themselves or Indians posted in Nagaland during the years of conflict. This set of literature was referenced in piecing together the discussion in Chapter 5 of Nagaland's more recent history under Indian administration. In Khonoma, the research relied on a combination of questionnaires, structured interviews, and informal chats. Village elders were interviewed as key informants since they were the best repositories of the village's oral history, song and stories, and could recall many historical events that they had witnessed in their own lifetimes

Ethnographic Data

Participant observation was the main method used in gathering ethnographic data on Khonoma. During the fieldwork, I lived with the Farmer-Coordinator of my research project (Khrieni Meru) and his family. They kindly lent me the use of a small side-room as an office, which allowed me to observe village life, join them in going to the fields, and otherwise build the rapport needed to earn Khonoma's confidence. My long-term presence also permitted me the flexibility of meeting villagers at times when they had time to talk at length.

Beyond the primary data collected during the fieldwork, there is already a significant amount of published ethnographic literature available on Khonoma. Hutton's authoritative treatise on the Angami Nagas (1969) draws heavily on Khonoma experience. This literature provides a rich ethnographic account of Khonoma, and was referenced as background material for the study.

Digital maps were created during the fieldwork to help illustrate many aspects of the study, and are used in this chapter to support the discussion..

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[1] The location of these records is described at the end of the Preface, above.

Historical context

An historical understanding of Khonoma's technological and social systems is of vital importance to this thesis, and occupies the two following chapters. For convenient reference, a summary of some of the key events in Khonoma's history is provided in table 3-1. However, to open a discussion of Khonoman society as it was in the very recent past, it is perhaps appropriate to consider what the British expeditions first discovered upon entering the Naga Hills.

Table 3-1. Chronology of Some Important Dates in Khonoma's History

ANCIENT PERIOD (pre -13th century)
Practically nothing is known.

MEDIAEVAL PERIOD (13th century - 1876) (from time of migration to current-day Nagaland to formation of district of Naga Hills)
13th century – descendants of Nagas are thought to have migrated to present homeland, probably through Burma and then Manipur
14th-15th century – founding of Khonoma by Angami settlers from Kigwema
1700 – according to oral history, Khonoma finishes all terracing, in both the paddy and jhum fields
18th – 19th centuries – conflict between Merhümia and Semomia khels, forcing the latter to resettle at Basa Rüso
1832 – 1st British military expedition, with 700 soldiers, enters Angami territory, in search of route from Manipur to Assam
1838 – Khonoma, along with Mezoma, implicated in raids into Cachar Hills
1841 – 5th British expedition visits Khonoma to build friendship and encourage peaceful intercourse with the lowlands
Nov. 1844 – 6th punitive expedition burns part of Khonoma and retrieves 4 stolen muskets
Aug. 3, 1846 – Khonoma assists Nilholy of Mezoma in attacking Bhogchand (officer-in-charge of the British post at Samaguting), killing him, a havildar (Indian army rank equivalent to a Sergeant) and some sepoys (soldiers)
1848 – establishment of Dzulake as a splinter village from Khonoma
Apr. 26 – Aug. 24, 1850 – Lieutenant Vincent establishes outpost with 46 men at Khonoma; withdraws, after burning down parts of the village, after several sepoys are killed
Dec. 10, 1850 – Captain Reid and Major Foquett attack Khonoma with a force of 344 men, forcing its evacuation to upper Chakka Fort

MODERN PERIOD (1876 - Present) (Introduction of British Administration, Peace and Order)
1876 – Khonoma and Mezoma gain notoriety for their major roles in plundering 6 villages and killing 334 people in North Cachar over the preceding 2 years
Oct. 13, 1879 – Damant shot dead at gate of Khonoma, and 35 of his entourage killed and 19 wounded
Oct. 16-27, 1879 – Khonoma leads an Angami rebellion; siege of British stockade in Kohima by 6000 Angamis
Nov. 22, 1879 – Brigadier-General Nation leads a major military offensive against Khonoma, forcing its warriors to retreat to fortified positions in the mountains; Nagas target the British officers and of the 9 participating, manage to kill 3 and wound 1
Jan. 29, 1880 – war party of 55 Khonoma men raids Bhaldhan tea garden in Cachar, 80 miles distant, killing the manager and 16 laborers and burning everything
Mar. 28, 1880 – Khonoma finally submits to British rule
1882-1883 – first schools open in Khonoma
Feb. 16, 1886 – Khonoma warriors lead a collective force of 1500 men from 15 villages to attack Shipvomi in retaliation for the murder of 3 Khonoma traders
1897 – first Christian converts in Khonoma
1905 – Angamis end headhunting

1905 – Khonoma men engage heavily in trading, traveling as far afield as Bombay, Calcutta and Rangoon
1915 – fight between Semomia khel and Kotsu clan of Thevomia khel, forces both parties to abandon the village for 7 years
1926-1950 – gambling becomes a serious problem in Khonoma
1944 – establishment of Khonoma Rüffüno as an apex organization for village descendants
Apr. 4, 1944 – arrival of Japanese soldiers in Khonoma
1946 – formation of Naga National Council (NNC), uniting the Nagas in a socio-political organization for the first time
1946 – vehicular road pushed through from Kohima to Khonoma
Aug. 15, 1947 – India gains its independence and the British administration pulls out
1950 – Phizo elected as President of NNC and announces plans to hold plebiscite on Naga independence
1955 – General Secretary T. Sakhrie and Publicity Secretary Jasokie Zinyü resign from the NNC in protest against Phizo's planned use of violence
Jan. 18, 1956 – torture and murder of T. Sakhrie, former General Secretary of NNC
July 5th, 1956 - Khonoma attacked and burnt by Indian army, forcing the villagers into exile for the next 2 years
1956-1972 – Merhümia khel fort occupied by Indian army
1958 – villagers begin returning from the forest and rebuilding on Khonoma's outskirts
July 22, 1959 – Khonoma villagers hiding at Kukhwi attacked by Indian army
Dec. 1, 1963 – Nagaland officially becomes the 16th state of Indian Union
Sept. 6, 1964 – ceasefire begins between Indian and Naga armies
1965-1966 – after 1964 ceasefire, some villagers begin to return to Dzulake; many never returned
1945-1975 – Khonoma is often in the headlines as a progressive, revolutionary and enterprising village
1972-1973 – arrival of electricity in Khonoma
post-1975 – Khonoma's influence in Nagaland's affairs drops off
1982 – hospital opens in Khonoma
1990 to 1997 – Indian army maintains a camp on Khonoma's outskirts

PLACE AND SOCIETY

The Arrival of the British (1832)

When, in 1832 and 1833, the first British military expeditions penetrated into the unexplored Naga Hills in search of a direct route between Assam and Manipur, they were forced to fight their way through fierce tribal resistance. This was their first introduction to the powerful Angami Nagas, and marked the start of what was to become a protracted struggle to pacify the Naga Hills and bring them under British authority.

As heavily armed British patrols pressed into Angami country, they encountered large villages, built in commanding positions and strongly fortified. Their altitude, between 450 and 1,850 m asl, provided a bracing climate – a comfortable zone between the unhealthy lowland heat and the bitter cold of higher peaks. Village outskirts were often marked by large monoliths, either monumental or simply commemorative of lavish feasts given by rich men[2]. The stones were often so heavy that several hundred men straining on ropes were needed to drag them into place on wooden sledges. Large mithun (*Bos frontalis*) horns (kika), carved out of thick wood and mounted on the front gable of dwellings, signified the Angami identity of villages (figure 3-1). Each village was self-sufficient in its needs, with the exception of salt, which was traded from the plains. Early British reports described with admiration the well-developed system of terraced fields carved into the hillsides and skillfully irrigated, drawing later parallels with the well-known Banaue rice terraces in the Philippines. The less visually-striking alder fallows, in contrast, earned comment from only the keenest observers (Hutton, 1929b, 23, 28-29, 47, 62; 1969, 76).[3]

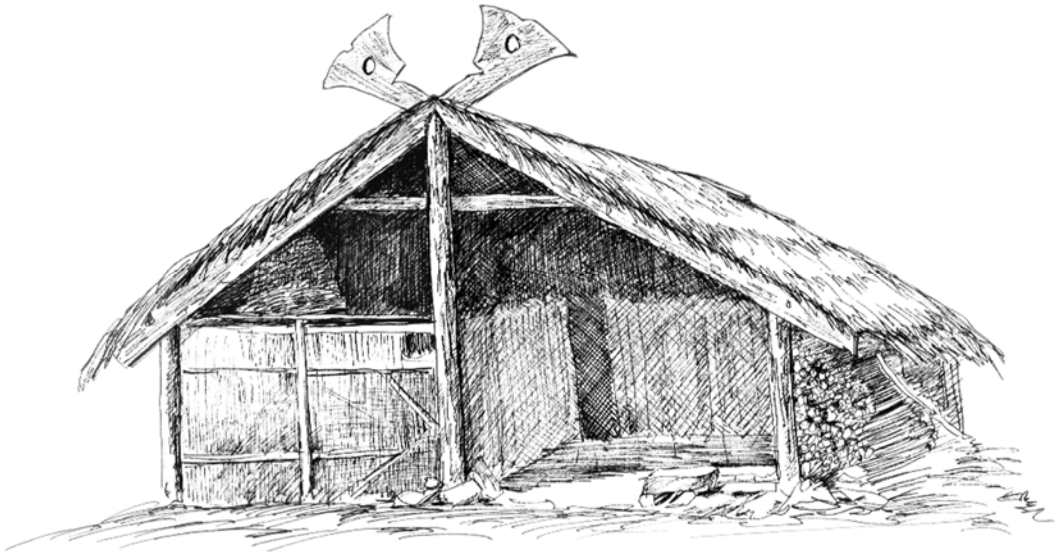

Figure 3-1. Majestic horns extending up from the gables of Angami houses marked the prestige of their owners. When houses were rebuilt, the horns would be carefully dismantled and then affixed on the new dwelling. The preferred wood for carving the house horns was zunha (*Cedrela serrata*) because of its durability and resistance to termites. This valued tree was thus often planted on villages' marginal lands to ensure its availability (Zhaza [Kigwema village], 2001). Roofs were made of thatched *Imperata* grass.

Each village was run akin to a mini-republic, electing its own headman and assembling villagers to make collective decisions, resembling the *gumlao* system described by Leach (1954) for the Kachin of upper Burma, and briefly discussed in the Preface. Despite this democracy, unfriendly relations often developed between clans in the same village and disputes were settled by bloody fights, as is not

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[2] In related ethnographic areas such as the Chin of western Burma, these lavish feasts have been strongly linked with the accumulation of social and supernatural prestige (Stevenson 1943; Lehman 1963). In Khonoma, they were certainly linked to accumulation of social prestige.

[3] That Hutton was a keener observer of Naga land use practices than his predecessors can, in part, be explained by the length and timing of his service in the Naga Hills (1917-1935). Earlier administrators were preoccupied with trying to impose law and order. Hutton's tenure coincided with the 'heyday' of British authority in the Naga Hills. He was able to travel extensively without much concern for his safety, and took careful note of how the Nagas were managing their resources. (Hutton's treatise on the Angami Nagas (1969 [Reprint]) was actually written between 1913 and 1915, but publication was delayed until 1921 because of WWI.)

uncommon in tribal segmentary systems elsewhere (Fortes and Evans-Pritchard 1940; Sahlins 1968). Early reports present a composite picture of the Angami as a tall, strongly-built race with great powers of endurance and capable of carrying heavy loads over long marches. Their character had a "Jekyll and Hyde" quality to it; while they became known for their intelligence, independence, frankness, honesty, and good humor ["always ready for a joke" (Hutton, 1969, 39)] - they were also "blood-thirsty, treacherous, and revengeful to an incredible degree" (Butler, 1875a - as cited in Elwin, 1969, 301). This needs to be understood in the historical context that Naga villages were in an almost constant state of war prior to the arrival of British authority and Christianity. The failure of smaller villages in the Naga Hills to pay tributes demanded by more powerful villages was met with swift and bloody punishment. Constant interclan and intervillage feuds meant that there were always scores to settle and attacks could come at any time. Hostilities were centered on reciprocal headhunting raids and considered vital to the prosperity of the village. Revenge was considered a sacred duty and each raid called for a series of counter-attacks. Blood feuds were thus handed down from generation to generation.

The Social Organization of the Pre-colonial and Colonial Population

If we can accept the remembered account of the opening days of Khonoma's settlement, described below in Chapter 4, this set the stage for the social organization in the village, of which an important part endures today. The original settlers became the ancestors of the three major clans (khels) that continue to comprise Khonoma's Angami population.[4] As their descendants multiplied over successive generations, they branched out in segmentary fashion (Fortes and Evans-Pritchard 1940) to form new subclans and lineages, eventually creating the present intricate network of kinship shown in figure 3-2. This was made more complex by the arrival of later settlers who began new subclans under the original three khels.

In tandem, the land chosen by the original settlers has remained with their descendants to the present day. According to oral history, the twin assets of food and military security offered by the site allowed the new village to expand quickly – both through internal fertility and immigration. As the population of each khel grew, more land was brought under cultivation and the intricate farming systems described by this study were developed. Strict inheritance laws were enacted to ensure that ancestral lands would not be lost, but would continue to be passed down through the patrilineage (see section on *Inheritance* in chapter 6). The importance of land thus grew far beyond simply providing for food needs. It represented the sweat, the toil, and the history of many generations of ancestors that had gone before. It became a vital part of their identity; a place of belonging in the larger world.

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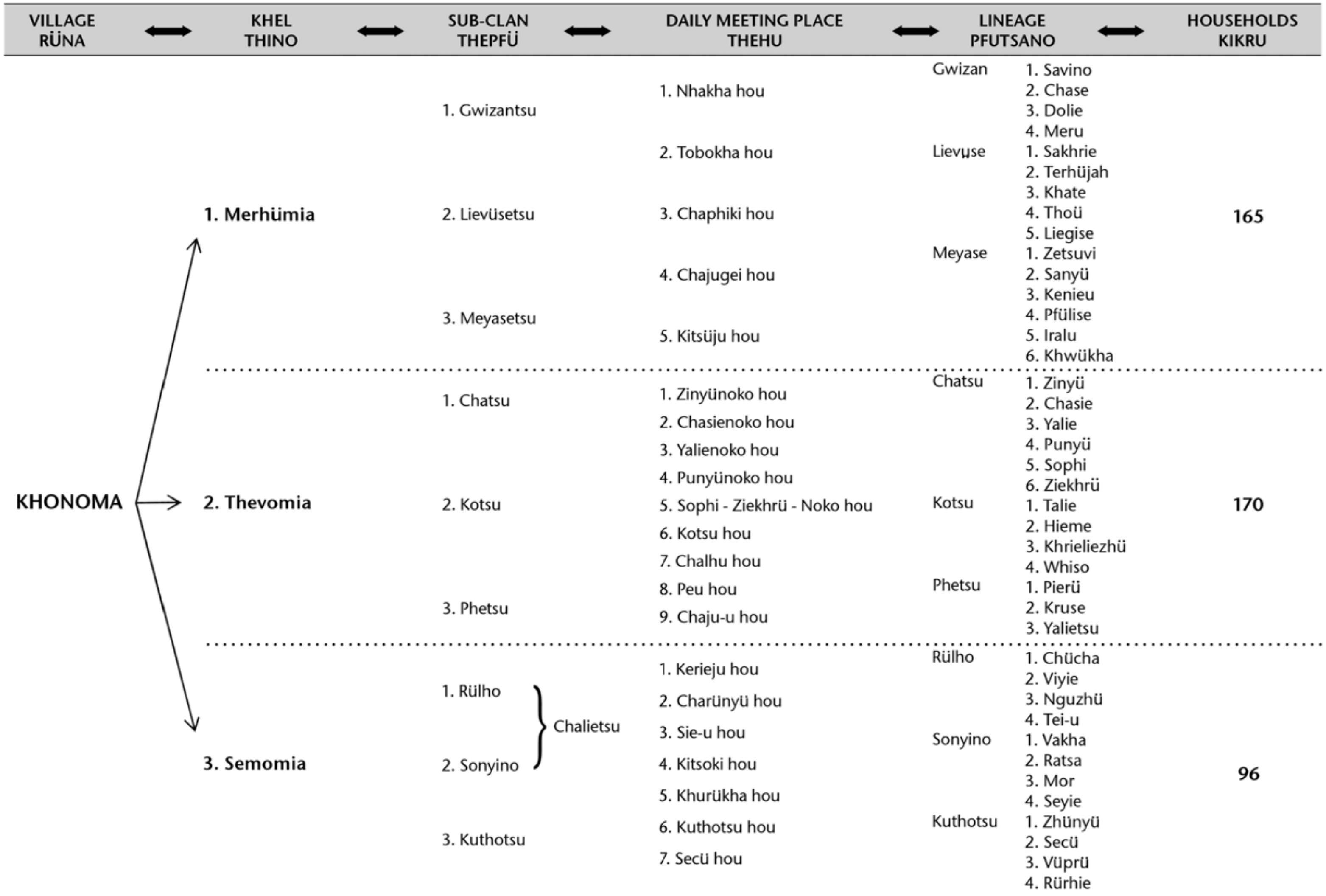
[4] Excluding modern Nepali, Bhutanese and other recent settlers on the outskirts of the village briefly discussed in Chapter 5, who form no part of Khonoma's population as recognized by the Angami.

Figure 3-2. Social Organization of Khonoma Village



VILLAGE RÜNA	KHEL THINO	SUB-CLAN THEPFÜ	DAILY MEETING PLACE THEHU	LINEAGE PFUTSANO	HOUSEHOLDS KIKRU
KHONOMA	1. Merhümia	1. Gwizantsu 2. Lievüsetsu 3. Meyasetsu	1. Nhakha hou 2. Tobokha hou 3. Chaphiki hou 4. Chajugei hou 5. Kitsüju hou	Gwizan 1. Savino 2. Chase 3. Dolie 4. Meru Lievṳse 1. Sakhrie 2. Terhüjah 3. Khate 4. Thoü 5. Liegise Meyase 1. Zetsuvi 2. Sanyü 3. Kenieu 4. Pfülise 5. Iralu 6. Khwükha	165
	2. Thevomia	1. Chatsu 2. Kotsu 3. Phetsu	1. Zinyünoko hou 2. Chasienoko hou 3. Yalienoko hou 4. Punyünoko hou 5. Sophi - Ziekhrü - Noko hou 6. Kotsu hou 7. Chalhu hou 8. Peu hou 9. Chaju-u hou	Chatsu 1. Zinyü 2. Chasie 3. Yalie 4. Punyü 5. Sophi 6. Ziekhrü Kotsu 1. Talie 2. Hieme 3. Khrieliezhü 4. Whiso Phetsu 1. Pierü 2. Kruse 3. Yalietsu	170
	3. Semomia	1. Rülho Chalietsu 2. Sonyino 3. Kuthotsu	1. Kerieju hou 2. Charünyü hou 3. Sie-u hou 4. Kitsoki hou 5. Khurükha hou 6. Kuthotsu hou 7. Secü hou	Rülho 1. Chücha 2. Viyie 3. Nguzhü 4. Tei-u Sonyino 1. Vakha 2. Ratsa 3. Mor 4. Seyie Kuthotsu 1. Zhünyü 2. Secü 3. Vüprü 4. Rürhie	96

Ancestry and land went hand-in-hand in terms of importance to the Angami – and they were prepared to protect these at all costs. They counted their kinship and loyalties in ever-widening circles from the family level (kikru), to their patrilineage (pfutsano), their subclan (thepfü), khel (thino), and ultimately to the village (rüna).[5] As already noted, villages had historically been the largest unit of social relations, each acting as an autonomous republic that was virtually self-sufficient in its own needs. Because of their strong ties to kinship and land, the Angami usually stuck close to home and were not very mobile as a people.[6]

Major Clans / Khels (thino)

The entire population of Khonoma is divided into the three patrilineal major clans descended from the village's original founders – Merhümia, Semomia and Thevomia (map 3-1). The Thevomia clan is descended from the senior Thevomia moiety that, according to legend, emerged from the earth first. The Merhümia and Semomia clans belong to the younger Thekronomia moiety that followed behind.[7] These clans are based on male agnatic descent and were formerly exogamous. Descent was traced through the male line and marriage partners brought in from outside.[8] This meant that males were permanent members of the clans into which they were born, but the females were impermanent, and would eventually leave the clan through marriage. Every villager recognizes his or her thino as an extension of the family on the father's side. All members can generally trace their descent to one of the founding settlers or later arrivals. The thino, now more commonly referred to as a "khel", is thus a guild or commonwealth of the whole clan.

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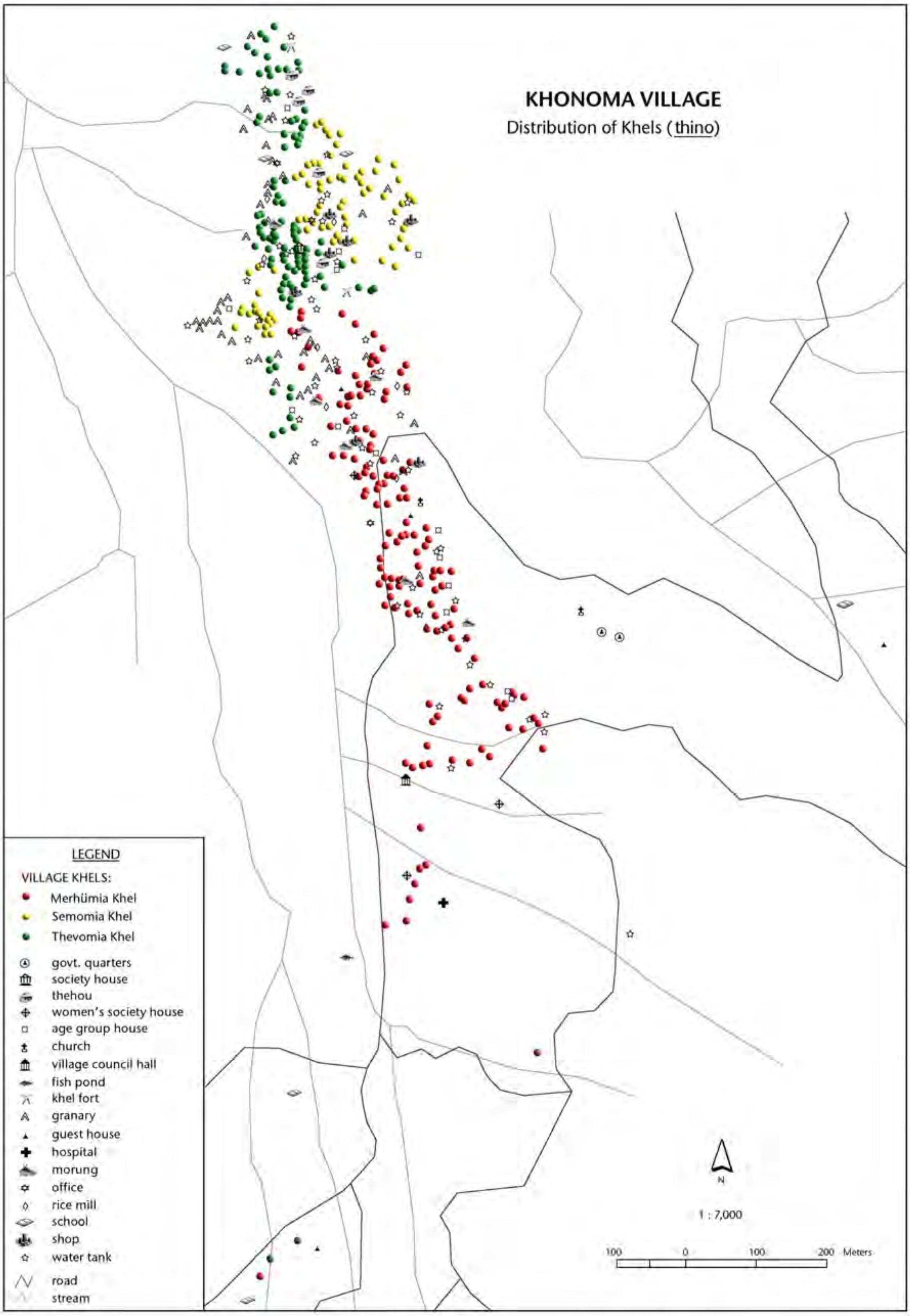
[5] See Sahlins (1968) on 'relative morality'.

[6] Even today, Angami working for the State Government are often loth to accept postings outside their own district.

[7] Moities are discussed in more detail in Chapter 4. See Sanyü, 1987, 100-106, for details of the ancestry of each of Khonoma's khels

[8] A later discussion on marriage will show that the rules of exogamy have changed to increasingly smaller kinship units as the village's population expanded over the generations.

Map 3-1. Distribution of Khels (thino) – Khonoma Village



Many writers observe that it was the khel – rather than the village – that was the most important unit of Naga society. Each khel acted almost as an independent village within the village. Each occupied a definite portion of the village's territory and was often separated from its neighbors by fortified walls. Each khel had its own heavy wooden gates that it swung shut and barricaded nightly to guard against attack. Khels living side-by-side often had few dealings with each other. Each of Khonoma's khels had a clearly defined area of forest land, jhum fields and rice terraces (map 3-2), and every morning the members of the respective khels would descend the spur in different directions on the way to their fields. They might work all day and return home that evening without ever crossing paths with members of the other two khels. Each khel had its own social system, its own defense[9], its own laws and codes of accepted conduct, its own independent external connexions, and invariably, its own disputes that were settled by bloody fights. Even the dialects spoken by Khonoma's three khels were somewhat different. There was thus hardly any bond uniting the khels. Each acted as an autonomous republic in its own right, depending on its neighboring khels mostly for women to marry.

The Angami therefore offered their loyalty to, and identified themselves most strongly with, their own khel. It was their community, whose history and stories they had heard countless times as they grew up. These reminded them of their putative common ancestry, of the path that had brought them to their current circumstances, and instilled pride in the heroic struggles of their forefathers. Whenever collective action was needed, khel meetings would be held to formulate plans. These included special events such as pulling a village gate, bridge, monolith, or communal bed – all done at the khel level. Allied khels from other villages were usually invited to attend and contributed cash or materials to the host khel.

While the khel system nurtured a sense of "us" amongst its members, it also heightened feelings of "them" in their dealings with neighboring khels. The extraordinary autonomy of the khels, their close geographic proximity within the village, the extreme pride of the Angami and their love of competition, all conspired to create an atmosphere of rivalry and distrust. These unfriendly relations often boiled over into bloody fights and revenge killings. Naga villages were seldom united communities. Quarreling between khels was the norm – not the exception – particularly amongst the Angami. Hutton summed it up by stating, "I know of no Angami village of any size which is not divided against itself by the bitter feuds which exist between its component parts" (1969). Many of these inter-khel feuds were kept alive and handed down from generation to generation. This squabbling further accentuated the solidarity within khels because their members had to stick

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[9] The forts of each of Khonoma's khels are shown in plate 3-147.

together for the sake of security. It was vital that members always acted in the corporate interests of the entire khel, rather than as individuals.[10]

The independence of the khels naturally extended to military affairs. It was usually at the khel level that raids were both launched and targeted. When one khel was attacked, its neighbors generally remained neutral and probably even watched on with a vested interest, in that they probably had their own feuds with the khel under attack and hoped it might be weakened. Naturally then, it was also at the khel level that peace treaties and alliances were forged. Not unlike the military alliances of modern nation states, Naga khels sought to improve their security by entering into mutual help pacts with other khels and villages. Although such alliances were aimed primarily at military assistance during times of war, they would also try to help each other during famines, natural calamities or any other time of difficulty. If a khel was badly damaged by fire, for example, its allies might bring materials and assist in the reconstruction. In cases of a dispute with a third party, these allied khels would often come to inquire and show support.[11] Some of these alliances had their roots in blood relations. When khel members became dispersed across several villages, they tried to nurture these kinship links and provide mutual support.[12] Such relations were renewed through a tradition of cross-visits known as kekinyi. These took place during the Sekrenyi festival season in February to March. Men from the visiting clan would don full traditional dress and walk, sometimes considerable distances, to visit an allied khel in another village. It was meant as an extravagant display of social wealth and military power. The visitors would spend several days with their hosts, discussing their historical relationship and renewing their commitment to help each other in times of war or other need. In this way, they maintained unity within blood relations, even after they became spread across other villages.

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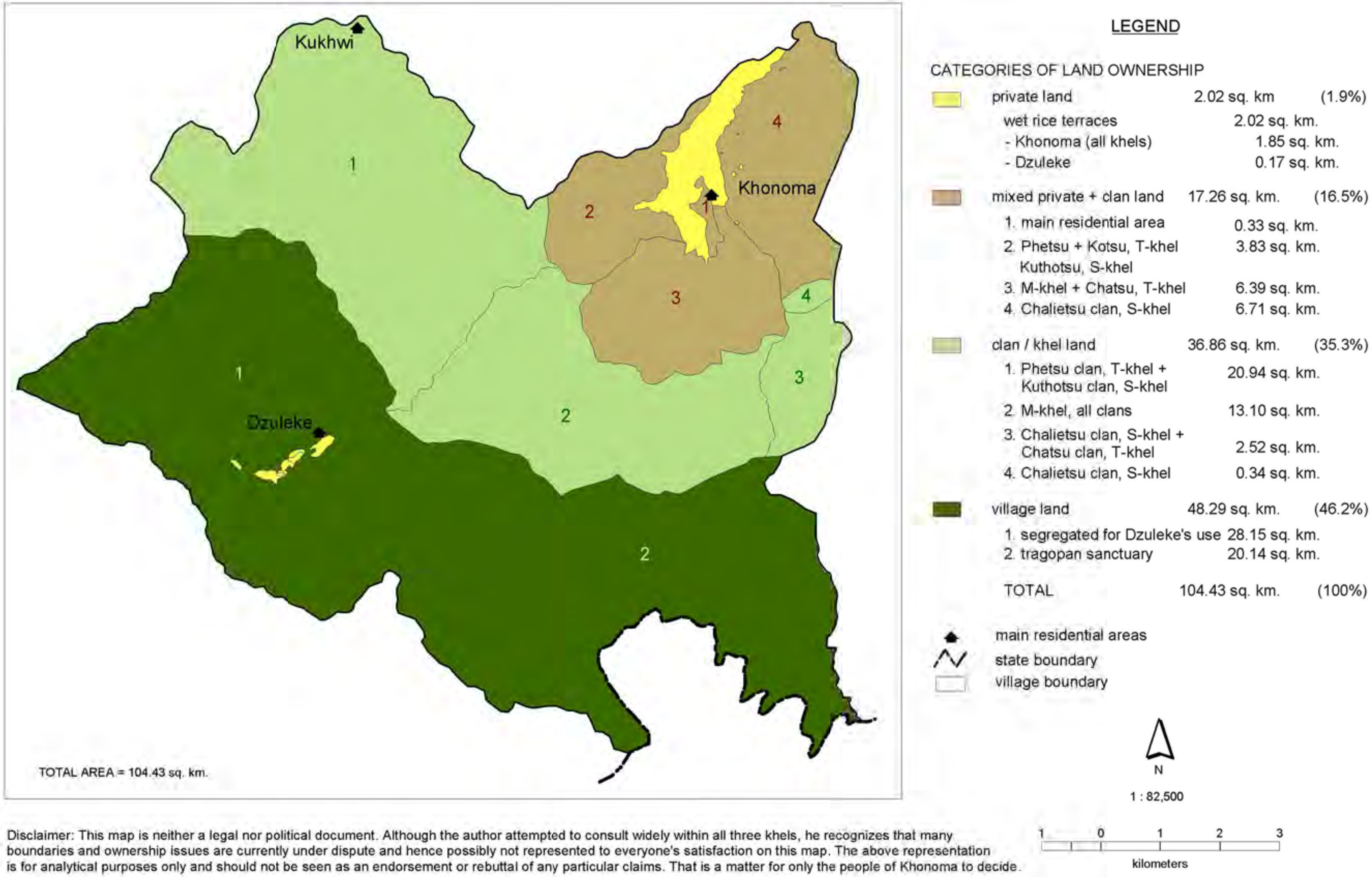
[10] Although solidarity was needed within the khels, this of course did not preclude some infighting between related subclans. But as Pawsey (1938:1) noted, it tended to be less lethal.

[11] A stone monument standing in front of the Thevomia khel fort in Khonoma, for example, commemorates that khel's long-standing friendship with Porba village (Chakhesang) in Phek District (plate 3-148).

[12] Having relatives in other villages provided Nagas with a network of "safehouses" where, while traveling, they could rest without having to worry about their security. The Aos described such houses as "nü motong", translating literally to "*spear – keeping vertically*", or in other words, "*a house where you could stand your spear up*". This expression is a cogent reflection of the insecurity that prevailed in the Naga Hills at that time. Referring to those days, an Ao colleague observed, "Spear and dao were a must. You could go without food or without any clothes. But not without dao and spear … not if you wanted to survive!" (Yaden, 2001)

Map 3-2. General Breakdown of Property Rights in Khonoma Village during Period of Fieldwork (2000-2001)



Disclaimer: This map is neither a legal nor political document. Although the author attempted to consult widely within all three khels, he recognizes that many boundaries and ownership issues are currently under dispute and hence possibly not represented to everyone's satisfaction on this map. The above representation is for analytical purposes only and should not be seen as an endorsement or rebuttal of any particular claims. That is a matter for only the people of Khonoma to decide.

This system of khel alliances appears to have had a stabilizing influence in a couple of ways. Firstly, it made smaller khels less vulnerable to their larger neighbors; although they might have appeared to be easy targets, aggressors had to be careful who they attacked if they were known to have powerful backers. Because fighting was usually at the khel level, it meant that rarely were two villages completely at war with each other. At least one or more khels in each village would be neutral in the conflict and might eventually be asked to act as mediators. Similarly, when khels of the same village were at war, the fact that most villages had at least three khels was often helpful in mediating a truce. At least one khel was probably neutral in the dispute and for the wider good of the village, was expected to intervene and act as an honest broker in bringing the warring parties to peace talks.

Both their oral history and in later years, British records, confirm the long adversarial relationship between Khonoma's three khels. An excerpt from Butler's tour diary, written during a visit to Khonoma in 1870, shows how khel feuding forced villagers to remain in a constant state of readiness against attack, even whilst they were working in their fields:

> "After visiting the old fort, or rather the site on which it used to stand, we went through the Merhma [Merhümia] fields where all the lads and lasses were out at work, and were much pleased to observe the good humour with which every one of them seemed to be working, tilling up the ground with joyous song and echoing shout, notwithstanding each man having his shield and spears close at hand ready for action in case the Semoma [Semomia] clans might attempt to attack them."(Butler, 1870b)

British administrators often grew weary of Khonoma's khels complaining about each other.[13] As described in Chapter 5, when Khonoma was split in the lead up to the Indo-Naga war, the fractures were very much along khel lines. Today, Khonoma's khel rivalries are muted, but still palpable. Most bad feelings are rooted in the events of the Indo-Naga conflict. These are not openly discussed to avoid the pain of reopening old wounds, but there has never been a sense of closure. On the surface though, some now – rather unconvincingly – discount the importance of khels and claim that villagers now tend to identify their allegiance more with church membership.[14] The later discussion on *Religion* suggests that this is only cosmetic, and that the old divisions between the khels remain deeply entrenched.

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[13] Although it was early days in Hutton's career in the Naga Hills (1917-1935), he appears to have rapidly lost patience in dealing with the perpetual bickering between Khonoma's khels, in which he had to act as referee (Hutton, 1917).

[14] One often sees khel rivalries continuing to play out in village politics. When in 2001, an age group from Thevomia khel proposed to build a majestic village gate arching over the approach road from Kohima, they needed permission from Semomia khel, which owned the land selected as the most suitable site. Semomia initially refused, ostensibly out of concern that the gate might later be used to question their ownership of the land. The more fundamental reason though, appeared to be the old habit of one khel trying to thwart the

Subclans (thepfü)

Khels may sometimes have come together in village formation, as in Khonoma as described in Chapter 4. They are the apex of a classic segmentary system, as discussed by Sahlins (1968) and many others, that characterizes Angami society. Progressing down to the next level, each khel is divided into multiple subclans or lineages called thepfü. These are groups of closely-related families putatively descended from a common ancestor, by whose name the thepfü is usually known. The suffix "tsu" that appears on all the subclan names translates literally to "*grandchild*", but refers here more generally to "*descendant*". As shown in map 3-3, each subclan generally occupies its own geographical area within the khel of which it is a member.[15]

Since the relationship is closer, the level of solidarity within the subclan is normally greater than in the wider khel. They are close not only in terms of ancestry, but also the proximity of their houses and the fields that they cultivate. Against the backdrop of warfare and headhunting that prevailed across the Naga Hills in earlier times, it was the subclan that provided security and would protect a person in times of trouble. And if a villager was harmed, it would be his subclan that would revenge his blood, providing a protective deterrent. In fact, a person's inseparability from his subclan was such that the entire subclan was often held collectively responsible for the actions of a single member.[16] In the case of murder, for example, if the actual perpetrator had fled and could not be punished, then blood revenge would be taken on another subclan member. For all these reasons, the attachment to the thepfü remains strong.

As populations increased, the subclan also emerged as the most important unit for exchange of marriage partners. The rule of exogamy that had formerly been applied to the khel level eventually devolved to the level of subclans.

Patrilineage (pfutsano)

The subclans are, in turn, divided into local descent groups or patrilineages called pfutsano, meaning "*offspring of the same grandfather*" (Meyase, S., 2001, 25). They address themselves as cousins. These are closely-knit groups of families that live and work on the same ancestral land (map 3-4). If a family has no male heirs, then its land will be inherited by one of the husband's cousins, thus keeping it within the

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efforts of the other and in this case, prevent them from earning prestige from the highly-visible gate project. (Semomia eventually relented and the gate has since been built.

[15] There is more intermingling of subclans belonging to Merhümia khel because of where families resettled after returning from exile in the forests (Meru, V., 2003).

[16] Cantlie mentions (1920a), for example, an entire khel (unnamed) in Khonoma having to flee in 1920 when one of its members murdered a Merhümia man. They were fully aware that if the culprit had made his escape and was out of reach, Merhümia khel would target its revenge on his relatives. See also Sahlins (1968).

patrilineage. Khonoma's population now comprises 40 such patrilineages (figure 3-2). If current trends continue and such patrilineages eventually emerge as the new exogamous groups, then anyone searching for a marriage partner within the village will theoretically have another 39 patrilineages from which to find a suitable candidate.

Family (kikru)

This brings us to the family or kikru as the final level of Khonoma's social organization. The data on Khonoma's families presented in table 3-2 were gathered as part of a household survey.

Table 3-2. Some Basic Data on Khonoma Families, Analyzed by Khel [a]

	Merhümia	**Semomia**	**Thevomia**	**Entire Village**
Relative Ages of Married Couples:				
seniority of husbands over their wives (avg. years) [b]	3.69 (102 couples)	3.67 (56 couples)	3.27 (87 couples)	3.52 (285 couples)
Reproduction:				
age of women at 1st childbirth (avg.) [c]	25.1 (87 women)	26.58 (60 women)	25.7 (112 women)	25.6 (259 women)
number of children (avg.) [d]	3.81 (128 families)	3.15 (85 families)	3.84 (154 families)	3.67 (367 families)
Family Size and Type:				
number of household members (avg.) [e]	5.17 (157 hh)	4.73 (94 hh)	5.19 (171 hh)	5.08 (422 hh)
nuclear families (%) [f]	79.62 (125 families)	88.30 (83 families)	90.64 (155 families)	86.02 (363 families)
extended families (%) [g]	20.38 (32 families)	11.70 (11 families)	9.36 (16 families)	13.98 (59 families)

[a] Data derived from a household survey undertaken as part of the field research.

[b] See figure 3-5 for a graphical presentation of these data.

[c] See figure 3-6 for a graphical presentation of these data.

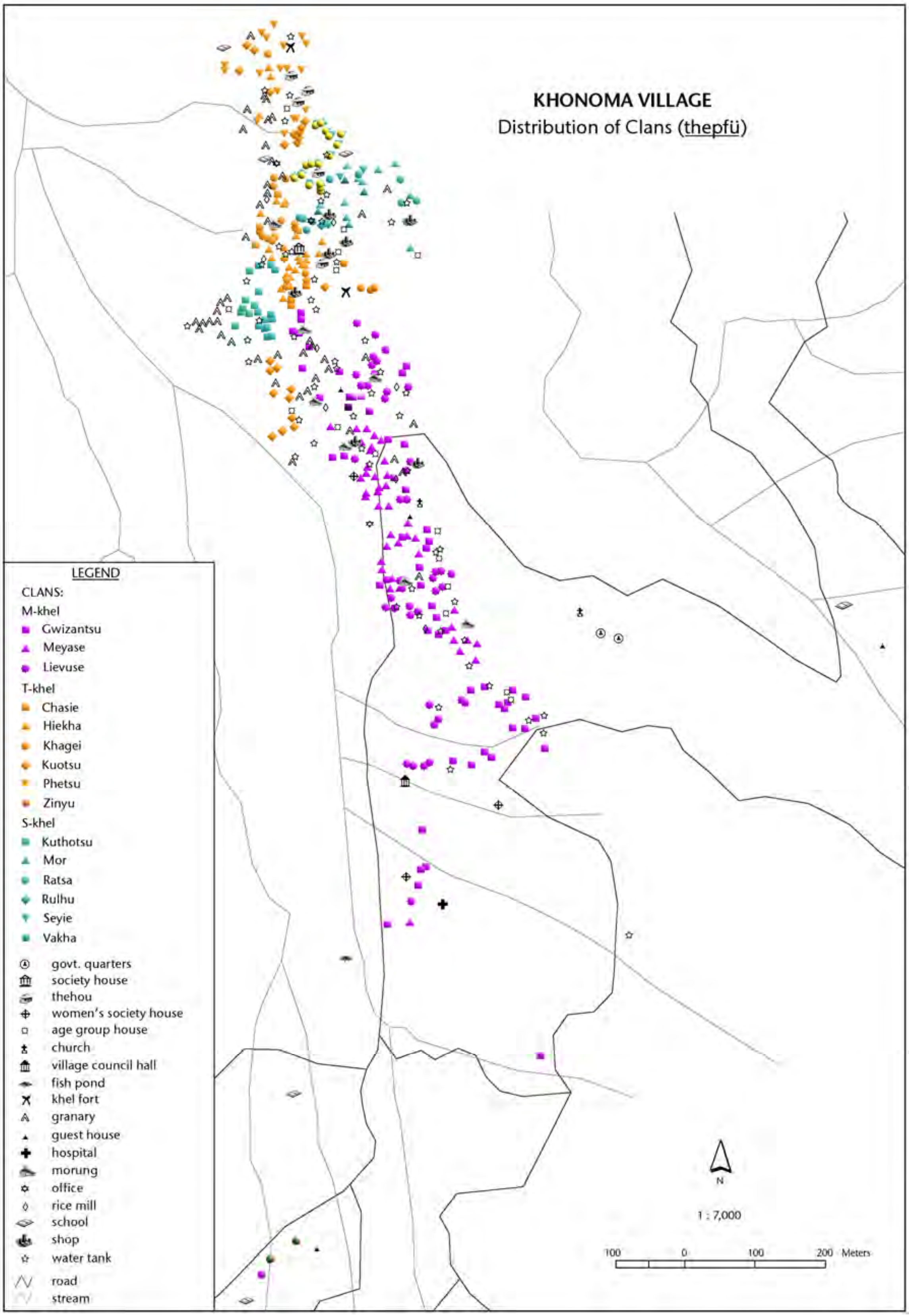
[d] For calculating average number of children, only women who appeared to be finished bearing children were included. All live children at the time of the survey were counted and no effort made to factor in mortality issues.

[e] See figure 3-3 for a graphical presentation of these data.

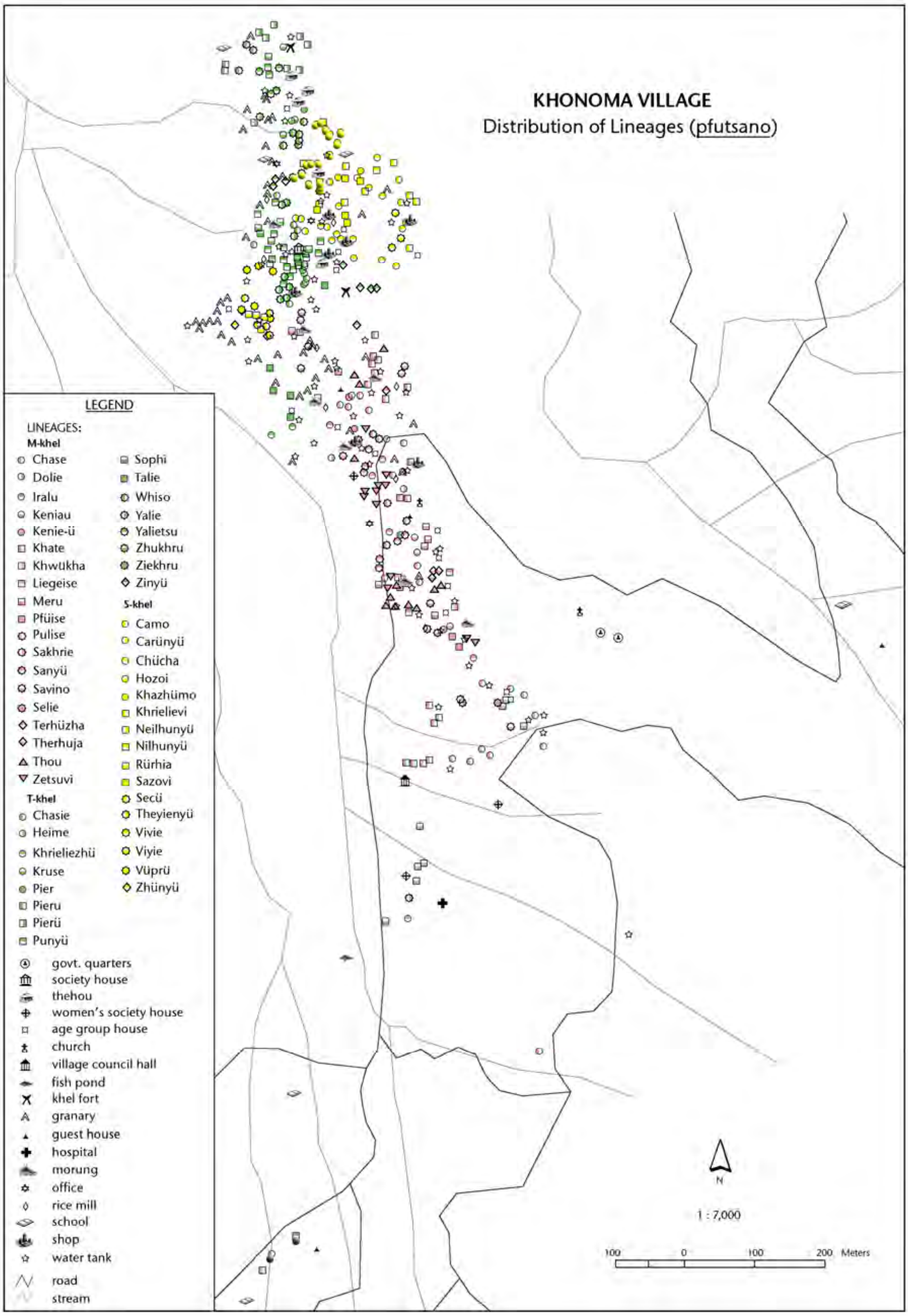
[f] Households that included no one beyond parents and their children.

[g] Households that do include member/s beyond parents and their children.

Map 3-3. Distribution of Subclans (<u>thepfü</u>) – Khonoma Village

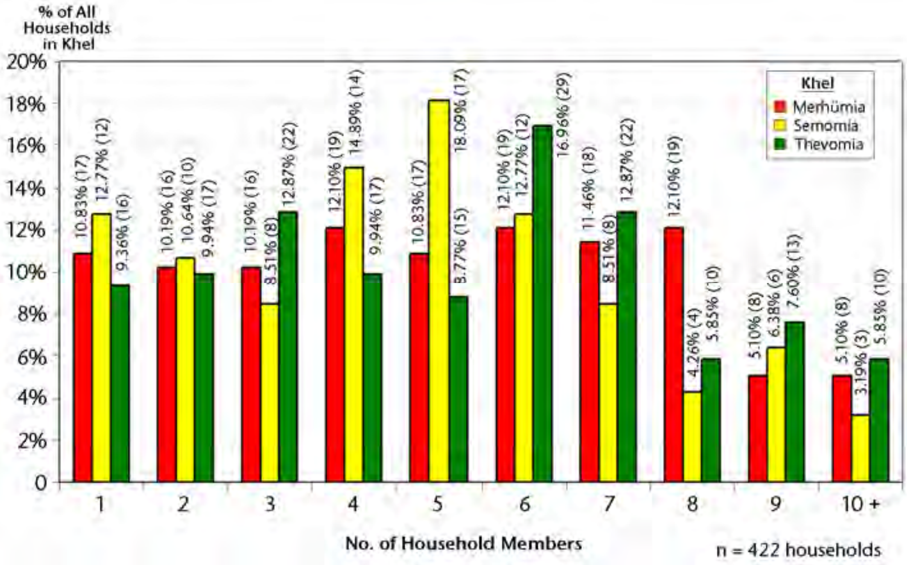


Map 3-4. Distribution of Lineages (pfutsano) – Khonoma Village



Angami families are generally of the nuclear type. After sons marry, they build new houses in that part of the village occupied by their lineage (pfutsano) and start their own families. Post-marital residence is thus patrilocal, near the husband's father's male patrilineal kinsmen – and thus creating the groupings of related households seen in map 3-4. Daughters go to their husbands' houses after marriage, and leave their descent group of birth. Parents usually value their independence, and after their children marry and move out to start their own families, normally live alone as long as they are capable of supporting themselves. This shows up in about 20.85% of Khonoma's houses having only one or two occupants (figure 3-3).[17] Although household size is quite widely distributed, the largest number (37.68%) fall within the range of four to six members per house.

Figure 3-3. Overview of Household Size in Khonoma Village, Broken Down by Khel *



* Data derived from a household survey undertaken as part of field research.
See appendix 3-22 for presentation of these data in table format.

Like all the Naga subgroups, the Angami have a patriarchal ideology and have quite a clear division of tasks between husbands and wives. As the head of the family, the man is expected to provide for and protect his family. Although his wife probably works longer hours in the fields, as we shall see in Chapter 8, he is expected to shoulder the physically more demanding tasks, such as tree-clearing. When not busy with fieldwork, men traditionally went hunting and brought back wild meat to supplement what they were able to produce on the farm. As the British enforced law-and-order in the Naga Hills, Khonoma's men became more active as traders. Slack periods were used to weave baskets, carve wooden platters and spoons, or make other handicrafts. In addition to providing for their families' material needs, Angami men acted as the family priests and performed the

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[17] This is why British administrators had used quite low estimates of the average number of people per house when calculating Angami population sizes. They knew that the relatively high proportion of houses with only one or two elderly residents dragged down the average. See also Sahlins (1968).

customary rites of the family. In the event of his death, the oldest son would then take over his deceased father's responsibilities as head of the family.

Amongst the Naga subgroups, Angami women are renowned as particularly hard workers. Naga colleagues like to joke that their wives are their "Ministers of Interior", managing all household affairs. In this, they refer to looking after the children, cooking the meals, milling the rice, collecting firewood, fetching water, feeding the livestock, weaving, and the multitude of other domestic chores involved in looking after a household and family. Moreover, as chapter 8 will show, Khonoma's women now do most of the fieldwork. The children assist them with this work, both lightening the load of the women and, in so doing, learning the domestic skills that they will need in later life. Perhaps in recognition of their important contribution to the household economy, women enjoy a fairly high social position in Angami society. As evidence of this, analysts commonly point out that the wife's participation was essential to conducting feasts of merit and she shared in the social standing thus earned.

The Angami traditionally viewed someone with many children as being favored by the spirits. Male offspring were particularly welcomed since they reinforced the strength of the family and its clan. But this attitude has changed somewhat with education, and numbers are no longer needed for military security. As already noted from Khonoma's population pyramid in figure 3-4, many families have begun adopting family planning and limiting children to the number that they feel they can afford to educate. The children are taught to be industrious and independent from an early age. The boys immerse themselves in hunting, trapping and (formerly) warfare, while their sisters learn how to weave and do other household chores almost as well as their mothers. They listen to their parents tell traditional stories that teach their history, values and code of conduct. They learn to show respect to their elders and work with peers in their age groups.

As explained in more detail in chapter 6, although the oldest son inherits the largest share of his father's property after marriage, it is the youngest son who is expected to look after his parents in their old age. The parental house and plot will pass to him on their death.[18] It is thus the middle sons who are most in danger of not receiving an inheritance if their parents do not own sufficient property. The daughters will marry and join another lineage through the laws of exogamy. Under Angami custom, they are not entitled to inherit ancestral property. This must remain in the hands of their brothers and continue to be passed down through the male line of descent. When a daughter marries into another lineage, she will then manage her husband's house and cultivate his land.

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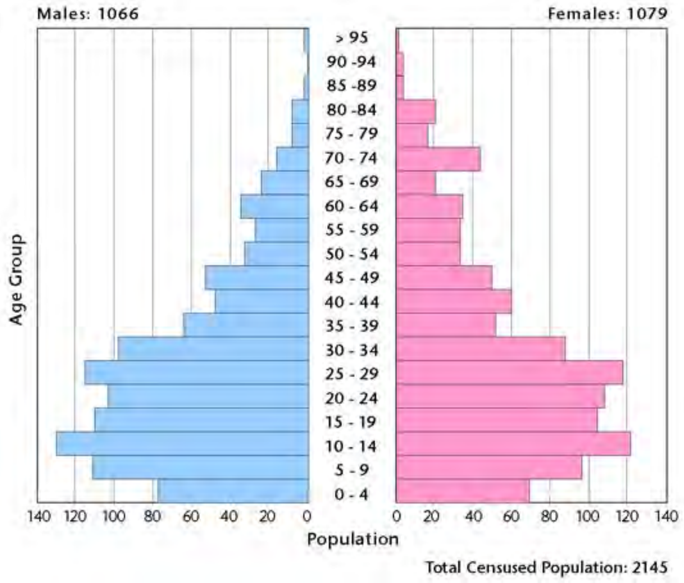
[18] This measure of ultimogeniture reflects the inheritance of chiefly authority in the *gumsa* societies of highland Burma, discussed in the Preface. It may or may not have historical significance. See Leach (1954) for a discussion of the tensions between ultimogeniturre and hypergamy.

Figure 3-4. Population Pyramid for Khonoma in 2002
(See appendices 3-16 – 3-17 for more detailed breakdowns of Khonoma villagers' ages.)



Marriage (kishü kiya)

I have already mentioned the paradox of khel relationships – although they were frequently at war, they needed one another for the exchange of wives. This dependence has lessened as the rules of exogamy have been applied to progressively smaller units of kinship. Angami oral history tells of a time when the Thevomia and Thekronema moieties were the original exogamous units that married mutually into each other (Hutton, 1969, 113). This probably underlay the old Angami custom that newly-established villages should include representatives of both moieties, so marriage partners would always be available within the same village. But as the population grew and the moieties branched into numerous thino (major clans), then these gradually became the level at which exogamy was applied. Much of the literature on the Angami continues to talk about khel exogamy, but this has long ago ceased to be the case. In fact, a survey of 342 marital unions in Khonoma found that roughly two-thirds of them had married someone from within their own khel (table 3-3)! The rules of exogamy are generally now applied only at the subclan (thepfü) level[19], and there is anecdotal evidence that it may be in the early stages of shifting to the sub-lineage (pfutsano) level in some Angami villages.[20]

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[19] Paradoxically, the rigid focus on the male line of descent can prohibit marriages between couples even very distantly related on the father's side, but allow marriages between couples quite closely related on the mother's side.

For example. the Meru patrilineage (pfutsano) of Khonoma's Merhümia khel traces its migration back through Zeliang territory before arriving in Khonoma some 11 generations ago. The Angami Merus in Khonoma recognize that they are of the same blood as the Zeliang Merus in Peren District, even though Indian census reports count them as belonging to different tribal groups. (Meru, V., 2001)

[20] For example, it is reported that marriages between lineages of the same subclan are on the rise in neighboring Jotsoma village. Some are not very comfortable with this trend because marrying within the

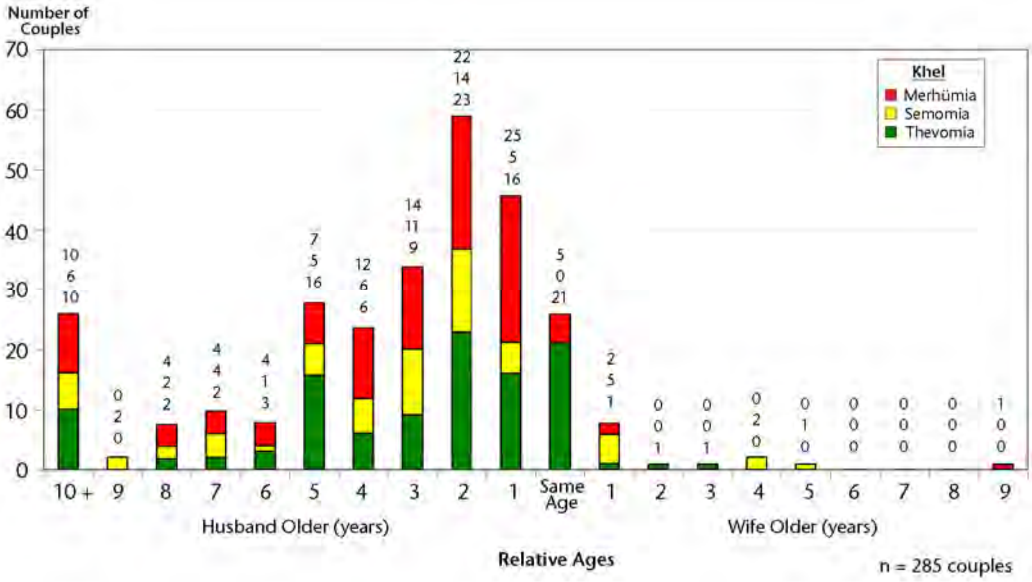
Table 3-3. Overview of Intermarriage between Khonoma's Khels *

		♀			
		Merhümia	**Semomia**	**Thevomia**	**Entire Village**
♂	**Merhümia**	82 (64.1%)	17 (13.3%)	29 (22.6%)	128 (100%)
	Semomia	19 (22.9%)	51 (61.4%)	13 (15.7%)	83 (100%)
	Thevomia	23 (17.6%)	23 (17.6%)	85 (64.8%)	131 (100%)
	Entire Village	124 (36.3%)	91 (26.6%)	127 (37.1%)	342 (100%)

* Based on 342 marriages. Data derived from a household survey undertaken as part of fieldwork.

Angami men were usually monogamous; they did not take more than one wife. Beyond limiting their search to those subclans permitted under the rules of exogamy, there appear to have been no other specific rules for finding a preferred marriage partner. However, data presented in figure 3-5 suggest a strong preference for wives younger than the men. Of 285 married couples surveyed in Khonoma, the husband was older 85.96% of the time, the wife 4.91%, and they were the same age the remaining 9.12% (see appendix 3-23). Husbands were an average of 3.52 years older than their wives. Women were giving birth to their first children at an average age of 25.6 years (figure 3-6), and having an average of 3.67 children (table 3-2).

Figure 3-5. Depiction of Relative Ages of Marrying Couples in Khonoma *



* Data derived from a household survey undertaken as part of field research.
See appendix 3-23 for presentation of these data in table format.

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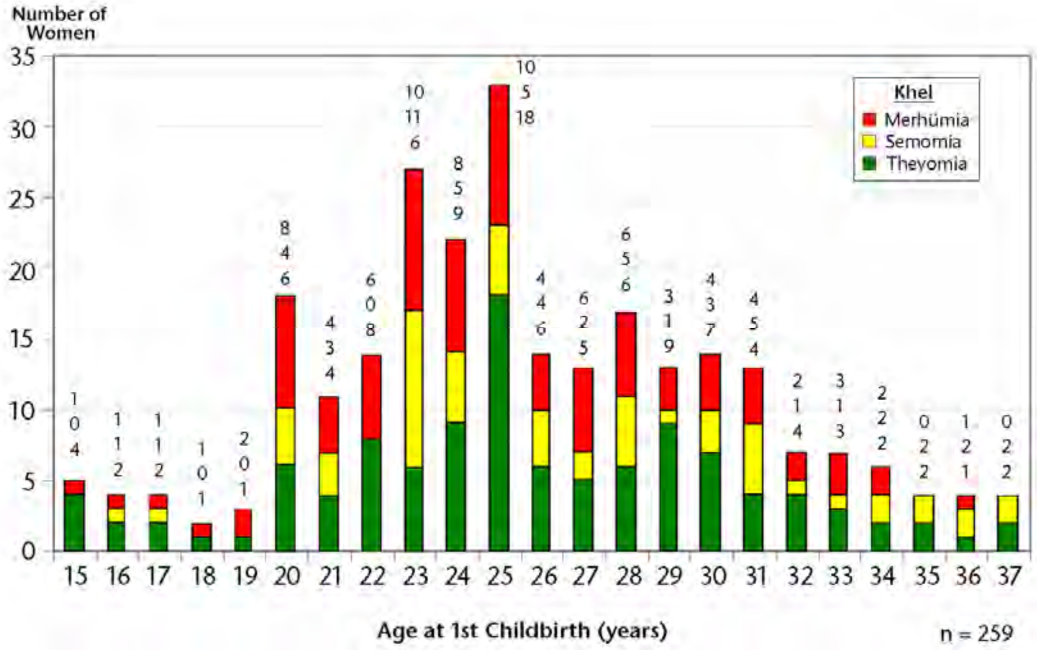
same subclan was earlier prohibited, and considered incestuous. Sometimes such couples become the target of neighbors' jokes, possibly as a form of social control. In Khonoma, marriages between lineages of the same subclan are not prohibited or penalized, but normally an Angami man prefers to marry someone from outside his own subclan (Aier, 2001).

Figure 3-6. Age of Khonoma's Women at the Time of their First Childbirth *



* Data derived from a household survey undertaken as part of field research. Calculated by subtracting women's ages from those of their first-born children. See appendix 3-24 for presentation of these data in table format.

In searching for a wife for their son, the main concern of parents was the social status of the girl's family, and whether its economic status was similar to their own (Meru, V., 2001). Which khel she belonged to was not considered important. This has changed somewhat with the village's conversion to Christianity. As will be seen in the later section on *Religion*, the division of membership between the Baptist and Catholic Churches falls closely along khel lines. The popularity of intrakhel marriages seen in table 3-3 is probably, in part, a reflection of villagers' wish to marry within their own church.[21] But while Angami society is becoming more permissive in terms of restricting the degree of relatedness which determines exogamy, there is also an opposing trend for marriage with outsiders. In the past, it would have been very rare for an Angami to take a wife from another village, and even rarer from another tribal group.[22] But this has also changed as the Angami have become increasingly mobile in the pursuit of education and work opportunities – and broader in their social contacts as chapter 5 will show.

Although young Nagas who have moved to urban centers have undoubtedly become more Westernized in their approach to courtship and marriage, arranged marriages continue to be the norm in the villages. The Angami commonly wait until reaching 25 to 30 years of age before marrying. Some boys develop romantic

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[21] Now that marriage partners can be found within one's own khel, it is quite possible that there is a preference for suitors from within, thus boosting the numbers of one's own khel, rather than sending a daughter to contribute to a rival khel. Such reproduction strategies are often related to production strategies regarding land/population ratios. See Friedman (1975).

[22] But there are many stories of Angami fighters sending their sisters to rival villages to gather intelligence on what they were planning (Husie, 2001). Several such stories are included in the folklore of the fractious relationship between Khonoma and Mezoma over the centuries.

interests with particular girls and when it reaches time for their parents to ask them who they would like to marry, their response is a foregone conclusion. If parents disagree with their sons' choices, they may try to persuade them to reconsider. In other cases, the search for a suitable bride may be left entirely in the parents' hands. Whichever the case, after the boy's parents have identified a suitable candidate, they then send a negotiator – usually an elderly woman – to approach the chosen girl's parents with the marriage proposal. The girl's parents then consult her opinion. She has the freedom to decline if she does not approve. If they decide to turn down the proposal, then they will find an excuse that allows them to do so in a tactful way. They had a ready opening for doing so in pre-Christian days when omens were consulted as part of the process for considering a marriage proposal. This was done by strangling a fowl and noting the position of its legs as it died.[23] Dreams were also carefully examined for any indication of the likely success of the proposed marriage.[24] So, if the girl's side did not wish to accept the marriage proposal, it was a simple matter of citing inauspicious omens or dreams as justification. If the girl's side was receptive, then the negotiator would continue to make several visits to finalize the date and marriage price (thema). After a marriage had been successfully negotiated, it was customary for the suitor to rise early in the morning and take a brand new spear (code 17.1.1 in appendix 5-7), along with a cock and hen, and present them to his prospective parents-in-law. The preferred season for weddings was between November and April, when the agricultural calendar was at its quietest.

There is no bride price or dowry as such amongst the Angami[25], but the boy's side is expected to pay for the marriage feast. The elaborateness of the celebrations varies according to the socioeconomic status of the two families. Traditionally, if a boy's family could not afford to sponsor a feast, they might choose the option of an informal marriage that avoided any ceremony or costs. Such informal marriages usually took place in one of three ways: an old woman would escort the bride directly to the groom's house (tapfü-kerei); at the end of a day's work in the fields, the bride would simply accompany the groom back to his house instead of returning to her own (also known as tapfü-kerei); or when their parents did not approve of their intended marriage, a young couple would sometimes elope (ni-kerei) (Meyase, S., 1985, 33).

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[23] While in its death throes, if the cock's right leg crossed over the left and it defecated, then it was a good omen (Hutton, 1969, 203).

[24] Dreams of weeping, excretion or sex were considered inauspicious (Hutton, 1969, 220).

[25] Amongst the Naga tribes, only the Semas have the tradition of paying bride prices. This has a number of interesting implications. Firstly, Angami traders who dealt in necklaces came to recognize the Semas as one of their best markets. Secondly, the revenue-earning potential of girls at the time of marriage meant that Semas welcomed the birth of daughters – whereas the Angami preferred sons that would carry on their father's line of descent. It was not unusual for Sema boys to have to delay their marriage until they could accumulate the required bride price.

For those who could afford a formal marriage, there were two levels of feasting from which they could choose, depending on their economic status: Firstly, thevünyhü, or a marriage celebrated with fowls. This was the most common marriage in the past, when Angami weddings were simple affairs and the girl's parents would demand only a few fowls to distribute amongst close relatives. Expenditure was small and did not impose a large burden on the marrying couple. Secondly, thevonyhü, or a marriage celebrated with pigs. If the girl came from a wealthier family, then her parents might demand grander celebrations, more in keeping with their prestige. Several pigs would have to be slaughtered to feast a wider circle of invited relatives (ibid).[26] Wealth, labour and land strategies were therefore closely interrelated.

With livestock provided by the groom's side, it was the bride's parents that arranged the feast in their own house. Larger thevonyhü feasts were attended by all the bride's kin, but only the first cousins on the groom's side. This was later reciprocated during the next Terhunyi festival, when the bride's relatives would send pork and zu (rice beer) to the newly-married couple, and this time it would be shared with the groom's clan.

Wedding practices have grown increasingly ostentatious over the past 50 years, during which most Nagas have adopted Christianity. Prior to that, it was during feasts of merit and funerals that the Angami displayed their wealth by slaughtering large numbers of animals. Since the missionaries put a stop to that, weddings appear to have become the only remaining legitimate occasion – in the eyes of the church – on which many animals can be slaughtered to demonstrate one's prestige.[27] Angami weddings have thus evolved into very extravagant affairs. Elaborate arrangements seem to be essential and great numbers of mithun, cattle and pigs are killed and their heads mounted on the house wall as a statement of prestige (plate 3-115). Providing for such weddings is usually the responsibility of the groom, but it may also depend on which side can do it better. It has become the norm and parents, not wishing to create the impression that their daughters have less social worth than others, feel obliged to demand that more and more livestock be slaughtered in exchange for their daughters' hands in marriage. For most Khonoma families, an agricultural surplus is therefore still essential to achieve social status and political power in the community. [28]

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[26] Details of the wedding ceremony will not be discussed here due to length considerations, but interested readers can refer to Hutton, 1969, 219-225; Meyase, S., 1985, 30-38.

[27] Soaring wedding costs mean that many young Angami that might otherwise be ready to start a family cannot afford to get married. Some churches have tried to intervene by encouraging their congregations to limit wedding feasts to one head each of mithun and pork, thus setting an upper cap on costs and keeping weddings affordable. But the church has no authority to enforce this and it is widely ignored.

[28] However, spectacularly lavish wedding celebrations are often seen for family members of Naga politicians and bureaucrats who have their fingers deep in the public till. Instead of being concerned that the public might wonder how they can afford it on their modest salaries, they view a wedding as an opportunity to display their assumed importance. Despite guest lists that may number into the hundreds, there are often so

As already noted above, the Angami generally follow a rule of patrilocal residence after marriage.[29] Young couples often begin their married lives by staying with the groom's parents, but maintain a separate hearth. They construct their own house when they are able, usually nearby on the husband's clan's land.

Divorce (Kimianupfü Kevaketie)

Marital unions in the pre-Christian era were not only easily formed, but even more easily broken – and often.[30] The most common reason for a man to seek separation from his wife was probably barrenness or failure to produce a male heir, since even in the absence of warfare, male labour was regarded as of primary importance for economic success and supernatural blesssing. In a patrilineal society like the Angami, continuance of the male line of descent was accorded immense importance. The most common grounds for women to seek divorce were their husband's laziness, extravagance, excessive drinking, and consequently, the continued poverty of the family – no matter how hard she might work (Meyase, S., 1985, 37). Spousal abuse was sometimes mentioned as a factor (ibid), but does not appear to have been very common.[31]

The high rate of divorce was often attributed to the strong social pressures on Angami women to marry quickly, even if they had not yet found a particularly suitable partner. In pre-Christian times, Angami girls had to shave their heads until they married. It was believed that a woman allowing her hair to grow long (thakra nyhü) before marriage would bring bad fortune upon her brothers and clansmen in warfare and headhunting. A shaven head was thus associated with adolescence, and a mature woman having to continue to shave her head, while other members of her age group were married and having children, was considered shameful. It would be interpreted that the girl and her family were not of good character and thus could not find a young man who would agree to marry her.

The practical result was that women had to find a way to get married to escape the stigma of having to shave their heads. A woman might marry an outsider

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many livestock slaughtered that the meat cannot be consumed and must be left to rot. Having this much wealth is regarded as an impressive display of prestige (Yaden, 2001).

[29] The patriarchal bias of Angami thinking is evident in the phraseology used for marital unions. When a man marries, he is said to "take a bride" (thenyulie). But when a woman marries, it is said that "she weds" (nhü vo). In the unusual circumstances that the groom goes to live with his bride's family, he becomes the subject of jokes that "he has wedded".

[30] Divorce rates amongst Angami are much lower today than in the past. Within the group of ten households that collaborated most closely with the research in Khonoma (plate 6-114), there had been no divorces, but one case in which a man's wife had died at a young age he had later married her sister.

[31] The Nagas provide an interesting example of social mores discouraging mistreatment of women. They view anyone who abuses women as not man enough to compete with other men, and therefore attempting to exert his dominance over the "weaker" sex. Those abusing women are thus viewed with contempt and found wanting in masculinity – a most grievous charge in the eyes of the Angami.

or even someone from the plains, with every intention of divorcing him in a few days. The objective was long hair – not necessarily a lasting union. If this failed, there was another “escape clause” that would allow her to avoid a lifetime of shaving her head. In the time of traditional beliefs, large stones and the village gates were believed to contain spirits and were thus highly respected. If a girl testified in front of the village elders that she had married one of these village gates or stones, then she would be permitted to wear her hair long. This practice was eventually abandoned as more of the village adopted Christianity, but unmarried women with shaven heads are still prominent in photographs taken in Khonoma in the 1960s-1970s (see photograph gallery).

Adultery was a common factor in broken marriages, and provides perhaps the clearest example of double standards between the expected behavior of men and women. A man’s prowess in extra-marital affairs was admired and earned him the right to wear a fourth row of cowries on his kilt, like a badge of honor. After his death, his love conquests would be immortalized by notches on his gravestone[32], or by placing the appropriate number of small stones around his grave site. But a woman would be harshly condemned for the same behavior. She would be punished by beating, possibly even to the extent of having the tip of her nose chopped off, and then sent back to her parents. Hence, adultery on the part of a wife would almost certainly end a marriage, but seldom so by a man. The alleged monogamy of Khonoma’s men before Christian times needs to be viewed in the light of this obvious discrimination.

This inequality extends to the division of property on divorce. If the breakup is amicable, then the wife will usually receive one-third of the couple’s movable joint property, but no share of the immovable properties – the house and land. She will usually retain at least what she brought from her house when she entered into the marriage. If the divorce is the result of her husband’s indiscretions, this does not entitle her to any larger share of the assets. This means that even when the fault is his, an Angami man can always divorce his wife without suffering any loss of property. However, if the wife’s infidelity is the cause, then she will not receive any property and will be sent away virtually with only the clothes on her back, and quite possibly beaten and injured. Regardless of parenting capacity, the children usually remain with their father since they are considered as part of his clan – not his wife’s.

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[32] This Angami equivalent of “notches on the bedpost” can still be seen on some old monoliths at Khonoma. One of the best known commemorates Danyü Zhünyü, an historical figure from Semomia khel’s Kuthotsu subclan, who was both a gifted poet (see appendix 3-26 for an example of his work) and a lady’s man. It is hard to measure to what extent these posthumous records of love conquests were influenced by exaggeration.

Remarriage (Kerilakecü)

In cases of either divorce or death of a spouse, remarriage is common. If a husband dies, Angami customary law acknowledges his widow's right to continue to live in his house and use all his properties as her own – until either she remarries or her own death. In both cases, the properties of her late husband would then return to his patrilineage. If she remarries, then she will join her new husband in his house and cultivate his lands. It is considered that a widow should wait a respectable length of time, usually at least one year, before remarrying. Remarriage of a widow or divorcee is simple and without any formality. But if a divorced or widowed man chooses a virgin bride, then he should again sponsor a marriage feast.

Other Traditional Angami Institutions

The kinship groups, as described, provide the foundation for Khonoma's social organization – and everything else stems from them. Three more institutions were essential to Angami society in the early years of British rule – the dormitories, the sitting places, and the age groups. All were indirectly related to kinship in that their memberships were based on geographic communities – which in turn, were determined by who was related to whom, because relatives tended to be neighbors. These three institutions are of major importance in understanding how Angami society once functioned.

The Dormitory System

The system of dormitories, commonly known as "morungs", was once the centre of social activities in all Naga villages. Morungs generally stood out as the finest and most ornate buildings in most villages. They varied in number, depending on the size of the village. S. Meyase (2001, 34) notes that they were so central to village life that the state of a village could generally be judged by the vigor of its morungs. Aside from their paramount role in defense, morungs were also institutions for imparting indigenous education. It was here that elders told stories of the past, and by listening to the deeds of their ancestors, young Angami came to know the traditions of their people and the reputation they were expected to uphold in their own lives (Meyase, S., 1985, 45). They were immersed in the traditional beliefs, the myths and legends, and the ways of life of their people. They practiced the songs and dances that their ancestors had passed down through many generations. The children learned about codes of discipline, responsibility, bravery, services and obedience (ibid). Morungs therefore played a vital role in shaping young Angami and preparing them for their future lives. Membership in a morung also determined one's circle of close friends and forged relationships that lasted throughout life. There was no discrimination between rich and poor. In many ways then, the morung was one of the most important components of Nagas' social structure and acted as the glue that bound villages together. These communal houses were segregated by gender, their activities and training tailored to the expected roles of men and women in Angami society.

Male Dormitories. In Angami villages, the male <u>morungs</u> were actually a combination of two closely-related institutions: the dormitory itself (kichüki), which was dominated by a large communal bed where the boys and young men slept at night, and usually, just outside the dormitory, a circular stone sitting place (<u>thehou</u>). An example of this combination is shown in figure 3-7.

The Stone Sitting Places Usually Associated with Male Dormitories (<u>thehou</u>). Each khel was divided into multiple locality-based colonies (<u>kila</u>), most of which were centered on a common water source.[33] As will be seen in the later discussion entitled *Administration and Justice* these colonies acted as the smallest administrative units within Angami villages. Each colony had a <u>thehou</u> that acted as a focal point for the men folk to meet around a fire, drink rice beer, and discuss village affairs. Khonoma was composed of 19 such colonies, each with a <u>thehou</u> as its nerve centre for the distribution of information (map 3-5). The men congregated here in the mornings before setting out for their fields, in the evenings after returning, and throughout the day during times of feasting or festivals. This was also the venue where the elders listened to both sides of any disputes that arose, and tried to reach just settlements. In discussing the relevant customary laws that applied to each case, their deliberations exposed the younger generations to the traditional customs and practices of the village. In that way, these fire-side debates around the <u>thehous</u> helped to preserve their cultural heritage.

The <u>thehous</u> were also the dissemination nodes for important announcements such as meetings, deaths, <u>gennas</u> (taboos) or approaching dangers (Meyase, S., 1985, 46). By yelling at the top of their lungs, the men would rapidly relay announcements from one <u>thehou</u> to the next until the entire village was informed. According to comments from neighboring Angami villages, Khonoma's men had a reputation for spending more time sitting around the <u>thehous</u> and talking than most. This may help to explain Khonoma's high level of organization and capacity to involve itself in events far beyond its own borders. It also sheds light on why the agricultural work may have been left largely to the women.

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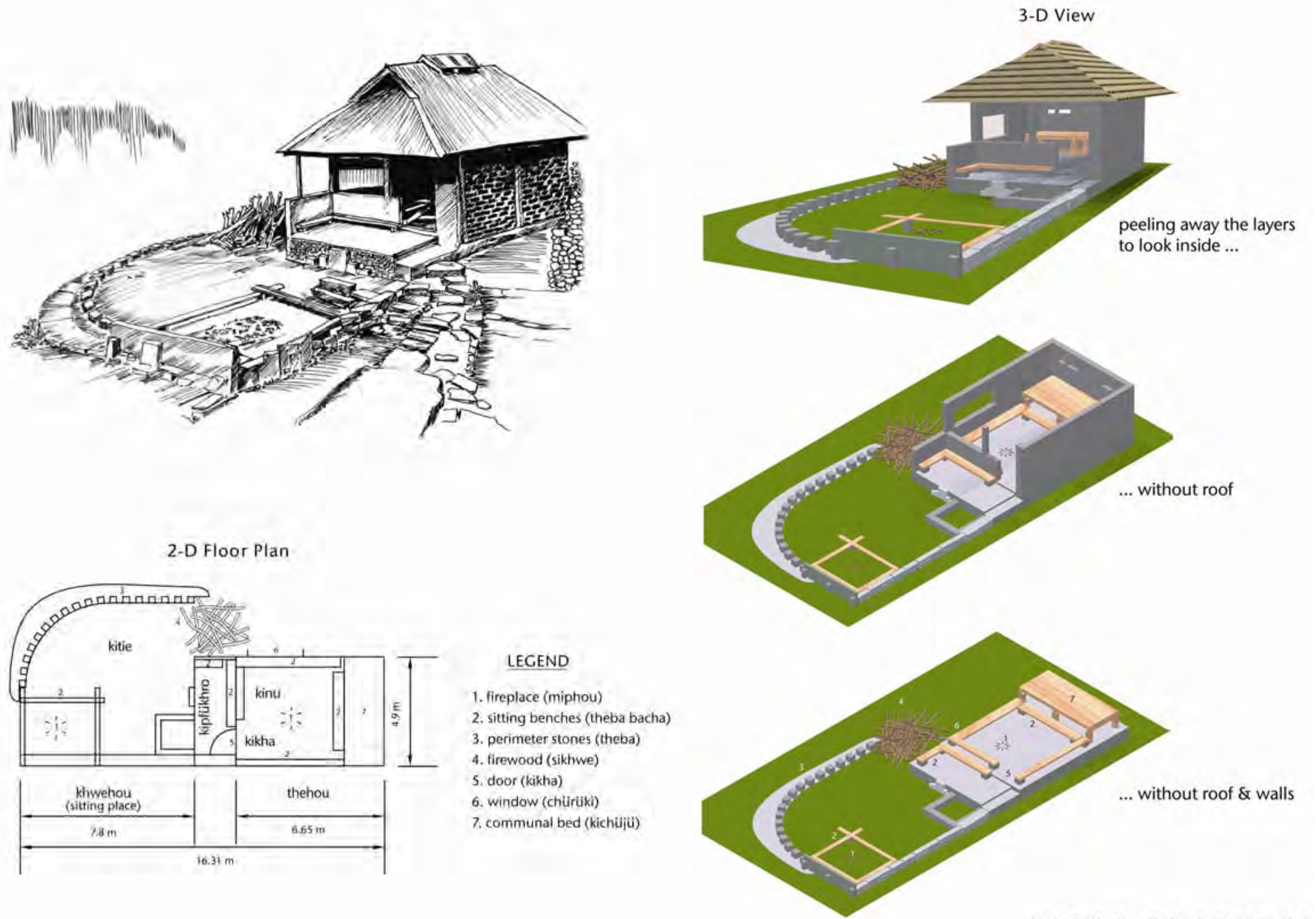
[33] Many of the colonies were named after the water source or, as shown in figure 3-7, some kind of plant or other distinctive feature of the locality.

Figure 3-7. An Example of the Combination of Traditional Sitting Places (thehou) and Male Dormitories (kichüki) that were Key Centres for Social Interaction in Angami Society *



* Huto Bokha Hou Thehou in Merhümia khel

* Refer to map 3-5 to see the location of this morung within the village map. Its name – Huto Bokha Hou – was derived from a tree that formerly grew in abundance in this area.

The Communal Sleeping Halls for Young Males (kichüki). Most of the stone sitting places fronted male dormitories, as exemplified in figure 3-7.[34] Punyü (1995, 36-37) counted 16 such male dormitories in Khonoma in 1994 when he was doing his doctoral research. Some were separate buildings, but they were more often attached to the house of a reputable villager. An extended room contained long communal beds (kichüjü) where the boys and young men slept.[35] These were men's clubs, from which women were strictly forbidden. A woman entering a male dormitory was seen as inviting bad luck, probably in the form of unsuccessful hunting or losses in war (Meyase, S., 1985, 48-49). Even worse, if somehow a woman climbed up on the men's communal bed, a genna (taboo) would be hastily announced to try to counter such an ill-boding event. The origins of the male dormitories can probably be traced back to the headhunting and warfare that had long prevailed across the Naga Hills. In response to the constant danger of attack, it was routine for the youths to get together at night to act as sentries and protect the village. Their weapons were always kept nearby in preparation to repel invaders, and this behavior was eventually institutionalized in the birth of the male dormitories. They became the "war rooms" or "barracks" of Naga villages. They were vital not only to every village's defense, but it was also here that offensive raids were planned. The morung members joined their clans or villages during times of war, and all captured heads were first brought back to the morung to perform the necessary rituals (Meyase, S., 2001, 33).

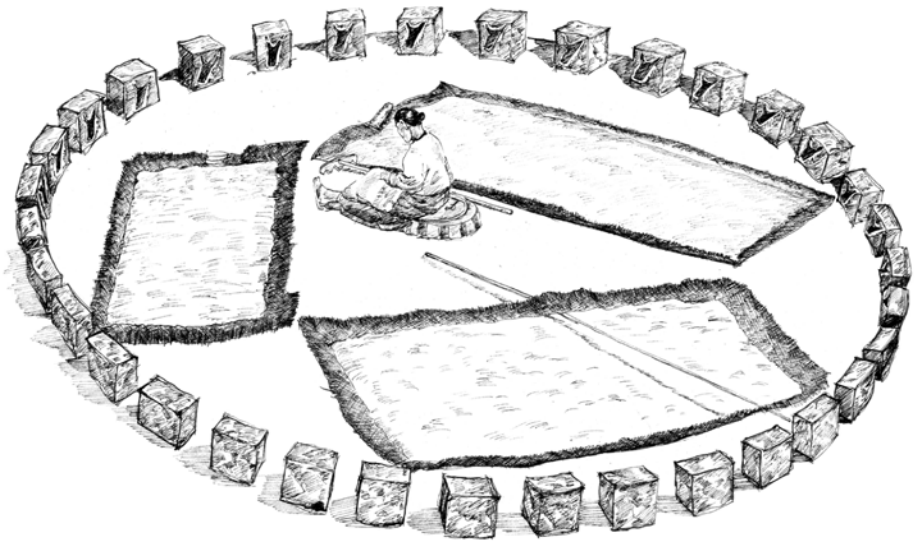


Figure 3-8. On sunny afternoons, the rice is spread out on bamboo mats for further drying. The village women keep careful watch, armed with long bamboo poles, to keep the chickens at bay. With the crops now safely in storage, the atmosphere of the village becomes relatively relaxed as its inhabitants pause to enjoy the cool clear weather and brief respite in the agricultural calendar.

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[34] The Angami had a different word for circular stone sitting places unattached to male dormitories, calling them baze (see appendix 5-17). They were usually built as memorials.

[35] Figure 3-9 shows a good example of a house that doubled as a male dormitory. Note the long communal bed (kichüju) in the second room. As would be expected, this particular house also has a circular stone sitting place (thehou) at its front (the one shown in figure 3-8).

Boys were inducted into *morung* culture when they became old enough to participate in manual work, usually at about 10 years of age. Henceforth, they would help their parents during the day and then retire to their morungs at night. This pattern would be continued until they married and started their own households. This meant that only the youngest sons (i.e., up to 10 years) slept with their parents at home. As they joined morungs, young boys came under the instruction of more senior members. Seniority defined the hierarchy within the morungs, with the oldest boys in control. As the most recent arrivals, the youngsters were expected to make sure that the dormitory remained well supplied with firewood and to run errands for the older members. This process both instilled discipline and provided training, not unlike a modern army. Morungs were run under strict rules known as thehou-moshu (Meyase, S., 1985, 47). They emphasized the importance of always paying proper respect to elders. When disagreements erupted amongst younger members, the older group would intervene to settle them. As the morung members gathered to talk, the choicest middle seats near the fire were reserved for the elders, while the younger boys remained respectfully on the fringes (Meyase, S., 1985, 47-48). The proper etiquette of discussion paralleled those of the seating arrangements. The younger members were expected to sit and listen patiently, without interrupting, as their elders spoke (ibid).

Map 3-5. Distribution of Colonies, Each of which Features a Stone Sitting Place (<u>thehou</u>) for Villagers to Meet and Discuss – Khonoma Village

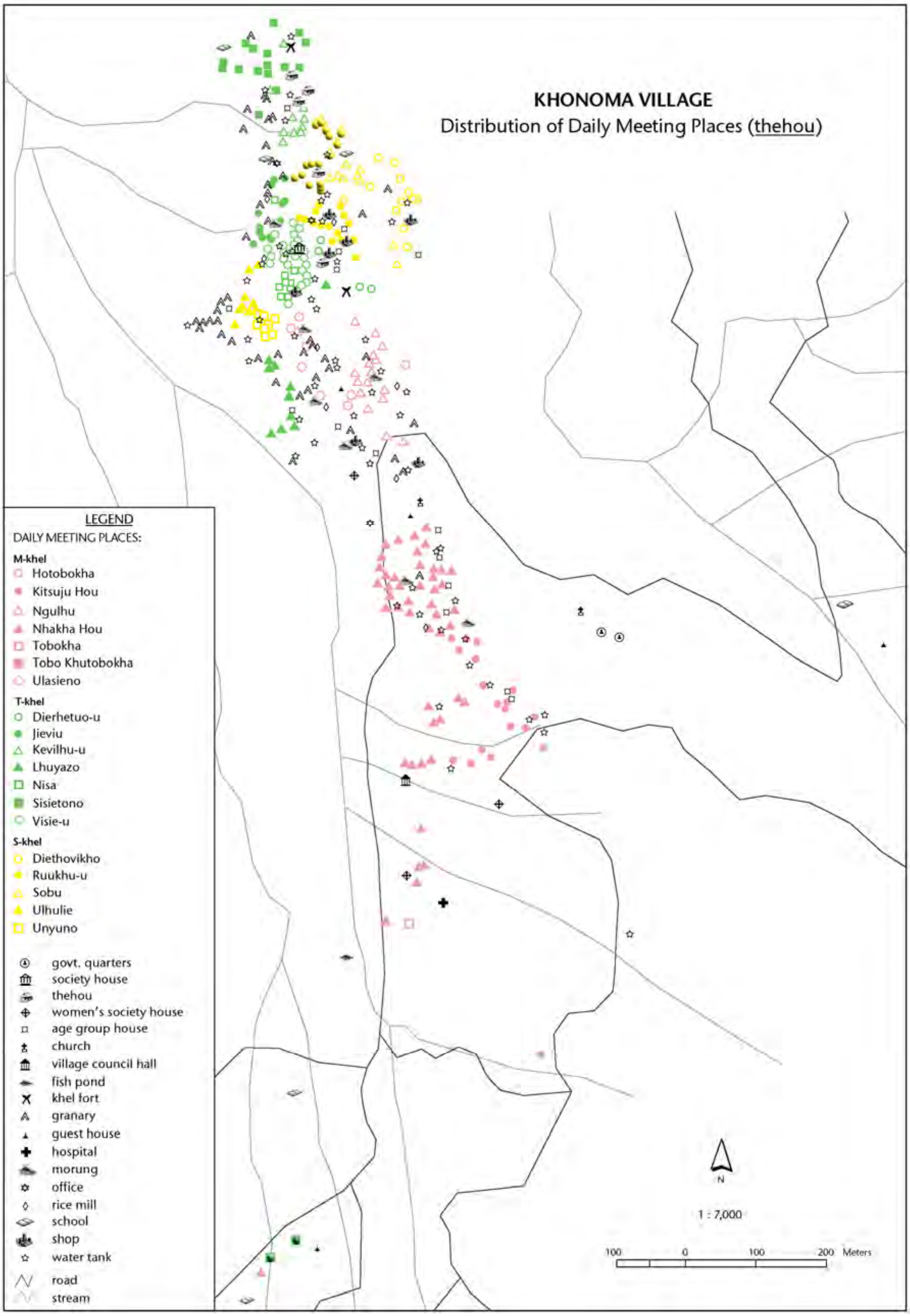
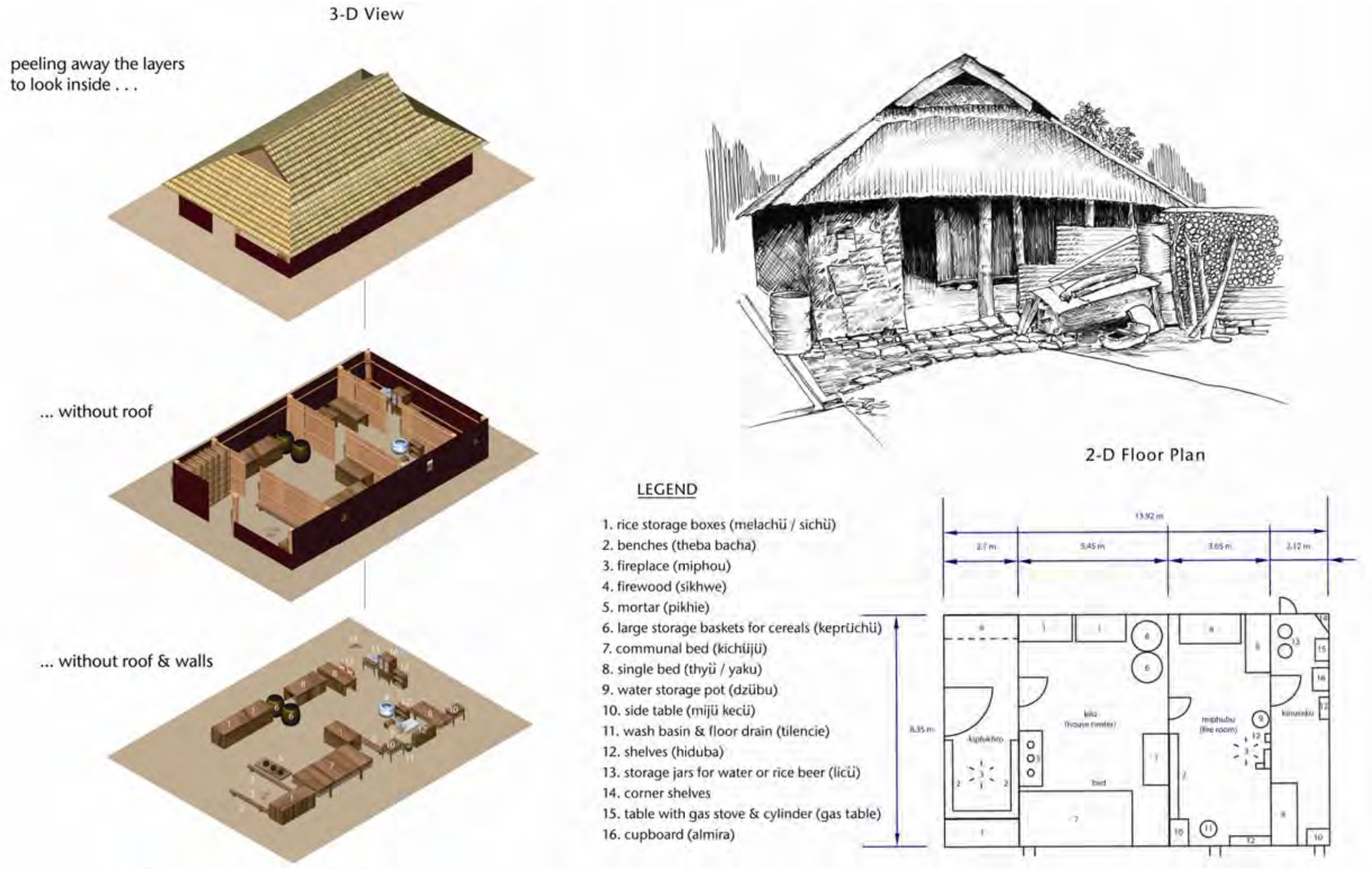


Figure 3-9. Layout of Traditional Houses (tenyimiaki) in Khonoma *



* Owned by Dr. Rüünguto Zinyü, Thevoma khel.

* This house is situated just below the Merhümia khel fort and was amongst the few that were not burnt by the Indian army in 1956. Other houses that were spared at that time have since been rebuilt along more modern designs. Hence this house is considered to be the oldest in the village, probably 70-80 years, and the best remaining example of how Angami houses were traditionally laid out.

In view of their original defensive purpose, it is likely that the training component of the male dormitories began with the skills of warfare. The more accomplished warriors would have instructed youngsters on the use of spears, daos, and shields in battle. Villages' very survival depended on their ability to defend themselves.[36] But through time, the morungs broadened to become traditional schools where all aspects of indigenous education were passed down from one generation to the next (Meyase, S., 2001, 33). This training was considered essential for moulding young boys into becoming responsible members of the community. Any boy that did not join in morung activities would, in the words of one Khonoma villager, "be considered in danger of missing out on manly skills, and becoming more like a woman" (Zinyü, 2001). Sitting around the fire, the boys listened to the elders tell stories of their clan history, their traditions, legends, and heroic deeds of their forefathers.[37] The elders' lectures included lessons on village politics, economics, religious beliefs and ceremonies, proper etiquette and discipline, love and courtship, expected bravery and conduct in warfare, and everything else that the boys would need to know for their adult lives. They learned the arts – wood carving, basket weaving, and making other handicrafts. They practiced playing their indigenous musical instruments,[38] singing their folksongs, and the steps of their dances. In addition to their military function then, the morungs functioned as schools that helped to preserve and perpetuate Angami culture (Punyü, 1995).

If a member got himself into strife, he could seek sanctuary in his morung and as long as he remained under its roof, his security would be guaranteed until the clan elders had settled the case (Meyase, S., 1985, 49). Fighting in the morungs was strictly prohibited.

The morung system spurred its members on to higher performance by giving them a proud reputation to live up to, and then nurturing keen competition both within and between morungs. Every Angami boy strove to live up to the ideals described by his elders, and was not prepared to entertain the idea that he might be a lesser man than his peers – particularly if the village maidens were watching![39] Each morung tried to be the first to light its fire in the mornings, to demonstrate to the village that it was earlier-rising and more industrious than its neighbors

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[36] If a Naga village was known to be crippled in an attack, its perceived vulnerability would invite follow up attacks by other enemies that had old scores to settle. Like sharks smelling blood in the water, they would circle for the kill, taking as many heads and as much plunder as they could. In this way, letting one's defenses down could have implications far beyond the losses suffered in an initial attack. It could trigger a series of further raids that would force survivors to gather whatever belongings they could and flee. Godwin-Austen (1873) mentioned the Nagas' penchant for targeting distressed villages in his 1873 tour diary.

[37] This was likely to have been a very selective version of history that glorified Khonoma and its people.

[38] For musical instruments see codes 18.1 through 18.3 in appendix 5-7.

[39] I am reminded of the words of a Chakhesang colleague who, when asked why the cooperative movement was not more prevalent in Nagaland, curtly replied "because the Nagas are not cooperative people" (Nakro, 2000). In contrast though, the Nagas' immense pride – particularly the Angami moshu – pushes them to be keen competitors and excel in their activities.

(Meyase, S., 1985, 48). During times of social work, the morungs attempted to outshine one another (ibid). It was customary, for example, that when a house was lost to fire, then the rest of the village would pitch in to gather the needed materials and help rebuild. In such cases, where several morungs joined forces on a single project, each competed to shoulder the heaviest tasks and give the most help. During festivals, various sporting competitions were held on the grounds in front of the morungs.

The morungs continued to be the centre of Angami boys' social life until marriage – at which time they became occupied with building a house and starting a family. After marriage, Angami men would visit their alma mater morungs only occasionally. Within 10 to 12 years, their own sons would be joining the same morungs to begin their training.

Female Dormitories. There were also morungs for Angami girls, but with some notable differences. Firstly, not every Angami village had them, in which case the girls remained at home with their parents and only their brothers slept in morungs. Where they did exist, the girls' kichüki was not associated with a stone sitting place (thehou). Sitting and discussing village affairs was the business of men, not women. The girls' dormitories were more modest affairs that usually took the form of large rooms attached to the houses of prominent villagers (Meyase, S., 1985, 49). These were organized by the girls' subclans and supervised by elders. Girls usually joined morungs around the age of menarche (ibid). After spending the day working with their parents, they ate their evening meals and, with other members of their age group, retired to the morung for the night.

The girls' morungs also tried to equip their members with the skills they would need in later life. Most girls learned from a very young age how to cook, brew rice beer, weave and perform other domestic work by helping their mothers at home. The morungs rounded out their education by tutoring them in social etiquette, discipline, and other virtues that were expected of Angami women. They learned the folklore of their people, their religious roles and taboos, how to sing and dance, and other aspects of Angami social life (Punyü, 1995, 41).

As the girls arrived at the morungs in the evenings, they brought along firewood that they had either taken from home or collected from the forest. They spent the evenings working near the fire, sometimes spinning cotton, weaving cloth, or perhaps just discussing their activities over the day. It was decidedly more serene and domesticated than the testosterone-charged atmosphere of the boys' morungs. As all were unmarried, the girls' thoughts often turned to romance. Some fashioned gifts for their male admirers. As part of the courtship ritual, Angami men wove baskets or bamboo fish traps to present to the women of their affections. And as a symbol of their returned love, the girls twisted cotton into rope necklaces (lophie)[40]

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[40] For the rope necklances (lophie), see codes 16.5.6 and 16.5.7 in appendix 5-7; also plate 3-107.

to present to their suitors. The girls' morungs were places of courtship. Groups of boys often visited to spend the evenings telling stories, joking, and singing folksongs (Punyü, 1995, 41).[41] Sometimes they made plans for the following day, to go fishing, collecting wild vegetables, or other activities. Rather than speaking directly, courtship songs were sung between couples to communicate their feelings. The girls' morungs were thus an important venue for socializing between the sexes, and relationships often took root there that led to marriage.

Women also gave up membership of their morungs after marriage, as they turned to their new responsibilities as wives, and soon, as mothers.

Age Groups (thesü)

Another institution that was vital to the functioning of Angami society was that of the age groups, known as "thesü". This system operated within each khel, dividing its members into groups of contemporaries, with age spreads of roughly three to five years. Unlike the dormitories, the age groups were not segregated between males and females and membership was for life. This provided the Angami with yet another system in which they could socialize, learn their traditions, work together, and support one another in times of trouble. Khonoma has 12 such age groups in each of its three khels (table 3-4).

Table 3-4. Age Groups (thesü) in Khonoma [a]

	Merhümia khel	Semomia khel	Thevomia khel	Age Bracket
1)	Kohesie	Cayievi	Zerüüzo	13-15 yrs.
2)	Sievi	Vielu	Lhouzoto	15-18 yrs.
3)	Dierhelie	Gosakho	Yatsievi	19-24 yrs.
4)	Dolhunei	Dzüvi-u	Golato	around 30 yrs.
5)	Kievi	Dorhi	Visie-u	35 yrs. above
6)	Anei-u	Ülalhu	Rho-u	40 yrs.
7)	Lasie-u	Krulhubei	Tsielhu	45 yrs. above
8)	Neisalie	Sisier	Goneiu	50 yrs. above
9)	Miakonyü	Vilhükho	Pfürüko	55 yrs. above
10)	Kolie-u	Lhoudilie	Cagwelie	60 yrs. above
11)	Ngabi	Khrietsülie	Zhasi-u	75 yrs. above
12)	Nido-u	Neilhunyü	Lhuvir	80 yrs. above

[a] The age groups are named after their 'parents' (kikrakrü).

As each clan's children grew old enough to participate in field work, usually six to seven years, they were formed into small groups of similar ages. These were precursors of the thesü to which they would later graduate. During this early formative stage, parents encouraged their youngsters to get into the habit of doing some kinds of work together. Wealthier men in the village invited them to work in

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[41] Appendix 3-25 provides two examples of Angami folksongs that typically intertwine themes of love and warfare.

their fields, and then repaid them by arranging a feast in their home during the Thekranyi festival, which marked the beginning of rice transplanting.

As the children reached 12 to 13 years of age, these smaller clan-based groups were amalgamated into village-based groups of similar ages that were known as thesü (Meyase, S., 1985, 39). This transition marked a significant milestone in the maturation of young Angami. Prior to joining age groups, youngsters were looked upon as children, and their transgressions were forgiven accordingly. But joining an age group inferred a significant step towards adulthood and increased accountability for their actions. Thereafter, any youngster who violated customary law would be held accountable (ibid, 40). As each new age group took shape, a respected man in the community would be recruited to act as its "host father" (*thesu kru-u* or *kikra kru-u*). He oversaw the group's activities and opened his home for them to use as a meeting place. Each age group was thus known by the name of the man that shepherded it. Participation in age groups provided young Angami with the opportunity to develop strong relationships amongst their peers, and deepened their attachments to the village. During Thekranyi and other festivals, the various age groups got together and spent the evenings singing folksongs, eating, drinking, and merry-making. They also took turns working in the fields of each member's parents, in a system of communal labor known as peli. Young people used these outings to showcase their skills and try to impress the opposite sex (ibid, 40-41). As they walked to the fields, the girls dutifully carried the boys' tools in their baskets. But once the field work began, the boys then competed with each other to shoulder the heaviest work, and left the easier tasks for the girls. They often sang as they worked, transforming dull fieldwork into a fun social activity. Many romances took root within age groups as they worked and socialized together.

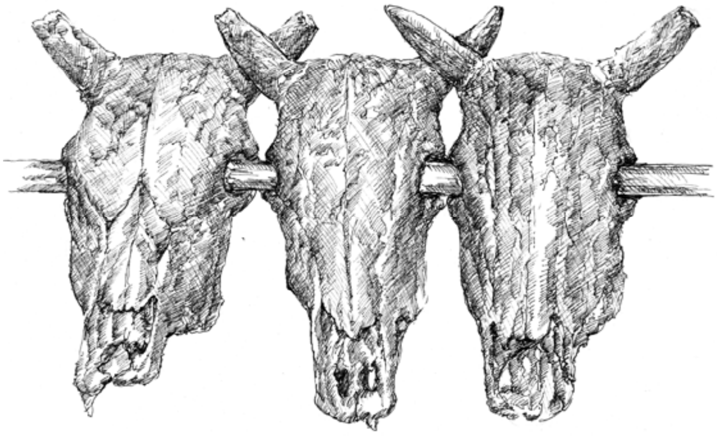
The spirit of competition was very strong amongst the age groups, each striving to outdo others in taking on specific projects that rendered public service to the village. This work usually involved improved sanitation or beautification of the village, or – more popular in recent years – the construction of rest houses. This latter trend produced a scattering of elaborate rest houses in scenic locations across Khonoma's landscape, such as overlooking Dzükou valley, along the road to Dzulake, and perched on top of Ketie-u Tsü Kerü peak. Most were made of chiseled sandstone blocks that were hauled up the mountain sides at extraordinary labor costs. They now stand as lonesome monuments to the greatness of the age groups that built them, but see little actual use from one year to the next. At other times the age groups competed with each other in providing free labor for improving the roads or other projects for the village's benefit.

In the volatile Naga Hills, where danger could lurk behind any corner, the age groups were important for providing yet another security net for the Angami. If one member of the group encountered problems, then his peers would rush to his or her assistance (Meyase, S., 2001, 34). They would lend a hand in ceremonies when members were married, or in times of sickness would help to cultivate their fields.

In that sense, solidarity within age groups represented another level of alliances, similar to those forged between khels and villages. Although membership continued throughout life, women became comparatively less active in their age groups after marriage. Prior to the arrival of Christianity, it was customary for a bride, on her wedding day, to present a cock to her age group as her price (thesa) (Meyase, S., 1985, 43). But her membership continued and her new husband was expected to show special respect to his wife's age group. Both sexes thus remained attached to their age groups until death. The final salute of an age group to a deceased member was the act of placing a new shawl over the body.

CHAPTER 4

The history of the Angami Nagas and Khonoma before Indian independence



THE ORIGIN STORY AND EARLY CENTURIES

Prior to British subjugation of the Naga Hills, the Angami were a major Naga subgroup that had gained notoriety for warfare and headhunting (figure 4-1). They are of Mongoloid stock and speak a language classified as belonging to the Tibeto-Burman sub-family of the Tibeto-Chinese family. Their oral history contends that they originally migrated from the southeast (Naga Institute of Culture, 1970; Shimmi, 1988). It is uncertain when these early migrations took place, but the official chronicles of the Ahom Kings (Buranjis) recorded fierce resistance from the Nagas when Sukapa brought his army over the Patkoi Range in the 13th century (Basu, 1970, 18; Ramunny, 1993, 5).

Figure 4-1. A Khonoma warrior in traditional dress.

Origin of Khonoma

Historical Migrations

The Angami share a story with the Rengmas, Lothas and Semas that their forefathers migrated together from Burma into northern Manipur and settled in a Mao Naga village called Mekruma (Shimray, 1985, 26). There, the story continues, population growth eventually forced them to move again in search of new fertile lands to cultivate (Punyü, 1995, 10; Meyase, S., 2001, 14). They moved northeast to Khezakenoma (plate 3-131), where they are believed to have stayed for a long time. There are other Naga people now living over the border in modern Burma, whose material culture and migration history are recorded by Saul (2005).

One legend hints at resource scarcity forcing dispersal from Khezakenoma, now a Chakhesang village in southern Phek District, just north of the Manipur border (map 4-1) (Punyü, 1995). The story of migration out of Khezakenoma is widely known amongst the Angami, Chakhesang, Rengmas, Lothas and Semas, and appears to confirm their close ancestral ties. Many Sema leaders still consider the Angami and Chakhesang as their elder brothers. One would not have intuitively guessed the Angami to be so closely related to the Semas. They are more remarkable for their differences than their similarities. Amongst these, the Semas have a system of hereditary chieftains – whereas the Angami practice an extreme form of democracy; implying in Leach's (1954) classic analysis that whereas Angami adhere to the gumlao form of social organization, the Sema follow gumsa practice. (See above, in the Preface). Moreover, the Semas are semi-nomadic, establishing only small villages before breaking away to create new ones – whereas Angami villages persist for many centuries and grow to a large size. Hence, while other Naga subgroups tend to be consolidated in contiguous areas, the Semas are more widely dispersed across Nagaland, often intruding into the territory of other tribal groups and creating land conflicts. This out-migration has dramatically reduced land use pressures in Zunheboto District – while the Angami, with their large villages, are forced to manage their limited agricultural land much more intensively.

Furthermore, land is owned by Sema chiefs, and villagers pay a tax for the right to cultivate it – whereas Angami villagers usually own the land that they cultivate. The Angami are famous for their skills in wet rice terracing but the Semas have almost none.[1]

The Angami also continue to recognize their close relationship with the Mao Nagas in northern Manipur. They still practice some of the old customs of the Mao Nagas, and wait for the Maos to give word before appointing the day for celebrating important festivals (Punyü, 1995 10-11; Meyase, S., 2001, 13).[2] The Angami also believe they are closely related to the Karen of Burma. This relationship is traced back to the time when they were still migrating through Burma. They were of the same tribal group at that time, according to oral history, but a split developed between their ancestors. One section of the group – known to them as "Kerenomia" – turned eastward and the ancestors of the Angami turned west towards Manipur (Ghosh, 1982, 52).

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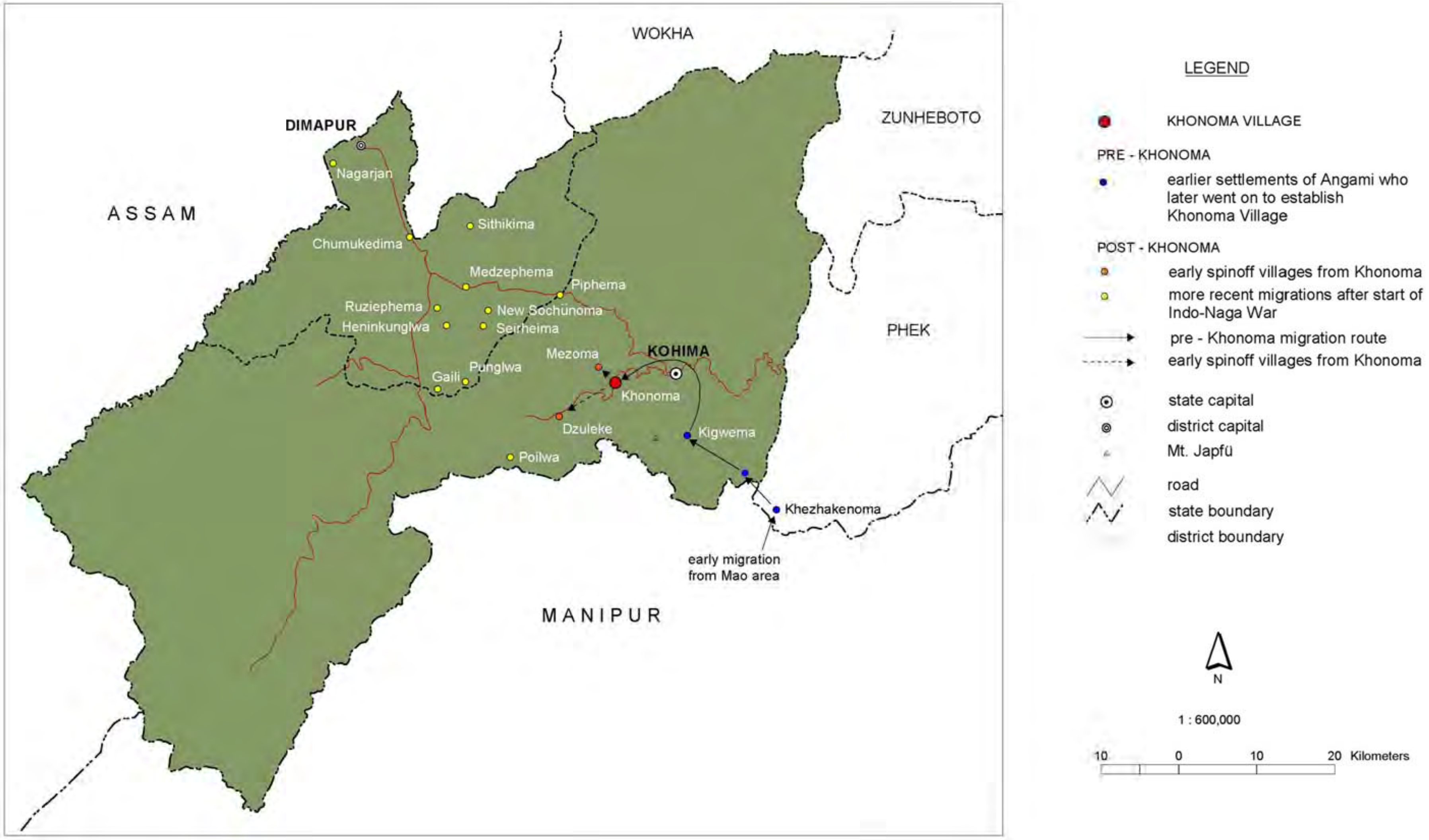
[1] After their separation as a distinct tribe, all Semas are thought to have originallty migrated from Swemi village in Phek District. They were originally known as Sümi (or Swemi in Kecha dialect). It was only after British arrival that the name was anglicized to Sema. Some recent discourse in Nagaland has criticized the term 'Sema' as an inaccurate Anglicization and argued that 'Semi' is more correct (Aier, 2001). The subgroup will continue to be referred to as Sema throughout this thesis, however, since it is still the term with the widest currency and maintains continuity with the terminology appearing in the historical quotes from British administrators.

[2] See Hutton, 1969, 16-20 for a more detailed discussion of tribal groups related to the Angami.

Map 4-1. Migration Route Leading to Establishment of Khonoma Village and Later Dispersal of Khonoma Descendants, Mostly during Indo-Naga War.



Creation of an Angami Homeland

After leaving Khezakenoma, the Angami continued northward and spread over what is today Dimapur District and northern Kohima District[3] (Imnauongdang, 1990, 33) (map 4-2). Assuming their livelihood and technology to have been the same in that earlier period, they were quite likely searching for spacious valleys and plentiful streams that would, later, be conducive to wet rice terracing (Sanyü, 1987, 46; Punyü, 1995, 45). They preferred the healthier upper mountains that were above the malarial zone, but still warm enough to grow rice. It was not until the arrival of the British, hundreds of years later, that this Naga subgroup became known as the "Angami". The name is thought to have been derived from the Zeliang word "gnamei", meaning "*thieves*" or "*robbers*". This name stuck, it is said, when the British were first exploring the Naga Hills and asked the Zeliang who lived in the neighboring territory. As intimated in the opening quotation of this chapter, the Zeliang had long suffered raids from Khonoma, and so replied with disgust that the "gnamei" or thieves lived over there (Punyü, 1995, 19; Meyase, S., 2001, 19)[4]. This was eventually anglicized to "Angami", although it had no meaning to the Angami themselves. Rather, they referred to themselves as "Tenyimia" – together with other closely-related Naga subgroups, the Chakhesang, Rengma and Zeliang in current-day Nagaland, and the Mao and Maram in current-day Manipur. Saul (2005: 17) remarks that the tribal divisions of the Naga people were largely a British administrative fiction and that village organization seems to have been primary. The homeland that the Angami eventually settled was largely surrounded by these other Tenyimia tribal groups – the Chakhesang to the east (Phek District), the Mao in the south (now northern Manipur), by the Zeliang in the west, and by the Rengma and Sema (now Zunheboto District) in the north.[5]

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[3] It is generally believed that Negroid aboriginals inhabited the Patkoi Range before the Nagas arrived. Hutton referred to them in this 1928 diary entry:

> "Not far from Gunjong is the site of the 'jungle men' whom the Kacharis destroyed by driving them into a cave and piling a fire against the mouth of it. They are described as little men who used bows and arrows and lived entirely in the forest. The Kachari name for them is Hagrasa which appears to be a synonym of the Angami Horotsu, the name of a clan in Kohima descended from one of these 'jungle men' who was caught near that village." (1928, 8-9)

As Hutton traveled around the Naga Hills, he often commented in his diaries about some villages having particularly strong Negroid features and postulated that they exhibited a lot of blood of their aboriginal predecessors. See also Choudhury, 1987, 79-81.

[4] According to one Zeliang story, the Angami returned the favor by providing the British with a name for them. According to this story, a British officer indicated the territory of the Zeliang and asked an Angami interpreter the name of the tribe that lived there. Since the Zeliang area was heavily forested and its people were considered to be forest inhabitants, the Angami replied that they were all ketsa – meaning "*forest*". . The British officer heard it as "kacha" and thus this group came to be known as the "Kacha Nagas" (Sanyü, 1987, 39).

[5] Nagaland has an ongoing boundary dispute with Assam, based on the question of how far Angami territory extended into the plains around Dimapur. The Angami claim that large tracts of reserved forest that now fall within Sibsagar and Jorhat Districts in Assam were originally part of their tribal territory and unfairly

Moieties

Angami moieties were briefly introduced in Chapter 3, but they are mainly significant in the historical context. This discussion draws chiefly on Hutton's writings (1969, 109-117). According to legend, the Angami descended from two men, sometimes described as brothers or cousins, who emerged out of the earth. These men became the forefathers of two divisions in the Angami tribal group, called kelhu. The older man (thevo), is the ancestor of the division known as Thevomia (Kepepoma or Kepezoma), and from the younger (thekrono), sprang the other division, known as Thekronema (Kepepvuma or Kepepfüma). This created a division of Angami social structure into Thevomia (elder) and Thekronomia (younger) moieties. To which moiety somebody belongs can easily be detected by how he or she addresses his or her parents. Those belonging to Thevomia call their fathers "apo" and their mothers "azo", while Thekronema members call their fathers "apvu" and their mothers "apfü". Since Thevo emerged from the earth first, and was therefore older, his descendants are entitled to precedence in eating at community feasts, before those of the younger Thekrono. The Thevomia and Thekronomia moieties were originally exogamous, marrying mutually into one another. But as the Angami grew in number, the kinship unit to which the rules of exogamy were applied gradually shifted from the kelhu to the thino, and then more recently to the thepfü.[6]

Founding of a New Angami Village Called Khwünoria in 1300-1400 A.D.

Some care is needed in relating the story of Khonoma's settlement because there are conflicting versions as to the identities of the original settlers and it is an issue to which villagers continue to attach extreme importance. Although the stories of Khonoma's settlement have now been passed down through the generations for 600 to 700 years, villagers continue to heatedly debate the details as if they happened only yesterday. The disagreement over the original settlers can be found chiseled in two stones in the village. One, erected in Merhümia khel (plate 3-145) credits only Khwükha, Khate (both Merhümia) and Ratsa (Semomia) as the original founders, while a second stone at Thevomia khel (plate 4-146) acknowledges not only these three, but adds Keviso, Kelhiekha (both Thevomia) and Vükha (Semomia) to the list.

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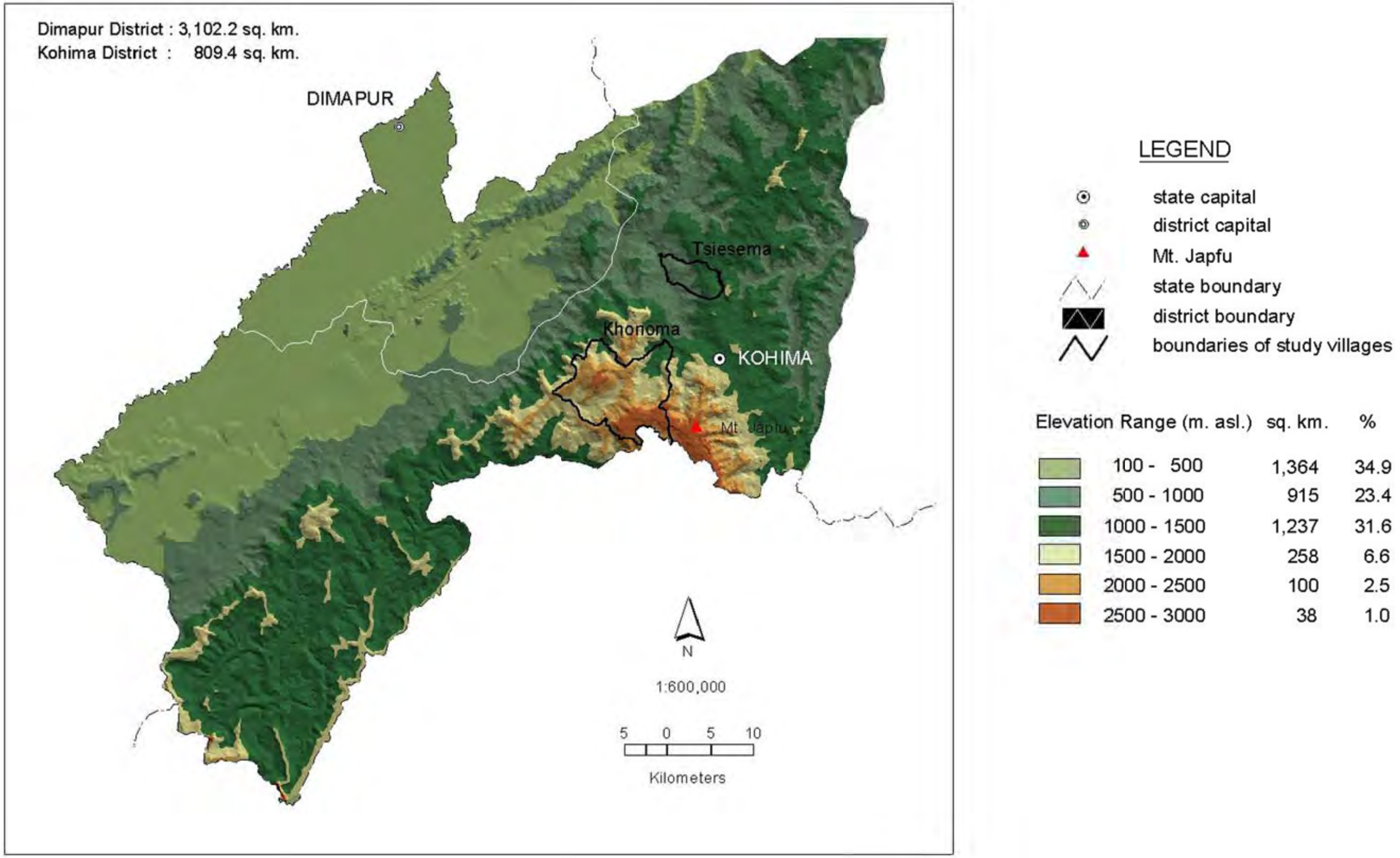
transferred to Assam by the British rulers (Government of Assam, 1985; Angami Public Organization, undated).

[6] See Das, 1993 for more details of Naga social organization.

Map 4-2. Topography of Southern Nagaland (Kohima and Dimapur Districts)



The families of the founding settlers are honored on particular days. In most Naga villages, the descendants of the original settlers will usually occupy residential sites in the nucleus of the village. They usually also own more and better land. These can provide practical pointers on whether a particular family was amongst the original settlers or a later arrival (Aier, 2001).[7] It is tempting to simply avoid this controversy by telling the story without going into the disputed details of the original settlers. But that would compromise an understanding of the village's formation and how this influenced the kinship groups that we see today. The following narration draws upon many interviews and written accounts, and differences are footnoted where they occur.

The story begins at Kigwema, an old Angami village just northwest of Khezakenoma (map 4-1). Kigwema, along with nearby Viswema village, are thought to have been settled about 1100 years ago, as the first new villages established by the Angami as they began their push northward from Khezakenoma (Punyü, 1995, 13-16). Most Angami villages today trace their ancestors' migrations back to one of these two villages.[8]

Discovery of an Ideal Site for Settlement

One day, some 600 to 700 years ago, three Kigwema men by the names of Khwükha, Khate and Ratsa, were out hunting with a dog.[9] Khwükha and Khate were brothers belonging to the Merhümia clan, and Ratsa to the Semomia clan. When the dog disappeared, their search eventually found it feeding on a stag at a place that was breathtakingly beautiful and fertile. A spur descending down from the mountains offered a highly defensible site for a village (plate 4-1). Precipitous cliffs rising up behind added to its natural defenses. The spur jutted out into a riverine valley that provided large scope for cultivation, and rivers dissecting the valley on both sides of the spur provided ample opportunities for irrigation. As the hunters explored the site, they grew excited about its potential for both food and military security. They were so impressed that they began to discuss plans to return to the site and establish a new village.[10]

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[7] As von Fürer-Haimendorf (1936) noted, the houses on the village edges were comparatively more exposed to attack than those in the village centre. Later arrivals thus provided a security buffer for the original settlers. This provided an added reason, after a new village was settled, for the original founders to encourage others to join them there.

[8] Although Naga names generally have meanings, it is noteworthy that most Khonoma surnames have no meaning in the Tenyidie language. They are common, however, with Khezakenoma and other Khezha-speaking villages along the Khuzha Thede (or Khozha Range), providing more evidence that the oral history is correct, and Khonoma's ancestors did descend from there (Hiese, 2001).

[9] The oral histories of many Naga villages begin with the sites being found during hunting expeditions. This is entirely believable considering the likely importance of hunting at that time, and that hunters in pursuit of game would traverse considerable distances.

[10] There is a general belief in Khonoma that before the arrival of their ancestors, the village site had already been occupied by an 'ancient people', but that they had left for some unknown reason. The discovery of

Moving to and Settling the New Site

As the settlers (phesemia) made plans for moving to the new site, they agreed that they would all carry the same articles, be clothed in the same manner, and members of the group would be forbidden to go against the norm (Terhuja et al., 1997). They reasoned that all people could live in equality in this new village if the settlers abided by this conformity. Before proceeding on the journey, they arranged their hair-knots neatly and rechecked that their clothes were worn properly and their weapons carried in the proper manner (ibid). On the first day, the three men stopped at Sechürie village and rested at Merhiese's house, before continuing their journey. They camped in the forest that night and as they settled down to sleep, agreed that whoever had the best dream would be the first to bless their new settlement.

On comparing notes the next morning, they concluded that Ratsa had had the most auspicious dream. But as they were preparing to continue on their journey, they discovered that Ratsa's pack of salt was missing.[11] A search found the missing salt amongst Khwükha's belongings. Moreover, despite their agreement that all would carry the same articles, they noticed that Khwükha also had an extra goatskin attached to his shield.[12] Feeling embarrassed at these discoveries, Khwükha mumbled that during their stopover at Sechürie the previous day, Merhiese must have mistakenly repacked Ratsa's salt amongst his belongings and stuck the extra goatskin on his shield.[13] They pressed on with their journey.

When they reached the village site, Ratsa asked his companions to stay back and walked on alone. Setting down his basket, he lifted up a large rock and found a crab with many young underneath. He saw this as a good omen and thought to himself, "In this place, the population will settle and multiply and it will become a great village." (Terhuja et al., 1997) Then he declared loudly:

> "Land of human habitation, land of joy and goodness,
> land that knows no plague or disease.

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pottery shards of a design unfamiliar to the Angami was cited as evidence of this. Sanyü (1987, 87) quotes one Khonoma elder as suggesting that the village had actually received its name from settlers who had preceded the current inhabitants, but that they had moved on after finding that the climate was too cold for growing rice.

[11] Salt was scarce and highly valued during those days. See the later section in this chapter on historical trade.

[12] Sanyü (1987, 93) points out that goats were sacred to the Angami. Goat hair was thus considered precious and carried as a symbol of good luck. Sanyü speculates that Khwükha's purpose in secretly taking extra goat hair along may have been to bolster his good fortune.

[13] These incidents led to several prophecies about the settlers and the new village that they were preparing to establish. The recovery of the pack of salt led to the prediction that although thefts would take place in this new land, the culprit would always be caught. The extra goat hair discovered on Khwükha's shield led to the prophecy that his descendants would be blessed and many heroes would arise from his clan (Sanyü, 1987, 93). Another less generous interpretation of the prophecy is that while Khwükha's clan would excel, they would also have many hidden things – such as illegitimate pregnancies.

> The land we sought, whose warriors will excel, is here.
> Come forward people." (ibid – translated by E. Iralu)

Khwükha and Khate chorused their agreement, "*O*", meaning "Yes". Then his companions gathered around him and Ratsa pronounced the blessing on the new village:

> "The spirits have granted us this land for our habitation.
> We will live here and prosper.
> May married women be found here crouched over their weaving,
> children fill the open with their tholi-khwütho play.[14]
> We will harvest and consume rice and brew.
> We will prosper and be happy simultaneously.
> Village victorious in war,
> the generations of people will flourish and overpopulate [??]the village.
> Village that will know no disaster in war,
> nor unnatural calamity and no ill fortune,
> its people will fare as well as or excel others.
> The dwellers of this land will grow to become female ancestors and
> grandfathers together,
> and have a good long life." (ibid – translated by E. Iralu)

The blessings of the spirits were thus invoked for the good health, growth and prosperity of the people who would live in this new land.

It was then time to consecrate the founding of the new village by performing a ritual called 'phesevu' (Sanyü, 1987, 94). Each settler had brought along a cock for this purpose, but when released, the cocks immediately began to fight amongst themselves. This was taken as an omen that there would be interclan feuds and they would never be able to live together in harmony.[15] Heeding the warning of this prophecy, they decided that it might not be a good idea to settle together at the same spot. They instead spread out on the spur, each searching for a favorable location. Khate decided to settle on the hilltop so that if fighting broke out, he would have the military advantage of the highest ground.

In this way, each settler selected the site for his house. Then each chose the site for the village gate that would protect his clan, and laid down a foundation stone

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[14] A game played by spinning peg-tops so that they collide, one upsetting the other (see Hutton, 1969, 104).

[15] Another incident that is often related as part of the story of Khonoma's founding also prophesized testy relations between the clans. As the settlers traveled toward their destination, they herded along all their cattle, pigs, cocks, dogs and other livestock that they would continue to rear in the new village. As night fell, they made camp down in the valley somewhere below present-day Khonoma. The livestock escaped into the forest in the darkness and discovering this, the Angami pioneers quarreled bitterly over who was to blame. This experience led to the prophecy that the residents in this newfound village would fight fiercely amongst themselves (Sakhrie, 2000).

(kiputsie) next to it (Terhuja et al., 1997).[16] Single access paths were cleared through the entrances marked for the village gates and then on to the house sites. When the gates were later erected, they would need only to be swung shut and barricaded to block access to approaching enemies.[17] These traditional sites have remained with their descendants to the present day. The water sources were then investigated and cleaned in preparation for use. A new village called Khwünoria[18] thus took root on a rugged mountain spur in what is today the extreme western frontier of Angami territory.

Recruiting Representation from the Priest Clan

The village was still not complete according to Angami traditions. Although the timing in relation to the events just described is not clear, some versions of the story describe the settlers consulting a wise elder amongst the Mao Nagas to seek his advice on how a new village should be settled. He reportedly counseled them that every strong village must have members from both the Thekronomia and Thevomia moieties, because according to Angami custom, one moiety alone could not form a village. Each had different roles to perform in the village's ritual life. For example, members of the Thevomia moiety were needed to be the first to partake of food during religious and social functions.[19]

The Khonoma settlers were, up to that point, all from the Thekronomia moiety, and so had to recruit someone from Thevomia to join them to make the village complete. They went first to Mejathi village and invited Kelhiekha to represent Thevomia in their new village.[20] Kelhiekha had to decline however, because he was suffering from a battle injury, and Angami custom forbids those recently wounded in war (terhürhapfü) from settling a new village or performing the associated rituals. Kelhiekha suggested that they approach his brother, Keviso, and

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[16] The kiputsie were symbolic totems for worshipping the creator deity. It was forbidden to touch or move these stones.

[17] For a detailed discussion of village gates and their significance to the Angami, see Archer, W., 1947.

[18] The village name was derived from the 'khwüno' bush (*Gaultheria fragrantissima* Wall. – see plate 4-21) that was abundant on the site at the time of settlement. The "ria" suffix means, in Khonoma's dialect, "*place or area where people live*" (spoken as "ra" in most Angami dialects). Hence, "Khwünoria" translates literally to "*the khwüno bush settlement*". When reference is seen to "Khwünomia", the "mia" ending means "*man*" or "*people*", i.e., "*the people of the khwüno bush*". Historically then, "Khwünoria" referred to the village and "Khwünomia" to its people. With the arrival of the British, "khwüno" was anglicized to "khono" and "mia" to "ma", hence its current name "Khonoma". Although this should technically translate to "*Khono people*", it is now widely used as the village name (Meru, V., 2001).

[19] Amongst both the Angami and Chakhesang, only the Thevomia clan is considered a priestly clan. ("Thevo" translates literally to "*high priest*" in both Angami and Chakhesang [Chokri dialect] languages.) Any village that was newly establishing thus had to recruit a representative of the Thevoma clan to act as its religious leader. A group of people could move to a new site, but until the Thevo arrived to perform the necessary rituals, it would not be considered a proper village, nor would it be given a name.

[20] Other accounts have Kelhiekha living in Jotsoma village.

invite him to join them. But Keviso was living comfortably in Mezhachaphi village and was reluctant to move. They offered preferential treatment for the Thevomia clan if he would change his mind and join them. Keviso finally agreed to go, with a number of concessions: Keviso and his descendants would represent Thevomia in performing the ritual first tasting of food in all religious or social ceremonies. Moreover, in undertaking ceremonial feasts and rituals, Thevomia's burden of responsibility would be lightened. In case of theft by a Thekronomia against a Thevomia, the culprit would be fined seven times the value of the stolen object, but in a reverse situation, the fine against a Thevomia offender would be reduced to only five times the value of the stolen items. Finally, in case of a Thevomia causing accidental death, the duration of punishment would be shortened.

With both the moieties represented, Khonoma finally became a fully-fledged village capable of performing its ritual obligations. These first settlers went on to "flourish and overpopulate the village", as Ratsa's prayer entreated, and became the ancestors of a village that was later to earn much infamy in the Naga Hills. There are various versions of this story, told by members of different khels.

The Pre-British Era (up to 1832)

We have only oral history, backed up by British records of what their first expeditions found, to hint at what happened in Khonoma between the founding of the village and the arrival of the British some 500 years later.[21] Most indications are that Khonoma prospered, reaping the dual benefits of strong defense and high agricultural potential that originally attracted settlers to the site.

Early Land Use Systems as Khonoma Began Converting Forests into Fields

As Khonoma's founders settled into their new surroundings, they would have gradually cleared jhum fields from the forested valley below.[22] The original forest was dominated by *Phoebe* and *Michelia* spp, but it was alder that colonized jhum lands when left to fallow. Surrounded by forests (ketsa), hunting and gathering would have contributed greatly to the diets of those early settlers. Sambar and barking deer, monkey, wildfowl and an abundance of other wildlife would have satisfied much of their protein needs. And wild vegetables such as *Porana racemosa* (garibu), *Gynura* sp. (lievino), *Diplazium esculentum* (tsiekhrüga), *Polygonum*

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[21] In examining the stories that Khonoma has handed down from generation to generation, one should be mindful that they will present a very selective version of history aimed largely at glorifying Khonoma. Elders interviewed during the fieldwork readily admitted that stories showing Khonoma in a negative light were not repeated and thus eventually slipped from the village's collective memory. To get a more balanced picture, it was thus important to look beyond Khonoma's own borders and interview other villages in search of stories relating to Khonoma.

[22] Although converted into wet rice terraces for centuries, the valley area to the west of Khonoma is still known as 'Katsaju' (meaning '*wooded place*'), hinting at its previous forest cover.

plebeium (gagie), *Girardinia heterophylla* (lovie), *Oenanthe linearis* (gakra) and wild yam could be gathered daily for mixing with their rice. With such abundance from nature, the needs from agriculture would have been modest – mostly grains as a staple and for brewing alcohol.

As time passed, Khonoma's ancestors continued to modify the landscape to meet the agricultural needs of their growing village. The Angami are today renowned for their skills in carving terraces into steep hillsides and channeling water from miles away, so the gently-sloped valley flanking Khonoma, dissected by perennial streams, might have been foremost in their minds when they chose the site for settling. There was thus a two-step process, 1) first clearing fields from forests for jhum cultivation (nhalie), and 2) then as time and labor permitted, gradually converting these jhums into irrigated terraces (tekhulie). In that sense, jhum cultivation was an intermediate phase in transforming wild forests into highly managed wet rice fields.[23] Some elders claim that most of the surrounding basin had been terraced by the year 1700, both for wet cultivation on the valley bottom and dry on the adjacent slopes.

The sedimentary stones that littered the valley floor were put to good use in building strong terrace walls that continue to stand firm today.[24] This probably continued for hundreds of years, starting immediately below the village and backing steadily away as the population grew. It extended down the valley in a northeast direction to the extent of Khonoma's territory, where its terraces now merge with those of neighboring Mezoma village (map 4-3). Moving in the opposite direction, the terracing was pushed up the valley to the base of the cliffs that rise up to embrace the picturesque Western Dzükou valley. But although terraced, this upper area (essentially the southern jhum blocks shown in map 4-4) remained unsuitable for wet rice. The streams here originate from about 2500-3000 m asl in the upper catchment area of the Dzükou valley above, and are still too cold for wet rice by the time they drop to the first terraced fields, at about 1800 m asl, below. Only after descending further to about 1450 m asl, do these waters warm up sufficiently to accommodate native rice cultivars. Climatic limitations thus keep these upper terraces under dryland cultivation.

According to oral history, before making a final decision on choosing the site for establishing a village, Vakha (an ancestor of Semomia khel) cleared a field in the area that is still known as lietsapfü (translates to "*grandmother of terraced fields*" – see map 4-5) and made a trial planting of rice to see if it would prosper in this new land. It is said that he rested on a large boulder (now known to villagers as Kerüzia) that he found along the Khurü River, and that the stone he used as a pillow can still

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[23] For a Bornean example of incremental conversion of swidden fields into ponded rice fields, see Padoch et al., 1998.

[24] See Hutton, 1926c, for a discussion on the use of stone in the Naga Hills, with many examples from Khonoma.

be found there. When he returned to the spot that October, he found the rice bearing well and was thus convinced of the site's suitability for settlement.

Tracing Land Holding Patterns Back to the Earliest Days of Khonoma's Settlement

As the founding clans spread out on the mountain spur, the site that each chose to settle was to have long-lasting implications for the farming systems of his descendants. This issue bears strongly on the historic and present-day ownership of Khonoma's land, discussed in chapter 6. As the story goes, 1) Chatsu and Kotsu clans, both of Thevomia khel, settled on the southwest side of the spur near Merhümia khel – so all three descended that side of the hill together in search of land to cultivate, and their cattle and mithun wandered together in the forests there. 2) Phetsu clan of Thevomia khel and Kuthotsu clan of Semomia khel similarly settled on the northwest flank of the spur and began cultivating the land on that side. 3) And Sonyino and Rülho clans of Semomia khel settled the eastern side of the spur and farmed the land on that side together (see map 3-3).

It is Naga tradition that the moment someone starts to clear the jungle on a spur, all land that flows beneath it will belong to him, and no one else will come to cultivate below him (Angami, T., 2001). Rather, they will open up land on another spur. In this way, the landscape was gradually sub-divided and inherited by the descendants of the original cultivators. The division of land does not fall strictly along khel lines, but is more mixed as a reflection of where the early settlers chose to construct their houses. Although the khels are clearly clustered together, map 3-2 shows some intermixing of clans that is a legacy of settlement patterns 600-700 years ago. This has created three groupings of land holders, each dominated by a particular khel. As the village grew, their descendants continued to develop fields in those same directions and the agricultural land was *de facto* divided between the clans. From the outset then, the clans were moving in different directions on the landscape and this has played itself out in the division of land that we see today (see arrows in map 4-6).[25]

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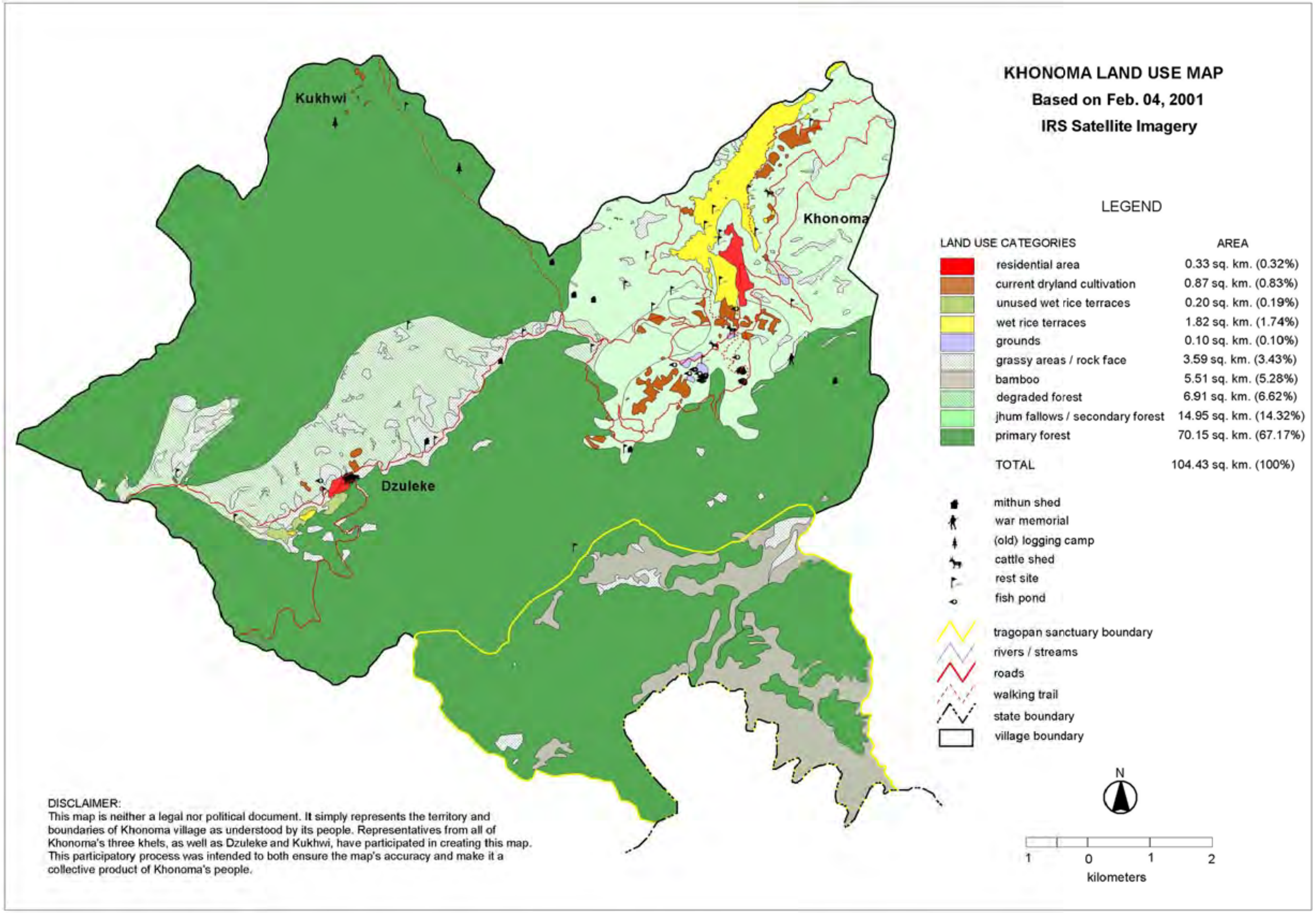
[25] Some speculate that this early land distribution may have initially disadvantaged Merhümia khel and its Chatsu and Kotsu co-owners. Their allocation was at the very end of the valley where the thickest virgin forests had to be cleared to make way for cultivation (map 4-6). Felling even one of those large trees could take several days with the tools available at that time. Nobody was very eager to open virgin jungle because it required so much labor, and left little time to grow food crops. Furthermore, this area was surrounded by wild lands that would have made its crops hard to protect against wildlife predation. And on top of all this, it was too cold for rice to grow well. These drawbacks have largely disappeared in the intervening centuries, and this area is now considered Khonoma's best agricultural land.

Map 4-3. Land Use Map for Khonoma Village



KHONOMA LAND USE MAP
Based on Feb. 04, 2001
IRS Satellite Imagery

LEGEND

	LAND USE CATEGORIES	AREA
🟥	residential area	0.33 sq. km. (0.32%)
🟫	current dryland cultivation	0.87 sq. km. (0.83%)
🟩	unused wet rice terraces	0.20 sq. km. (0.19%)
🟨	wet rice terraces	1.82 sq. km. (1.74%)
🟪	grounds	0.10 sq. km. (0.10%)
▨	grassy areas / rock face	3.59 sq. km. (3.43%)
▨	bamboo	5.51 sq. km. (5.28%)
▨	degraded forest	6.91 sq. km. (6.62%)
🟩	jhum fallows / secondary forest	14.95 sq. km. (14.32%)
🟩	primary forest	70.15 sq. km. (67.17%)
	TOTAL	104.43 sq. km. (100%)

mithun shed
war memorial
(old) logging camp
cattle shed
rest site
fish pond

tragopan sanctuary boundary
rivers / streams
roads
walking trail
state boundary
village boundary

DISCLAIMER:
This map is neither a legal nor political document. It simply represents the territory and boundaries of Khonoma village as understood by its people. Representatives from all of Khonoma's three khels, as well as Dzuleke and Kukhwi, have participated in creating this map. This participatory process was intended to both ensure the map's accuracy and make it a collective product of Khonoma's people.

Map 4-4. Layout of Khonoma's Jhum Blocks and Summary of their Cultivation History

WESTERN JHUM BLOCKS

a - 🟦 - Phetsu (T) + Kuthotsu (S)
b - 🟦 - Phetsu (T)
c - 🟦 - Kotsu (T)
d - 🟦 - Kuthotsu (S)

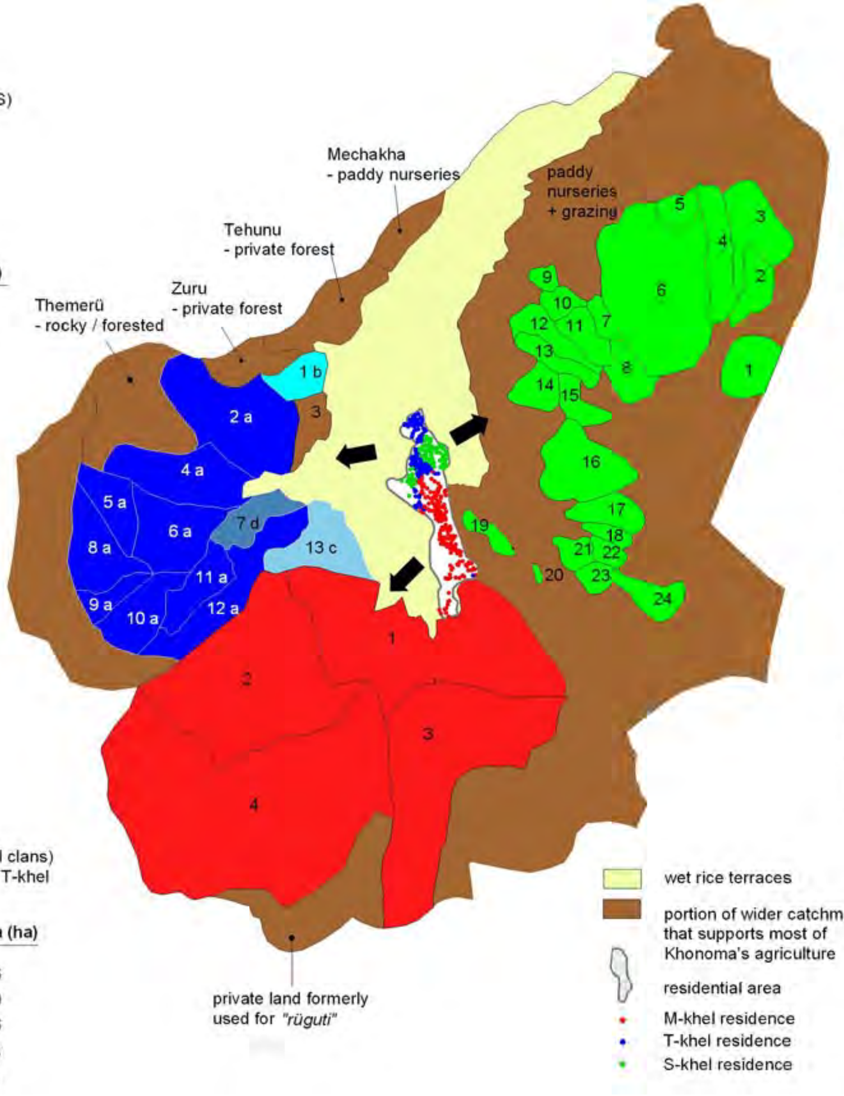
No.	Name	Last Year Opened for Cultivation	Area (ha)
1	Salhourükha	2001	8.2
2	Viyaliake+Meyasüliekha	2003	41.5
3	Chayakha	private forest	7.4
4	Ratsalieke	1995	26.2
5	Rüliju	1997	12.1
6	Tsiekraju	2002	22.3
7	Khadiliejü	2000	10.4
8	Kiduke*	1988	18.2
9	Jüdukha**	steep forested	6.1
10	Rücüzie*	1983	15.3
11	Teisükha	1999	12.1
12	Seikhakha**	steep forested	24.1
13	Keziekha		17.7
	TOTAL:		222

* surrendered to mithun use
** jhumming discontinued due to steep rocky terrain

SOUTHERN JHUM BLOCKS

🟥 - M-khel (all clans) + Chatsu, T-khel

No.	Name	Last Year Opened for Cultivation	Area (ha)
1	Tsiekopfüju	2001	91.6
2	Kiphoju	2003	90.0
3	Mhozieke	2002	85.6
4	Sikhake	2000	172.3
	TOTAL:		439



🟨 wet rice terraces
🟫 portion of wider catchment area that supports most of Khonoma's agriculture
residential area
● M-khel residence
● T-khel residence
● S-khel residence

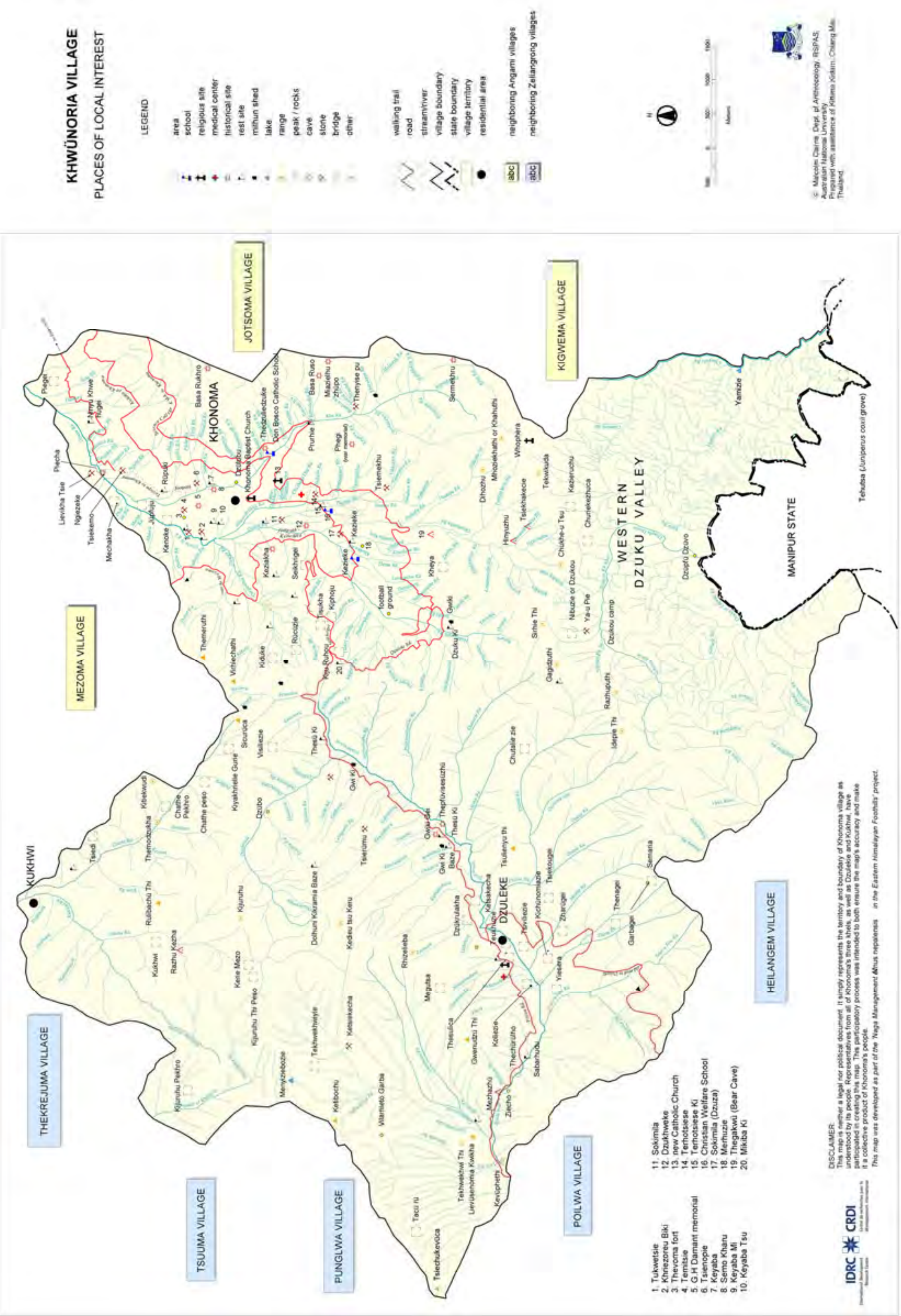
EASTERN JHUM BLOCKS

🟩 - Chalietsu, S-khel (Sonyino + Rülho)

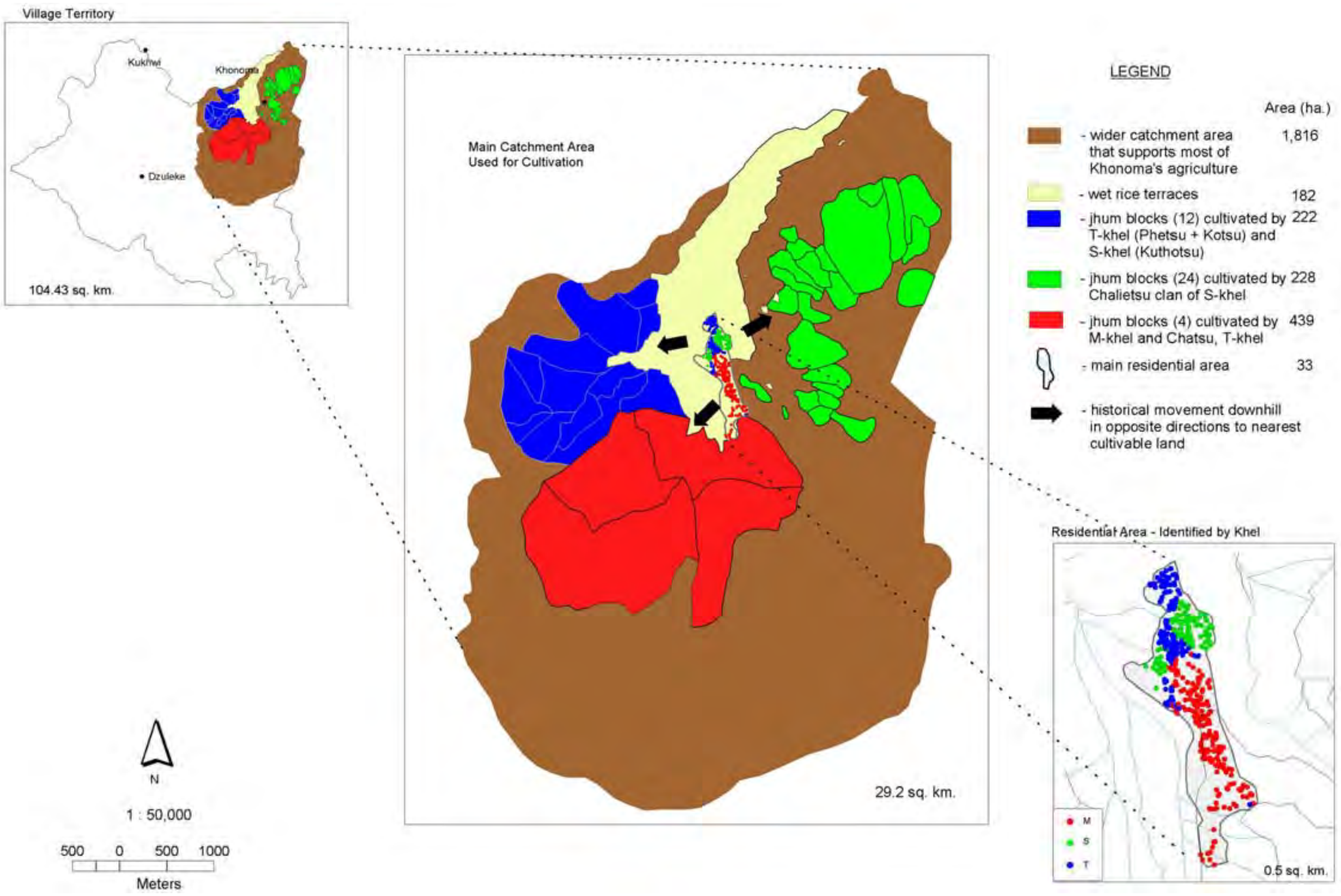
No.	Name	Last Year Opened for Cultivation	Area (ha)
1	Pezerü-Nharü Thevümesitsu	1971	12.0
2	Zasu Liekie-Chüjiezie	1975	8.0
3	Seihirü Nharü	1976	17.1
4	Thinolietsa Seithu	1969	14.2
5	Nevi-u Khudu	1998	5.2
6	Themerü-Dzü Vokhie	1990	61.9
7	Basa Gei	1999	3.5
8	Reiduliekie	1963	8.2
9	Krasekhudu	2001	2.4
10	Rüziekha	1999	4.0
11	Thupfülietsa	1981	7.5
12	Sepilikie	2003	8.0
13	Salierü	2003	6.4
14	Thezüliedzü	2002	7.1
15	Morlietsa	1994	6.1
16	Cahieju Dzükipho	2002	21.2
17	Meya Kiju	2000	8.4
18	Ratsalie Dzü	1976	3.0
19	Kikha	1991	3.7
20	Seyiezü Kha	1986	0.6
21	Kezizie	1997	4.2
22	Mekricu Lieju	1985	3.2
23	Sicucha	1967	3.8
24	Thisanuo Liezie	1936	7.9
	TOTAL:		228

N
1 : 50,000
500 0 500 1000 Meters

Map 4-5. Places of Local Interest in Khwünoria – Identified by Villagers through Participatory Mapping Process



Map 4-6. Division of Jhum Land According to Where Each Khel Originally Settled within the Village



As long as Khonoma was a young village with few people occupying a vast land, there were probably few territorial disputes. As the villagers grew intimately familiar with the landscape on “their” side of the village, the men hunted for wildlife and the women gathered wild fruits and vegetables, medicinal plants and other forest products. The clans were thus physically segregated in their livelihood activities and there was little chance for them to clash.

This gradually changed as the village grew and more people competed for the same resources. As populations pushed against boundaries, disputes would have become more common between individuals, clans and neighboring villages. The village elders had to pass increasing numbers of resolutions to try to ensure equitable use of resources and to keep the peace (see appendix 4-33).

It is unlikely that kitchen gardens (kihiekimhuze) were ever of much importance to Khonoma’s agricultural systems. Both Khonoma’s oral history and early British records agree that the village had grown to roughly 700 houses by the time the British first arrived in 1840.[26] In these crowded conditions, most livestock roamed freely within the village residential area. While accompanying Hutton on a visit to Khonoma in 1922, Henry Balfour noted: “Everything is filthy, ankle-deep in muck; cattle, pigs, fowls, etc. wander in and out of the houses at will, and after the heavy rains, the filth is indescribable.” (Balfour, 1922).[27] Livestock (ukhurino) were kept largely for feasts of merit, funeral sacrifice and other ceremonial purposes associated with traditional religion.

In an unknown period, the village’s strong natural defenses were reinforced with an elaborate system of stone walls, palisading and trenches that made it extremely difficult to attack. Khonoma’s fighting readiness was undoubtedly honed by constant hostilities with neighboring villages.[28] The Western Angami area gave

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[26] This must be regarded with care because seven is a favored number among the Nagas and many villages talk about a bygone era when they had up to 700 houses. Sanyü points out that the number seven appears frequently in Angami folklore (1987, 55), such as Khonoma’s settlement 700 years ago, its growth to 700 houses, or in the case of crimes, banishment from the village for seven years as punishment for wrongful death, or levying a fine of seven times the value of any amount stolen.

[27] Cattle were reared in much greater numbers then. Many houses would join together in hiring a boy to take their cattle to graze during the day. Upon returning to the village in the evening, the cattle would separate and return to their individual owners’ houses and spend the night in the first two rooms (kipfükhro and kilo rooms – see figure 3-8). Livestock and people shared accommodations then. When a holler announced the arrival of a night-time visitor, he would often be greeted with a yelled caution to be careful in picking his way through the cattle, lest he trip over them on his way to the fireplace in the third room (miphubu – a combined kitchen and bedroom). (Meru, V. 2001)

Another factor has helped to end the traditional practice of sharing accommodation with livestock. Khonoma was burnt by the Indian army and its people dispersed into the forests at the start of the Indo-Naga war in 1956 (Iralu, 2003, 164-180). When survivors finally began returning from the forests several years later and rebuilding the village, most of the new houses were too small to use as night-time corrals for the cattle as they had in the past. But traces of the old system remain in parts of Thevomia khel, where traditional religion persists and pigs and poultry can still be seen wandering in and out of the older style houses (plate 5-60).

[28] These hostilities were manifested not so much in large-scale warfare, but rather in small ambushes and limited revenge attacks.

rise to some of the most powerful villages in the Naga Hills and none could afford to be weaker than its neighbor. During that era of constant warfare and headhunting, the Naga Hills were ruled by the laws of survival of the fittest.

Land Use Intensification

There are strong indications that at some point, Khonoma became a victim of its own success, by outgrowing its resource base. Early British records confirm Khonoma's acute shortage of land and claim that by the early 1900s, fully one-third of the village's population were landless (Mills, undated, 5). At a time when most Naga villages existed as independent republics, sufficient in their own needs, Khonoma was struggling to feed itself.

Scrutinizing the information available from that era, Khonoma appears to have made a multi-pronged response to its land shortage problem. The increasing village population meant not only that there were more mouths to feed from its limited land base, but also that there was more labor available to work the land. So there existed both the need and the means to intensify land management. The valley bottom was carved into the expansive rice terraces that, after pacification of the Naga Hills, were to earn much admiration from early visitors.[29] The hill slopes had the combination of contour barriers and dispersed alders that became the focus of this study. In parallel with these technical innovations, Khonoma also relied on ritual interventions to increase the productivity of its farming systems. Heads were brought home to bolster the village's supply of "soul force", monoliths were erected (figure 4-2), clay models of breasts were placed overlooking the rice terraces (figure 4-3), and many other rituals undertaken for the purpose of enhancing fertility.

Figure 4-2. Rows of menhirs line many of the paddy fields, erected as monuments or commemorative of big feasts given by rich men in the distant past.

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[29] See King's comments in appendix 3-12, for example.

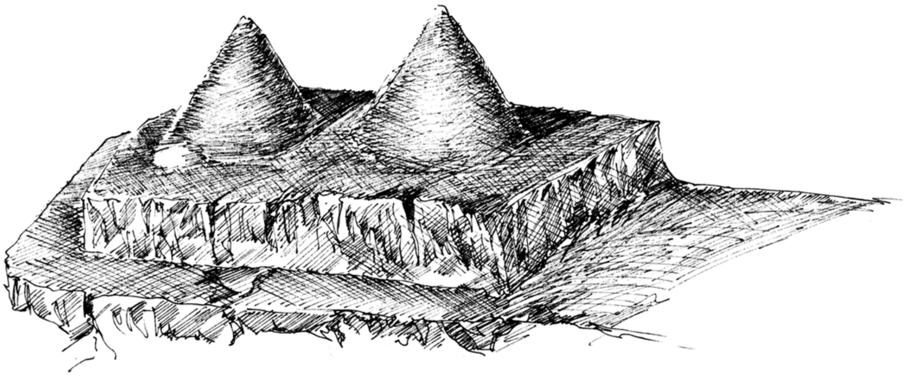

Figure 4-3. One of probably many practices that have faded into obscurity with the arrival of Christianity, Archer (1946) described encountering breast-like formations, sculpted from earth, that overlooked Khonoma's wet rice terraces. They were reported to be built every year during the first day of the Tsünyi festival, apparently as a fertility symbol. (Illustration is an artist's rendition of a photo taken by Archer.)

Central to the Nagas' conception of the world was their belief in 'aren' – the soul substance thought to govern the vigor of crops, the fatness of livestock and general prosperity of the village. Inadequate levels of this life force could be manifested in disease epidemics, fires or other calamities. Headhunting and warfare were not only about blood feuds and honor, but were also inextricably linked with status and the pragmatic need to 'top-up' aren levels by securing heads from outside villages, thus assuring continued prosperity. This fertility cult permeated every aspect of Naga society, and was integral to mortuary practices, erection of monoliths, giving feasts and seeking status and selection of marriage partners. [30]

Raiding and Looting

Khonoma also began looking outward for additional resources. By the time the British took control of Assam in 1826, Khonoma was already known as one of the most powerful and warlike villages in the Naga Hills. Even by Angami standards, Khonoma's people had a reputation for being stubborn and crude (ujieshose) to the extent that other villages were wary of them, and preferred to send representatives bearing gifts of spears and to seek peace treaties rather than risk conflict with Khonoma. Its feared reputation allowed it to exact widespread tribute from many villages of neighboring tribal groups – and weaker Angami villages – in exchange for their safety. Khonoma was undoubtedly often the aggressor and bullied whatever it could from smaller villages.[31]

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[30] For more on Naga headhunting practices and their underlying beliefs, see Pandit, 1896; Mills, 1935a, 1935b; and Gohain, 1977.

[31] The consequences of refusing to accept allegiance to Khonoma could be severe. An entry by Mills in a 1927 tour diary illustrated the degree of carnage that Khonoma raids could inflict:

> "All the small villages are subject to the large villages of Mozumah [Mezoma], Konomah [Khonoma], Kohemah [Kohima] and Jopshemah [Jotsoma], and they are obliged to secure their own safety by paying them an annual tribute of cloths, fowls, cows, pigs, etc. according to their means, or as much as will satisfy the rapacity of the free-booters." (Mills, A.J.M., 1854)

Since Khonoma abuts against Zeliang territory, it was they who suffered most from Khonoma's depredations – as reflected in the Zeliang saying quoted at the beginning of this chapter.[32] Khonoma warriors passing through Zeliang villages often helped themselves to any rice they encountered spread out on mats to dry in the sun – while the owners watched on helplessly. In other cases weaker villages sought Khonoma's help in neutralizing threats from troublesome neighbors.[33] These subject villages would, in turn, be expected to send their own contingents of warriors if summoned by Khonoma to assist in an attack. Khonoma's sphere of influence thus expanded exponentially. The more it was feared, the greater the number of villages that agreed to submit to Khonoma's suzerainty – increasing, in turn, both the tributes paid to Khonoma and the pool of warriors that Khonoma could draw on in times of need. The raiding and plundering was, of course, not confined to the hill country. The geographical closeness of the Assamese plains made villages there easy targets for Angami looting expeditions. Khonoma often led raids into the plains in search of slaves, iron and other goods that were scarce in the hills. It thus appears that Khonoma's economy probably became heavily subsidized by tributes and the spoils of war.

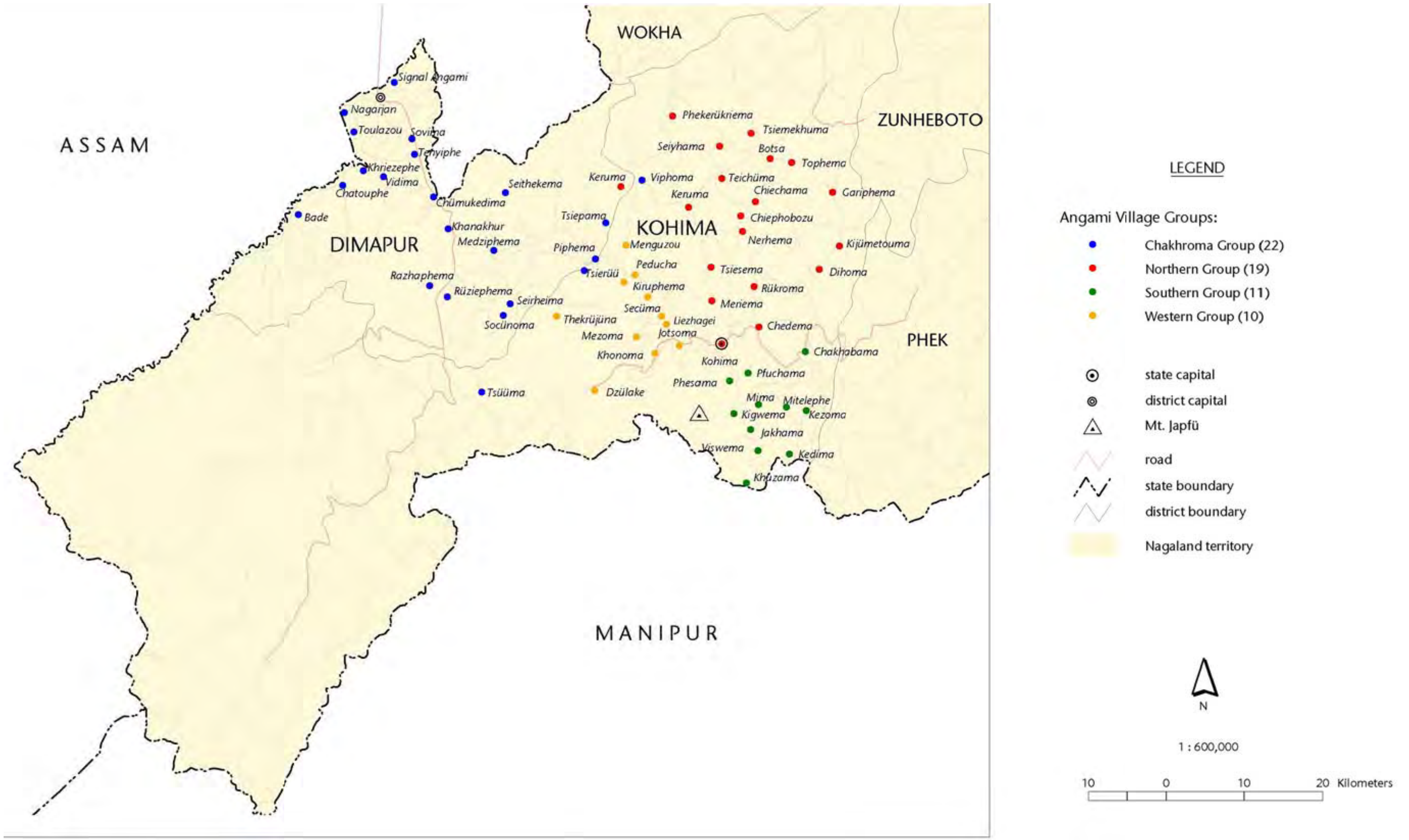
Predatory raiding and headhunting characterized people in many lands, asfar apart as Borneo, New Guinea and Amazonia in pre-modern days. There is a substantial literature seeking to explain these practices which were often associated with well-developed agricultural economies. A sample of this literature would include Gardner (1968) and Heider (1996) for the Grand Valley of central Irian (New Guinea), McKinley (1976), Rosaldo (1980) and Hoskins (1996) for different parts of insular Southeast Asia and Chagnon (1968) for the famous Yanomamo of Amazonia. Explanations proposed include conflicts over women as well as emerging conflicts over land and its product, as in the Angami case.

> "The village [Semkhor] is in a very strong position on a spur with steep sides. Nevertheless, Khonoma once raided it and took 80 heads." (Mills, 1927, 7)

[32] Hutton commented that Khonoma's influence over its Zeliang neighbors was so great that it was difficult to distinguish what customs were actually traditional to the Zeliang and which had been imposed on them by Khonoma (1969, 16).

[33] Seiyhama, one of the last Angami villages in the Northern Angami area (map 4-7), was not a big village by Angami standards and was frequently attacked by its Rengma and Sema neighbors. Realizing that it needed help if it was to survive Seiyhama sought assistance from the largest Northern Angami village, Chiechama, only to be turned down, with a suggestion that it seek help from the Western Angami side where warriors were said to be "as numerous as bees". Seiyhama representatives journeyed to Khonoma to explain their predicament and Khonoma agreed to be their "parent village". Sending some of its warriors back to the Northern Angami area, they let it be known that any village attacking Seiyhama would thereafter face Khonoma's wrath. Seiyhama was never attacked again. (Narrated by Dolie, 2001.)

Map 4-7. Breakdown of Angami Villages by Group *



It was Angami raids on British subjects in Assam and the North Cachar Hills that eventually forced the British to keep returning to the Naga Hills to try to pacify the Angami. As described by Hutton (1969), the British found the Angami to be divided into four distinct subgroups:[34]

- the "Khonoma group" – consisting of six large villages and their offshoots, considered to be Angami par excellence;
- the "Chakroma group" – comprising villages nearer the plains, and derived chiefly from the Khonoma and Kohima groups;
- the "Kohima group" – composed of Kohima and surrounding villages; and
- the "Viswema group" – encompassing those villages south of Kohima.

Map 4-8 shows the location of Khonoma and a compared secondary study village, Tsiesema, within the context of Hutton's subgroups. These groupings continue to be used today, but are now more commonly referred to as the "Western Angami", "Chakhro Angami", "Northern Angami" and "Southern Angami", respectively. Amongst them, the Western Angami group is noted for having the highest population pressures, and for having – earlier in history – dominated in warfare and more recently, played a leading role in commerce and Naga politics. (See appendix 3-14 for a list of the 62 villages that currently fall under the four Angami subgroups.) Although each village has a slightly different dialect, all can speak Tenyidie as a common language.

Since they were almost constantly at war, military security was of paramount importance in choosing village sites. They therefore settled in large villages, built in commanding positions on hill summits or ridges, which were strongly fortified. From these positions, they could keep vigil against approaching enemies and swing the villages' heavy wooden gates securely closed at night. The need to be able to defend themselves demanded at least a minimum size or they would be find themselves at the mercy of all larger villages (Meyase, S., 2001, 21). Small villages could survive only by seeking the protection of a larger "parent" village, which would demand tributes in return.

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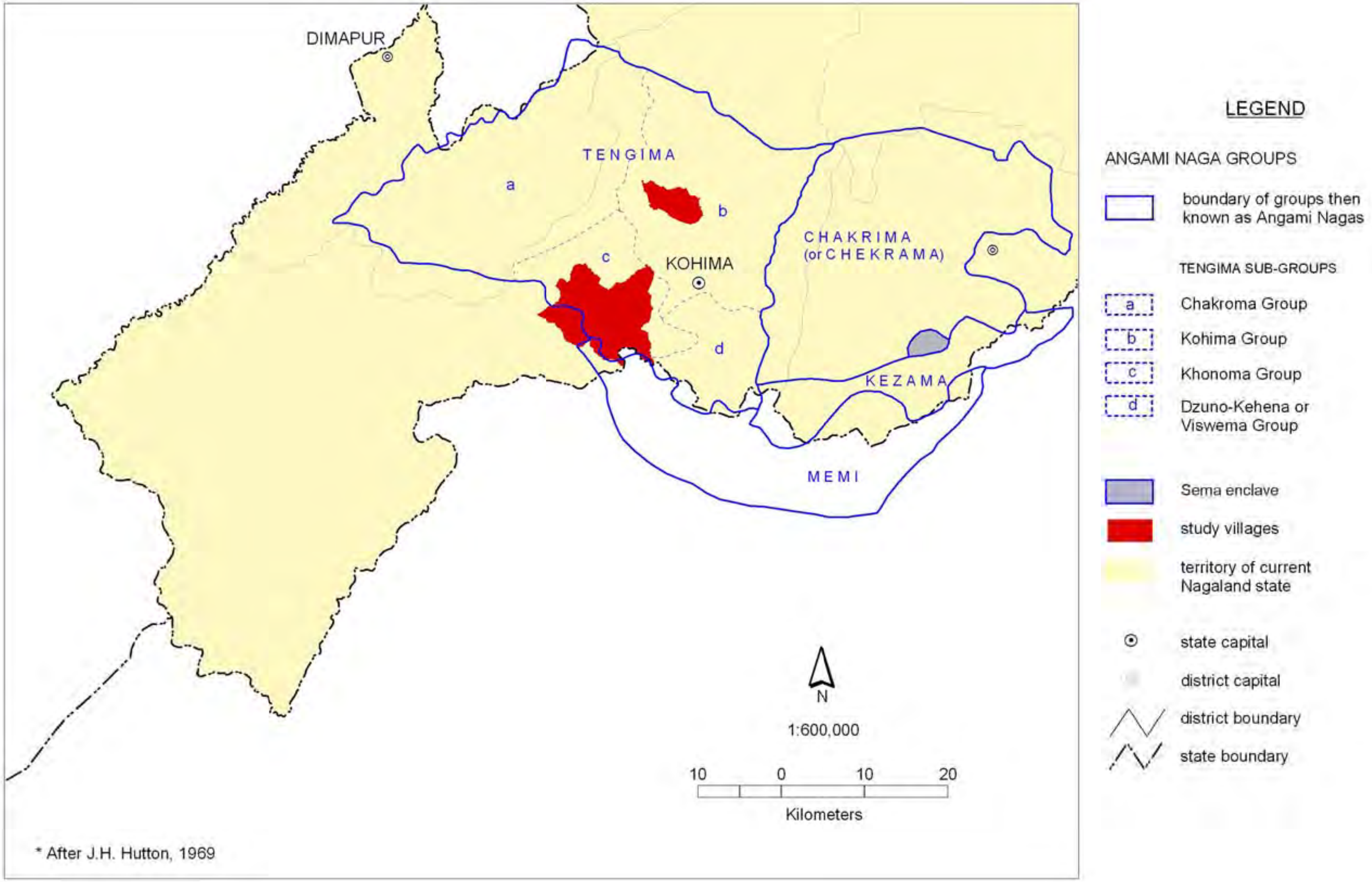
[34] Another group known as the "Eastern Angami" was originally classified as part of the Angami tribal group by early writers, but in 1948, it was officially designated as a separate tribe – the Chakhesang, occupying present-day Phek District. When the name was coined, the Chakhesang were composed of the Eastern Angami (Chakrü and Kheza) and Eastern Sangtam (Puchori). The name derived from a combination of the names of the three member subtribes, i.e., Chakrü + Kheza + Sangtam = Chakhesang. The Puchori were recognized as a separate tribe in 1984. They similarly received their name from the three member clans – the Pu, the Cho, and the Ri (Sanyü, 1987, 41).

The continual reformulation of both tribal classifications and political boundaries makes it difficult to trace population growth and densities of specific tribes over recent history because the units of analysis have been continually changing. Census records for the Nagas were kept in Guwahati while the Naga Hills remained a district under Assam, but in 1963, when Nagaland gained statehood, it began keeping its own records in Kohima.

Map 4-8. Location of Research Villages within Early Groupings of Angami Nagas



* After J.H. Hutton, 1969

Implications of Angami Propensity for Warfare

Hostilities in the Naga Hills at that time thus indirectly encouraged intensified land use. Since safety in numbers required larger villages, this meant that many people had to be supported by the nearby land base. There appears to be a strong causal link here, in that not only were the Angami considered to be the most warlike of the Naga subgroups, but they also settled in the largest villages and were noted to be the most advanced in cultivation. While other subgroups in contemporary Nagaland still rely almost totally on jhum cultivation, the Angami (and Chakhesang) are remarkable for their well-developed system of terraced rice fields, which are skillfully irrigated. Angami elders interviewed during the fieldwork thought that their ancestors probably brought their terracing skills with them when they arrived in present-day Nagaland (Punyü, 1995, 45; Meyase, S., 2001, 108). That would mean that they were already wet rice cultivators by the time they arrived in Khezakenoma. But if the Angami, Lothas and Semas did not divide into separate tribes until after they left Khezakenoma, then how did the Lothas and Semas lose their rice terracing traditions? It seems far more likely that terracing was a later development.

Allen, in particular, pointed to population pressures as having driven the Angami to develop terraces:

> "Sometimes the terraces are simply dug out of the earth and are not faced with stone, but near Khonoma, they even go so far as to build low walls across their jhum land to prevent the soil from being washed away by the rain. This system of terraced cultivation was probably introduced from the south, and without it the large and populous Angami villages could not exist, as they have not sufficient land in their vicinity to support them by the wasteful system of jhuming." (Allen, 1981 [Reprint], 44) Some of the larger villages like Khonoma are positively pressed for land, and the people have carved out into terraced rice fields the most precipitous and unlikely looking slopes." (ibid. 80-81)

With their rice needs provided by the irrigated terraces, the Angami opened only small jhums on the hillsides to grow secondary crops. Management of their jhum fields was of a much higher order than that found amongst other Naga subgroups, particularly amongst the larger Angami villages at the base of the Japfü Mountain Range. Although this study focuses on Khonoma as a particularly striking example, many of these villages also had the combination of pollarded alders and stone contour walls in their jhum fields, and had shortened their fallows to only five or six years.[35] These intensification measures were developed to support the high

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[35] Many of the Angami villages surrounding the Japfü Mountain Range had terraced their jhum fields similar to Khonoma's, but when roads were being constructed around 1910, the stone walls were removed for use on the roads. Many of the jhum terraces in neighboring Jotsoma, in Kohima and Zubza (also called Secü) in Northern Angami area, and in Viswema, Phesama and Jakhama in Southern Angami area, were destroyed

population pressures of these large Angami villages – whose size, in turn, was pushed by the need to be militarily strong.

Another implication of the propensity for warfare among the Angami was that it discouraged travel and trade between villages. Anyone venturing away from the relative safety of his own clan could easily fall victim to a neighboring village looking for some heads to settle an old feud or to ensure a bountiful crop, or perhaps to a young warrior keen to earn his ornaments and the admiration of the village maidens. This increased the isolation amongst Angami villages, and led to differences in dialects,[36] dress and traditions. It is therefore difficult to make sweeping statements about Angami culture, since it cannot be assumed that it will be found in precisely the same form in all villages. It also decreased the likelihood of anyone finding a marriage partner outside his or her own village. Even today, when Angami government officials meet fellow tribesmen on the streets of Kohima, they can usually identify their home villages by noting their facial features and dialect (Kevichusa, 2000).

Village Fission

There are numerous stories of villagers breaking away from Khonoma to settle new villages elsewhere, but it is unclear how significant this might have been in terms of reducing land use pressures in Khonoma during the pre-British era. Mezoma, just across the valley and its nearest neighbor, is the most prominent example of a breakaway village from Khonoma, but that took place long before land shortages are likely to have become a problem.[37] There were isolated cases of villagers getting into strife and being forced to flee Khonoma. But most people would have been loth to forfeit their membership of such a strong village in exchange for the uncertainties of beginning anew. Even when Khonoma's khels dispersed while at war with each other, they always returned to the old village site after the conflict ended, sometimes years later.

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in this manner (Kevichusa, 2000). The arrival of roads thus struck the first blow against the alder terraces. Kohima grew rapidly after Nagaland was declared a state in 1963, and the flood of money from Delhi contributed to the further decline of the dispersed alder system as neighboring villages neglected their fields and instead sought ways to tap into the lucrative federal funds.

[36] The Nagas' monosyllabic languages evolved rapidly under conditions of isolation. McCabe noted a rather remarkable example of the speed at which this could happen:

> "As an example of how rapidly isolation produces dialectical change, I would mention the fact that the Rengma Naga families who migrated some seventy years ago from Themokedima to the hills along the Kolĭăni, are now almost unintelligible to members of the parent stock." (cited by Hutton, 1969, 9)

[37] Mezoma residents say that about 17 generations have passed since the village was established (Husie, 2006). If each generation was approximately 30 years, that would make Mezoma about 510 years old. At that time, Khonoma's own population might still have been small and land relatively plentiful.

The birth of Dzulake as a satellite settlement in 1848 – a time when land shortage was acute in Khonoma – seems to be the clearest example of Khonoma's population spreading out to exploit nearby pockets of land suitable for agriculture. Dzulake's growth to over 50 households prior to the outbreak of the Indo-Naga war eventually played a significant role in reducing population pressures in its parent village.[38]

Amongst their many responses to land shortage, it was the penchant of the Angami for raiding and plundering in the plains and North Cachar Hills that first captured the attention of the British and forced them to attemp to pacify the Nagas (see map in appendix 1-2). Since Khonoma was quickly identified as one of the worst offenders in these attacks on British subjects, it may not be overstating the case to draw a direct causal link between Khonoma's shortage of agricultural land and the eventual annexation of the Naga Hills as a district under Assam![39]

CONTACT, CONFLICT AND CONQUEST

Phases of British Relations with the Nagas

Analysts generally divide British relations with the Nagas into the following four phases (Joshi, 2001, 47-81):

Attempted Control from Outside. The 1832 to 1846 period of attempted control from outside was characterized by frequent Naga raids to claim heads and slaves from surrounding plains villages and the tea gardens of the East India Company in Upper Assam. Determined to protect their subjects, the British responded with punitive military expeditions into the hills. Offending villages were usually burnt, or when they yielded to superior British firepower, were forced to pay pigs and mithuns as fines. During this volatile period, a grouping of six powerful Angami villages west of Kohima – including Khonoma – quickly earned a reputation as the main perpetrators of many of the predatory raids. They became known as the "Khonoma group" and were considered Angami *par excellence* – particularly in warfare.

By 1838, Khonoma was becoming infamous as one of the main Angami aggressors in attacks on British subjects in the North Cachar Hills. In attempting to put an end to the raids, the British first tried a conciliatory approach. While leading the fifth British expedition into the Naga Hills in 1841, Captain Bigge (Principal Assistant in Nowgong) visited Khonoma in an attempt to build friendships and

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[38] See later section on Dzulake Valley in chapter 6 for further details.

[39] Although there are no detailed writings about the Nagas in the pre-British era, some oblique references can be found in literature about Assam prior to its annexation by the British in 1826 (Basu, 1970; Gogoi, 1986; Choudhury, 1987; Bhuyan, 1989; Trivedi, 1997). These deal mostly with the Nagas' relationship with their neighbors in the plains.

encourage peaceful intercourse with the lowlands. This appeared to be yielding positive results when, the following year, the British Political Agent was able to mediate between Khonoma and Mezoma in settling an old quarrel. However, any illusions that the Angami might be easily tamed were soon shattered. They were defiant when in April, 1844, Browne Wood (Sub-Assistant of Nowgong) returned to collect tribute. Both Khonoma and neighboring Mezoma refused to pay tribute or acknowledge the authority of the British Government (Changkiri, 1999, 43-44). As if to emphasize its stance, Khonoma followed up in October by taking part in an attack on a police post near Semkhar, killing three Shan soldiers and wounding another. This clear challenge triggered what was to become the first of many punitive expeditions against Khonoma. That December, Wood led a detachment of the 2nd Light Infantry in burning down part of Khonoma and retrieving four muskets that had been stolen during the raid on the police outpost. Khonoma responded by immediately burning down Mezoma in retaliation for its assistance to the British. This appears to have achieved its intended effect, albeit temporarily. When Captain Butler (Principal Assistant of Nowgong) returned to the area in the winter of 1845-1846, he was warmly received by the chiefs of both Khonoma and Mezoma, and presented with tributes of ivory, cloth and spears.

Establishing Outposts. When the strategy of repeated British promenades into the Naga Hills did not achieve the desired results, outposts were established there as a brief experiment between 1847 and 1850. A military post was established at Samaguting in 1847, and placed under the command of Bhogchand, an official who had earned government notice for his bravery and intimate knowledge of the Angami. He was given authority over the entire Angami tribal group. Khonoma and Mezoma were locked in a serious land dispute at that time. Eager to enlist the British as an ally, Mezoma asked that a police outpost be established there to prevent further attacks by Khonoma. Bhogchand proceeded to Mezoma in April, 1849, to oversee construction of a stockade there for the requested police guard. But while there, he began interfering in the internal quarrels of two rival chiefs of Mezoma and, in trying to be impartial, he made arrests on both sides and managed to infuriate everyone. While escorting his prisoners back to Samaguting, Bhogchand's group was surrounded at Piphema where they had camped for the night on August 3, 1849, and attacked by a combined force from Mezoma and Khonoma. Bhogchand was speared to death, along with some of his police guard. In retaliation, in December 1849, Lieutenant Vincent (Junior Assistant at Nowgong) led a detachment of troops to occupy Mezoma. He then continued to march to Beremah, where he hoped to arrest the murderers of Bhogchand, but ill health forced him to turn back and Lieutenant Campbell took command of the detachment. Shortly afterwards, the expedition had to be aborted after hostile Angami burnt down Mezoma for its loyalty to the British, and all the detachment's provisions were destroyed in the fire.

Vincent returned in March, 1850 to recapture Mezoma and, using it as a base, set about putting down a threatened Angami revolt. Judging Khonoma to be the most likely source of the trouble, he established an advance post there and decided to remain there during the 1850 rainy season. However, his meager force of 46 men dwindled even further as several soldiers fell victim to Khonoma's spears. Judging their position to be precarious, Vincent finally burnt down part of Khonoma and fell back to the stockade at Mezoma. Alarmed at rumors that 5000 Angami were preparing to attack his position, Vincent sent an urgent call for reinforcements from the plains. Major Foquett was hastily dispatched to Mezoma with a strong force of 500 men from the 2nd Assam Light Infantry. Captain Reid was also directed to advance to Mezoma with an Artillery Division. Both Foquett and Reid arrived in Mezoma on December 7th, 1850. Three days later, in what was to become known as the "First Battle of Khonoma", the combined British forces attacked. (See Butler 1874, as cited by Changkiri 1999: 59 for details). After finally seizing Khonoma, the British forces continued to attack and burn other hostile villages in the neighborhood.

Non-Interference. At this juncture, the British Government then decided its policy of limited engagement to be untenable, withdrew its troops, and from 1851 to 1865 instead adopted a policy of non-interference with the Nagas.

The Angamis took full advantage of the slack and from 1854 to 1865, launched 19 unanswered raids in which 232 British subjects were killed, wounded or carried off (Sir Alexander MacKenzie as cited in Allen, 1981, 18).

Permanent Pacification and Annexation. As the situation grew intolerable, the British again reversed policy and in 1866 began a process of permanent pacification and annexation of the Naga Hills. As Allen (1981) pointed out, it was a decision made with reluctance. (Allen, 1981 [Reprint], 21). The British had realized that their post at Samaguting, in the foothills about 10 km from Dimapur, was too far away for effective control of the troublesome villages. This prompted Deputy Commissioner Damant to relocate British headquarters in November, 1878 to Kohima, in the heart of Angami territory. The decision was hastened by a bitter war brewing between Khonoma and Mezoma that threatened to bring more trouble. By May of 1879, rumors were rife that Khonoma was acquiring arms and ammunition on a large scale. In an ominous foreshadowing, Khonoma's Semomia khel sent emissaries to Damant to pledge that they would not participate if the other two khels engaged in hostilities against the Government.

Khonoma Leads an Angami Uprising

Events came to a climax on October 13th, 1879, when Damant was ambushed and killed at the gates of Khonoma, along with 35 of his troops. Nineteen more were wounded. The 118-man garrison at Kohima was then besieged by an estimated 6,000 Nagas, including contingents from nearly every Angami village (Whitehead, 1989). After an 11-day standoff, Colonel Johnstone arrived with a strong force of Manipuris and the Nagas dispersed (Johnstone, 1987). Determined that the Nagas needed to be taught a lesson, on November 22, 1879, Brigadier-General Nation led a strong force consisting of the 44th Sylhet Light Infantry, a detachment of the 43rd Assam Light Infantry, two mountain guns and a rocket battery to assault Khonoma and hostile neighboring villages. Thus began the "Second Battle of Khonoma".

Anticipating the attack, the villagers had transformed Khonoma into one of the strongest fortresses that the British had ever encountered (map 4-9, appendix 3-4). Despite what was later described as "the severest fighting ever known in these hills" (Mackenzie, 1880, 137), the British forces managed only slow progress and suffered heavy casualties.[40] Accounts of the battle sound eerily similar to its predecessor 29 years earlier (Allen, 1981 [Reprint], 14-15). Khonoma managed to kill or wound 49 of its attackers during a single day of fighting, before retreating under cover of darkness to its fallback position at Chakka Fort. Angami fire had strategically targeted their attackers' commanding officers, killing a Subedar-Major and two British officers.[41] The British chose not to pursue the battle to Chakka Fort, recognizing that its position on a steep ridge made it difficult to attack and it could not be taken without heavy losses. Instead, they left a garrison of 200 men at Khonoma to finish demolishing the village and sent the rest of their forces to attack neighboring villages that had participated in the siege. Despite stubborn resistance, one Angami village after another was destroyed – until only the Khonoma men continued to hold out from their mountain stronghold.

The British planned to force the Khonoma rebels to surrender by blockading Chakka Fort and denying them access to provisions. But this was not easily done. The rugged Barail Range provided effective cover for the Angami to evade British forces and visit neighboring villages to gather supplies. Nor had Khonoma given up fighting. On the 26th of January, 1880, Lieutenant MacGregor marched with a force of 150 rifles to Paplongmai village (also called Kenoma or now, Poilwa) to stop its flow of supplies to Khonoma and drive out any of its people found to have taken refuge there. Watching the expedition's progress, Khonoma fighters quickly descended from Chakka Fort and attacked its rear guard. Khonoma also made frequent retaliatory attacks on the Samaguting outpost, including three in one week, killing and wounding nearly 50 on the British side.

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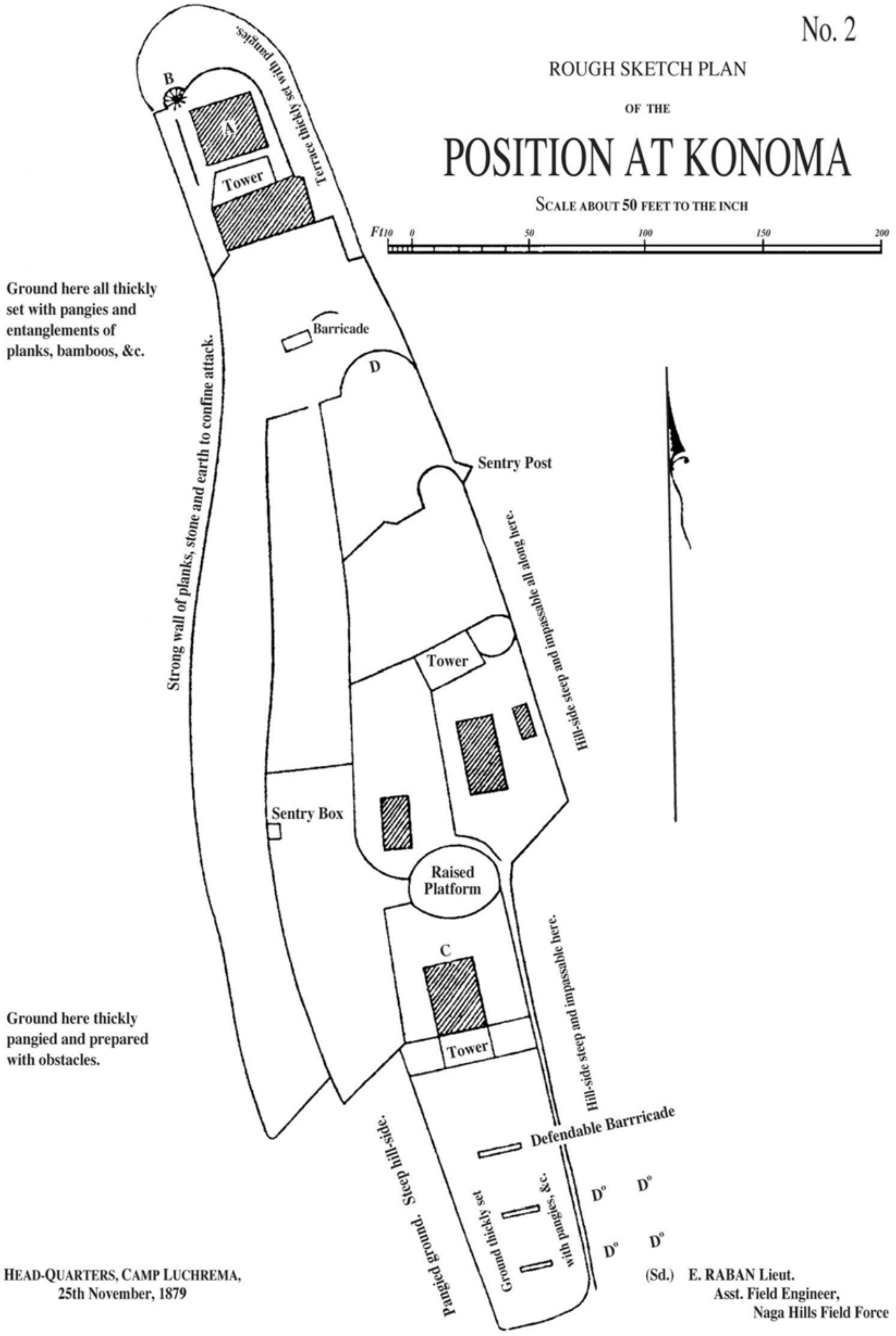
[40] Eighteen years after the battle, another British officer visiting the site marveled at Khonoma's natural defenses and the task that his predecessors had faced in trying to capture the village:

> "Marched along the path up which the village was attacked by General Nation in 1879. For an outsider, unaware of the reasons for attacking from this direction, it is difficult to understand why the attack was delivered from the south. Even denuded of its fortifications, the approach to the village is most formidable, and one wonders not at the heavy losses, but that it was possible to take the place at all. (Cole, 1897, 1)

[41] A memorial for these three fallen officers and Damant was later erected near the highest point of the Khonoma hill (see plates 3-156 and 3-157).

Map 4-9. A Sketch Map of the Fortifications Encountered by the British when they Attacked Khonoma on Nov. 22, 1879 (See also appendices 3-2 and 3-4 for related maps.)



Source: Dr. Alan Macfarlane, Department of Social Anthropology, Cambridge University

With their blockade leaking like a sieve and Khonoma fighters continuing to launch raids at will, the British were forced to change their strategy. On the 27th of March, the British attacked Chakka Fort and finally managed to cut off all supplies. The Khonoma defenders were forced to surrender the following day.[42] The Angami rebellion led by Khonoma was finally put down.

The surrendered Chakka fort was destroyed. Khonoma itself, and its fields, were confiscated. The village site was not to be re-occupied; the fields offered to neighboring villages. Khonoma's men were dispersed. (Yhome, 1880) The once-proud Angami fortress was never to be allowed to arise from its ashes (see Elwin, 1997, 22). The official attitude towards Khonoma eventually softened, and the village was allowed to resurrect itself, step-by-step. A force of military police remained stationed in a fort on the crest of the spur where they could keep a watchful eye on the surroundings and enforce government orders. After wandering homeless for a year, in 1881 the villagers were permitted to reoccupy their land – but not to rebuild their houses on the old village site. Instead, the three khels were segregated and told to build their houses on separate sites designated by the Political Officer in the valley area. On January 4th, 1888, the Chief Commissioner of Assam promised the people of Khonoma that, conditional upon their continued good behavior, they could rebuild on their old site after another five years. This penance was later reduced by one year in recognition of assistance given by Khonoma during the Manipur revolt in 1891.[43] In 1892, Khonoma was finally granted permission to reoccupy its old house sites on the hill. It was not until 1923 – 44 years after the uprising – that Khonoma's khels were finally allowed to rebuild their forts[44] and the village resumed normalcy.[45]

Placing Shifting Cultivation in the Naga Hills into Historical Context

Our earliest source of detailed comment about the period between the founding of Khonoma and the arrival of the British comes from the records of the British as they began to penetrate the Naga Hills from 1832 onwards. Early reports tend to be preoccupied with matters of military concern, such as the ongoing struggle to pacify the Nagas, and surveying their countryside. It was not until 1878, when the British relocated their headquarters from Samaguting (now called Chümukedima), near Dimapur, to Kohima and Deputy Commissioners began

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[42] See appendices 3-5 for a more detailed account of the British assault on Khonoma, and 3-6 for the terms of surrender. Appendix 3-7 provides some observations on these events from the perspective of a Khonoma elder.

[43] Although it was only 11 years since the British had put down the Angami's own revolt, the larger Angami villages now assisted their conquerors in defeating the Manipuris.

[44] The khel forts (dahu) were rebuilt under Hutton's tenure as Deputy Commissioner of the Naga Hills. See appendix 3-9 for Hutton's account of the rebuilding, and plates 3-8 to 3-10 and 3-182 for his photographs.

[45] Although forced to submit to the superior military power of the British, Khonoma continued to assert its authority over weaker Naga villages during this period.

touring the hills regularly that we find in their reports rich insights about how the volatility of those pre-British years played out in the Nagas' day-to-day lives. These will be heavily drawn on in the following discussion.

The Constant Threat of Famine and Disease

The tour diaries create an overwhelming impression of the vulnerability of life in the Naga Hills at that time. Life could easily be lost by a crop failure, by attack from a neighboring village wanting to settle an old score, or from the ravages of smallpox and other diseases that found their way into Naga villages more often as intercourse with the lowlands increased. The British reports reveal the seriousness of these threats and how the Nagas tried to mitigate them.

Crops were sometimes laboriously nurtured throughout an entire growing season, only to be destroyed in the final weeks before harvest by predators (usually elephants, rats or birds) or storms (heavy rain, winds or hail). Bumper crops that promised full granaries thus evaporated overnight and were replaced with the specter of famine. A diary entry by Hutton in 1922 confirms that food shortages were claiming high mortality in some villages. (Hutton, 1922b, 1) The failure of one crop could have a domino effect on the next as the villagers, now weak and sick, could not muster sufficient strength to maintain their fields properly. Although not specifically stated, there are some indications that women may have suffered disproportionately in times of famine. Later in that same year, Hutton recounts visiting Phegwema where he "… found many sick and all the women but 4 (in about 17 houses) dead" (Hutton, 1922b). Villages were sometimes decimated to the point that British administrators brought in outsiders to try to keep them at a viable size. A specific case was described by Pawsey (1939b).

As Pawsey noted, one of the Naga strategies to mitigate the threat of starvation was to fall back on the forests for wild foods when their farms failed to produce enough to eat. The mithun wandering in the forests could also be rounded up in an emergency and sold to fund the purchase of rice. This strategy was problematic however, in that every village would be trying to do the same thing in widespread famines, pushing the price of mithun down and the cost of rice up (Hutton, 1922b). Cultivating both jhum and wet rice fields was seen in itself as a way of spreading risk since both were unlikely to fail in the same year. And no doubt, scarcity would have also increased the rate at which more powerful villages like Khonoma helped themselves to the resources of their weaker neighbors.

The Influence of Religious Belief

Other strategies that the Nagas pursued to fend off disaster fell within the realm of ritual and their understanding of the spirit world. The Nagas' relationship with the spirits was mediated by a series of rituals throughout the agricultural calendar (see Cairns et al., unpublished), starting with those of the first-sower, who placed the first seeds of the new cropping year in the ground. As grains bent low under the weight of filling panicles, this was the most vulnerable time when disaster could visit, perhaps in the form of a freak hail storm or passing herd of hungry elephants.[46] This was thus a period of frequent rituals aimed at appeasing the relevant spirits and warding off bad events. Harvests were both preceded by first-harvest rituals and concluded with festivals that thanked the spirits for their benevolence.

Throughout the year, <u>gennas</u> were strictly observed to ensure continuing smooth relations between the human and spirit worlds. Hutton explains that 'genna' is a general Nagamese term that refers to something forbidden. It is used to convey the meaning of the following Angami words: <u>kenna</u> – a prohibition applying to a person or household; <u>penna</u> – a non-working day, similar to a Sabbath, on which it is forbidden for the entire village to work in the fields or interact with strangers; and <u>nanü</u> – a taboo and the entire ceremony connected with it (Hutton, 1969, xviii).[47] All three are lumped together as "<u>genna</u>" and commonly used in reference to incidents of magico-religious observance.

The rigidity with which <u>gennas</u> were observed – and the lengths to which the Nagas went to avoid breaking them – is worthy of comment. There were times when the demands of <u>gennas</u> could not be balanced with those of survival, and some compromise was necessary. Village elders described one such case that occurred in Tsiesema's distant past. After a death, it was traditionally <u>genna</u> for other members of that clan to stop work in their fields for the next five days. During a troubled period when warfare, epidemics and famine were decimating Tsiesema, this regulation became untenable since the regularity of deaths prevented them from working in their fields enough to feed themselves. To lessen this burden, the Mere clan divided itself into two groups, Mere I and Mere II. They resolved that if someone died in one group, then only members from that group would abstain from working in their fields for the full five days, while the second group would stop for

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[46] The Nagas were careful never to tempt fate by speaking admiringly of a developing crop – for fear that they would jinx it and something would go wrong. Bor appears to have been referring to this in a 1942 diary entry:

> "To Chizami. The first fine day for many weeks – not a cloud in the sky. Crops look splendid everywhere but the nearest admission to satisfaction that I can get is that they are not too bad." (Bor, 1942, 1)

[47] See Punyü, 1995, 90-103 for a detailed discussion of these terms and how they applied to Angami life.

only a single day. This compromise allowed them to maintain tradition while recovering some degree of food security.

Temporary Jhums (rügu tei)

Another emergency measure was sometimes used when the village population had grown to the point where it was struggling to feed itself on its available land. It was called rügu tei (meaning '*stolen cultivation*'). This entailed clearing patches from communal forests not ordinarily used for agriculture, and dibbling cold-hardy varieties of millet directly into the soft soil.[48] The upper slopes cultivated under rügu tei were too cold for other jhum crops. The seedbed was not hoed and weeds were few. The fields were left to revert back to forest after harvesting only a single crop. The name was likely derived from the fact that rügu tei was considered exempt from the usual rules of genna and could be cultivated at any time. This may have been a concession to the plight of poorer families who could not produce sufficient food from their jhums and wet rice terraces, and thus relied on rügu tei to help make up the deficit. The granaries of these families would have been empty several months before the next year's crop was ready to harvest. Extra fields of millet would have helped alleviate their food shortage since it is ready to harvest by July or August – several months ahead of other cereal crops – and thus would have helped bridge the hungry period until the other crops were ready.[49] As will be detailed in Chapter 5, the population pressures that necessitated rügu tei disappeared literally overnight when Khonoma was attacked by the Indian military in 1956, and its people were scattered across the countryside. Rügu tei has not been practiced since.

Respect for the Spirit World

When villages failed to prosper, the Nagas sought explanations within their understanding of the spirit world and its influence on their physical world. Their interpretation of this was rich with symbolism. Women, for example, were forbidden to spin or weave while their men folk were out on a raid out of fear that "if she were to handle thread at such a time, they would trip over creepers and fall into the hands of their enemies" (Mills, J.P., 1934, 6). In Khonoma, even if a woman was returning to the village with an empty basket, when she passed through the village gate, the basket strap must be braced against her forehead as if carrying a heavy

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[48] The millet varieties normally planted in jhum fields (appendix 5-11) were reportedly not cold-hardy enough to plant on the higher slopes opened for rügu tei, and would not bear fruit.

[49] In another example of similar planning, in times when villagers in Viswema recognized that a food shortage was imminent, they would quickly plant a particular millet variety called "Khrüsele" (translates literally to "three months") that could be harvested in the exceptionally short time of 90 days (Kikhi, C., 1997).

load.[50] Failure to do so was thought to risk offending the spirits, and that henceforth, all baskets returning from the fields might likewise be empty – bringing famine.

As the British finally began to make progress in pacifying the Nagas in the late 19th century, the improved law-and-order allowed villagers to move around more freely, but this brought a new threat – disease epidemics. When villages were struck down by disease, usually brought back by someone who had been traveling, neighboring villages quickly piled branches to block the pathways and warn others away from the stricken village. But those inside the quarantined village desperately turned to the spirit world for help.

The Influence of Headhunting on Land Use

Symbolism carried over into the headhunting practices that were deeply rooted in the soil and considered vital to each village's prosperity. A particularly vivid example of the perceived linkage between taking heads and crop performance is provided by Mills:

> "On one occasion they captured an Angami from Tophema, and kept him till the young rice began to sprout, when his fertilizing influence would be most valuable. Then he was killed and his head, hands and feet were hung from the head-tree, as if they were those of an enemy killed in war. But the sacrifice did not turn out well. The wretched victim, in his death agony, swept the ground with his hand, and this caused the crops to be damaged by wind that year." (Mills, J.P., 1982, 161)

Working in the fields was laden with risk, especially distant jhum fields where a quick retreat to the village was less possible. When attacks against fortified villages failed, raiders would often try to pick up a few heads from cultivators working in outlying jhum fields as easier targets.

> "From the hill near Yangtung we saw beneath us, in a clear field on the left bank of the river, a large gaily-dressed body of warriors, escorting some women with loads; on seeing us, after many demonstrations of defiance, and dances up and down the field by each of the warriors in turn, they prudently retired to the other side." (Woodthorpe, 1876, 14)

Woodthorpe's account shows that cultivators had to be prepared for attack at all times, and moreover, that women did much of the agricultural work while the men stood guard over them (figure 4-4).

The British tour diaries cite numerous examples of how the Nagas' continual warfare influenced land use. This began with selecting their settlement sites on ridges and spurs that were highly defensible. The need to be able to defend themselves militarily encouraged larger villages. Or if they were small and vulnerable to attack, then their survival depended on forging alliances with more

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[50] Otherwise, empty baskets were more easily carried with the strap hanging casually in front of the wearer.

powerful "parent villages". This, in turn, created a need to produce agricultural surpluses that would have to be paid as tributes to their protectors. Cultivation was concentrated in fields near the relative security of the village. An excerpt from an Assam Administration Report in 1899-1900 provides a clear example of how the threat of attack limited cultivation:

> "The biggest raid which was reported was a raid by Yajim on the village of Kamahu. Yajim took sixty heads, mostly women and children. Nearly all the villages are very strongly defended, and on account of the hourly dread of attack, very little cultivation can be done, except in the immediate vicinity of the villages." (Anonymous, undated-a)

The most distant fields were, of course, the most risky to cultivate, and thus often left idle. There are frequent references to "no man's lands" left as buffers between warring villages, which neither side dared to cultivate for fear of provoking attack.[51] The net effect of all this was an artificial shrinkage of the pool of land available for cultivation, and increased use pressures on lands closest to the village. Although walking time always limits how far away it is practical for a shifting cultivator to open fields, the added threat of losing one's head would have been a compelling reason for staying close to home!

Although fields were selected with security in mind, there was still no guarantee that they would be able to cultivate them unmolested. Along with the usual threats of bad weather or predator damage that make shifting cultivation a gamble in ordinary circumstances, Naga farmers had the added uncertainty of whether fighting would interfere with proper management of their crops. Kennedy cites one such example from the Southern Angami area:

> "Khuzama is still afraid of another attack from Sopvoma. All the crops out here look well, except the Khuzama sali dhan [rainfed lowland winter rice], which was planted out too late, as they were afraid to go to their fields for some time after the row with Sopvoma." (Kennedy, 1900a, 1)

Sometimes the crops themselves were the targets of punitive raids, as mentioned in a 1934-1935 report:

"Across the frontier, the village of Choemi raided the fields of the British village, Laruri, owing to the latter not having paid tribute as demanded by the former, and did considerable damage to the standing crops." (Anonymous, undated-b)

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[51] When British administrators were out on tour, it was difficult for them to travel between warring villages, as neither paths were opened nor could coolies from one village carry their loads all the way to the next. Hutton (1926d, 14-15) provides a glimpse of the negotiations involved.

Figure 4-4. “Usually a party of braves would go out either to snatch a head or two from a sleeping village or, more commonly, to try to rush the sentries guarding a party working in the fields, and fall upon the screaming women as they scattered.” (Mills, J.P. 1982, p. 157) Artist’s perception of a jhum field being scouted in preparation for attack, as unaware warriors stand guard on the field perimeter.

It was well known that damaging its food supply was one of the severest punishments that could be inflicted on an enemy. In other cases, fighting was so severe that they had to give up trying to cultivate their fields.[52] This was particularly true if the fighting was between khels within a single village. These were often the bitterest disputes – and the close quarters of the quarreling parties meant that anyone straying away from their khel to work in their fields could be quickly noticed and attacked. Here, Tuensang provides a good example of the effects of such internal fighting on a village's ability to feed itself:

> "Tuensang seems to be at peace with its neighbors for the moment but the "khel" feuds are still bitter. Once the whole of Tuensang was involved in such civil war; they could not even look after their fields for a whole year and in the end were near starvation." (Mills, J.P. 1936, 63)

Weaker villages that did not dare to cultivate their fields were sometimes forced to abandon their village sites altogether to avoid starvation.

Outside players had also added to conflicts over land. Meithei Rajas (Manipur) had long followed a policy of recruiting the nomadic Kukis for their army, and settling them to form a buffer against the troublesome Nagas. Later, in the 19th century, the British continued this same practice when the expansion of tea plantations in the foothills brought them into increasing conflict with the Nagas. They intentionally encouraged the settlement of Kuki tribal groups adjacent to British territory, particularly in the North Cachar Hills, with the hope that it would reduce Naga attacks on British subjects (Changkiri, 1999, 64). This effectively pitted the Kukis against the Nagas.[53] The newly arrived Kukis had guns that allowed them to bully weaker Naga villages and push them off their land. Dundas' diary from a tour through Eastern Angami (now Chakhesang) area in 1907 documents many examples of Nagas suffering at the hands of the Kukis .

The proliferation of guns in the Naga Hills became pivotal in the balance of power between villages and, as noted by Pawsey in 1939, emboldened their owners to expand their lands under cultivation:

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[52] An example of the almost total diversion of labor from farming to fighting during times of war is provided by an 1876 diary (Badgley, 1876, 17).

[53] This old practice of playing one tribe off against another eventually erupted in a Naga-Kuki ethnic conflict that raged between mid-1992 to 1996, mostly in northern Manipur, and claimed over a thousand lives, many burnt villages, and created tens of thousands of internally-displaced on both sides. Since India's independence, Naga insurgents have fought for an independent Naga homeland called "Nagalim", which would encompass not only current-day Nagaland state, but also parts of neighboring states including Myanmar where large populations of Nagas have traditionally lived. The Nagas accuse the Kukis of siding with Delhi in opposing Naga independence. For their part, the Kukis also seek an autonomous (though not independent) Kuki homeland. But their history of settlement as a buffer against the Nagas has left the Kukis widely dispersed and forming a majority in only a few pockets of land, primarily in Manipur. Some of the areas of Manipur that the Kukis wish to include in their territory contain large Naga populations, areas that the Nagas consider as part of Nagalim. And so the seeds of conflict were sown by the policies of first the Manipur Rajas and later the British, in using the Kukis as a bulwark against the turbulent Nagas.

> "All the villages to the east of the Yangmun now have large numbers of guns. The result is that they are able to cultivate right down to the river whereas there is a thick belt of heavy jungle to the west of the River, as the villages in the Control area who are not armed, dare not stand up to them." (Pawsey, 1939a, 24)

These effects on land use were later confirmed by changes that were observed after the British began enforcing law-and-order across the Naga Hills. Not surprisingly, it was the weaker villages that were most eager to throw themselves under the mantle of British protection. Maitland (1880) noted that the increased security that villages enjoyed by becoming British subjects allowed them to bring more distant lands under cultivation that previously would have been too risky:

Not only the more distant fields, but also the "no man's lands" that had previously been set aside as buffers between hostile villages, could now be added to the pool of cultivable land. (Porteous, 1890: 7-8) noted that settlement patterns became more dispersed after peace, as strong village fortifications and safety in numbers were no longer necessary for survival.

The process of gradually pacifying the Naga Hills continued and ten years later, at the turn of the century, Allen surveyed the results with obvious satisfaction:

> "One is glad to think that their material prosperity has greatly increased since our advent to the district. … Their lives being secure, they can cultivate at greater distances from their villages than formerly. Their cattle, too, are safe from hostile raids, and can be pastured on the best grazing grounds, however far from the village. Judging from the anxiety of tribes outside our border to be brought under our control, our rule appears to be popular among Nagas, and I think the older men enjoy the security of life and property which now obtains. It is, however, inevitable that the younger men should regret that the paths of glory are closed for them." (Report of the Deputy Commissioner in 1901-1902, as cited by Allen, 1981, 56)

The picture that emerges is thus one of expansion of communities, cultivation, and grazing lands as the threat of attack abated.

The Influence of Warfare on Agricultural Labor

We have already seen that although villages were fashioned as fortresses, people became easy targets as soon as they ventured out to work in their fields (figure 4-5). Their attempts to mitigate this threat were essentially threefold. Firstly, they opened up joint cultivations since working in groups was the only method that offered any safety to individuals. Secondly, they placed panjis- spikes placed in the ground -around their fields that would slow down and possibly injure any enemy that, lurking in the adjacent forest, tried to rush them by surprise.[54] And finally, escorts of armed warriors accompanied working parties to the fields and stood watch over them as they worked. This created a natural division of village labor, with men as the fighters and women as the farmers.

The Division of labor, between Men and Women

The reluctance of Naga men to pick up a hoe and work alongside their wives was eloquently captured in a small story recorded by Godwin-Austin in 1873:

> "In going down the hill we walked along with a Tangkol and his two wives, they carrying the hoes and baskets. I was rather amused in the abrupt way he stopped on arriving at a field on the roadside and motioned to them with a grunt to commence their hoeing work which they quickly began without saying a word, their lord and master apparently not having the slightest intention of doing anything in that line himself." (Godwin-Austen, 1873)

Even as they returned from the fields, it would be unthinkable for the men to burden themselves by helping the women to carry their heavy loads of tools, harvested crops, firewood, and often a toddler or two. They had to walk unencumbered, their shields and weapons held ready to repel any attack. Many British officers remarked on the hard work of Naga women and its toll on their health (See Butler 1875b, 303). It was uncertain if even death would allow the women to escape the drudgery of their daily lives. When a Naga woman died, "her basket in which she carried her loads, her rice-pounding mortar and her weaving sticks" (Waddell, 1986, 24) were placed on her grave for use in the next world.

Interestingly, some writers seemed to equate women's hard work with a high status in Naga society. One can not help but suspect that Woodthorpe was writing "tongue-in-cheek" in 1881, when he noted:

> "All the weaving, a good deal of the work in the field, such as preparing the soil, &c., carrying wood, and pounding rice, is done by the women. In fact, women's rights are fully recognized, the men doing very little besides drinking and fighting." (Woodthorpe, 1881)

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[54] Kennedy, in 1900, cited an example of how fields were routinely booby-trapped to slow down would-be attackers

> "Kyeku's son, Peto, complained that one of his people had been wounded by a panji placed in the fields of Ghukui's (Sakhai's son) village. Ghukui was present. It seems that both villages, which are beyond our boundary, panji their fields, and one of Ghukui's people was wounded before by a panji placed by Kyeku's people. As both parties are beyond our jurisdiction, I could only recommend them to give up the practice of panjiing their fields. The whole difficulty arises from the old land dispute between the two villages, which has not yet been settled." (Kennedy, 1900b, 3)

Figure 4-5. "Kyêku's people congregated in concealment above a jhúm, where numbers of unsuspicious men and women were at work, and suddenly charging down the jhúm dispatched the seventeen persons in a few minutes. In their efforts to escape, the unfortunate people threw away their baskets and other encumbrances, which were still lying in the jungle close to the jhum." (Cole, 1897, p. 3)

This positive appraisal might, in part, be due to inevitable comparisons with even grimmer conditions of women in the Indian lowlands. When (usually) outsiders advocate a "women's rights" agenda in Nagaland, Naga (usually) men like to point out, with some justification, that the Naga Hills are not like the Indian plains and Naga women do not have to deal with a caste system, do not have to pay dowry to their husbands' families, or worry about their saris being set on fire if their in-laws are not satisfied with the amount received.

More recent writers have proposed other explanations for how work is divided between Naga men and women. Das proposed that it is the tool that determines who picks it up and does the job. "By and large work involving the use of the dao (a long-bladed, thin-handled, broad-fronted chopper) or the spear (as in hunting) is mainly done by men" (Das, 1976, 9). Alternatively, Souza suggests that the location of the work determines who does it:

> "Forests are the realm for the work mainly of men, while fields are the arena where mainly women toil. Thus there is a fairly clear division of roles in the work of men and women, with men concerned about forests and women about fields, including terraced fields. Although the two spheres, namely forests and fields, are not mutually exclusive, the separation between them is clear." (Souza, 2001, 54)

There is, of course, a great deal of congruence in these two assertions, since the forests, that Souza claims as the domain of men's work, is the site of most cutting (dao) and hunting (spear). It also raises interesting questions about how, through the centuries, the gradual shift in emphasis from forests to fields has affected the division of labor between the sexes. Both explanations ring true to a large degree, but the division of labor between the genders that we see in Nagaland today is firmly rooted in its headhunting past.

KHONOMA UNDER BRITISH RULE

Trading replaces Raiding

The defeat of Khonoma in 1879 was a turning point in British efforts to administer the Naga Hills. The process of pacification and extension of British rule over the Naga Hills continued steadily and by 1905, the Angami had largely ended headhunting and warfare. However, even with the British enforcing law-and-order, Khonoma was still able to exploit its feared reputation and demand tribute from weaker villagers for many more years.[55] But as looting and raiding dried up as sources of off-farm income, Khonoma had to find other ways of supplementing its

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[55] Notes written by Mills while touring through Zeliangrong area in 1927 – almost half a century after the fall of Khonoma – show that Merhümia khel, in particular, still retained a remarkable ability to intimidate its neighbors (Mills 1927: 5, 11, 15).

agricultural production.. With the expansion of cart trails and suppression of warfare, it was both easier and safer to move around the Naga Hills. As Khonoma's raiding dwindled, its trading expanded to fill the gap and by 1904, its villagers were traveling as far as Bombay, Calcutta and Rangoon for trade. By the time Hutton was writing about the Angami (1913-1915), he estimated that almost half of Khonoma's economy was based on off-farm income (1969, 102). Trading was replacing raiding as the relief valve for Khonoma's land shortage.

Trading Prior to the Arrival of British Administration

Before the imposition of British law and order, there had long been extensive trade between the villages of the Naga Hills, and far beyond. But it was a trade that went hand-in-hand with conflict. The first British patrols into the Naga Hills returned with stories of a savage people living in fortress-like villages on lofty mountain ridges. No overarching system of tribal government bound them together. Rather, each acted as a republic, largely self-sufficient in its own needs. They were separated not only by rugged mountains, but also by constant warfare and headhunting. Despite this suggested isolation and subsistence economies, it would have been a mistake to view Naga villages as "islands" entirely disconnected from the wider region. For instance, many of the necklaces used by the Angami as part of their traditional dress were made from cornelian sourced not only from Bangladesh but also from Gujarat, on the opposite side of the Indian subcontinent. This shows that trading links had existed for a long time. Further evidence of this are the cowries and other shells that featured so strongly in Angami dress. They had to have been imported from coastal areas.[56]

Indeed, evidence dating back to the late centuries B.C. shows that the Brahmaputra valley was one of the earliest overland routes for socio-economic and cultural relations between China and the Indian subcontinent (Mukherjee, 1992). Amongst the products that North East India itself exported were silk, black aloes wood, sandalwood, cinnamon, gold, ivory, cotton and rhinoceros horns. Some of these, such as the highly-valued aloes wood, were procured from the hill forests and supplied to traders in the plains – who then exported them through the valleys to other parts of India and the outside world (ibid, 92).

Militarily powerful villages like Khonoma were able to demand tribute from weaker villages over wide areas. It could be argued that this was essentially a trade in goods for the protective services of the more powerful village. These tributes, along with the spoils of war, must have made a significant contribution to Khonoma's economy. This was supplemented by raids on the plains in search of iron

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[56] Mukherjee (1992, 59) cites evidence that cowries were imported from the Maldive islands to the coastal area of what is today south-central Bangladesh. From there, he speculates, the cowries were taken to the Brahmaputra valley where they would have been traded to Nagas and other hill-dwellers. Cowries were used as currency in the kingdom of Kāmrūpa in the proto-mediaeval age (ibid).

and other commodities in scarce supply in the Naga Hills. Prisoners captured could also be held for ransom or sold as slaves. There was reported to be a brisk trade in such kidnapped children, usually Angami or Lhota, to Kuki buyers (Anonymous, undated-a).

But apart from the plunder of warfare, commodities were also being exchanged under fairer terms of trade.[57] Khonoma's war expeditions had exposed them to a wide area of surrounding countryside and propagated extensive contacts in allied villages. These were cultivated as markets. Significantly, Khonoma's feared reputation provided a mantle of protection that allowed its traders to move more freely with less fear of attack. Attacking a Khonoma trader would have been a suicidal move, in view of certain retaliation by his clansmen! There may also have been positive feedback from Khonoma's trading to its ability to wage war. Khonoma's trading expeditions into the plains allowed it to develop relationships with Manipur and Assam Rajas, who are believed to have provided Khonoma with guns before other Naga villages, and even with military cooperation. Naga villages were designed for protection against attack by dao and spear, but many were vulnerable to musket fire. Early access to guns thus helped reinforce Khonoma's hegemony over the Naga Hills.

Trading often continued side-by-side with fighting. This was possible because entire villages were seldom at war with each other, but rather hostilities were usually at the khel level. Each village's component khels were sufficiently independent in their affairs and alliances that while some khels of neighboring villages might be locked in bloody combat, the other khels often remained on friendly terms and continued to trade. In other cases, fighting erupted over trade itself. This usually started with villages on the outer slopes of the Naga Hills that overlooked the plains below. Those strategically located along the main travel routes profited by acting as middlemen in the flow of goods between the plains and mountains. But fighting often broke out when interior villages tried to bypass the middlemen and trade directly with the plains. The most powerful villages were able to monopolize trade and force smaller villages to deal through them. In his 1841 writings Robinson, 1975, 384 [first published in 1841]) described the various Naga sub-groups jealously guarding their trade routes.

A later Assam Administration Report in 1884-1885 pointed out the hegemony of larger villages over trading amongst the Ao Nagas:

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[57] It is suggested that the Kukis may also have sometimes facilitated this by acting as middlemen in the flow of goods between Naga villages that were hostile and would not otherwise trade directly. The semi-nomadism of the Kukis positioned them to play this role. They are not part of the Naga ethnic group, and thus would have been outside the fray of internecine quarrels that divided Naga villagers. This, and the fact that the Kukis had guns before the Nagas and were feared, allowed them to travel between villages without being attacked. This allowed them to see and take advantage of trading opportunities that the Nagas could not.

> "The smaller villages are not allowed to trade direct with the plains, but are compelled to purchase salt and other imported articles from the more powerful trading communities. (Anonymous, undated-a)

Attempts to monopolize trade continued to be a common source of conflict for many years to come. Almost half a century later, Hutton cited trading conflicts as still being one of the three main causes of war amongst the Sema Nagas.

Expansion of Trading After Arrival of the British

The Khonoma-led revolt against the British in 1879 and the village's surrender from the heights of Chakka Fort the following year marked a turning point in Nagaland's history. Almost a year later, in February 1881, the British administration decided to retain its position in Kohima, setting the stage for the progressive establishment of peace and order and the quiet submission of the Nagas (Anonymous, undated-b). With Khonoma subdued, other less powerful villages quickly fell into line.

Although those villages that had enjoyed privileged positions in the local pecking order no doubt resented the British intervention, the peace that followed was welcomed by many Nagas. Even the turbulent Angami were aware that fighting was keeping them from advancing economically. When, in 1870, after observing the spacious houses, large herds of cattle and full granaries of Merima, John Butler commented that it appeared to be far more prosperous than any of his boasted Angami villages, the shrewd retort of his Jotsoma companion was telling:

> "Merheemah [Merima] has been conquered by Munipoor [Manipur] and is protected by Manipor and the spear to them is almost forgotten, but who protects us? The Angamee is always at war and has scarcely lived either to sow or to reap. How can he be rich? Let the Sahib stop our fighting and then see." (Butler, 1870b)

As tribal fighting was suppressed, a security hitherto entirely unknown fell over the Naga Hills and battlefields were gradually turned into marketplaces.[58] This was hastened by the construction of cart roads as arteries of communication that allowed trading excursions between the hills and plains throughout the year. The Angami left behind their old habits of levying blackmail and turned eagerly to trading. Many spent enough time visiting the plains that they even picked up a fair degree of fluency in speaking Assamese.

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[58] Hutton described an interesting example of this transition from fighting to trading in a 1926 tour diary:

> "Ukha, across the river, arranged to hold a bazar with Hukpang, Pongu, Yungphang, etc. on this side under our aegis and a number of villages who could normally never venture to have visited one another turned up in force in the river bed and bartered daos for salt, etc. The Ukha women even came down and the river bed was filled with a most picturesque concourse of hostile people in their best clothes trafficking in a perfectly friendly way – probably the first meeting of its kind ever held at all in this neighborhood." (Hutton, 1926e, 8)

Exports from the Naga Hills. Cotton was overwhelmingly the major export from the Naga Hills, along with small amounts of other crops (chillis, ginger, oranges) and forest products (rubber [tapped from *Ficus elastica*], cane, lac and agar). Cotton was grown mostly by the Lhotas, Rengmas, Semas and Mikirs on the warmer lower hills. It was estimated that 1200 maunds[59] of cotton were brought down to Golaghat in 1882-1883 alone (Anonymous, undated-a). Both the Nagas and their trading partners in the plains appear to have quickly picked up the finer points of sharp trading practices. The Assistant Commissioner eventually took steps to establish a cotton market to regulate trading and try to protect the Nagas from being cheated (Anonymous, undated-a). Although significant amounts of cotton were used by the Nagas themselves for weaving, these local markets began to dry up under competition from cheap mill-made yarn imported from outside As transportation became easier, cloth was amongst the commodities that could be imported cheaper from outside areas that enjoyed the advantages of more mechanization, a cheaper labor force, and economies of scale. Even before WW II, outside producers were already imitating Naga patterns and flooding the market with cheaper copies:

> "Visited Ghakwi. In the afternoon, heard some miscellaneous cases. There is nothing of any special importance, excepting that Kohdo DB reports that Semas are frightened that shops in Kohima and Mokokchung are going to sell machine made cloth, according to Sema patterns, and so undersell theirs." (Lambert, 1938)

Labour also became a major export from the Naga Hills, as large numbers came to the plains to seek work every cold season – a time when their own farms were less busy. Many laboured in tea plantations, mostly clearing the jungle and building huts (Anonymous, undated-b). Some worked at coal mines, although they refused to enter the underground galleries (Anonymous, undated-a). Large numbers worked for the Public Works Department in building or repairing cart roads, and others cleared jungle for the railway (Anonymous, undated-b). Iron rails and other iron railway materials often disappeared from the Assam Railway and Trading Company's collieries and were spirited back up the mountains where they were hammered over Naga anvils into tools and weapons (ibid).

To some degree, the Nagas' visits to the plains were encouraged by the need to earn cash to pay their annual house tax. With the major exceptions of cotton and some oranges, their farms produced only for their own needs and cash had to be sought off-farm.

Imports from the Plains. As this uplands-lowlands commerce developed, the commodity that most Nagas prioritized in carrying back up the hills with them was

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[59] A "maund" is a unit of weight used on the Indian sub-continent, with a value that varies from place to place, but is often equal to 37 kg.

one in great demand but that could not be produced on their own farms – salt.[60] Illustrating the importance of salt, one of the first confidence-building measures in efforts to pacify the Nagas, as early as 1841, was to comply with their request that a salt depot be established at Dimapur (General Staff, India, 1930, 4; Hazarika, B.B., 1987, 282). As an Assam Administration Report observed in 1882-1883, the cotton that the Nagas brought down with them was often bartered directly for salt:

A notation in a 1944 diary indicates that in the Naga interior, salt continued to be a more widely-accepted form of currency than cash, even up to WW II:

> "To Chingmei (16 miles) – met the Chingmei Scouts en route. The Scouts are complaining that they have so much work for government these days that they cannot do their own cultivation, and that they cannot get people to go to their fields for money. This is true, and the only solution is to pay them in salt instead of money – with salt they can get hired labour." (Adams, N.N., 1944)

Large quantities of rice were also carried back (Anonymous, undated-a), seemingly pointing to rice deficits in some Naga villages. Other items on their shopping lists included iron, daos, beads and ornaments, fish, cattle and to the concern of British officials, guns. The same Assam Administration Report remarked in 1882-1883 that "both the Angami and Lhotas are active traders, though the former export hardly anything" (ibid). The Angami appear to have acted more as middlemen in buying and selling, rather than as primary producers for the market. Table 4-1 shows the steady increase in salt, cattle, and beads and other ornaments imported by Angami traders in the years after the fall of Khonoma.

Like other Naga subgroups, the Angami were also heavy importers of salt. Evidence of this can be found in an observation in the Assam Administration's Report of 1882-1883: "The twelve Kohima traders imported Rs 77,000 worth, chiefly salt" (Anonymous, undated-a). But the Angami also engaged in internal trade with neighboring Naga subgroups. Cattle imported from the plains and mithun, usually bought from the Zeliang, were in turn sold to the Semas and Lhotas (ibid). The large purchases of beads and ornaments were traded mostly with the Chakhesang, for which they received fowls, pigs and dried fish in exchange (ibid).[61]

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[60] There were brine wells in many parts of the Naga Hills that were highly coveted and fought over, but the supply was not nearly sufficient to meet demand. These wells were dug in areas where the groundwater had a slightly saline taste, and lined with hollow tree trunks. Brine drawn from the wells was placed in bamboo containers and heated over mud stoves until all the water had evaporated and only salt crystals remained. (Anonymous, undated-b)

[61] The barter system continued to take precedence over cash payments for many years to come, particularly in the more remote areas. Hutton referred to this in 1923, while explaining how Naga villages paid fines:

> "14th [February, 1923]. … There is very little coin in circulation here [Thachumi, on the eastern frontier]. Mithun is of course everywhere recognized as suitable medium for the payment of fines, but one was paid in cloths and another payment started in rupees, proceeded with spear heads

Table 4-1. Intended Purchases by Angami Naga Traders Leaving the Naga Hills District, 1882-1887

	1882-3	**1883-4**	**1884-5**	**1885-6**	**1886-7**
Number of Passes†	425	394	475	339	186
Number of Nagas	2,491	2,136	2,722	1,864	3,122
Imports	**Value of Imports *(Rupees)***				
salt	20,000	8,027	n.a.	6,469	10,850
cattle	n.a.	4,610	7,890	10,327	14,765
beads/ornaments	n.a.	7,800	n.a.	22,037	28,000
all other goods	n.a.	6,367	n.a.	4,550	4,427
Gross value (Rs.)	35,662	26,804	40,965	43,383	58,842

Source: Extracts on Nagas from 'Assam Administration Report', 1882-1891

† At that time, the British enforced a regulation that the Angami had to obtain passes before leaving the district for trade. Those records are the source of these data

Nagas living close to the plains of Cachar and Manipur were in constant communications with the plains and had long ago lost the ferocity of their cousins in the more distant hills. Trade quickly followed as both roads and peace-and-order were pushed into the interior hills, and by 1892, an Assam Administration Report observed of Sema villages in the Doyang valley, "… cash, of which three years ago they had none, is now to be found in most villages, a sign that habits of trading are being developed in the country" (Anonymous, undated-b). With the increased flow of goods in the 1880s, prices also began to fall and become more affordable. Potatoes that sold for Rs 15-40/maund in 1883-1884, for example, had fallen to Rs 6-10 by 1886-1887 (Anonymous, undated-a).[62] In 1887-1888, an Assam Administration Report noted the increased use of lowland products in the Nagas' everyday lives:

> "Here and there, one finds a Naga who has replaced the rude and uncleanly earthen or wooden vessels in almost universal use for eating and cooking purposes by metal utensils. In the large villages near Kohima, such articles as umbrellas and matches are in fairly common use, while the steel needle has taken the place of the primitive bamboo implement with which all sewing was formerly done." (Anonymous, undated-a)

By 1920, transfrontier Naga villagers outside British territory were traveling to shops at Mokokchung and Kohima to buy iron, salt, cooking pots and other necessities of life (Cantlie, 1920b).

> and concluded with a pair of red cane leggings. The payee took it as a matter of course." (Hutton, 1923a)

Trade wars were also known to sometimes break out between the producers of various commodities (see Bor 1942:2).

[62] To provide a measure of the value of money at that time (1886-1887), the wages for a day's work in Angami country were eight annas (Anonymous, undated-a). 1 Rupee = 16 annas.

As trade expanded, it became an increasingly powerful way for the government to exert nonmilitary pressure on unruly villages. If they committed any outrage, the pass used by the offending village or tribal group in their descent to the plains could easily be blocked, thus debarring the Nagas from visiting the bazaars in the plains until they made amends with the government. The topography and system of mountain passes that all Nagas depended on in visiting the plains made these economic blockades relatively easy to put into effect. The British had in fact been using this strategy since the mid-1800s, at a time when they had withdrawn from the Naga Hills.

An 1884-1885 Assam Administration Report concludes, with evident satisfaction, that:

> "The introduction of a settled Government into the Naga Hills has been followed by the development of trade, the cessation of intervillage wars, an extension of cultivation, and marked improvement in the condition of the poorer classes. A taste for the luxuries of civilisation has also been engendered, and Angami Nagas now invest in umbrellas, tobacco, and sugar. The great demand for labour has caused a large sum of money to pass into the possession of the inhabitants of the district, and this has been invested in cattle and in the opening out of new land, all tending to the increase of general prosperity." (Anonymous, undated-a)

Yet in contrast to these rosy assessments, a 1931 report by the then Honorary Director of Ethnography to the Government of Assam, J.P. Mills, outlined in rather stark terms some of the negative consequences that followed the opening of the Naga Hills to outside influences. Mills lamented, amongst others, the disappearance of Naga culture in favor of all things foreign, the breakup of the family unit as Nagas began working away from their villages as casual laborers, the substitution of rice beer with hard distilled liquors, the introduction of diseases, the spread of opium use, prostitution, and other social vices, and that young Nagas were receiving the wrong type of education that left them unfit to work in either their fields or Government service. This essay contains so many interesting observations little reported elsewhere that it has been included in its entirety in appendix 3-11.[63]

The Arrival of Christianity

As well as the British administration and its achievement of peace and order, the other major catalyst that brought tremendous change to the Naga Hills was the arrival of Christianity in the late 19th century.

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[63] In the later years of his career, Hutton also wrote widely about the perilous future of minority groups as they were incorporated into the wider Indian nation and exposed increasingly to outside influences. Many of his comments drew on his long years of experience with the Nagas. See Hutton, 1927-30; 1938; and 1941.

Traditional Religious Beliefs

Before this, the Angami had their own religious beliefs that permeated every aspect of their lives. They honored a supreme God known as "Ukepenopfü", translating literally to "*she who bore us*" (Meyase, S., 1985, 59). The soul was believed to not perish with the body at death but to continue on to a higher place, possibly becoming a star (Meyase, S., 1985, 91).[64] Ukepenopfü was viewed as benevolent and too powerful to bother interfering in the day-to-day affairs of mankind. Of more concern were the many spirits and deities, called terhomia, that were thought to be everywhere in the environment and play a direct role in people's everyday lives.[65]

Terhomia could be either good or evil. The Angami were constantly aware of the power of these spirits and the need to appease them through ceremonies and offerings.[66] The benevolent spirits were appeased to obtain more blessings, and the evil spirits to ward off disease, death and crop failure. In the absence of alternative explanations, almost all suffering, illness, misfortune and death were ascribed to the influence of evil spirits (Meyase, S., 1985, 59). Likewise, any event seen as unusual or ominous (table 4-2) would call for a genna (taboo), during which work in the fields and contact with the outside world were forbidden, and special ceremonies were performed to appease the spirits. Village priests called zievo-u were the religious leaders and conducted most magico-religious functions and announced the dates of public religious ceremonies. Most of these religious ceremonies were designed to protect the crops in the field and warriors in battle. Their religious beliefs were central to almost every aspect of Angami lives – and changes in those beliefs would have profound socio-cultural impacts.[67] Traditional rituals associated with first sowing (tsiekrü) and first harvesting (liedepfü) of jhum fields have already been described in chapter 2. Different rituals were associated with wet rice cultivation.

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[64] Khonoma's only remaining zievo-u (traditional priest) explained that after death, there are several different paths that the soul may travel, depending on his or her conduct in life. There are separate paths for those who had done mischief in the world, for those who had been honest, and for those who had done good things. There may be some kind of court, he suggested, to decide which path should be taken (Chase, D., 2001). It is unknown how much these beliefs have been influenced by the teachings of Christianity.

[65] Large or unusual stones were often believed to be inhabited by spirits. A rock formation with an uncanny resemblance to a human face can be found high on a cliff behind Khonoma (plate 4-12). Before the spread of Christianity, Khonoma's ancestors knew it as shükhie-u – the spirit that controlled all wild animals. When setting out for the forests, hunters would pray for shükhie-u's blessing, promising it a share of the meat if it granted them success. Successful hunters would then cut an ear off their kills and leave it in the forest as an offering to shükhie-u. Failure to do so, it was believed, would cause the meat to shrink or not taste good.

[66] See a selection of prayers in appendix 3-10.

[67] Further readings on the traditional religious beliefs of the Nagas can be found in Hutton, 1969, 177-186; Longchar, 1995; Terhuja et al., 1997; Epao, 1998, 37-88; and Lotsüro, 2000, 19-27.

Traditional Rituals for Wet Rice Cultivation

After the laborious days of field preparation and puddling of the wet rice terraces in April and May, there was a brief hiatus as the old man appointed as “first sower” performed the necessary rituals. This usually took place on the second day after the Thekranyi festival, in late May or June, but would be delayed if there was a death in the village – in which case the village would first have to observe a one-day genna during which work in the fields was prohibited. Only then could the first sowing ritual be performed. Like all festivals and rituals, it would be announced in the thehou the evening before and the news then yelled from one thehou to the next.

Table 4-2. Unusual Events that were Deemed Inauspicious and Required Compensatory Gennas*

- A death in the village;
- The deaths of two people in the village on the same day;
- Somebody that has gone to the field to cut firewood receives a leg injury sufficiently serious that he can no longer walk and must be carried back to the village (rüza zha);
- A person being shot by mistake (themou zha) (If the wound is fatal, then the shooter and his entire family must move away from the village for 7 years.);
- Accidental shooting of cattle or mithun (mistaken for deer);
- Accidental burning of a house (kiru kitho);
- Accidental burning of graves (mekhru kerie);
- Accidental burning of grain (cadi kerie);
- A roof being blown off;
- A girl climbing up on the communal bed (kishüzhü) in a morung;
- Cattle or pigs clambering up onto the bed in a morung;
- While transplanting paddy, seedlings are accidentally dropped into the river and swept away in the current (thichü kepeju);
- While harvesting paddy, a field accidentally catches fire and burns some of the paddy crop (thibie kerie);
- While drying paddy spread on mats in the sun, strong winds arrive and blow the paddy away;
- Excessive rain;
- Destruction of crops or houses by fierce winds;
- Unusual darkening of the skies during the day;
- Drought, or other harsh weather;
- Damage to fields by landslides (cadi keme) or floods (dzü lieva);
- An eclipse of the sun or moon (should not do anything for two days, not even collect firewood);
- A big landslide;
- The appearance of a comet; or
- An earthquake.

* *Sources*: Dovihu Chase, Khonoma zievo-u (plate 3-224); Terhuja et al. (1997)

An elder of Merhümia khel, 74 year-old Theyiehezo Zetsuvi, was the first sower for the entire village at the time of the field studies.[68] Theyiehezo was elected as first sower by those in the community still following traditional beliefs

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[68] Many Naga elders are uncertain of their exact age, but Theyiehezo recalled his birth as the year before the old Merhümia khel gate was pulled into place. This event provided him with a historical signpost for calculating his age. The date is corroborated by an entry in Hutton’s tour diary (Hutton, 1929a).

since, in his words, "there were no older men available". Amongst the Nagas, the first sower was usually a man and the first reaper a woman. This was probably related to the widely-held perception that "men are the seeds; women are the soil." Being construed as "seeds", it then followed that the first sowing should be performed by a man. And since women were the nurturers, then this was ritually represented in women being the first reapers (Aier, 2001). There was also a saying amongst the ancestors that less food would be eaten when it was served by women – so their food reserves would last longer. This was sometimes cited as an additional reason why it should be women who did the ritual first reaping and preparation of the food.

There were also ecological reasons underlying the division of ritualistic responsibilities between the khels. The first sowing ritual (tekhusekhrü) was performed by a representative from Merhümia khel, while Semomia khel took responsibility for the first harvest ritual (liedepfü). The explanation for this lay in the position of each khel's paddy fields on the landscape. Most of Merhümia khel's rice terraces lay in the upper end of the valley (known locally as the Ketsaju Valley), where rice grew more slowly in the colder conditions. If transplanting was done too late, then the rice would fruit less because of the cold weather. Hence, Merhümia khel farmers had to begin transplanting earlier than their neighbors, so the timing of the first sowing ritual had to accommodate this ecological limitation. It thus made sense that responsibility for the first sowing ritual should lie with those who nature compelled to plant first. But in the warmer area further down the valley where Semomia khel had its terraces, the rice developed more quickly and ripened earlier – even though it was planted later. Thus harvesting always began with Semomia khel and the first reaping ritual had to accommodate its timetable. If the roles had been reversed and Semomia khel forced to wait until Merhümia khel's rice was ready to harvest before the first reaping ritual was performed, then Semomia khel's crops would have become over-ripe and damaged by lodging, shelling out, birds and so on. Conversely, if Merhümia khel had been obliged to wait until Semomia khel was ready to transplant before the first sowing ritual was performed, it would have been past the best time for Merhümia to be transplanting and their yields would have fallen.

The first sower would rise early in the morning on the selected day, and hasten alone to his rice nursery to pull up a handful of rice seedlings. These he would take to his paddy field and transplant while incanting a prayer to the supreme power, Ukepenuopfü (also known as Terhuo Rüsuo). This day of first sowing was genna and those who followed traditional beliefs refrained from any work. The first sower was constrained to remain quiet and avoid conversations with outsiders. It was believed that if he conducted the ritual properly, then the transplanting would progress smoothly that year.[69] The rest of the village could begin transplanting the following day. Some would also whisper prayers as they worked, but this was not considered necessary.

The exact timing of transplanting from year-to-year was of course dependent on when the rains arrived.[70] If they began at the normal time, transplanting usually began about May 20th. Most of the transplanting might be completed before the end of May in years when the rains began early – but it could be delayed until June by their late arrival.

The other major ritual associated with wet rice cultivation occurred at the other end of the growing season, when the village would again pause to seek the blessings of the spirit world. By now, the village would be abuzz with conversation about when harvest should start. At their collective nod, it was then the duty of the first reaper of paddy (Terhüliede) to hasten to her field to perform the necessary rituals.[71] This was announced through the thehou system on the evening before the chosen date. A pig was also sacrificed on the day before the first reaping ritual, and a piece distributed to every family in the village. A front leg of the slaughtered animal was given to the first reaper. She would rise early the next morning and gather the needed tools – a sickle (zhiekhwino), the bamboo flail used in threshing (lieda), a winnowing tray (jarü) and a basket (khodi) (see appendix 5-7). Covering her head and avoiding any conversation, she would move silently down the stone pathway to the terraces, a lone figure. Arriving at her terraces, she would begin by unwrapping some cooked rice that she brought along and tasting a small amount. The remainder was then mixed with one of three ingredients – earthworm castings (tsochü), soil from a termite mound (rüpu), or leaves of *Urena labata* L. (kuchü)[72] –

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[69] But if something had happened that could have been interpreted as ominous, then more gennas would have been required to try to appease the spirits and enlist their help in changing the course of events. If, for example, while performing his duties, the first sower inadvertently dropped some paddy seedlings into the water and they were swept away with the current, then this would have been seen as a sign that part of the rice crop would be lost that year.

[70] As well as the ritual first sower, some Angami villages also appointed a ritual specialist as their "rain-maker" (Raseo), to ensure reliable rainfall. Kikhi (1997) describes this in her home village of Viswema, where the ritual, known as Terase, was performed on May 18th every year.

[71] I refer to the first reaper as a female because this was traditionally the case. But Khonoma is now in the rather unusual position of having a male elder as its first reaper. There were apparently no suitable female candidates available within Semomia khel's dwindling population of believers in traditional religion. Dolhuvi Kimovi of Semomia khel has been performing the first reaping rites for paddy since his election by followers of the old traditions four years ago. There were also ritual requirements for his induction to the post. This normally would have involved the newly-appointed first reaper replacing the roof thatching on his house. But since his house roof was made of tin sheets, he instead went through the symbolic motions of collecting some thatch and tying it to his roof. A clean cock was then sacrificed by the zievo (village priest), piercing its neck with a sharp bamboo lance and trying to hit an artery. A strong flow of blood was viewed as auspicious. After then throwing the wings and kidney onto the road, the zievo took the rest of the bird to eat and returned to his home without speaking to anyone.

[72] The Angami view these as having "good names" and symbolic of qualities that they hope to see in the harvest. The earthworm castings are associated with abundance and fertility; the termite mounds rise from

and then wrapped in a banana leaf. Praying that the harvest would be blessed, she carefully tied the package to one of the rice bundles. This particular rice bundle would then be set aside until the entire village had finished harvesting. Her prayers would continue as she finally picked up her sickle and began harvesting. If her crop was still not ripe, she might harvest only a symbolic amount for the purpose of the ritual. But if it was ready, she could continue work until the entire field was harvested.

The rest of the village began their harvest the following day.[73] As for the first reaper, she had to remain close to her house and keep her head covered for the following three days. At the end of the harvest season, marked by the Tiekede festival, she would return to her field to harvest the solitary remaining rice bunch to which she had tied the package. As a final enactment of the ritual, she would present a full basket of rice to the first sower of paddy – as he was the one who had initiated the crop.

Only a dwindling community of believers in traditional religion these days continues to observe the first reaping ritual. The Baptist church has replaced it with a special thanksgiving service every September 25th. But regardless of whether they know their supreme being as "God" or "Ukepenuopfü", and regardless of their form of worship, the significance of the event is the same for all. Much of the former ritual elaboration of wet rice cultivation has slipped steadily into obscurity since the arrival of Christianity. Archer, for example, described a visit to Khonoma in 1946, during which he encountered earthen models of breasts erected to overlook the terraced valley during the Tsünyi festival in late August or September. They seemed to be intended to boost yields (figure 4-3).[74] Interestingly, the rice would have been around the milk stage at that point – a time critical to determining its future yields.[75]

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the ground in tall piles of pure soil, like the anticipated piles of newly-harvested rice; and *Urena lobata* is notable for its copious seeding, like the heavy panicles of a bumper rice crop that they hope to soon be harvesting.

[73] Anyone beginning their harvest before the Liedepfü had completed the ritual was committing a very serious offence. Hutton (1969, 456) noted that the penalty was expulsion from the village for seven years.

[74] That Hutton saw the same thing on a visit to Khonoma at the same time of year, but almost 20 years earlier, seems to confirm it as an annual ritual:

> "Outside the Semoma gate was a row of pointed cones of red earth on platform of the same. They represented breasts and were apparently intended to increase the fertility of the fields. Opposite were tiny miniature morungs beautifully built and miniature stepped pyramids in clay." (Hutton, 1928, 1)

[75] Hutton (1922b, 177-178) described another Angami Naga ceremony that entailed erecting two posts of phallic design in front of the ritual performer's porch and then throwing a young dog down from the top of the house roof. Before hurling it from the roof though, the unfortunate pup was given human attributes in the form of a spear and a piece of cloth. Tradition stated that this ceremony had been performed generations earlier by casting down a human being rather than a dog, and Hutton speculated that it had originally been a form of human sacrifice. He reasoned that the casting down of a victim from above may have been to encourage the fall of fertilizing rain.

After a Slow Start, Christianity Gains Rapid Momentum

The Angami are often described as a people who are slow to believe in something, but then after they have accepted it, equally reluctant to give it up. This seems to have held true in their reaction to Christianity. The first missionary to work amongst the Angami was Rev. C.D. King of the American Baptist Mission. His arrival at Samaguting in 1879 coincided with the outbreak of the Angami rebellion, forcing a delay in his work. The Angami proved to be unreceptive to Christianity and Rev. King earned few converts during those early years. It would have been surprising if it had been otherwise. The American Baptists were particularly strict in their expectations of Christian behavior. This included what can only be described as an obsession against the consumption of any type of alcohol – to the point that teetotalism was viewed as the ultimate measure of a good Christian (Mills, 1932). This alone would have been a large adjustment for Angami fond of drinking rice beer as part of their daily diet. But more seriously, the Church's insistence that everything relating to traditional beliefs was bad and had to be discontinued meant that the Angami essentially had to reject much of their own culture as a precondition to accepting Christ. They had to exclude themselves from communal rejoicing – the singing and dancing, the drinking and feasting which took place during festivals and were central to their identity as Angami.

Nevertheless, the first Khonoma villager accepted Christianity in 1897 – 18 years after the Baptists opened their mission in Kohima.[76] By 1904, Rev. Rivenburg was employing two evangelists, one based in Khonoma and the second in Jakhama village. The missionaries' eventual success probably owed much to their use of education, and often dispensaries, as a way to convert the Nagas to Christianity.[77]

Both education and medical services undermined the Angami's traditional religious beliefs. Most obviously, education provided alternative explanations for many of the natural phenomena that the Angami had previously attributed to the spirit world – planting seeds of doubt in their long-held beliefs. Medical science dealt traditional religious beliefs a further blow. The Nagas had long viewed sickness and death as punishment by the spirits for some wrong-doing. In their world view, religion and illness were inseparable (Meyase, S., 2001, 102). Sickness therefore had to be treated by the village priest, by sacrificing chickens or performing other rituals. When it became clear that modern medicines were both more effective and often cheaper in treating illnesses, this again shook the very foundations of Angami religious belief. This, in turn, undermined the role of the traditional priests and their influence within village life.

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[76] The Khonoma Baptist Church consequently celebrated its centenary in 1997.

[77] Not only did the missionaries open schools and provide the means for villagers to receive education, but Christianity also provided a compelling reason for wanting to be literate. Some older folks who were unable to attend schools taught themselves to read so that they could use the Bible and hymn books.

Adopting Christianity thus became seen as an effective route to access education[78], improved health[79], and generally an improved standard of living. This perception reflected similar trends in many other Asian minority groups which received Christian missions (Tapp 1989). It was reinforced when the first Christians in Khonoma became the village elite by virtue of their education. Some even became government officials. The villagers thus came to view Christianity as a stepping stone to a higher social status (Sanyü, 1994). S. Meyase adds: “It is regarded as fashionable to get education and become a Christian because [the] majority of the educated population are Christians” (1985, 127). Therefore the missionaries’ success rate grew not so much because of promised rewards in the afterlife, but rather because of substantial economic benefits in the present life.

Sweeping Changes that Christianity Brought to Village Life

Whatever their reasons for conversion were, the pioneers of Christianity in any village faced daunting consequences. Many were ostracized and driven away, sometimes by their own families and clans. Their neighbors feared that the entire village would suffer the spirits’ wrath if the Christians were permitted to discard the rituals and violate all the old beliefs. Any misfortune would be blamed on them. It was thus common for fledgling Christian communities to have to break away from their main villages and resettle nearby. These tensions appeared to have mounted as Christianity gained momentum in Khonoma, and by the second quarter of the 1900s, the Deputy Commissioner increasingly had to mediate between the two groups. A diary entry by Hutton in 1926 reveals the difficulties of trying to reconcile the two religions:

> “Much talk at Khonoma about Christians and gennas. The Christians having gone to the fields on a genna day recently, the millet has begun to die mysteriously, though it was looking extremely well before. It is true that

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[78] The links between Christianity and education are very clear in Nagaland. The Ao Nagas are probably the most commonly-cited example. They were the first of the Naga tribes to receive Christianity when Rev. E.W. Clark began preaching in Molungyimsen village in 1876 and opened a school soon afterwards. This gave the Aos a head start in education that, 130 years later, continues to give them an advantage over other Naga tribes. A disproportionate number of professional and government positions in Nagaland are filled by Ao graduates. The high frequency of Aos in government jobs was undoubtedly also aided by having an Ao Chief Minister [S.C. Jamir] for two consecutive terms.

Others draw comparisons between Khonoma and its neighbor, Mezoma. Although these two Angami villages have much in common, a striking difference is that Christianity gained a foothold in Mezoma (1943) 46 years later than Khonoma (1897). Interestingly, Mezoma also did not have its first university graduate (1971) until 47 years after Khonoma (1924).

Within Khonoma itself, Merhümia was ahead of the other two khels both in adopting Christianity and getting educated and continues to hold that advantage.

[79] Many Naga health problems at that time were related to poor hygiene. Christianity encouraged better hygiene because it meant that believers would get scrubbed up and change their clothes at least once a week – before attending the Sunday church service. Education played a similar role as students were taught to at least wash their hands and faces before leaving for school in the mornings (Meru, V., 2001).

> something has happened to the millet. It is not a visible insect but looks like too much sun, which under the circumstances is impossible, also it is affecting the lower leaves which are turning yellow whereas the sun would probably catch the tops first. (Hutton, 1926b, 14-15)

Religion had become an issue sufficiently divisive that Khonoma's Christian community was facing the prospect of having to move far enough away from the village to be outside its spiritual jurisdiction. As Christianity gained more converts, they were increasingly able to promote their new religion[80] and shrug off the prohibitions of the old.[81] In time, the tables turned, and the Christians were the dominant majority, able to dictate terms to those who declined to give up the old beliefs. The rate of conversions to Christianity rose rapidly in the years leading up to and after departure of the British.[82]

In a 1931 paper, Mills described at length the dramatic changes that Christianity was imposing on the very fabric of Naga society at that time. "As religion plays a part in every Naga ceremony", he wrote, "and as that religion is not

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[80] In 1929, Hutton cited an interesting example of the Christians' attempts to recruit more followers in Khonoma, while adherents to the old beliefs fought to maintain the status quo:

> "There is trouble about the school. The owner of the site at present occupied by the school has announced his intention of building his house there, and as sites in Khonoma are very valuable, he must be allowed to do so. It is the village's business to provide a site for the school and I have told them that if they do not do so, I have no objection to the school's being closed. They have, however, but cannot agree on a site. The question is complicated by the schoolmaster having turned Christian and the non-Christians complain of evangelization and moral pressure put on their children – under cover of secular teaching. The schoolmaster of course, denies it, but if it is believed that he is proselytizing, that is as bad as if he really does so, as far as the peace of the village and the progress of the school is concerned." (Hutton, 1929a, 1-2)

[81] A clear example of this was young women who, after converting to Christianity, refused to shave their heads until marriage, according to the earlier custom (see plate 3-101, for example, and eralier section on *Divorce*). Hutton again provides insights on this debate in Khonoma in the 1930s:

> "A fuss is going on in the village [Khonoma] because one or two Christian girls have refused to shave their heads till marriage according to the immemorial custom of the village. They like to grow their hair to put the come-hither on the boys, but the ancients say it is taboo, and of course the Christians cannot pretend that it is a matter of conscience for them to grow their hair, so I have ordered them that they must obey the village custom or live outside the village. It is a clean and seemly custom and St. Paul would certainly have been on my side." (Hutton, 1934b)

[82] S. Meyase (2001, 129-130) makes an interesting point that the rate of conversion to Christianity was not the same amongst the Naga tribes. The fastest growth in Christianity took place amongst the autocratic Semas and Konyaks. In these cases, if the Aung (Konyak king) or village chief (Semas) was converted, then the entire village would convert en masse. But for the Angami, famed for their extreme democracy, individualistic thinking and resistance to change, conversion to Christianity was an individual or family decision and the church grew more slowly. As evidence, Meyase points out that although the first Angami adopted Christianity in 1885 and the first Sema not until 1906, by 1936, there were reportedly 6,500 Sema Christians while the Angami lagged far behind with only 630. This gap had widened even more dramatically by 1950, with Christians numbering 1,500 Angami and 16,000 Semas. However many of the old ideas persisted. See Archer, W. (1947); Aier (2001).

Christianity, every ceremony must go" (Mills, 1932).[83] This effectively suppressed the ceremonies, festivals, and feasts of merit that were the main occasions for the Nagas to don their full traditional finery, to dance and sing, and retell the stories of old. The implications were far-reaching. The history and traditions that had been handed down through songs and stories were rapidly forgotten. Wealth was no longer redistributed, or prestige earned, through feasts of merit. The standards of wealth changed from the land, livestock, and full rice granaries that had traditionally marked success, to how much money had been accumulated. This new form of wealth was not perishable and could be kept indefinitely. Instead of sharing it through feasts of merit, it could instead be accumulated. The Nagas began wearing western dress, encouraged by missionary teaching that somehow equated more completely-covered bodies with higher morality and Christian values. Many analysts blame the Mission's strong prohibition policy for pushing drinking behind closed doors, away from the prying eyes of the church, and fostering alcoholism (Sanyü, 2001).[84]

While all this social upheaval was taking place, the <u>morungs</u> (male and female dormitories) that had been the social centre of Naga villages, were also being systematically undermined. It was in the <u>morungs</u> that Naga boys and girls learnt the behavior and skills that were expected of them, listened to the stories of their ancestors (Shishak, 1990), and practiced their songs and dances (Takatemjen, 1990). During the earlier days of constant warfare and headhunting, the men's <u>morung</u> had also played an important role in village defense as the young bachelors that slept there served as sentries. But in the eyes of the missionaries, these activities made <u>morungs</u> places of vice and to be discouraged. The importance of the <u>morungs</u> declined as more families turned Christian and forbade their children from spending time there. They disappeared altogether from villages that had turned entirely Christian, and the church replaced them as the new centre of social life.

The demise of the <u>morung</u> was abetted, in part, by the schools that were opening at the same time, many of them also operated by the missionaries. They replaced the former teaching role of the morungs. Young Nagas began depending more on teachers for their knowledge, and less on their parents and peers (Punyü, 1995, 113; Meyase, S., 2001, 99). As the economic benefits of having an education became apparent, the respect that Nagas formerly accorded to their elders was instead shifted to the educated. Those who received even a smattering of education were no longer interested in the hard labor of cultivation, but aspired to what Mills

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[83] The full text of the Mills paper (1932) is provided in appendix 3-11. This is followed, in appendix 3-12, by a short paper by Rev. C.D. King (undated), the first missionary to work amongst the Angami. The latter is included both for its contrasting optimism about the changes that were occurring in the Naga Hills and its specific references to Khonoma. The two papers clearly show the antagonism that existed between British administrators and American missionaries over their respective roles in the Naga Hills.

[84] Or, as Mills notes (1932), since drinking alcohol was condemned as sinful, some villagers began using opium instead. This was uncommon, but not unknown, amongst the Angami.

(1932) called "sitting and eating" jobs - characterized by sitting behind desks, white shirts and soft hands.

British administrators described a drabness that descended over Naga villages after pacification and Christianization. The colorful ceremonies and festivals that had previously broken up the monotony of the agricultural year were fading from use. The old system of gennas was discarded, instead replaced by observing Sunday as a single genna day when work in the fields would stop and people would attend church to conduct a new set of rituals brought by the white man. The Supreme Being was no longer known as "Ukepenopfü", but now as "God". Even the first-sowing and first-harvesting rituals were replaced by special church services. The artistic outlet of the Nagas withered as they had fewer opportunities to dress in their traditional finery, to sing and dance, or to retell stories that had been handed down over generations. Wood carvings had been amongst the most important of their material arts, used mainly in decorating morungs and houses of those who had given feasts of merit. But as the arrival of Christianity pushed both morungs and feasts into disuse, the ornate carvings disappeared along with them.

Hutton noted that Khonoma tried, without good result, to fill this vacuum with "litigation, gambling and drunkenness" (1921a, 13).[85] Wrestling took a dramatic jump in popularity amongst the Angami, Chakhesang and Zeliangrong[86] at that time, seemingly as an alternative way to prove one's manliness, settle disputes, or defeat another village or tribal group.

All in all, the combination of British administration and Christianity wrought tremendous social changes on Naga society (Maitra, 1991, 152-154). It destroyed much of what was central to their identity as Nagas and replaced it with attempts to emulate all things western.

Birth of Naga Political Consciousness

Despite the fundamental changes wrought by British administration, Christianity and education, what emerged was something that was to have larger repercussions than any one of those influences … the rise of Naga nationalism. Again, Khonoma was at the centre of political activities that were to shape the future of the entire Naga Hills. Before modern times there was no concept of a larger "Naga nation"[87] that united the Angami with other subgroups. This wider sense of identity did not

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[86] Zeliangrong refers to an amalgamation of the Zemai, Liangmai and Rongmai tribal groups.

[87] It is still vague as to what distinguishes Nagas from the many other tribal groups found in Northeast India. While geography stands them out, other issues like their independent and warlike spirit differentiate them from others. Hutton considered "Naga" to simply be a useful term for denoting groups living in a particular geographical area (1922a, xvi), but Elwin claimed "there is an atmosphere, a spirit, in a Naga which is unmistakable" (1997, 5). Today, which groups fall under the Naga umbrella can easily be influenced more by politics than ethnicity, especially given the separatists' agenda to create a united homeland encompassing all Naga subgroups.

begin until after the Naga Hills had quietened down under British rule and people began traveling more widely.

Role of World Wars in Creating Naga Unity

Nagas' awareness of the outside world expanded rapidly in the early 1900s. A significant number could read and write by that time. They interacted with British officials for matters of state, and American missionaries in the church. Some had joined the government service or become evangelists themselves. Others, particularly from Khonoma, traveled widely in the region on trading missions. Khonoma was viewed as one of the most progressive villages at that time, and the British administration often relied on its skills for developing the Naga Hills District. Some Khonoma villagers were recruited by the Government to live amongst other Naga subgroups to teach them about wet rice terracing (Sema, 1992, 105). Some were hired as stone masons, to build roads. Others were provided with new skills, such as grafting, and sent off to extend them amongst other villages.[88]

The Nagas' exposure to global affairs took a dramatic lurch forward in 1916 and 1917 when 2000 of them were sent to France as part of the Labour Corps (Yonuo, 1974, 121-126). There they witnessed warfare on a scale that made their own intervillage raids seem like innocent fun in comparison. They must have wondered why the white man felt justified in condemning the Nagas as barbarians (Nibedon, 1983, 23). But the horrors of the WWI battlefields forged a sense of political unity amongst the many Naga subgroups that participated[89]. The alien surroundings made their own intertribal differences seem inconsequential and for the first time, they saw themselves as part of the same Naga nation. This, in turn, fostered concern about future developments and the constitutional status of their own homeland. In 1918, after the end of the war, the Naga Club was formed with chapters in Kohima and Mokokchung. Its members were mainly government officials and leading headmen of villages. Their purpose was to represent all Nagas and assist British officers in understanding their social and administrative problems (Changkiri, 1999, 198-199). It also began infusing a political consciousness amongst the Nagas. When India was in turmoil in the 1920s and Mahatma Gandhi was leading the Indian National Congress (INC) in trying to overthrow British rule, a Statutory Commission was formed in November 1927 under the chairmanship of Sir John Simon to study the workings of the administration in India and to recommend reforms. When the Simon Commission arrived in Kohima in 1929, the Naga Club

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[88] The government's heavy recruitment of extension agents from Khonoma probably had several reasons. Most obviously, it was geographically near the state capital and its infamy ensured that it was visited often by District Commissioners; Khonoma's well-known skills in rice terracing and stone masonry were in high demand; and Khonoma continued to command high respect and other villages were prepared to listen to its people. It may also have been an intentional strategy to keep Khonoma occupied and out of mischief!

[89] There were no participants from Khonoma.

presented it with a memorandum demanding that the Naga Hills not be included in the proposed reforms. It stated Nagas' preference to remain directly under British government, but if the British were to quit India, then they asked to be left alone to decide their own future, as in days of old. This is usually considered to have been the Nagas' first formal demand for independence.

By 1942, Burma was engulfed in war as Japanese troops advanced westward towards India. The Japanese strategy was to invade India through Nagaland and Manipur, and from there, to launch attacks on the plains. They were being supported by the Indian National Army (INA), which hoped to take advantage of British vulnerability to liberate India from its rule. At that time, two Khonoma men were living in Rangoon – Angami Zapu Phizo[90] and his brother, Keviyalie, from the Gwizantsu clan of Merhümia khel (figure 3-2). A.Z. Phizo had gone to Burma after his tyre retreading business in Dimapur had failed and he had been unable to repay his debts. Ultimately, his property was confiscated and he was expelled from the Naga Hills. Phizo had long been staunchly anti-British. Now, faced with the indignity of being exiled from his own homeland by the white rulers, he had added reason to dream of liberating Nagaland. He saw opportunity in the arrival of the Japanese army. In 1943, Phizo and his brother offered to assist the Japanese and the INA in exchange for their promise to recognize Nagaland as an independent sovereign state. On April 5th, 1944, an estimated 12,000 to 15,000 Japanese troops laid siege to Kohima. After 64 days of fierce fighting, during which an estimated 4000 Indian, Gurkha and British defenders were killed or wounded and not a building was left standing in Kohima town, the Japanese were finally defeated and their invasion of India brought to a standstill (Rooney, 1992). Unlike Phizo and his brother, most Nagas remained loyal to the British and contributed enormously to the Japanese defeat.[91] With the defeat of his allies, Phizo fled back to Burma where he was arrested by the British.

With major battles this time being fought on their own doorsteps, WWII had an even more dramatic impact than its predecessor in exposing Nagas to the outside world and developing their sense of solidarity as a people. Roads and communications were improved as part of the war effort. The foreign armies brought with them many modern weapons and other equipment that the Nagas had never seen before.[92] The myth of British invincibility was also crushed. It may have been

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[90] A.Z. Phizo was the grandson of Pelhou, the noted Khonoma leader who negotiated surrender to British forces in 1880 (see appendix 3-6). It is not known if this helped to drive Phizo's hostility to the British.

[91] Khonoma's involvement in the war was limited to a 4-day visit by a platoon of Japanese soldiers. Marching from the Zeliang area (west), they arrived in Khonoma on April 14th, 1944. Although my understanding is that there was no fighting between British and Japanese forces in Khonoma, Ganguli (1984, 40) describes a grand battle there. The accuracy of Ganguli's story seems doubtful.

[92] Money flooded into the Naga Hills to finance post-war reconstruction. Many Nagas who received government contracts to participate in the rebuilding became quite wealthy (Sanyü, 1987, 186). Even the war dead contributed to the economy:

partly in response to this unprecedented invasion from outside that, in 1944, the Khonoma Rüffüno was established to unite Khonoma's khels in pursuing the village's interests (Kruse, 1994).[93]

Formation of a Naga Political Lobby, Spearheaded by Khonoma

As the dust of war settled, Deputy Commissioner Charles Pawsey proposed to the Nagas that they organize themselves to reconstruct their sociopolitical life according to modern democratic lines. In response, the Naga Hills Tribal Council (NHTC) was formed in April 1945 and, for the first time the Nagas were united in a single socio-political organization. Its secretary was a bright young intellectual from Khonoma's Merhümia khel, Theyiechüthie Sakhrie. T. Sakhrie was actually the cousin of Phizo, who by this time was incarcerated in Rangoon. As it grew clear that India would soon receive its independence, the Nagas became increasingly worried about their political future. In February 1946, the council renamed itself the Naga National Council (NNC), with the main objective of fighting for a separate Naga country and developing it according to their own wishes. The NNC had 29 members, representing the various Naga subgroups.

At this time, Naga political activities began centering more and more around Khonoma. An officer of the Assam Civil Service who was instrumental in setting up the NNC was Nagaland's first university graduate, A. Kevichusa (Ramunny, 1993, 18)[94]. T. Sakhrie was the NNC's first secretary (plate 3-70). When Phizo (plate 3-71) was released from detention in June 1946 and returned to the Naga Hills full of political ambitions, T. Sakhrie recruited him to join their efforts. Later, Mosievile (Mowu) Chase (plate 3-72) was to become Commander-in-Chief of the Naga Army.

> "A large number of dead bodies, particularly the Japanese soldiers, were lying scattered and unattended in the jungle. Many of those dead soldiers had a weapon, one or two gold teeth as well as gold rings, wrist watches and other valuables on their persons. These were taken away from the dead bodies by the local people which formed a part of their amassed wealth." (Meyase, S., 2001, 120)

[93] Kruse (1994, 34) explains that "Rüffüno" means "*army*", but is usually used in referring to the "congregation of a highly potent, dynamic and an ever-prepared body consisting mainly of the ablest and most experienced warriors of a village or a people for any defensive or offensive purposes against the enemies".

[94] Khonoma villagers still chuckle over the story of A. Kevichusa's application for government service. Apparently he was being tested by Hutton and had proven his capabilities in everything except horse riding. But Khonoma had no horses that would have allowed him to acquire such skills. Probably liking what he saw in the young man, Hutton motioned for A. Kevichusa to get up behind him on the horse and hold on tightly. Hutton then spurred the horse and galloped the length of the sports field. As A. Kevichusa dismounted, Hutton check-marked the box for horse riding ability on his application form and he was accepted into government service (Meru, K., 2000).

Hutton's faith was not misplaced, and A. Kevichusa, and later his sons, went on to make important contributions to Nagaland's political development. It was one of his sons, Khrieli Kevichusa, who first took me to Khonoma village in 1995 leading to this research. Another two sons were tragically assassinated by the underground. Many of Nagaland's most promising leaders have died in this way.

All were from Khonoma's powerful Merhümia khel. A close friend of T. Sakhrie, Jasokie Zinyü (widely known as J.B. Jasokie) from Thevomia khel, became the Information Secretary (plate 3-70). Just as Khonoma had historically led resistance to outside invaders, it was again leading the way in forging Naga unity and providing a voice for their political aspirations.

In the final months under British rule in 1947 there was a flurry of activity as the NNC tried desperately to avoid being subsumed into the Indian Union.[95] The council resolved in February that the Naga Hills should cease to be a part of India when India received its independence. In June, the Governor of Assam, Sir Akbar Hydari, went to Kohima and spent three days negotiating a 9-point agreement with the Naga leaders. The final point was vague (probably purposely), but seemed to hold open the possibility of Naga independence:

> "9. Period of Agreement: The Governor of Assam as the Agent of the Government of the Indian Union will have a special responsibility for a period of 10 years to ensure the due observance of this agreement; at the end of this period, the Naga Council will be asked whether they require the above agreement to be extended for a further period or a new agreement regarding the future of the Naga people arrived at." (Ramunny, 1993, 23)

However, Sir Akbar Hydari died suddenly of a massive stroke on December 28th of the following year, and the agreement died with him, unimplemented.

The month after negotiating the Hydari Agreement, Phizo led an NNC delegation to Delhi to announce that the Nagas would declare their independence on August 14th, 1947, one day before India received its own independence.[96] Jawaharlal Nehru, then Prime Minister, vehemently rejected the Nagas' right to separate from India. During a July 19th meeting, they received a much more sympathetic hearing from Mahatma Gandhi who encouraged them to remain within the Indian Union, but assured them that regardless of their decision, India would not use force against the Nagas:

> "Nagas have every right to be independent. We did not want to live under the domination of the British and they are now leaving us. I want you to feel that India is yours. I feel that the Naga Hills are mine just as much as they are yours. But if you say that they are not mine, the matter must stop there. I believe in the brotherhood of man, but I do not believe in force or forced

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[95] The British were not unsympathetic to the Nagas' wishes. Several British administrators proposed the creation of a Crown Colony comprising the Naga Hills area of Assam and the tribal area of upper Burma, but the Nagas opposed it (Ramunny, 1993, 20-21). This could easily have provided an intermediate step towards complete independence, at such a time that the tribal groups felt prepared to administer their own affairs. In retrospect, rejecting the Crown Colony idea was probably a serious blunder on the part of the NNC.

[96] That no fewer than three of the seven-member delegation representing the Nagas were from Khonoma (A.Z. Phizo, Khrisanisa Seyie and T. Sakhrie) illustrates the village's leadership role at that time.

> unions. If you do not wish to join the Union of India, nobody will force you to do that." (Gandhi, 1947 as cited by Nibedon, 1983, 33)

When his Naga visitors related Sir Akbar Hydari's threat that India would use its military to force them to submit to its rule, Gandhi reportedly exclaimed:

> "Sir Akbar is wrong! I will ask them to shoot me first before one Naga is shot!" (ibid)

But Gandhi was assassinated by a Hindu extremist on January 30th, 1948, and another promise to the Nagas was to remain unfulfilled. So it was that after a presence of about 450 years, the curtain drew to a close on British colonialism in India without the Naga issue being resolved. On August 14th, 1947, the Nagas sent cable messages declaring their independence to the United Nations Secretary General and the British High Commission, and India celebrated its independence the following day.[97]

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[97] For further reading on the Nagas under British administration, see Owen, 1844; Butler, 1847; Mills, 1922, 1973 [Reprint], 1982 [Reprint]; Smith, 1925; Majumder, 1925; Bower, 1950, 1953; Hutton, 1968 [Reprint], 1969 [Reprint], 2002 [Reprint]; von Fürer-Haimendorf, 1969; Michell, 1973 [Reprint]; Waddell, 1986; Hazarika, B.B., 1987; Anonymous (Ed.), 1988; Ao, T., 1993; Kumar, 1994; Sanyü, 1994; Changkiri, 1999; Allen et al., 2001 [Reprint]; and Meyase, S., 2001.

CHAPTER 5

Nagaland and Khonoma within Independent India

INTRODUCTION

The change from British to Indian administration marked the beginning of a nightmare for the Nagas that would drag on into the next century. It remains unresolved to this day. Although it is a fascinating story, this section must be limited to a brief contextual overview of events in the wider arena of Indo-Naga relations and focus more closely on the central role that Khonoma played.

HISTORICAL OVERVIEW

The Gathering Clouds of War

The Nagas had a grace period of four years, from 1947 to 1951, because India's new government was preoccupied with the aftermath of partition and other priorities. It was the calm before the storm. The NNC used the time to formulate strategies on how to get India to accept its claim for independence. The Hindus and Muslims had carved out their own separate countries. Why not the Nagas? As Phizo's influence grew within the NNC, he became increasingly convinced that its policies were too moderate to succeed. He saw armed revolt as the best possibility for shedding the specter of Indian rule. However, Phizo's ambitions were temporarily delayed in July 1948 when, on the way back from meetings with the Government in Delhi, he was arrested in Calcutta for possessing incriminating documents that were prejudicial to the security of India. While he was in jail in Calcutta, personal tragedy struck Phizo's family. An accident on the road between Khonoma and Jotsoma left his wife critically injured and a two-year-old son dead. Phizo was therefore released on parole on December 18, 1948 on compassionate grounds. India was later to regret this humanitarian gesture towards the Naga leader (Ramunny, 1993, 33-34). They never succeeded in taking Phizo into custody again.[1]

Phizo returned to Khonoma and continued his tireless campaigning for Naga sovereignty.[2] His prominence within the NNC grew to the point that he was elected its president on December 11, 1950.[3] This gave him the authority he needed to push forward with his agenda for independence.

A number of events over the following years are worthy of notice for stoking the fires of impending conflict between India and the Nagas. On May 16th, 1951, the NNC held a voluntary plebiscite aimed at demonstrating to Delhi that Nagas spoke with a unified voice in their demand for freedom. According to Phizo, the results showed 99.9% support for Naga independence. On January 25th of the following year, the Nagas reinforced this message by boycotting India's first general elections. Tensions rose dramatically on October 18th of that year when, during a public protest in Kohima against the use of undue military force against civilians, an Indian soldier unaccountably shot dead a respected judge from the Angami Tribunal Court who had been participating in the peaceful march (plate 3-67). Indian security forces thus drew first blood in what was to become a long and violent struggle. The door slammed shut on the final opportunity for dialogue when Indian Prime Minister Jawaharlal Nehru visited Kohima on March 30th, 1953, together with his Burmese counterpart, U Nu. The Nagas gave them a rousing reception initially, but turned furious when informed that they would not be permitted to read a prepared statement to the Prime Minister. The roughly 10,000 Nagas who had come to listen to Nehru walked out of the meeting in protest and left the Prime Minister to address empty places (Horam, 1988, 51). This incident stiffened the resolve of both sides. To further distance themselves from India, the Nagas then began a civil disobedience movement that boycotted Indian schools, colleges and hospitals. Angered by the Nagas' belligerence, the Government responded by ordering the arrest of the NNC leaders and their supporters. Widespread police operations began with village raids to make arrests. As part of these operations, 1200 troops raided Khonoma on November 30th, 1953, and the village was ransacked. Many villagers were beaten up in the process (Iralu, 2003, 165). But the NNC had already gone underground and easily evaded its pursuers. Determined to put down the uprising, India sent in the

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[1] One is reminded of the old adage that one man's terrorist is another man's freedom fighter. When in 1931-1932, Gaidinliu led a revolt among the Kabui and Zeliang Nagas against British rule, Jawaharlal Nehru saluted her as a great patriot and bestowed her with the title "Queen Rani of the Nagas" (Yunuo, 1982, 121). But when Nehru later came to power and, a mere 10 years later, Phizo played a similar role in leading a Naga revolt against Indian rule, it failed completely to earn Nehru's admiration.

[2] I intentionally avoid using the term "separatist activities", out of deference to the Nagas' fundamental argument that they have never been a part of India, so it is not an issue of seeking to secede from the union because they never belonged to it in the first place. Rather, the Nagas argue that they were independent just as soon as the British left, and to them, the difficulty has been getting India to accept this historical truth.

[3] Phizo was to remain president of the NNC for the next 40 years, until his death on April 30th, 1990.

army in 1955 and passed the Assam Disturbed Areas Act that gave it extensive powers (Vashum, 2000, 82).

How Khonoma became Politically Divided

While the Naga Hills were edging closer to the brink of war, a more personal drama was unfolding in Khonoma. Phizo and Sakhrie came to work closely together under the NNC in the late 1940s because of their common conviction that the Nagas must exist as a free nation. The two cousins from Merhümia khel had complimentary skills that made them a potent team. Phizo had the energy and zeal – some would say the obsession – to tirelessly push forward the independence agenda. But it was Sakhrie who took Phizo's ideas and honed them into eloquent statements that argued the Nagas' case. Sakhrie was a leading intellectual, and a gifted musician and poet as well. He was the brains behind the NNC. Communications released by the NNC were invariably drafted by candlelight by the thoughtful Sakhrie. The many books that have since been written about this era of Naga politics unanimously stress Sakhrie's exceptional brilliance and that he was a vitally important asset for the Naga people.

Emergence of a Struggle between Moderation and Extremism

As time went on, the two leaders' ideas about how their common goal should be achieved began to diverge. Phizo became more extremist in his views and was intent on setting his people on a collision course with India's military. Singh quotes Phizo as often remarking to his trusted lieutenants, "Tell me which country has never suffered from a war!" (1987, 83). He was adamant that unless they struck "while the iron was hot", the Naga case for independence would be lost. Sakhrie held a more moderate view, shaped greatly by Gandhi's doctrine of non-violence (Maitra, 1998). He moreover saw it as suicidal to provoke a war, for which the Nagas were ill-prepared, against the infinitely more powerful India. Sakhrie also doubted the Nagas' readiness for independence. He had worked as an interpreter with the District Commissioner's office in Kohima, while still under British rule, and had first-hand exposure to the daily administration of government. He worried that the Nagas were not yet politically mature enough as a people to govern themselves, and favored a more incremental process towards independence.

The relationship between the two erstwhile friends deteriorated rapidly as Sakhrie began challenging Phizo at public forums and delivering his own powerful speeches about the dangers of what Phizo was proposing. Sakhrie was a skilled orator and began to undermine Phizo's support. Already, many of the more educated NNC members allied themselves with Sakhrie's urgings for a peaceful solution. Amongst his supporters was J.B. Jasokie, the young leader from Thevomia khel who held the post of Information Secretary in the NNC. In fact, the debate had torn Khonoma apart along khel lines, with most of Thevomia supporting Sakhrie's urgings for moderation and discussions with India, while Merhümia stood by Phizo in his plans to use violence to force India into recognizing Naga independence.

A letter that Sakhrie wrote to an Indian friend in early 1955 reveals his growing despair in trying to prevent war from engulfing his people:

> "The situation is getting out of control. I do not know if India Government had wanted these developments to take place. I like to think they hate it as much as we do. After the first strike, it will not stop until it exhausts itself. We must, therefore, prevent the first strike from being ever struck. This must be attempted by peaceful methods. There is a lull now, a terrifying calmness. Do you know what that means? The God who had so far saved Nagas and India from resorting to the most undesirable method of settling their differences can still deliver us from evil and keep us sane …" (Sakhrie, 1955, as cited in Maitra, 1998, 43)

Both Sakhrie and Jasokie resigned from the NNC that year in protest at Phizo's extremism. But Sakhrie continued to counter Phizo by traveling around the Naga Hills and promoting peaceful alternatives for achieving independence. A furious Phizo saw his carefully-laid plans under threat if Sakhrie was not stopped. Not surprisingly, Sakhrie and the other moderates were accused of being traitors against the Nagas and now conniving with the Indian Government. In one fiery public meeting in Khonoma, the enraged Phizo challenged Sakhrie to debate with him. Probably he knew that Sakhrie was sick in bed at the time and in no condition to accept his challenge.[4] Nonetheless, Sakhrie's clansmen literally took him from his bed and carried him to the panchayat (village hall) to debate. The subsequent exchange is remembered not for what was debated, but rather for Phizo's blistering personal attack on Sakhrie. He denounced Sakhrie as not being a man[5], and that he did not deserve to live! This was not only a debate between individuals, but also the khels that backed each of the men. Thevomia khel was incensed that their spokesman had been subjected to such abuse.

Silencing the Voice of Dissent

Shortly after, a rumor began circulating that orders had been issued to eliminate Sakhrie and some of the other moderate members of the NNC. Sakhrie had no choice but to go into hiding from the very organization that he had helped to build. Initially, Sakhrie appeared to have disappeared. Searches through Khonoma failed to locate him. Then somebody recalled that he had a romantic interest in Chichama village. Could he have taken refuge there? On January 18th, 1956, a large group went to Chichama in the dead of night and, breaking into the house where he was

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[4] Sakhrie had a heart condition and was often in poor health.

[5] This is probably the most derogatory insult that could be directed against Angami men, who place such importance on manliness and whose pride is legendary.

suspected of hiding, finally found Sakhrie. Sakhrie was taken into the forest and tied to a tree where, some accounts say, his teeth were smashed with a rifle butt and he was tortured horribly over the next 48 hours. Being one of the main architects of the NNC, Sakhrie would have known all its secrets. The unspeakable torture that he endured in his final hours was presumably aimed at making him divulge what he might have told the Government about the NNC.[6] And so it was that the brilliant young leader that had tried so hard to save the Nagas from war died a slow and terrible death at the hands of his own people. This was clearly a pivotal moment in the Nagas' political history. They had been poised at a crossroads, pondering which path would take them to independence – that of war as incited by Phizo, or that of negotiation as urged by Sakhrie. Now, the voice of moderation had been silenced. Like Gandhi eight years earlier, Sakhrie had fallen victim to extremists.[7]

Sakhrie's body was reportedly so badly mutilated that it had to be tied together with vines in order to carry it back to Khonoma. News of his death had the effect of a bomb exploding in the Naga Hills. Nagas were appalled at what Phizo's supporters had done to one of their own.[8] The Government quickly issued arrest warrants for Phizo and others for complicity in Sakhrie's death. Ramunny (1993, 52) later commented that Sakhrie's death almost led to civil war in the Naga Hills. But if his death was akin to a bomb blast, then "ground zero" was Khonoma. Thevomia khel viewed Sakhrie's murder as tantamount to a declaration of war by Merhümia khel. Although they refrained from immediate retaliation, they resolved never to join Phizo's group in taking up arms against the Indian Government. Sakhrie's death thus had the effect of strengthening Thevomia khel's allegiance to India. The village was split down the middle in its political views. Members of the NNC that had shared Sakhrie's views washed their hands of the organization and came overground to negotiate with the Government.

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[6] Several accounts claim that there were also more personal reasons for Sakhrie's cruel treatment. One of his abductors was an unsavory character by the name of General Dotsule. Dotsule had reportedly made advances on the same Angami girl that was now keeping company with Sakhrie, but had been rejected. He thus had a personal grievance against Sakhrie for winning Kehuneiü's affections (Singh, 1987, 100-101).

[7] An NNC publication (1993, 48) states tersely that "Mr. T. Sakhrie was assassinated for his policy of cooperation with the Government of India". Nibedon (1983, 71) notes that given the sensitivities involved, Sakhrie's death is a taboo subject amongst the Angami Nagas. This is profoundly true in Khonoma, where it sparked a period of turmoil and divisiveness. The scars are still fresh and people avoid talking about it. This brief overview therefore had to rely heavily on published accounts of the events surrounding Sakhrie's death (Nibedon, 1983, 70-72; Singh, 1987, 95-104; Horam, 1988, 77-79; Ramunny, 1993, 51-52; Maitra, 1998, 40-47). Sakhrie died at a youthful 35, leaving behind a Khasi wife and four children. Despite his prominence in Nagaland's recent political history, Sakhrie's body lies in an unmarked grave on his family's clan land, as if trying to erase the tragic wound from the village's consciousness.

[8] Phizo denied to the end that he had ordered Sakhrie's death. Even so, he almost certainly incited it. There was already a lot of public anger against Sakhrie amongst Phizo's supporters. His public denouncements of Sakhrie as undeserving to live, in effect, declared "open season" on Sakhrie's head.

Phizo's Departure from the Naga Hills

Although Sakhrie's death silenced his main critic, it also brought danger to Phizo himself. On the Indian side, the Government was searching for Phizo to arrest him for Sakhrie's murder. But his safety could not be assured even amongst his own people. Rumors were circulating that Sakhrie supporters planned to assassinate the upper echelons of the NNC and thus divert its march towards war (Maitra, 1998). Even if this was not true, given an opportunity, there was every possibility that one of Sakhrie's clan might try to avenge his death. So Phizo went into hiding and was said not to trust anyone beyond the members of his own family. It was also clear that the Nagas needed outside intervention in their struggle for self-determination. Therefore, in November 1957, Phizo left Nagaland and slipped into Bangladesh (then East Pakistan). He spent the next couple of years there, raising funds and smuggling weapons back to Nagaland (Nibedon, 1983). Announcing that he was going to take the Naga cause to the United Nations, Phizo finally flew to Zurich on a Peruvian passport in 1960, and with the aid of Rev. Michael Scott, entered Britain as a member of the British Commonwealth. After living there for the mandatory one year, he applied for British citizenship and spent the rest of his life controlling the NNC from afar.[9]

Outbreak of the Indo-Naga War

The shock waves of Sakhrie's death reverberated all the way to Delhi.[10] The assassination of one of their most promising dialogue partners on the Naga side shattered hopes that the Naga problem could be settled through peaceful means. It was clear that the extremists would stop at nothing, not even murder of their own kin, to push through with their agenda for an armed uprising. After Sakhrie's death, events gained momentum as both sides finalized preparations for war. The Nagas quickly laid the groundwork to function as a sovereign state. On March 22nd, 1956, at Phenshunin village (Rengma), Phizo declared the birth of the People's Democratic Republic of Nagaland, hoisted its flag and released a constitution (Yonuo, 1974, 215). A Naga army was already taking formation. Delhi responded by sending in its own army, declaring martial law and imposing a press blackout. The Indian army launched its clampdown by sending a stark message to the Naga populace. After attacking an NNC camp in the Southern Angami region on Febuary 27th, 1956, the bodies of two Nagas killed in the encounter were hung up and displayed at the Kohima market for several days (Iralu, 2003, 78). It was a clear warning of the fate

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[9] There is irony in this at several levels. Firstly, Phizo had to seek sanctuary in the very country that he had spent his life criticizing and had betrayed during WWII. Secondly, after starting a war, Phizo watched from the comfort of London while an estimated 200,000 of his countrymen died. Phizo died in London on March 30, 1990, and his body was repatriated to Nagaland for burial.

[10] Sakhrie and Prime Minister Nehru had been exchanging letters on the Naga situation (see appendix 3-13).

that awaited Nagas that dared to take up arms against the Government. The bloodbath had begun.

Continuous fighting engulfed the Naga Hills from March 1956 until September 1964, with hardly a word in the world press. The Nagas used the rugged terrain to their advantage in fighting a guerrilla war against the much larger Indian forces. The Indian soldiers, mostly from the plains, were not accustomed to operating in mountain environments and were easily out-maneuvered by the agile Nagas. Frustrated by continual sniping, ambushes, and hit-and-run raids, the Indian army often clamped down on villagers with indiscriminate arrests, raping and pillaging, torture, murders, desecrating churches and razing villages. Cut off from the rest of the world, it was an excruciating period of rampant human rights abuses (Maxwell, 1980; IWGIA, 1986; Anonymous, 1997b, 2001; Ao, A.L., 2002; Federal Government of Nagaland, 2000; Iralu, 2003). Some of this might be explained by the Indian army's difficulty in differentiating between ordinary villagers and guerrilla fighters. To try to segregate the guerrilla fighters from the general civilian population, the army pursued a campaign of burning down villages and forcing the inhabitants into concentration camps euphemistically known as "village groupings". Being held as prisoners in these camps added to the misery of the general Naga population.[11] Other villagers fled into the forests, many dying there of starvation, or having been shot by army patrols. Some estimates place the number of Naga casualties during the Indo-Naga war as high as 300,000 (Iralu, 2004), in 56 years of fighting. To put this into perspective, the 1961 census found the total population of Nagaland at that time was 369,200 (Census Operations, Nagaland, 1967). Sakhrie's worst fears had been realized.

It did not take long for the fighting to reach Khonoma. The Naga army, supported by a large number of village volunteers, attacked Indian forces in Kohima on June 11th, 1956. However, the Nagas were badly handicapped by having insufficient weapons. Their firearms were mostly muzzle-loading muskets and an assortment of old guns left behind by retreating Japanese forces during WWII. Ammunition was in short supply. Many of the volunteer fighters carried only daos and spears. The Indian troops' superior firepower allowed them to keep the Nagas at bay, and after five days of fighting, the two sides were locked in a stalemate, neither able to defeat the other. The Khonoma and Mezoma fighters decided to return to their respective villages and attack the Assam Police outposts there, and with the weapons they captured, return to overwhelm the Indian positions in Kohima.

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[11] An Ao colleague described his personal experiences in being forced to live in such a concentration camp as a youth. The Indian army forced the Nagas to cut all the bamboo in the area to build high fences surrounding the camps. This was intended to prevent Naga fighters from blending into the general village population to get food, intelligence, and other support. Anyone found outside the enclosures without authority was assumed to be an enemy. For this system to work, the army needed to keep track of who left the village each morning to work in the fields, so they would be allowed back in each night. This was done by stamping the back of everyone's left hand as they left the village. If they could not show the stamp on their return, they not only wouldn't be allowed back in, but they also risked being arrested or shot.

The Third Battle of Khonoma

Khonoma was already braced for trouble. Merhümia khel feared that the Indian army would swoop on it in retaliation for Sakhrie's death. Many had evacuated the village as early as March, in anticipation of attack. Some remained nearby, hiding in the Dzulake valley. Others had fled down towards Dimapur and were now scattered across Medzephema, Ghaspani, and Nagarjan. The force of about 50 Assam Police that the Government had sent to keep control of the village had wisely based itself in Merhümia khel's fort – the highest and most defensible position in the village (plate 3-147). This was the target that Khonoma's fighters were preparing to attack, with the objective of seizing weapons. The attack was complicated by the presence of the Thevomia clans, which, having been alienated by Sakhrie's death, had pledged allegiance to India. Those clustered near the base of the fort would be caught within the cordon that the Khonoma fighters were preparing to throw around the fort. Although they would not be attacked, they would have to be prevented from lending assistance to the Assam Police.

As darkness settled over the village on the evening of June 16, 1956, the Khonoma attackers quietly surrounded the fort and somebody crept forward to lob two hand grenades inside, thus beginning the "Third Battle of Khonoma". The fighting soon developed into a repeat of what had happened in Kohima, with the Nagas unable to dislodge an adversary that was better armed and holed up in a highly-defensible position. This time though, the Khonoma attackers held a vital advantage: by maintaining around-the-clock vigilance, they kept the Assam Police confined to the fort and unable to access water. Nearby water sources were closely guarded to ensure that the Thevomia clans could not smuggle water back to the fort. After a few days, the police were in dire straits and reduced to drinking their own urine to stay alive. Some were shot dead while trying to sneak out to get water under the cover of darkness. The Indian army was powerless to react swiftly to the frantic radio pleas for help from its Khonoma outpost because it was already bogged down in fighting at so many other places and the Nagas had slowed down its mobility by damaging the roads. Finally, on the fifth day of the siege, a column of about 100 troops from the 9th Sikh Regiment was spotted marching across the valley from the Mezoma side. Instead of confronting them, the Khonoma fighters quietly drew back from their positions, and allowed the reinforcements to march unhindered into the fort. They then slipped back into place, once again closing the cordon, and the battle raged on. The defenders now held an even greater advantage in firepower, but still had no water. Dakota aircraft appeared overhead on the 13th day of the siege and tried to parachute water and rations into the besieged fort. But the target was small and most of the parachutes floated beyond the fort and into the attackers' positions. The aerial drops were attempted three or four more times in the coming days. However, after trying for 20 days to capture the fort[12], Khonoma finally ran out of time:

> "On 5th July, reinforcements were seen coming towards Khonoma. Those in the besieged camp must have also sighted the reinforcements because a flare immediately arched into the air to announce that the besieged soldiers were still alive. There were thousands of troops marching in three lines. From a distance, they looked like an advancing army of ants. As soon as they crossed Keya Bagei, they resorted to a different style of marching. First, one company would advance and take up position, to be followed by the next company, and so on. The Khonoma fighters ambushed and harassed the advancing troops right up to the gates of Khonoma village. But realizing that they could not stand and fight such a huge army, the order was given to withdraw and regroup at Mesikhwezhu and Khuku river. … That night, they started burning the village in the Merhuma [Merhümia] and Semoma [Semomia] sectors." (Iralu, 2003, 173-174)

Only a few Thevomia houses just below the Merhümia fort were spared from burning (Savino, 2001), probably for the use of the occupying troops. And so for the third time, Khonoma was razed to the ground by an invading army and its people forced to flee into the mountains.[13]

From the safety of Sikhriegei ridge, the villagers watched grimly as their houses and all their worldly possessions disappeared in flames. But much more serious than the material damage was the gaping chasm that had been torn between Khonoma's people. Trust and forgiveness would take much longer to rebuild than their houses. All of Merhümia and Semomia khels, and the Kuotsuma clan of Thevomia khel, had chosen to fight the Indian invaders – and thus had to flee into the jungle.[14] The remainder of Thevomia khel (the Chatsuma and Phetsuma clans) had been inclined towards negotiations with India, and Sakhrie's murder had alienated them completely from Phizo's group and pushed them squarely into the pro-Indian camp. This group, amounting to about one quarter of Khonoma's population, remained behind in the village as loyal Indian citizens. India was to shrewdly nurture and exploit this, aware that a politically-divided Khonoma would

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[12] The timing of this battle worked in favor of the defending Indian troops. Khonoma usually receives heavy rain in June and July (see figure 6-2). Had they not been able to trap rainwater, the Indian troops would not have been able to survive so long.

[13] The most senior farmers participating in this study were young children when the Indo-Naga war broke out and recall the years when they had to camp in the forests as refugees. Others were born in the Dzükhweke or Chayagei camps, where returning villagers were forced to temporarily settle before finally being allowed to return to the main village site in 1970 (plates 3-198 – 3-200). Some from Thevomia khel belonged to clans that vowed allegiance to India and did not have to flee. Many villagers calculate their ages using India's attack on Khonoma as a reference point.

[14] Today, political alliances in Khonoma continue to be defined by who had "been in the jungle together" after the village was destroyed by the Indian army.

present much less of a threat to its rule. Those who remained behind in the village were pampered as “loyalists”, and those who fled into the forests were to be hunted down as “separatist rebels”.

Dzulake, in the neighboring valley, had grown into a thriving satellite settlement of over 50 houses in the years prior to the Indo-Naga war.[15] But with the outbreak of fighting in Khonoma, it too was quickly abandoned.

Refugees in the Forest

India’s occupation of Khonoma created several thousand refugees scrambling to escape the pursuing enemy. Most initially melted into Khonoma’s rugged landscape and hid in the forests and caves of Dzükou valley, Dzulake area, and Kukhwi (see descriptions of these areas in chapter 6). They cooked at night when the smoke from their fires would not be seen and moved camp often to stay one step ahead of army patrols. Few had blankets, and during the winter months, had to spend their nights huddled around a fire, trying to stay warm. They lived off the land – gathering wild fruit and vegetables, collecting honey and shooting game. For their rice needs, the Khonoma refugees took advantage of their historical suzerainty over nearby Zeliang villages. Able-bodied men would first scout Zeliang villages to ensure that the Indian army was not there. If it appeared safe, they would wait until nightfall before slipping into the village to try to buy rice. At first they had cash, but were soon reduced to bartering their traditional jewelry and even their clothing for rice. In the end, they probably had nothing to offer and were forced to rely on the Zeliangs’ feelings of obligation to the once-powerful Khonoma. In reality, the Zeliang had little choice in the matter. Both parties knew well that if food was refused, then Khonoma would take it anyway. Back at their forest camps, the precious rice was carefully rationed. A handful, mixed with tsiekhrüga fern (*Diplazium esculeatum* – plate 5-81) and various edible leaves (appendix 5-36), was often divided between an entire family. They collected sour vegetables such as *Polygonum plebeium* (gagie) and *Hibiscus sabdariffa* (gakhie) as a substitute for salt. Mortality was high during this time.

Khonoma’s villagers scattered in different directions in the wake of the Indian attack. The story that Nirüdo Khate (farmer collaborator no. 7) tells of his family’s flight is perhaps typical. Nirüdo was born in 1938, so would have been 18 at the time. He fled with his family up to Dzükou Valley – where they spent their first year in hiding. He remembers it as an ideal sanctuary. Dwarf bamboo (*Chimonobambusa callosa*) provided a plentiful supply of poles for building huts, and an abundance of wildlife, honey, and wild vegetables contributed to their food needs. Guards posted on the ridges surrounding the valley provided an early warning system against surprise attack. Any approaching

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[15] A diary entry by Pawsey in 1938 confirms that Dzulake was still expanding prior to WWII:

> “Dzülake continues to increase slowly. Their terraces are only just below 6,000 ft. in height and only ‘Abor dhan‘ (the seed was brought back by carriers on the Abor Expedition) will grow.” (Pawsey, 1938, 1-2)

Indian troops were detected early enough that they had ample time to scatter and hide in the forest. On two separate occasions, Nirüdo recalls, Indian soldiers conducted sweeping operations through the valley in search of Khonoma rebels. Although they found and burnt down some of their camps, the villagers themselves remained safely hidden in the thick forest. The army was not keen to follow them, knowing they could be easily targeted by unseen Naga guns. After spending the first year in Dzükou Valley, Nirüdo and his family left their forest refuge and melted into Kigwema village (Southern Angami area) where they lived for the next three years. By that time, the situation had improved considerably and they could return to Khonoma. But even then, they had to stay in the temporary Dzükhweke camp on Khonoma's outskirts (plate 3-80) for another two years before the Indian army finally allowed them to rebuild on their old house sites. (Narrated by Nirüdo Khate).

Meanwhile, the Government of India was taking steps to ensure that Khonoma could never again rise up in revolt. A military outpost would continue to occupy the Merhümia fort and monitor events in the village.[16] The Thevomia "loyalists" were helped to rebuild their houses[17] and given other support, seemingly to assure them of the benefits of Indian citizenship. At the same time, the Indian army continued to comb the forests in pursuit of the hostile khels that were scattered across Khonoma's wildlands. One of the farmers collaborating with the project, Meno Meyase (field no. 8), told of her mother dying in a hail of bullets from a pursuing army patrol. Meno was about five or six years old when Khonoma was burnt down by the Indian army. She had two younger brothers, the youngest of which had not yet reached his first birthday. With this young family, her parents had taken refuge in the forests in Kigwema area. Bursting into their camp one morning, Indian soldiers shot dead her mother and left her father writhing on the ground with a thigh wound. This happened as the three terrified children watched. Other members of their clan were wounded or killed. All the survivors were arrested and jailed. The children were released after one week, Meno surmises, because of her brother's tender age. They went to stay with their father's elder brother in Kohima. . It was not until a month later that their father was also released and able to rejoin them. The family remained in Kohima for another two years before finally returning to Khonoma to try to rebuild their lives. (Narrated by Meno Meyase.)

To bolster the village's defenses, members of the loyal clans were provided with uniforms and guns and formed into "Village Guards". This began one of the most regrettable chapters in Khonoma's history. Bitterly divided and armed, the loyalists and rebels literally began hunting each other down. The Thevomia loyalists also acted as guides for the Indian army, as they searched for and attacked the rebel camps. They knew the landscape as well as their former neighbours, and where they were likely to be hiding. Iralu, for example, describes a major 13-day battle at

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[16] The Merhümia fort continued to be occupied by the Indian army from 1956 to 1972 (16 years).

[17] The Indian army reportedly provided aluminum sheeting.

Kukhwi in April 1957 that began after the Village Guards led the Indian army to a hiding place (2003, 195-200). In these operations, the Khonoma guides would often disguise themselves so that they could not be recognized by their quarry and singled out for later retaliation.[18]

With food scarce and under constant threat of discovery by the Indian army, the Khonoma refugees gradually left the forest and tried to blend into other villages that were under less scrutiny. Many joined Angami villages in the Chakroma area. Others stayed with nearby Zemi villages that had long-standing relationships with Khonoma.[19] Khonoma's population thus became widely scattered across the southern Naga Hills District (map 4-1). Those years of upheaval had far-reaching effects.

A Phased Return to the Village

The Government of India changed its policy in 1958 and offered a general amnesty so Nagas displaced by the fighting could return to their home villages. This triggered a partial repopulation of Khonoma – but the returnees were not allowed to immediately reoccupy their former house sites. Under the watchful eye of the Indian military, they were instead forced to remain in small satellite settlements on the village outskirts. Merhümia khel and Kuotsuma clan of Thevomia khel settled together on the west of the spur, just south of the terraced valley (see plates 3-80 and 3-198 to 3-200). This new settlement was known as Dzükhweke (named after a nearby spring). The Semomia khel went to the east of the spur and established a settlement called Chayagei. Khonoma had effectively been divided into three sub-villages, each dominated by a different khel. It was not until 1970, 14 years after the village had splintered, that the returnees were finally allowed to move back and the village was physically reunited. Some rebuilt on their old house sites but many, particularly Merhümia khel, chose not to – perhaps finding it crowded and claustrophobic after having spent the previous couple of years camping in the forest. Still "licking their wounds" from the civil war that had splintered Khonoma, there may also have been an unspoken reason of wanting to keep some distance from the rest of the village. Many in Merhümia khel did not rebuild within the boundaries of the old village gates, but instead spread southward along the spur (map 3-1). The residential pattern changed from a compact cluster on Khonoma hill designed for defense (plate 3-1), to the more elongated formation seen today.

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[18] Khonoma was by no means always on the receiving end of attacks. One story that has become part of Khonoma's folklore tells of an ambush on a Sikh patrol on its way to Dzulake on April 1st, 1957. Only one of the 28 members of the patrol escaped with his life (Iralu, 2003, 189-194). This was probably what precipitated the Indian army's attack on Kukhwi two days later on April 3rd.

[19] It was difficult for Khonoma's people to blend into nearby Zeliang villages, since their complexion and facial features allowed the Indian army to recognize them as Angami. But most damning, the traditional Angami style of wearing two or three holes in their ears set them apart from the Zeliang, who wore only one (see code 16.2.2 in appendix 5-7). There was also the additional worry that the Zeliang might betray them.

Search for a Political Solution

As war gripped the Naga Hills, some of the moderate Naga leaders searched frantically for a political solution. Ironically, while Phizo, the extremist leader of the armed uprising, was from Khonoma – so too was one of the key moderate leaders who sought to end the fighting. This was J.B. Jasokie, the former NNC Information Secretary who was repulsed by the murder of his friend, T. Sakhrie, and refused to have anything further to do with Phizo's plans for violence.[20] These moderate leaders organized a series of three Naga People's Conventions (NPC) between 1957 and 1959 that brought together thousands of delegates representing all the Naga subgroups, to discuss their problems and search for solutions (Ramunny, 1993, 71-80). India was pleased with these developments, and Prime Minister Nehru let it be known that he was prepared to consider changes in the administrative setup of the Naga area, short of independence. India had grown particularly sensitive about its north-eastern borders since 1959, when there were fears that China would invade.[21] This heightened India's resolve to suppress the Naga rebels as quickly as possible. The NNC protested against these developments. It saw itself as the only organization that had a mandate to negotiate on behalf of the Naga people, and furthermore, viewed any talks that did not include independence as a betrayal of the Naga cause and those who had sacrificed their lives in that struggle.

Birth of Nagaland as a State

The Naga People's Conventions opened a dialogue with Delhi which ultimately led, on December 1st, 1963, to Nagaland being declared the 16th State of the Indian Union. The Nagas were able to elect their own political representatives and govern their own affairs, but under the umbrella of the Indian Union. Although statehood appeared to be a step towards achieving the Nagas' political aspirations, it was criticized for falling short of complete independence; for failing to consolidate all the contiguous areas occupied by Naga subgroups into a single political unit[22]; and for

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[20] This difference of opinion extended beyond these two men to their clans and khels. Jasokie belonged to the Zinyü clan, one of the Thevomia clans that remained behind in Khonoma and was considered loyal to India. Members of Phizo's Merhümia khel were the rebels, now scattered in the forests and engaged in guerilla warfare against the Indian army. The history of fighting between Khonoma's khels was probably as old as the village itself, but this time, it was as if they had managed to expand their dispute to engulf the whole of the Naga Hills.

[21] India's fears were realized on October 20th, 1962, when China invaded Arunachel Pradesh. China's ambassador to India recently confirmed that China continues to view all of Arunachel Pradesh as part of its territory. This remains a major impediment to stronger relations between the two Asian giants.

[22] As in many parts of the colonized world, one of the unfortunate legacies of colonial rule has often been poorly-conceived boundaries set up for administrative convenience, and ignoring history and ethnicity. A major grievance of the Naga insurgency has been that the Nagas have been divided across political boundaries, occupying not only Nagaland, but also extending into the adjacent Indian states of Manipur, Arunachel Pradesh, and Assam, and across the international border into Sagain Division of Northern Burma. Naga groups have long demanded that their homeland be consolidated into a single political unit that they propose to call "Nagalim".

failing to restore to Nagaland reserved forests which had earlier been transferred to Sibsagar District in Assam. However, statehood provided an opportunity for Delhi to move beyond a military response and begin demonstrating to the Nagas the benefits of peace and Indian citizenship. Many development projects were launched to build roads, schools and hospitals, and federal funds began pouring into the state.[23] Kohima grew rapidly as the new state capital, and construction, markets and wage employment expanded to accommodate the needs of the civil service. Khonoma and other outlying villages found opportunities to tap into this new economy.

However, these concessions were not acceptable to the NNC, and the armed struggle continued. A Peace Mission led by Rev. Michael Scott finally led to a ceasefire on September 6th, 1964 (Aram, 1974; Gundevia, 1975, 101-126). It was only then, with the security situation thus improved, that villagers began returning to Dzulake.

By 1968, the NNC had begun sending its men across Burma and into China for military training and arms. While returning from one of these trips, on March 16th, 1969, Major General Mowu Chase, Commander in Chief of the Naga Army (from Khonoma's Merhümia khel – see plate 3-72) was captured by Indian forces. The ceasefire agreement had broken down by 1972 and on August 31st, the Indian Government declared the NNC and Naga Federal Government as unlawful associations under the Unlawful Activities (Prevention) Act (Vashum, 2000, 83).

The Shillong Accord

India was largely successful in containing the underground movement over the ensuing years, eventually forcing it back to the negotiating table. Nagas had grown weary of war and were desperate for peace. Negotiations between the Governor of Assam and five representatives of the Naga Federal Government led, on November 11th, 1975, to the signing of the Shillong Accord. This was hailed as an historic breakthrough that would finally bring an end to the 20-year insurgency. The agreement contained only three clauses: that the Nagas agreed to accept, without preconditions, the constitution of India; that all the underground's arms would be deposited with the Peace Council; and that representatives of the underground organizations would be given sufficient time to formulate other issues for discussion before a final settlement would be reached (Nibedon, 1983, 339). Although the Indian Government refused to include Phizo in these talks, one of the Naga delegates was his brother, Keviyalie, so presumably Phizo's ideas were represented in the negotiations. But peace for Nagaland was to remain elusive.

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[23] In retrospect, many Nagas contend that although India was never able to defeat the Nagas militarily, it was finally able to do so with money. The free flow of money into Nagaland bred rampant corruption, laziness and addicted the Nagas to handouts from Delhi. Kohima is full of expensive vehicles and palatial homes financed by siphoning off government funds. During the British colonial era, the Nagas were admired for their honesty. Now the state is renowned for its corruption.

Breakup of the Underground into Factions

The NNC was not united in its reaction to the Shillong Accord. Some leaders rejected it and bitterly accused its signatories of betraying the Naga cause. The dispute eventually led the most extreme group, under the leadership of Thuingaleng Muivah, to break away from the NNC on January 31st, 1980, and form the National Socialist Council of Nagaland (NSCN). Further internal bickering led, in 1988, to the NSCN itself splitting into two factions – NSCN-IM and NSCN-K. The small state of Nagaland, then with a population of 1,209,546 (1991 census. See Vijayanunni, 1998), had no fewer than four "governments": the constitutionally-elected State Government based in Kohima (then with Neiphi-u Rio [Angami] as Chief Minister) and three underground governments in exile. They were the NNC, based in London and led by Adinno Phizo (Angami), A.Z. Phizo's daughter; the NSCN-IM, based in Bangkok and led by Isak Chishi Swu and Th. Muivah (both Tangkhuls); and the NSCN-K, based in northern Burma and led by S.S. Khaplang (Pangmi). Naga villagers were paying tax to support four governments, and getting very little in return from any of them.[24] Sadly, most of the fighting in recent years has been inter-factional – Nagas killing Nagas – whilst the Indian army watches on. A tenuous peace now prevails across Nagaland, the result of a series of ceasefire agreements that the Indian Government has cobbled together with the factions. But this could change quickly. Although estimates of the number of Nagas killed in the Indo-Naga war range from 200,000 to 300,000, there is still no final solution in sight, and armed bands of underground soldiers continue to roam the countryside.[25] Sakhrie's words written to his friend in 1955 were prophetic: after the first blow was struck, the violence had not stopped until it had exhausted itself.

A Bruised Khonoma Turns Away from Politics

Khonoma became rather subdued after 1970, when the clans living on the outskirts were finally permitted to return to the main village. A military presence in the Merhümia fort watched over them for signs of further trouble until 1972. Many of Khonoma's leaders were now either dead, in prison, or in exile. A large memorial

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[24] It is doubtful how much popular support the underground factions continue to enjoy. They typically support themselves, and their leaders' lifestyles in foreign countries, by extorting "taxes" from villagers, businesses, and government officials, often at gun-point. When criticized for this, the so-called "national workers" shrug it off and point out that government officials are stealing far more from Nagas through corruption … so why should they not claim their share? This illustrates how Naga society is being "sucked dry", with government officials siphoning off funds at the top and underground factions feeding from the bottom. The average Naga villager is caught in the middle and sees little improvement in his or her life despite all the funding that Delhi pours into Nagaland every year.

[25] In conflicts of this nature, both sides typically engage in a propaganda war, and release exaggerated or subdued accounts aimed at furthering their own agendas. When confronted with very different accounts from the Indian Government and the Naga underground, without supporting evidence, it is difficult to know where the truth lies.

stone in front of Khonoma's bus stand lists 46 of the village's sons and daughters who were killed between 1956 and 1992 in Nagaland's struggle for independence (plate 3-160). Individual gravestones provide further testimony of Khonoma's losses (plates 3-161 and 3-162), but the bodies of many still lie in Burma and other distant battlefields, where they fell.[26] A large number of its people remained scattered across other villages, where they had bought land and begun new lives. Those who returned to Khonoma not only had to rebuild their village, but also to come to terms with the psychological scars left by the war. Khonoma seemed to turn its back on politics and became better known for its contributions to medicine, education, and religion (Zinyü, M., 1994, 58).[27] After rebuilding their homes[28], the Baptist congregation spent the years from 1979 to 1982 erecting the large stone church that now dominates the village's skyline. A hospital was added in 1982, when Khonoma's Dr. Setu Liegise was State Minister of Health.

In 1990, Khonoma received news that its most infamous son, A.Z. Phizo, had died in London, aged 86. The man that many call "The Father of Naga Nationalism" never lived to see the sovereign Naga nation of which he had long dreamt. Although this overview has been far too brief to do justice to the complexity of political developments that unfolded in the Naga Hills after India gained independence, it is sufficient to show the extraordinary role that Khonoma played in these events and in turn, how they affected the village.[29]

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[26] Many more were injured or imprisoned. The story of Sanguto Chase provides one such example. Now a gentle, softly-spoken man who works tirelessly in the church, it is hard to imagine Sanguto taking up arms against anyone. But he was one of a group of 543 Naga fighters who left their homes in the final days of 1967 to walk to Yunnan, in China, for arms and military training. While crossing Burma they encountered the Kachin, or eastern Nagas, and many other tribes that they did not recognize. People were not overly alarmed by the large group of Nagas because they were accustomed to the movements of the Kachin Independence Army (KIA). Recognizing them as brothers-in-arms engaged in a similar struggle for freedom, the KIA assisted the Nagas in safe passage through Burma. After walking for about two months, the group arrived in Yunnan and the Chinese took them to Beijing and gave them 10 months of military training and arms. Sanguto was amongst those captured by the Indian army as they crossed back into Nagaland. He spent the next 8 years and 2 months in Indian jails. (Narrated by Sanguto Chase.)

[27] Wider aspects of the village's history and development have been documented by several Khonoma scholars; see Meyase, S., 1985, 2001; Sanyü, 1987, 1994; and Punyü, 1995.

[28] Khonoma today clearly shows the fault lines that divided the village at the onset of the Indo-Naga war. The houses of the Thevomia clans that pledged allegiance to India and remained behind appear old and blackened, having been constructed partially from materials scavenged after the village was burnt down in 1956. Those who fled to the forests were not able to reoccupy their traditional house sites until about 1970 and had to use new materials, so their houses appear much newer and more modern in design.

[29] There is a rich literature on this era, written by both Nagas (Yonuo, 1974; Namo, 1987; Horam, M., 1988; Mao, 1992; Atsongchanger, 1994; Horam, R., 1998; Chasie, 1999; Vashum, 2000; 2001; Ao, A.L., 2002; Nuh, 1986, 2002; Iralu, 2001a, 2003; Zhimomi, 2004) and Indians (Aram, 1974; Gundevia, 1975; Anand, 1980; Nibedon, 1983; Singh, 1987; Ramunny, 1993; Maitra, 1998). Research into the Indo-Naga conflict should consult both sets of literature since they often present contrasting perspectives on who was at fault and where it all went wrong. Other authors have discussed Nagaland as part of the wider insurgency movements across Northeast India (Ghurye, 1980; Datta, 1994; Gopalakrishnan, 1995; Hazarika, S. 1995; Tarapot, 1996; Ghosh, 2001; Nuh, 2001; Nepram, 2002).

THE CONTEMPORARY SITUATION: THE VILLAGE AS FOUND DURING THE PERIOD OF FIELDWORK

An estimated 18 to 21 generations have now passed since Ratsa uttered his prayers asking for the spirits' blessings and the settlers began clearing trees for the new village that would become known as Khwünoria. Much has changed in the intervening 600 to 700 years. After centuries of relative seclusion, the arrival of British rule brought profound changes to the Naga Hills, but the curtain of isolation was drawn again with the outbreak of the Indo-Naga war in 1956. India barred outsiders and spent much of the next 50 years fighting to suppress the Naga revolt. In many ways, this slowed the pace of change as the Naga Hills were again cut off from the outside world. Khonoma remains rather isolated on the southwest fringe of Angami territory (map 5-1), but its historical reputation endures. A state census found the Angami population to be 97,631 in 1991, spread over 62 villages (appendix 3-14). This made the Angami the fourth-largest of the Naga subgroups in current-day Nagaland.

The Continued Dispersal of Khonoma's Population

Khonoma now stands as a mere shadow of its former glory. A census conducted by one of the village organizations in 1997 found that more than two-thirds of its people remain scattered outside the village (3623 out of a total of 5263. See figure 5-1 and appendix 3-15). The scattered ones are the villagers that fled the Indian army's attack in 1956 and never returned. These village-level data were confirmed by the family histories recorded by the ten households that were the main collaborators in fieldwork for this study. Vingulie Viprü (farmer no. 6) provides a good example. He was born as the fifth child in a family of three boys and four girls. At the time of the fieldwork, he calculated that he was probably about 62 or 63 years old. One brother and two sisters had already died. Of the surviving four siblings, only Vingulie remains in Khonoma. The other three live in Medzephema, Socunoma and Dimapur, having not returned after the war. This means that Vingulie has sole use of all his father's ancestral lands and is relatively land-rich (See appendices 6-1b and 6-1c). Some of the land belongs to his surviving brother, but since he is not in the village, Vingulie has use of it. His house is also on the plot previously occupied by his father. This family is typical of Khonoma and illustrates why the village population and pressures on land have both decreased. As they gradually left their forest refuges, they bought land, intermarried and settled into other villages. Today there are many villages, mostly at lower altitudes in the Medzephema area, whose populations are dominated by Khonoma's descendants (map 4-1).[30] Even after almost 50 years, these

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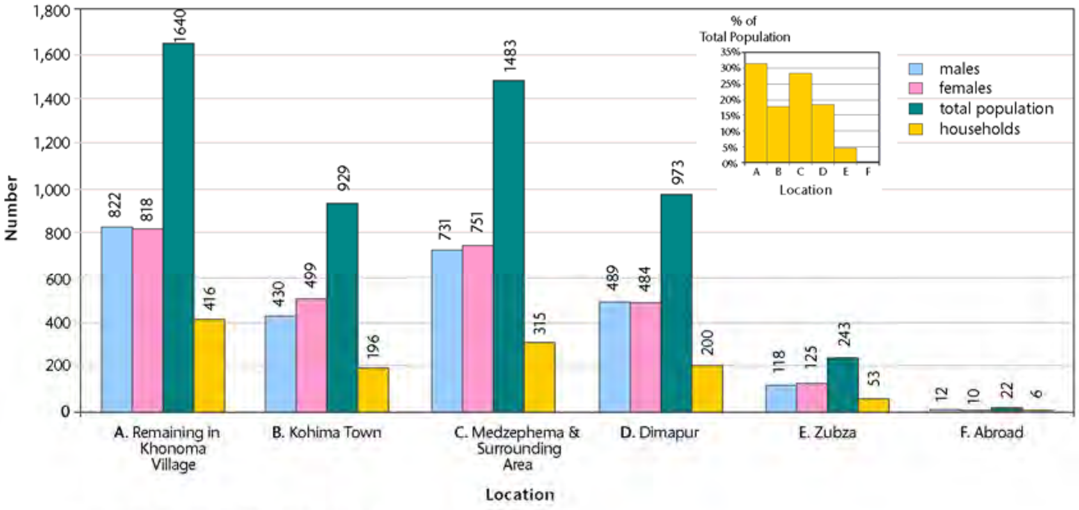
[30] Places whose populations include a sizeable representation of Khonoma descendants who arrived as refugees during the war years include Nagarjan colony, Chumukedima, Ruziephema, Heninkunglwa, Sithikima, Medzephema, Ghaspani, Piphema, New Sochünoma and Seirheima in Chakroma area; and in Punglwa, Poilwa (also called Pulomi) and Gaili in Zeliang area (see map 4-1).

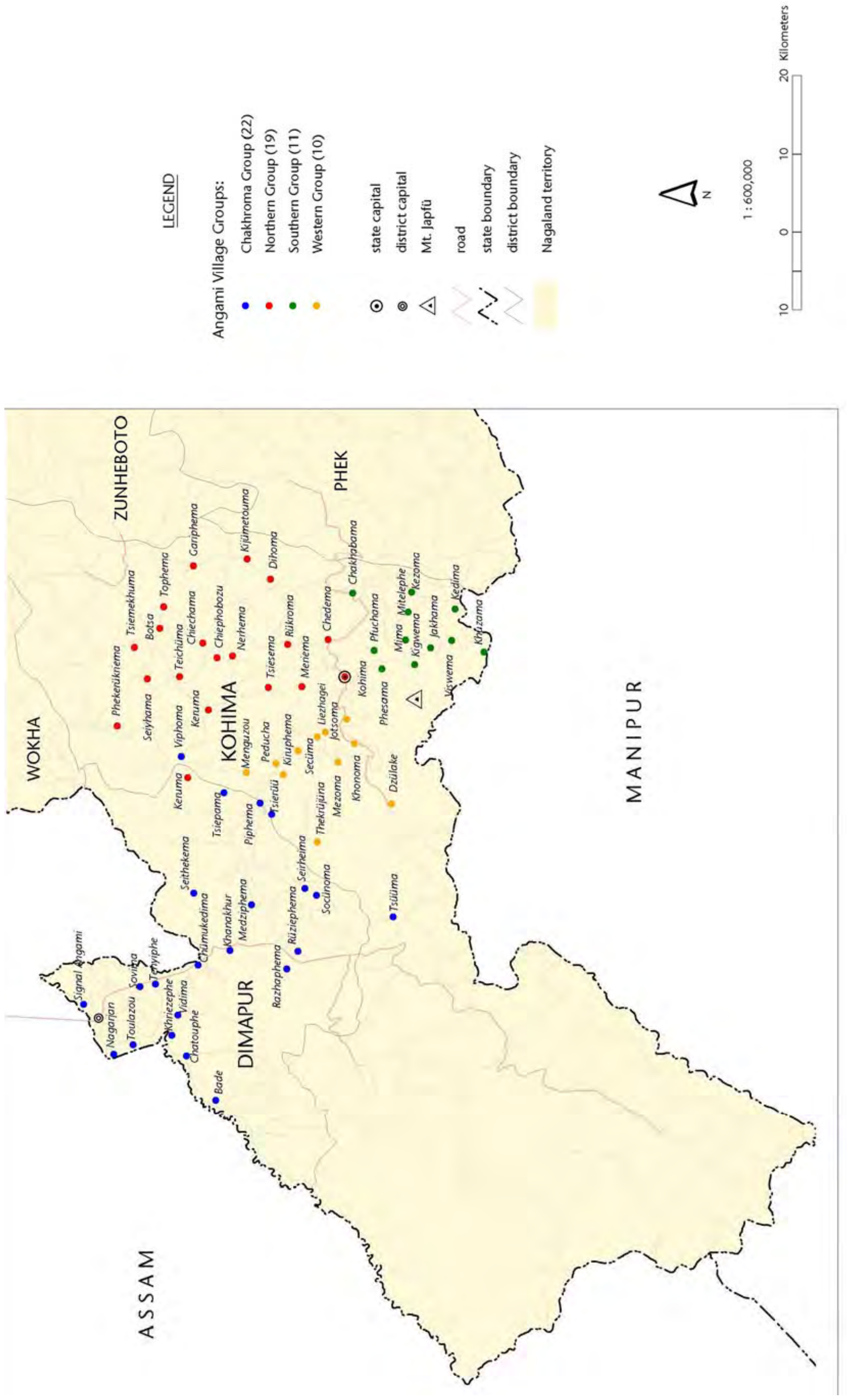
descendants continue to proudly identify themselves as Khwünomia (“*men of Khonoma*”) (Aier, 2001).

Figure 5-1. Dispersal of Khonoma’s People as of 1997 *



* *Source:* Greenridge Club, Residence in 1997.

In contrast to this huge outflow of its people, there has been virtually no inflow of outsiders into Khonoma, other than Nepali and other foreign herders who live on the outskirts of the village and work for Khonoma people, but are not regarded as forming part of the population. The data presented in table 5-1 show that 95.10% of the local Angami population was born there. The remainder was born mostly in Kohima (1.72%), Dimapur (1.12%), and other nearby Angami villages (1.21%). The 4.9% born outside Khonoma are most probably imported brides or people born during the war years when most of Khonoma’s population was in exile. Although technically born outside Khonoma, this latter group returned to the village with their parents when the security situation improved. The Angami’s strict prohibition against selling land to outsiders made it impossible for any outside male to acquire either a residential plot or agricultural land to settle in Khonoma. Nor, since the Angami generally follow a rule of patrilocal residence after marriage, is it likely that an outside male would marry into the village. Even if someone did so, the Angami system that limits land ownership to the males would mean that his wife would not have any property for them to cultivate. Therefore, while it was easy for villagers to leave Khonoma, it was very difficult for outsiders to enter.



Map 5-1. Breakdown of Angami Villages by Group *

Table 5-1. Place of Birth of Khonoma's Current Residents, Examined by Khel and Gender *

Place of Birth	Merhümia khel		Semomia khel		Thevomia khel		Entire Village
	males	females	males	females	males	females	total
Dimapur	5 (1.25%)	6 (1.43%)	- (-)	- (-)	4 (0.87%)	9 (2.13%)	24 (1.12%)
Dzulake	1 (0.25%)	2 (0.48%)	- (-)	- (-)	4 (0.87%)	2 (0.47%)	9 (0.42%)
Jotsoma	- (-)	2 (0.48%)	1 (0.48%)	2 (0.84%)	2 (0.44%)	7 (1.66%)	14 (0.65%)
Khonoma	384 (96.24%)	397 (94.52%)	207 (99.04%)	230 (97.05%)	433 (94.54%)	389 (92.18%)	2040 (95.10%)
Kohima	3 (0.75%)	8 (1.90%)	- (-)	1 (0.42%)	13 (2.84%)	12 (2.84%)	37 (1.72%)
Mezoma	- (-)	- (-)	- (-)	1 (0.42%)	- (-)	1 (0.24%)	2 (0.09%)
Rüziephema	- (-)	- (-)	- (-)	- (-)	- (-)	1 (0.24%)	1 (0.05%)
Zeliang area	- (-)	1 (0.24%)	- (-)	- (-)	- (-)	- (-)	1 (0.05%)
Not Available	6 (1.50%)	4 (0.95%)	1 (0.48%)	3 (1.27%)	2 (0.44%)	1 (0.24%)	17 (0.79%)
Total	399 (100%)	420 (100%)	209 (100%)	237 (100%)	458 (100%)	422 (100%)	2145 (100%)

* Data derived from a household survey undertaken as part of field research.

Figure 5-2 takes a longitudinal look at available population data for Khonoma. It should first be noted that, on the extreme right of the graph, the official 2001 census indicates much higher numbers than our own census, which was conducted the following year as part of the fieldwork. This is most likely due to over-reporting of Khonoma's population in order to boost government grants to the village.[31] The official census-takers appear to be counting many who spend most of their time outside the village and perhaps return to the family home only on weekends or during festivals. This raises the possibility that they may be counted a second time in their adopted residences, casting doubt on the reliability of Nagaland's census data.

Khonoma's elders talk of pre-British times when Khonoma boasted more than 700 houses (Savino, 2001). We have no independent verification of this, but if it is accurate, then it means that Khonoma is now only slightly greater than half the size it had once been. The data on house numbers became more reliable after 1866, when the British decided to annex the Naga Hills as part of Assam and began counting houses as a basis for taxation. The data show drops in Khonoma's population – as expected – after both the attack by the British in 1879 and by India

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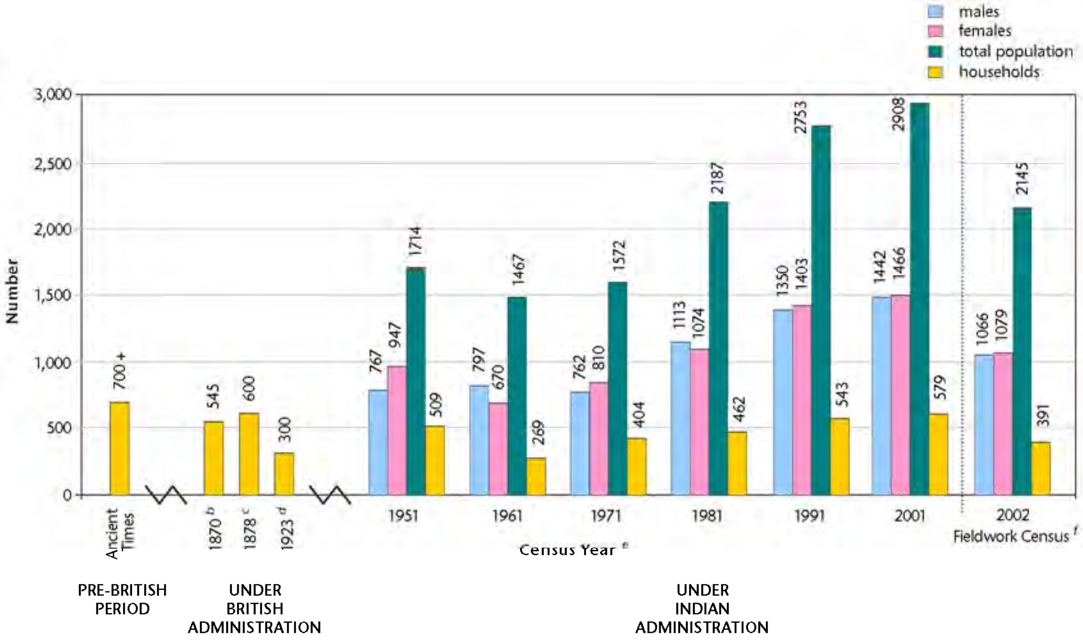
[31] Centrally-sponsored funds are generally channeled through the state's Rural Development Department to each village's VDB (Village Development Board) and the amount is based on the number of households. Therefore, it is in every village's interest to count families even after they have moved away and only their empty houses remain. This is abetted by Census India hiring locals, usually teachers, to enumerate their own villages. Inflated numbers are almost a certainty.

in 1956. Many young men, who otherwise would have been starting families and cultivating the land, were instead occupied by, and often killed in, fighting. Although Nagaland is now relatively peaceful, and the village should be in a position to grow, it is probably shrinking once again – this time because people are moving away to pursue better education and livelihood opportunities. Many houses stand empty, their owners moved away. As already hinted at, the situation of sustained growth since 1971 shown by India's official census figures probably does not reflect this latest exodus. On a state level, Nagaland's population showed 64.41% growth in the ten years from 1991 to 2001 (Jamir, 2002). This was one of the highest growth rates in all of India and indicates a population-doubling time of less than 20 years. Yet Khonoma's population has been stagnant or shrinking – with profound implications on land use pressures. If Khonoma is typical and many Nagas now appear on more than one census list, this may help to explain Nagaland's exceptional population growth. If the same holds true for voting lists, then it also provides a huge opportunity for electoral fraud. Another well-known reason for Nagaland's sky-rocketing population is that politicians are facilitating the entry of large numbers of non-Naga outsiders to exploit as voting blocks.

Figure 5-2. An Overview of Available Population Data for Khonoma over Time *



[a] Reported by Khonoma's oral history and some early British documents

[b] Butler, 1870a; 1870b; 1873

[c] Ridsdale, 1878

[d] Balfour, 1923

[e] Census of India

[f] Village censused as part of fieldwork

* See figure 5-1 for insights on why the numbers that we counted during the fieldwork census were so much lower than those of the official Census of India the year before. Our census counted only those residing in Khonoma village itself (group A), but it is likely that the official census also included many who now reside outside the village (groups B-F).

Privately, many affluent Nagas living in the larger towns consider it a mark of their success to hire outsiders as servants to chauffer their cars, clean their homes, cook their food, and help raise their children. If one walks around Kohima, it is clear that most tasks involving drudgery or heavy labor are being done by non-Nagas, while the Nagas are acting as a privileged class of landlords. Most of the mercantile trade is also controlled by Marwaris (a group of Indo-Aryan people originating from the Marwar region of Rajasthan, well known for their business acumen), despite legislation that restricts licenses to Nagas only. The Nagas simply lease these licenses to the Marwaris and make a profit without any investment. The high value that Nagas attach to their personal freedom does not suit them well for keeping shops, working in offices, or other vocations that require regular hours. Government offices in Kohima are often virtually deserted during what are meant to be official office hours.

As one drives around the state, the crews seen repairing the roads are usually plains people. Even in the villages, it is usually migrants from India or Nepal who look after the cattle. Although Nagaland does not share India's caste system, it is nonetheless developing a strong social stratification that relies on impoverished neighbors to do the jobs that Nagas prefer not to do – not unlike Indian labor in Bhutan, Burmese labor in Thailand, or Mexican labor in the United States.

If these trends continue, then Nagas may eventually become a minority in their own homeland. The political implications of this will be enormous, as exemplified in nearby Tripura where indigenous people are now outnumbered by migrants – mostly from adjacent Bangladesh. As von Fürer-Haimendorf (1979) observed, the Nagas remain in a relatively advantageous position compared to other tribal peoples precisely because they have been able to maintain control over their own land and economy. But this could easily change, given the current high rates of migration into Nagaland from the crowded lowlands and a political system where one person equals one vote, regardless of ethnicity. Nagaland's extraordinary population growth between 1991 and 2001 is evidence of this.

Khonoma's current population is depicted by the population pyramid shown in figure 3-4 (author's census). Here again, we can see additional reasons for reduced population growth. Most noticeably, it shows a significant decline in fertility that began 10 to 15 years ago, as Nagaland became more peaceful and family planning methods more available.[32] The sex ratio was 1012 females per 1000 males.[33] The

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[32] Some speculate that the demand for chastity during the Nagas' frequent gennas may have traditionally reduced fertility (Keitzar, 2000). However, this influence would presumably have disappeared as Nagaland converted to Christianity and gennas were no longer observed.

[33] The ratios of women per 1000 men for the individual khels were 1052 for Merhümia, 1134 for Semomia, and a somewhat lower 921 for Thevomia (see appendix 3-18). It is not clear why Thevomia's proportion of women is relatively less than that of the other two khels.

higher proportion of females probably reflects higher male mortality during the Indo-Naga war. This is suggested by some rough calculations. If we assume that most war deaths occurred from 1956 to 1964, when fighting was most intense, and that most combatants were 20 to 40 years old, then Khonoma men killed in the war should now be noticeable by their absence from age categories 55 years and up on the village's population pyramid. If we use this as the dividing line, we find a sex ratio of 1471 females to 1000 males for ages 55 and above, and 955 females to 1000 males for below 55 (see appendices 3-19 to 3-21). Hence, women greatly outnumber men in the higher age brackets in Khonoma.

The forced exodus of its people during the Indo-Naga war had another important implication for reducing pressures on Khonoma's scarce agricultural land. Many of those who eventually returned to Khonoma had become familiar with the fertile lowlands, which yielded bumper rice crops, and had bought land there. The Medzephema area had earlier been a Kuki stronghold, but during a Naga-Kuki conflict that began in mid-1992, many Kukis sold their land there to Nagas (probably under duress) and moved somewhere safer. It is recognized as one of the best rice-growing areas. Many of the buyers of the Kuki land were from Khonoma. Rice cultivation in the relative lowlands of Medzephema was very different from what they were accustomed to in Khonoma, and easier in many ways. The flatter landscape permitted larger fields suitable for cultivation by draught animals. New hybrid rice varieties could be planted in Medzephema's hotter climate, providing higher yields. Buffalo could be used in threshing the rice and the crop then transported back to the village by truck. Rice could be grown on a scale and at a level of mechanization far beyond what was possible on Khonoma's rugged terrain.

Khonoma's familiarity with Medzephema long predated the Indo-Naga conflict. Medzephema was amongst the many villages that involuntarily contributed to Khonoma's economy through the plunder of war. In his 1870 tour diaries (February 7th), Butler noted that Medzephema had pleaded to be taken under British protection to save it from attacks by Khonoma, Mezoma and Kohima. Butler was powerless to do much because government policy at that time was to avoid interference in the Nagas' internal disputes (Butler, 1870b). Most of this outside land is cultivated by Nepalese, Assamese or Biharis on a share-cropping basis and an estimated 10 to 15 large truckloads of rice arrive to be offloaded in Khonoma every autumn. There has thus been the double effect of a dwindling population supported by an expanding land base. This largely explains the present significant reduction in cultivation pressures on Khonoma's agricultural land, although the expansion of the off-farm economy has also played a major role (See chapter 7). Jhum fields are being left in increasingly longer fallows and some of the more distant or less productive fields have not been opened for a long time. Tree cover on

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The 2001 census showed sex ratios of 932 women per 1000 men in Nagaland's rural areas, 853 in urban areas and 909 overall (Ao, M., 2002).

the landscape has increased (see plates 3-180 and 3-181, for example). Even some of Khonoma's more distant wet rice terraces, in the Piegei area, are now often left unplanted, their owners preferring to either buy rice or import it from fields they have bought on the plains. In neighboring Dzulake valley, which had helped to absorb some of Khonoma's population pressures since the mid-1850s, the reduction in agriculture is even more dramatic. The wet rice terraces that Hutton admired in 1934 now lie largely abandoned (Hutton, 1934a).[34] Alder regrowth is the only trace of the jhum cultivation that once occupied the adjacent hillsides. The former bustling population of more than 50 households that cultivated these lands prior to the Indo-Naga war has now shrunk to only 18 or 20. The village had to sell its bus because of a lack of passengers, who must now rely on a Poilwa bus that passes through Dzulake several times a week on its way to Kohima. Those who remain find it more profitable to graze cattle and mithun on uncultivated land and concentrate their energies on weaving baskets and shawls for sale. Across the mountains to the north, the Kukhwi settlement that had expanded to 20 households until attacked by the Indian army in 1957 (Iralu, 2003, 195-200) now sits virtually abandoned, the jungle reclaiming the land. Only two brothers from Phetsu clan (Thevomia khel) continue to visit this area to plant ginger and turmeric in the rich forest soils. Khonoma's whole landscape gives the impression of having once supported a much higher population than is currently the case.[35]

The village's residential area also shows the effects of its recent history. When last rebuilt, the traditional Angami design of large wooden houses with thatched roofs (plate 3-43) was replaced by smaller bungalows with aluminum roofing and often with cement walls and floors. Since conversion to Christianity meant that livestock no longer had to be kept in large numbers for sacrificial purposes, the houses no longer had to be large enough to double as barns at night.[36]

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[34] An earlier diary entry, by Davis, shows that in the closing years of the 1800s, Khonoma was still expanding its cultivation in the Dzulake valley.

> "This year the Khonoma experimental terraces in the Zullu valley [presumably Dzulake valley] have been a great success, the crops obtained having been very good. The Merhima [Merhümia] khel are now talking of rebuilding a village which existed in the valley many years ago, but was abandoned owing to failure of crops, and of opening out the whole of the available land in the valley, which lies at an elevation of 6,000 feet, as terraced rice cultivation. The climate of this valley in the cold weather is very cold. In December 1887, when camped there, water outside my tent was frozen over hard by 8 p.m." (Davis, 1891b, 4)

[35] There is nothing unusual about this. Drawing a comparison, many rural Canadians migrated to the cities in search of better economic opportunities after World War II, and more marginal agricultural land was left uncultivated. Using my own province as an illustration, much of the sandier land in eastern Prince Edward Island that was farmed before the war is now back under forest cover, and the best agricultural land is being cultivated more intensively than ever before. Some of these same dynamics are seen in Khonoma.

[36] The decline in animal sacrifices also reduced villagers' economic burden. Nirüdo Khate (farmer collaborator no. 7), describes how – when both his parents died when he was still very young – his family was forced to sell much of its land in order to purchase the livestock needed to sacrifice at their funeral rites. This left them chronically short of land during Nirüdo's life. After the 1964 ceasefire, he supplemented his income by buying cattle in Lanka and Doboka (Assam) and driving them up the mountains to resell in

Only a few houses, such as that depicted in figure 3-9, retain the traditional layout and even these now have steel sheeting on the roofs and walls.[37] There are none of the majestic house horns (kika - figure 3-1) or frontal planks carved with mithun heads (figure 5-3) that were once typical of Angami villages.[38] The morungs that were formerly the centre of village life now lie covered in dust and cobwebs. The only carvings that remain are those on the village gates (figure 5-4 and plates 3-149 to 3-154). But even one of the main Merhümia gates was replaced with a stone replica in 1983 (plates 3-196 and 3-197) so that it will be permanent and the traditional gate-pulling ceremony will never have to be repeated for that particular gate. Most of the ornaments, shawls, and other heirlooms that should have been passed down to succeeding generations were destroyed when the village was burnt. Others were bartered for rice when the villagers were driven into hiding in the forests. Khonoma is a good example of the artistic sterility that Mills (1934) described as typically descending on Naga villages after conversion to Christianity. Now that tourism is being promoted, some recently-published coffee-table books (Stirn and van Ham, 2000, 2003; Arya and Joshi, 2004, for example) give a deceptive impression of unchanged timelessness in Nagaland. These images are likely to be seen only during festivals or when the villagers are persuaded to pull their traditional dress out of storage to entertain outsiders demanding photographs of exotic natives.[39]

Kohima, usually 14 to 20 head at a time. With his earnings, Nirüdo was eventually able to supplement his land holdings by purchasing both wet rice and jhum plots. He is also the only son remaining in the village and has sole use of all of his father's ancestral land that was not sold.

[37] Old steel barrels, imported into the Naga Hills for road-building, are commonly cut open, flattened, and used for wall and roof materials in Naga villages (see, for example, the roof in the background of plate 3-103). Sometimes even biscuit tins are used in this way.

[38] During Archer's visit to Khonoma in 1947, his notes indicate that even before the effects of warfare, Christianity, and modernization, Khonoma was less ornate than other Angami villages because of the exceptionally stiff feasting requirements that had to be met before one earned the right to erect such decorations of prestige:

While visiting Khonoma in 1936, von Fürer-Haimendorf also observed the village's lack of decoration and explained:

> "Formerly, Khonoma houses did have horns but the necessary genna connected with it was so expensive that there came a time when no one could afford it. Now, however, it cannot be held at all any more as the feast giver needs the help of a man who himself has held the house horn genna." (von Fürer-Haimendorf, 1936)

[39] A good example of this is a World Bank-sponsored film on Khonoma's system of alder management in its jhum fields – "Alder Tree Farming in Nagaland. A Heritage of Conservation" (Sanen, undated). It contains footage of Khonoma men, replete in kilts and rattan kneelets, busily pollarding alder trees. I never encountered such a sight in my years of fieldwork, but the cameraman for this film was able to stage-manage it within his few hours in the village. The coffee table books are often the same – meant to attract buyers with colorful exotica rather than depict the true, perhaps more mundane, day-to-day lives of Nagas.

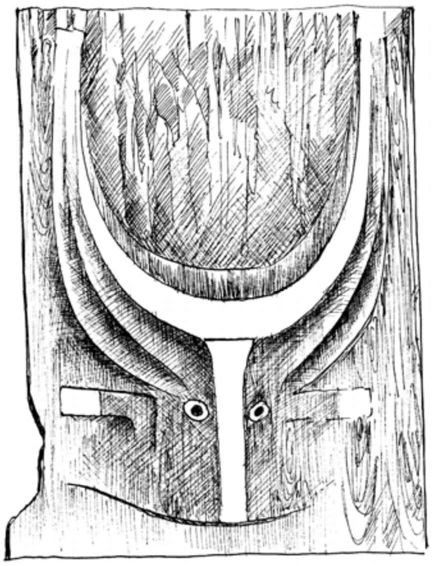

Figure 5-3. Carvings of mithuns decorated the fronts of many Angami houses.

Figure 5-4. A sketch of Semomia khel's gate, a reminder of past headhunting days when all gates were constantly guarded by sentries looking out for approaching invaders, and swung shut at night. The carvings on the gates were intended to frighten intruders.

Khonoma was not homogeneous in terms of these changes, however. There was another side-effect of India's imposed breakup of the village. Villagers themselves observe that those clans that endured the hardship of exile became stronger; the wider social networks they were forced to develop, and exposure to outside knowledge systems, made them more outward-looking and served them well in surviving the turbulent years since. Those years of struggle are widely credited with making Merhümia khel, in particular, more progressive and better educated than its neighbors. The two Thevomia clans that remained behind were coddled by the Indian army and had no reason to change. Thus, as one traverses the village from the south (Merhümia sector) towards the north (Thevomia sector), it is a bit like walking backwards in time. The houses become older and more crowded. Many have no toilet, and their occupants must either use community latrines or slip behind bushes and depend on free-ranging pigs to clean up.[40] Most of those who have retained their traditional religious beliefs are in this northern-most section of Khonoma (map 5-2). Angami festivals are celebrated with more vigor here. As in years past, men are more likely to be found sitting around the thehou (stone sitting places), nursing a bamboo mug of rice beer. Alcoholism is now reported to be a problem. The children running about this part of the village have more runny noses and appear to receive less care. They are reported to perform less well at school.

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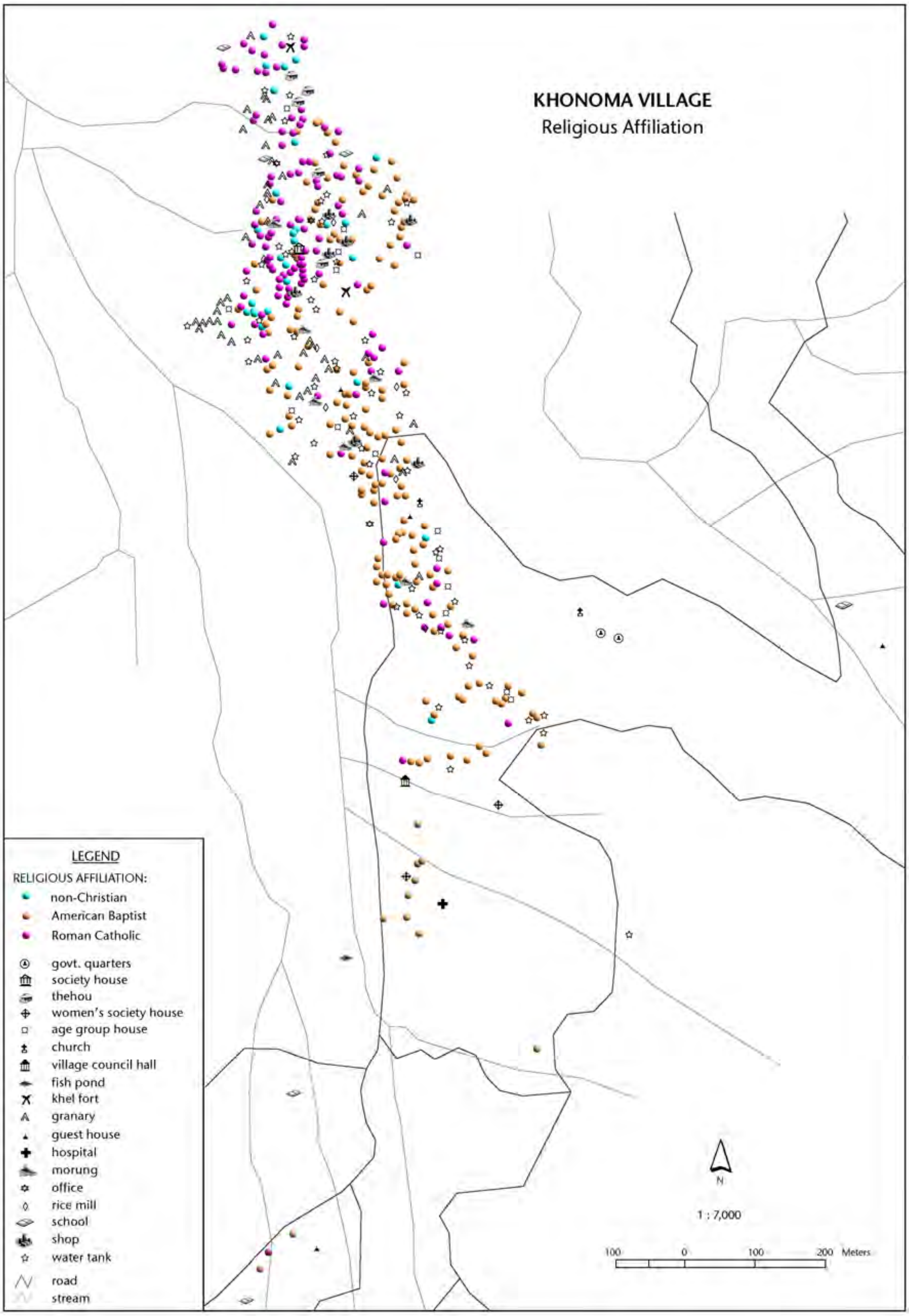
[40] A further example of this can be found across the valley in Mezoma village, where the upper Vihutsuma khel and lower Neisenoma khel refused allegiance to India and were driven from the village in 1956 (Singh, 1987, 126-133). Like the Khonoma refugees, many of them also settled in the area between Ghaspani and Dimapur and today are more educated and prosperous than those who remained behind in the village (Husie, 2001). Similar dynamics were also seen in Naga families with a son in the Indian army. Due to his exposure, influence and salary, his family would soon be further ahead than its neighbors (Yaden, 2000).

Map 5-2. Identification of Khonoma's Households According to Religious Affiliation *



* Cross-reference with table 5-5 and figure 5-9.

Undoubtedly their studies are frequently interrupted by the need to help their parents in the fields and their poorly-lit houses are hardly conducive to completion of homework in the evenings. The overall impression is one of less change and less prosperity.[41]

The Changes Brought about by Outside Influences and New Priorities

The review in Chapter 3 of Khonoma's social institutions as they existed in the early days of British rule provides a backdrop against which the tremendous social changes since then can be measured. Visitors to Khonoma will no longer find the heavy wooden gates swung shut at night, nor evidence of the palisading and trenches that formerly surrounded the village's perimeter. Gone are the days when the young men stood guard over the village, vigilant for any sign of attack. Women now set off for their fields in ones or twos without having to be escorted by armed warriors. Nor are the young men any longer schooled in the arts of warfare. They are far more likely to be found rushing off to activities in the churches or schools than listening to the elders. The dormitories (kichüki) now lie silent, covered in dust and cobwebs – artifacts of a past that the younger generations know little about. No one sleeps there anymore. Their former important role in training the village's youth has become but a footnote in history. They witness brief spurts of activity during festivals, but even those – formerly the highlights of the Angami social calendar – are being celebrated with waning enthusiasm.

The stone sitting places (thehou) outside the morungs have fared little better. A few elders can often be found gathering at the thehous in the late afternoon, particularly on Sundays. As they watch the sun sink behind the mountain ridges, they discuss village affairs, sometimes sing a few folksongs, or reminisce about the past. There are few problems for them to mull over; few decisions to be made. Village affairs are these days managed by a Village Council and disputes can be taken to a formal system of law courts. Khonoma's people are expected to abide by the decisions of state departmental heads in Kohima, and laws made in a distant place called Delhi. In view of the dramatic changes that these elders have witnessed in their own lifetimes, the events of the past must seem almost like a dream. As the long afternoon shadows merge into darkness and a damp chill grips the evening air, the elders huddle closer to the fire and women bring steaming cups of tea. Gone are

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[41] My research assistant's behavior reflected her opinion that the Thevomia khel continued to be more conservative in its outlook. Zeroni-ü Meru, the daughter of a Merhümia father and a Thevomia mother, had a good cross-khel perspective of the village. She normally dressed in jeans when our work took us to the fields and forests. But whenever we needed to visit the Thevomia section of the village, Zeroni-ü would first drop by her house to change into a mekhela (skirt) because of the more conservative expectations there of how women should dress and behave. This was not part of her behavior when we had interviews scheduled amongst the Merhümia and Semomia khels, which had become more liberal-minded whilst living outside the village.

the bamboo mugs of zu (rice beer) that they once nursed around the fire – banished, like so much else in their culture, by the white man's religion. Indeed, the sun is setting on an era for the proud and independent Angami – once the most feared warlords in all of the Naga Hills. Neither the old social institutions, nor the values they taught, seem particularly relevant in today's fast-changing society. As oral traditions are lost, the history and practices of their people are no longer being passed on to new generations.

Defense

The most urgent imperative that historically shaped how the Angami organized themselves was defense. These dynamics all changed when the British finally succeeded in subjugating the Nagas and bringing headhunting and hostilities among tribal groups to an end. Quite probably for the first time since migrating into their current homeland, Naga villages found it unnecessary to maintain their own civilian military forces. Responsibility for military affairs was surrendered first to the British colonial Government and then to India. The military purpose of the morungs became obsolete.

Neither Britain nor India found the demilitarization of Khonoma easy. After initial fighting was over, both powers found it necessary to maintain military camps in Khonoma over the long term. Most recently, the Indian army occupied the Merhümia khel fort Khonoma until 1972, as well as establishing a second camp on the village outskirts from 1963 to 1996. The Indian army also maintained a presence in the adjacent Dzulake valley until about 1980.[42] Hence it has only been within the last ten years that Khonoma has not had Indian soldiers on its soil.

Today, defense is not a pressing issue. Khonoma's three forts stand as abandoned monuments of the past, and are maintained for posterity. Most villagers are preoccupied with providing an education for their children and finding ways to get ahead in the newly-opening economy.[43] The most significant security threat that remains for most Naga villages is the continued fighting between the underground factions, and their demand for "taxes".[44] But Khonoma appears to be somewhat

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[42] Khonoma's political history makes it a particularly sensitive security area. It is seen as a potential flashpoint for trouble. Like a volcano that has shaken the region with several previous eruptions, the authorities worry about sufficient pressure building again, to cause another explosion. During a search of aerial photographs taken in the 1980s, it was found that those showing the Khonoma area had all been pulled from the collection.

[43] One career prospect for Naga villagers without much education or marketable skills is joining the Indian armed forces. Naga soldiers, accustomed to mountain environments, are reported to have fought valiantly in India's most recent conflict with Pakistan, in Cargill in 1999. However, many more young Nagas belong to the underground factions, potentially putting them on the opposite side of the battlefield to their brethren in India's national army.

[44] An incident that occurred towards the end of the fieldwork highlighted this threat. Two of Semomia khel's men were clearing a jhum field in the Medzephema area in October 2002 when they were abducted by NSCN-IM forces. Khonoma villagers pursued the group, hoping to negotiate the release of the men. They

buffered from these interfactional turf wars. As the birthplace of the original Naga political movement, everyone recognizes that Khonoma remains an NNC stronghold. In view of history, the other two factions probably retain respect for Khonoma's wrath.[45]

Education

The second major role of the morungs had been in providing education. Khonoma's morungs began to lose their monopoly on teaching when the first formal school opened in 1883. The expansion of schools (and medical dispensaries) across the Naga Hills was of course prioritized by the missionaries as a way to cultivate souls. The Nagas soon embraced both eagerly, associating them with economic advancement. All this hastened the demise of morungs, and they soon lay empty, like abandoned clubhouses, their members instead trooping off every morning to western-style classrooms.

In 1885-1886, the Deputy Commissioner estimated that "the number of Nagas in these hills who can read and write to be under 20" (Anonymous, undated-a). This provides a benchmark for highlighting the impressive gains that education has made in Khonoma over the past century.[46] Figure 5-5 shows a graphical representation of the educational levels (at the time of the fieldwork) attained by

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were too late to save one villager, who had already been beaten to death by IM soldiers. It remained unclear what had provoked the abductions. Reports suggested that a cache of either guns or drugs hidden by IM in the area had gone missing, and since the two jhum cultivators were closest at hand, the IM soldiers had concluded that they were responsible. They intended to torture the villagers until they revealed where they had hidden the lost property. It appears likely that the villagers were guilty of no more than being in the wrong place at the wrong time. This type of behavior suggests that some underground groups should more properly be regarded as terrorist organizations, preying on the very people they claim to represent.

[45] I have limited ability to comment on the underground governments since I strenuously avoided this sensitive area of Indo-Naga politics during my fieldwork. It is common knowledge though, that Khonoma remains a stronghold of the original Naga National Council (NNC), now led by Phizo's daughter. This parallel government is usually invisible, but I was reminded of it late one night when I was unexpectedly summoned to a villager's home. After the obligatory cup of tea and small talk, my hosts began to probe whether I wanted to meet the "legitimate" government of the Nagas. If so, then I should let them know and they would arrange it. Nothing further happened. I respected what they were doing, but they also recognized that I was trying to make a different type of contribution and needed to keep my distance, lest it be compromised.

[46] At state level, the 2001 census reported the following literacy rates, as percentages of the population, in Nagaland:

	Total	Rural	Urban
Persons	67.11	62.99	85.95
Male	71.77	67.73	89.01
Female	61.92	57.87	82.09

(Ao, M., 2002,. vii)

villagers who were not planning on further studies. By breaking down the data into age brackets (table 5-2) the progressive improvement of education in Khonoma over the past century becomes evident. A couple of other points are worth noting from figure 5-5. The older generation that never received any formal education still represents a sizeable portion of the population (29.8%). Most adult villagers now have at least an intermediate level of education (grades V-X), that is probably quite adequate for life in a rural Naga village. Since the village's own school system only reaches the 10th grade, many end their studies there. To continue studying would necessitate moving away from the village, probably to Kohima, and supporting that expense can be a strain on many cash-short families. Therefore, it is not surprising that few end their education in the senior grades (XI-XII). If they relocate to Kohima to finish senior high school, it is likely that they intend to continue on to university. For those who have graduated from a post-secondary institution, Arts degrees are by far the most popular – both at Bachelor's and Master's levels.

Figure 5-6 presents the same data, but in a pyramid format that allows a clearer comparison of educational levels between the genders.[47] Here we can see clear evidence of the earlier Naga attitude that it was unnecessary to educate girls. Of the total that received no education (346), fully 78% (270) were women. Indeed, since resources were scarce and labor still needed to work in the fields, it is understandable that parents chose to send their sons to school and keep their daughters at home. It was, after all, the boys who would continue the male line of descent and represent the families in dealing with the outside world. It would have seemed a poor investment to educate daughters who would then marry and join another clan. Besides, the role of women in society was seen as tending fields and families, and they had always been able to do that without reading, writing, or arithmetic. This entrenched women in the subsistence sector, while their husbands were more likely to engage in off-farm activities. The results of this, in terms of division of labor, will become evident in chapter 6.

It is widely reported that Merhümia khel was both the first of Khonoma's khels to accept Christianity, and by extension, the first to receive formal education. Figure 5-7 shows that it still retains some advantage from that head start. This can be seen at both ends of the spectrum – in terms of fewer people that have received no formal education at all (23.73%), and more that have gone on to university (including pre-university) – (22.84%). Semomia khel appears to be lagging significantly behind the other khels in both these areas.

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[47] See appendices 3-31 to 3-33 for breakdowns by khel.

Table 5-2. Overview of Education in Khonoma as Influenced by Age [a] [b]

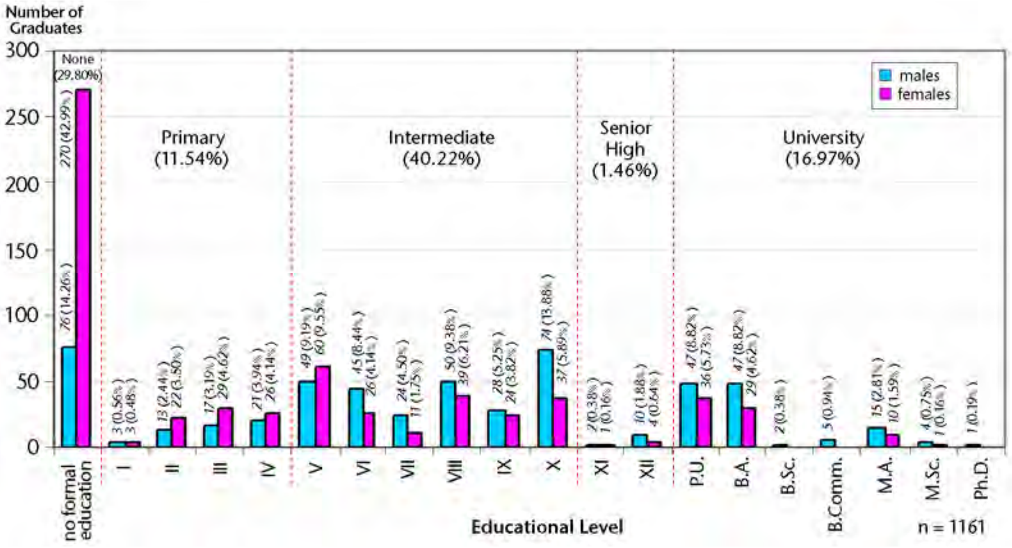
level completed [c]	Age Brackets (years)					
	< 20	20-39	40-59	60-79	80+	Total
none	13 (25.00%)	61 (10.66%)	107 (34.08%)	132 (70.97%)	33 (89.19%)	346 (29.80%)
I	-	4 (0.70%)	2 (0.64%)	-	-	6 (0.52%)
II	2 (3.85%)	13 (2.27%)	14 (4.46%)	5 (2.69%)	1 (2.70%)	35 (3.01%)
III	3 (5.77%)	24 (4.20%)	11 (3.50%)	8 (4.30%)	-	46 (3.96%)
IV	4 (7.69%)	24 (4.20%)	15 (4.78%)	4 (2.15%)	-	47 (4.05%)
V	6 (11.54%)	64 (11.19%)	29 (9.24%)	10 (5.38%)	-	109 (9.39%)
VI	5 (9.62%)	37 (6.47%)	23 (7.32%)	6 (3.23%)	-	71 (6.12%)
VII	3 (5.77%)	24 (4.20%)	4 (1.27%)	3 (1.61%)	1 (2.70%)	35 (3.01%)
VIII	8 (15.38%)	59 (10.31%)	17 (5.41%)	4 (2.15%)	1 (2.70%)	89 (7.67%)
IX	3 (5.77%)	32 (5.59%)	13 (4.14%)	3 (1.61%)	1 (2.70%)	52 (4.48%)
X	1 (1.92%)	71 (12.41%)	36 (11.46%)	3 (1.61%)	-	111 (9.56%)
XI	1 (1.92%)	1 (0.17%)	1 (0.32%)	-	-	3 (0.26%)
XII	-	11 (1.92%)	3 (0.96%)	-	-	14 (1.21%)
P.U.	2 (3.85%)	68 (11.89%)	9 (2.87%)	4 (2.15%)	-	83 (7.15%)
B.A.	-	49 (8.57%)	23 (7.32%)	4 (2.15%)	-	76 (6.55%)
B.Sc.	-	2 (0.35%)	-	-	-	2 (0.17%)
B.Comm.	1 (1.92%)	3 (0.52%)	1 (0.32%)	-	-	5 (0.43)
M.A.	-	20 (3.50%)	5 (1.59%)	-	-	25 (2.15%)
M.Sc.	-	5 (0.87%)	-	-	-	5 (0.43%)
Ph.D.	-	-	1 (0.32%)	-	-	1 (0.09%)
all levels	52 (100%)	572 (100%)	314 (100%)	186 (100%)	37 (100%)	1161 (100%)

[a] Data derived from a household survey undertaken as part of field research.

[b] See appendix 3-29 for a breakdown of these data to the khel level.

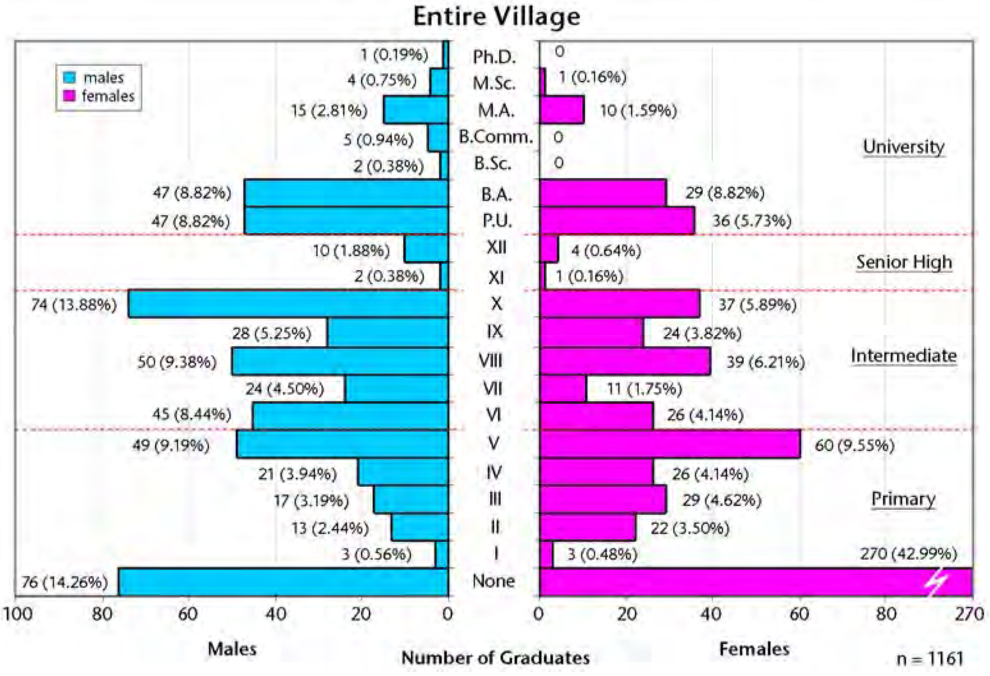
[c] P.U. – pre-university; B.A. – Bachelor of Arts; B.Sc. – Bachelor of Science; B.Comm. – Bachelor of Commerce; M.A. – Master of Arts; M.Sc. – Master of Science; Ph.D. – doctorate

Figure 5-5. Gender Comparison of Educational Levels Attained by Khonoma Residents who Consider their Formal Education to be Complete *



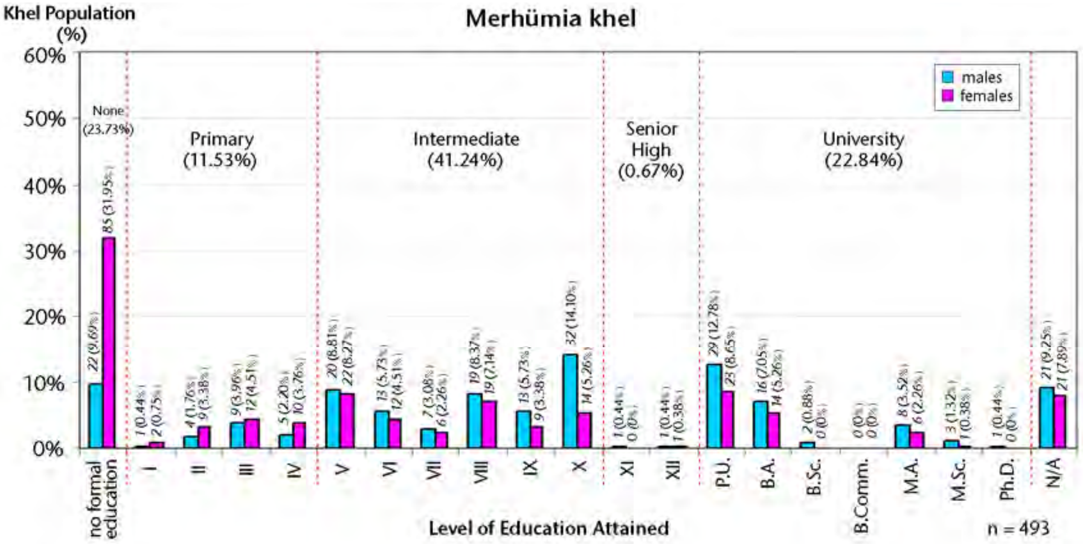
* Data derived from a household survey undertaken as part of field research.
P.U. – pre-university; B.A. – Bachelor of Arts; B.Sc. – Bachelor of Science; B.Comm. – Bachelor of Commerce; M.A. – Master of Arts; M.Sc. – Master of Science; Ph.D. – doctorate; N/A – data not available
See figure 5-7 for a further breakdown of these data by khel.

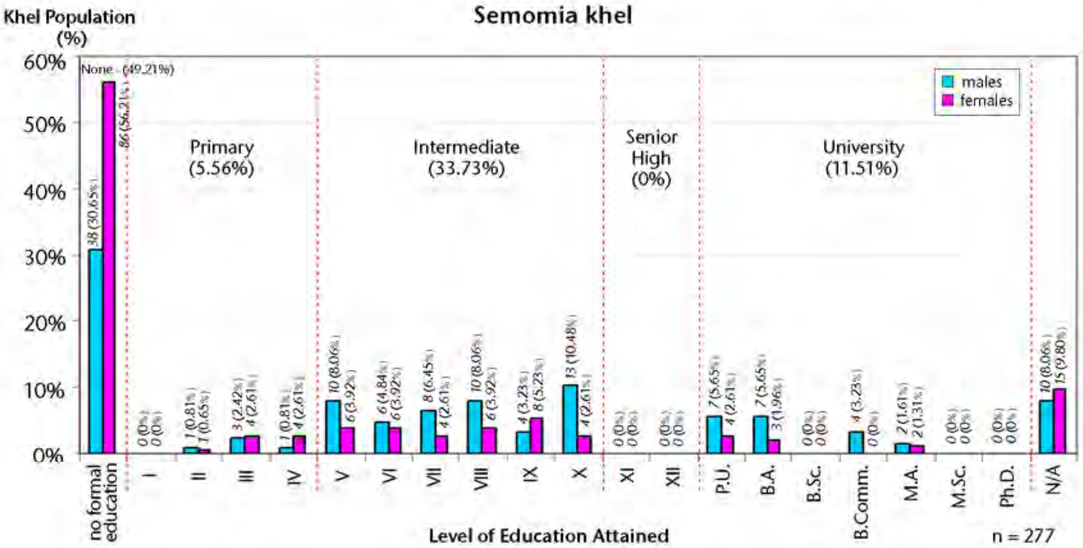
Figure 5-6. Gender Analysis of Education Levels in Khonoma *
(based only on that part of population that considers its studies to be complete)

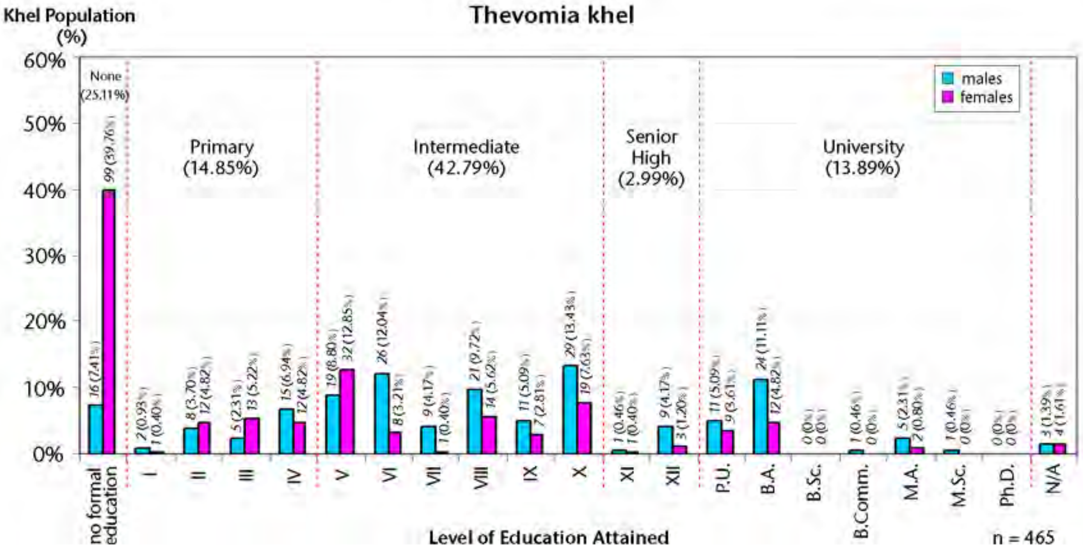


* Data derived from a household survey undertaken as part of field research.
P.U. – pre-university; B.A. – Bachelor of Arts; B.Sc. – Bachelor of Science; B.Comm. – Bachelor of Commerce; M.A. – Master of Arts; M.Sc. – Master of Science; Ph.D. – doctorate; N/A – data not available
See also appendices 3-30 – 3-33.

Figure 5-7. Gender Comparison of Educational Levels Attained by Khonoma Residents who Consider their Formal Education to be Complete – Breakdown by Khel *







In evaluating the educational status of Khonoma's people, an important point must be kept in mind that radically alters interpretation of the data. The data discussed so far includes only those who continue to reside in the village. But a process of "brain drain" or "negative culling" is going on, and most of those who leave the village in search of higher education never come back. They end up taking office jobs elsewhere in Nagaland or India. This means that the data recorded by our household survey represents a huge underestimation of Khonoma's actual academic achievements. In fact, they over-represent the poorer performers who did not pursue higher studies and had few career alternatives other than remaining in the village and cultivating their ancestral land. A more comprehensive picture was provided by a 1997 survey of all Khonoma descendants, regardless of where they lived (Greenridge Club, 1997). It showed an impressive list of degrees, including four doctorates and 18 medical doctors (table 5-3). The vast majority of these degree-holders no longer live in the village because their higher qualifications have opened employment opportunities for them elsewhere. This brings us to another point. The preponderance of Arts degrees in Khonoma is partly because they are academically the easiest degrees to earn – but also because they are less successful in securing employment. This reflects the stage that Nagaland has currently reached in its development. It needs technical skills – engineers, doctors and veterinarians. Arts degrees provide few skills and knowledge that are saleable in today's economy, so a proportionately higher number of Arts graduates end up returning to the village, unable to find jobs.

Table 5-3. Educational / Professional Qualifications at a Glance *

1.	M.A.	47
2.	M.Sc.	18
3.	M.Com.	5
4.	L.L.B.	10
5.	B.Engg.	8
6.	Medical Doctors	18
7.	B.V.Sc.	5
8.	M.Phil.	7
9.	Ph.D.	4
10.	Indian Forest Service (I.F.S.)	1
11.	I.A.S.	1
12.	Teachers	121
13.	Headmasters / Principals	13
14.	College Lecturers	23
15.	University Lecturers	5
16.	Gazetted Officers, Class 1	52

A primary factor influencing the likelihood of Khonoma's youth pursuing higher degrees is the quality of education that they receive in earlier grades. Without a strong foundation to build upon, pursuing higher studies becomes difficult, particularly in the sciences. Khonoma's students have the choice of attending either public or private schools that operate side-by-side. Table 5-4 shows the distribution of the village's entire student population across the various schools in 2001, and the teaching staff employed at each. The State Government operates a Grade Primary School (GPS – grades A-IV) in each of the three khels, and one central government Middle School (grades V-VIII) for the entire village. The alternative is to attend one of the private schools run by the churches. Both the Baptist and Catholic churches are running their own schools from grades A to X. Some comparisons between the public and private schools invite attention.

The first thing to note is that although the public school system attracts only 26.7% of the student body, it boasts 45.6% of the teachers. There is a much higher ratio of teachers to students in the public school system. This should translate into better learning conditions as classes are smaller and teachers can spend more individual time with each student. The other major attraction of the public school system is that tuition is free. This can be a deciding factor in rural villages where cash-earning opportunities are few. But the fact that almost three-quarters of Khonoma's students have opted to pay scarce money to attend private schools shows that the public school system is poorly-regarded. It is generally only the poorest families in the village, who cannot afford tuition fees (roughly Rs 150-250/term, depending on grade), who send their children to the public schools.[48] The school system is just another example of the private sector operating much more effectively than the public sector. This can be found everywhere, but is particularly true in Nagaland, where the Government is bloated, unresponsive and prone to corruption.

The church-operated schools were set up as a response to the failings of the state schools and cater mostly to the children of their own congregations. The families know that their children need a good education to prosper in today's competitive economy and are prepared to invest their time and money to ensure that they get it. Since they are charging tuition fees, the private schools have to be more performance-oriented and responsive to complaints from parents. Undoubtedly, there is also a healthy element of competition between the two rival churches in trying to run the best school.

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[48] If a family has three or four children attending private school, then it will have to pay school fees of at least Rs 500-600/mo. This appears modest, but for villagers with no regular source of income, it can be an insurmountable obstacle. Some hard-pressed families in Khonoma are reported to be five years behind in paying their children's school fees.

Table 5-4. Student Population in Khonoma's School System in 2001[a]

Grades	Government				Private		VILLAGE TOTAL
	Primary Schools[b] (A-4)			Middle School[c] (5-8)	Christian Welfare School[d] (A-10)	John Bosco School[e] (A-10)	
	M[f]	S[g]	T[h]				
A	13	7	24		9	19	72
B	5	4	10		9	23	51
1	8	4	8		10	22	52
2	6	3	4		10	28	51
3	11	3	5		11	29	59
4	8	4	-		10	28	50
5				13	17	26	56
6				9	17	25	51
7				6	10	28	44
8				7	31	21	59
9					9	20	29
10					18	15	33
TOTAL STUDENTS	51 (8.4%)	25[i] (4.1%)	51 (8.4%)	35[j] (5.8%)	161[k] (26.5%)	284[l] (46.8%)	607[m] (100%)
TEACHING STAFF	7 (12.3%)	6 (10.5%)	5 (8.8%)	8 (14.0%)	16 (28.1%)	15 (26.3%)	57 (100%)
STUDENT : TEACHER RATIO	7.3	4.2	10.2	4.4	10.1	18.9	10.6

[a] See appendix 3-34 for a more detailed breakdown of the student population by gender.

[b] One Government Primary School (GPS) in each of the three khels. Each of these schools is dominated by, but not limited to, students from the khel in which it is located.

[c] A single Government school for intermediate grades.

[d] Operated by Khonoma Baptist Church.

[e] Operated by Roman Catholic Church.

[f] M - Merhümia khel

[g] S - Semomia khel

[h] T - Thevomia khel

[i] Includes 4 Nepalese students.

[j] Includes 3 Nepalese students.

[k] Includes students from Mezoma (12), Kohima (1), Uttar Pradesh (1), Kerala (1) and Nepal (4) = 19.

[l] Includes students from Mezoma (2), Kohima (16), Jotsoma (3), Jakhama (6), Viswema (10), a Sema (1), some Chakhesang (6) and Mao (5), Kerala (1) and Nepal (2) = 52.

[m] For salary levels of teaching staff of the various schools, see appendix 5-52.

In comparison, there is little accountability or concern about performance in the state-run schools.[49] Their funding is viewed as government largesse from Delhi

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[49] In India's education system, all students have to pass a standard matriculation test after the 10th grade, as a precondition to continuing their studies. After the 2000 round of such tests, there were widespread media reports about the exam being leaked in Nagaland. Despite this, there were still more than 30 public schools across the state in which nobody succeeded in passing the exam, and hence were ineligible for further studies! (The performance of students from the privately-run schools was much better). A better education system that produces more employable graduates or at least gives them entrepreneurial skills to start their own businesses, could play a major role in reducing pressure on Nagaland's scarce agricultural land. Yet in spite of all its problems, the literacy rate in Nagaland is within the top 10 in India.

that provides Khonoma with 26 well-paid positions. No matter how abysmal their performance, they are confident that the money pipeline will not dry up. This attitude shows not only in the performance of the schools, but also in the reluctance of villagers to trust them with their children's education.

Ironically, the salaries paid to teachers at the state schools are almost 2.5 times those at the private schools (avg. Rs 6707/mo - state vs. avg. 2742/mo - private; see appendix 5-52). Hence, although the public schools are not seen as desirable places to send one's children, they are by far the best places to get a teaching position! To put the salary levels into perspective, the Rs 6707 monthly salary of a teacher is approximately equal to the value of crops a farmer could expect to harvest from a jhum field after about nine months of hard labor (see chapter 8). By the standards of the village's economy then, the size and reliability of a teacher's salary at a public school is indeed an attractive windfall. Not surprisingly, most of the better-paid teaching positions at public schools are jealously divided amongst Khonoma's own villagers – often with pretty dubious qualifications. There is intense competition within the village for these highly-coveted positions and once secured, they may be passed from one generation to the next to keep them within one family, like a plot of valued ancestral land.[50] This system is failing in the opinion of villagers, as is evident from its low enrollment. The private schools are much more stringent in their hiring practices, and for a fraction of the salary, usually end up hiring far better qualified teachers from outside states, often Kerala. The salary levels are sufficiently low that there is less pressure to allocate the positions to people's relatives, so hiring can be done with ability and qualifications as the only criteria. This offers an added advantage in that outside teachers can focus solely on their jobs, and will not be off working in their fields when they are meant to be in the classrooms. Villagers who sit on the Education Committee (Baptists) or School Management Board (Catholics) sometimes sit in on classes to evaluate the teachers' work. The popularity of the private schools and villagers' willingness to pay for their services shows that they consider this system to be working far better.

Villagers' concern for the quality of teaching that their children are receiving reflects the high priority now accorded to education. When villagers are found mortgaging land, the most common reason is the need to finance their children's studies. They hope that this investment will pay dividends by helping their children to find outside jobs and later send part of their earnings back to the village to support their aging parents. They commonly express the hope that a good education will allow their children to enjoy an easier life than they had. The students share in their parents' enthusiasm because they see a good education as their ticket out of the village and on to a better life. It is thus not uncommon to see a leap within one generation, from illiterate parents to a son earning a doctorate or even practicing

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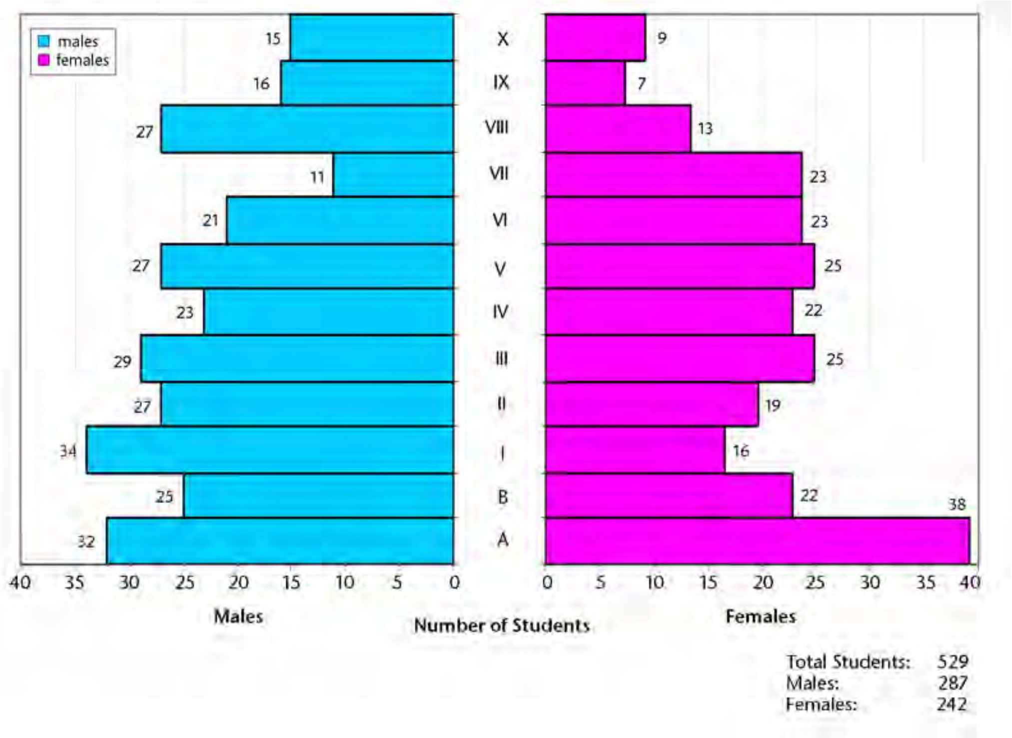
[50] During the period of fieldwork, I saw several cases where senior teachers who wanted to retire from the public school system simply handed their jobs on to sons or daughters, without the positions having to be opened for competition.

medicine. The gender breakdown of Khonoma's student body in 2001 (figure 5-8) shows that the girls have made huge strides in school attendance, and are now often praised for outshining their brothers in the classroom.

Figure 5-8. Gender Analysis of Current Student Population in Khonoma *



In the early days of British administration, officers such as Kennedy (1898) and Mills (1932) emphasized that most Nagas attended school primarily with the hope of getting soft government jobs. There were relatively few such jobs to go around, they lamented, but the education they were receiving left them ill-prepared for any other useful role in Naga society. Now, a century later, this situation remains little changed. The State Government continues to be the main employer and most students still see a position in the civil service as their ultimate goal. However, despite Nagaland's bloated government sector, the civil service can only offer employment to a small percentage of Naga graduates

Education brought with it a number of other predictable social impacts. Firstly, education, along with employment, acted as powerful twin magnets to draw some of Khonoma's brightest and most talented people away from the village, and potential leaders were lost to the community. Furthermore, the fact that Khonoma's sons and daughters who were most exposed to education and outside ideas never returned meant that the village remained conservative in its outlook. Secondly, there was a marked change in people's view of farming and other forms of manual labor. It is now common to see frustrated parents pointing to the cow-herders (now mostly Nepalese), and threatening their children that if they do not study hard, that will be their fate (Talie, 2001). This type of thinking has led people to look down upon and devalue manual labor. They fear that to do such work will risk being mocked for having spent many years and a lot of money on education, only to be incapable of rising above the work of farmers.

Thirdly, as Naga students spent more time immersed in western knowledge systems, they began losing the indigenous knowledge and practices handed down by their ancestors through the centuries. One type of knowledge was substituted for another. The morungs that were once the centers of indigenous learning now sit silent, and the schools that have replaced them have not taken up local knowledge as part of their curricula. It is devalued, like so much else from the past, and seen as irrelevant to the future for which students are preparing themselves. Linked to the discounting of indigenous knowledge has been a loss of respect for the village elders – the main repositories of that wisdom. The status that they once enjoyed has been shifted to the holders of college degrees or high government office.

Finally, it is noteworthy that access to education appears to be uplifting the social status of women in Angami society. It has allowed many to break free from the constraints of their traditional roles and now compete with men in the workplace.

Religion

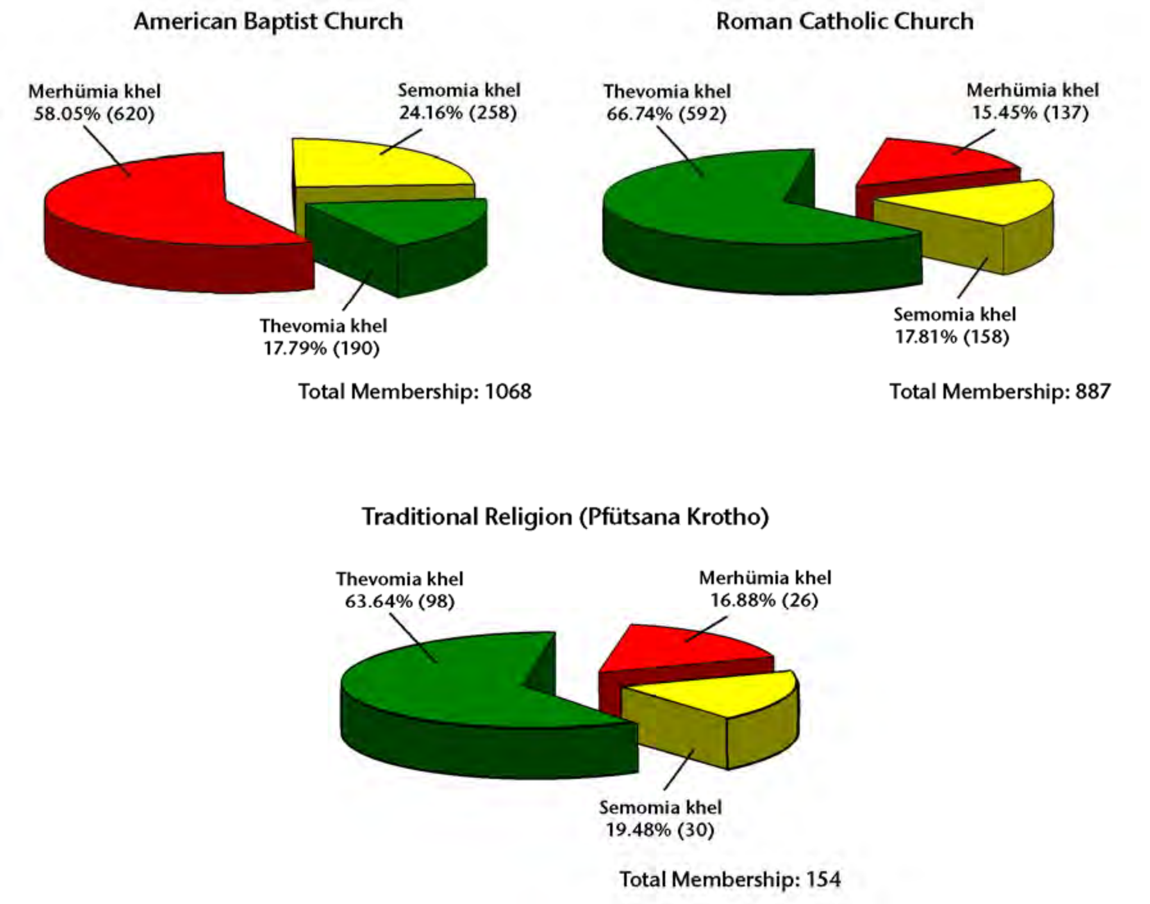
The religious landscape in Khonoma has changed dramatically since the Baptist Mission welcomed its first convert there in 1897. The traditional religious practices of the Angami have been steadily displaced by Christianity until now, less than 8% of the population still follows the old beliefs. The American Baptist Church has grown to claim among its congregation almost half the village population (49.79%). The remaining Christians belong to the Roman Catholic Church (41.35%) (table 5-5 and figure 5-9).

Table 5-5. Religious Membership in Khonoma, Broken Down by Khel *

Religion	KHEL			
	Merhümia khel	Semomia khel	Thevomia khel	Entire Village
Traditional Religion	26 (3.17%)	30 (6.73%)	98 (11.14%)	154 (7.18%)
American Baptist	620 (75.70%)	258 (57.84%)	190 (21.59%)	1068 (49.79%)
Roman Catholic	137 (16.73%)	158 (35.43%)	592 (67.27%)	887 (41.35%)
Not Available	36 (4.40%)	0 (-)	0 (-)	36 (1.68%)
Total	819 (100%)	446 (100%)	880 (100%)	2145 (100%)

* Data derived from a household survey undertaken as part of field research. See also figure 5-9 and map 5-2 for other ways of presenting these data.

Figure 5-9. Khel Breakdown of the Membership of Each of Khonoma's Three Religious Persuasions *



* Data derived from a household survey undertaken as part of field research. Cross-reference with table 5-5 and map 5-2.

American Baptists

When C.D. King began his pioneering work amongst the Angami in 1879, he initially found them unreceptive. The Baptist Mission was strict in its insistence that Nagas wanting to accept Christ had to give up drinking zu, taking part in morung activities, repeating oral history or singing folksongs that included any reference to their old beliefs, as well as discarding most other traditional beliefs and practices. They were expected to jettison just about everything that was essential to their identity as Angami and start with a clean slate.[51] The Baptists overcame this original resistance by linking their evangelism with education and health services. As the economic benefits of education became apparent, the "package" became more attractive and by the 1940s and 1950s, the slow trickle of conversions had swelled into a torrent. The missionaries were quite clever in replacing Angami traditions with new Christian practices. For example, the first sowing ritual (Tekhusekhrü) was replaced by a special 5 a.m. church service on every May 20th, before they began

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[51] During a visit in the closing days of British colonial rule, Mildred Archer described the effects of Christianity on the Naga Hills in scathing terms (Archer, M. 1947). Her words closely echoed Mills' sentiments of ten years earlier (Mills, 1932 – appendix 3-11).

transplanting the rice. Likewise, the first harvest ritual (Liedepfü) was substituted for a thanksgiving church service every September 25th, at 5 a.m. The concept of genna was continued, but with the difference that it was now restricted to Sundays. This was to be the new day of rest when work in the fields was prohibited. Gradually, the familiar sight of the zievo-u (traditional priest) conducting rituals in honor of Ukepenopfü was replaced by a pastor praying to God in a church.

Today the Baptist Church dominates the skyline and has become the centre of social activities for roughly one-half of the village population. It holds three services every Sunday and is frequently busy on week-nights with prayer meetings, youth groups, and other activities. The church has taken a leading role in forging peace pacts with Khonoma's old enemies. In 1997, as part of its Golden Jubilee celebrations (100 years), Khonoma's Baptists built a church and did other reconciliation work in the North Cachar Hills in Assam, to make amends for past atrocities. In a further sign of how much things have changed since C.D. King struggled to win converts there in the late 19th century, Khonoma now sends out its own missionaries and supports projects elsewhere in the region.[52]

Roman Catholics

The monopoly on Christianity in Khonoma ended in the mid-1970s, when the Roman Catholic Church arrived to compete for souls. It proved to be less puritanical than the Baptists and more tolerant of the Nagas' native habits. The more liberal Catholic Church thus found a ready niche in the considerable number of villagers who were attracted to the teachings of Christianity and willing to give up rituals, but were not prepared to give up their creature comforts of drinking zu, smoking, or chewing tobacco and pan (betel nut). At that time, an influential Thevomia elder, Gotsilie Punyü, argued that rice beer was also a gift from God and that Christianity did not insist that it not be drunk. His neighbors found his arguments convincing and many in Thevomia khel followed him in joining the Catholic Church. It was his lobbying that led to two-thirds of the Catholic Church's present membership being composed of Thevomia villagers. Showing their disapproval, the Baptists often refer to the Catholics as "the drinking church" (zu krie kehou).

During the period of field research, Khonoma's Roman Catholic community was completing the construction of an impressive new church on a ridge overlooking the approach road from Kohima. The priests shepherding Khonoma's Catholic flock are generally from Goa, Kerala and other parts of southern India that have a strong Catholic presence.

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[52] One church leader compares the missionary work with the previous British administration's strategy of sending Khonoma villagers to other parts of the Naga Hills to share their wet rice terracing and stone masonry skills. They are continuing that tradition, he explains, but now it is the gospel that they are spreading (Meru, K., 2001). During the period of field work, Khonoma's Baptist Church was supporting projects as far away as Nepal – but interestingly, was ignoring the plight of Nepalese families living in extreme poverty on its own village outskirts.

Adherents to the Traditional Religious Beliefs of the Angami

The dwindling community that has remained true to its ancestors' religious traditions represents the last remaining bastion of a passing era. These people tend to remain more keenly aware of the spiritual dimensions of their day-to-day lives. Their Christian neighbors refer to them as "the Ancients" or "non-believers" – associating them with a primitive past and defining them by what their religious beliefs are not, rather than what they are. The Pfütsana Krotho that acts as an association for those retaining their old religious beliefs now has only 154 members (table 5-5). They are the best remaining repository of the customs, stories and beliefs from Khonoma's past. Consistent with its reputation for conservatism, Thevomia khel accounts for almost two-thirds of those who have continued to follow the old religious beliefs. They live predominantly at the far northern end of the village in Sisietono colony and are considered "very backward", compared to their neighbors. Fewer houses in this part of Khonoma have toilets or piped water, and the level of education is generally lower. Long after the rest have given it up, this is the only colony in the village that continues to enact the rat-chasing ritual (Thezukepu) during the Tsünyi festival. Many of these people have pushed far beyond the old traditions of drinking in moderation and now flirt with alcoholism.

Figure 5-10 shows that it is mostly the older generation that has retained the old religious beliefs. By examining the household size of each of the three religious groups separately, we find that one-quarter of all households adhering to the old beliefs have only a single occupant. These are villagers in the twilight years of their lives, whose spouses have died and whose children already have their own families. As this older generation passes away, the ranks of "non-believers" are steadily declining through attrition.

The Pfütsana Krotho now has insufficient members to fill its customary posts, in order that it can rigorously follow the old practices. Its members persist in performing the first sowing (tsiekrü) and first harvest (liedepfü) rituals, but they must seem less meaningful now that the Baptist half of the village no longer waits for them. The Roman Catholics, interestingly, are reported to exercise more deference to the old beliefs and usually wait for completion of the rituals before starting their field work.[53] The former contingent of one zievo-u (traditional high priest) for each khel has now withered to a single zievo-u for the entire village. Eighty-two year-old Dovihu Chase of Merhümia khel (plate 3-224) is the sole remaining zievo-u and it remains uncertain whether there will be a replacement for him on his death.

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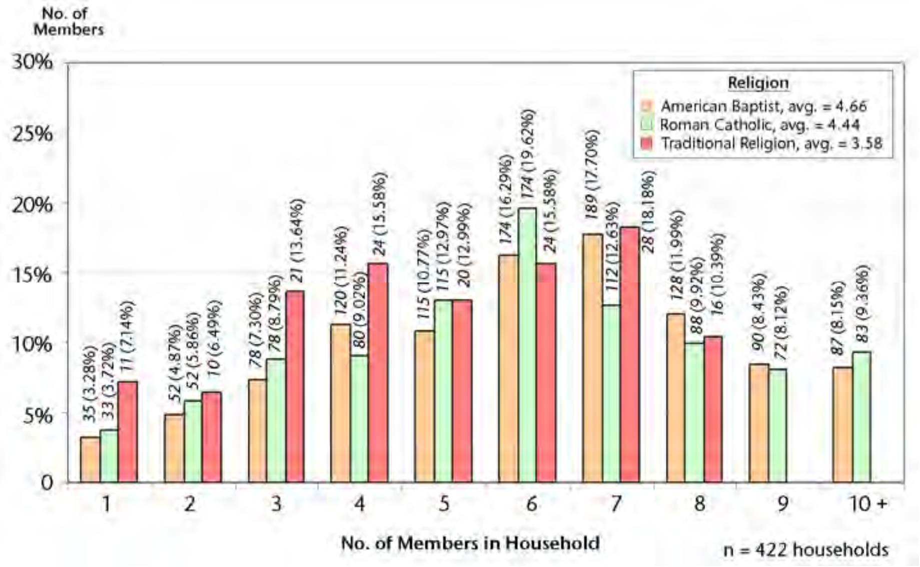
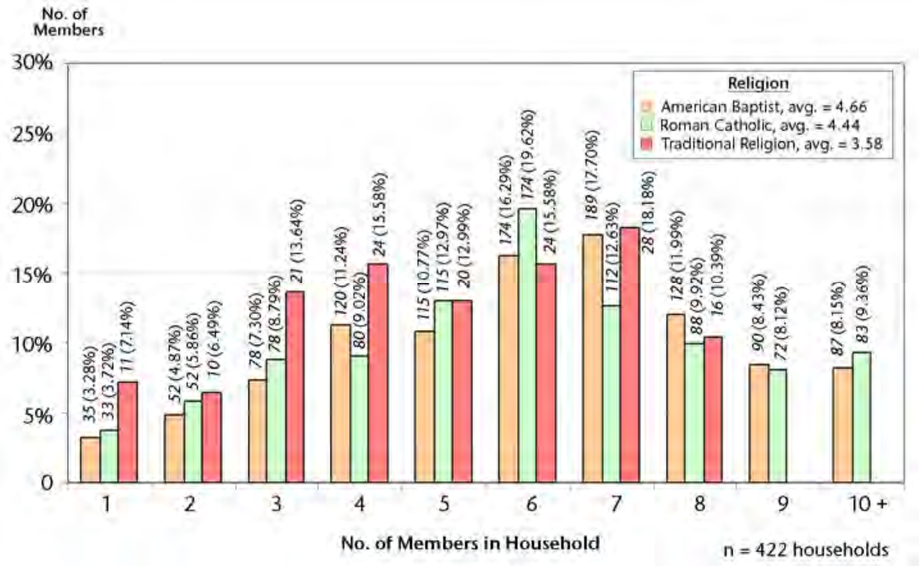
[53] However, this may be a gesture of khel solidarity. Both the Roman Catholic Church and the Pfütsana Krotho are roughly two-thirds dominated by Thevomia khel (figure 5-10).

Figure 5-10. Comparison of Household Size Amongst Khonoma's Three Religious Congregations

A) Measured as a Percentage of Households of Each Size



B) Measured as a Percentage of Villagers that Live within Households of Each Size



* Data derived from a household survey undertaken as part of field research.

The many monoliths, resting places and other stonework scattered across Khonoma's landscape are commemorative of feasts of merit given by wealthy men in the past. As mentioned earlier, sponsoring these feasts was part of a graduated system for earning prestige, that allowed them to wear specific shawls or ornaments, or decorate their houses in certain ways. Anyone trying to decorate his house in the style of a titled man, but without having earned the right to do so, would be the laughing stock of the village (Iralu, K., 2001b). Feasts of merit also passed into extinction as part of the decline of the Angami's traditional religion. Aside from the missionary influences, this was also precipitated by the introduction of markets and a cash economy. Until then, native wealth was accumulated in rice stocks and head of livestock that were perishable and could only be managed in limited quantities. It therefore made sense to “cash in” one’s material wealth from time to time by hosting feasts – and converting it into social capital in the form of prestige. But with the introduction of cash and markets, it became possible to sell surpluses and hoard wealth. There was no longer pressure to share it with others in the community. Moreover, the white man had brought western education, new types of dress, watches, kitchen utensils and many other material possessions that became more powerful symbols of status.[54] They could best be acquired not by sharing – but by selling surpluses and accumulating the needed goods. Hence, the motive for producing agricultural surpluses changed from wanting to host feasts and earn ritual status – to wanting to have something to sell and earn cash. The pressure on agricultural land may not have been significantly affected by this transition. What it did do, however, was eliminate an important mechanism for redistributing agricultural surpluses from households of surplus to those of shortage. The end of communal feasting meant that those struggling through lean times no longer had the safety net of knowing that they would be able to share in their wealthier neighbors’ surpluses.[55] It represented a significant change in behavior from traditional values designed to ensure that the wider community had enough to eat, to more selfish strategies aimed at accumulating individual wealth.

With churches now emerged as the new centers of loyalty, some claim that the former paramount importance accorded to clan relationships has declined, and as a consequence, the historic tensions between khels has now faded from significance. Indeed, the village’s new fault lines appear to fall along the lines of religious membership. But this does not represent as significant a change. Referring back to figure 5-9, we noted that khels had tended to act in unison in choosing their religious loyalties. Merhümia khel dominates membership of the American Baptist Church (58.05%), and Thevomia khel comprises the majority in the Roman Catholic Church (66.74%) and among those who have retained the old religious practices (63.64%). Being smaller than the other two khels, Semomia cannot muster sufficient numbers to dominate any of the three groups. But again, most of its people (57.84%) join Merhümia khel in attending the Baptist Church. This clustering of religious loyalties along khel lines is apparent in map 5-2. Most obvious is the concentration of Baptists in the Merhümia sector in the south of the village, while most of the remaining “Ancients” are at the northern tip in Thevomia territory. As mentioned earlier, the Merhümia Baptists are regarded as the most modern and prosperous, whilst the Thevomia “Ancients” are seen as the most conservative and least

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[54] When cameras first became available in the Naga Hills in the 1940s and 1950s, taking somebody’s photograph was a special occasion. In preparing to have their portraits taken, men often borrowed a still-rare wrist watch from somebody, and then posed with their arms carefully folded so the watch was conspicuous (Meru, V., 2001).

[55] While I was examining a monolith in Khonoma one day, a passing elderly lady informed me that it was erected to commemorate a feast of merit that she and her husband had hosted some years earlier. The feasting continued for 10 days, she explained, during which they slaughtered 8 mithun, 5 cattle and 10 pigs.

successful in adapting to the rapid socioeconomic changes that have swept across the Naga Hills. Therefore, it is largely the same groups who are standing in opposing camps, but now it is under the cloak of religious membership instead of kinship.

The Christian literature touts Nagaland as one of its sparkling success stories in India, with 95% of Nagas now professing to Christianity. But there appears to be a gloss of superficiality over this miraculous conversion.[56] Christianity has commonly been adopted in the form of a new set of rituals – these ones brought by the white man – to be mechanistically followed, rather than a heartfelt or guiding force of righteousness in the lives of believers. Even church leaders readily admit that the moral conduct of Nagas frequently deteriorates after conversion to Christianity (Terhüja, R., 2001). Early British administrators frequently commended the Nagas on their integrity and straight-forwardness. These qualities have been badly eroded in contemporary Naga society. There is a widespread perception that the non-Christians often behave better than their Christian neighbors (ibid).[57]

In other ways, Naga thinking remains relatively unchanged. In the past, Nagas attributed everything that they did not understand to the spirit world; now they attribute everything to God's mysterious workings. There is still a strong tendency to connect misfortune and misdeeds, but now it is God that is meting out the judgment.[58] The continuation of stories about ghosts (appendix 3-35) and sorcery[59] that circulate around the village is probably also a survival from their previous understanding of the spirit world.

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[56] During broad-ranging interviews with farmer collaborators, they expressed a range of reasons for being Christian. Many had been born into Christian homes and simply adopted their parents' faith. Others pointed to the magnanimity of the Christian God in looking after them in this world ("if our parents are no longer on this earth, then only God can take care of us") and promising eternal salvation ("when we depart this earth, God will take our spirits to heaven") as reasons for converting. One woman said she was motivated by a desire to "fit in" with the rest of her peer group ("while studying, all my friends were Christian, so I also wanted to become one"). One of the men explained unexpectedly pragmatic reasons for adopting Christianity. He had earlier been a policeman, and was usually posted to other districts. This presented problems because the old religion required all family members to be present whenever rituals were performed. So his family converted to Christianity to overcome the problem.

[57] Conversations with the so-called "non-believers" can be confusing. They explain that they have always worshipped a Supreme Being known as Ukepenopfü; that they believe that after death, there will be a judgment based on their performance in this life; and that the spirits of the dead go to a place called Rünyügei (Kehie, 2001). This would seem to have much in common with some of the fundamental precepts of Christianity. So what is that qualifies them as "non-believers"?

[58] An interesting example of this occurred in the aftermath of the 1999 murders of Australian missionary Graham Staines and his two young sons in Orissa, at the hands of a mob of Hindu militants. The Nagas saw this as just another example of persecution of India's Christian minority by its Hindu majority. When a short time later, Orissa was hit by the worst cyclone in recent memory, many Nagas viewed it as God's retribution.

[59] There continue to be incidents that show that many old beliefs remain. A few years ago, Khonoma expelled a woman and her two daughters from the village following accusations that they were dabbling in the black arts.

Administration and Justice

Annexation of the Naga Hills in the late 19th century marked the first time that the fiercely independent Nagas had been brought under a central system of administration. Prior to that, each Angami village had governed itself under an extremely loose form of democracy.[60] Political representation was based on kinship groupings (figure 5-11) and each acted as a politically cohesive group in advocating its interests in the wider village polity. Each subclan (thepfü) was governed by an informal council of elders from all the constituent patrilineages (pfutsano). An elder presided over the meetings, during which they discussed all matters pertaining to their subclan and made decisions in a democratic matter. The collective wisdom of the elders was thus brought to bear on all decisions. One or more leaders would emerge, usually by virtue of their age, maturity and statesmanship, to manage affairs at the khel (major clan or thino) level. (During times of war, it would usually be the best and bravest warriors who stepped forward to lead the village.) Although recognized as leaders, these khel headmen had little real authority to impose unpopular decisions.[61] As Khonoma's history shows, the chain of leadership extended only to the khel level, and villages were usually not politically united.

The British were quite ingenious in grafting their administration onto the Nagas' traditional power base. They did this by appointing existing village leaders to become representatives of Her Majesty's Government and act on its behalf in each village. Two types of positions were created to form the interface between villages and the Government – the gaonbura (GB) (village chief) and dobashis (DB) (interpreters). In this way, the traditional Naga leaders were co-opted into assisting the new administration. In Khonoma, for example, the legendary leader Pelhou Dolhie, who had led his people in opposing the British, was later appointed as the village's first gaonbura (Meyase, S., 2001, 81). The British were also astute in reinforcing the prestige of these new positions by building on the Nagas' custom of demonstrating status in society (wealth, leadership, or skills in warfare) by wearing certain shawl patterns. The British emulated the Nagas' status symbols by issuing red blankets to all their gaonburas. These were worn with great pride since they provided immediate recognition that their wearers were entrusted by the white man to act on the Government's behalf.[62]

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[60] The Angami bristle at the idea of the caste system practiced in Hindu India, and pride themselves that they do not have groups of varying status.

[61] This often confounded British administrators when they demanded that leaders hand over khel members wanted for offences, only to be told that the khel leaders had no such authority. This frequently led to collective punishment of an entire khel.

[62] Although it is impossible to tell with certainty from von Fürer-Haimendorf's black and white photographs (plates 3-24 to 3-26), it appears that during his 1936 visit to Khonoma, his hosts were proudly draped in the red blankets that marked them as representatives of the Government. It would have fallen within their duties to represent the village in receiving visitors.

Figure 5-11. Schematic Representation of Social Organization of Angami Villages *

Terminology & Explanatory Comments

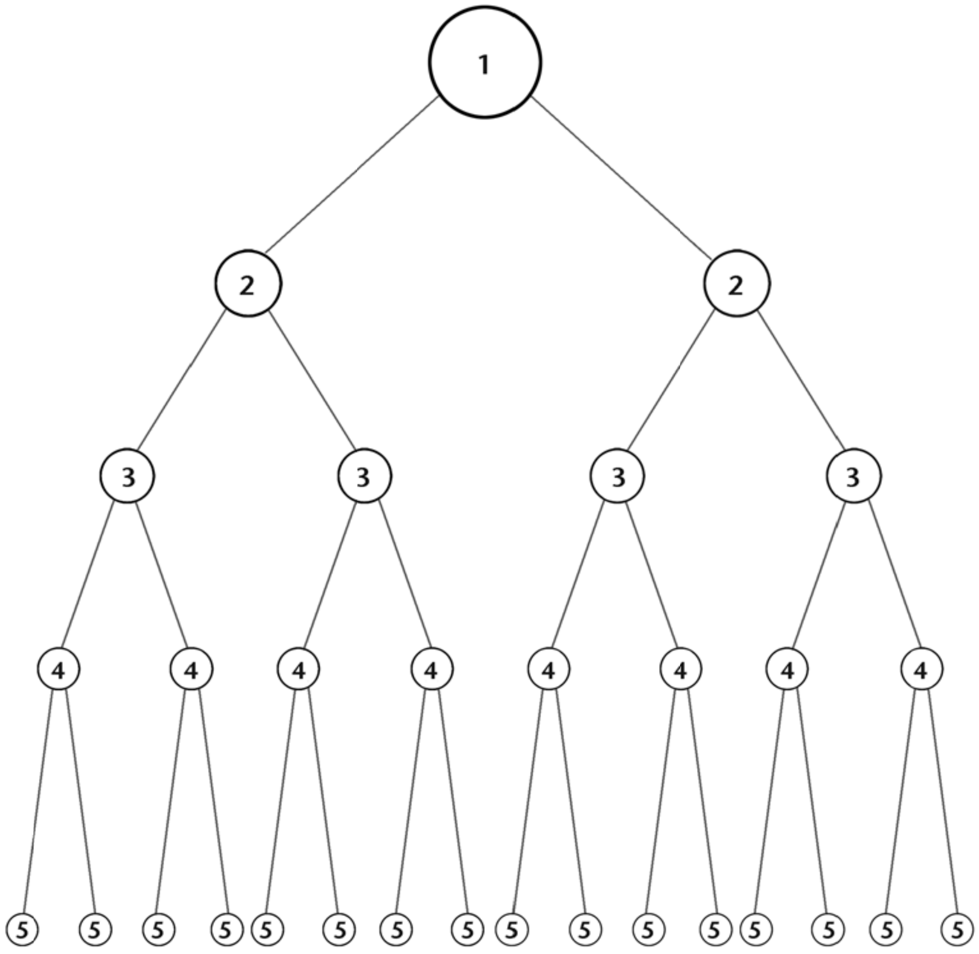
1. RÜNA (village)
- acted as independent republic
- run as extremely loose form of democracy
- led by village headman (kemevo) who has little authority, and council of clan leaders (rünapeyu)

2. THINO (major clan)
- widely referred to as “khels”
- most important unit of Angami society
- led by elders (rünapeyu [village leaders] or peyumia)

3. THEPFÜ (sub-clan)
- elders of all constituent patrilineages form an informal council
- marriage between members of different thepfü is permitted

4. PFUTSANO (patrilineage)
- literally means “descendants of the same grandfather”
- consider themselves as cousins
- led by an elder representing a number of families
- marriage within same pfutsano is forbidden

5. KIKRU (households)
- the smallest social unit
- usually nuclear families
- headed by father



* See figure 3-2 for how this organization applies to the Khonoma study village.

It was not until 1970 that Village Councils (VC) were formalized as the sole administrative body at village level. Each lineage still acts as a political unit, and chooses a head to represent it on the village council. The council is therefore a body comprising lineage heads who elect a chairman and work together in overseeing the affairs of the village as a whole.[63] In 1980, Village Development Boards (VDB) were added specifically to administer centrally-sponsored funds targeted at development activities at village level. Funding is channeled from Delhi to the State Government's Rural Development Department, which then disperses it to the villages based on the number of households (and hence the incentive to inflate census figures). The VDBs then administer these funds in accordance with each village's development priorities. Despite Nagaland's forced membership in the Indian Union, its villages continue to enjoy wide autonomy in governing their own affairs. What has changed is where their decisions are made. In the past, the thehou and baze were the places where village elders gathered to resolve problems; now, those debates have shifted to the more formal environs of village halls (panchayat).[64]

In many cases though, government-supported projects appear to have been conceived not for their own merits – but primarily to bring additional funds into the village. In Khonoma, perhaps the best examples of this are the hospital and adjoining doctor's residence that were built in 1982 under Dr. Setu Liegise's tenure as Minister of Health. Both now sit empty, their primary contribution being the additional government-paid jobs (on paper) that they bring into the village. Villagers needing a paracetamol tablet, dressing for a small wound, or other minor treatments sometimes drop by, but in case of anything more serious, they have to go to Kohima in search of a doctor. The hospital – with its own full-time doctor (who in reality has almost abandoned his post) and support staff – is essentially performing the role that one would expect from a first aid kit. In neighboring Dzulake, a lone concrete building sitting in the middle of a field was also meant to be a medical clinic. Its remote location outside the village suggests that there was never any intention that it actually function as such – but somebody would have profited from the

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[63] One thing that has not changed is the Angami's extreme interpretation of democracy, which sets them apart from other Naga subgroups. They continue to view each man as his own master with the right to do as he wishes – even if it is at the expense of the public good.

[64] Khonoma is part of the Western Angami region, which elects a member of parliament to Nagaland's State Parliament in Kohima. The State Government appears to be immensely top-heavy, with a bewildering array of departments that, individually, would appear to have very little work. (Compare it, for example, to nearby Bhutan that efficiently lumps many of these jurisdictions together into a single Ministry of Natural Resources.) Nagaland's State Government has clearly earmarked much of Delhi's generous funding to feed its own growth. It is the state's single largest employer, after agriculture. The division of responsibilities into so many ministries and departments creates immense overlap in their work, as well as territorial jealousies as each tries to defend "its patch". There is consequently very little coordination between them. Nagaland has ended up with a big, unwieldy government that its own tax base can never support, but poor governance.

At the Federal level, all of Nagaland sends a single member to represent its interests at India's 543-member Lok Sabha. These numbers show how small the Nagas' voice is in the national context, and why they feared being "swallowed up" by India to the point of insignificance.

government contract to construct it. The door is padlocked shut, preventing even the free-range chickens and pigs from taking advantage of its shelter. Overlooking the village, a government-sponsored tourist lodge sits similarly empty.[65] Tourists are a rarity in Dzulake, and certainly there are not enough of them to warrant special accommodations. Nevertheless, just near the deserted tourist lodge, four additional bungalows were under construction at the time of the field study, for the same purported purpose. The Government is clearly more successful in constructing such facilities than in keeping them running – or asking if they are necessary in the first place.[66] Regardless of how useless they may be, the villagers themselves have a vested interest in welcoming all government projects since they bring money and sometimes jobs into the community.[67] They are part of the network for distributing government largesse from Delhi to the grassroots level – arguably the central Government's own style of "feast of merit", aimed at winning electoral support.[68]

When the British began administering the Naga Hills, the early District Commissioners spent much of their time adjudicating in Naga disputes that otherwise might have been settled by fighting. This role of settling disputes had traditionally been performed by a council of elders who would establish the facts, discuss the applicable customary laws and pronounce judgment. If there was conflicting testimony, then the parties would be asked to take an oath on their lives

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[65] There was virtually no tourism in Nagaland at all during the years of political turmoil and fighting. The Indian army commandeered Dzulake's tourist lodge to use as a camp until about 1980, so it was not available for guests anyway. In recent years, Nagaland's State Government has begun actively promoting tourism, so this situation may change.

[66] Both federal and state levels of government support projects in Nagaland. One might expect state-supported projects to be more successful, since they are planned and administered by Nagas who are most intimately familiar with the development needs of their own people, and who are on site to ensure that they are successfully implemented. Projects coming out of distant Delhi, on the other hand, would be expected to follow a blueprint approach to development that was insensitive to the unique conditions and needs of the Nagas. But quite the opposite is true. Centrally-administered projects may be slow and inefficient, but they are eventually pushed through and succeed in some measure. But Naga-led projects and industries seem to routinely fail (e.g., a cement plant and a paper mill). This has sobering implications for those who seriously advocate that Nagaland should manage its own affairs.

[67] Although the government sector has a particularly notorious reputation for corruption, it by no means holds a monopoly on shady practices. A Naga friend from Kohima mentioned the case of a neighboring congregation that was constantly holding fund-raising activities for the construction of a new church. The church, he commented wryly, was progressing very slowly – but the pastor's private house that was being erected at the same time was becoming very palatial.

[68] Probably the best example of the diversion of public funds for private benefit can be seen on Nagaland's roads. Kohima is particularly full of expensive vehicles – to the point where traffic jams have become a serious problem on its narrow mountain roads. Most of these are "official" vehicles that belong to various State Government departments, but they spend a substantial portion of their time delivering kids to school, taking maids to the market, ferrying worshippers to church, and taking government officials to the numerous social activities that they attend both during and after office hours. What is impossible not to notice though, is that while Nagaland seems to have lavish funding for vehicles, the roads that they have to travel are in a deplorable condition. There seems to be no budget for road maintenance, but plenty for vehicles. One government official commented frankly that by the time wages and benefits had been paid to the staff, there was very little money left to actually do any work (Kevichusa, 2000).

As the British subjugated the Nagas, the Nagas wanted to take their disputes to the highest authority in the land. Amongst the Angami, not surprisingly, Khonoma had a reputation for being most litigious. In time, modern sub-divisional and district courts emerged that applied legal procedures as a replacement for indigenous justice. Both systems now exist side-by-side. The oral traditions of customary law are still largely followed, but anyone unsatisfied with the outcome has the right to pursue the matter in a formal court. Nagas can often be heard complaining that the Government has introduced many laws without understanding Naga ways. They lament that their old ways of honesty, gennas, and customary laws have often been cast aside in preference for outside laws that are ineffective.

Age Groups (thesü)

Age groups have been more successful in adapting to the changing times and continue to be an important part of Angami society. The concept of peer groups joining together to build fellowship and undertake group activities remains useful and has not threatened the agendas of either the administrators or the missionaries. These groups also evolve naturally in the sense that children of similar ages attend school together, are often in the same catechism classes on Sunday, compete with each other in sports competitions, and in the small confines of village life, meet each other during almost every type of social intercourse. The thesüs formalize and give structure to groupings that are already taking shape.

The activities of the age groups have adjusted in pace with societal changes. Now, instead of meeting at their host parents' house in the evenings to practice folksongs, as they did in the past, they are more likely to be found singing hymns in church. Their activities have also taken on more of an economic orientation as Nagaland has moved rapidly from barter to a cash economy. Age groups now work together in wealthier villagers' fields during rice transplanting and use their group earnings to support their social activities for the remainder of the year. Of course, the migration of so many of Khonoma's people to Kohima, Dimapur and other towns has left the age groups widely scattered. But in spite of – or perhaps because of – their new surroundings, these transplanted villagers cling to their village roots and if enough of their peers are in the neighborhood, "chapters" of age groups can emerge in these other towns. But since they live in a "foreign" place, for which they feel no ancestral attachment, these "other-town"-based age groups have little interest in undertaking projects for the betterment of the community, as they would if they were still back in the village. Rather, they are more likely to team together with their trusted age-mates in trying to exploit the economic opportunities of the comparatively bustling towns, perhaps by running mini-buses, loan sharking, tendering for government contracts, or operating other types of small businesses. Nagaland is a small enough place that almost everyone has connections to people in high positions in the state machinery. If they happen to be from one's clan or age group, then those connections can be used in lobbying for lucrative contracts, positions on the government payroll, and other types of perks. The feeling still persists amongst Nagas that age groups provide an important security net that can be called on in times of trouble. Hence, nobody wants to be seen as ignoring their age group obligations and thus weakening their own safety net.[69] Hence, even a busy Chief Minister will set aside his appointments if a member of his age group shows up unexpectedly at his office, wanting to talk.

Birth of Rüffüno - a New Organization Aimed at Perpetuating Khonoma's Legacy

In 1944, World War II was raging in the Naga Hills and it was unclear who would win or what the implications would be for the Nagas. It already seemed certain that the British would soon leave India, but the Nagas' own relationship with a newly-sovereign India was still in doubt. As the Nagas teetered on the brink of an uncertain future, Khonoma created a new organization called Rüffüno that transcended khel boundaries and united the village under a single apex body. Whatever storms the future held, Khonoma would be much better positioned to weather them as a united community. By that time, its people were already becoming scattered far afield for education and work and the village was concerned that many were losing touch with their roots. The Khonoma Rüffüno was therefore established "to unite the people of Khonoma, to work for self-determination, to uphold the dignity and prestige of Khonoma village, to preserve Khonoma culture, ideals and values" (Kruse, 1994, 35). All who were old enough to hold a spear and dao were considered to be part of Khonoma's "Rüffüno" (*army*).

Rüffüno was very active during the 1950s and 1960s and played a major role in deciding the village's reaction to India's claims that the Naga Hills were part of the Indian Union, and later in the Indo-Naga war (ibid).[70] During those difficult years, they even compiled a book of patriotic songs to uplift villagers' spirits by reminding them of Khonoma's proud heritage and why Rüffüno was created. However, the scattering of Khonoma's people by the war eventually made it difficult for Rüffüno to continue to represent all Khwünomia (people of Khonoma). Only the minority that remained in the village could continue to participate. This prompted a restructuring of Rüffüno, creating "Rüffüno Nagaland" as a supreme body and subordinate chapters (A-E) for the major centres of Khonoma diaspora (appendix 3-15). As part of this reorganization, a committee was also formed to coordinate between the various chapters and look after their interests. If, for example, a

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[69] The expectation that Nagas should constantly set all else aside to take part in age group activities can present a real dilemma for those with heavy demands on their time. It becomes impossible to do intensive work. Most student research by Nagas, for example, must be done outside the state where they can escape their age group obligations and work uninterrupted.

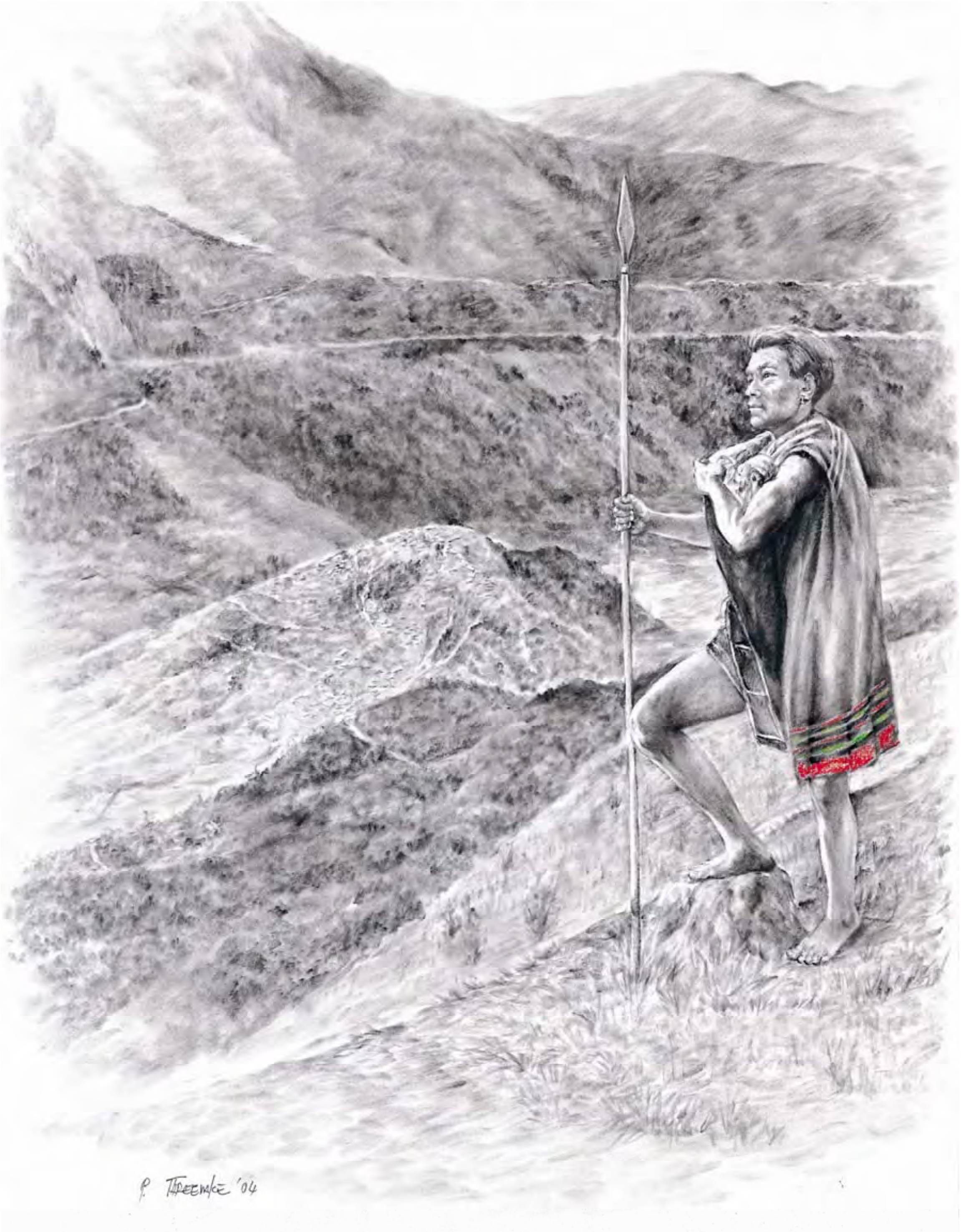
[70] Perhaps it might have been asking the impossible, but Rüffüno was obviously unable to achieve sufficient unity between Khonoma's khels to prevent them from turning against each other in the lead up to the Indo-Naga war.

Khonoma student was to die in Delhi, then this committee would assist in retrieving the body.

To remind themselves of their common ancestry, all of the Rüffüno chapters celebrate “Khonoma Day” every year on September 1st – the anniversary of Rüffüno’s creation. Everyone wears a shawl or mekhela (skirt) of a Khonoma design (appendix 3-36) and there is a competition to decide which of Khonoma’s descendants have excelled and brought pride to the village. This shows a remarkable level of organization for a mid-sized village and helps explain why many continue to proudly identify themselves as Khwünomia, even after having lived away from the village for the past 50 years.

CHAPTER 6

The Land and its Ownership



> "Though they have covered their hillsides with a marvelous system of irrigated terraces, they cannot grow enough food to support them[selves]. It is estimated that in Khonoura [Khonoma], their most powerful and warlike village, a third of the population is landless. Now that the country is settled and the roads safe, trade provides a means of livelihood for the surplus population. But in the old days the loot obtained on raids and the prisoners held to ransom did not just provide a welcome extra; they were an essential source of income."
>
> (J.P. Mills, District Commissioner for the Naga Hills between 1924 and 1936.)

INTRODUCTION

It is difficult to overstate the importance of ancestral lands to the identity and continuity of many tribal societies. It is often the land that gives roots to the family, the clan and the tribal group, and holds them together as a community. Without their land, they would cease to exist as a people, so their very survival is linked to ownership and control of their land and its resources (cf. Sahlins 1968). In Northeast India, this sense of land and identity – and the need to protect them – has led to numerous armed struggles (Longchar, 1998). These have been a long-term political headache for distant Delhi (see, for example, Ghurye, 1980; Duyker, 1987; Bhuyan, 1989; Datta, 1994; Gopalakrishnan, 1995; Hazarika, 1995; Tarapot, 1996; Anonymous, 1997b; Ghosh, S., 2001; Nuh, 2001; Nepram, 2002), but for the 'tribal' people who chose to pick up guns and sacrifice their blood to protect their land, it was fundamentally an issue of cultural survival and defending their homeland against what they viewed as foreign invasion. Incursions on another's territory have always been met with warfare in the Northeast, so in that sense, the ongoing political turmoil in the Northeast is a continuation, albeit escalated, of something that is deeply rooted in history.

Even when ancestral territory could be successfully protected, it was still no guarantee that it would be sufficient, in both extent and quality, to provide for the food needs of a growing population. Mills' words, in the opening quote of this chapter, document the desperate shortage of farmland in Khonoma that the British found as they began to administer the Naga Hills. Mills' observations are poignant for drawing a direct linkage between Khonoma's land scarcity and its habit of preying on less powerful villages. He attributed Khonoma's famed belligerence to its need to compensate for the inadequacies of its own ancestral lands in terms of providing a livelihood for its people. This vital issue of land scarcity is raised in detail later in this chapter. It not only triggered innovations within the village that enabled intensified land use; it was also to have far-reaching consequences across India's Northeast.

Most Naga subgroups have myths which say that they are children of the earth. Angami legend, for example, suggests that their ancestors emerged from the bowels of the earth in some land to the south (Hutton, 1969, 6). The Nagas' view of the earth was thus one of a mother-child relationship, in which she nurtured and sustained them with produce from the land. As an agrarian people, farming was the core of their social life. Most of the old traditions, festivals, folktales, and songs were entwined around the agricultural calendar. Their culture was interwoven with the land, forests, rivers and mountains that provided their means of food production. The Angami lived in a world of spirits, and the sacredness that they accorded to their land was further deepened by their belief that it was the dwelling place of the gods and spirits. They made no clear-cut separation between the physical and spiritual worlds, but saw them as an integrated whole. Stones, trees, water or any other unusual features of the landscape were believed to be inhabited by spirits. Their ancestors had lived and worked on this same land, and their bones were lying there as a final resting place. The land was thus a sacred place of communion with their ancestors and spirits (Vashum, Y. 1998).

These are not new insights. Many of these same themes were encapsulated in an 1871 British report debating boundaries and Naga attachment to land:

> "Lieutenant Sconce stated that the Nagas are not nomadic in their habits; that they are peculiarly attached to their places of abode, probably because their dead are buried opposite to their doors; that while there is no private property in land[1], the chiefs have very fixed notions of possession; that the tribal lands are generally bounded by streams; and that the Nagas' jealousy about their landed rights is in a great measure owing to their belief that certain spirits, whom they have long gratified with adoration and offering, reside in hills, groves, rivers, etc." (Anonymous, 1871, 22).

The whole of life's activities thus revolved around the land and its surroundings. It was the foundation of social, religious and economic life. Individual identity was deeply rooted in the community and, even today, Nagas commonly identify themselves by their village rather than their own names. Even villages on the most windswept of spurs, with poor soils, chronic food shortages, and far from water sources, are – in the eyes of Nagas who grew up there – the best places on earth (Meru, 2001)!

The Nagas' protracted struggle for independence has won them several important concessions from Delhi that are relevant to this discussion. In 1963, as we

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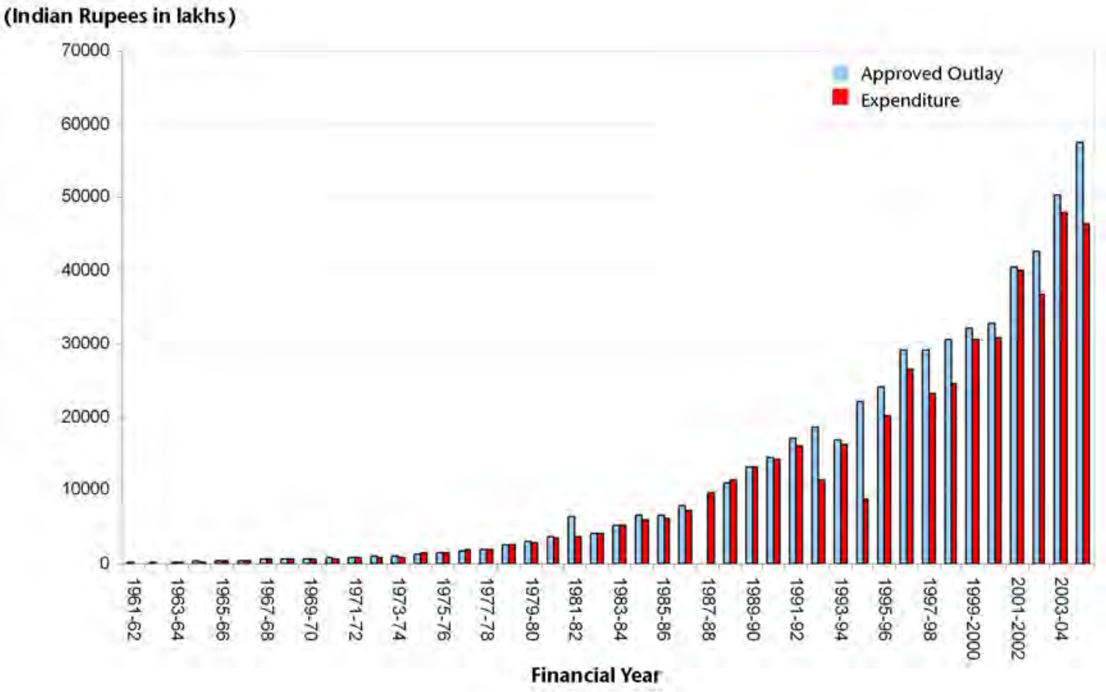
[1] The review of Angami property regimes later in this chapter shows this to be untrue. Lieutenant Sconce apparently assumed that what he had observed in some subgroups applied to all Nagas.

saw in Chapter 5, Nagaland was granted statehood with the right to elect its own representatives and govern its own affairs, while still remaining under the Indian union. This was accompanied by an increasing flow of funds from central government out of all proportion to the size of the state and its population (see figure 6-1). Nagaland's autonomy is enshrined in Article 371A of the constitution of India that states that "No act of Parliament can apply to Nagaland unless it is ratified by the State Assembly." Furthermore, the special status accorded to Nagaland by the constitution provides that "the land and its resources shall belong to the people of Nagaland." Traditional land tenure systems are thus protected and state intervention with regard to land holdings is minimal. The land remains largely in the hands of the people, with only about 7 per cent of the state's land area under government control. This is unique in India, where forested lands are generally viewed as belonging to the state.

Figure 6-1. Budget Allocations to Nagaland since Indian Independence *



Notes:
* 1 *crore* = 100 *lakh* = 10,000,000
* Budget allocations from central Government to Nagaland are made under successive plans, each usually covering five years: 1st Plan (1951-56); 2nd Plan (1956-61); 3rd Plan (1961-66); 3 Annual Plans (1966-69); 4th Plan (1969-74); 5th Plan (1974-79); 1 Annual Plan (1979-80); 6th Plan (1980-85); 7th Plan (1985-90); 2 Annual Plans (1990-92); 8th Plan (1992-97); 9th Plan (1997-2002); 10th Plan (2002-07).
* Budget for the then Naga Hills Tuensang Area (NHTA) was included under Assam's Plan until the beginning of the Third Plan. It was officially granted full statehood and became known as Nagaland on Dec. 1, 1963.
* The 5th plan was terminated by the end of 1977-78 when a new concept of a rolling plan was introduced. It was therefore confined from 1974-75 to 1977-78.
Source: Alemtemshi Jamir, Government of Nagaland, 2006

Whatever culture Khonoma's ancestors brought with them when they founded the village 600-700 years ago, it had to mold itself to the peculiarities of the environment that they found there. And the environment, in turn, was modified by the culture of its new settlers. They depended on the land and forests for their livelihood, to generate agricultural surpluses that would enable them to sponsor feasts and build their social prestige (Takatemjen, 1998). The agroecology of this new land called for modifications to whatever farming systems that they had earlier found to work in Kigwema, and before that in Khezhakenoma. And this would have precipitated changes in the myths, rituals and festivals entwined within the agricultural calendar. Nikatu Iralu, a noted thinker from Khonoma, credits the landscape with a powerful influence over his people: "… the entire pristine ecosystem of the majestic mountains overlooking Khonoma has provided our people down the centuries with the sense of awe and mystery about nature which plays a vital part in the formation of the values of a people." (Iralu, N., 1994, 50)

It also had significant economic implications. As shown later in this chapter, although Khonoma had a large territory, the ruggedness of its terrain meant that relatively little of it was suitable for agriculture – thus creating the impetus for intensified cultivation of limited arable lands. And the alder that provided the means for that intensified use found ideal growing conditions in the cool damp environs of the Khonoma basin. The land scarcity problem and alder solution that are the core of this study thus have their roots in the land.

Constructing a mental map of Khonoma and its neighborhood is necessary for readers to visualize the history and lives of its people that are so interwoven with that landscape. This impact began from the earliest days when relief features played the deciding role in the location of the village – on a highly defensive spur and surrounded by a fertile valley with high potential for wet rice cultivation. With their food and security needs thus met, they were able to launch raids into distant lands and demand tributes from weaker villages that bowed to their force. And when they themselves were faced with the overwhelming firepower of the British in 1850 and 1879 and the Indians in 1956, the rugged landscape, its deep forests and caves, provided them with refuge. Every mountain, every ridge, and every stone has a legend and every peak a tale to tell. This became obvious as we tried to capture the villagers' mental map on paper (map 4-5). While the most detailed government maps show the village location and possibly one or two of the main rivers at best, villagers view the landscape at an infinitely finer level of resolution.

METHODOLOGY

This chapter draws on a combination of geographical tools and informal interviews to first describe Khonoma's biophysical environment, then to look at its ownership, and how both interact to influence land use. The process began by using a 1:50,000 government-issue topographical map as a base, and then holding a series of group interviews with villagers to jointly demarcate their understanding of the village's boundaries.[2] This map was scanned and then digitized on-screen using ArcView v. 3.3 and R2V v. 5.0, and finally edited with ArcInfo v. 8.1. This then allowed us to use ArcMap v. 8.2 to create a digital terrain model and generate useful thematic maps showing altitude, slope and topographical profiles. Satellite imagery (IRS Panchromatic) was then purchased from the Indian National Remote Sensing Agency and using ERDAS v. 8.3, draped over the digital terrain model to show ground cover. This in turn was used as a basis for classifying land use; a first draft was done using ERDAS, and then refined through ground-truthing from high ridges that provided sweeping views of the landscape below. Specific points were located on the map with the help of a Garmin GPS 12 (Global Positioning System). By this point, the map had become sufficiently detailed that even villagers unaccustomed to looking at maps could read it easily. More group meetings were then held to ask for help to draw internal boundaries within Khonoma's territory, showing the various categories of land tenure and the land blocks between which each of the three khels rotated their jhum cultivation. This process thus generated useful data layers that could then be overlaid for analytical purposes. While clearly concerned about where boundaries were being drawn, villagers were keenly interested in this participatory mapping, noting that for the first time, the entirety of Khonoma's territory and its resources could be grasped at one glance. They saw it as having the potential to be an extremely useful planning tool for the future.

Weather was another issue of extreme importance for which no secondary data were available. Weather stations were thus established at mid-elevation sites in each village (1550 m asl in Khonoma; 1180 m asl in Tsiesema) to collect basic data on rainfall (manual rain gauge, and Hobo Event Logger connected to a rain bucket), light, temperature, and relative humidity (all Hobo loggers). Since wind was sometimes mentioned as a factor in alder management (heavy winds sometimes break alder coppices, particularly on higher, more exposed slopes), a wind meter (Davis Weather Monitor II system) was later added in Khonoma.[3] With the exception of the manual rain gauges, all other instruments were automated and only needed to be downloaded into a laptop computer monthly. The manual rain gauge was read daily and served as a backup in the event that our automated equipment

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[2] There was considerable debate amongst villagers about where boundaries should be drawn, particularly that for the village's more remote western frontier. These boundaries were revised several times over the course of successive meetings before settling on those shown in the maps. These boundaries will in fact only become clear after a dispute breaks out with neighboring villages and a negotiated agreement has to be reached. Until then, some were unwilling to put anything on paper that could compromise their ability to claim more at a later date, if such a dispute did erupt.

[3] The wind meter initially presented a problem because it ran off a mains power supply, and when the electricity was out for days at a time – as was often the case in Khonoma – the 9 v battery that provided backup power was quickly exhausted, resulting in lost data until the battery could be replaced. This was solved by adapting the unit to use a 12 v motorcycle battery connected to a solar panel that kept it charged. The meter was installed on the cross on the roof of the Baptist Church, where its height minimized interference with wind velocity and direction and provided maximum exposure to sunlight to keep the backup battery charged.

failed. Its only weakness was that we had to rely on villagers to read it, and despite our best training efforts, this did leave questions about accuracy. Midway through the research, additional weather stations were installed to provide a clearer picture of climatic variation across each village's agricultural landscape, and hopefully help account for differences in cropping patterns. Since the original stations were established at mid-altitude sites, we thus chose low and high extremes of the cultivated areas in each village to set up these additional stations.

In terms of other biophysical data, the *Nagaland Soils* map (National Bureau of Soil Survey and Land Use Planning, 1999) was referenced for pedological information. Soil samples were collected from monitored jhum and wet rice fields, at 0-15 cm and 15-30 cm depths using standard methods, and submitted for analyses to the laboratory of the Department of Soil Science and Conservation at Chiang Mai University in Thailand. Herbarium specimens were also carried back to Thailand and identified by J.F. Maxwell, curator of the Biology Department's herbarium at Chiang Mai University. Although these data were collected in parallel for both study villages, this chapter limits its discussion to Khonoma and the comparative data from Tsiesema are relegated to the appendices.

In tandem with building a profile of Khonoma's biophysical environment, informal interviews were used to probe the history of the village's establishment and land use, and document its property rights system. Village elders, as the main repository of oral history and customary laws, were sought out as key informants. A local teacher was recruited specifically to assist with the property rights aspects of the study (see Chücha, 2001).

FINDINGS

Biophysical Description of Khonoma

As introduced in the opening chapter, Khonoma is situated in southern Nagaland at 25°5' N latitude and 94°2' E longitude, about 16 km west of the state capital, Kohima (map 1-1). This places it in the extreme southwest of Angami country (map 5-1). It is a large village by Naga standards, stretching about 14 km from east to west and encompassing about 104.43 sq km (map 6-1).[4] Its northeastern side faces Secüma (Zubza), to the north is Mezoma, and to the east, Jotsoma – all members of the notorious Western Group of Angami villages. Its western border abuts against the neighboring Zeliangrong tribal group and extends for about 11 km as part of the sensitive border between Nagaland and Manipur. In one sense, Khonoma is physically isolated behind mountains in a particularly rugged corner of Nagaland – at the extreme edge of its tribal frontiers – with one flank bounded by another Naga subgroup and its back against a neighboring state. However, this boundary between

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[4] This must be taken as a tentative figure since Khonoma's borders are under dispute in several areas.

Manipur and the Naga Hills District was not settled until 1872. Villages in Nagaland are typically perched on mountain spurs and ridges, sites chosen to be defensible. Thus, they usually command panoramic vistas of neighboring mountain ranges scattered with Naga villages at strategic points. They interact with – and are influenced by – many neighboring villages in their day-to-day activities. Most villagers are unable to see beyond the immediate mountain ridges that surround them. Only Mezoma village is visible across on the western side of the valley. But since Mezoma is an offshoot from Khonoma, its culture and way of doing things are marked more by their similarities than differences.

Despite the quiet corner that it occupies, in another sense, Khonoma is strategically located within easy marching distance either northward to Assam or to Manipur in the south. This explains in part why Khonoma's name was so prominent in British reports of Naga outrages against villages in the North Cachar and Mikir hills. It was also the misfortune of the Zeliangrong to have one of the militarily strongest and most feared Angami villages on their doorstep, subjecting them to frequent raids and payment of tributes. But the Zeliang also influenced Khonoma. Some of Khonoma's clans migrated from the Zeliang area[5], and Khonoma's Tenyidie dialect is strongly influenced by Zeliang language (see Blankenship, 1994).[6]

Terrain

During my first visit to Khonoma in the autumn of 1995, I recall puzzling over why a village that was reported to have so much land would have felt the need to innovate a technology aimed at land-use intensification. The answer became clear as I grew familiar with the terrain.

Map 6-2 provides an aerial perspective needed to understand at a glance the array of clustered peaks, sharp ridges and valleys that comprise Khonoma's rugged landscape. It was created by draping a satellite image on top of a digital elevation model, providing a view very similar to what would be seen from an airplane flying over of the village. Lines have been added to divide the territory into its component sub-watersheds.

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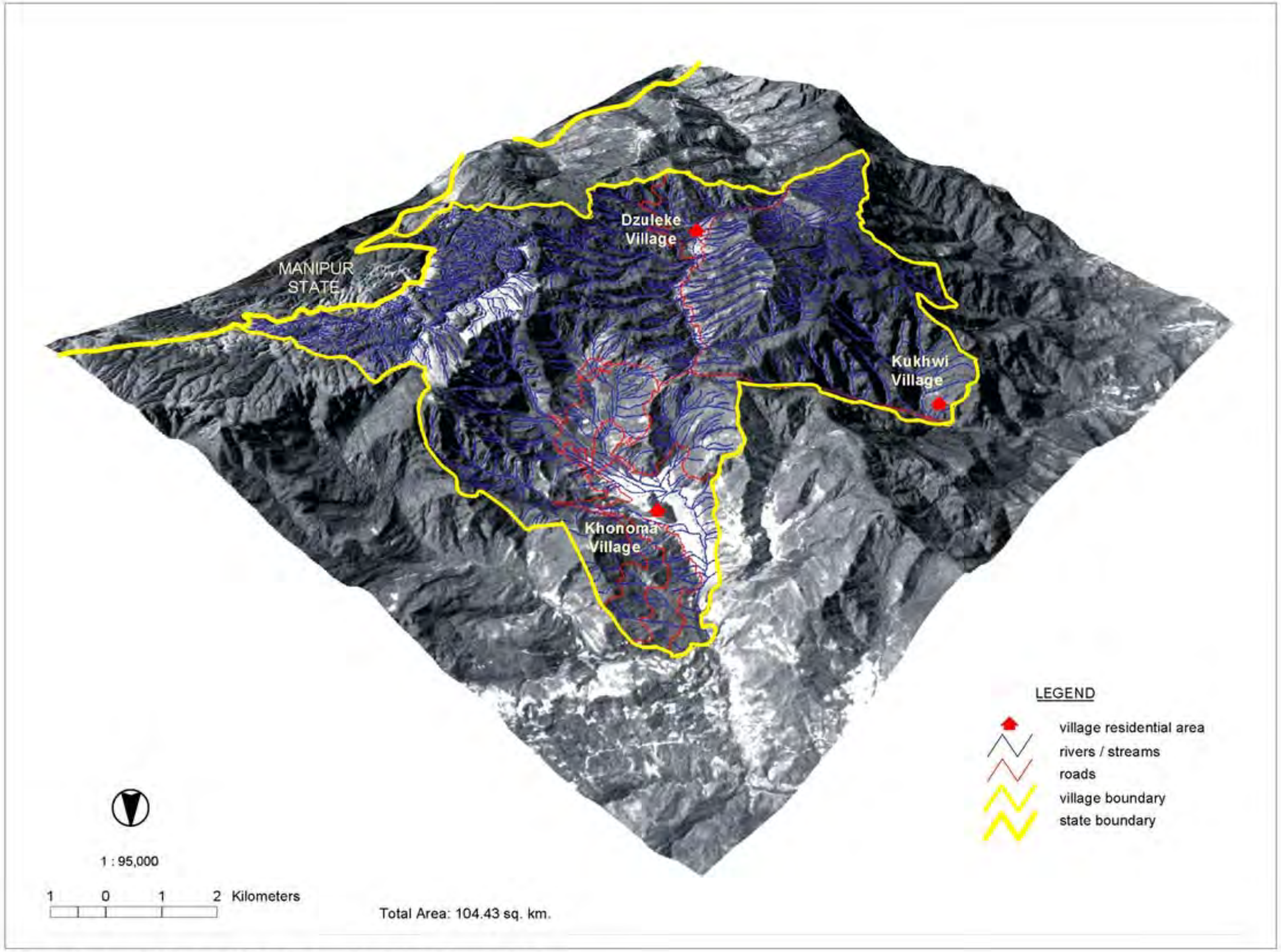
[5] Khonoma's Meru clan, for example, is also found in Zeliangrong territory. They recognize that they are related and the usual proscriptions against marriage within a clan apply – even though the census counts them as belonging to a different tribal group. Many names in Khonoma do not have much meaning in Tenyidie dialect, probably another indication that the village's ancestry crosses tribal boundaries.

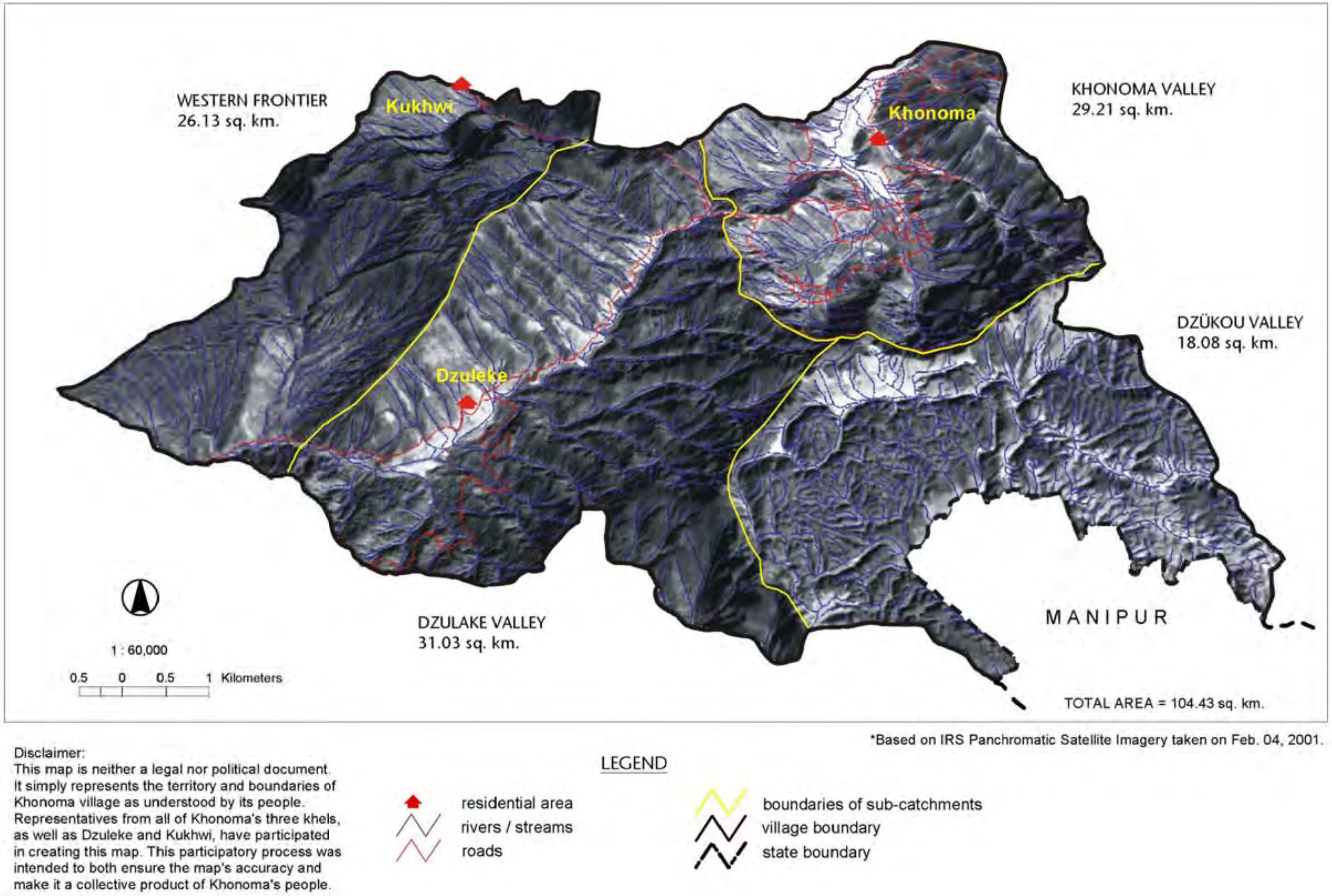
[6] This can be expected between neighboring tribal groups. The dialect spoken by Southern Angami villages is heavily influenced by Chakrima and Mao languages, while it is the Rengma that influence the dialect of Northern Angami villages.

Map 6-1. A Bird's Eye View of Khonoma from Space*
(IRS Panchromatic Satellite Imagery taken on Feb. 04, 2001, draped over a digital elevation model



* Cross-reference with 'Khwünoria Village: Places of Local Interest' for more details.

Map 6-2. Digital Elevation Model of Khonoma Village, Draped with a Panchromatic Satellite Image*



*Based on IRS Panchromatic Satellite Imagery taken on Feb. 04, 2001.

Disclaimer:
This map is neither a legal nor political document. It simply represents the territory and boundaries of Khonoma village as understood by its people. Representatives from all of Khonoma's three khels, as well as Dzuleke and Kukhwi, have participated in creating this map. This participatory process was intended to both ensure the map's accuracy and make it a collective product of Khonoma's people.

(See appendix 4-3 for a similar digital elevation model of Khonoma, but draped with a colored satellite image.)

Khonoma Valley *(plates 4-4 - 4-18)*

Strategically perched on a spur descending from the Barail Range, the steep drop-offs on most sides of Khonoma provide a strong natural defense. This spur juts into the middle of an alluvial valley that, with great labor over the centuries, has been carefully carved into permanent wet rice terraces. These are irrigated by many streams and rivers, most notably the Khu Rü (Rü = River) flowing past the east of the village and the Khüno Dzükhu Rü to the west, before they converge further down the valley to form the Dzuzu Rü. Although the valley has been terraced up to about 1780 m asl, the terraces are planted with wet rice only up to 1520 m, above which they are used only for dryland cropping. The reason for this is that the streams feeding the irrigation systems originate from the cool mountains above and the water does not warm up sufficiently to support rice cultivation until it has descended down to about 1520 m.[7] The most cold-hardy rice cultivars are then planted in these upper terraces. Above this, up to about 1800 m, is the intermediate zone used for jhum cultivation. Agriculture does not extend much beyond this because the terrain becomes too steep and rocky and temperatures too cold for most dryland crops.

This upper zone is generally left under natural forest cover. Beyond the agricultural zone, majestic cliffs rise up suddenly to create an amphitheatre effect. Their ridges form the boundary of a 29.21 sq km sub-watershed that contains virtually all of the village's agricultural activities. A couple of key points are worth reiterating here, about the vital role that relief and terrain have played in Khonoma's security. Militarily, the village's strategic positioning on a mountain spur made it highly defensible. A measure of this is that in an era when raids and counter-raids between hostile villages were part of the normal fabric of life in the Naga Hills, there do not appear to be any stories of Naga war parties attacking Khonoma village. And this, despite the fact that Khonoma had made many enemies and was within striking distance of some powerful villages. Secondly, the village's food security was bolstered by the wide valley bottom that they developed into extensive wet rice terraces and produced most of their rice needs. With the valley

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[7] Other villages along the base of Japfü Range face the same constraint and have innovated ways to minimize it. In the Southern Angami area, for example, Viswema village has intentionally designed its terraces so that the inlets and outlets are always on opposite ends of the fields (Kikhi, 1997, 42-43). This forces the water to flow the full length of each terrace, maximizing its exposure to the sun, before dropping to the next terrace below. As well as warming the water, this has the added advantage of providing more time for sediments to settle, reducing the loss of nutrients when the water flows on to the next field. Stones, widely used in lining the irrigation channels and terrace walls, accelerate the warming process by absorbing solar heat and transferring it to the water. Farmers commonly plant their most cold-tolerant rice varieties highest on the landscape, where the irrigation water is still cool, and more heat-demanding varieties lower down, to match the warming of the water. Kikhi (1997) observes that this varietal selection based on water temperatures even occurs within a single plot, with the most cold-tolerant varieties planted next to the water inlet, and one or two more heat-demanding cultivars towards the middle and far end of the field, where the water will have warmed up.

thus converted into the village's rice basket, other food crops needed to supplement their rice staple were available from jhum fields on the surrounding slopes. Here again, relief factors and their corresponding influence on climate provide ideal conditions for the alder that Khonoma has used so effectively to boost the productivity of its jhum land. Nestled at the base of the lofty Japfü Range, Khonoma also benefited from a multitude of hill streams and rivers that could be diverted for irrigating their terraces. The village was thus relatively well positioned in terms of its military security and ability to feed itself, like other Angami villages adjacent to the Japfü range with reliable water supplies, and an abundance of rocks for terrace walls, and unlike northern villages such as Tsiesema, typically perched on the highest ridges.

Most casual visitors to Khonoma do not see beyond the surrounding basin. But this is only the northeastern corner (27.97 %) of the total territory of 104.43 sq km that Khonoma claims as its own. Beyond this is another 75.23 sq km of more rugged mountain terrain.

Dzükou Valley *(plates 4-19 – 4-22)*

Hidden from sight, behind the ridges south of Khonoma, unfolds the picturesque Western Dzükou Valley (Dzü = freezing; kou = water) at 2500-3000 m asl. This is a popular destination for trekkers attracted to the natural beauty of the landscape. The thick growth of dwarf bamboo (*Chimonobambusa callosa* (Munro) Nakai) on the valley floor gives it a carpeted appearance, interspersed with thickly forested hillocks. The serenity of the valley is punctuated only by the sound of the wind in the trees and the occasional call of barking deer. Many hikers time their visits to coincide with the blooming of an array of wild flowers during May to July, most notably the Dzükou lily (*Lilium mackliniae* Sealy).[8] The Dzükou River passing through the valley demarcates the Nagaland – Manipur state border. In times of trouble, this 18.08 sq km enclave has provided refuge to Khonoma's people, taking shelter in its thick forests and caves.

Dzulake Valley *(plates 4-23 - 4-30)*

Ascent of the western face of the ridge behind Khonoma and over the neck brings us to yet another valley. Dzulake Valley extends for about 8.5 km between the Idepie Thi and Ketie-u Tsü Kerü massifs, with the Dzulerudi River flowing through it in a southwesterly direction. In 1848, some Khonoma villagers, probably in search of

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[8] See Mao and Kataki, 1994 and Karnatak, 1994 for more detailed discussions on the ecology of the Dzükou valley. There have been proposals for gazetting this area as a national park, but these have been resisted by local Angami villages as interference with their territorial jurisdiction. It is reported to have rich genetic diversity and remains relatively pristine, protected by its sheer inaccessibility. Another plan by Nagaland's State Government, to divert water from the Dzükou River to alleviate water shortages in Kohima has remained in the proposal stage.

more cultivable land, migrated to its western end, where the valley bottom is wider, and established Dzulake village (1670 m asl) (Khate, 2000).[9] Continued travel along this road for another 23 km would take us out of Angami territory to the first Zeliang village of Poilwa. A boundary dispute between the two villages remains unresolved, but according to Khonoma's claims (as shown in the village maps in this chapter), 31.03 sq km of this valley falls under its jurisdiction.

Western Frontier *(plates 4-31 - 4-34)*

The remainder of Khonoma's land falls along the western side of the Ketie-u Tsü Kerü massif. This western border is part of the rugged hinterland between Angami and Zeliangrong territories. Since the area is remote and seldom visited by either side, there have never been formal negotiations over the border demarcation, and it remains unclear. This border will probably not be formerly settled until a dispute – often triggered by logging – breaks out and it goes to arbitration. Such a dispute in 1989, between Khonoma and the neighboring Angami village of Thekrüjüna (see map 4-5), has already resolved the northern border of this part of the territory. At that time, to bolster Khonoma's claims, about eight households from Thevomia khel temporarily relocated to an old settlement site, called Kukhwi, in the disputed area. The case was settled after five or six years and Kukhwi was again depopulated as most returned to the main village. Now, only two brothers continue to cultivate land in Kukhwi, mostly planting ginger and turmeric that thrive in the black organic soils. According to Khonoma's understanding of its boundaries, this final section of its territory covers about 26.13 sq km.

Entire Village Territory

Map 6-3 shows the village's altitude, broken into 250 m bands. A modified version is shown in map 6-4, but this time supplemented with several topographic profiles of selected transects. (See appendices 4-4 - 4-7 for additional topographic profiles.) And finally, map 6-5 provides a rough interpretation of slopes. These parameters have profound implications for land use systems and will be discussed later in the chapter.

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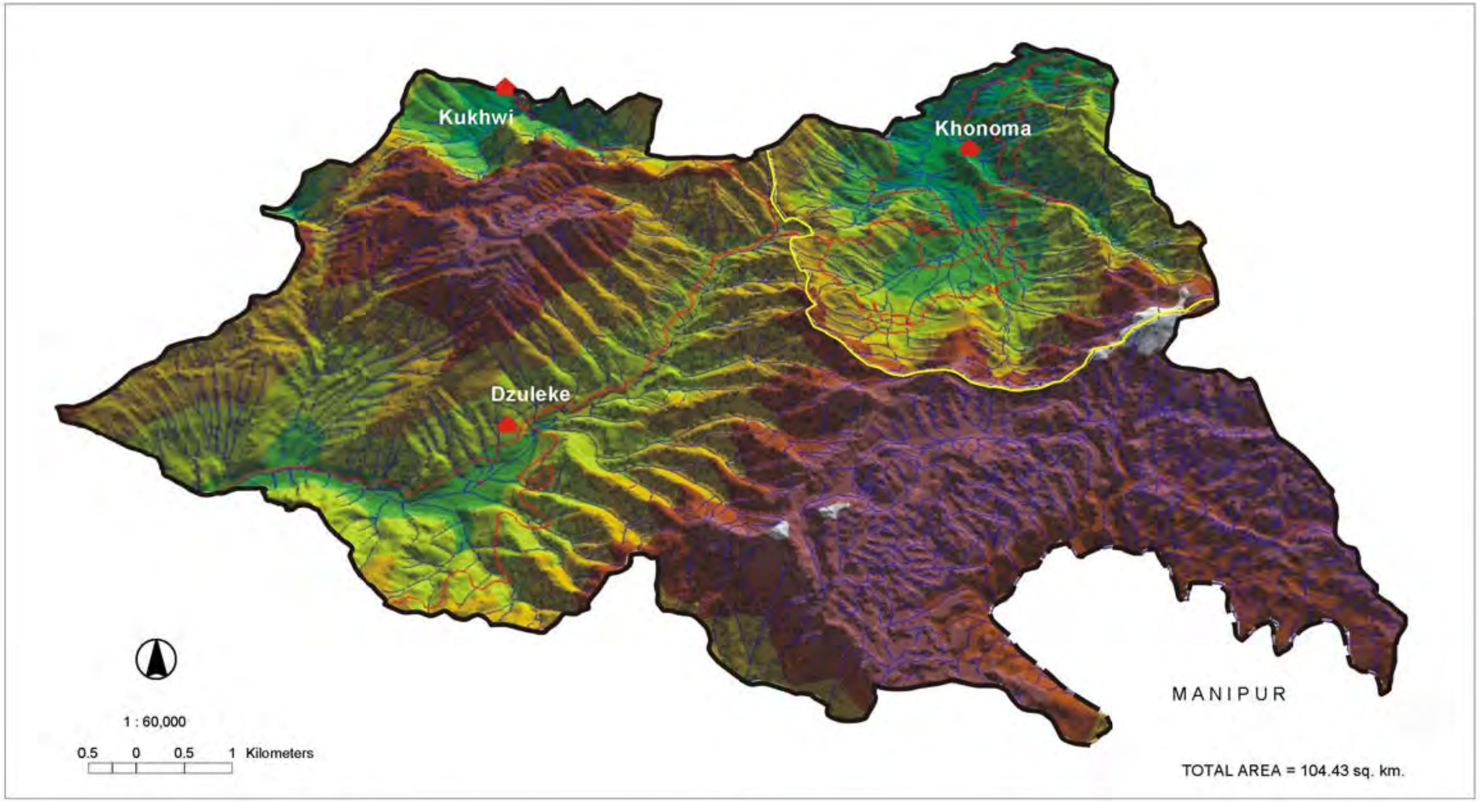
[9] Dzulake was officially recognized as an independent village in the 1980s (with its own clearly defined boundaries), but its people and economy continue to be so closely intertwined that most people still view it as an extension of Khonoma. It represents a safety reservoir for land-short villagers in Khonoma. According to regulations (see appendix 4-34), if they relocate to Dzulake village, then they will have full access to its abundant land and other communal resources. (Dzulake is, of course, keen to attract new residents and bolster its numbers).

Map 6-3. Breakdown of Altitudinal Bands in Khonoma Village

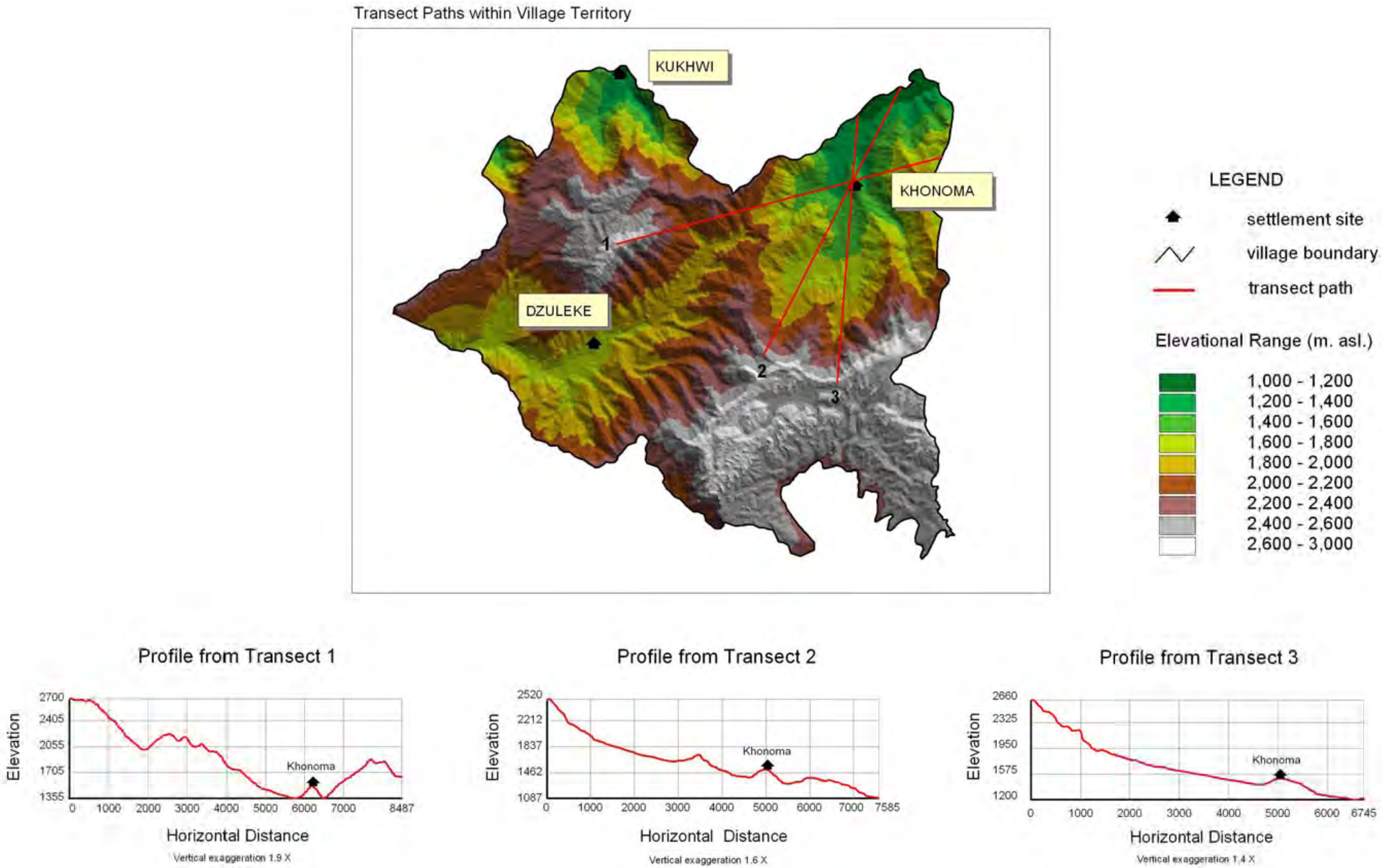


LEGEND

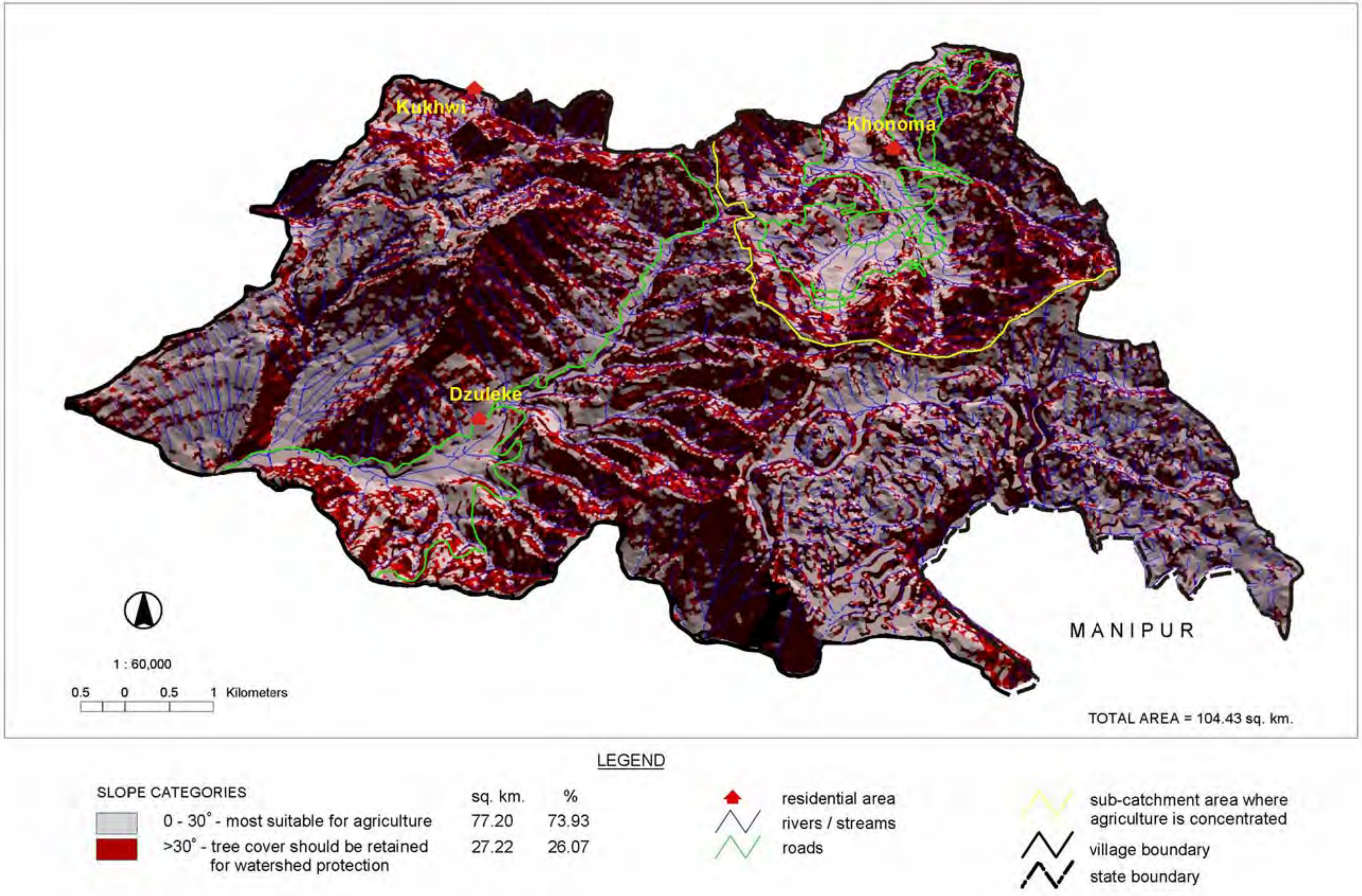
Elevation Range (m. asl.)	sq. km.	%
1000 - 1250	1.55	1.48
1250 - 1500	5.92	5.67
1500 - 1750	12.48	11.95
1750 - 2000	23.36	22.37
2000 - 2250	23.10	22.12
2250 - 2500	18.82	18.02
2500 - 2750	18.64	17.85
2750 - 3000	0.56	0.54

residential area
rivers/streams
roads
sub-catchment area where agriculture is concentrated
village boundary
state boundary

Map 6-4. Topographic Profiles of Selected Transects through Khonoma Village



Map 6-5. Slope Classification of Khonoma Village



Geomorphology

According to the Nagaland Soils map, the geology of Khonoma is part of the Barail series. The combination of fertile soils and stone useful for construction would have been attractive to Khonoma's founders and invited permanent settlement. Cutting these soft sandstones into blocks for construction purposes has become an important source of supplementary income for the village (see chapter 7).

The soils on the cool hill slopes are acidic mollisols, very rich in organic carbon[10] but generally poor in phosphate and potash content. Landslides are frequent during the monsoon season. The river valleys are characterized by more fertile alluvial and colluvial soils. Table 6-1 presents the mean analytical results of both hill slope (jhum) and valley (wet rice terraces) fields sampled in Khonoma.[11]

Table 6-1. Soil Properties in the Valley Bottom and Adjacent Hill Slopes of Khonoma ‡

	River Valley (wet rice terraces)		**Hill Slopes** † (jhum fields)	
sampling depth	**0-15 cm.**	**15-30 cm.**	**0-15 cm.**	**15-30 cm.**
pH	5.025	5.616	4.71	4.66
OM (%)	3.087	1.942	5.87	3.09
CEC (me/100 gms)	12.761	12.695	21.73	18.08
N (%)	0.1702	0.1083	0.32	0.20
P (ppm)	11.65	4.8	8.42	4.23
K (ppm)	84.168	77.616	155.33	119.60
Ca (ppm)	657.5	832.5	517.50	309.17
Mg (ppm	100	141.5	63.38	46.65
% sand	30.872	34.662	34.87	30.24
% silt	40.8	36.804	38.14	38.85
% clay	27.954	28.734	26.95	33.14

‡ Analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University on May 18, 2001.

‡ pH - acidity; OM - Organic Matter; CEC - Exchangeable Cation Exchange Capacity; N - Total Nitrogen; P - Extractable Phosphorous; K - Exchangeable Potassium; Ca - Exchangeable Calcium; Mg - Exchangeable Magnesium

‡ Methods used for soil analyses:

pH:	soil to water ratio 1:1	CEC:	Distillation
OM:	Walkley and Black 1934	Ca:	Titration Method - EDTA
N:	Kjhedahl Method	Mg:	Titration Method - EDTA
P:	Brays Method No. 2	Texture:	5% Calgon Solution
K:	Flame Photometry		

‡ See appendices 4-15 and 4-16 for lab results for individual samples.

† Samples taken from monitored jhum fields after one year of cropping.

Climate

Climate must of course receive prominence as an important determinant of cropping patterns. But it has had a much broader defining influence on the course of Khonoma's history. Most Naga villages are situated at high altitudes with cool and bracing climates. Besides influencing crop selection, the cool temperatures would have placed a premium on firewood – and magnified alder's importance to the local

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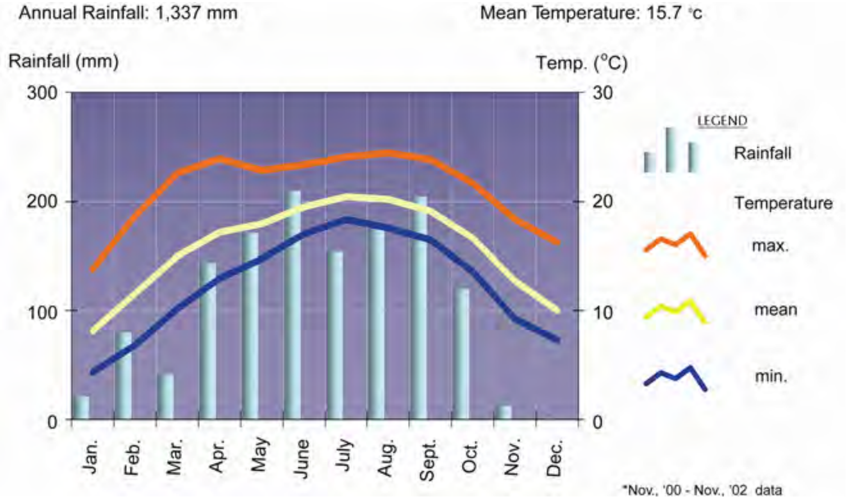
[10] The thick layer of humus on Khonoma's forest floors is in contrast to the almost bare floors of forests in the Dimapur area – indicating how rapidly litter decomposes and is reabsorbed in lowland tropical forest ecosystems.

[11] See Kire, nd., for a detailed survey of soils across Kohima District.

economy. Although Khonoma had a reputation locally for being colder and wetter than neighboring villages, there were no data available to confirm this. The nearest weather station is in Kohima, about 16 km away. Since weather patterns can change significantly even over short distances in mountain environments, Kohima's data could only be considered as indicative of what might be expected in Khonoma. Weather instruments were thus set up in the village over the duration of fieldwork and the data are presented in figures 6-2 to 6-4. These will be referenced in the following discussion of Khonoma's seasonal weather patterns.

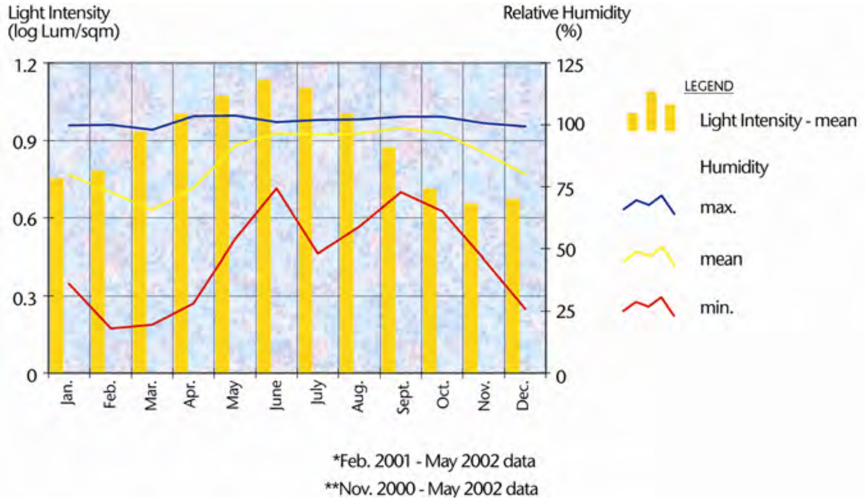
Figure 6-2. Annual Temperature and Rainfall Data for Khonoma *



*Nov., '00 - Nov., '02 data

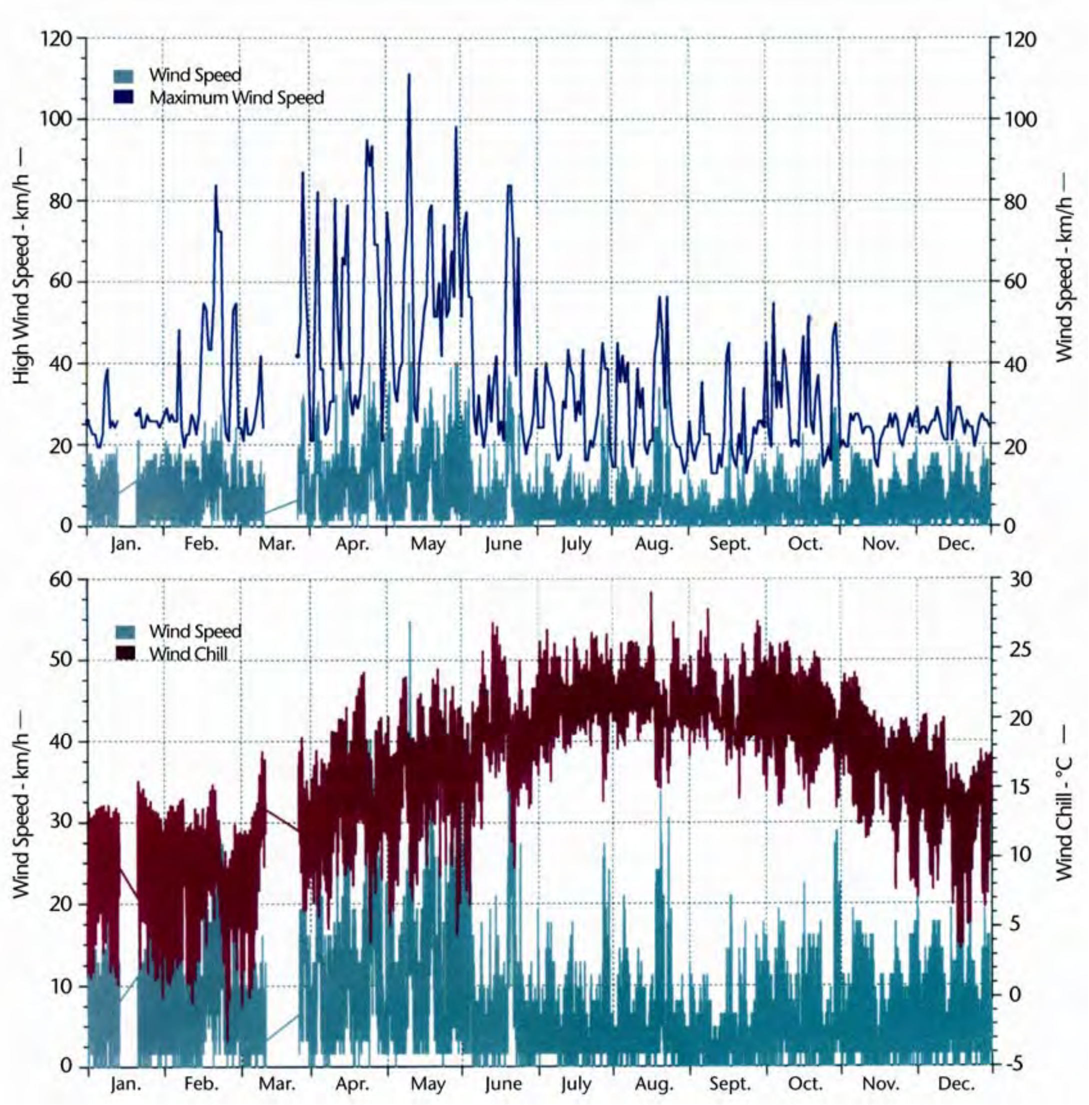
* See appendix 4-28 for daily rainfall recorded from a manual rain gauge at the same site

Figure 6-3. Light Intensity* and Relative Humidity** at Khonoma's Mid-Altitude Weather Station (1,550 m. asl.)



*Feb. 2001 - May 2002 data
**Nov. 2000 - May 2002 data

Figure 6-4. Wind Data for Khonoma Over a 12-Month Period *
(Dec. 1, 2001 – Nov. 30, 2002)



Identical weather stations were installed in Tsiesema (except a wind meter).[12] The general pattern of rainfall, temperature and light are identical between the two villages, the main difference being that the lower altitude of the Tsiesema weather station (370 m lower) makes it consistently about 3-4°C hotter throughout the year. They suggest similar levels of rainfall, but that Khonoma may have a less distinct dry season. Daily light is less during the winter season, but increasing as days grow longer after the New Year. Mean humidity is consistently a bit higher in Khonoma throughout the year, perhaps reflecting its position on the foothills of the densely-forested Japfü Range.

Nagaland has a modified tropical monsoon climate that gives it relatively dry winters and wet summers. The annual rainfall in Khonoma averaged 1337 mm over the two years that data were collected (2000-2002), occurring mostly over the seven

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[12] The data are presented in appendices 4-22 - 4-25. Graphs comparing data from the two villages are then given in appendices 4-26 – 4-28.

months from April to October (figure 6-2). The highest rainfalls are in June, and the transplanting of the wet rice crop is timed to coincide with this. Peak light intensity and temperatures follow one to two months later in July and August, providing conditions for good crop growth. By the time of harvest in October, rainfall has tapered to almost nothing, the days are shortening, and the mercury dropping. The maximum temperature recorded was 29.1°C on April 27th, 2001 (12:41:21 p.m.), while the minimum recorded was 1.17°C on January 26th, 2002 (4:04:58 a.m.).

Seasons

The year is divided into four seasons (Imnayongdang, 1990, 20-22) that set the pattern of village life.

Winter (December to February). Cool continental winds set in from the northeast, driving away the patches of stratocumulus clouds from the sky. A high pressure belt extends over Northeast India during this period, heralding generally clear skies and fine weather. Rainfall is generally absent[13], deciduous trees shed their leaves and the landscape becomes dry and vulnerable to wildfires.[14] January is the coldest month, with night time temperatures dipping to 2-4°C in the village, widespread frost on the upper slopes, and snowfall on the surrounding hilltops. The streams in Dzükou valley are frozen solid during this time and the valley covered with snow. Preparations for the next cropping season are gaining pace, with villagers busy opening up their jhum fields and giving their wet rice terraces a first hoeing. These vigorous activities are assisted by the cool winter temperatures, low humidity, and absence of rainfall. Nor are there any of the annoying leeches, mosquitoes and other insects that will show up later with the arrival of the monsoons. People tend to go to bed early because the days are short, the nights long and cold, and the electricity is often out.

Spring (March to May). Spring is marked by the arrival of strong winds from the southwest, gusting at velocities sometimes exceeding 100 km/hr (figure 6-4). Temperatures begin to rise quickly, daylight continues to lengthen, and the high pressure of the cold season is gradually replaced by a low pressure. This is the period when Naga farmers burn their jhum fields and the skies are hazy with smoke. Pre-monsoon showers in April break the drought and provide the moisture that farmers need to sow their jhum crops.[15]

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[13] Nearby Kohima suffers water shortages during this period, and hence the proposed scheme to divert water from the Dzükou River.

[14] Unseasonable winter rains can cause problems in getting the slash in jhum fields dry enough for a good burn in March.

[15] Khonoma's heaviest day of rainfall in 2001 came during the Sekrenyi festival on February 26th when a violent thunderstorm dumped almost 120 mm in 24 hours – about 7-8% of that year's total (see appendix 4-19). This illustrates the potential intensity of rainfall and its erosive capacity. Jhum fields were just being planted at that time, so the soil was unprotected and vulnerable to washout. Erosion damage was

Summer (June to September). In April, moisture-saturated winds circulating over the Bay of Bengal begin to move northward into Northeast India. As these winds meet the mountains of the sub-Himalayan region, they are pushed upwards, causing a rapid cooling and condensation of water vapor in the atmosphere. This brings the onset of the southwest monsoons in Nagaland in the latter part of May or early June and continues until mid-October. This period is characterized by overcast skies and often heavy rainfall. This is the growing season for crops, when temperatures (figure 6-2) and relative humidity are at their maximum, and daylight is longest (both figure 6-3).[16]

Although Khonoma's rainfall did not prove to be particularly heavy (1337 mm), its reputation as a wet village may stem more from its frequent cloud cover. This is a function of the terrain. During the monsoon season, clouds settle in the lower valleys during the cool of night. As temperatures warm up at daybreak, these clouds begin to ascend the valley – usually enveloping the village by 8:30-9:00 a.m.[17] The high mountains that surround the Khonoma basin form a barrier to the clouds, causing them to accumulate over Khonoma until they can gain enough altitude to breach the ridges.[18] But this heavy cloud cover does not seem to translate into extra rainfall.

Autumn (October to November). By the end of September, the rainfall begins to slacken in time for crop harvest. This is considered to be the best time of year, when skies are clear and temperatures pleasantly cool. The pace of life relaxes perceptibly as the granaries are filled and the villagers seem to take a deep collective breath before returning to their fields to prepare them for planting next year's crops. Shortening day length and dropping temperatures hint that winter is again just around the corner.

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surprisingly light though, seemingly testimony that the terracing of Khonoma's jhum fields, with intermittent rock walls along slope contours, is very effective in minimizing soil loss (see plate 2-84). Tsiesema's jhum fields, more sloping, with at best a few logs placed along contours in steeper areas, would presumably have washed out much more – but since only 24.8 mm fell in Tsiesema that day, no meaningful comparison was possible.

[16] Those farmers cultivating both wet rice terraces and dryland fields enjoy a degree of security against the vagaries of the weather. Farmers in Tsiesema, for example, noted that in the 2000 growing season, heavy rains in August reduced rice yields from their swiddens (and caused landslides that blocked the main access road to the village for several months), but conditions were ideal for the wet rice crop. This was reversed in 2001, when insufficient rains led to the drying up of seasonal streams used to irrigate the terraces, reducing yields. But the weather was considered quite favorable for swiddens that year, and their high yields helped to compensate for losses in the irrigated terraces. It is less likely that both systems will fail simultaneously.

[17] These daily movements of the clouds mean that during the monsoon season, any panoramic photographs of Khonoma from overlooking ridges have to be taken in the early morning before the valley clouded over.

[18] An indication of this can be seen in plate 4-19. Although the sky over Dzükou valley still remains clear, the Khonoma valley on the other side of the ridge was under heavy cloud cover. Clouds seen to the north (left of photograph) are just beginning to breach the 2740 m ridge and spill over into Dzükou valley.

Climatic Variation within the Village

Given that Khonoma spans about 14 km of mountainous territory horizontally from east to west, and another 1.87 km vertically (from 1000 to 2866 m asl), there are significant climatic variations within the village itself. To get some measure of this variation within the cropping zone, midway through the fieldwork, additional weather stations were installed at lower (1200 m) and higher (1762 m) sites, to compare with the data that was already being collected at the mid-altitude site (1550 m). Map 6-6 presents these data from the three stations on a single graph to permit easier comparison. Similar additional weather stations were also installed at Tsiesema. If we assume a standard temperature lapse rate of 0.65°C/100 m of altitude, then we would anticipate Khonoma's high site to average about 3.7°C colder than the low site (1762 m – 1200 m = 562 m). The inverse relationship between rising altitude and lowering temperatures is clear, although there was little difference between the mid- and high-altitude sites for much of the year.[19] The mean temperature at the low site was consistently about 2-4°C hotter than the high site, in keeping with the expected lapse rate. There is a range of several hundred mm of rainfall (1337 – 1571 mm) between the stations, but no clear trend to suggest the factors at play.[20] But in mountain environments, altitude and aspect can bring significant changes in temperature and precipitation even over short distances. The villagers are keenly aware of this and factor it into their decisions about which crops should be planted where. Farmers try to match the crop – or its cultivar – to the prevailing conditions in each given site. Their awareness of even subtle changes in light, temperature and moisture – and their effects on crops – demonstrates an impressive intimacy with the landscape.

These data provide quantitative support to farmers' testimony about the differences in weather patterns over even short distances, and its effect on their cropping decisions. This highlights the heterogeneity of mountain environments – and the inherent complexity of undertaking farming systems research in the uplands. These environmental effects appear to be playing an equal role in influencing alder establishment and its degree of vigor (see chapter 7).

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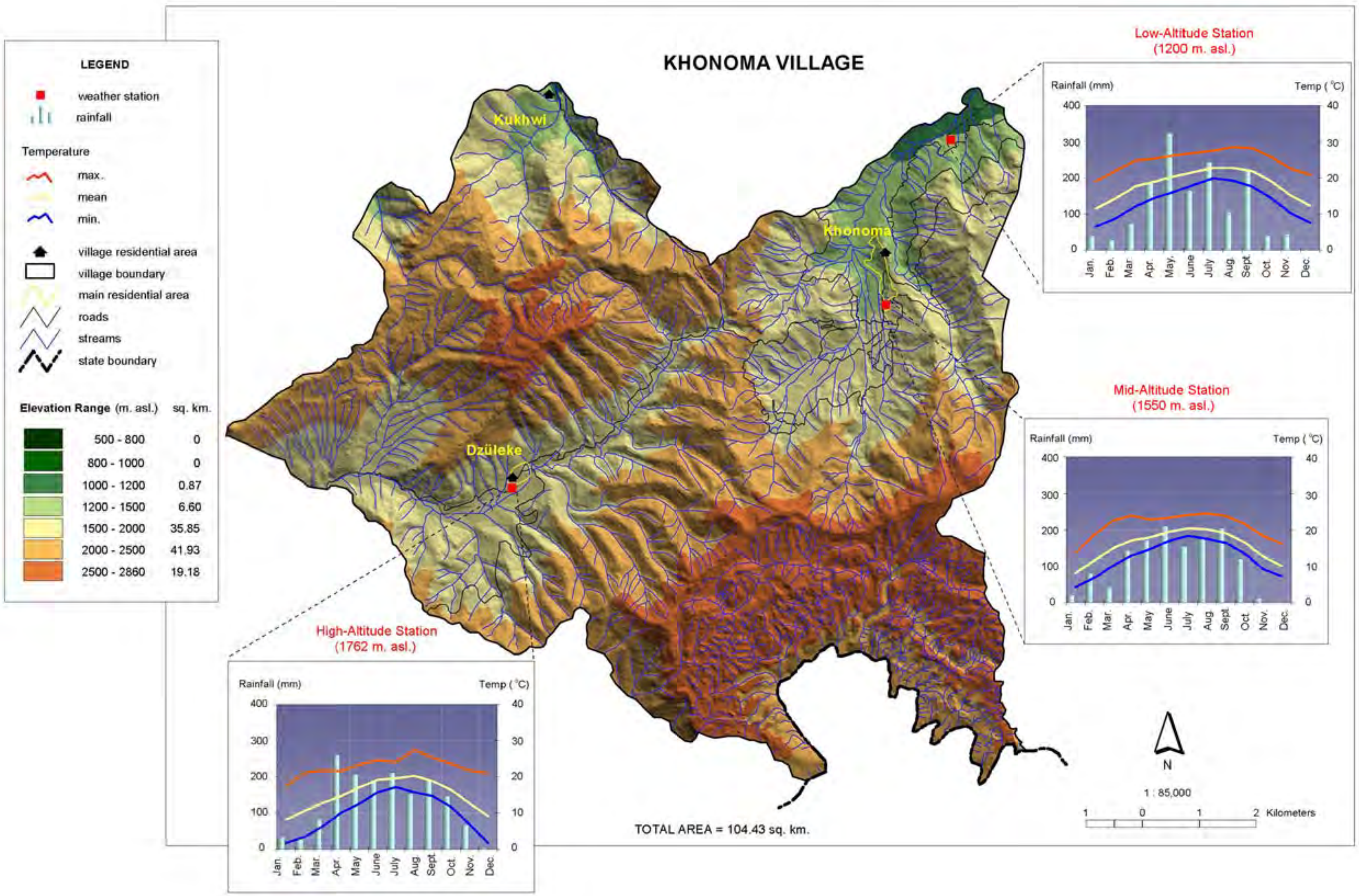
[19] This was probably due to the confounding effects of aspect. The mid-altitude weather station was sheltered on the west side of the Khonoma spur, and thus remained shaded from the early morning sun. It did not warm up until later in the morning when the sun was higher in the sky. But the high-altitude station was in the Dzulake valley that runs roughly east and west, and was thus exposed to the warming rays of the sun as soon as it broke the horizon. Evidence of this can be seen in the much more ordered relationship of minimum temperatures between the three sites as shown in appendix 4-21. Temperatures typically drop to their lowest in the early morning, before daybreak, when shading from the sun is not a factor.

[20] The Tsiesema weather stations, however, showed a clear trend of increasing rainfall as we moved downslope (appendix 4-24). But even here, we have to be guarded in our conclusions, given the limited data set and the added complexity that the high-altitude station was on an eastern aspect, while the mid- and low-altitude stations were on western aspects. (See appendices 4-22 – 4-25 for more details of Tsiesema's weather data.)

Map 6-6. Overview of Climatic Data across Khonoma's Landscape *



* See appendix 4-21 for additional graphs comparing the maximum, mean and minimum temperatures across the three weather stations.

Flora and Fauna

Northeast India is at the intersection of the sub-Himalayan, Indian, Chinese and Burmese types of flora and fauna, and is included as one of 25 "biodiversity hotspots" in the world identified by Conservation International. Although not supported by any formal studies, Khonoma is touted to represent a microcosm of that biodiversity (Whiso et al., 2002, 7-9).[21] Its diversity of terrain, location on a remote state border, and the fact that a significant portion of its landscape remains pristine would certainly seem to recommend it as a candidate for conservation efforts.[22]

A northwest to southeast transect cut diagonally across Khonoma's territory (appendix 4-4) begins with hot, tropical conditions below Kukhwi at 1100 m – and gradually climbs to near alpine conditions in the Dzükou valley at 2500 m. Over this 14.2 km, there is thus a corresponding transition in forest type from tropical moist evergreen hill forest characterized by species such as *Castanopsis*, *Michelia champaca*, *Schima wallichii*, *Gmelina arborea* and *Albizia* spp. – to temperate evergreen highland forest populated by *Betula*, *Rhododendron*, *Magnolia*, *Juglans regia*, *Juniperus* and *Acer*. This transition across two forest types is a major factor underlying Khonoma's high levels of biodiversity. This includes several species curiously confined to small pockets on the landscape. A Palmae sp. (probably *Livistona*) occupies a dry rocky slope above Dzulake village (plate 4-28), its only appearance in Khonoma. And a grove of *Juniperus coxii* is hidden away in a remote corner of the Western Dzükou valley, the only reporting of this species in Nagaland outside of the Saramati Range (Angami, T., 2001). Many of the alpine plants in the higher altitudes of the Dzükou valley, including its spectacular array of *Lilium mackliniae*, *Anemone*, and other wild flowers, are not found elsewhere in Khonoma.[23]

Khonoma's forests were badly degraded when a boundary dispute with Poilwa, a neighboring Zeliangrong village (see map 4-5) sparked a "virtual gang rape of the virgin forest" (Iralu, N., 1994, 81). It began in 1983 and took almost ten years to stop (see also Anonymous, 1996). Customary law had always permitted villagers

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[21] Although Khonoma's alder fallows are floristically not exciting, they nonetheless play a vital role in conserving the village's biodiversity. By allowing a smaller area of land to be cultivated more frequently, alder helps divert jhum cultivation pressure from the village's remaining natural forests.

[22] The Indian Ministry of Human Resource Development, UNESCO, the Darwin Initiative Program, and other donors have been supporting some modest environmental activities conducted by Khonoma's Thevomia khel since 1994-1995. They formed an NGO called Environmental Society of Nagaland (ESN) and have been sending members on exposure trips and training programs, supporting awareness programs in the village, propagating medicinal plants, and documenting local indigenous knowledge, traditional sayings and proverbs related to the environment (Chasie, 2001).

[23] Dried flowers from Dzükou valley can be found decorating many guest rooms in Khonoma, particularly *Cardiocrinum* sp. (ketsu), *Ilex* sp. (nicha), *Delphinium* sp. (ketsu), *Anaphalis* sp. (teime), and an unidentified Rosaceae (niezie) and Liliaceae (Dzükou dried flower). Some are also taken to Kohima for sale but this is theoretically against village regulations.

to cut timber on Khonoma's village lands for their own use (see village-level regulations in appendix 4-33). But by the early 1980s, sawmill operators in the lowlands took advantage of peace to become more active in sourcing their logs from Naga villages. These purchases were often coordinated by village members who had resettled in Dimapur and acted as middlemen between the sawmills and their home villages. This sparked a logging frenzy in Nagaland, as village youth eager for easy money began to plunder their villages' communal forests, often in defiance of their elders (Keitzar, 1998, 72; Souza, 2001, 29). For youth more accustomed to a subsistence economy, the money was too tempting to refuse and they did not have to do any of the hard work themselves. They were paid handsomely only for providing the log buyers with access to their villages' communal forests, and Nepalese and lowland Indians (mostly Biharis, Bengalis and Assamese) were imported to do the actual logging. The unfairness of converting village common property into private profit caused major conflicts within villages – often pitting impatient youth against the council of elders (Anonymous, 1996).

Although this scenario was common to many parts of Nagaland, in Khonoma's case the logging frenzy focused on the thick virgin forests of Dzulake, where, as mentioned above, it was aggravated by the boundary dispute with Poilwa, which claimed most of Dzulake valley, up to the rest house on Nikriba peak, as part of its traditional territory. This dispute dated back to British times, but was coming before the courts at around the time of Nagaland's logging boom. In 1983, Khonoma's youth began to log the disputed area to both assert their claims over it and supposedly to generate revenue to finance the court case. Fights erupted when Poilwa tried to match Khonoma's tactics and join in the logging, and Poilwa was eventually forced to retreat from its more powerful neighbor and rely on legal recourse. The case remains unresolved to date.

Once the flow of timber revenue had begun, Khonoma found that it had opened a Pandora's Box that was difficult to close again. At its height, up to 50 elephants were working in Khonoma's forests (Kevichusa, 2001) and logs were leaving for Dimapur at a rate of 300 truckloads per month (Sophi, 2001). It was strictly a free-for-all, with no attention given to replanting or the sustainability of what they were doing. In addition to environmental damage, there were also social repercussions. Underground factions became frequent visitors to demand their share of the logging revenues. Some village women began businesses selling alcohol to the lowland loggers and several eloped – both frowned upon by a conservative society heavily influenced by the Baptist Church. And then there were the quarrels between the pro- and anti-logging camps. Some of the educated and influential, now living outside Khonoma, returned home to lend their voices in trying to reason with the youth. Many turbulent meetings were held and after almost 10 years of debate (1983-1993), Khonoma finally passed a resolution banning commercial logging on its village land. Merhumia and Thevomia khels further resolved to adopt the logging ban on their khel lands. Only Semomia continues to permit logging on its khel land

and this remains an irritant between the khels to this day. The logging has left much of the northern flank of Dzulake valley as degraded grasslands (see land use in map 4-3).[24] Frequent wildfires in the Dzükou valley are also damaging its thick forests and causing an expansion of the dwarf bamboo (*Chimonobambusa callosa*) as a fire climax.

The most effective place to see Nagaland's wildlife is not in its forests, but in its fresh markets. Khonoma has fared better than most, but here too, the influx of guns during World War II had a devastating effect on its wildlife. On clear autumn days after the harvest was in, men enjoyed throwing their guns over their shoulders and going to the forest for the day. The numerous wildlife skulls adorning the walls of many houses provide testimony of their success – barking deer, stag, monkeys, wild pig and bear, amongst others. But like logging, conservation concerns eventually gained enough support that a complete hunting ban was imposed by the village council in 2000. This was in addition to the 20.59 sq km of its most pristine forests that Khonoma had gazetted as a tragopan sanctuary in 1998 and where hunting was already strictly prohibited. Populations of at least some species have since rebounded and some would-be hunters are now citing increased wildlife damage to crops as evidence that the ban should be lifted. But forest fragmentation and habitat loss in the surrounding region leave little possibility that the macro-fauna will ever return. The herds of Indian elephants that used to frequent the Dzükou valley have not been seen since 1956.[25] Nor have tigers been seen for years, despite Khonoma once having been renowned for having so many of them.[26] And now new generations of Khonoma's children have to look at picture books to know what the hornbill – the bird most central to their folklore - looks like.[27] Although

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[24] Although exacerbated by massive logging, the contrast in forest cover between the northern (plate 4-23) and southern (plate 4-24) flanks of Dzulake valley predates the logging boom. After driving along the Dzulake road in the early 1960s, the then head of the Nagaland Forest Department, P.D. Stracey, wrote:

> "The rich, virgin forests of species new to me on the mountains to the south of the road and the bare grassy slopes on the towering ridge to the north of the road, were full of interest for me and my mind wandered from exploitation of the former to afforestation of the latter." (Stracey, 1968, 103)

The reason is likely to centre on the rocky soils and hotter, drier exposure of the northern flank. Wild fires periodically sweep through the grass-fern communities during the dry season. These, coupled with the soil compaction and browsing of the mithun, probably make it hard for tree seedlings to establish. Rather than recovering after logging stopped, trees along this Dzulake road continue to be felled for firewood every year, often to sell in Kohima.

[25] This is reported to be the highest recorded elevation where Indian elephants are known to have lived (Angami, T., 2001). The Nagas did not hunt elephants much, but bought most of their ivory armlets from Assam.

[26] The last Khonoma villager to have killed a tiger is now an elderly man in Semomia khel. Tiger predation on livestock had been a major problem and Khonoma was reputed to have had more than most. Old colonial records show that after pacification, British administrators often distributed guns to Naga villages to solve their tiger problem.

[27] Traditional Naga headgear now often uses paper or plastic substitutes since real hornbill feathers are not easily available.

there are no faunal surveys specific to Khonoma, many of the species listed generally for Nagaland (appendix 4-29) can be found in Khonoma.

In concluding this section of the chapter, let us revisit the earlier-posed puzzle of why a village with so much land would become the birthplace of an agroforestry technology aimed at intensifying land use. Most Naga villages swidden as extensively as their land resources permit. Of course this is in part because they recognize that longer fallows are better able to regenerate the woody biomass needed for firewood, recover soil fertility, and disrupt weed and disease cycles. But there was also a compelling social imperative of demonstrating ownership through use. A distant corner of their territory left uncultivated would be vulnerable to incursions by land-hungry neighbors. Entire territories (except areas reserved for other uses) were thus brought under the jhum cycle, whose length was determined by the ratio of population to land area. But if that was the norm, why then was Khonoma the exception? Why did this particular Angami village intensively jhum only a small portion of its sloping lands – while leaving the remainder untouched?

An earlier paper (Cairns et al., 2007) argued that in a climate of constant headhunting and warfare, security would have been a strong incentive to intensively cultivate nearby fields – so that in the case of attack, they could quickly summon help and retreat behind the protective fortifications of the village. Cultivating distant slopes might promise fertile soils and bountiful crops, but at an unacceptably high risk of losing one's head. But this is not a convincing explanation. First of all, it contradicts observations in the preceding paragraph that Nagas typically tried to cultivate all their lands to demonstrate ownership and stave off competing claims. And secondly, warfare and headhunting prevailed throughout the Naga Hills, but unlike Khonoma, other villages did not necessarily respond by innovating ways to intensify land use.

The constraints that gave birth to the dispersed alder system lie within the land itself. A simple exercise using GIS to examine slope and altitude parameters suggests that roughly only 26.07% of Khonoma's landscape has high potential for agriculture (map 6-7). Another 15.4% has some potential, but fully 58.53% is too steep and/or at too high an altitude for cultivation.[28] Not surprisingly, the three residential sites – Khonoma village itself and its two satellite settlements of Dzulake and Kukhwi[29] – were founded precisely in the centre of the main areas

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[28] This same analysis on Tsiesema's landscape provides an interesting contrast. Fully 90.09% of its land has high potential, the remaining 9.91% has some potential, and there is no land without potential for agriculture. See appendix 4-31.

[29] And of course long before this – thought to be about 17 generations ago (Husie, 2006) – Mezoma was also a spinoff settlement from Khonoma – similarly situated on a mountain spur and surrounded by valley land highly suitable for conversion into irrigated terraces.

suitable for agriculture.[30] By far the best land was that surrounding Khonoma itself (appendix 4-30) – where a wide valley, fertile alluvial soils, and an abundance of mountain streams were ideal for permanent cultivation of wet rice terraces, and an intersecting mountain spur provided a highly defensible village site.

Khonoma's oral history talks about a time, prior to the arrival of the British, when Khonoma had grown to 700 households. Since this predated the establishment of Dzulake (1848) and Kukhwi (1956), we can probably safely assume that this population fed itself entirely from cultivating the Khonoma valley (and by tributes from other villages). If we calculate an average of five people / household, then the population pressure on the whole valley would have been 119.9 people / sq km (3500 people / 29.2 sq km). But if we consider only the 13.42 sq km (54.98%) of the valley suited for agriculture, then each square kilometer would have had to feed about 260 people! To put these numbers into perspective, a British report written in 1870 comments on the high population density in Angami territory compared to other nearby hill areas:

> "There are altogether 46 Angami villages (every one of which has been personally visited by me, and most of them repeatedly). The total number of houses (obtained by actual enumeration) is 6,367, which, at 5 souls to each house, gives us a population of 31,835 souls, which I believe to be rather under than over the mark; and this population covers a tract of mountainous country with an average length of 30 miles and an average breadth of 20, or only about 600 square miles together [1554 sq km]; from which figures we may assume that we have here got a population of something over 50 to the square mile [129.5/sq km], whereas on referring to the last Census Report of Bengal (1872), I see that the Khasi Hills have only 23 souls to the square mile [59.57/sq km], and the Chittagong Hill Tracts positively only 10 [25.9/sq km], whilst Hill Tipperah is lowest of all, with only 9 [23.31/sq km]!" (Butler, 1870a, 9)

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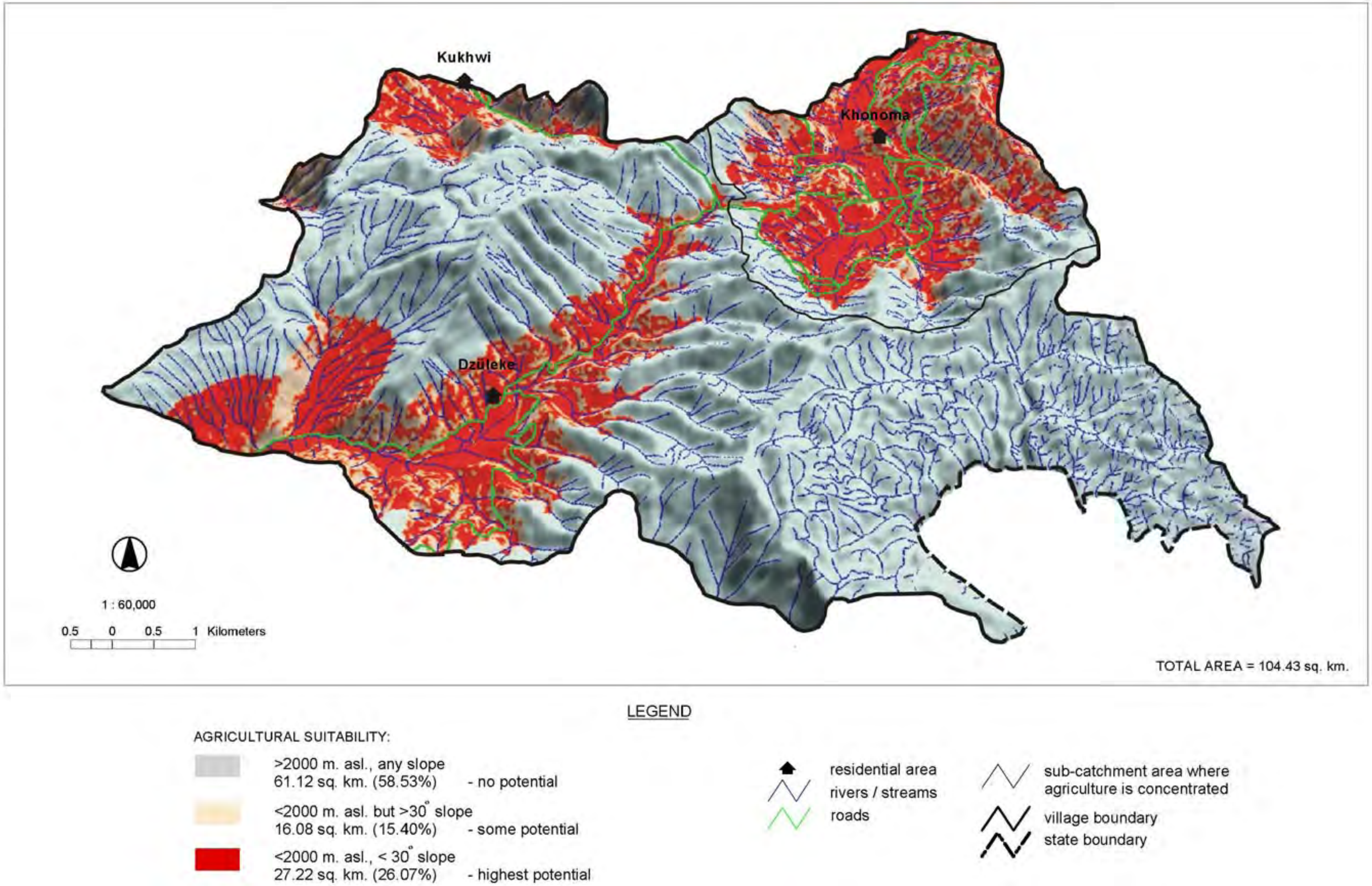
[30] A 1891 diary entry implies that Khonoma was actively experimenting with cultivating land in other parts of its territory. Although the British administrators often distorted Naga place names, it seems most likely this one refers to the Dzulake valley:

> "This year the Khonoma experimental terraces in the Zullu [Dzükou or Dzulake?] valley have been a great success, the crops obtained having been very good. The Merhima Khel are now talking of rebuilding a village, which existed in the valley many years ago, but was abandoned owing to failure of crops, and of opening out the whole of the available land in the valley, which lies at an elevation of 6,000 feet, as terraced rice cultivation. The climate of this valley in the cold weather is very cold. In December 1887, when camped there, water outside my tent was frozen over by 8 p.m." (Davis, 1891b, 4)

Map 6-7. Identifying Land that should have Highest Agricultural Potential in Khonoma Village – Based on Altitude and Slope Criteria



Two important points arise here. If searching for innovations to enable intensified land use, the Angami should have been a promising population to study. Moreover, within the densely-occupied Angami area, the pressure on Khonoma's land (suitable for agriculture) was about double that of the tribal mean – going far in explaining why its people have been more innovative than their neighbors in finding ways to harness soil-building trees in their farming systems. The immense land use pressures in that era, and the impossibility of extended fallow periods, jump into stark relief. They had little choice but to continually return to reopen the same jhum plots again and again after only the briefest of fallows.

Given that Khonoma's uncultivated territory was on its western borderlands with the less warlike Zeliangrong, the danger of their ownership being contested was almost zero. Most Zeliang villages were already paying tribute to Khonoma to ensure their safety. To challenge Khonoma's borders would have been suicidal. It would have been a very different story if these wild lands had been on the opposite border with Mezoma and Jotsoma, where opposing land claims could have been backed up with military muscle comparable to Khonoma's own.

Ownership of the Land and its Resources

Like other Angami villages, Khonoma's system of property rights is built around the patrilineal ideology described in chapter 3. Principal to this is that line of descent is traced only through male descendants. The family name is passed on to the men, together with its ancestral land. An Angami woman is considered to be only a temporary member of her clan of birth, since she will eventually become a member of the clan into which she marries. Hence, she is given no hereditary land. All the rules that govern Angami property rights are designed to ensure the unity and continuity of the male line of descent and its land base. These customary laws and traditions are now protected by Article 371A of the Constitution of India.[31]

Gradual Division of the Landscape through Time

As detailed in Chapter 3, the land leading down from Khonoma's original site was developed according to where, on the village site, the original settlers chose to live. As the Angami settlers descended the spur on the side they had chosen for their dwellings (map 4-6) and began to clear fields from what was presumably thick jungle, they agreed that each would occupy and claim only as much land as he could utilize for home and cultivation. This was in the spirit of ensuring sustainable and

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[31] For further discussions on property rights regimes of the Angami, see Hutton, 1969, 135-150; Das, 1976; Ghosh, B.B., 1977, 15; Meyase, 1985, 93-99, 2001, 35-37; or Kikhi, 1997, 16-18, 1999; or for Nagas more generally, see Husain, 1988, 83-87; Das, 1993; Thong, 1997, 82-85; Keitzar, 1998, 45-46.

equitable use of resources. The remainder would be kept as a reserve of communal land to attract more settlers[32] and for the needs of future generations.

As the village expanded through the centuries and the land was brought under increasing cultivation, its pool of communal land was gradually fragmented into different types of ownership (map 6-8). This would have begun in the very earliest days when the new settlers constructed houses and began to open fields – laying personal claim to this land by virtue of their efforts. They gradually extended their agricultural lands by setting fire to the surrounding forest during the dry season. This helped to both clear the underbrush and drive away wildlife that would otherwise destroy crops. As the forest margins were pushed back, the newly-exposed lands were initially used for shifting cultivation and then gradually converted into wet rice terraces as labor permitted. With the village as its nucleus, this transformation – from forest to jhum land to wet rice terraces – began in the surrounding valley where the land was most suitable for terracing, and gradually expanded. As they moved further up the valley, they eventually reached the point (about 1520 m asl) where the water became too cold for rice, and conversion into wet rice fields was stopped. But despite this limitation, terracing was continued even into this dryland zone and, as detailed in chapter 2, alder became a critical component of its management. In this way, the land with highest agricultural potential was carved from the communal pool and divided amongst member households within each clan.[33]

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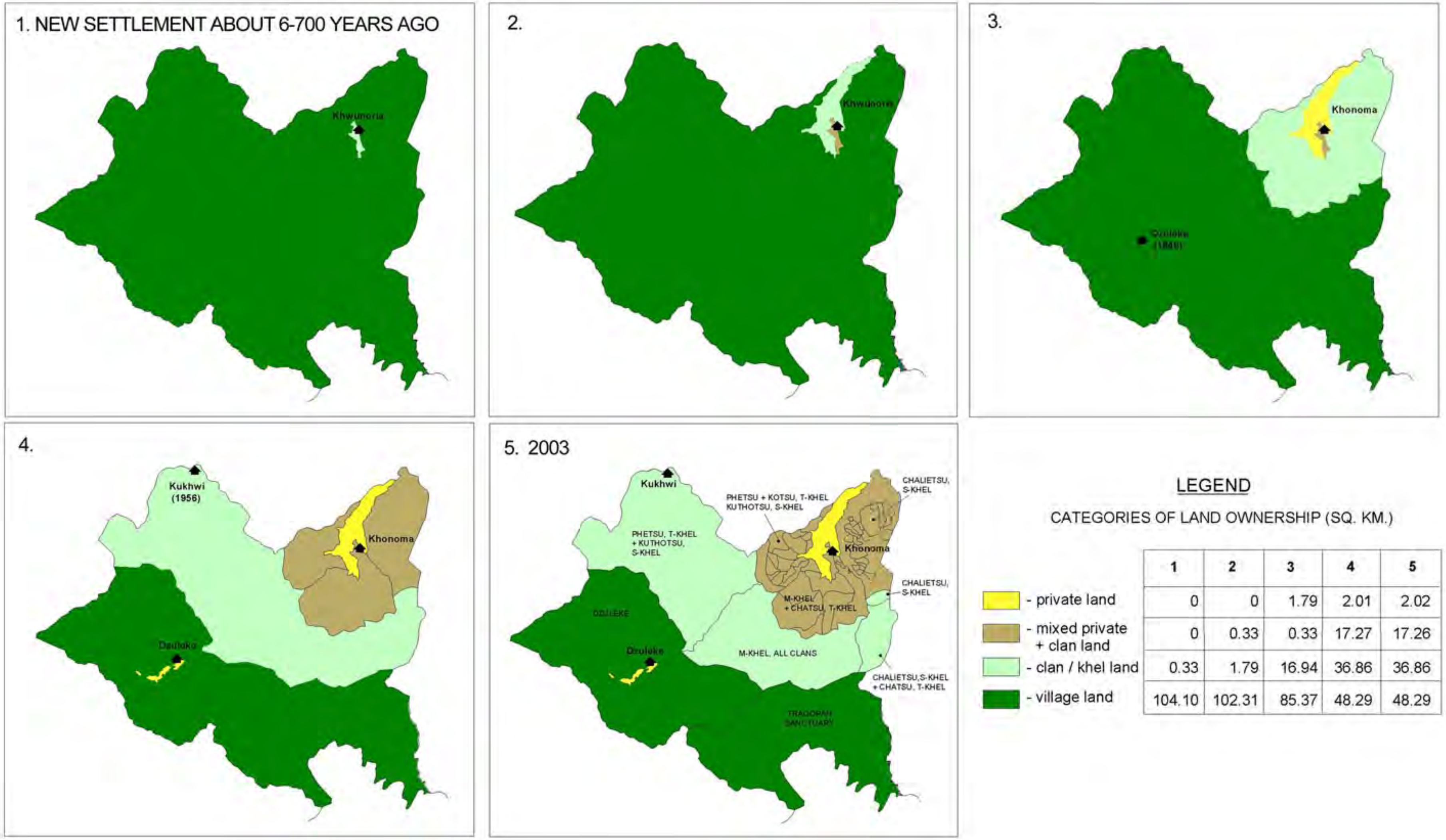
[32] Attracting more settlers to increase their numbers would have been critical to acquiring sufficient military strength to ensure the village's viability. Mills, writing in 1854, described this necessity of maintaining numbers:

> "If any village happens to diminish in numbers, the larger villages immediately insist on annual tribute being paid to them of cattle, pigs, fowls, dhan and cloth or otherwise they plunder it by force and utterly ruin it." (Mills, 1854 cited in Elwin, 1969, 288)

[33] Individual ownership of land is common amongst the Angami and Chakhesang, who invest heavily in developing terraces and irrigation systems for wet rice cultivation. They need to be assured that they will reap the benefits from their efforts and that the land will be passed on to their children. However, for other Naga groups to the north and east that invest less in landesque capital and rely more on extensive shifting cultivation and harvesting forest products, communal systems of resource tenure are more common.

Map 6-8. Rough Representation of Gradual Privatization of Khonoma's Territory (based on oral history)



LEGEND

CATEGORIES OF LAND OWNERSHIP (SQ. KM.)

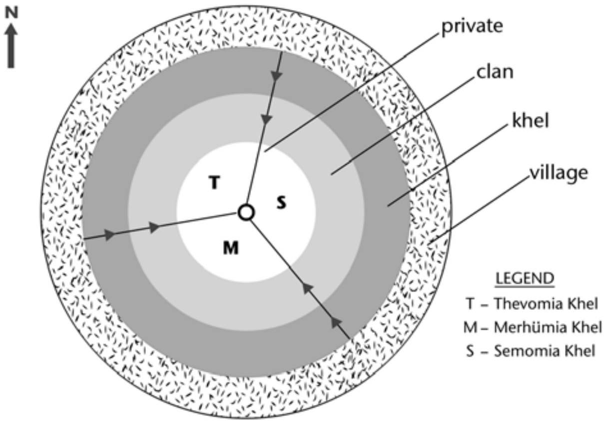
	1	2	3	4	5
🟨 - private land	0	0	1.79	2.01	2.02
🟫 - mixed private + clan land	0	0.33	0.33	17.27	17.26
🟩 - clan / khel land	0.33	1.79	16.94	36.86	36.86
🟩 - village land	104.10	102.31	85.37	48.29	48.29

Beyond the frontier where fields turned to forests, other activities were also laying the groundwork for further personal ownership of the landscape. Mithun were probably the cutting edge in this land division in that they grazed the forests directly beyond their owner's agricultural fields and by virtue of this use, provided justification for extending land claims into the forests. Other types of resource use also contributed to individual ownership of the landscape. Those discovering nesting sites for wild honey bees, usually in caves or other rocky areas, would carefully preserve the bees and keep returning every year to harvest the honey. In this way, they established tenure over the nesting site and its bees. The same happened with particular stretches of the river found to be good for fishing.[34] Repeated use allowed families to claim exclusive fishing rights over sections of the river. Others collected stones and arranged them, often on hilltops, as resting sites for travelers. In all these cases, individual's names were attached to particular areas of the landscape and in succeeding generations, were often used by his descendants as evidence of ownership. So just as the ownership of agricultural land was claimed by the first individuals to clear away the forest and bring it under cultivation, the same principle was similarly applied to other resources.

Categories of Land Tenure

In this way, Khonoma's territory has been divided into four gradations of land tenure – moving from individual holdings closest to the village to increasingly communal ownership as we move further away. Figure 6-5 shows a simplified schematic of how this works.

Figure 6-5. Simplified Portrayal of the Division of Khonoma's Landscape between Different Types of Ownership



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[34] The rivers are reported to host a number of tasty fish, including a snow trout introduced by the British (Kevichusa, 2001).

Individually Owned Land

The residential plots and most of the intensively-managed agricultural fields are considered to be individually owned. This includes both wetlands (rice terraces) in the valley, and drylands (jhums, permanent gardens, plantations, backyard gardens) on adjacent slopes. These are the lands with the highest agricultural potential that attracted settlement to Khonoma in the first place. Ownership was by virtue of first cultivation and subsequent improvements to the land.

Clan Land

These are the lands, both cultivable and uncultivable, that are jointly owned by a number of families within the same clan. They usually originated when some feature of the landscape was named after a particular ancestor, and with the passage of time and growth of the village population, his descendants began placing increasing restrictions on outsiders – until finally declaring the land as their own. This is a gradual process that occurs over several generations. Clan property receives much less effort towards improvements than land that is personally owned – but there are several examples of clans working together to convert such lands into *Pinus* plantations.

Khel Land

Each khel claims an expanse of land that falls roughly behind its members' personal and clan land. This appears to be a more recent division and some argue that these lands should not be claimed by individual khels and thus segregated from the village communal pool.[35]

This land is both distant and rugged, and thus seldom opened for cultivation. However marginal, it can be an important safety reservoir for land-short families that do not have better options.[36] They will usually be asked to pay a symbolic rent as acknowledgement that the land does not belong to them. All land beyond this belongs to the entire village.

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[35] They view this as contrary to the earliest resolutions on which Khonoma was founded, that reportedly insisted that individuals could claim only as much land as they could manage and the remainder must remain the communal property of the entire village. But since these resolutions were made up to 500 years ago, before there were any written records in the Naga Hills, oral history can easily be twisted by anyone with a particular agenda.

[36] Khel land was commonly used for so-called rügu tei cultivation before the Indo-Naga war began in 1956, when land use pressures in Khonoma were extremely high.

Village Land

All remaining land within the village's territory that is not claimed by individual, clan or khel belongs to the entire village. These are the most distant and rugged lands, and mostly remain under forest cover. They have little agricultural potential, but play vital roles in protecting the watershed and providing forest products.

With this brief description, let us now advance from the earlier stylized portrayal (figure 6-5) to a more accurate mapping of Khonoma's current land tenure system (map 3-2).[37]

Land Transfers

The next step to understanding the land tenure system is to examine how land transfers work – both within and between the four categories. But first, two additional terms that are fundamental to this discussion need to be clarified. As in many tenurial systems, the Angami distinguish between two basic types of property:

1. <u>ancestral / hereditary</u>: These are inalienable properties that have a history of being passed down from one generation to the next within a family, and whose inheritance is strictly controlled by customary laws; and
2. <u>transferable / alienable</u>: These are lands that have been acquired recently, usually through purchase, and thus have not been in the family long enough to be viewed as ancestral property. The owner is therefore not bound by customary laws in their disposal. Such lands may be resold to a third party or even given to daughters.

Presumably, the latter category would only have gained much significance after the development of property markets that followed pacification of the Naga Hills. Prior to that, the only way to acquire new – and thus transferable – lands was to clear them from virgin forests and claim them from the communal pool. But when this transferable land was passed from father to son and became referred to as "the field of my father", it was henceforth included as part of that family's ancestral property – and thus subject to customary laws of inheritance. This was the way that ancestral properties were increased. This distinction, and the different rules that each invokes, must be borne in mind during the following account of land transfers.

Inheritance

Division of Ancestral Properties amongst Male Heirs. In Angami society, paddy fields are considered to be a family's most valuable asset in providing assured food security. The eldest son is viewed as the senior member of the next generation

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[37] As with most maps in Nagaland, these boundaries are tentative and subject to disputes. This map, as with all others in this thesis, should not be seen as an endorsement of particular boundaries.

and in the event that his father dies prematurely, he is expected to become the man of the house and shoulder responsibilities towards the family. He will be consulted on all family affairs and any major decisions will require his consent. In exchange for these responsibilities, he will inherit his father's best paddy field/s, usually when he marries. The best paddy fields are thus handed from one generation to the next through the oldest sons.

The youngest son is charged with different responsibilities to his parents. Unlike his older brothers, he does not break away and establish a new household when he marries. He, and now his new wife, will continue to live under the same roof as his aging parents, but each family cooks over a separate hearth. When his parents die, this youngest son will inherit his father's house and the plot that it is built on, and depending on how much ancestral land his father had in relation to the number of his sons, may or may not receive a paddy field.[38] But with this privilege also comes a set of responsibilities to other family members. Most importantly, he will continue to live alongside his parents and take care of them as they grow old. When guests drop by to see his father, then the youngest son will be on hand to receive and host them. And after the death of his parents, it will be his duty to arrange a feast in their honor (kesia-meruo). He will also act as the closest brother and support his sisters when they are arranging feasts, such as to celebrate marriage or to earn titles. Angami inheritance thus combines both primogeniture and ultimogeniture. There is nothing in the ethnographic record to suggest that this has changed through time as among the Kachin of Burma [39]

Middle sons are in a much more precarious position in terms of what inheritance they can expect. If their father has sufficient land, then they will also get a share. But if the land is limited compared to the number of sons, then it will be the middle sons who are disadvantaged, and will have to rely on communal land (usually distant and of inferior agricultural potential) or use others' land through rental or sharecropping arrangements. The economic prospects of an Angami male are thus largely determined at birth – depending on where he fits into the order of births, and the land wealth of his father. Someone who is wealthy enough may divide his assets amongst his sons relatively early, retaining only enough for himself and his wife, so that his estate will have been taken care of in the event that he dies unexpectedly.

In case a man dies without any offspring, then all his properties (both moveable and immovable) will go to other family members who do have sons, usually his brothers or their children. If he also has no brothers, then the search for an heir will expand to male cousins on his father's side. If there are still no candidates, then his land will revert to clan ownership (an example of private land

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[38] This is the exact opposite of some matrilineal societies like the Khasis in nearby Meghalaya, in which the youngest daughter inherits the family house.

[39] See Preface and Leach (1954).

being absorbed back into a communal pool). The flow of land is thus designed to ensure that it follows the male line of descendants as closely as possible. If a man has only daughters and no sons, then the customary laws relating to transfer of his land will be exactly the same as those for a childless man.

Where do Women Fit into Division of Property? When an Angami woman weds, she assumes her husband's surname and is considered a member of his clan.[40] Herein lies the reason that ancestral lands are not passed on to daughters; the land would leave the clan when she marries, and the whole principle of trying to keep the clan's land holdings intact would be defeated.[41] This would be seen as a threat to the clan's very survival, in terms of both economy and identity.

A father can allow his daughter/s to continue cultivating some of his ancestral fields, even after she marries, but she cannot inherit them or pass them on to her own children. The agreement only applies for the duration of her lifetime. In pre-Christian days, her brothers and their sons would approach her on her deathbed to request the return of the land and would complete the deal by sacrificing a cow or mithun on the day she died. Now, under Christianity, this practice has evolved into presenting a pig to the deceased woman's family as a token of request for the asset to be returned to its original ownership.

In most cases, daughters work in their father's fields until marriage, after which they transfer to their husband's fields. Given the frequency of divorce in Angami society (Chapter 3), this raises the question of what happens when a marriage dissolves and a woman loses access to her husband's land. A divorced woman would return to her father's house, or if he was already deceased, would have to seek shelter with her brothers. A divorced woman generally had the right to cultivate her father's land during her lifetime. If a man had sufficient land, he often tried to set aside some paddy fields, in anticipation that one of his daughters might divorce and require land to cultivate to support herself. But if all his fields had already been divided amongst his sons, then they would allot a portion to their sister for cultivation. But again, she would not inherit these lands and they would have to be returned at the time of her death.

The only ancestral property that passes through the daughters' line of descent is a mother's jewelry. The first-born is again privileged, the oldest daughter inheriting her mother's traditional necklace (<u>cubi</u>) and other jewelry. Whether her younger sisters receive anything again depends on the wealth of the family and how many pieces of jewelry their mother has to distribute. Khonoma daughters have an added endowment that warrants mention. The village makes a finely-designed basket (<u>khophi</u>) that is unique in Nagaland and enjoys a strong market demand as a

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[40] This does not hold true for all Naga subgroups. An Ao woman, for example, always remains a member of her clan of birth and continues to use her father's surname even after marriage.

[41] Clans are exogamous, so her husband would definitely have to be from a different clan.

gift, souvenir or wall decoration. As she reaches puberty, each Khonoma daughter is given a khophi basket for ceremonial use in the Sekrenyi festival.[42]

Buying and Selling

Although the Angami have recognized individual land ownership for a long time, the notion of selling it is relatively recent. Before that, they viewed themselves more as stewards of their ancestral lands, to be tilled until passed on to the next generation. There were immense social pressures not to fail in this duty, as observed by Vashum: "According to Naga traditional belief, to sell out the ancestral land / property is equivalent to invoking a curse upon the family." (Vashum, Y. 1998, 83) But such social sanctions gradually lost their bite as pacification enforced by the British, and the spread of Christianity, sparked immense social changes in the Naga Hills. Nagas began to participate more in the cash economy and for the first time, a land market began to develop, and land became a saleable commodity.

While it was considered a shameful thing to sell property gifted by one's father, there were sometimes countervailing social pressures that actually encouraged land sales. The most compelling of these was the emphasis that Angami culture placed on sacrificing as many livestock as possible as part of the rituals when a family elder died. The belief was that the spirits of these slaughtered animals would accompany the deceased for use in the afterlife. Just as those of us in western culture might feel the need to splurge on an expensive casket and funeral ceremonies as a final tribute to a loved one, the Angami felt similar pressure to slaughter as many pigs, cattle and mithun as possible to honor their dead. Neglecting to perform the death rituals would be seen as a disgrace to both the deceased and surviving kinsmen. If the grieving family did not own enough ritual animals (thepi), then they might be forced to sell ancestral lands to raise the money needed to buy more. They would essentially face a dilemma between the immediate imperative to fittingly honor the dead – and the long-term need to keep their ancestral lands intact. They might mortgage their ancestral property, with the hope of finding a way to settle the debt later.[43]

Selling land also became one of the few options available when cash was urgently needed – such as in times of sickness, to pay the education costs of children[44], to settle debts, or some other type of financial crisis. Gambling reportedly became a problem in Khonoma around the second quarter of the 20th century and

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[42] When entering a Khonoma home, one can often quickly determine how many daughters are in the family by glancing along the wall and counting how many khophi baskets are hanging there.

[43] This practice, like all other rituals, faded as Christianity gained more converts in Khonoma, and its demise precipitated a huge drop in the importance of livestock in Naga farming systems because they were no longer needed for rituals. In a diary entry in 1925, Hutton noted that these old practices were not abandoned without some misgivings.

[44] If parents were unable to pay school fees, then their children's examinations would be withheld.

some land was also lost through the roll of a dice (Chücha, 2001). As the off-farm economy developed, some villagers no longer wanted to till the land because they could find easier and more remunerative ways to make a living. Once Nagaland became relatively peaceful, people travelled more – often studying, working and eventually settling outside the state. Clan members are now becoming dispersed; the village is no longer the centre of their universe. Therefore, the traditional role of land as the foundation of the economy and identity of the people is also being eroded, and even ancestral lands are sometimes sold without much shame.

However, if the difficult decision is made to sell ancestral lands, there are still rules in place aimed at keeping it within the clan. The seller must first offer his brothers and cousins the chance to buy the land, and then others in his clan. Only if a buyer still cannot be found, is the sale offer then extended to the entire village, and finally to outsiders. Although not strictly forbidden, ancestral land would be sold to someone from a neighboring village only with considerable discomfort. It seldom happens.

Special constraints are applied to those lands on which monoliths have been erected to mark a ritual feast. Lands containing monoliths must remain in the family of the feast-giver. If such a plot of land is to be sold, that portion containing the monolith/s must be segregated and withheld from the sale. This is not an issue if the transaction is within the same family (and thus the buyer is also a descendant of the feast-giver). In this case the plot can be transferred in its entirety.

If the sale does go through, there are still more safeguards in place to give the clan every chance to recover its ancestral property. If someone loses his ancestral property by mortgaging it against a debt that he is then unable to repay, other family members have the right to step in and reclaim the land by settling the debt. As much as he might want to keep the property, the money lender has no right to refuse this intervention by the borrower’s family. The land must be returned.

Leasing

Given its temporary nature, land rental is seen as less of a threat to the retention of ancestral lands and is thus virtually ignored by customary laws. The terms of the agreement depend entirely on the two negotiating parties. Verbal agreement is final.

Most rented lands are paddy fields, often owned by Khonoma descendants who now live outside the village and no longer want to cultivate their ancestral lands themselves. Rental rates are influenced by:

1. Fertility of the Land: Villagers recognize gradients in the agricultural potential of individual fields and that some are not suitable for all crops;
2. Convenience of the Location: Walking time to and from fields can be a significant part of cultivation costs, so fields closer to the village command higher rental rates. The fee for paddy fields immediately surrounding the

village is usually one half of rice yields, but this is typically discounted to only one third of yields for some of Semomia khel's fields that are further down the valley; and

3. Whether it is a Jhum Field or Wet Rice Terrace: The Angami are predominantly wet rice cultivators who undertake supplementary jhum cultivation to provide other foodcrops. Paddy land is therefore viewed as being a much more scarce and valuable resource than jhum fields.[45]

The rental costs may be negotiated in terms of either cash or a share of the yield – in the latter case making it a share-cropping arrangement. However, there is now enough cash circulating in the village economy that most renters prefer to pay cash and keep all the rice for themselves. If the rent is to be paid in cash, it should be paid before the Tshünyi festival in August. Failure to settle the bill by that time will result in the automatic forfeiture of 50% of the crop to the land owner.

Arrangements for renting jhum fields are more casual, reflecting their lesser value. Often only a symbolic fee is paid, meant only to acknowledge to whom the land belongs. This must be paid before the crop (traditionally Job's tears on the first cropping year) is harvested. Failure to pay on time will nullify the agreement and the renter will not be permitted to plant millet on the plot in the following year.

Borrowing

The distinction between borrowing and renting is blurred in that even when land is "borrowed", some token fee will usually change hands as a way to acknowledge that the cultivator does not own the land. This lessens the likelihood of him trying to claim the land later on the basis that he is the one cultivating it. Paying even a nominal fee demonstrates his recognition of the payee as the land owner. There are no customary laws pertaining to lending land. It depends entirely on the verbal agreement between the two parties.

It is usually jhum land – now under less cultivation pressure and historically seen as less valuable – that is lent under these more casual arrangements. Much of the lending transpires through marital connections. Since all marriages are between different clans, and most between different khels, this provides a window for villagers to access land that is normally not under their control. Another common situation is when Khonoma descendants move outside the village and no longer want to cultivate their ancestral lands. They will usually allow close relatives remaining in the village to cultivate their land in exchange for looking after it. In such cases where the arrangement is between relatives or in-laws, the borrower will

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[45] This perception is likely changing with growing trends, discussed in Chapter 8, to plant high-value cash crops in jhum fields – while improved transportation links make it easier to import cheap rice from the lowlands.

often simply give some rice or vegetables to the land owner in appreciation for the use of his land.

The mechanisms by which land moves from one tenurial category to another are summarized in figure 6-6. It shows how Khonoma's landscape has gradually but incessantly moved towards increased individual or family ownership in the estimated 600-700 years since the village was established. Once ownership reaches clan level, the village's customary laws try to retain it within the clan as a birthright to be passed on to future generations. This system has been weakened by the advent of land markets and tremendous social changes that followed the arrival of the British. As documented in the case studies in appendix 4-32, land is now being transferred between clans and even khels through direct sales, by giving land to daughters who then take it with them when they marry into another clan or khel, and sometimes even through gambling losses. For these reasons, the divisions of land ownership between the three groups of landholders have become less clear and plot ownership more mixed.[46]

The complexity of the system defies the simplistic analysis of many commentators that try to sum up Naga tenurial systems as either communal or private. As in so many societies, it can be both – and multiple shades in between. It also shows that any analysis can be but a snapshot in time, since property rights systems are dynamic and continually evolving.

Resolving Disputes and Enforcement

Before the arrival of the British, Khonoma's judicial system was largely in the hands of its elders, both in terms of formulating its customary laws and then enforcing them. They were entrusted to act wisely and make decisions in the village's best interests, and their word was considered final. Amongst the stormiest issues in dispute were, of course, land – and irrigation water. It seems obvious that the evolution of Khonoma's land tenure shown in map 6-8 could only have come about through a lengthy and often messy process of claims, counterclaims and arbitration, as more and more of the landscape was carved from the communal pool to become personal property. The village elders had to pass increasing numbers of resolutions to try to ensure equitable use of resources and to keep the peace (see appendix 4-33). All decisions regarding communal land required the consent of the elders, and their agreement would be accompanied by warm blessings – that the user of the land "would reap bountiful harvests and become wealthy, that his sons and kinsmen

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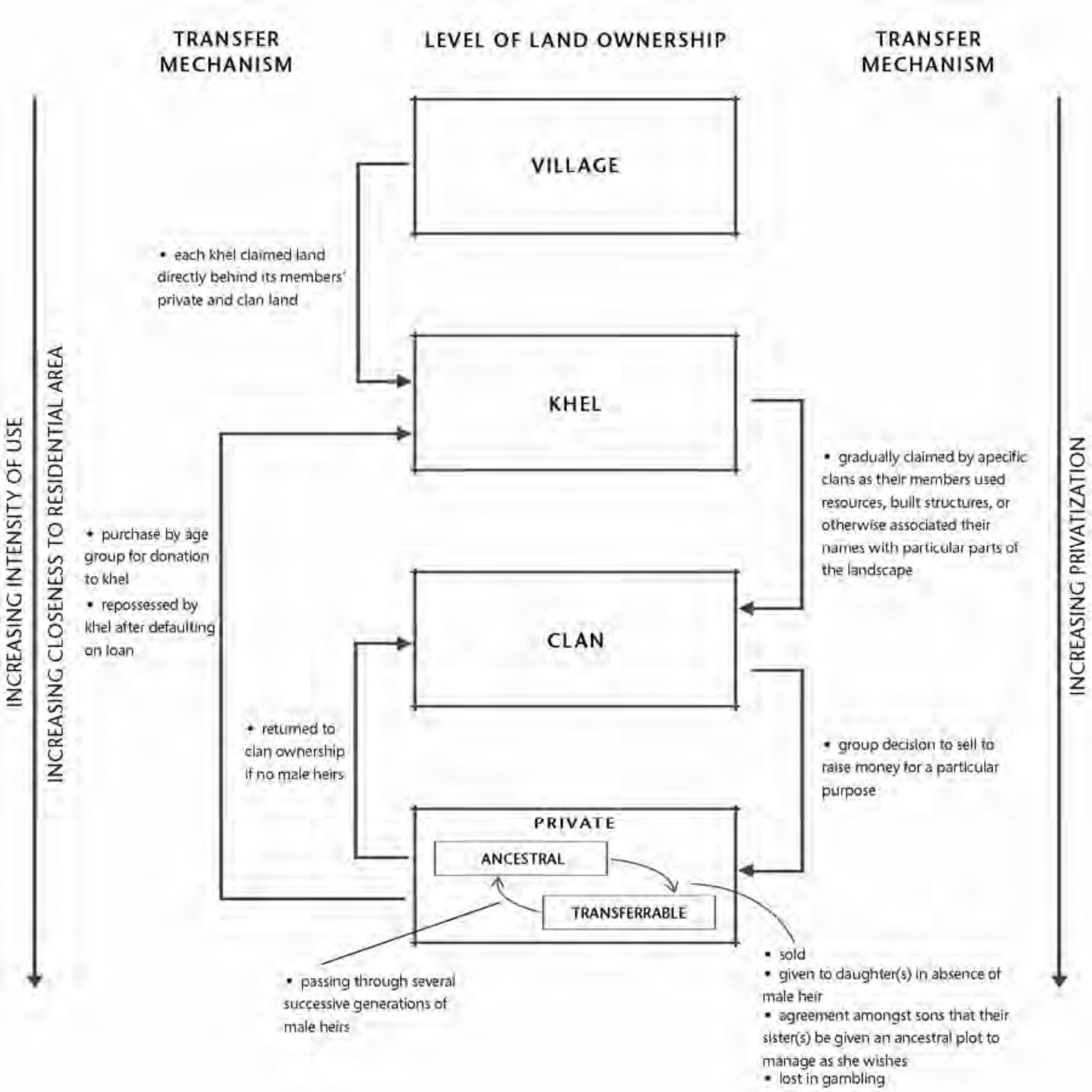
[46] Some speculate that even before the advent of a property market, land was probably being exchanged between friends and relatives – breaking down the original divisions between each khel's land. This suggests that the degree of mixing in patterns of land ownership can be used as a surrogate gauge of a village's age (Angami, T., 2001). At present, Merhumia khel continues to own almost all the wet rice terraces directly below it (i.e., to the west) in the Ketsaju valley, Semomia khel owns everything on the opposite (east) side, but the lower reaches of the valley are much more mixed in ownership.

would multiply like crabs and spiders, and that he would live a long life to see many generations of descendants".

Figure 6-6. Schematic of How Land Flows between Different Levels of Ownership in Khonoma



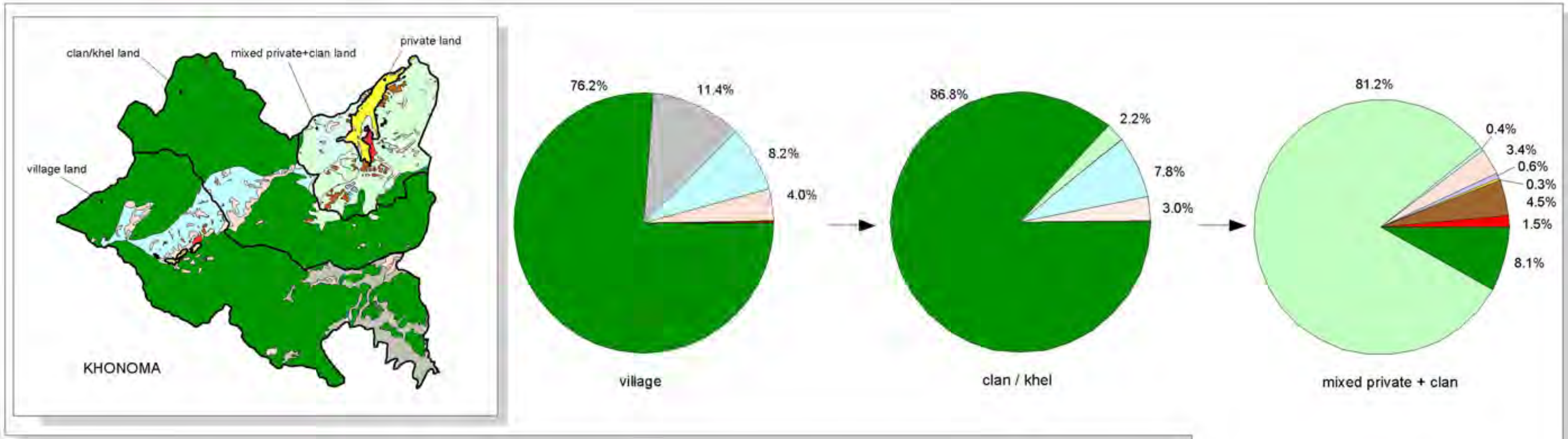
When disputes arose, the village elders would gather to hear the statements of the opposing claimants. Disputes internal to a single khel would be heard only by that khel's elders, but if the opposing parties were from different khels, then it became the jurisdiction of all the village's elders to help resolve it. Each claimant would give a statement to the effect that according to his ancestors, his family had long owned the area in dispute, and would then go on to describe the natural landmarks that defined the boundaries of his property. Upon hearing the evidence, the elders would urge them to settle their dispute amicably. But if both parties remained inflexible, then as a last resort, the elders would ask them to swear an oath on the truth of their respective claims (seü – oath-taking by both parties). Such oath-taking was widely practiced amongst the Nagas and relied on the spirits to act as judges. Each party swore its claim in the name of the spirits, urging them to curse him and his family members to a terrible fate if he was not telling the truth. The consequences of lying were considered quite awful and taken with great gravity in the pre-Christian era. The more lives of family and clan members that were staked on the oath, then the more weight the oath carried. If both parties swore, backed by an equal number of family members, then the disputed land would be divided. But if one party refused to swear, or his oath was supported by the lives of fewer family members, then his oath would not be heard. In this case, the other party would be asked to swear alone (seli – swearing by only one party), and the land would become his. It was believed that the spirit world would punish anyone taking a false oath, and any sickness, death or other unusual incident would be interpreted as proof that he had been lying and the land would be taken back. When the British later began arbitrating land disputes amongst the Nagas, they routinely used such oath-taking as part of their judicial proceedings.

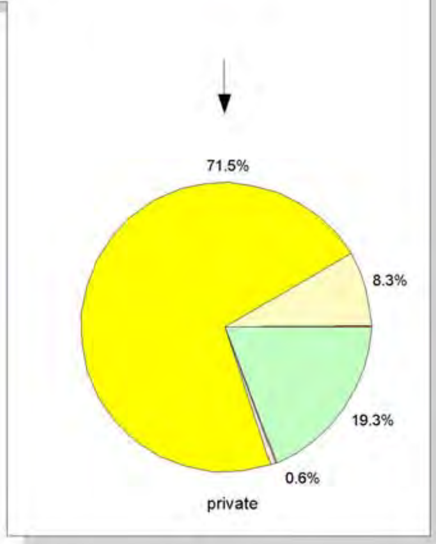
Anyone accused of violating Khonoma's customary laws would be put on trial by the elders and could be exiled from the village if found guilty. Offenders who dared to defy the village's decision faced the likelihood of being cursed (kehi) by the priest and ostracized by his neighbors. Although at that time there were no police, jail or other formal mechanisms for enforcing its customary laws, social pressure was strong enough to ensure compliance. More formal judicial procedures came later with the arrival of British administration. Disputes between khels or villages are now heard by a Dubashi (DB) Court in Zubza. Khonoma had a case in this court during the period of fieldwork – once again, centred on logging. Semomia khel was contesting Merhumia khel's claims over the area shown as its khel land in map 3-2. The dispute appeared to be related to the continued logging by a handful of influential members of Semomia khel – who had already cut most of the commercial timber on their own khel lands and were now keen to access adjoining areas. When members of Semomia khel began logging on the disputed land, young people from the other two khels raided the site and destroyed the logging equipment. Village elders had to intervene to prevent the situation from spiraling out of control. Since the village had proven unable to resolve the problem itself, the case was being tried before the district courts in Zubza.

How Land Tenure Affects Land Use – or Vice Versa?

Now that we have examined both Khonoma's biophysical environment and its property rights regime, it is useful to consider how the two may be interacting to influence land use. One way of approaching this is by overlaying a land use map (with a land tenure map and searching for patterns. The results are shown in map 6-9, along with a brief analysis of the findings.

Map 6-9. Analysis of Relationship between Land Use* and Tenure in Khonoma Village





Relationship Between Tenure and Use* of Land in Khonoma Village

CATEGORIES OF LAND USE	CATEGORIES OF LAND TENURE									
	private		mix private+clan land		clan / khel		village		TOTAL:	
	ha	%	ha	%	ha	%	ha	%	ha	%
🟥 residential area	0.2	0.7	24.6	75.6	0.1	0.2	7.7	23.6	32.6	100
🟫 dryland cultivation	0.1	0.0	75.6	86.6	5.8	6.7	5.8	6.6	87.3	100
🟨 unused wet rice terraces	20.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	20.5	100
🟨 wet rice terraces	176.6	96.8	5.8	3.2	0.0	0.0	0.0	0.0	182.4	100
🟪 grounds	0.0	0.0	10.1	100.0	0.0	0.0	0.0	0.0	10.1	100
🟧 grassy areas / rock face areas	1.4	0.4	56.6	15.8	109.4	30.5	191.1	53.3	358.5	100
🟦 degraded forest	0.0	0.0	7.4	1.1	287.1	41.5	396.6	57.4	691.1	100
⬜ bamboo	0.3	0.0	0.0	0.0	2.4	0.4	548.6	99.6	551.0	100
🟩 secondary forest	47.7	3.2	1364.6	91.3	82.8	5.5	0.0	0.0	1495.1	100
🟩 primary forest	0.0	0.0	136.5	1.9	3197.8	45.6	3681.1	52.5	7015.3	100
TOTAL:	246.8	2.4	1681.2	16.1	3685.3	35.3	4830.9	46.3	10444.2	100
	no.	%	no.	%	no.	%	no.	%	no.	%
fish ponds	1	3	30	94	0	0	1	3	32	100
cattle sheds	0	0	3	9	0	0	9	28	12	100
mithun sheds	0	0	2	6	5	16	0	0	7	100
rest sites	5	16	10	31	7	22	4	13	26	100
logging camps	0	0	0	0	2	6	0	0	2	100

* Calculated by using GIS to overlay maps of land use with property rights.

This brings into sharper focus a number of observations already touched upon in the preceding section on tenure. The most striking pattern is that as we move from village ownership towards increasing individual ownership, we see a parallel shift from natural vegetative cover (primary forest, degraded forest, bamboo, grassy and rock areas) to an increasingly intensely managed landscape (wet rice terraces, jhum fields, residential area). That is not a surprise; essentially, lands that provide villagers with food on their tables and roofs over their heads have been claimed as individual property through intensive use – whereas wild lands that provide only occasional hunting and other forest products remain as part of the communal pool.

The next thing we notice is the close correlation between proximity to the village's residential area and the intensity of land use. Again, this is to be expected. When Angami settlers founded Khonoma, it was precisely its agricultural potential that brought them to the valley – as well as its highly defensible village site. In the years since, the valley has been largely cleared and brought under intensive cultivation, while the more distant and rugged terrain, which lacks agricultural potential (map 6-7), has been left as a commons for hunting and gathering activities. Similarly, fish and other livestock that require more intensive care and/or are subject to theft, are kept on family or clan land nearby the village, whereas free-ranging mithun are relegated to more distant clan and khel lands where they have plenty of forest to roam and are less likely to intrude into farmers' fields.

In summation, the land closest to Khonoma's residential area is intensively managed and as a consequence, is individually owned, but as we move towards the village's periphery, we find increasing wild lands that remain common property. This all makes sense and reflects logical village planning by Khonoma's ancestors.

"Chicken-and-Egg" Question

However, there is a cause and effect issue here that needs to be addressed. Are we really justified in claiming that lands surrounding the village centre have been claimed as personal property through time as a result of their intensive use? Or would it be equally credible to hypothesize the reverse of this – that Khonoma's founders divided the most valuable agricultural land between themselves at an early point in the village's history and, once confident of their ownership, invested heavily in improving it for agricultural use? So which came first – the intensive use – or the individual ownership? Or did they develop in tandem through time? If more distant slopes had also been claimed as personal property, would they also have been transformed from forests into fields? How much different might the landscape look today?[47]

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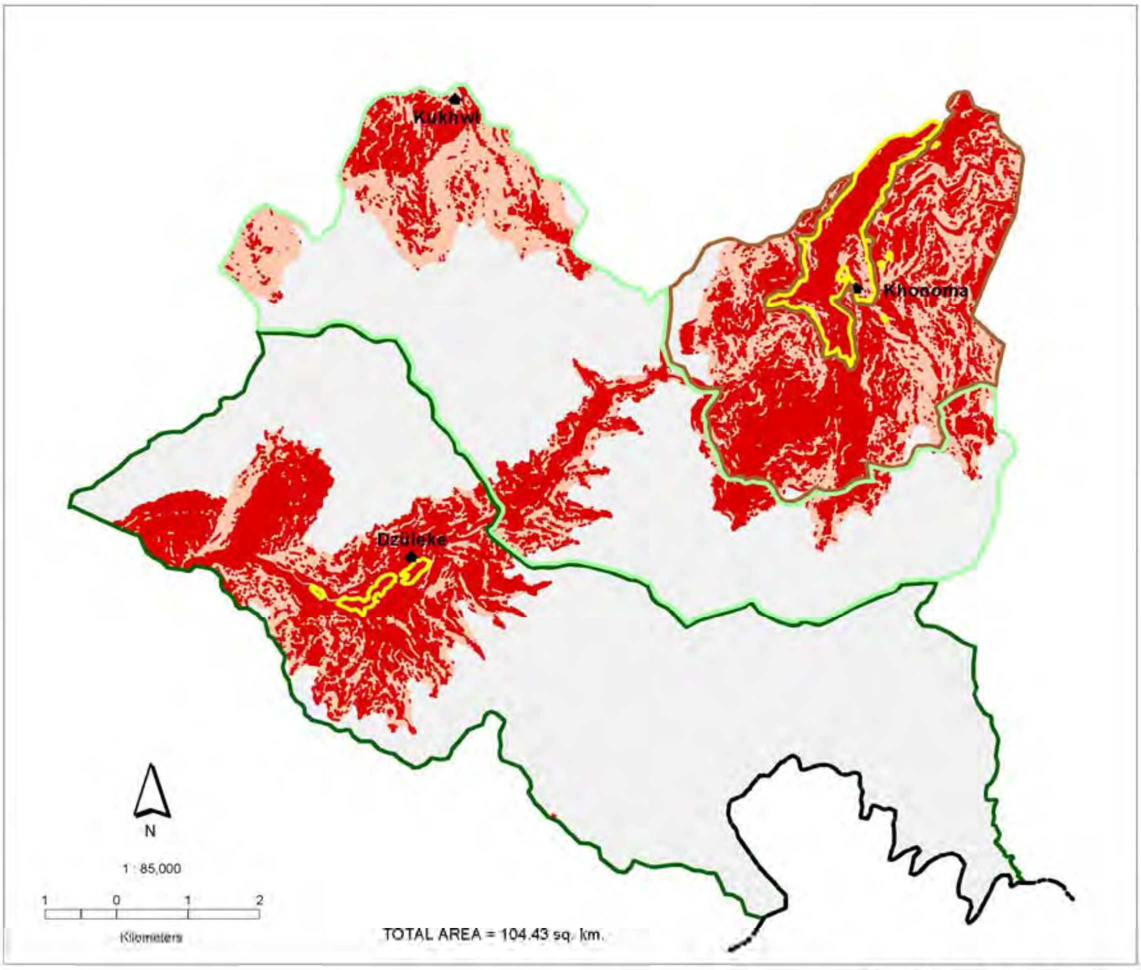
[47] See also chapter 7 for a discussion on how land tenure may be influencing the likelihood of alder management in Khonoma's jhum cultivation blocks.

It is useful to ponder this as an alternative to the "personal ownership through use" scenario that I have argued. Ultimately, however, it does not hold up to scrutiny. Data on Khonoma's biophysical environment can be useful here in reconstructing the history of land ownership and use that we see today. The agricultural potential map presented earlier (map 6-7) is based on two of the key biophysical limitations to agriculture in Khonoma – altitude and slope, which in turn, have important implications for a third, weather. If we overlay this agricultural potential map on top of the land tenure map (map 3-2), it confirms a clear correlation between the agricultural potential of land and the degree to which it has been claimed as personal property (map 6-10). Of the pool of land that is owned by individuals, fully 85% is classified as having high potential and the remaining 15% has some potential. This is essentially the valley bottoms that have been carved into wet rice terraces. The land with a mixture of individual and clan ownership is ranked as 60% high, 35% some, and 5% has no potential for agriculture. This is predominantly the jhum cultivation area on the slopes surrounding the Khonoma valley. As we continue to move outward from the village centre towards its periphery and increasingly communal ownership, the percentage of land unsuited for agriculture soars to 65% and 75% respectively for that claimed by a mixture of clans and khels, and that remaining common property of the entire village. These are the more rugged hinterlands of the village whose use is mostly restricted to hunting (before it was banned) and gathering. This correlation will grow even stronger if, over the long term, the two outposts of Dzulake and Kukhwi attract more settlement and follow the same pattern of individual ownership as the Khonoma valley did hundreds of years earlier.

Map 6-10. Relationship between Agricultural Potential* of the Landscape and Who Owns it



* Based on altitude and slope criteria

LEGEND

● village residential areas
☐ village boundary
〰 state boundary

AGRICULTURAL SUITABILITY	CATEGORIES OF LAND OWNERSHIP									
	Private		Mixed Private and Clan		Clan / Khel		Village		TOTAL	
	sq. km.	%	sq. km.	%	sq. km.	%	sq. km.	%	sq. km.	%
no potential	0	0	0.91	5	24.09	65	36.15	75	61.15	59
some potential	0.30	15	6.09	35	6.30	17	3.48	7	16.17	15
high potential	1.72	85	10.26	60	6.46	18	8.66	18	27.10	26
TOTAL	2.02	100	17.26	100	36.86	100	48.29	100	104.43	100

The explanation that makes the most sense is thus one in which the biophysical environment played the leading role in shaping Khonoma's early development. The expansive valley and its large scope for terraced cultivation attracted settlers to the site in the first place, but the terrain beyond it was too rugged, high and cold to offer much potential for agriculture. This then was the environment that Khonoma's settlers found waiting for them, and which shaped their farming systems, their culture, and defined their very identity as a people. As they hacked down the trees and turned forests into fields, they would have begun with the nearest valley lands and gradually pushed backward as the village population grew and needed more land to feed itself. The very act of selecting the village site thus meant that the land with the highest agricultural potential was nearest and opened for cultivation first. As the clans grew, successive generations continued to improve the old fields – clearing away rocks and using them to build contour walls, leveling the terraces, developing irrigation systems, propagating *Albizia* trees in the irrigated fields and *Alnus* in the dryland fields, etc. At the same time, new fields would have been cleared further away – pushing back the forest frontier. The expansion of agriculture was thus like ripples from a stone thrown into a placid pond.[48] But for practical purposes, the "pond" was only as large as the immediate sub-watershed; beyond that, most of the land was unsuitable for agriculture, too far away, or both.[49] Further population growth could only be accommodated by intensified cultivation of their existing lands, trading, or by plundering resources from weaker villages, all of which they did successfully. This process has been going on, in the estimation of some villagers, for 18 to 21 generations. As successive generations of the same families kept returning to cultivate the same land and invest in landesque capital, it would have become unthinkable that anyone could question their tenure over it. In this way, increasing portions of the landscape became individually owned. But the more distant and rugged lands that were used only occasionally for hunting and gathering activities remained the common property of the entire village. Nobody invested in any improvements to this land that would have given them justification for claiming it.

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[48] The growth of village populations and need for more land to cultivate was the most common cause of village fission – that and fighting. The former Chief Conservator of Forests in Nagaland (Indian Forest Service) proposes an interesting theory based on a lifetime of observation. He contends that by the time most Naga villages reached 200 years of age, their populations had grown to the point where they were cultivating land up to five km away. If this took 2-2.5 hours to walk in each direction, that was dangerously extended during headhunting times. This, he argues, would typically force part of the village to break away and establish a new settlement about 20 km away – far enough to alleviate the land scarcity problem but close enough to maintain relations with the parent village. The process would repeat itself and they would again be looking for a new settlement site in another 200 years. This means that villages would have been migrating at a rate of about 20 km every 200 years (Angami, T., 2001). This theory could be easily tested by plotting village migration routes and years of establishment on a map.

[49] It was not until Khonoma had been in existence for roughly 450-550 years, that population pressures pushed settlement into the Dzulake (1848) and Kukhwi (1956) areas – the only two pockets outside the Khonoma valley with potential for agriculture.

This explanation appears sound in view of the data presented, and resonates with both the oral history and customary laws of Khonoma.[50]

The village's land tenure system is thus multi-layered, providing different levels of ownership in accordance with the land's capabilities and use. This makes it difficult to agree with Das' contention that the "Angami economy could not develop because the land control continued to be by the community rather than by individual." (Das, 1976, 9) Quite the opposite is true, if Khonoma is representative of the wider Angami subgroup. Their tenurial system appears to have been admirably flexible in providing the security of private ownership needed to encourage investment in the land, while balancing this with varying levels of communal ownership that provided a different type of security to the poorer sector of the village that had little private property and relied heavily on communal resources. But while assuring access to common resources for household use, customary laws strictly forbad commercialization that would undermine the equitability and sustainability of their use.

New Stresses on an Old System

Rapid demographic and social changes in Nagaland have brought new pressures that, some fear, are eroding the traditional Angami system of property rights.

Increased Commercialization of Land

The land market looks set to expand as Nagas find themselves needing more cash, and the stigma against selling even ancestral land declines. Paying for children's education costs is a common reason for mortgaging land. In a sense, financially strapped villagers may be forced to choose between maintaining their ancestral land of the past, or selling it in a bid to build a better future for their own children by providing them with a good education. Others who have relocated to Kohima or taken government jobs might no longer want to cultivate their forefathers' land. Some villages have responded to these perceived threats by banning further land sales.

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[50] As a more recent settlement (1848), the current land tenure system of Dzulake village is at a much earlier stage of individual ownership – and probably reflects what we would have found in Khonoma several centuries earlier (roughly panel 1 in map 6-8). Dzulake classifies its entire territory as community land except for its wet rice terraces, which are individually owned. After jointly deciding which area to open for jhum cultivation every year, each household can cultivate as much land as it has labor to manage. But cultivating land under the jhum system does not provide justification for claiming it. Only by converting the land into permanent gardens can cultivators claim it as their own, as they do with the wet rice terraces. Until now, anyone planting trees on community land can claim tenure over the trees, but not the land. This regulation is likely to come under pressure to change as more farmers in Dzulake are establishing tea and passion fruit plantations and will probably regard them as tantamount to permanent gardens that should fall under their personal ownership.

Inability to Access Bank Loans

Banks are of course another source of cash[51], but access to substantial loans again pivots on using land as collateral. Farmland in Nagaland is neither surveyed nor registered[52] so even if it is individually owned, formal lending institutions such as banks still cannot accept it as security for loans. Even if banks could accommodate the informal system of land ownership, customary laws would still view ancestral lands as nontransferable – so technically, they would still be ineligible for use as collateral to secure loans. Formal bank loans are thus out of reach of most villagers, leaving them dependent on local money lenders at steep interest rates of 6% per month.

Marginalization of Women

With increasing emancipation, Angami women may begin to question the irony of having to work so hard on land that they have no hope of ever owning (Kikhi, 1999). And of course this makes bank loans to women even more problematic than for men. Some women's leaders are beginning to challenge the fairness of customary laws that ignore daughters in the distribution of ancestral lands. If this lobby gains strength, then it has the potential to threaten the entire concept of retaining ancestral land within the male lineage.

Need to Formulate New Tenurial Rules for Trees and Other Perennial Crops

As Khonoma has engaged more with the market economy, there has been a surge in land planted to perennial cash crops such as passion fruit, large cardamom and tea, and sometimes fast-growing timber trees such as *Gmelina arborea* (thovü), *Hovenia dulcis* (kipia), *Melia azedarach* (khusie), and *Terminalia myriocarpa* (bicha). These crops are well-suited to the relative coolness of the Naga Hills, are less perishable, and enjoy remunerative markets in the lowlands. Another factor underlying their newfound popularity is the increasing urban migration – as more Nagas leave their villages in search of education and jobs. Where significant, this trend is often leaving smaller and aging populations back in the villages, needing to find less labor-intensive strategies to manage their land. Plantation crops are an attractive solution in that they allow village lands to continue to be fully utilized but with a much reduced labor input. Particularly for those who have migrated to towns to pursue other economic opportunities, plantation crops are a good way to continue to earn an income from their ancestral lands back in the village without having to return often. For Khonoma descendants who have moved away from the village, a favorite way to continue to earn income from communal resources is through owning

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[51] Nagaland only got its first banks after it gained statehood in 1963. Before this, there were no formal institutions for lending money, so securing loans was not an issue.

[52] British administrators levied a house tax in lieu of land revenue.

mithun. Profit margins are large and they do not have to invest any of their own labor since the mithun are looked after communally by a designated herder. The transition from jhum field to plantation is made easier by the fact that many of these perennial cash crops perform better under a tree canopy – and N-fixing alder works exceedingly well as a canopy species. The alder is thus retained (although no longer pollarded) and the only change occurs to that planted underneath it.

This sudden proliferation of long-term plantations is fragmenting the hill slopes – and thus disrupting the smooth rotation of the jhum cycle.[53] As described in chapter 2 the jhum system works on the basis of villagers opening up entire blocks in unison. Part of the rationale for this was that it made it easier to guard fields against wildlife damage. Even if a villager owning a plot within this block had no wish to cultivate it, he would still be expected to pollard his trees to avoid shading his neighbors' crops or providing a sanctuary for parrots. Otherwise his neighbors would have the right to pollard the offending trees, no doubt muttering complaints with every stroke of their daos. The social pressure to conform to village rules was very strong. But these rules have since fallen by the wayside in response to changing land use. Expansive blocks of completely cleared jhum land have become a relic of the past as more farmers are choosing not to open their fields or are converting them into plantation crops. These plantations have to be strongly fenced to protect them from the cattle and mithun that range freely behind the cropping phase of the jhum cycle.

Beyond these more practical problems, the arrival of plantation crops raised tenurial issues that are new to Khonoma. The tenurial system was based on the assumption that only annual or at most biennial crops would be planted in jhum fields, everything would be harvested by the end of the second year, and the field would then be allowed to lapse back into fallow. When the elders consented that a land-short villager could open up a jhum on common land, it was thus with the assurance that the land would be returned to the commons after two years. If your ancestors had planted timber trees on clan land, then you could claim the right to cut them, but any coppice regrowth would revert back to being common property of the entire clan. Planting trees on common lands could not be used as justification for later trying to claim private ownership over those lands. There was a strict separation between tree and land tenure.

The advent of plantation crops effectively expanded Khonoma's agricultural land base. Much of the commons land that is too rugged or distant for jhum cultivation with annual crops is quite suitable for perennial crops. Distance is less of an obstacle since plantations do not have to be visited often and the harvest is

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[53] Many land-short households currently rely on borrowing or renting jhum land from their neighbors who have more than they can cultivate. As more of this "surplus" jhum land is converted into plantations, then the pool of privately owned land available for short-term rental will dwindle – and thus force land-short villagers to turn to common lands for cultivation.

generally low volume and thus easily carried back to the village. Steep or rocky slopes are also more easily accommodated since little soil tillage is required and erosion thus less of a danger. So just as dryland crops allowed Khonoma to expand its agricultural activities beyond the valley bottom where wet rice will grow, so too do plantation crops have the potential to push agriculture even further upslope. The likelihood – nay, the virtual certainty – is that when enough people become involved, there will be strong pressure to amend the customary laws and eventually these areas will also become individual property. This is not really a threat to the land tenure system so much as the continuation of a process of conversion to individual ownership that has been going on for hundreds of years. But we must remember that it is the poorest sector of society that relies most on communal resources, and they will suffer most when this land becomes individual property. There will be increasing stratification within the village as more land is accumulated by a privileged few, while others become landless. This is contrary to traditional Naga ethos that the community is the only legitimate custodian of the land and none should be landless.

Implications of Commercialization to Sustainable Resource Use

The scenario of resources being managed sustainably for generations, and then plundered as soon as they obtain a commercial value, is one that we find replayed repeatedly as the cash economy penetrates remote areas. Customary laws may try to prevent such short-sighted pillage of resources, but they are rarely sufficiently robust to withstand the lure of easy money. The clearest example of this in Khonoma has been the logging explosion, detailed earlier in this chapter. Despite the obvious devastation that they were inflicting on forests that their ancestors had protected for centuries, it took almost ten years before village leaders could finally rein in this assault on the village's communal forests. Many of the current land disputes in Khonoma appear to be connected to logging interests in search of more harvestable timber.[54]

But this threat extends to any resource that attains a significant commercial value. When local ginseng (*Panax pseudo ginsing*), for example, became popular and was earning prices of Rs 800/kg, it too was rapidly pulled from Khonoma's communal forests with no thought of sustainability. Others are questioning how long stone quarrying (essentially a non-renewable resource) can continue at its present pace before Khonoma undermines the stability of its soils and creates serious erosion problems. It will be a challenge for customary laws to adapt quickly

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[54] The loggers seem agile at using village politics to sir up feelings of "us" versus "them", thus inflaming the passions of the wider khel to push for its land rights, as a smokescreen for their true agenda of harvesting the fat of the land for personal enrichment. The situation becomes harder to resolve because some village council members have themselves become involved in logging, creating a clear conflict of interest in their decisions.

enough to respond to commercial pressures and intervene to ensure a continued equitability and sustainability of resource use.

Declining Authority of Village Elders

Directly related to the previous point is the ability of village elders and institutions to continue to make wise decisions on behalf of the village, and to enforce them. Although many comment on Khonoma's continued conservatism, it is not immune to the winds of social change that are sweeping across Nagaland. Communities have fragmented as many move away from the village in search of jobs and employment. People are bringing back new ideas and becoming more individualistic in their thinking. Membership in a strong and united khel no longer has the paramount importance to one's welfare that it once had. Large houses, cars, and other icons of consumerism have replaced feast-giving as the most effective way to earn prestige. Money now earns more respect than integrity.[55] And now that Christianity has taught them the fallacy of the spirit world, it no longer has to be respected. All of this undermines the ability of village authorities and institutions to exert social pressure in enforcing compliance with customary laws.

CONCLUSIONS

So what role has the land and its ownership played not only in farming systems, but in wider events that shaped the history of the Naga Hills? Amongst the Nagas, the most powerful and warlike villages – dubbed as "the Khonoma group" – were clustered together around the foothills of the Japfü mountain range. No matter how many punitive expeditions were sent against them, they continued to defy *Pax Britannia*'s authority with repeated raids on British subjects. What was it about this area that bred such fierce independence and military strength? A large part of the answer lies in the environment – the rich soils that the Angami had so skillfully carved into expansive wet rice terraces and irrigated by streams cascading from the Japfü Range above (cf Chagnon 1968). This carefully managed landscape was able to produce sufficient food grain to support large villages that were militarily strong

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[55] This is vividly illustrated by a conversation with an Angami university graduate (name withheld) who was temporarily hired to assist with the fieldwork. While relaxing around the fireplace one evening, he enthusiastically described his hopes to get a job with Indian customs. He had already gone for several interviews. His eyes shone as he recounted all the tricks for earning extra income. For example, an artificially heavy tax could be applied to incoming parcels that far exceeded their value, forcing the recipients to abandon them. According to department rules, the abandoned packages would then have to be disposed of by auction, only he would be the sole bidder. The packages would become his for only a few rupees and he could resell them at a large profit.

Listening quietly as I nursed my tea, I finally asked him just how much money he thought he needed to be happy in life, and was his reputation not worth anything to him at all? I have never forgotten his response: To be respected in Naga society these days, he countered, you had to drive expensive cars and build a big house. Nobody really cared how you got the money. These were the new symbols of prestige.

enough to prey on weaker villages and thus pose major problems for the British. Khonoma was better-sited than most, although handicapped by a shortage of land suitable for agriculture. Its immediate neighbors (Mezoma and Jotsoma) were also large and powerful villages so this ruled out any real possibility of annexing neighboring land. As noted in the opening quotation of this chapter, J.P. Mills, District Commissioner for the Naga Hills between 1924-1936, drew a direct line between land shortages and Angami incursions into the plains:

> "Heads were always desired, and the temptation to take them from those living softly in the plains was irresistible. Moreover the population here is dense, and land hunger has always caused movements. It was the Angami Nagas who had first brought down our wrath on them by raiding the Zemi, and for years they were the most persistent troublers of the plains. Their restlessness was due as much to economic causes as to an innate truculence. Though they have covered their hillsides with a marvelous system of irrigated terraces, they cannot grow enough food to support them[selves]. It is estimated that in Khonoura [Khonoma], their most powerful and warlike village, a third of the population is landless. Now that the country is settled and the roads safe, trade provides a means of livelihood for the surplus population. But in the old days the loot obtained on raids and the prisoners held to ransom did not just provide a welcome extra; they were an essential source of income." (Mills, undated, 4-5)

So shortage of agricultural land forced Khonoma villagers to seek additional income from outside. Some went as traders, forging alliances and bringing back new ideas. Its traders visited Manipur so frequently that many learned to speak Manipuri, and it is thought that trade connections with Manipur Rajas provided Khonoma with guns considerably before its neighbors (Savino, 2001). This was probably vital in reinforcing Khonoma's hegemony in the Naga Hills, since the defenses of Naga villages were not designed to withstand attack by muskets. But it was Khonoma's raids into British territory as pillaging warriors that earned it the ire of the British as the main instigator of a group of "trouble-makers".

Despite the notoriety generated by their "outside" activities, the Angami had a powerful attachment to their land – as their mother whose benevolence provided them with both food security and refuge in times of warfare. Their villages spoke of permanence: stone was used, skillfully and laboriously, generation after generation, to face their terrace walls (khupo), construct pathways to the fields (khadu), sitting places (baze or khwehu), walls (tsiepfe ba) and forts (kuda), or to erect monoliths (tsiesi) to commemorate past feasts (Hutton, 1926c; nd). The jhum fields became increasingly precious as they were carefully terraced and alder trees were nurtured by successive generations of Khonoma's forefathers. These lands took on an added sentimental value because they were gifted from their ancestors. They were central to their history; their identity as a people. This love of their land and sense of honor was probably reinforced as they were forced to protect it from successive waves of invaders (Ahoms, Manipuris, British, and Indians) who threatened them with displacement. Heroes and folklore were generated in the process. The folk song translated in appendix 4-36 reflects these themes, urging a call to arms to protect Khonoma against advancing British forces.

The centrality of land to Angami identity made it crucial that it be kept in the family and passed on to the next generation. This, in turn, strengthened both the patrilineal ideology and the need to produce male heirs to receive the land and carry on the family name. There was much stigma attached to any family that could not produce a male heir, and a barren wife often led to second or third marriages. Customary laws were designed to prevent the loss of ancestral lands at every level (individual, clan, khel, village), thus protecting the identity and distinctiveness of its owners. That Angami country was densely populated and agricultural land in short supply made it all the more critical that it be zealously protected. The strong attachment to the land and the strong patrilineal ideology of the Angami are thus inextricably interlinked.

The Angami attachment to their land continues to be evident in contemporary Naga society. Even those who left the village at the start of the Indo-Naga war in 1956, and have lived elsewhere for the past almost 50 years, still proudly refer to themselves as <u>Khwünomia</u> (men of <u>khwüno</u> [*Gaultheria fragrannis*]). It is also well known that Angami civil servants generally resist outposting to other districts, and will often resign from a good job rather than relocate (Sema, 2001). This of course costs them many good opportunities in terms of promotions to higher positions in the state machinery. Visits to government offices in Kohima in June typically find many of the Angami staff missing, all back in their home villages knee-deep in mud and transplanting the rice crop. Alongside the development of this sense of identity and pride arose Khonoma's extreme form of patriarchy – one that continues to view carrying baskets of rice or firewood as beneath male dignity, and heaps special attentions on sons while ignoring their sisters. Even amongst the patrilineal Angami, Khonoma stands out in the status and privilege accorded to its men. Its customary laws have been more stringent than those of most other Angami villages in prohibiting the sale of ancestral lands and insisting that it is passed on only through sons.[56]

Since not only the Angami, but also the Rengma, Lhota and Sema Naga subgroups are all believed to have migrated from Khezhakenoma village (Hutton, 1969, 19-20), their forefathers would presumably have shared a common culture. This suggests that Khonoma's exceptional pride, strong patrilineal ideology and laws governing land transfers were not something that they brought with them – but rather something that evolved in Khonoma in response to the environment that they found there.

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[56] In Jakhama village (Southern Angami), in contrast, there are few hard and fast rules and ancestral land may even be inherited by daughters (Angami, A., 2001).

CHAPTER 7

The Wider Livelihood System

The focus of this study – jhum cultivation – was of course only one of a multiplicity of land use strategies that together comprised Khonoma's total livelihood system. These component subsystems, as interrelated part of a more complex whole, must be understood as the wider context in which Khonoma's dispersed alder system evolved.

> "To a stranger suddenly arriving in the Angami country, nothing strikes him with greater surprise and admiration than the beautiful terraced cultivation which meets the eye everywhere, on gentle hill slopes, sides and bottoms of valleys, in fact wherever the land can be utilized in this way. In preparation, upkeep, and irrigation, the greatest care is taken, far in excess of anything seen in the northwest Himalayas. The appearance of the countryside for miles south of Kohima, for instance, is such as to suggest the handiwork and labor of a far higher order of people than these wild Nagas. These terraced fields are often bordered with dwarf alder bushes, are carefully irrigated by an elaborate system of channels bringing water down from mountain streams, and luxuriant crops of rice are grown on them. To pass through the valley where stand the two powerful villages of Khonoma and Mozema [Mezoma] during late October when the crops are ripe is indeed a delight for the eye; a veritable golden valley."
>
> (Shakespear, 1914, 206-207)

INTRODUCTION

Outsiders arriving in Angami territory for the first time, like Shakespear, often enthused about the engineering marvel of the terraced hillsides and compared them favorably with those of Banaue in the Philippines. They were particularly intrigued that "primitive savages" were capable of such sophisticated land management – seemingly forgetting that the Ifugao of Banaue were themselves fierce headhunters. Many pondered whether the Angami had acquired their terracing skills during an earlier time when they might have migrated through the lowlands. Their terracing ability continues to set the Angami and the closely allied Chakhesang (formerly known as the Eastern Angami) apart from all other Naga subgroups and obviously has a huge impact on their agricultural landscape. (See Gokhale et al., 1984 for a picture essay on Nagaland's wet rice terraces, known locally as "panikhetis" [Hindi/Nagamese].)

Praise of the Angami's wet rice terraces is a reminder that the jhum cultivation that was the initial focus of this study is not the only component of Khonoma's farming systems. Nor is it even the most important one. The Angami are at heart wet rice cultivators, evidenced by its cultural elaboration, the large number of varieties planted, and the high value placed on terraced fields. When work is needed in the wet rice terraces, all else is set aside. They provide the rice staple that assures food security, while the jhum fields play a more supplementary role in providing other food crops that contribute variety to the Angami diet.

Therefore, it is not possible to analyze jhum cultivation in isolation, without first understanding at least a broad outline of other components that comprise the complex, holistic system of livelihood and how they interact. It would be akin to examining one piece of a jigsaw puzzle and trying to visualize the entire picture. Adding to the complexity is their interconnectedness and the fact that all are dynamic and continually changing. This chapter thus sets out to provide an overview of Khonoma's wider livelihood system, of which jhum cultivation is just one part. Much of the rich detail has been relegated to lengthy appendices for easy reference by interested readers.

METHODS

The descriptive account of livelihood systems that is the core of this chapter is based upon participant observation in Khonoma village over three years of intermittent fieldwork, between November 1999 and December 2002. Immersion in village life allowed me to observe people going about their daily lives, to accompany them to their fields and forest, and to engage in countless discussions. A local English-speaking assistant was always present to interpret during these conversations. A notepad and camera were always close by throughout this journey. Care was taken that my inquiries were as informal and as unobtrusive as possible. This was a continuous process that gradually built familiarity with the people, their landscape, how they were managing it, and why.

Documenting the Farming Systems

The research focused closely on a group of 10 collaborating households. They were chosen for me by village leaders to provide a representative cross-section of all three of Khonoma's khels. Their role was to act as a council of experts for the project, and to assist in generating quantitative data on the performance of their land-use systems. One in the group was hired as a Farmer Coordinator, to advise the project and facilitate its research activities in the village. Starting in November of 1999, each of these households began keeping detailed diaries on all of their material and labor inputs, and all the harvested outputs, for two types of fields: the jhum fields that they were opening from fallow in preparation for the first year's cropping; and one of their wet rice plots. They were encouraged to make these diary entries part of their daily routine after returning from the fields every evening. A local research assistant visited the collaborating farmers regularly to monitor the diaries' progress and ensure that they were being filled in properly. At the end of each year, the diaries were reviewed carefully with their authors to check for discrepancies or incomplete information. This was continued for two agricultural years to provide data on one complete cropping phase of the jhum cycle, i.e., first- and second-year cropping. The wood harvested when the jhum fields were being opened provided a measure of the productivity of the previous fallow period. We thus had productivity data for both the cropping and fallow phases of the jhum cycle. All monitored fields were carefully measured to permit calculations based on land area. Each farmer received a small honorarium of Rs 500/mo to compensate for time spent in record-keeping. These diaries were intended primarily for the productivity analysis in chapter 8. But they are also drawn upon in this chapter to provide additional details of land management, to generate crop inventories and calendars, and to calculate crop frequencies and gestation periods.

Kitchen and permanent gardens were visited to map their positions and inventory what was being grown. But given their lesser importance to Khonoma's farming systems historically, diaries were not kept on their management.

Irregular meetings were held with the collaborating group of farmers to discuss the progress of the work and consult them on topics that emerged as important. They acted as a sounding board for testing conclusions drawn from the data. Key informants were sought out on specific topics, such as those holding the posts of "first sower" and "first harvester". The sole remaining zievo-u (village priest) was interviewed about traditional religious practices. And village elders in general were consulted frequently as repositories of much of the village's traditions and wisdom.

Looking Beyond the Fields to the Forest

As the fieldwork progressed, two additional issues emerged as important to the wider picture of Khonoma's livelihood system and were added to the research agenda. First, it became clear that agriculture was only part of the village's resource management, and that gathering of wild plants continued to play an important role in the village's economy. We needed to look beyond the fields to the forests. We thus began compiling lists of wild plants used by Khonoma for a wide range of economic and cultural purposes. These data were collected by identifying villagers with specific ethnobotanical expertise and trying to document their knowledge. These local experts guided trips to the forest to search for useful plants, photograph them, and collect herbarium specimens for identification. Specimen vouchers were later identified at the Herbarium of the Biology Department, Chiang Mai University, in northern Thailand. This process generated the lengthy plant lists contained in the appendices. To then identify which, from this wide menu of plants, were the most important, we again turned to our group of 10 collaborating households. Each was asked to list, in descending order of importance, the 10 wild vegetables and 10 wild fruits that they collected most often, and the months each was available. These data were then compiled to generate indices of importance and a harvest calendar.

As we documented how villagers were managing their land, this led naturally to an interest in the tools they were using and their efficiency. This obviously had huge implications for the labor expenditures that our collaborators were recording in their diaries. We thus set out to photograph field tools used in the study villages and then commissioned an artist in Chiang Mai to render the photographs into line drawings. The focus gradually broadened to encompass the wider material culture of the Angami Nagas presented in the appendices.

Measuring the Cash Economy

The methods described so far aimed to develop a detailed understanding of how the village was managing resources in its fields and forests – primarily for subsistence needs. But they hint little at the off-farm economy or the flow of goods and services beyond Khonoma's own geographical boundaries. To measure this cash component of the village economy, we began by consulting village authorities in compiling a list of all the salaried positions in the village. These represent the single largest flow of cash into the village every month. Then we turned our attention to the goods that were being exported from the village on a daily basis for sale in Kohima and Dimapur markets. Since almost everyone relied on the village buses for transporting their goods to market, we undertook a year-long survey of what they were taking to sell. This was coordinated through Kenei Krotho (a self-help group), for which it received a Rs 500 monthly stipend. On roughly the first 10 days of every month, they descended on the bus station early in the mornings and inventoried all the passengers' goods and their estimated values, as they boarded the buses. (This was quite manageable since departure times for all buses leaving Khonoma fall between 5:30 – 6:00 a.m.) The data collected over these 10 days were then extrapolated for the remainder of the month. The bus survey and inventory of salaried positions thus provided measures of the value of goods and services sold monthly at the village level. But since most decisions about how resources are managed are made at the household level, we also wanted to look at household economies and how they may be driving changes in farming practices. Here again, we returned to our core group of 10 collaborating farmers and during the final year of fieldwork, worked with them in maintaining financial diaries of all their daily income and expenditures.

Mapping Component

The supporting mapwork draws on the 1:50,000 base map that had been digitized as part of the project's mapping activities (see *Methods* section of the previous chapter). Virtually all of this work described was repeated in Tsiesema. Most of the Tsiesema results are presented in the appendices and referenced here only when they provide useful comparisons with Khonoma.

As in Chapters 3 to 6, old tour diaries and other reports were an important source to provide historical insights from British administrators who toured the Naga Hills extensively during colonial rule, and were intimately familiar with its people and landscape.

FINDINGS

The On-Farm Economy

The analysis is prefaced with a quick overview of several key factors that strongly influenced the nature of Khonoma's farming systems.[1]

Contextual Factors that Shaped Land Use Systems

As Khonoma was carved from the forests, the systems of land use that evolved were a product not only of the skills and experiences that the settlers brought with them, but also of the environment, tools and germplasm with which they had to work.

The Environment that they had to Work with …

The environment and its possibilities and limitations for agriculture have been adequately covered in chapter 6. Like mountain dwellers everywhere, the Angami evolved their farming practices from an intimate understanding of their surroundings. Their activities were paced by the lunar calendar (appendix 5-1), while local ecological indicators such as the arrival of a particular migratory bird or flowering of a tree (appendices 5-2 – 5-3) provided other signposts of where they should be in their agricultural cycle. The spirit world also played a role in guiding day-to-day activities through the medium of omens and dreams (appendices 5-4 – 5-5).

While populations remained small and forests expansive, hunting and gathering supplied much of the food that they ate with their rice. As they wandered the forests, they developed an impressive knowledge of how to use local flora and fauna, and where and when they were available. As the village grew and more of the landscape was converted into agricultural use, then the emphasis of local knowledge would have shifted to soils, domesticated plants, and the management of each. While Nagaland's state soil map shows Khonoma as having mostly Pachic Haplumbrepts and Umbric Dystrochrepts soils (National Bureau of Soil Survey and Land Use Planning, 1999), the villagers developed a more detailed system that differentiates between 22 different types of soils and how each may be used (appendix 5-6). This is reminiscent of Conklin's writings about the legendary botanical knowledge of the Hanunóo (1957), and indicates the depth of local knowledge systems.

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[1] For other overviews of Naga farming systems, see Das, N.K. 1976; Directorate of Agriculture, 1986; Husain, 1988; Keitzar, 1998; Kikhi, 1997, 1999; Forest Department, 1998; NEPED and IIRR, 1999; SARS, 1998, 2000; Chauhan, 2001; Nakro, 2001; and Odyuo, undated.

The Tools that They Had to Do the Job …

The specialization of tools and knowledge evolve together and are hugely influential on farming systems.[2] They determine how effectively the environment can be manipulated, and with what degree of labor. Tsiesema farmers claim, for example, that a buffalo-drawn plough can cover ground more quickly than 10 men hoeing by hand. The recent introduction of hand tractors with tillage attachments will reduce labor costs even further, freeing it up for other pursuits. More specific to this study, Khonoma's careful pollarding of its alder trees may have been impractical with stone tools and probably did not evolve until iron became available in the Naga Hills in about the 16th century.[3]

And the Germplasm at their Disposal …

These were the "genetic tools", if you will, that farmers had available to them for producing food from the land; which, through careful husbandry, would convert Nagaland's abundant sunlight, fertility and moisture into bountiful harvests. A glance at table 7-1 will confirm that many of the main crops grown in Khonoma's fields originated from elsewhere around the world and were imported into the Naga Hills at various points in history. This is contrary to the routine description of farming systems in remote mountain areas as being "traditional". A closer examination of the origins of the crops being grown raises serious questions about whether this term has any real meaning at all. Despite their relative isolation, the Nagas have benefited from the globalization of food crops through the centuries, as European explorers visited new lands and brought useful plants back in the holds of their ships. The history of experimenting with new crops and adopting those found to be useful is as old as agriculture itself.[4] A survey of the 10 collaborating farmers in each of the two study villages counted 157 species, representing 53 plant families, cultivated in their farming systems during the period of field work (appendix 5-10).[5]

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[2] This chapter relates to a lengthy appendix that illustrates many of the tools used in the two study villages (appendix 5-7), and their systems of weights and measures (appendix 5-8).

[3] There have been some archaeological digs of Angami graves in Nagaland. Iron fragments found amongst the burial items have been dated to the 16th century (Aier, 2005). See Dani (1960, 62-70) for an overview of stone tools collected in the Naga Hills; also Hutton, 1924. In some rather unusual experiments, in the mid-1900s Danish researchers attempted to reconstruct Stone Age swiddening. They felled trees with stone axes, planted crops with digging sticks, and harvested with flint sickles and flake-knives, carefully documenting their results (Steensberg, 1979).

[4] This of course can be a "two-edged sword" in terms of agrodiversity. Introduction of new crops and cultivars can enrich the sum total of genetic resources planted in farmers' fields, but a crop that proves particularly successful and is then widely planted may precipitate the loss of many old varieties.

[5] The Nagas were always vigilant for new crop varieties, even when on military excursions. British Deputy Commissioner C.R. Pawsey wrote about leading three platoons of Assam Rifles to punish a Naga village of Pangsha, in current-day Tuensang district, for its massacre of another village earlier that year. The expedition was supported by 14 sections of Sangtam, Ao and Sema carriers, each of 30 men. Arriving to find that everyone had fled, Pawsey set about making Pangsha pay a price for its atrocities:

Beyond that, there is another level of genetic diversity in terms of the number of cultivars grown of each crop species. Not surprisingly, the importance of rice is underlined by the large number of varieties grown (20 in both Khonoma and Tsiesema by the 10 surveyed farmers.[6] See appendices 5-11 – 5-13).[7] These were the genetic resources that the study villages had available for meeting their dietary needs (appendix 5-14).

Table 7-1. The Origin of Key Crops Cultivated in the Study Villages *

Common Name	Botanical Name	Likely Centre of Origin
OLD WORLD		
rice	*Oryza sativa* L.	N.E. India, northern Bangladesh, & the triangle adjoining Burma, Thailand, Laos, Vietnam & southern China
foxtail millet	*Setaria italica* (L.) Beauv	temperate Eurasia, from Europe to Japan
Job's tears	*Coix lacryma-jobi* L.	across South Asia, from Assam to Philippines
wheat	*Triticum aestivum* L.	Middle East
taro	*Colocasia esculenta* (L.) Schott	north India and probably other parts of S.E. Asia
rice bean	*Vigna umbellata* (Thunb.) Ohwi & H. Ohashi	Indo-China
winged bean	*Psophocarpus tetragonolobus* (L.) DC.	central African highlands
peas	*Pisum sativum* L.	possibly Ethiopia, the Mediterranean and central Asia, with a secondary centre of diversity in the Near East
pigeon pea	*Cajanus cajan* (L.) Millsp.	India
eggplant (brinjal)	*Solanum melongena* L.	possibly India, with China as a secondary centre of variability
cabbage	*Brassica oleracea* L. var. *capitata* L.	European Atlantic seaboard
mustard leaf	*Brassica campestris* L.	southwestern Asia
radish	*Raphanus sativus* L.	possibly both Asia and Europe, with subsequent gene flow between the two centers commencing with the establishment of the Silk Road
turnip	*Brassica rapa* L. subsp. *rapa*	two main centers of origin –

> "A large quantity of paddy was brought in and husked in the camp with looted paddy huskers. The rice here is extremely good and grows at heights of nearly 6,000 ft. Samples to try in their own villages were collected by many of our Nagas." (Pawsey, 1939a, 11).

[6] This survey included only the 10 farmers monitored closely during field work for this study in each of the two study villages. A village-wide survey in another Angami village, Viswema, counted 103 rice varieties (Kikhi, 1999).

[7] In sharp contrast, another survey of these same farmers found very few varieties amongst their less important crops, and that they were usually not recognized by specific names. Rather, they had to rely on descriptors, such as the "local chilli", the "soft cucumber" or the "green squash", in identifying varieties grown. There is no cultural elaboration for these crops of secondary importance.

		Mediterranean area, eastern Afghanistan and the adjoining portion of Pakistan, with Asia Minor, Transcaucasus and Iran as secondary centers
garlic	*Allium sativum* L.	central Asia
ginger	*Zingiber officinale* Rosc.	various opinions – India, China, Malaysia, Pacific Ocean Islands
turmeric	*Curcuma longa* L.	India
large cardamom	*Amomum subulatum* Roxb.	North India, Nepal, Bhutan
common perilla, green-leaved perilla	*Perilla ocymoides* L.	indigenous to India and China
cucumber	*Cucumis sativus* L.	possibly southern Himalayan foothills of India
bottle gourd	*Lagenaria siceraria* (Molina) Standl.	assumed to be tropical Africa and Madagascar
tea	*Camellia sinensis* (L.) O.K. var. *assamica* (Mast.) Kita	western & southern China, and adjacent Cambodia, Laos, Thailand, Burma & N.E. India
NEW WORLD		
maize	*Zea mays* L.	Mexico, lowland Central America
potato	*Solanum tuberosum* L.	high plateaus of Bolivia and Peru
sweet potato	*Ipomoea batatas* (L.) LmK.	South America
cassava	*Manihot esculenta* Crantz	South America, with two centers of diversity – one in north-eastern Brazil, extending toward Paraguay, and the other in western and southern Mexico
French bean	*Phaseolus vulgaris* L.	Mesoamerica, possibly Mexico
tomato	*Lycopersicon esculentum* Mill.	western South America, probably Mexico or Peru
chilli	*Capsicum frutescens* L.	tropical America
pumpkin	*Cucurbita pepo* L.	Mexico and possibly eastern USA
chayote	*Sechium edule* (Jacq.) Swartz	southern Mexico and Central America

* *Source:* Smartt and Simmonds, 1995

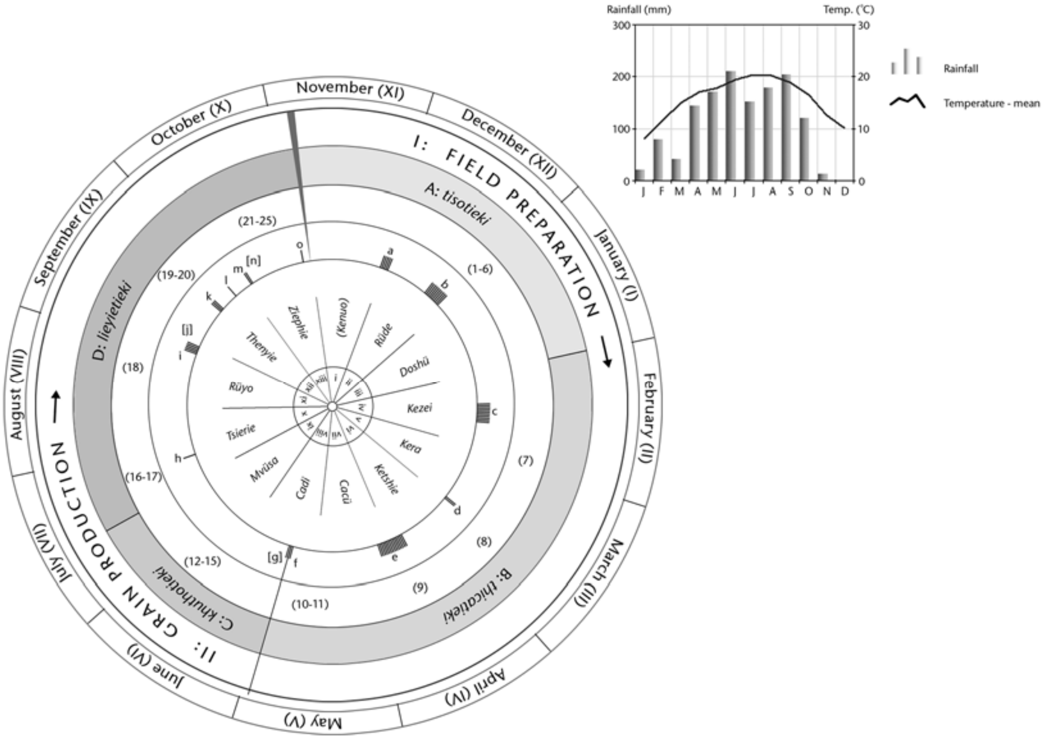
As detailed in chapters 4 to 6, the clearing of forest for jhum fields, hunting and gathering in the forests, and gradual conversion of jhums into wet rice terraces were the basic elements of Khonoma's economy in the village's long history. The rhythm of life was shaped by the agricultural calendar (figure 7-1) and interspersed with numerous festivals that provided welcome rests from labor in the fields (table 7-3).

Contemporary Livelihood Systems as Influenced by Spread of the Cash Economy

Moving forward to the opening years of the 21st century (figure 7-2), we find that Khonoma's land use has evolved immensely since the early days when trees began falling under the Angami settlers' axes. The changes are most obvious in terms of degree. As the village grew, cultivation expanded to occupy virtually all arable land in the surrounding sub-catchment and spilt over into other pockets of the territory (Dzulake [1848] and Kukhwi [1956]) that had more limited agricultural potential. Only the steepest and rockiest slopes escaped the cultivator's hoe.

But their farming system has also become more specialized as villagers experimented with new crops and tools that in turn, led to new agronomic practices. Another layer of complexity is now being added as the cash economy spreads through the Naga Hills and farmers are responding to demands from distant markets. And with this opening of the economy, has come a rapid expansion in the non-farm sector. It is no longer sufficient to look only at land-based resources in assessing the village's economy. More and more villagers are earning most of their income from offices, classrooms, or shops, and have become part-time farmers. Neither can we understand land use changes in a vacuum, without looking at contextual factors such as the arrival of Christianity, Delhi's policies to firstly contain the Nagas militarily and then later to buy them off with jobs and money, and now market influences. All are external, but play out locally in terms of what happens in farmers' fields.

Figure 7-1. Composition of Angami Wet Rice Calendar *



* Cross-reference with Table 7-2.
(design after Conkin, 1980, p.13)

Table 7-2. Composition of Khonoma Wet Rice Calendar *

DIVISIONS OF THE AGRICULTURAL YEAR

Phases

I Preparation of fields
II Production of grain

Seasons

A *tisotieki* – dry season
B *thicatieki* – off season
C *khuthotieki* – planting season
D *lieyietieki* – harvest season

SEQUENCES OF EVENTS

Stages

(1) *thiguda* - cutting down the rice straw
(2) *rie* - burning down the straw
(3) *thesulihi* - hoeing the nursery field
(4) *niekrovü* - breaking up soil lumps

(5) *thesuli kephie* - second hoeing
(6) *niekrovü* - breaking up soil lumps
(7) *thesula* - broadcasting seeds into nursery bed
(8) *tekhuhi* - turning over soil by spade
(9) *niekrodu* - breaking up soil lumps
(10) *tekhunyie* - 1st puddling
(11) *sepuhi* - 2nd puddling
(12) *khupone* - applying mud to terrace bunds
(13) *rhe* - leveling soil in preparation for transplanting
(14) *thesuphe* - uprooting rice seedlings from nursery
(15) *tekhuse* - transplanting seedlings into terraces
(16) *lierha* - releasing water from field and weeding
(17) *khuporhe mu nhaphieda* - cleaning weeds from bund walls and around field perimeter
(18) *sekekhe* - turning over weed piles to assist drying
(19) *thiphivü* - pruning dead outer leaves from rice
(20) *liekhro* - bunching rice plants
(21) *liere* - harvesting
(22) *lienyü* - threshing
(23) *liehe* - winnowing
(24) *medo* - measuring
(25) *pfü* - carrying harvest back to village

Festivals and Rituals

a *Tiekede* – completion of crop harvests
b *Terhünyi* - thanksgiving for paddy harvest
c *Sekrenyi* – male purification
d *Kekinyi* – village cross-visits
e *Ngonyi* – completion of jhum planting
f *Thekranyi* – start of paddy transplanting
[g] *Tekhusekhrü* – 'first sowing' ritual
h *Terhase* – making peace with spirits
i *Tsünyi* – completion of millet harvest
[j] *Thezukepu* – rat-chasing ritual
k *Liekhwenyi* – vigilance of paddy fields
l *Teitho* – sky ceremony
m *Liedenyi* – start of harvest of paddy & Job's tears
[n] *Liedepfü* – 'first harvest' ritual
o *Thekralieyie* – celebration of paddy harvest

SEQUENCE OF LUNATIONS

Lunar Months [†]

i	*Mvüsa*	July-August
ii	*Tsierie*	August-September
iii	*Rüyo*	September-October
iv	*Thenyie*	October-November
v	*Kenuo*	(November-December)
vi	*Ziephie*	November-December
vii	*Rüde*	December-January
viii	*Doshü*	January-February
ix	*Kezei*	February-March
x	*Kera*	March-April
xi	*Ketshie*	April-May
xii	*Cacü*	May-June
xiii	*Cadi*	June-July

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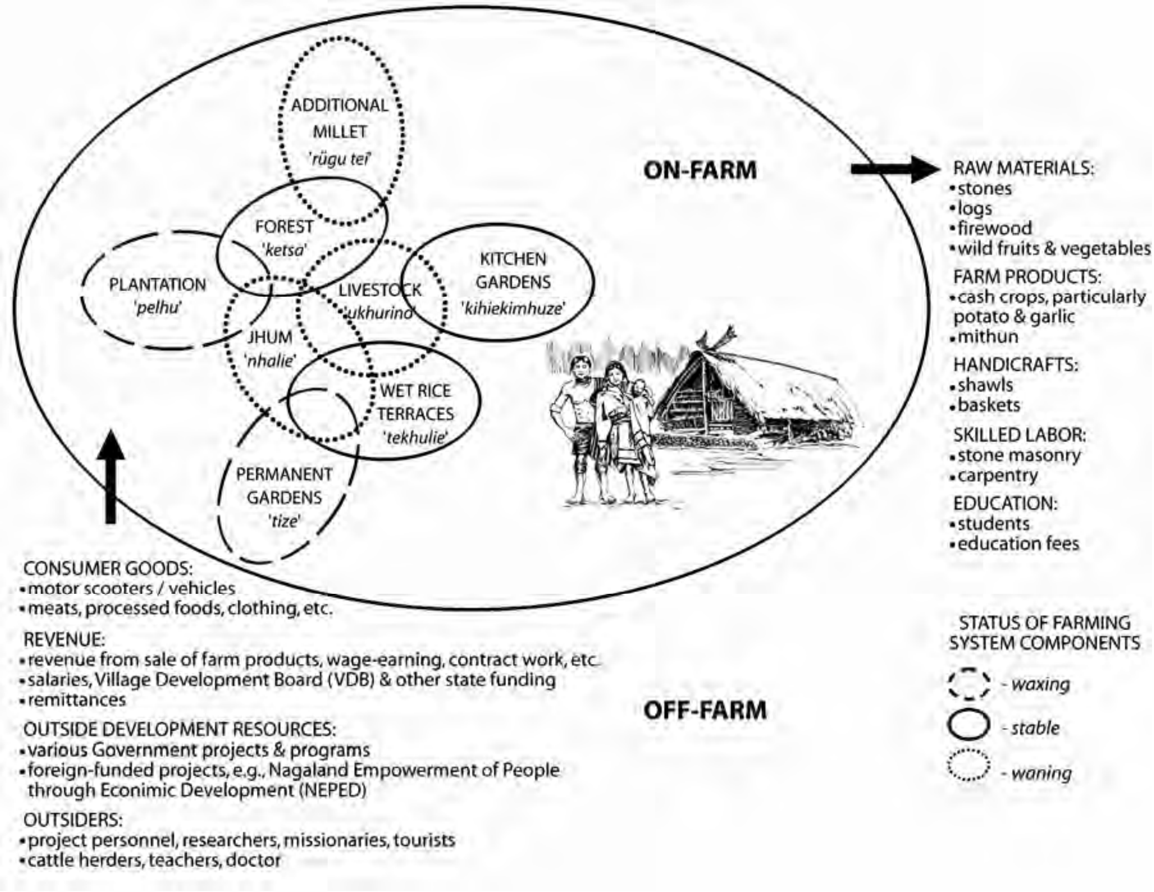
* Cross-reference with accompanying figure 5-1.
[†] Months of the Gregorian calendar were introduced by the British and are known only in English.

Table 7-3. Major Festivals (thenyi) Celebrated by Angami Nagas [†]

Festival	Month	Lunar Timing	Duration	Significance
Terhünyi	Dec.		10 days	Celebration of thanksgiving for the paddy harvest, during which villagers show their gratefulness to the supreme power by offering paddy and other crops to the zievomia (priest) – who prays to the spirits on their behalf.
Sekrenyi (Phousanyi)	Feb.	5th day after the full moon in Feb., or 2nd day after the full moon in Mar.	10 days	Males observe a series of rituals for purifying themselves, to ensure the village's good health and prosperity over the coming year. By ritually washing themselves, along with their weapons and tools, they declare that all their misfortunes and illnesses have gone down the drain with the wash water.
Kekinyi	Mar.	occasional	2 days	Time of cross-visits between villages to establish peace and friendship.
Ngonyi	Apr.	3rd day after the full moon	14 days	Marks the completion of sowing the newly-opened jhum fields (nhalie). Is a rest period when the youth go on hunting and fishing excursions.
Thekranyi (Kerunyi)	late May or June	on full moon or 20 days later, depending on progress of rice crop	3 days	Marks the beginning of paddy transplanting and with that, the onset of the busiest season. At completion on the festival, the tekhusekhrüpfü performs the first sowing ritual that allows the rest of the village to then begin transplanting.
Terhase	late July		1 day	A minor festival aimed at making peace with the spirit world. A white chicken is released into the forest.
Tsünyi (Chadanyi)	late Aug. or Sept.	7 days after the new moon, or full moon of Sept. if crop is late	5 days	Celebrated at the end of the rainy season to mark completion of the millet harvest. The village is spruced up by cleaning all the village roadsides and pathways (especially those leading to the jhum fields), wells, memorial places, graves, and compound boundaries. A special ritual called thezukepu is performed to chase away rats that might otherwise damage the crops.
Liekhwenyi	Sept. or Oct.	30 days after Tsünyi	3 days	Literally means "field-watching festival". This is celebrated in the lead-up to paddy harvest, when villagers build scarecrows and otherwise take meticulous care in protecting their crops from damage.
Teitho	Sept. or Oct.	5 days after Liekhwenyi	1 day	During the "sky ceremony", villagers pray to the supreme power that their ripening crops will be successful and protected from hailstorms and other natural calamities.
Liedenyi	Oct.	3 days after new moon	2 days	Initiates the harvest of the wet rice and Job's tears. Until the liedepfü performs the first-harvest rituals, everyone else is strictly forbidden from going to the fields.
Thekralieyie	late Oct. – early Nov.		1 day	Now seldom observed, village youth would celebrate the paddy harvest by wearing traditional dress and gathering with their age groups to sing and drink.
Tiekede (Kevakete)	late Nov.	3 days after new moon	5 days	Heralds the completion of the harvest. The granaries are full and villagers pause to enjoy the fruits of their labor. Prayers of thanks are made to the supreme power for once again leading the village safely to a period of plenty. After this festival, the cattle and mithun are allowed to come down to graze in the agricultural fields. This festival marks the completion of the yearly cycle, after which activities for the following year's cultivation begin.

[†] For more details on Angami festivals, see Bareh, 1970, pp. 69-73; Meyase, 1985, pp. 71-78; or Cairns et al., unpublished.

Figure 7-2. Livelihood System of Khonoma Study Village and Interaction with Wider Naga Society



An overview of Khonoma's land use (map 4-3) shows agriculture to be chiefly confined to the sub-catchment surrounding the village residential area (28%), while the rest of its territory (72%) remains mostly under natural vegetative cover. (Supporting tables providing Angami classifications of land use, land forms and constructions are contained in appendices 5-15 – 5-17.) When analyzing agriculture in Khonoma, we are thus dealing mostly with this 29.2 sq km valley, shown in 3-D perspective in map 7-1.[8] Land use across this watershed can be roughly divided into a series of zones – starting with a band of dryland gardens immediately below the village, wet rice terraces on the valley bottom, jhum fields and now increasingly

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[8] This chapter does not deal with the two satellite settlements – Dzulake and Kukhwi – where the influences that have shaped land use were quite different. Dzulake was founded in 1848 (Khate, 2000), but did not really begin to prosper until a villager participating in the Abor Expedition of 1911-12 (see General Staff, India, 1930, 41) brought back a rice variety he noticed growing at high, cold altitudes – similar to those of Dzulake (1670 m). This variety, henceforth known as "Abor", thrived in Dzulake and spurred the development of terraces along the valley bottom. This ushered in an era of prosperity during which the village expanded to 70 households. This came to an abrupt end with the outbreak of the Indo-Naga war in 1956, when the village was abandoned and its people fled into the forests.

Although some came back to Dzulake after the 1964 ceasefire, many never returned. Today – with only 18 households –the abandoned rice terraces and extensive alder fallows on the surrounding slopes hint at a much larger population. The village remains self-sufficient in its rice needs and grows small quantities of dryland crops such as potato, cabbage, carrot, radish, Job's tears, chilli and kidney beans in a few jhums. Kukhwi was settled only during the Indo-Naga war, but today two brothers from Thevomisa khel grow ginger and turmeric there.

plantations of perennial cash crops on the lower to mid-slopes of the hills on the opposite side of the valley, and natural forests on the upper ridges (figure 7-3). How a particular plot of land is managed thus depends on where it falls on the landscape.

Wet Rice Terraces (tekhwie) (plates 5-8 – 5-44 and 5-125 – 5-181)

Throughout Khonoma's remembered history, the lives of its people have always been tightly interwoven with their wet rice terraces. Food security was the village's most basic requirement for survival, and the reliable, yearly harvests from the terraces provided it with the best possible security net. No matter what challenges arose, they could at least face them on full stomachs. With the assurance of full rice granaries, they could then use the sloping hillsides to grow secondary crops that, together with what was hunted and gathered, provided variation to their diet.

The terraces are truly an impressive sight; the result of centuries of painstaking work by successive generations of Khonoma's ancestors. It is not hard to understand why they provoked effusive admiration from early visitors.[9] The rows of stone monoliths add to the sense of history, each representing elaborate feasts sponsored by wealthy men over the centuries (figure 4-2). Stone has been used extensively, in building the terrace walls and lining the many pathways that skirt along the terraces. Some fields have huts that provide cultivators a shelter to escape monsoon downpours while having their lunch, but these are dwarfed by the more substantial rest houses erected by age groups.[10] Trees are lightly scattered across the terrace bunds. These are mostly banana (*Musa* spp.) and guava (*Psidium guajava* L.) in the warmer lower valley, Black Siris (*Albizia stipulata* (DC.) Boivin) in the mid-zone, and an assortment of soap nut (*Sapindus rarak* DC.), tree bean (*Parkia roxburghii* G. Don) and alder (*Alnus nepalensis* D. Don) in the upper valley. A few groves of bamboo, mostly vüni, vüsie, khupi and vüpie, are dotted here and there amongst the terraces, planted to provide raw materials for weaving baskets, fencing, walling and a myriad of other uses.

Management of this terraced landscape throughout a growing season follows a strict calendar of activities.[11]

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[9] In the late 19th century, the American missionary C.D. King wrote a note that was as scathing of the British colonial government ("an organized band of legalized trouble-makers") as it was admiring of the Khonoma Angamis (King, undated. See appendix 3-12 for the full text). William Archer's lengthy diary account describing his 1946 visit to Khonoma provides a glimpse of the terraces in the final days before India gained its independence and the Nagas began their long fight for independence (Archer, 1946. See appendix 5-23 for the full text of Archer's diary entry).

[10] A sign on one such rest house constructed by Merhümia khel in 1984 records that it was built at a cost of Rs 5000 and more than 700 man-days of labor (see plates 5-154 to 5-162).

[11] A detailed listing of activities is available in appendix 5-19. Reference to plates 5-12 to 5-42 and 5-125 to 5-181 in the photograph gallery will give the reader a clearer vision of the annual transformation of the landscape.

Map 7-1. Layout of Jhum Blocks within Sub-Catchment Area Surrounding Khonoma Village

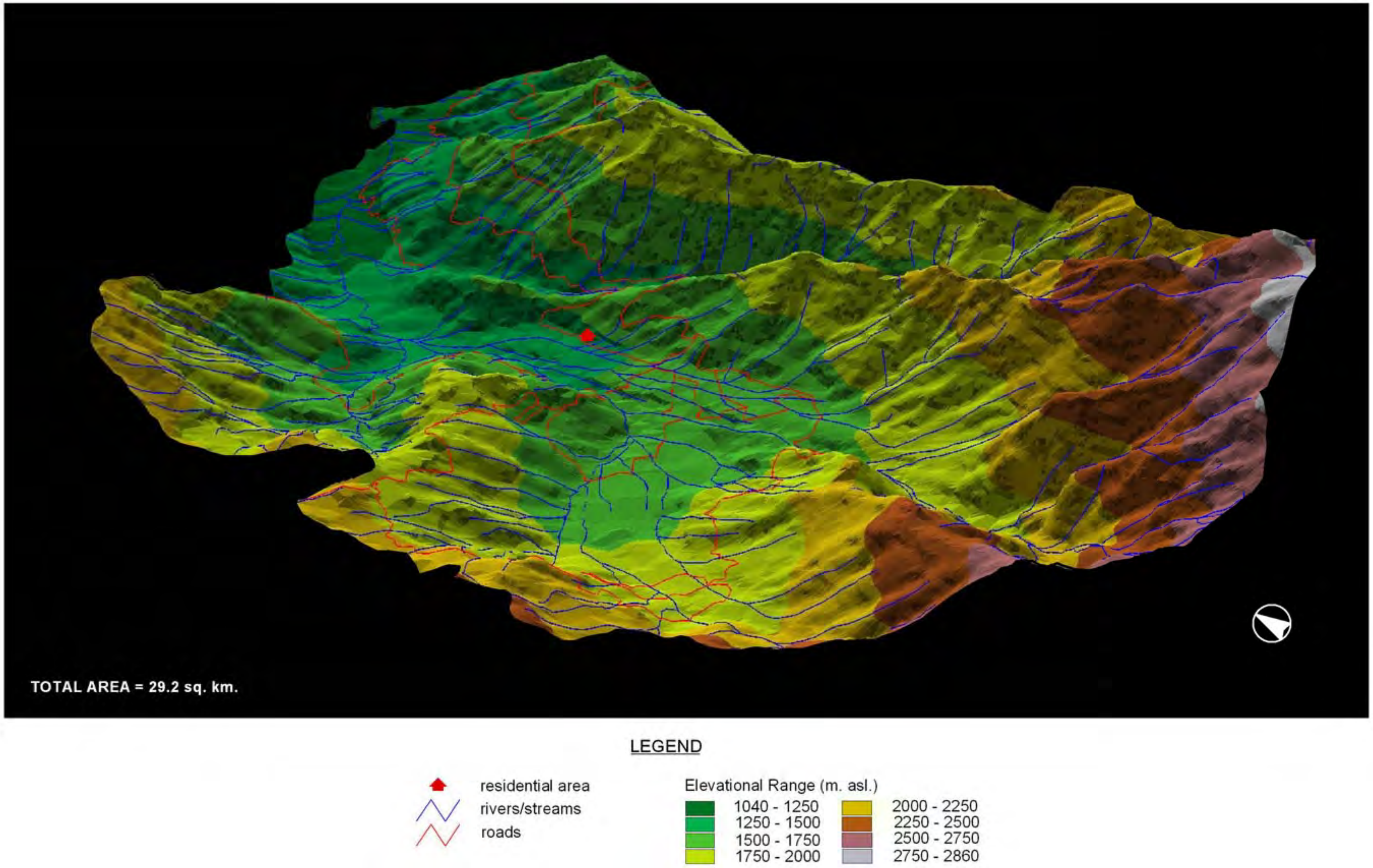
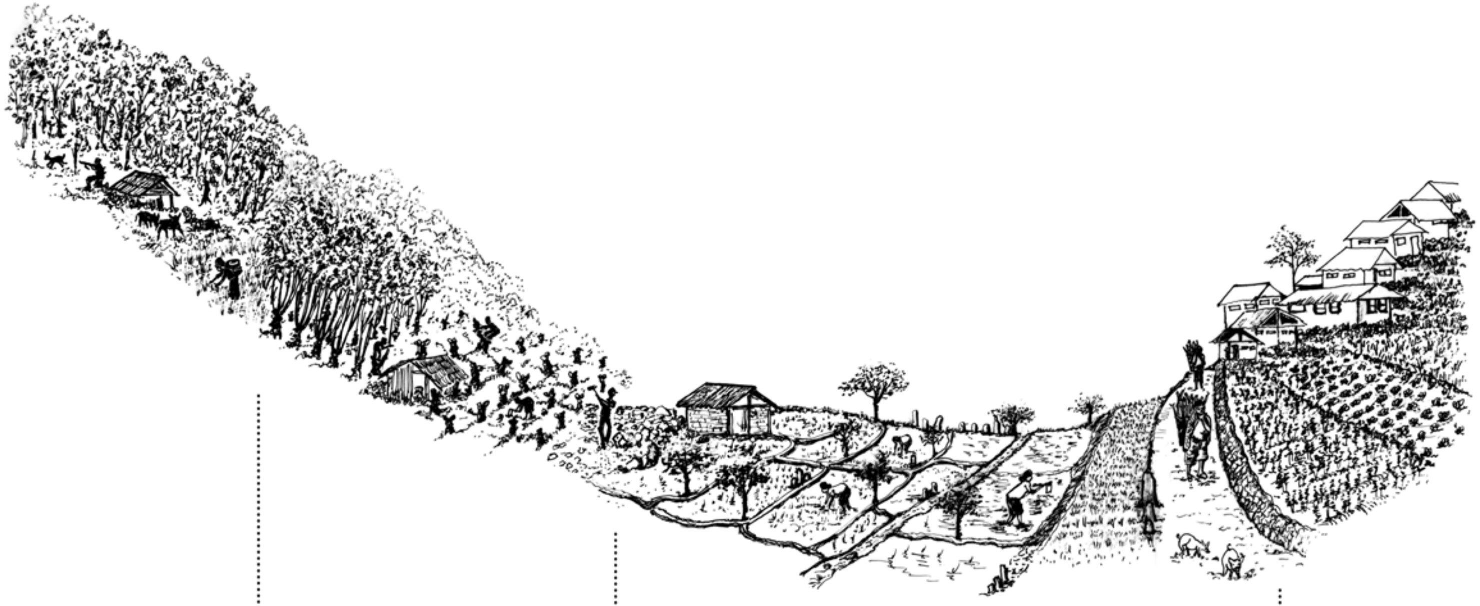


Figure 7-3. Simplified Cross-Section of Khonoma's Landscape and its Management



	FOREST	SHIFTING CULTIVATION	WET RICE TERRACES	PERMANENT GARDENS	VILLAGE
LOCAL TERMS:	ketsa	nhalie kiju ku kekrie	tekhulie	tize	ukebieshu
MAIN PRODUCTS:	- wild game, fruits and vegetables; bamboos and rattans, medicinal plants; timber; grazing for mithun	- firewood & small-diameter poles; dryland rice, potato, maize, Job's tears, millet, and wide assortment of secondary crops; quarried stones - off-season grazing for cattle and mithun	- rice, but also increasingly garlic, mustard leaf, potatoes, maize, sometimes as winter crops - sometime fish or snails, combined with rice	- garlic, carrots, cabbage, potatoes, sweet potatoes	- pigs, poultry; assortment of herbs grown in small kitchen gardens; manufacture of handicrafts
PROBLEMS:	- disputes over ownership, boundaries, and logging - extensively damaged by earlier uncontrolled logging	- traditional regulations permitting cattle and mithun to graze during the off-season makes it difficult to grow winter crops or otherwise extend the cropping season - frequent marketing problems - little commercial value of traditional crops	- cooler temperatures limit which rice cultivars can be planted and may reduce yields - steep and rocky terrain make animal draft power impracticable - only a single rice crop/year - less profit from growing rice	- damaged by wandering livestock - usually require fencing - reduced availability of livestock dung	- crowded conditions, alcoholism, feuding between khels, brain drain, underground factions
TENURE:	- communal - village + khel-owned	- generally private, but also some khel-owned	- private	- private	- private + clan-owned
FUTURE TRENDS:	- increasing consciousness about need for environmental protection	- more focus on potatoes and vegetable cash crops that prosper in Khonoma's cooler temperatures - conversion to cardamom, tea, passion fruit and other long-term plantations	- less emphasis on rice and more on garlic, potatoes, and other cash crops	- expanding, especially by those who want to grow vegetables but don't have enough labor for swiddening	- new houses constructed on village outskirts - encouraging tourism - out-migration for education and jobs

Field Preparation. With the harvest in and the final echoes of the Tiekede festival still reverberating across the valley in late November, villagers begin returning to their terraces to prepare them for the coming planting season. The ritual observances once necessary before this work could begin are mostly ignored now that most of the village has converted to Christianity. Work begins by slashing and burning the rice straw residue from the previous crop. The fields are then hoed for the first time (figure 7-4) and the lumps pulverized (figure 7-5). All tillage in Khonoma continues to be done by hand. Although Tsiesema began using animal draught power on its paddy land about ten years ago and is now experimenting with hand tractors, these technologies are ill-suited to Khonoma's conditions. Neither draught animals nor tractors would be able to navigate the narrow, stony pathways leading to Khonoma's terraces, and even if they could get there, many terraces are too narrow to allow either beast or machine to turn around. Even if access paths and fields could both be widened, a plough would continually get caught up on stones in Khonoma's shallow soils.

Figure 7-4. Winter tillage of the terraces begins in December and is usually completed by Christmas, transforming the golden hue of the valley to a somber brown as the rice straw disappears underneath the turned-over soil.

Figure 7-5. After hoeing, the fields are gone over again, this time using a mallet-like tool to break up soil lumps into a finer tilth. The soil must be quite dry for this operation.

The hoeing process is done a second time, and the fields are then left idle for three months. There is no urgency in completing this winter tillage and people tend to work on it individually when they have time.[12]

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[12] Khonoma does its winter tillage earlier than most other villages in the neighborhood. Its first and second hoeings are usually completed by Christmas, whereas most other communities do not begin until January. This earlier scheduling may be related to Khonoma needing to get this work out of the way more quickly, so it can then focus its attention on its jhum fields in the new year.

Nursery Management. Seeds are broadcast into nursery beds in February to March, synchronized with the expected arrival of the first rains (figure 7-6; plates 5-14 – 5-15), Numerous varieties are planted (appendix 5-11), all of them "traditional".[13] The seedlings are weeded once when they reach a couple of inches in height (figure 7-7) and, if necessary, thinned with a rake-like tool known as a phiero.

The rice nurseries are often not made in the irrigated terraces themselves, but rather in corners of newly-opened jhum fields. Farmers explain that seedlings established in the jhum soils grow better after transplanting, particularly the glutinous varieties.

Figure 7-6. Rice seeds are first broadcast in nurseries in February to March, and then the seedlings later transplanted to the terraces usually in late May to June.

Figure 7-7. Some thinning and weeding is done during this early nursery stage.

Continuation of Field Preparation. As Khonoma disappears beneath a thick blanket of cloud in April and the monsoon season begins in earnest, the pace of activities in the valley bottom begins to accelerate. After a third round of hoeing and breaking up dirt clumps, the terraces are flooded in preparation for puddling.[14] Other fields are permanently wet and the weed cover that established over winter has to be turned over to decompose and contribute to soil fertility (figure 7-8). The irrigation channels, bund walls, and the entire field perimeter are meticulously cleaned (figure 7-9).

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[13] "Traditional" is in quotation marks here because farming communities have always exchanged crop germplasm, and some varieties may have been relatively recent introductions to Khonoma. (The Abor variety, mentioned above, is an example.) The salient point is that all are farmer-bred varieties developed before the Green Revolution.

[14] See Hutton, 1969, 72-74; Kikhi, 1997, 19; and Kikhi, 1999 for explanations of the rather elaborate rules governing the use and ownership of irrigation water.

Figure 7-8. By early May, when the terraces are next hoed, a new crop of weeds has already emerged that needs to be turned over and integrated into the soil as a green manure.

Figure 7-9. Cleaning the irrigation channels and bund walls is part of the routine in preparing paddy fields for another year's cultivation.

Figure 7-10. Pollarding the *Albizia* trees scattered across the valley and mixing the leaves into the soil are part of field preparation.

At this point, Khonoma's second, less-known pollarding process takes place. Men again clamber up into trees, this time the *Albizia stipulata* scattered on the terrace bunds, and pollard them in a way that mimics their treatment of alder in the jhum fields (figure 7-10; see also plates 5-20 – 5-22 and 5-178 – 5-181). The leaves and small branches are cut away and spread over the terraces, and the larger branches set aside for firewood. Farmers recognize the fertilizing value of the tree cuttings and note that rice growing nearby *Albizia* trees performs noticeably better. *Albizia* thus plays a very similar agronomic role in wetland fields on the valley bottom as alder does in dryland fields on the adjacent hillsides. Sometimes farmers also slash *Eupatorium adenophorum* on nearby hillsides and spread the biomass in their terraces as a green manure.[15] Any green manures thus added are worked into the soil and given a chance to decompose during the two puddling operations in May. The bunds are built up with slabs of mud dug from the terrace floor (figure 7-11) and then smoothed to prevent leakage

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[15] This must be a relatively recent practice because *Eupatorium adenophorum* Spreng. is not native to the area and only became widespread around the time that Japanese soldiers invaded Nagaland in WWII, hence its local name: "tsunha" (Japanese weed). Villagers complain that rice yields declined after the war because cattle populations had dropped dramatically and their manure was no longer available as a soil amendment. The cut-and-carried *E. adenophorum* biomass may be an attempt to compensate for this.

(figure 7-12). Small piles of soil are placed at intervals along the bunds, to use as mortar in plugging any holes that may appear later, usually dug by crabs or rats. As the time for transplanting nears, all other activities are set aside as the village's entire labor force swarms into the valley every day. Haunting work songs drift through the fog as the tempo of work reaches a crescendo, with final puddling (figure 7-13; plates 5-16 – 5-17), leveling and reinforcing of the terrace bunds (plates 5-18 – 5-19 and 5-23) all going on in unison. Despite the hard work, there is clearly a light-hearted, festive mood as neighbors work shoulder-to-shoulder and compete to avoid being the last to finish.[16]

Figure 7-11. Terrace bunds are reinforced by soil scooped from the field bottom.

Figure 7-12. This newly-added soil is then carefully shaped and smoothed out to create a water-tight seal.

Figure 7-13. The second puddling in late May completes preparation of the terraces for transplanting. Anyone not covered with mud from head to toe would be viewed as not wielding the hoe vigorously enough.

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[16] Aside from pride, there were also pragmatic reasons why everyone wanted their rice crop to be synchronized with those of their neighbors. In the early stages, young paddy seedlings transplanted ahead of neighboring fields are more likely to be attacked by stem borer (Kikhi, 1997). And towards the end of the season, those fields ripening out-of-step (either faster or slower) with the rest will suffer more losses from birds and rats. Synchronization of cropping reduces pest populations by shortening the window of time in which there is an abundance of food for them. It also means that what damage there is, is diluted across everyone's fields, and not focused on an unlucky few.

Planting. When traditional religious practices still prevailed in Khonoma, there was then a pause as the old man appointed as "first sower" performed the necessary rituals (see chapters 3 and 4). These days, there are only 65 or so households that cling to the traditional beliefs and continue to observe the first sowing ritual. The Baptists have replaced it with a special 5 a.m. church service on May 20th every year, so although the enactment of the ritual and the name of the supreme power have changed, the purpose remains the same.

For the majority who have abandoned the old rituals, the transition is now seamless, with transplanting often already underway at one end of a field even as hoeing and leveling are still being completed at the other. With bent backs, the villagers move rapidly from terrace to terrace and the valley slowly takes on the emerald hue of young rice seedlings. The period of late May to June thus sees the single largest burst of concentrated labor in the agricultural calendar (see chapter 8) as all able bodies bend to the task, pressed by the knowledge that it must be done quickly.[17] Even the schools close for at least two weeks so that children can help their parents in the fields during this busiest time.[18]

Planting begins with uprooting seedlings from the nursery (figure 7-14), tying them into bundles, and carrying them in basketloads to the terraces that are to be planted. There, each seedling is planted separately, the hands of the most skilled transplanters blurred with speed as they repeatedly plunge into the water to position the seedlings in the soft mud (figure 7-15). They are keenly aware of slight variations in the micro-climate of the terraces and take them into account during transplanting. Abor and other cold-tolerant varieties are directed to the upper terraces where the irrigation water, freshly descended from the Dzükou Valley, still retains its high-altitude chill. The water warms up as it winds its way down the valley, dropping from one terrace to the next, and farmers respond by planting increasingly heat-demanding varieties. Like the water itself, this results in a cascading of varieties down the valley, starting with the most cold tolerant and moving steadily towards the most heat-demanding. Hence, which varieties a farmer plants depends largely on the position of his terraces along this spectrum. Within the different classes of temperature tolerance, only then can other traits such as taste, yield, aroma and so on be considered in selecting which varieties to plant (appendix 5-13). Long experience has also taught them that Merhümia farmers need

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[17] The exact timing of transplanting from year-to-year is of course dependent on when the rains arrive. If the rain begins at the normal time, transplanting usually starts around May 20th (hence the scheduling of the Baptist's early-morning church service). Most of the transplanting may be completed within May on years that the rains begin early, but it can be delayed until June if the rain is late coming. According to ancestral stories, late rains can delay transplanting even until August, but this is the limit beyond which a viable crop will no longer be possible. Such extreme delays have not been experienced within the memory of the current population; July is the latest that elders can recall transplanting.

[18] This is reminiscent of the author's own childhood, growing up on a farm on Prince Edward Island, Canada, where potatoes were the single most important crop and the provincial school system shut down for a two-week "potato harvest season" every autumn.

to plant at a closer density in their less fertile upper terraces than their Semomia neighbors do further down the valley where soils are richer.

Figure 7-14. Transplanting begins by uprooting rice seedlings from the nurseries and bunching them together for transport to the terraces.

Figure 7-15. Almost like a piston driven by a well-oiled engine, the hand of a skilful transplanter plunges rapidly and repeatedly into the soft mud, each time leaving behind a single rice seedling.

Rice culture is sometimes mixed with minor sources of protein, particularly in fields that retain water throughout the year. Fish and sometimes snails are released into some terraces, and bamboo signs (kethie) are erected to mark them as private property.[19] This is in addition to the many types of natural paddy fauna that villagers collect while working in their terraces (table 7-4).[20]

Small quantities of other crops are sown, making use of available niches between the terraces. Pulses, such as soybeans or Naga dal, are often seeded into the bund walls; after harvesting later in the year, the vines are cut off and spread across the terraces as a green manure. A few seeds of winged beans, French beans and other climbers are sown at the base of *Albizia* trees to take advantage of them as trellises. Field huts commonly have a few tobacco plants growing outside their doors, their roofs often covered by the vines of passion fruit, chayote or other cucurbits.

Plant Management. A perceptible air of satisfaction settles over the village as transplanting finishes in the final terraces. The valley suddenly falls silent again as villagers visit their terraces only occasionally to check the water level. This hiatus lasts until July, when the fields are given a thorough weeding. After draining away the water, the (usually) women almost disappear from sight as, bent at the hips, they slowly work their way between the now tall rice plants, pulling out weeds (figure 7-16). In taller varieties, only the rustle under the rice canopy betrays their presence, until they pop up from time to time to cast aside a handful of weeds. Any

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[19] Archer (1946) described the kethie as having more magico-religious purposes, suggesting that their purpose may have evolved since the decline of traditional religion.

[20] Hutton (1925:1) also spoke of toads being reared in Khonoma's rice terraces, but no evidence of this was seen during the field work.

snails or crabs encountered are deftly slipped into small woven baskets (khocü) that hang at their sides, welcome additions for the evening meal. The bunds are scraped clean to deny any hiding place to the rats that try to claim their share of the harvest (figure 7-17). And as their parents work, children often busy themselves nearby, capturing dragonflies and other edible insects (figure 7-18).

Table 7-4. Minor Sources of Wild Protein *

Type	Vernacular Name	Comments
fish -	1. mhicüno	very small fish
	2. khorüno	found in wetter terraces
	3. khokhe	type of carp found in wetter terraces
Dzulake fish	4. khothevü	tasty fish caught in Dzulake streams in May
snow trout		reportedly introduced by British
frogs -	1. mheigwü	green, generally found in forest
	2. goruno	brown, always available in wet rice terraces
crabs -	1. gogu	black, rather tasteless
	2. gotho	reddish and tasty
snails -	1. larie	gathered from paddy fields
	2. nulla	also collected while working in paddy fields
dragon flies -	1. khuceuu	larva of larger type of dragonfly
	2. suothinogo	smaller type of dragonfly
grubs -	1. sonhe	dug from jhum fields, eaten in hot & salty preparation
Alnus wood borer	2. kelu	cut from alder wood (*Alnus nepalensis*), hutuo (*Erythrina indica*), and sopfüsokhrie (*Salix* sp.)
Quercus wood borer	3. phielu (oak kelu)	pinkish larva, quite costly in Kohima market
spiders -	techachügwe	commonly found spinning webs between trees
other insects:	1. kwünya	frequents tender young alder shoots
praying mantis	2. dzierho	usually captured in rice straw
cicadas	3. pechü	collected from trees in summer
bees	4. mepfi	
grasshoppers	5. teku	most abundant after paddy harvest
dragonfly	6. khodo	captured in paddy fields during the flowering phase

* See plates 5-74 – 5-78 in photo gallery.

As the rice husks fill, efforts turn to protecting the developing crop. A series of rituals are observed to fend off rats (the Thezukepu ritual, performed during the Tsünyi festival)[21], birds (Liekhwenyi), and hailstorms (Teitho), suggesting that these are the major causes of crop losses (see table 7-3). In fields containing the earliest-maturing varieties – and hence the most vulnerable to bird predation –

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[21] An entry in Woods' tour diary in 1893 confirms that rats were sometimes a problem that compromised food security.

plastic bags are hung to flap in the wind, audio or VCR tapes are strung across the fields to reflect the sunlight, and more traditional scarecrows are erected.

Another pass is made through the rice terraces in September, this time pulling the dead outer leaves from each plant. Removal of this dead outer foliage is believed to render the stems stronger and more resistant to lodging, and to boost grain formation. About two weeks from harvest, villagers go through some fields one final time, tying the standing crop together in bunches. This is done chiefly in fields that are subject to heavy winds, where taller varieties have been planted, or where there is an excess of water – all conditions that could lead to lodging and loss of the crop. In addition to preventing lodging, this operation pays dividends in that it dramatically speeds up harvesting.

Figure 7-16. By about late July to early August, the terraces are drained of water and thoroughly weeded.

Figure 7-17. As part of weeding operations, terrace walls and bunds are carefully scraped clean to deny rats a hiding place.

Figure 7-18. Using a stick tipped with sticky resin from the ketsa tree (*Loranthus* sp.), this girl is catching khodo (dragonflies) to add to the evening's dinner menu. This is done while the paddy is flowering in June and July.

Harvesting. Under the watchful eyes of the village, the rice panicles grow heavy and the valley slowly turns golden under the ripening crop. Casting an eye towards the valley, one elder reminisces that within his memory, the shortest time in which the rice has been ready for harvest is one day beyond three months after the seedlings were transplanted.

Brandishing their sickles (zhiekhwino), the harvesters move slowly through the fields, pausing regularly to deposit handfuls of rice in nearby baskets (figure 7-19). Their rate of work is much faster in fields where the rice has already been bunched, and time is not wasted chasing individual stems. As the baskets fill, they are carried to a bamboo mat (tsopie) and dumped. Threshing begins by foot, kneading the grain from the straw while moving in circles around the mat in a rhythmic, dance-like motion. Any remaining grains are dislodged by then lifting the straw one armload at a time and beating it with a lieda (figure 7-20). The straw is then picked up a few stems at a time – so the grains can fall away – and thrown to one side of the mat.[22] Two people are required for the final step in separating out the chaff (figure 7-21). The grain is placed in a basket, and then as one holds it over her head and slowly pours it back onto the mat, the second vigorously fans it with a winnowing tray (jarü), thus blowing aside the lighter chaff. If a bit moist, the grain is then spread out on bamboo mats or plastic tarpaulins to dry in the afternoon sun. On cloudy days when rain is threatening, the big rest houses are used to good advantage for providing shelter during this drying process.

Figure 7-19. Harvest is completed in October to November and signals the end of another rice-growing season.

Figure 7-20. Vigorous beating with a bamboo flail helps separate the rice grains from the straw.

Figure 7-21. Initial winnowing is performed by one person holding the basket as high as possible and then slowly pouring the rice back onto the mat below, while another rapidly waves a bamboo tray to generate a breeze that blows aside the chaff.

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[22] A simplified threshing procedure may be used on days with light rains. As each handful of rice is harvested, it is threshed immediately by banging it against the side of the basket and shredding off any remaining grains by hand.

Figure 7-22. At the end of the day, women heft baskets of newly-harvested rice onto their backs and make their way past rows of megaliths as they return to the village.

The dried crop is then ready for bagging and the hard climb back up the hill (figure 7-22). As dusk falls, a human caravan winds its way up the path to the village, straining under the heavy load of that day's harvest. They pause frequently at stone resting places strategically located along the trail, their height calculated to take the weight of the villagers' loads without having to unstrap them from their backs.

The harvest progresses in this way, starting with the earliest-maturing varieties, and moving from one to another as each ripens. The slower-maturing glutinous varieties are the last harvested, usually in early November. Some of the straw is also carried to the village for bedding pigs and feeding cattle. A short time later, truckloads of rice also begin arriving from the Ghaspani side, where many Khonoma villagers have bought land and others grow rice on it under sharecropping arrangements. Khonoma is now estimated to be only about 80% self-sufficient in its rice needs (Kevichusa, 2000). It is thus a net importer and rice is viewed strictly as a subsistence crop, and is not for sale.

Winter Cropping in the Rice Terraces. The potential for winter cropping remains little tapped in Khonoma's rice terraces. The possibilities of this are amply demonstrated by other villages such as Kikrema (Chakhesang) and Viswema (Angami) that earn much of their income from potatoes grown in terraces over winter (plate 5-43).[23] That Khonoma fails to fully exploit this niche underlines just how far its land use pressures have waned since the days when they experimented with ways to use alder as a "biological crutch" that could support intensified cultivation. When the villagers vanished into the forests in 1956, under attack from the Indian army, the pressures on the land disappeared with them and have never recovered to their previous levels.[24] This is discussed in more detail later in this chapter. The salient point for now is that through these historical events, land

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[23] Many irrigated terraces in Nagaland grow only a single rice crop yearly. However, Tsiesema farmers have developed a rather ingenious technique for harvesting a cold season crop from their terraces - with few additional labor inputs. They broadcast tomato seeds into the transplanted wet rice in June-July.

[24] Left uncultivated during those years of upheaval, the rice terraces bordering on jhum land were swiftly colonized by alder and tree cover began descending into the valley. The village did not begin to repopulate until a ceasefire was declared eight years later in 1964. Many never returned. Others did return to Khonoma, but had bought paddy land down in the Medziphema area. This created a combined effect of a reduced population cultivating an expanded land base.

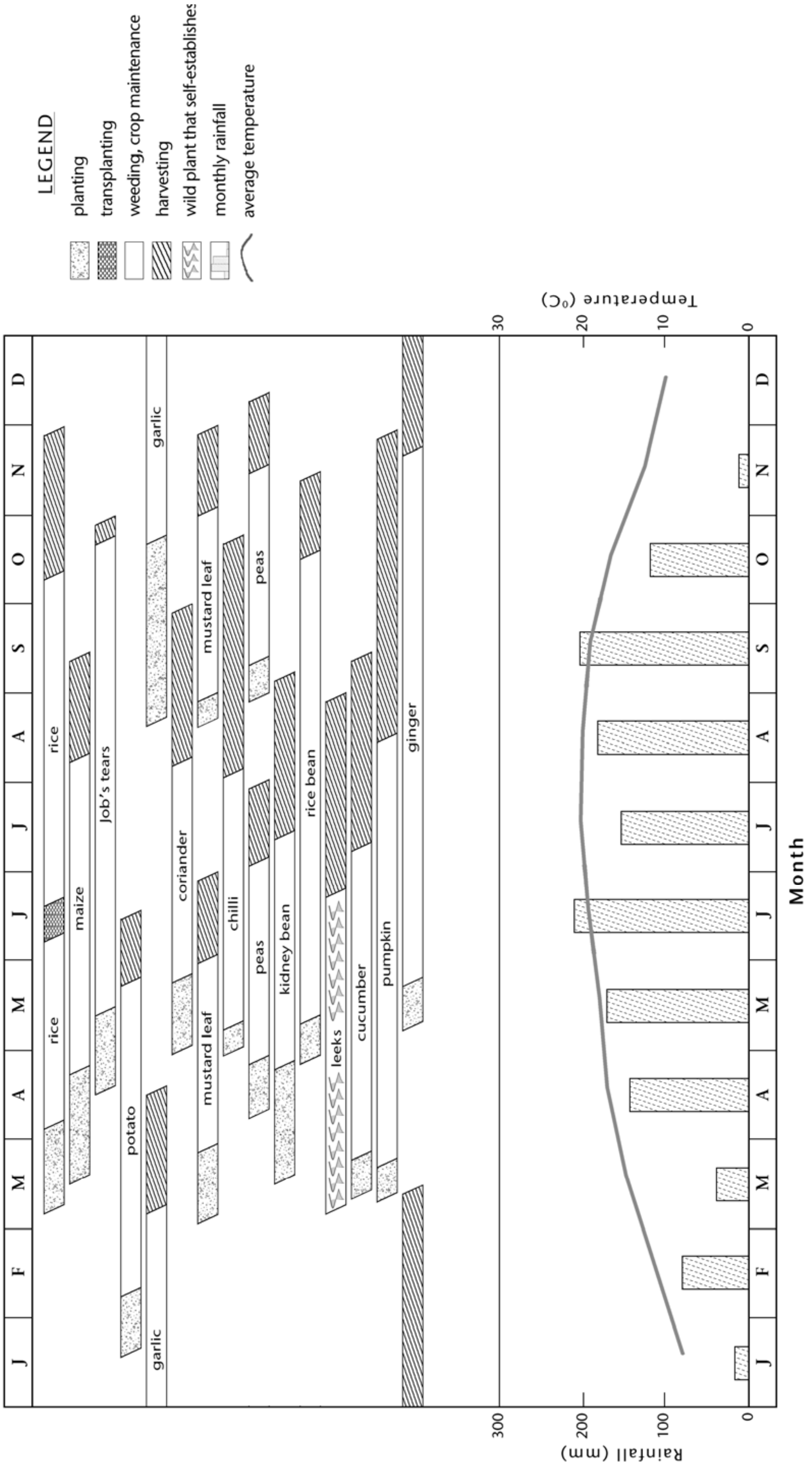
became relatively abundant in relation to labor. But for reasons probed further in chapter 8, Khonoma prefers to plant most of its potatoes and other cash crops amongst the alders in its jhum fields.

However, a view of Khonoma's valley during winter does reveal, a few strips of lush green scattered across the otherwise brown landscape, already hoed and lying fallow until next year's rice crop. These are mostly garlic, potato and sweet potato, planted by families with sufficient labor and an eye toward the market. Steady high prices in recent years have earned garlic the greatest popularity as a winter terrace crop (figure 7-23). Most will be harvested by February or March, and then the fields are immediately flooded in preparation for wet rice. The crop calendar presented in figure 7-24 (and appendix 5-22 for Tsiesema) shows the timing for rice and some other crops often planted in the terraces.

Figure 7-23. With cheap rice now easily available from the plains, more farmers are choosing to plant garlic and other cash crops in their terraces.

Although not widespread, a winter green manuring technique used by some farmers is noteworthy. About ten years ago, some began experimental plantings of mostly *Tagetes patula* L. (marigolds), but also some *Cosmos sulphureus* Cav. on their terrace bunds (see plate 5-42). These set seed in the fall that, after completion of rice harvest in November, farmers collect and broadcast in their terraces as a winter crop. The biomass is slashed the following April to May, before the fields are hoed and flooded. Farmers note that the two Asteraceae grow rapidly, are prolific seed producers, and help to soften the soil. Although marigolds are widely recognized for their ability to repel insects and nematodes, this was not among farmers' explanations of why they valued them as a green manure crop (cf. Khiki 1997).

Figure 7-24. Cropping Calendar for Khonoma's Wet Rice Terrace



* Data derived from farmer-kept diaries on their inputs and outputs for fields monitored over 2000 and 2001 cropping years.

Jhum Cultivation (nhale) (plates 5-45 – 5-53)

This brings us back to the jhum cultivation system that was the initial focus of the fieldwork. Khonoma is typical of most Angami and Chakhesang villages in the sense that it derives most of its rice needs from irrigated terraces, and jhum cultivation plays a supporting role in providing a multiplicity of other needs. They are what Conklin termed "partial" shifting cultivators (1957, 2). Their jhums are thus smaller, more garden-like, and intensively managed.[25] This is in contrast to Ao, Lotha, Konyak, Sema and other Naga sub-groups that have no tradition of cultivating wet rice and rely on jhums for virtually all their food needs. These "integral" shifting cultivators (ibid) often clear entire mountainsides for extensive jhums.[26] The intensification of land use permitted by the wet rice terraces in Kohima and Phek Districts dramatically reduces jhum cultivation pressures and creates a strikingly different landscape.

But even within Khonoma village itself, we cannot speak of a single jhum system. From a vantage point high on the ridge that overlooks the village, the appearance of the jhum fields below changes markedly as one's eyes sweep the landscape. The intricate system of alder management detailed in chapter 2 is concentrated at the far end of the valley where sheltered, moist conditions most favor alder – what I have described as the "epicenter" of the system. This is the area where visitors are always taken to see alder management at its best. But it would be a mistake to suggest this as representative of all jhum cultivation in Khonoma. The system changes quickly as we move out of this basin onto drier and more exposed slopes. This account thus aims to step back from the details of alder management presented in chapter 2 and look at the wider context of jhum cultivation in Khonoma.

Overview of the Wider Picture of Jhum Cultivation in Khonoma. The history of how land was divided amongst the settling clans has received some discussion in the preceding chapter. This led to the emergence of three separate jhum cultivation blocks, each quite different in nature. The broad parameters were the same. Each was cultivated under variations of shifting cultivation, involving elements of fire and fallow. This was a vital component of the village's livelihood system and anyone not cultivating a jhum field would have been shunned as hopelessly lazy. Each

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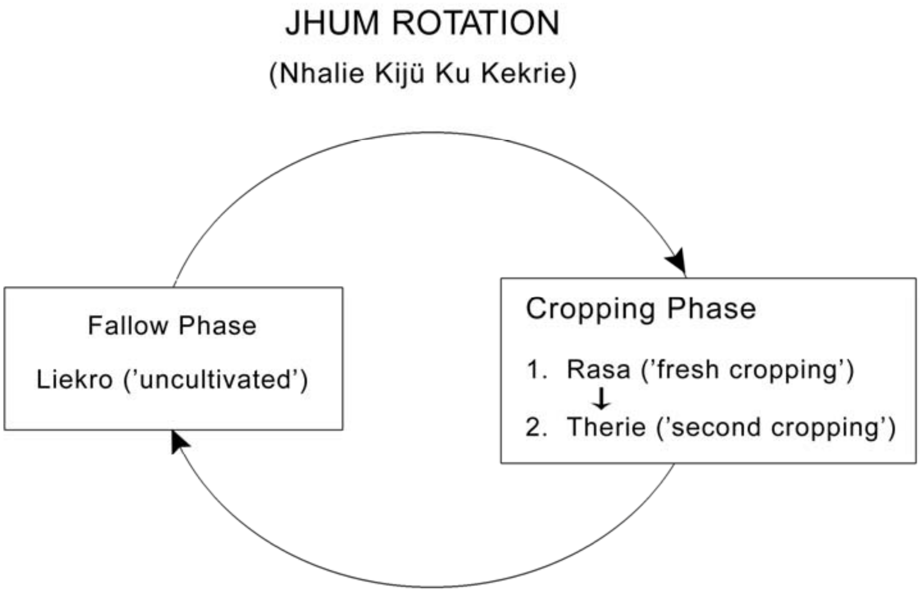
[25] There is a remarkable discrepancy in the literature surrounding the agrodiversity of Naga swiddens. Husain claims that his fieldwork showed "that two to ten mixed crops are sown in jhum lands" (1988, 146), while Naga writers often report fields planted with up to 60 different crops (Kikhi, 1997, 47, 1999; Keitzar, 1998, 48; Odyuo, nd). Khonoma falls between these two extremes. The 10 jhum fields monitored during the fieldwork averaged 21.5 different crop species/field and pooled together, totaled 53 species. This does not include native plants that are collected as wild vegetables. (The diversity of crops planted in Tsiesema jhum fields was slightly lower, averaging 16.2/field and totaling 40 amongst the 10 fields monitored.

[26] Clearing was often incomplete though. Naga swiddeners commonly retained relict emergent trees in their fields that were valued economically or to serve as trellises for climbing crops. Trees were also sometimes spared for non-economic reasons. Like many groups across Asia, Nagas also associated *Ficus* with spirits and were reluctant to risk their wrath by felling their trees.

household opened a new field every year, and generally cultivated it for two years before allowing it to lapse back into fallow. This created a system in which every farmer cultivated two fields every year – the freshly opened first-year field (rasa) and the second-year field (therie) that had been opened the previous year (figure 7-25). This was coordinated amongst the landowners within each block, so that they decided as a group where to open their swiddens each year.

Figure 7-25. The Stages of Khonoma's Alder Jhums, as Conceptualized by their Practitioners



It would be misleading to refer to these as "communal" swiddens, since each plot was usually owned and managed by an individual household. But there was a joint decision made by the community of users as to a common location for opening their jhum fields each year. Those not owning fields in the selected location made arrangements to borrow, rent, or swap land with others. There were compelling reasons for this strategy of congregating swidden fields together in a common location. Firstly, it allowed them to use communal labor in opening up a single access path to the selected site. Swidden fields are typically five or six km from residential sites, and the prospect of farmers opening their own paths off in different directions was impractical. Even if they could break a trail, the labor costs would be prohibitive and leave them with little time to actually cultivate their fields. Trails needed to be kept wide and dry for daily movements, particularly during the harvest season when sure footing was needed for carrying heavy loads. But if one opened his field together with those of his neighbors, one access path would suffice for all and the labor burden was shared by the community. Path-clearing was then reduced to a three-day activity – the first time after the jhum was burnt, again at the time of weeding, and a final time just before harvest. Once opened, the volume of human traffic helped to keep a community path open – whereas a private path could become overgrown in a week or two.

The same principle applied to cutting firelines. Using group labor to clear a single fireline around the perimeter of the entire swidden area was much more efficient than each farmer having to cut one around his own field. Burning was also done communally, using the vigilance of all to ensure that the fire did not escape.

Individual fields surrounded by forests were also vulnerable to predation by birds, monkeys, and other wildlife. But if located together, the outside perimeter could be more easily guarded, again with communal labor. The larger volume of human traffic also scared off most animals. Mountain communities usually relied on "social fencing" to protect their crops from wandering livestock. Villages decided to use a particular area for jhum cultivation in a particular year and livestock were therefore prohibited. Once again, this concept only worked well when jhums were opened in a single area. If physical fencing was needed, then the outside perimeter of the entire area was much less than that of the sum of its individual plots – and the work could be shared communally.

Since labor was the limiting asset for most swidden farmers, the savings achieved by grouping swiddens together in a common location were doubly important. It is no surprise therefore, that this same strategy was universally practiced amongst shifting cultivators in Nagaland. Some, like the Ao, added regulatory mechanisms to discourage stragglers from going off and opening jhums elsewhere. After completing their rice harvest in August, the village council would meet to review the past year's events and make decisions for the coming year. On the final day of these meetings, a decision would be made on which jhum areas would be opened for cultivation in the coming year. The area chosen would then be announced and identified by its natural boundaries, such as from a given stream to a particular ridge. Anyone opening a jhum outside this area would be held accountable for any accidents that might arise from his decision not to conform with the rest of the group. If, for example, he was careless in burning or his fireline was inadequate and the fire escaped, the fine imposed by the village council would be more than he could bear. But if the same accident occurred while his jhum was located within the area identified by the village council, then he would not be liable since he was abiding by the group's decision. Hence, in addition to forfeiting the practical benefits already listed, the regulation made it all the more unlikely that anyone would refuse to open his jhum in the chosen area (Yaden, 2001).

Finally, in the era of headhunting and warfare, there was one other critical incentive for wanting to be one of a crowd while working in your swidden field – personal security. A small group of laborers working alone in an isolated field would be an easy target for any young bucks wanting to earn their decorations as headhunters or increase the quantity of "aren" in their village (Anand, 1967, 100-101; Mills, 1935a, 1935b, 1973, 225). Most villages had their warrior heroes and other villagers preferred to open their swiddens as close to these fighters as possible, in the hope of falling under the umbrella of their protection. Thus, even without any formal resolution, there was a natural grouping of swiddens wherever noted warriors decided to cultivate (Husie, 2001).

In Khonoma, each of the three separate jhum blocks was divided into sub-blocks, between which the owning farmers rotated their cultivation (map 4-4). But beyond this general framework, the details of each jhum block varied substantially (table 7-5).

Table 7-5. Comparison of the Three Distinct Blocks that Comprise Khonoma's Jhum Cultivation Area†

PARAMETERS	**JHUM BLOCKS**		
	Southern	**Western**	**Eastern**
Description:			
total area (ha)	439	222	228
no. of sub-blocks	4	9* (13)	24
aspect	northern	eastern	north-western
slopes: < 25° 25-30° >30° total	3.855 km^2 (87.7%) 0.042 km^2 (1%) 0.498 km^2 (11.3%) 4.395 km^2 (100%)	1.017 km^2 (45.69%) 0.018 km^2 (0.81%) 1.191 km^2 (53.50%) 2.226 km^2 (100%)	0.851 km^2 (37.34%) 0.144 km^2 (6.32%) 1.284 km^2 (56.34%) 2.279 km^2 (100%)
altitudinal range (m asl)	1500 – 1940	1400 – 2100	1300 - 1860
relative climate	cool & moist	avg. between other two blocks	averages several degrees hotter
Management:			
cropping period (yrs)	2	2	2
fallow length (yrs)	as short as 2, pre-1956; now typically 6	4-10, avg. 7	7-10 in most accessible areas, up to15 on more distant slopes
contour walls	permanent stone walls on the valley floor, but as we move up the surrounding slopes, changing to alder branches staked in place	combination of rock walls in lower areas and logs higher up on slope	confined to logs temporarily staked into place along contours
planting dates	Mar.	Mar. – Apr.	Apr.-May
harvest dates	Oct. (Job's tears) July-Aug. (millet)	late Sept. – early Oct. (rice) Aug. – millet Oct. – Job's tears	Nov. (rice)
main crops	nonsticky Job's tears & maize, millet, soybean, perilla, potato, cabbage, & other semi-temperate vegetables	rice, Job's tears, millet, soybean potato, perilla, cabbage, cucumber, pumpkin, maize, rice bean, chilli, taro, vegetables	rice, sticky varieties of maize & Job's tears, taro, chilli, perilla, pulses such as rice beans, soybean & winged beans
planting patterns	different crops divided between different terraces, creating patchwork effect	division of crops, similar to southern jhum block	seeds of different crops mixed together and broadcast, in a shotgun style; line plantings along boundaries
dispersed trees	dense alder, with a few *Hovenia dulcis*, *Melia azederach*, *Terminalia myriocarpa*, and Indian crab apple	medium density of alder, interspersed with *Hovenia dulcis* and *Schima wallichii*	sparse alder, supplemented with some *Schima wallichii*

problems	mithun and cattle	mithun, predation by porcupine and squirrels	bird damage, few investments in improving communally-owned lands, long walking distances to some fields
Ownership:			
land tenure	mostly private	mostly private, but some communally owned	higher proportion of clan-ownership
cultivators	M-khel (all clans) + Chatsu, T-khel	Phetsu + Kotsu, T-khel; Kuthotsu, S-khel	Chalietsu, S-khel
reliant population ‡	1151	435	306
density of dependent population (persons/ha)	2.62	1.96	1.34

† Cross-reference with map 4-4.
* Four sub-blocks have been removed from the jhum cycle in the western jhum block because their terrain was too steep and rocky to be ideal for cultivation, and it was difficult to keep the mithun out of them.
‡ Based on household surveys.

Ecological Variation between Jhum Blocks, and its Effect on Alder. The jhum land that each khel inherited (map 4-4) is very different, most importantly to this study, in its suitability for *Alnus nepalensis*. The southern jhum blocks (red), with their northern aspect, altitudes of 1450 to 1800 m asl, and sheltered by mountains on three sides, provide just the type of cool, moist environment where alder thrives.[27] Rain clouds ascending the valley during the monsoon season are trapped against the cliffs, creating lingering cloud cover and frequent rain. During the dry winter months, it receives less direct sunlight as the sun is late in breaching the eastern ridge in the morning and disappears again behind the western peaks by mid-afternoon. It thus remains cold and dew-covered, compared to the more exposed flanks of the valley. As the abundant stones were used to create terracing, this flattening of the landscape further slowed water runoff and made it more welcoming to alder. This is, in effect, the ‘epicenter’ of Khonoma’s alder management.

In contrast, the western (blue) and eastern (green) jhum blocks occupy the flanks of the valley, where steeper slopes, thinner topsoil, and more exposure to direct sunlight create drier conditions. There are fewer rocks for building permanent terrace walls here, so farmers have to instead rely on temporary measures of laying poles along contours and anchoring them in place with wooden stakes (plate 5-46). Trees grow more slowly here, but farmers note that their wood is harder and burns longer than those cut in the valley below.[28] The composition of the undergrowth is also said to be more grassy and prone to wild fires during the dry season. Farmers

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[27] Chingmei, a Chang village in Tuensang District that is also well known for alder management in its jhum fields, is very similarly situated (Angami, 2001).

[28] Such environmental influences are reported to cause variation in wood quality, even within a single tree. Farmers note that the side of trees facing the sun (i.e., the southern aspect) will always have harder wood. When trees growing on boundary lines are cut and the wood shared between the two property owners, it is carefully divided to ensure that each receives an equal amount from both sides of the tree (Angami, 2001).

say that when opening jhum land in the valley, the succulent shrubs and creepers that grow under the alder have to be slashed, dried and piled, and can still be difficult to burn. But on the slopes, a carelessly tossed cigarette is enough to send flames racing through the dry grass. Many alder seedlings have been planted here, only to perish in such wildfires. The alder population becomes even sparser and less vigorous on the upper slopes that receive more sun, wind and frost. Alder's gnarled and bent appearance at about 2000 m asl hints that it is nearing the upper limits of its ecological niche. In several such places, villagers have worked communally to plant pine (both *Pinus kesiya* and *P. patula*) to reestablish tree cover.

Differences in How the Jhum Blocks are Managed. The differences in the land and its ecology are in turn played out in how it is managed.

Crop Selection. Environmental influences are of course not limited to alder, but also enter into farmers' crop selections. The cool, wet conditions that so favor alder in the southern jhum blocks do not provide good rice yields; plants grow vigorously but produce little grain. This area has traditionally been limited to more cold-tolerant Job's tears and millet. But as jhum cultivation has become more market-oriented, this limitation has been transformed into an opportunity for growing potatoes and semi-temperate vegetables that thrive in the black, organic soils and cooler temperatures.[29]

Cropping patterns in the other two jhum blocks have changed less since their warmer and drier conditions offer fewer competitive advantages in producing for lowland markets. Rice and other subsistence crops continue to be planted for household use. Bird predation is more of a problem here, and fields are decorated with a colorful mixture of scarecrows, bamboo clappers, flags, plastic bags hanging from maize stalks, and even video tape fluttering in the breeze – all to keep the birds at bay. An observation platform built in front of each field hut allows farmers to keep a careful eye on their fields, even while relaxing over a mug of zu (local beer) (plate 5-51). Farmer perceptions of which crops are limited to particular jhum areas are shown in table 7-6. On a finer scale, varietal differences within each crop allow farmers to match even small changes in the environment as they move up or down the slopes. The rice grows faster and yields better on the warmer lower slopes, they explain. This in turn requires adjustments to planting dates, with upper slopes sown earlier so that they will be ready to harvest at the same time as the faster-maturing lower fields – even if the same variety is planted. A local joke, suggesting that if a woman from Merhümia khel married a man from Thevomia khel, she would

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[29] After the outbreak of the Indo-Naga war in 1956, there was little need to continue trying to grow rice in these jhum fields, where its performance was marginal. The combination of a reduced population and purchased paddy land in the Medziphema area meant that Khonoma could confine its rice production to more suitable land.

probably catch malaria while working in his fields, alludes to these intra-village climatic differences.[30]

Table 7-6. Farmer-Reported Differences in Crop Suitability between Khonoma's Jhum Blocks ‡*

Warmer and Drier Jhum Blocks (western + eastern)	Cooler and Wetter Jhum Blocks (southern)
Oryza sativa L. (dryland rice)	*Brassica oleracea* L. var. capitata L. (cabbage)
Capsicum frutescens L. (king chilli)	*Solanum tuberosum* L. (potato)
Hibiscus sabdariffa L. (Rozelle plant)	*Setaria italica* (L.) Beauv. (foxtail millet)
Zea mays L. - glutinous (maize)	*Zea mays* L. – non-glutinous (maize)
Coix lacryma-jobi L. - glutinous (black Job's tears)	*Coix lacryma-jobi* L. – non-glutinous (white Job's tears)
Vigna umbellata (Thunb.) Ohwi & H. Ohashi (rice bean)	
Psophocarpus tetragonolobus (L.) DC. (wing bean)	
Cajanus cajan (L.) Millsp. (pigeon pea)	
Vigna unguiculata (L.) Walp. (cow pea)	

‡ Refer to map 7–3 for division of jhum blocks.
* The unlisted majority of crops are sufficiently adaptable for planting anywhere on Khonoma's swidden landscape (see appendix 5-25).

Length of the Jhum Cycle. Another obvious difference lies in the length of rotation practiced in each of the three jhum cultivation areas. This reflects varying land to people ratios within each area (and in turn, goes back to ownership issues), and hence the length of time that each can afford to leave their land fallow. A new block will be cleared each year, sometimes more if the blocks are small.

What is most striking here is that the southern jhum land – where extreme land use pressures coincided with vigorous alder growth – was eventually merged into only four blocks.[31] This is the basis of published accounts that describe Khonoma as practicing a four-year jhum cycle (figure 2-1). Indeed, farmers note that if fallows are left longer than this, they begin to have lodging problems with subsequent crops, presumably because of excessive nitrogen buildup by the alder.

But the jhum cultivation system never intensified to this degree in the other two areas. There, cycles remained longer and less systematic. More judgment was required every year in appraising the fallow regrowth and underlying soils to decide which block to open next. Like shifting cultivators everywhere, they "read" the environment – observing the size and vigor of the mixed stands of rüpo (*Alnus nepalensis*), kipia (*Hovenia dulcis*) and mashie (*Schima wallichii*), and noting the underlying soil to see if it was soft and black, with few weeds and plenty of

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[30] Malaria is perceived as a disease of lower altitudes.

[31] I say 'merged' in the sense that in earlier times when the population was still small, this land would have been cultivated on a longer cycle, and hence divided into more blocks. As the population grew and forced a shortening of the fallow period, then jhum land would have been progressively merged into fewer blocks.

earthworm castings. These were their proxies for a soil analysis report. Areas where alder did not thrive were usually infertile and grassy, better reserved for grazing. The villagers were keenly aware that it would take other types of trees and vegetation far longer to recover soil fertility than alder would take.[32] This was in contrast to the southern jhum area, where farmers rotated around the four blocks like a well-oiled clock and it was a foregone conclusion where they would be cultivating every year.

Interplay between Ecology, Tenure and Other Factors. It would be misleading however, to ascribe all of these vegetational differences purely to ecology, without considering its complex interplay with other anthropogenic factors such as property rights, land use pressures, and distance from the village. For example, there are strong overlaps between areas where alder is sparse and communal land ownership. To what extent then do we assign responsibility for alder's declining population to ecological factors related to "tragedy of the commons" behavior? Everyone readily acknowledges that when opening communal land for jhum cultivation, they prioritize short-term interests in maximizing firewood and `cut the trees low. The remaining stumps are then more easily killed by fire as the field is prepared for cultivation. Even if they survive, coppices are often not properly thinned, but instead repeatedly cleaned from the stumps during later weeding operations to prevent any shading of adjacent crops, but delaying the trees' regeneration. And there is little chance that new seedlings will be protected or planted. Farmers have no private interest in this land that would persuade them to take a long-term view in managing its trees.

It is equally valid to ask the inverse of this. To what extent is alder's prominence in the southern jhum blocks due to favorable ecology, when other factors are brought into the equation, such as the individual ownership of the land, the fact that its owners were historically most land-short and thus compelled to manage firewood and fertility more carefully, and that its shorter walking distance from the village facilitated intensified management?

Although field trials are needed to confirm this, the most likely explanation is simply that the areas of highest agricultural potential that farmers sought to open for jhum cultivation were also the most favorable for alder. So when farmers were selecting for good crop growth, they were also (unintentionally?) choosing areas where alder would thrive. By clearing the forest and disturbing the soil, the jhum cultivation process further created a welcoming environment for pioneering alder. The natural attributes that attracted farmers to open these fields in the first place, now coupled with the soil-building benefits of spontaneous alder fallows, would have guaranteed that this land was cultivated often. By virtue of its frequent use, the best jhum land would have gradually been claimed by individuals from the

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[32] Pioneer plants, some emerging as weeds during the cropping phase, and others appearing in the early stages of fallow succession, are listed in appendix 5-29 for both study villages.

communal pool. This, in turn, would have given cultivators the long-term incentive needed to begin managing the alders as they learnt of their benefits. Given the nature of Khonoma's physiography (maps 6-1 – 6-5 and 4-5), most of the best jhum land was in the lower valley areas surrounding the spur on which the village was built, so shorter walking distances would have made it easier to manage those lands more intensively. As growing population pressures forced a shortening of the fallow period to as little as two years, other trees would not have sufficient time to establish and produce seed. The shy seeders and slow-growing shade-lovers in particular would have disappeared from the system, again reinforcing alder's dominance on the jhum landscape. Centuries of human intervention and default would thus have favored alder relative to other trees. This scenario, however speculative, suggests that alder's domination of certain areas of the landscape was foremost determined by ecology, but then reinforced by how farmers responded to that environment. It is the result of long-running interactions between human activities and natural processes. The alder forests are almost totally managed human artifacts.

This brief overview demonstrates the fallacy of characterizing village jhum cultivation systems in simplistic terms. Given the heterogeneity of mountain environments, there can be virtually as much variation within a single village as between neighboring states. The impression that any visitor develops of "Khonoma's jhum cultivation system" depends entirely on which direction he or she walks in search of a field to study. Within this mosaic of different jhum patterns, this study focuses on the southern jhum blocks that I have described as the epicenter of Khonoma's alder management. It is this area that best illustrates the dispersed alder system that has attracted attention for its promise as a sustainable way to intensify shifting cultivation on a much broader domain.

Trends of Change. When economies such as that in Nagaland are opened, changes to farming systems can be so rapid that attempts to document them are doomed to be out-of-date before the ink is dry. While Khonoma's fields were long ago cleared from the forests and their boundaries are now largely stable, what is happening within those fields is very much in flux. As Nagaland becomes increasingly incorporated into the wider Indian economy, this dynamism is often driven by markets and events in far-away places. In the jhum fields, these changes are primarily played out in what is planted and the length of the fallow period.

Crop Selection. The Nagas have long been trialing crops from all over the world and adopting those they find to be useful. This fact has already been highlighted in table 7-1. The pace of this experimentation accelerated with the arrival of the British administration, and successive Deputy Commissioners who took a personal interest in testing what would grow well in the Naga Hills. Tour diaries show that the British introduced potatoes, for example, as early as the 1870s, even while still struggling to bring the volatile Naga Hills under their control:

> "I distributed several seers[33] of potatoes among the Headmen of Sepamah and thoroughly explained to them how they should be planted. I also told them that I would give them six annas[34] for every seer they could bring in to me at Samaguting." (Butler, 1872)

Hutton's diaries almost half a century later indicate that potatoes were still at an experimental stage, but that villagers had apparently developed a taste for them:

> "At Sagami Mr. Lloyd Rees and I spent the afternoon in digging potatoes in the Sub-divisional Officer's experimental crop, which bore exceedingly well, and good potatoes, but many stolen by the adjacent village of inveterate thieves." (Hutton, 1929c, 4)

Another diary entry, only five years later, hints that Dzulake farmers had already added potatoes to their cropping repertoire, but their isolation was posing marketing problems:

> "This small village has lately been making magnificent panikhets [terraces] to be planted with a cold rice seed from the Chin Hills[35], but is still very poor as the fields have not come to bear yet, and they have been unable to sell their excellent potatoes at a price which will cover the labor of carrying them the 20 miles to Kohima, where the present price paid for potatoes retail is only 3 pice[36] a seer." (Hutton, 1934a, 27)

This was to be a constant obstacle to Nagaland's agricultural development throughout the 20th century. Although many crops prospered in its rich environment, most failed when it came time to market them (Kevichusa, 1995; Sema, 1996). It was a "catch-22" situation because market linkages could not be forged into remote mountain areas until there was a sufficient volume of produce originating there. But farmers were unwilling to gamble by planting large acreages of a crop for which they had no guaranteed market. Small volumes, produced over a large area, were just not economical and often ended up rotting by the roadsides. The problem was exacerbated by the fighting and political upheaval that has wracked Nagaland since the departure of the British.

The return of relative peace and improvements in roads have since made large strides in linking farmers with markets. The evolution from subsistence towards a cash economy has also brought increasing demands for cash in villagers' daily lives, particularly for education. It is no longer sufficient to be able to feed your family and put a roof over their heads; the need to earn cash now drives farmers' decisions on how to invest their land and labor. This has driven the switch to semi-

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[33] An Indian weight of widely ranging amount, but officially about 2 lbs.

[34] Before decimalization in 1957, a coin of India, valued at one sixteenth part of a rupee.

[35] Hutton appears to have been mistakenly referring to the variety brought back from upper Arunachal Pradesh during the 1911-12 Abor Expedition.

[36] "Pice" were formerly equal to 1/64 of a rupee. New pice (paisa), at 1/100 of a rupee have taken their place.

temperate cash crops in the southern jhum block, as already described in chapter 2. The Indian lowlands provide an almost insatiable market for such crops that need cooler mountain environments to thrive.[37] The Job's tears and millets that were formerly the staples of these jhum fields are now too low in value and provide insufficient returns to the considerable labor that it takes to open a jhum field. They have evolved into intensely-managed market gardens of potatoes, garlic and other vegetables, specializing in their areas of competitive advantage, and using their cash returns to buy cheap rice from the plains. This has led to the more complicated cropping calendars presented in figures 7-26 and 7-27 (and for Tsiesema in appendices 5-26 – 5-27).

Fallow Length. Looking at Khonoma's jhum lands today, there is little hint of the intense land-use pressures that gave birth to the dispersed alder system. It is only by listening to elders that one hears of bygone days when jhum areas were expansive and opened so completely that there was hardly an unpollarded tree in sight. Every family routinely opened a jhum plot every year, and larger families with sufficient labor might even open a second. If done in two consecutive years, then a family could conceivably be cultivating up to four jhum plots at a given time. Their strong work ethic, the elders explain, made it embarrassing for anyone to be seen relaxing while others worked. And pride (moshu) had to be retained at all costs.

The watershed event that changed all of this came in 1956, when the Indian army attacked and destroyed Khonoma, forcing its people into exile for the next couple of years (see chapter 5, and map 4-1). As mentioned earlier, the eventual outcome after the 1964 ceasefire was a smaller population cultivating an expanded land base. When in the 1970s, Delhi began a policy of trying to win the hearts and minds of Nagas by flooding the state with federal money (see figure 6-1), this took further pressure off the land by offering other ways of making a living – ways that were much easier and more lucrative than tilling the soil. Many observers also point out that it destroyed the Naga work ethic and bred rampant corruption.

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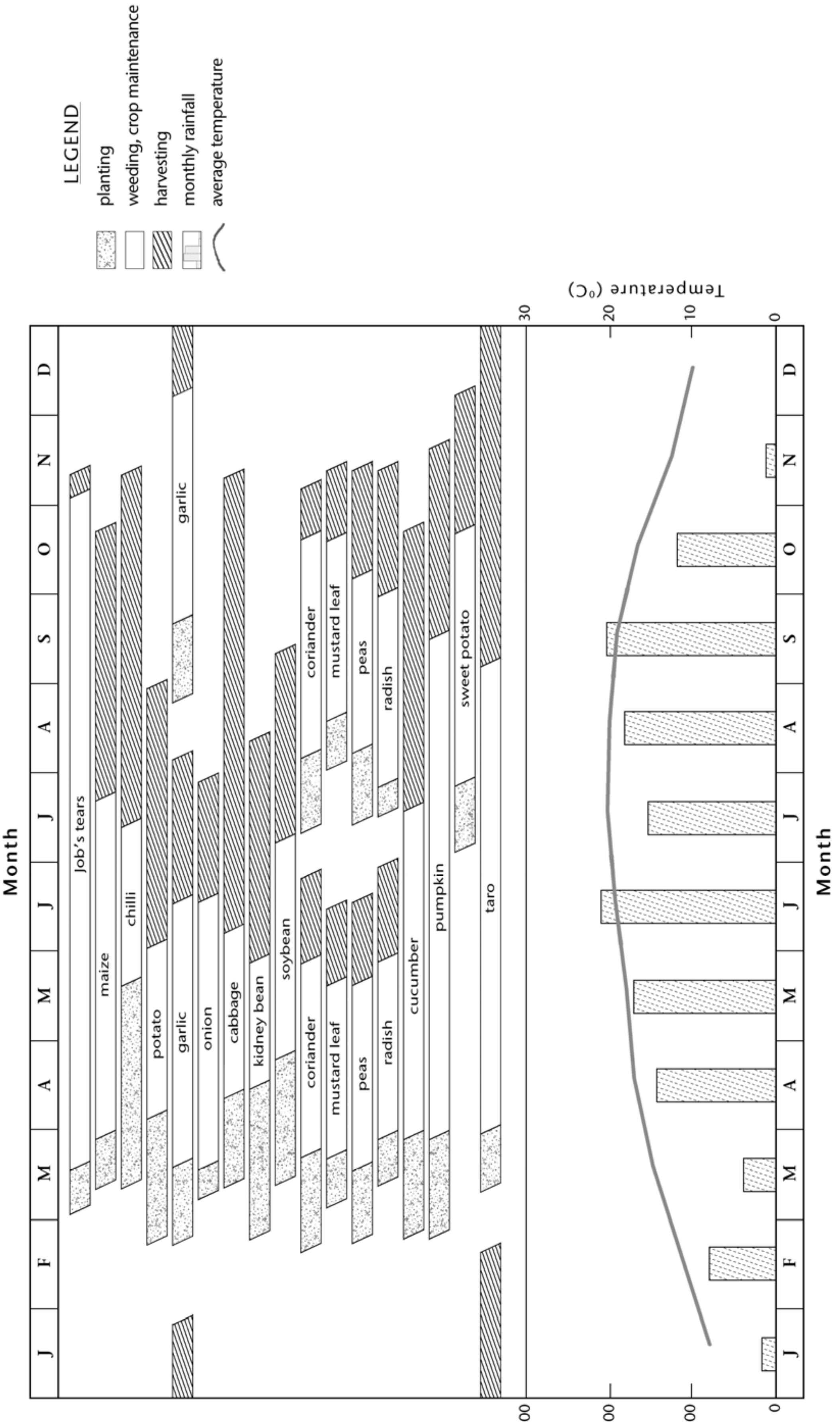
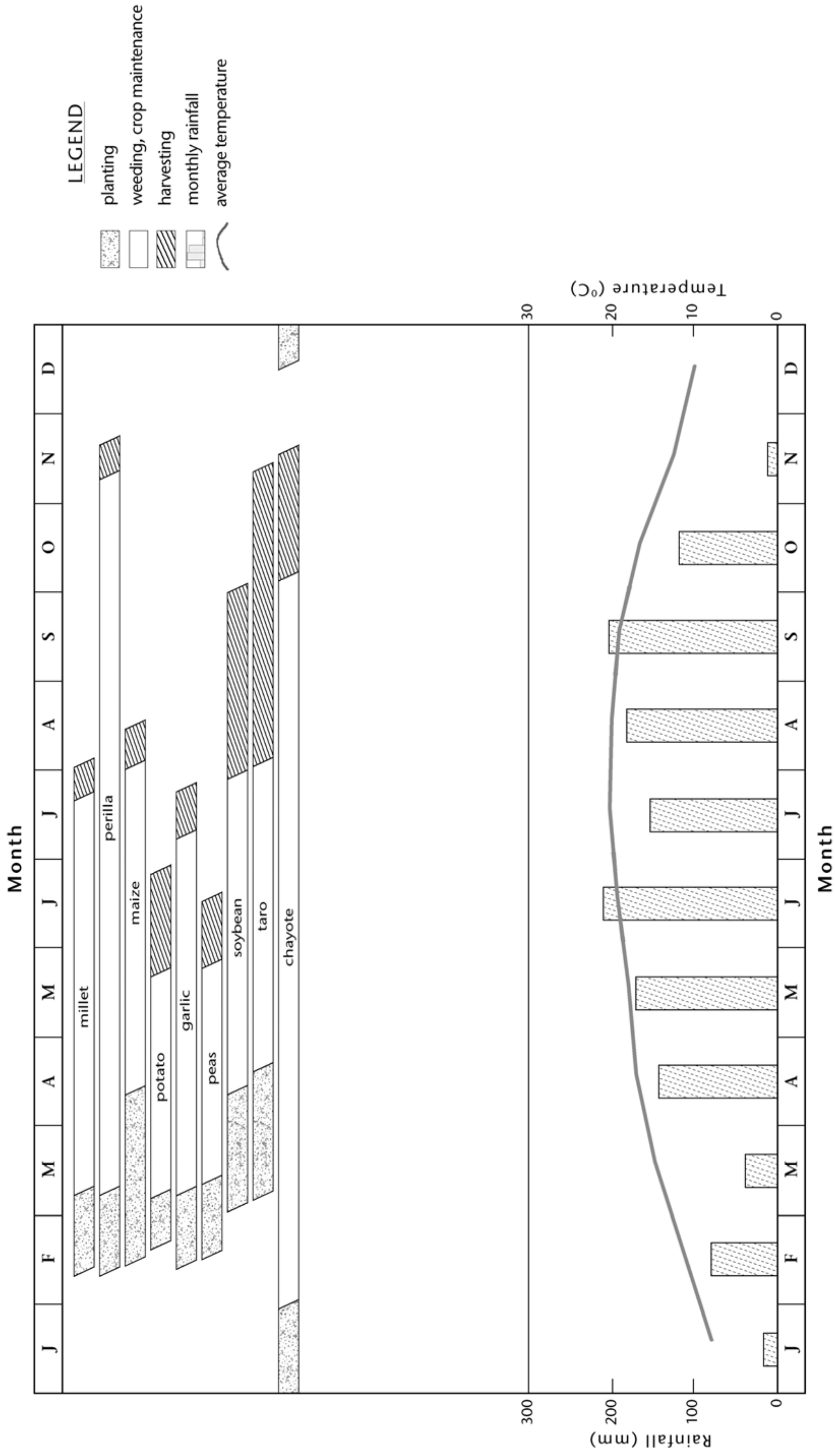
[37] There have been parallel transformations across the Himalayas, such as in Bhutan and Nepal, where cropping systems have also been revamped to produce for the vast Indian market. This is a region-wide phenomenon.

Figure 7-26. Cropping Calendar for Khonoma's Jhums – 1st Year



* Data derived from farmer-kept diaries on their inputs and outputs for fields monitored over 2000 and 2001 cropping years.

Figure 7-27. Cropping Calendar for Khonoma's Jhums – 2nd Year



* Data derived from farmer-kept diaries on their inputs and outputs for fields monitored over 2000 and 2001 cropping years.

These factors have coalesced into the much reduced jhum cultivation pressures seen today. I was reminded of this in 2002, as I stood on a ridge near the war memorial and studied the valley below me, where that year's jhums had been opened in the southern block. It appeared that roughly only 1/3 of the sub-block to be cultivated that year (block 3 in map 5-3) had actually been opened. Indeed, our surveys confirmed that fully 33.8% of Khonoma's households no longer cultivated a jhum on a routine basis. Many had diverted their efforts to salaried positions, contract work, and other cash-earning activities that were more remunerative (outlined later in this chapter). Others had moved to Kohima in pursuit of better opportunities offered by the state's capital, leaving their jhum fields idle and unmanaged. Most of the younger generation who had earlier been an important part of the labor force were busy at school and needed money to support their studies. It was mostly the older folk who continued to cling to the old ways, in part because they had fewer options. Many continued to work in the fields until their strength completely failed them. Some cultivated jhums only on those years when the area to be opened was not too far away. But the social stigma that had formerly dictated against anyone not opening a jhum, or who was seen relaxing while their neighbors labored, had all but disappeared.

This meant that those who continued to cultivate jhums could pick and choose more in deciding which fields to open. Nobody wanted to reopen young fallows that offered less firewood, less fertility, and therefore smaller returns to labor. Although jhum cultivation in the southern jhum block continued to rotate between four sub-blocks (map 4-4), it was more common that individual plots within those sub-blocks were opened only on every other cycle, effectively tripling the fallow period to six years. Some of the more distant fields on upper slopes were being set aside for 12 to 15 years, their timber value improving each year as the alder coppices grew larger and the wood turned hard and reddish with age. Planting food crops between the alders had been discontinued in some of these fields, leaving them strictly as timber plantations harvested on a longer-term cycle. In both the eastern and western jhum blocks, entire sub-blocks that were less fertile, rocky, too distant or marginal for whatever reason had been removed from their jhum cycles, allowing the forest to reclaim them. Hence, the fabled two-year fallows that many wrote about no longer existed in Khonoma, nor did the factors that made them necessary in the first place.

Kitchen Gardens (kihiekimhuze)

Although the large and densely-packed layout of Angami villages served a security purpose, they left little room for kitchen gardens. The livestock that wandered freely within villages would have added to the difficulty for Angami to plant much at their back doors. For these reasons, it is unlikely that kitchen gardens ever played a very important role in Khonoma's farming systems.[38]

This is changing somewhat now that peace prevails and the security of numbers is no longer essential. Many of the new houses are being built on the village outskirts to escape the congestion of the old residential area and reduce the walking time to the fields. It appears that the kitchen gardens of these new outlying houses will be more significant and may often blend seamlessly into the surrounding jhums. This is another example of modification to land use in response to the improved security situation. There are also many fewer livestock roaming the village, due to both reduced numbers and tighter regulations on their movement.

Of the ten farmers monitored by the study, all but one maintained a kitchen garden of some extent (map 7-2). The size and diversity (appendix 5-31) of these gardens were highly variable and greater in outlying areas where more room was available. There, they were often used as experimental plots for trialling new crops under the watchful eye of the farmer. Those found successful were later expanded to other parts of the farming system.

Permanent Gardens (tize) *(plates 5-54 – 5-55)*

Permanent dryland gardens have only appeared in the past 10 to 15 years as Khonoma has become better connected to outside markets. Before that, rice could not be bought in the village shops, even in the unlikely event that villagers had enough money to buy it. So every farmer had to prioritize the production of enough rice for his own family's needs. Hence, the importance accorded to the wet rice terraces.

This gradually changed as the Indo-Naga war subsided and the state turned from fighting to trading. Many Khonoma families had already bought paddy land down in the Medziphema area by this time, and so were better positioned to grow enough rice for their own needs. Rice from the plains could furthermore be trucked up the improved roads and sold at cheaper prices in Kohima's markets. And semi-temperate crops that thrived in cooler mountain climates could be taken back down the hill to lucrative markets in the lowlands. This set the stage for the diversification of rice land into other crops, starting with upper terraces below Khonoma that were less suitable for rice – usually because the irrigation water was insufficient or too cold. But the cooler conditions and proximity to the village made them ideal for intensive vegetable gardening.

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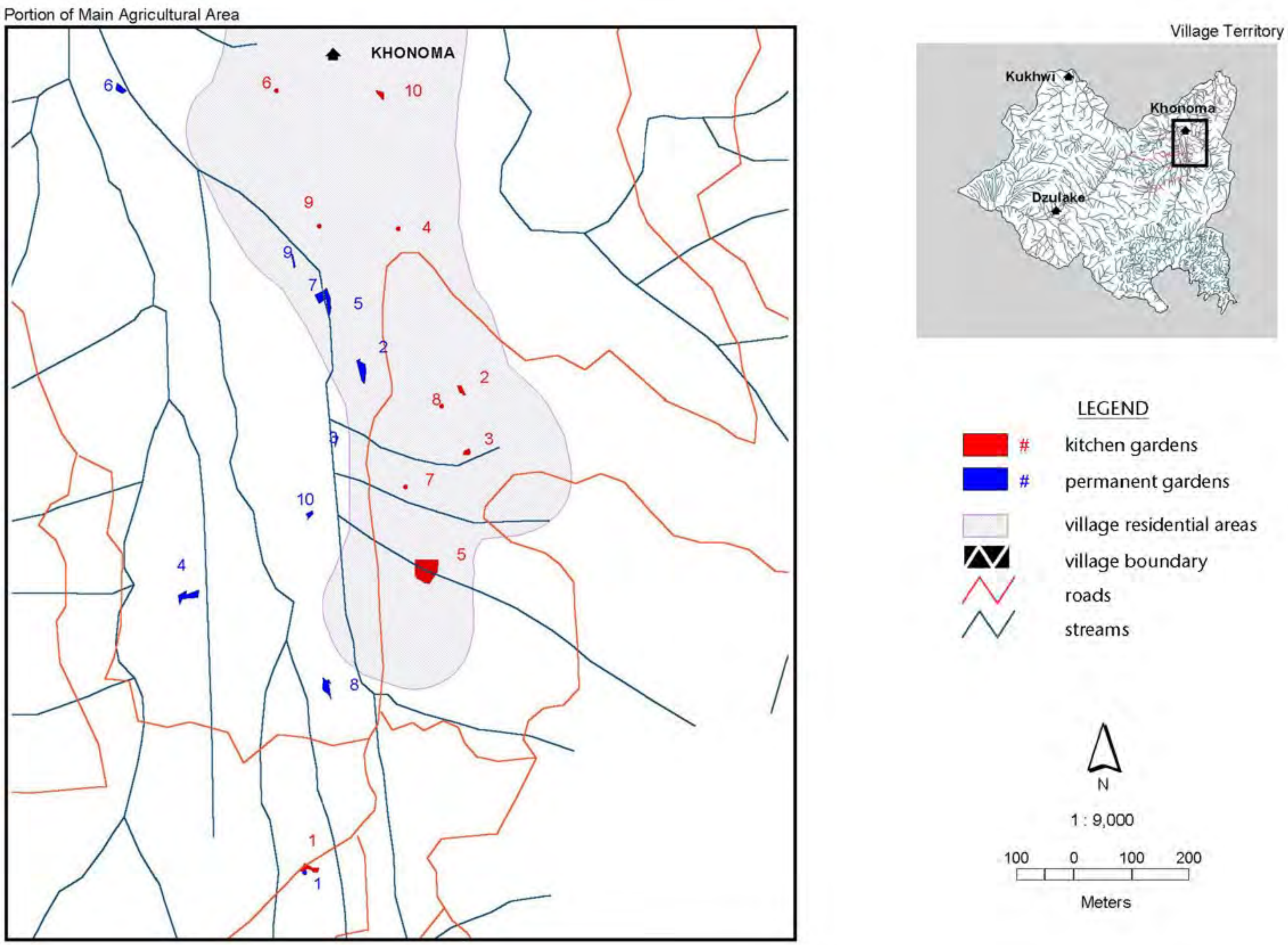
[38] The kitchen gardens of Tsiesema village appear to be more substantial and better maintained than those at Khonoma. This is likely in part because Tsiesema is less congested and has fewer wandering pigs. But it is equally likely that the closer proximity of Khonoma's jhum fields allowed them to largely subsume the role played by kitchen gardens in Tsiesema.

Map 7-2. Locations of Kitchen Gardens and Permanent Gardens Cultivated by Collaborating Farmers in Khonoma



The economics behind this shift in strategy were compelling. These fields could produce only a single rice harvest per year, at a cost probably exceeding its purchase price from the lowlands.[39] But by converting to dryland cultivation, multiple harvests could be achieved in the same time frame – for example, a rotation of potatoes, maize and garlic. These crops could then be sold to the lowlands at high prices and the revenues used to buy cheap rice. This is an extension of the same commoditization of cropping systems described in the jhum fields in chapter 2.

A zone of permanent gardens has therefore emerged on the outer fringes of the village, between the residential area and the rice terraces. Potatoes, garlic, cabbage, mustard leaf and sweet potatoes are most common, but an inventory of the gardens of the ten farmers whose fields were monitored during the fieldwork revealed a wide range of crops (appendix 5-32). Since these fields are permanently cultivated under dryland conditions, they benefit from neither the fallows that help to rebuild fertility in jhums, nor irrigation waters that bring nutrients to paddy fields. They also have to be fenced to keep out hungry livestock that stray down from the village.

Livestock (ukhurino) *(plates 5-56 – 5-60)*

Khonoma was always adept in using livestock, with few management inputs, to scavenge in various niches of its environment, converting otherwise useless resources into animal products. Poultry and swine roamed the village feeding on table scraps and whatever human refuse they could find; bees assisted pollination while foraging for nectar; fish swam amongst the rice plants, searching for insects; cattle followed behind harvests to graze crop residues and fallow grasses; and mithun browsed trees in the mountain forests. Such low-input systems of animal husbandry are typical of shifting cultivation communities where fodder resources are abundant but labor scarce. However, like cropping, the livestock sector is also changing in response to economics and socio-cultural pressures.

Although too rugged for agriculture, Khonoma's expansive forest tracts are ideal for the semi-domesticated mithun (*Bos frontalis*).[40] Mithun have always been highly prized amongst the Nagas and considered the most prestigious animal to slaughter at times of feast-giving and funerals (see Woodward, 1989, for example). They were kept for slaughter at weddings, and used as security that could be sold in times of scarcity to buy rice. A mithun in the forest was thus like money in the bank, that would grow and appreciate in value. They were in fact widely accepted as a currency,

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[39] A member of Semomia khel, who is also a teacher, did his own calculations and concluded that he earned only Rs 30-40 for every day of labor invested in growing rice in his terraces. After deducting the cost of meals, he was left with nothing. He was able to survive only by selling vegetables that he also grew in his terraces (Chücha, 2001).

[40] Amongst the Western Angami villages, only Mezoma, Jotsoma and Khonoma have sufficient forest to allow mithun to wander and fend for themselves.

at first to pay tributes to more powerful villages and later as fines levied by the British for misbehavior. Its meat is said to be particularly clean since it spends its entire life browsing in the forest.

Mithun are generally given the run of the forest and only summoned back to outlying sheds (gwiki) from time to time to count them and check on their condition. This is the responsibility of migrant herders (gwükhwemia) who camp at these sheds and are paid by the owners at an annual rate of two tins of paddy (about 27 kg) for every animal under their care. Many of the mithun are now reportedly owned by Khonoma natives who hold government jobs in Kohima. Even though they no longer live in the village, they retain their birthright of access to communal resources. Since mithun run free in the forest and are looked after communally by herdsmen, this allows these officials to continue to benefit from communal resources without investing any of their own labor. Investing in mithun thus allows them to continue to earn some income from the village, while at the same time enjoying the perks of a government position in Kohima. By the time a mithun reaches slaughtering size at about five years of age, its owner will have paid the herder ten tins of rice (2 tins/yr x 5 yrs), representing an investment of about Rs 650 at today's prices. Assuming that the calf itself was purchased for about Rs 2000 and the mature animal is sold for Rs 12,000, then each animal reared can earn its owner a profit of Rs 1870/year – without investing any of his own time or labor.

The herders summon their charges from the nearby forest by blowing a horn (ketsu) and then rewarding the animals by sprinkling salt on the rocks. Since they are reared communally and seldom seen by their owners, their ears are notched to help identify them. A system of gates, trenches and fences confine the mithun to the forests and away from the cultivation area. Similar to Bhutan's yaks descending to lower pastures during winter months, mithun are also permitted to come down from the forests in the autumn after jhum crops have been harvested and graze on the residues.

In past times when cash was scarcer, villagers often pooled their money to buy a mithun calf to raise. The herd size grew as increased cash flow made them more affordable and profit margins remained high. One estimate suggests that Merhümia khel alone now owns over 300 head. This recent surge in popularity stems from a new ritualistic use that has developed in Nagaland's increasingly status-conscious society. Just as the measure of a deceased man's worth was formerly taken by the number of livestock sacrificed during his funerary rites to accompany him to the next world, so too today is the status of a marrying couple indicated by the number of mithun, cattle and pigs slaughtered at their wedding. When family members of politicians or high-ranking bureaucrats are involved, animals may be slaughtered in mass, beyond any expectation of what the wedding guests can consume.[63] Hence, there is a lucrative market for mithun during the wedding season every winter. It provides by far the largest income from Khonoma's livestock sector.

Unlike mithun, there has been a dramatic plummet in cattle numbers over the past century. The old scenario of cattle crowding into the front rooms of Khonoma houses every nightfall (chapter 3) now remains only as a memory. The seeds of this decline were planted in 1897, when the first villagers accepted Christianity. As rituals and feast-giving faded into disuse, so too did the major reason for keeping large numbers of cattle. Their decline was hastened by the outbreak of the Indo-Naga war in 1956. With their village burning behind them, Khonoma villagers fled into the forests with only the clothes that they wore on their backs (Iralu, 2003, 164-180), and spent the next couple of years running and hiding from Indian soldiers. On the run, villagers were in no position to look after cattle, and most of the herd would have been eaten either by non-Hindu members of the occupying army or desperate refugees. When they could finally begin returning in 1958, the houses that they built were mostly of a more modern style and too small to house cattle. By this time, there was also a growing awareness of hygiene and its link to health, and a realization of the problems inherent in livestock and people sharing the same roof.

Attitudes about the status of tending cattle as a livelihood have also changed. Formerly, it was seen as a privileged occupation, usually reserved for nuokhrienuo – the only sons of wealthy households (Talie, 2001) Every day, they would round up the cattle owned by nine or ten families and take them as a communal herd to graze. The owners paid them at a rate of 3 tsa[41] of paddy/yr for every head of cattle in the herd. But this once-coveted job has faded from prominence as the developing economy has offered easier and more lucrative ways of making a living. When children in Khonoma refuse to go to school, it is now common to hear their parents threatening that they will have to spend their days looking after cattle. Few Angami want to rear cattle. The migrant population, mostly from Nepal and the Indian plains, has far fewer options and is eager to fill this role. [42] So a division of responsibility for herding cattle and mithun has arisen. Cattle herders (thukhwemia) are almost always Nepalis, but those who care for the mithun (gwükhwemia) are invariably Angami. The roles are seldom reversed. But villagers complain that the Nepali cattle herders supplement their income by milking the cows, leaving the calves with insufficient nutrition to grow properly.

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[63] This is reminiscent of Marvin Harris' (1989) description of potlatch amongst American Indians who formerly inhabited the coastal regions of Southern Alaska, British Columbia and Washington.

[41] Equivalent to about 18 kg of paddy.

[42] These people, most of whom are from Nepal, are not included in any of the census-type data presented in Chapter 3. Khonoma people do not regard them as part of the community population.

Today, the remaining cattle in Khonoma are kept by night in three to four communal corrals on the village outskirts (map 4-5). Those that are lactating are milked in the morning and the milk taken door-to-door in the village in time to mix with morning tea. They then spend the rest of the day grazing, under the watchful eyes of herders. They are confined mostly to fallows and wastelands during the growing season, but follow along behind harvest in the autumn to browse on crop residues.

Pig numbers in Khonoma have probably remained relatively stable, even as rearing methods have moved steadily from free-range to confinement. This was enforced by village regulations, mostly for hygiene reasons. But it also became necessary when European pig breeds introduced after the Indo-Naga war were found to be more destructive than the local Asian breed, and badly damaged stone walls with their rooting and digging. These days, only a few of the black, pot-bellied Asian pigs continue to wander Khonoma's footpaths. The rest are confined to pens and are no longer able to scavenge, and the burden of keeping them fed now rests totally with their owners. In many Naga kitchens, the days begin and end with large pots boiling on the hearths, cooking bran mashes mixed with wild taro and chayote leaves for the pigs. As a byproduct of this intensified rearing, manure can now be more easily collected for application on the fields. The Nagas' fondness for pork is legendary and, like mithun and cattle, pigs are slaughtered in large numbers at times of weddings and other celebrations.

Young dogs are commonly bought at the Kohima market and fattened for a few months before slaughtering.[43] Virtually every house has a small number of chickens free-ranging around it, providing eggs and on special occasions, chicken dinners. This probably has not changed much over the years. But their use in ritual sacrifices is now confined to those households that cling to the old religious beliefs.

Although their contribution to the total farm economy is small, fish are reared both in ponds and combined with rice in some paddy fields. The benefits of rice-fish culture are well documented elsewhere. The state's Department of Fisheries encourages this by purchasing common and grass carp fingerlings from Imphal and distributing them to farmers for release. Pits dug in the middle of terraces provide reservoirs for the fish during winter months when water levels are low (plate 5-41).

Villagers sometimes broadcast cattle dung and marigold leaves into the terraces, to supplement natural populations of insects and worms that fish are able to capture themselves in the paddy environment. The fish are generally harvested at about two years of age, at 0.5-1 kg. Snails are similarly released into paddy terraces to supplement natural populations but again, the frequency of this is probably low.

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[43] Cats, in contrast, appear to enjoy considerably more respect throughout the Naga subgroups, apparently because of their role in protecting the granaries from rats (Hutton, 1969, 82).

There are suggestions that there may be tenurial reasons why fish and snail culture have not gained more popularity in the rice terraces. It has long been the custom that wild populations of both can be freely collected wherever they are found. They are viewed as a product of nature, and not intentional husbandry. This attitude is changing, but propriety concerns may linger. It is common practice that fields in which fish and/or snails are being reared are marked with bamboo signs (kethie) that designate them as private and bar them from communal access. Some farmers keep a few hives of krüno bees and earn extra income by selling honey at Rs 200 per bottle.

Despite the Nagas' extreme fondness for meat, the livestock sector in Nagaland is surprisingly little-developed. Much of their pork and beef is imported from nearby Indian states where religious beliefs forbid their consumption. Herds of cattle are commonly seen being driven up the road from the plains to the Kohima markets. This represents a substantial outflow of revenue from the state. Of those cattle that are raised in Nagaland, many are tended by Nepali labor.

Plantations of Perennial Cash Crops (pelhu) *(plates 5-61 – 5-68)*

The earlier section on jhum cultivation described a shift in emphasis from subsistence cereals to vegetable cash crops, while the basic structure of the jhum cycle remains unchanged. Food crops are still planted for two years, after which the fields are left in "fallow" to recover fertility and grow firewood. But in other cases, instead of pollarding the alder and opening the fields for cultivation, farmers are instead clearing only the understory and then planting perennial cash crops under the alder canopy. The role of alder thus transforms from a "fallow" to a "canopy" tree, and the jhum cycle is replaced by a long-term agroforest. This movement towards perennial cash crops is yet another consequence of the expansion of the cash economy in Nagaland. It resonates well in Khonoma where villagers are looking for less labor-intensive ways to manage their drylands that can generate the income they now need in increasing quantities to participate in the cash economy. It is a particularly effective strategy for those who have moved away from the village to pursue other opportunities, but want to keep their ancestral lands under productive use.

Large cardamom has become the most popular of the plantation crops. The combination of cardamom under an alder canopy is widely practiced across the eastern Himalayas, in ecologies similar to that in Khonoma. The benefits and management are thus well known (Ghimire, 1985; Singh et al., 1989, 1991; Sharma R. et al., 1994, 1998; Sharma E. et al., 2000), and planting materials easily available. It fits the criteria needed for cash crops in remote mountain areas – low volume, high value, and low perishability, and prices have been steadily high. There is now considerable duplication in extension efforts as several government departments and the Canadian-supported NEPED project are all promoting cardamom. Villagers from Khonoma were amongst those taken on various exposure visits to Sikkim, to learn from farmers' experiences there.

Although nearby Assam is famous for its tea, it has never gained much popularity in Nagaland. But seeing it as a possible alternative to jhum cultivation, in the late 1990s the state Department of Agriculture launched a promotion campaign that offered generous subsidies for farmers planting tea.[44] In 1999, about 50 Khonoma farmers responded by forming the Khonoma Tea Plantation and Agricultural Society and each planted from 500 to 1000 seedlings (Meru, K., 2000). Those introduced to jhum fields were interplanted in a *taungya* pattern during the cropping phase, and thus benefited from the standard maintenance operations directed at the other crops. This allowed them to become strongly established by the time the other crops were discontinued and the fields were left with only tea under alder.

Others have chosen timber as a cash crop. At its simplest, some are increasing their timber output by leaving more distant fields in longer-term fallows and thus allowing the alder coppices to reach more marketable girths. This provides a leap in profitability over the usual practice of harvesting smaller coppices for firewood. As new alders establish, some may not be pollarded at all, but instead left as single-stemmed timber trees (plate 5-68). Some villagers are interplanting other timber species amongst the alder stumps, predominantly *Gmelina arborea*, *Melia azederach*, *Hovenia dulcis,* and *Terminalia myriocarpa.*

Until recently, horticulture was limited to a few fruit trees grown in backyard gardens for home use. A recent trend to convert jhums closest to the village into mixed orchards of oranges, plums, pears and peaches shows the fruit sector to be expanding to more commercial levels. In other cases, jhum cultivation continues in some fields but crab apple and *Elaeagnus conferta* are interplanted amongst the alders to increase the fruit component. In some cases, wires are strung across jhum fields as trellises for passion fruit.

Chayote has been a minor component of backyard gardens since its introduction to Khonoma around the 1940s. It climbs nearby trees vigorously and both its fruit and growing tips are harvested as vegetables. It is also commonly included in the mash that villagers cook for their pigs and therefore contributes to pork production. In another example of a crop gaining commercial importance and expanding from backyards, chayote is now often planted in jhum fields.

In growing most of these products, mountain areas enjoy a competitive advantage in supplying huge markets in the Indian lowlands. Few are new, and

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[44] This created an instant market for tea seedlings in Nagaland's villages. Some who knew the industry in Assam set themselves up as middlemen to fill this demand. In view of the large ecological differences between Assam's plains and the Naga mountains, one wonders about its suitability as a source of planting stock.

many of them have been planted in small quantities in backyard gardens for a long time. What is new is the market access that has transformed them from minor components to important cash crops.

Hunting, Fishing and Gathering *(plates 5-71 –5-118)*

In the early generations of Khonoma's settlement, the forest probably rivaled the farm in importance for providing the village's food needs. With a wide array of wild vegetables, fruits and wildlife available from the forests, villagers could focus their farming efforts on growing cereals (rice, Job's tears, and millets). Like forest-dwelling communities everywhere, the forest was their supermarket, their drug dispensary, and provided for most of their daily needs. Men routinely carried spears to the field with them, not only to guard against attack, but also in readiness to pursue any wildlife that they encountered along the way. Women seldom returned from the fields with empty baskets, but paused along the way to gather wild vegetables for that evening's meal. Even now, the Angami are notorious for their adventuresome eating habits. A local joke suggests that if Adam and Eve had been Angami, we would all still be living in the Garden of Eden because they would have ignored the proverbial apple and, instead, eaten the snake (Aier, 2005). This penchant for hunting, fishing and gathering was heightened in the autumn, as the tempo of agricultural work slowed after harvest.

As Khonoma grew and more of its landscape came under human management, the balance of importance tilted increasingly towards food produced on-farm. This was necessitated in part because even as agricultural productivity rose, the forests were losing their capacity to produce many of the resources on which Khonoma traditionally relied. The guns that proliferated during the Second World War provided a huge technological leap over spears in terms of villagers' ability to kill wildlife. The rows of wildlife skulls displayed on the walls of many Khonoma houses are testimony to their success (plates 5-72 - 5-73). But predictably, hunting rose to unsustainable levels and the local wildlife population was decimated. This continued until 1998, when during a fiery village meeting that stretched late into the night, a total ban was finally imposed on all hunting. Some village elders continue to carry a spear to the fields with them out of habit, but hunting no longer contributes to their daily diet.

Meanwhile, invading Asteraceae were taking a toll on some of the wild food plants. By 1921, Hutton was expressing alarm over the rapid expansion of *Ageratum conyzoides* in jhum fields across Nagaland.[45] This was followed by the arrival of *Eupatorium adenophorum* around the time of WW II, prompting villagers to call it

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[45] "*Ageratum* is very bad everywhere here. Since the 15th, I have marched through solid walls of it. They say it came in only 5 or 6 years ago and that jhumming is impossible where it is once established. It is very difficult to clear the ground and even when cleared, *Ageratum* comes up faster than paddy or anything else, and no other plant can grow in among it." (Hutton, 1921a, 7-8)

Japan nha ("Japanese weed") or nhasa ("new grass"). Others referred to it as "sniper's grass", believing that it had been intentionally planted at the outbreak of fighting to provide cover for snipers (Chase, R., 2001). *Chromolaena odorata* began colonizing lower altitudes at around this same time. All are exotic Asteraceae that had no natural enemies in the Naga Hills, and thus quickly covered the landscape in dense thickets. Many native food plants were displaced by these new arrivals (Terhüja, 2000).

Despite this, respondents in the two study villages still listed about 430 plant species that they continue to use for various purposes (appendices 5-36 – 5-42). Documenting them was not part of the original research plan, but as the fieldwork progressed it became apparent that the vegetables villagers were eating were from the forest as often as from their fields, so they could hardly be ignored. Their contribution to the local economy was too important. A survey revealed that Khonoma villagers collected most wild leafy vegetables during January to May, when their field crops were not yet available (figure 7-28, appendix 5-43).[46] The harvest of fruit, nuts and berries is more spread throughout the year, depending on when they are in season (appendix 5-44).[47]

Linkages between Parts of the Wider Whole

Having sketched this cursory overview of each of the components comprising Khonoma's total land use system, it is useful to consider in turn how the above units fit together and interact. None stand in isolation, but are related through a complex web of bioresource flows (figure 7-29), timing of labor, and provision of products).

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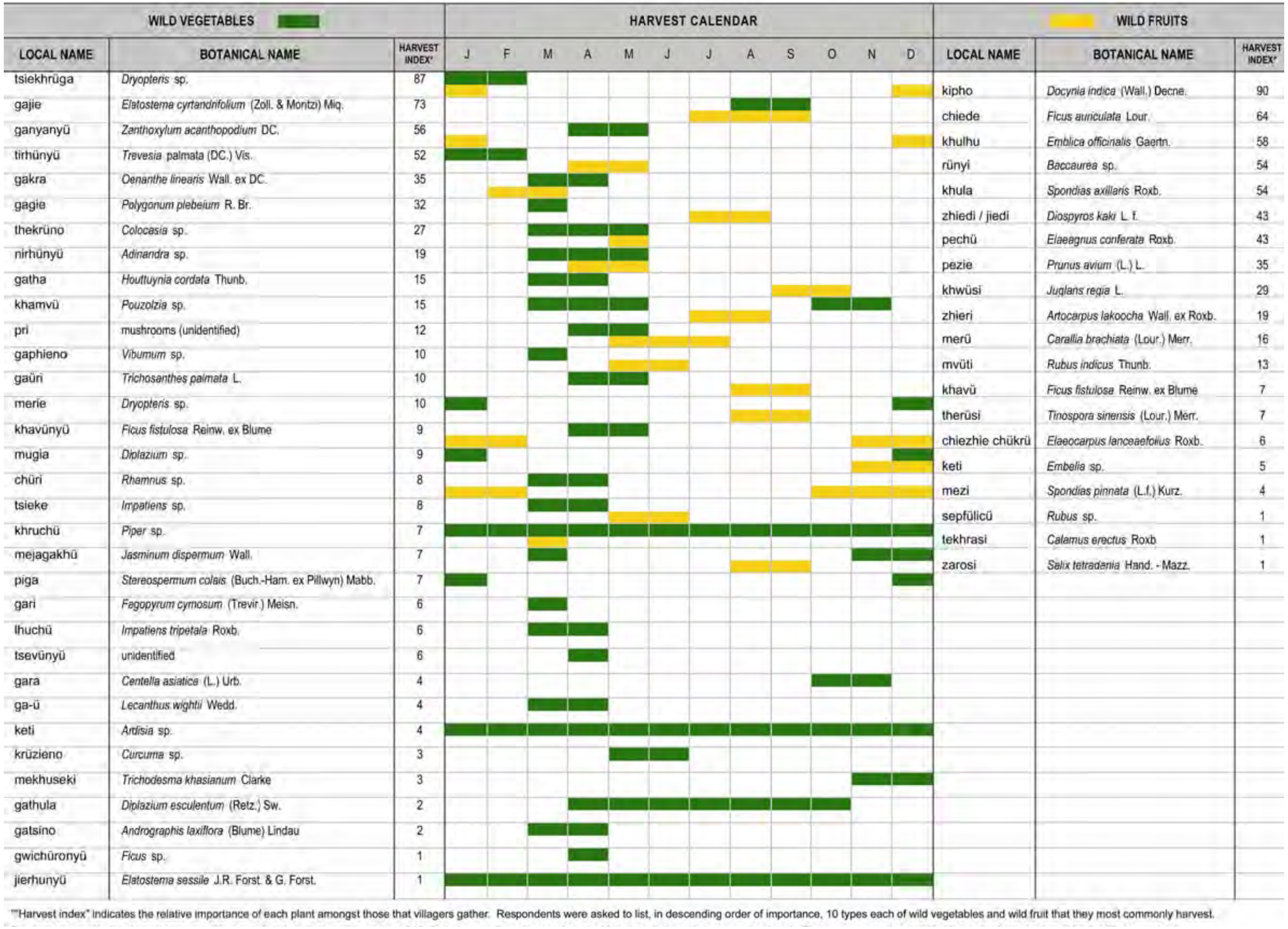
[46] We found quite different patterns in Tsiesema (appendices 5-45 – 5-47). There, many of the wild vegetables collected were available throughout the year. This, along with climatic reasons, may help explain why Tsiesema farmers grow fewer leafy vegetables in their jhums.

[47] For further readings on Naga ethnobotany, see Godbole et al., 1997; Rastogi et al. (Eds.), 1998; Natso and Tep, 1999; Nakro, nd.

Figure 7-28. Overview of Wild Fruits and Vegetables Harvested by Khonoma Villagers throughout the Year



WILD VEGETABLES 🟩 — HARVEST CALENDAR

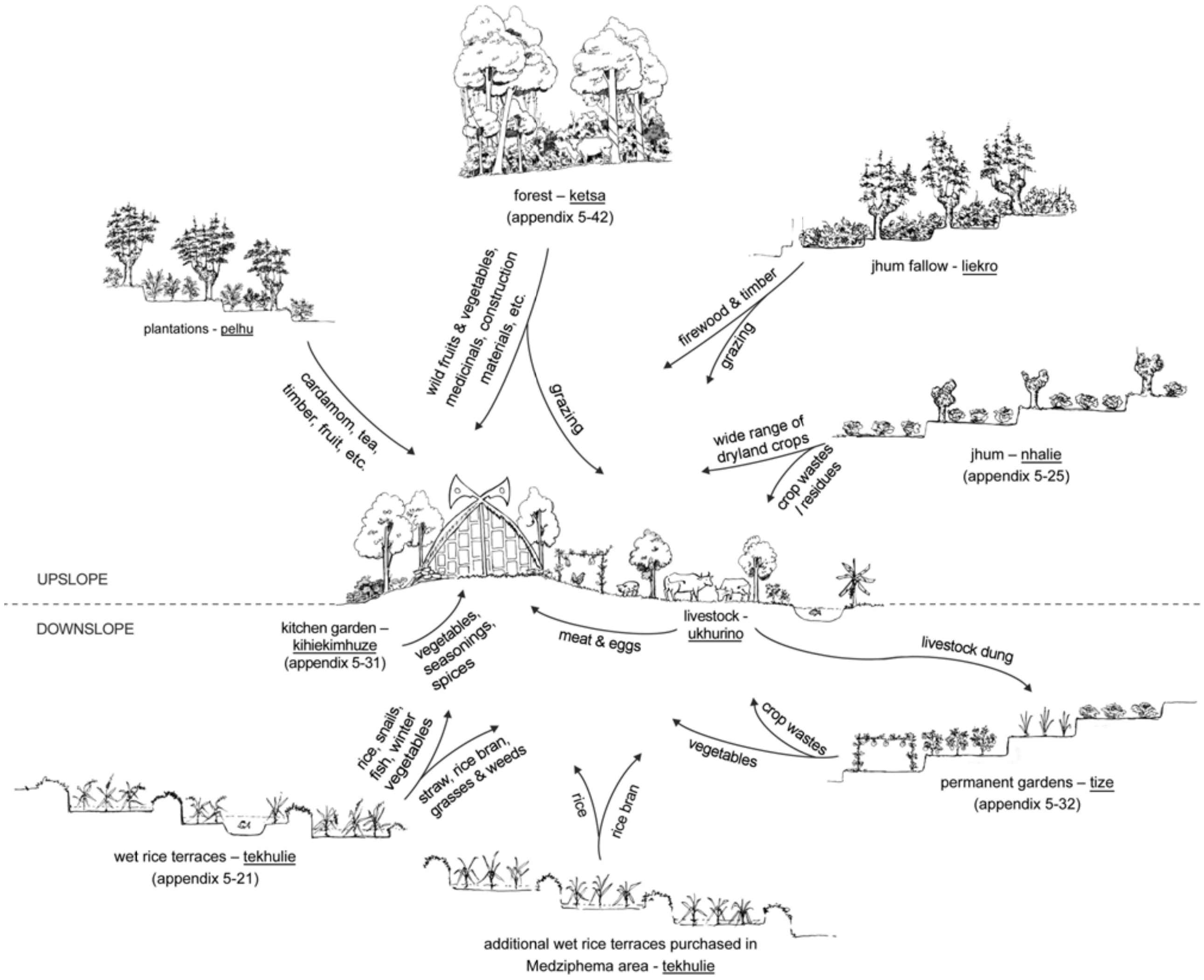
LOCAL NAME	BOTANICAL NAME	HARVEST INDEX*	J	F	M	A	M	J	J	A	S	O	N	D
tsiekhrüga	*Dryopteris* sp.	87	🟩	🟩										
gajie	*Elatostema cyrtandrifolium* (Zoll. & Moritzi) Miq.	73								🟩	🟩			
ganyanyü	*Zanthoxylum acanthopodium* DC.	56				🟩	🟩							
tirhünyü	*Trevesia palmata* (DC.) Vis.	52	🟩	🟩										
gakra	*Oenanthe linearis* Wall. ex DC.	35			🟩	🟩								
gagie	*Polygonum plebeium* R. Br.	32			🟩									
thekrüno	*Colocasia* sp.	27			🟩	🟩	🟩							
nirhünyü	*Adinandra* sp.	19			🟩	🟩	🟩							
gatha	*Houttuynia cordata* Thunb.	15			🟩	🟩								
khamvü	*Pouzolzia* sp.	15			🟩	🟩	🟩					🟩	🟩	
pri	mushrooms (unidentified)	12				🟩	🟩							
gaphieno	*Viburnum* sp.	10			🟩									
gaüri	*Trichosanthes palmata* L.	10				🟩	🟩							
merie	*Dryopteris* sp.	10	🟩											🟩
khavünyü	*Ficus fistulosa* Reinw. ex Blume	9				🟩	🟩							
mugia	*Diplazium* sp.	9	🟩											🟩
chüri	*Rhamnus* sp.	8			🟩	🟩								
tsieke	*Impatiens* sp.	8			🟩	🟩								
khruchü	*Piper* sp.	7	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩
mejagakhü	*Jasminum dispermum* Wall.	7			🟩								🟩	🟩
piga	*Stereospermum colais* (Buch.-Ham. ex Pillwyn) Mabb.	7	🟩											🟩
gari	*Fegopyrum cymosum* (Trevir.) Meisn.	6			🟩									
lhuchü	*Impatiens tripetala* Roxb.	6			🟩	🟩								
tsevünyü	unidentified	6				🟩								
gara	*Centella asiatica* (L.) Urb.	4										🟩	🟩	
ga-ü	*Lecanthus wightii* Wedd.	4			🟩	🟩								
keti	*Ardisia* sp.	4	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩
krüzieno	*Curcuma* sp.	3					🟩	🟩						
mekhuseki	*Trichodesma khasianum* Clarke	3											🟩	🟩
gathula	*Diplazium esculentum* (Retz.) Sw.	2				🟩	🟩	🟩	🟩	🟩	🟩	🟩		
gatsino	*Andrographis laxiflora* (Blume) Lindau	2			🟩	🟩								
gwichüronyü	*Ficus* sp.	1				🟩								
jierhunyü	*Elatostema sessile* J.R. Forst. & G. Forst.	1	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

🟨 WILD FRUITS — HARVEST CALENDAR

LOCAL NAME	BOTANICAL NAME	HARVEST INDEX*	J	F	M	A	M	J	J	A	S	O	N	D
kipho	*Docynia indica* (Wall.) Decne.	90	🟨											🟨
chiede	*Ficus auriculata* Lour.	64							🟨	🟨	🟨			
khulhu	*Emblica officinalis* Gaertn.	58	🟨											🟨
rünyi	*Baccaurea* sp.	54				🟨	🟨							
khula	*Spondias axillaris* Roxb.	54		🟨	🟨									
zhiedi / jiedi	*Diospyros kaki* L. f.	43							🟨	🟨				
pechü	*Elaeagnus conferata* Roxb.	43					🟨							
pezie	*Prunus avium* (L.) L.	35				🟨	🟨							
khwüsi	*Juglans regia* L.	29									🟨	🟨		
zhieri	*Artocarpus lakoocha* Wall. ex Roxb.	19							🟨	🟨				
merü	*Carallia brachiata* (Lour.) Merr.	16					🟨	🟨	🟨					
mvüti	*Rubus indicus* Thunb.	13					🟨	🟨						
khavü	*Ficus fistulosa* Reinw. ex Blume	7								🟨	🟨			
therüsi	*Tinospora sinensis* (Lour.) Merr.	7								🟨	🟨			
chiezhie chükrü	*Elaeocarpus lanceaefolius* Roxb.	6	🟨	🟨									🟨	🟨
keti	*Embelia* sp.	5											🟨	🟨
mezi	*Spondias pinnata* (L.f.) Kurz.	4	🟨	🟨								🟨	🟨	🟨
sepfülicü	*Rubus* sp.	1					🟨	🟨						
tekhrasi	*Calamus erectus* Roxb.	1			🟨									
zarosi	*Salix tetradenia* Hand. - Mazz.	1								🟨	🟨			

*"Harvest index" indicates the relative importance of each plant amongst those that villagers gather. Respondents were asked to list, in descending order of importance, 10 types each of wild vegetables and wild fruit that they most commonly harvest.

Figure 7-29. Diagram Showing Bioresource Flows between Components of Khonoma’s Farming System



Wet Rice Terraces

The role of paddy terraces as the bedrock of Angami food security and the high value attached to them has already been emphasised. The ability to irrigate means that these fields are less vulnerable to the vagaries of weather and seldom fail to produce a successful crop, although the old British tour diaries tell of rare exceptions where even Khonoma's terraced fields threatened to fail them. We also know that the presence of wet rice terraces reduces farmers' reliance on jhum fields. This can be seen clearly by comparing the small, garden-like jhums of the Angami and Chakhesang, that need only supplement the rice staple grown in the wet rice terraces, with the expansive swiddens, often covering entire mountain sides, of most Naga subgroups that depend on them as their sole method of cultivation. It makes a dramatic difference to the agricultural landscape.

These two major cultivation systems are further synchronized in terms of where they are positioned on the landscape, what they produce, and how labor is invested. Irrigated terraces are of course carved from the valley bottoms where water and warmer temperatures provide ideal conditions for wet rice. But as we move out of the valley and up adjacent hill slopes, the drier and cooler environment is better suited to vegetables and other dryland crops grown under jhum conditions. This division between irrigated terraces in valley bottoms and swiddening on adjacent slopes is a pattern that repeats itself throughout mountain areas where both systems are practiced. Wet rice and jhum cultivation also dovetail nicely in that although the timing of management inputs into the former is critical, the latter offers more flexibility. This means that when work is required in the wet rice terraces, it is done quickly and given priority over everything else. But the more relaxed pace of jhum cultivation allows it to be fit around the more exacting demands of the wet rice terraces, and is done as time permits. On a day-to-day basis, weather also plays a decisive role in where farmers direct their labor. Villagers try to select sunny days to work in the jhum fields since it is harder to kill weeds when it is dark or rainy. These are some of the reasons that make wet rice and jhum cultivation such an effective combination and why Khonoma villagers insist that ideally, everyone should have both.

The rice terraces also contribute to the livestock component in that some of the straw is collected for bedding and the cattle are allowed to descend into the valley after harvest to graze the residues. Rice bran collected during milling is fed to poultry and swine. Fish and snails are released into the terraces, but this remains modest. Where it is done, dung collected in the corrals where the cattle are housed at night is sometimes broadcast into the flooded terraces as feed for the fish.

Jhum Cultivation

With rice supplied by the irrigated terraces, it is left to the jhum fields to provide a wide assortment of secondary crops, as well as wood – and now, increasingly, cash from the sale of both. This alleviates cultivation pressure on the terraces in the sense that, in the absence of jhum fields, Khonoma would be planting a lot more winter crops in its terraces.

Wedged on the mid-slopes below the high forests, the jhums provide a number of important environmental services to the wet rice terraces in the valley below. Most obviously, the terraces depend on nutrient washdown from the slopes above to maintain their fertility. But at the same time, the careful system of contour barriers and terracing that extends throughout the jhum fields effectively checks soil erosion and prevents siltation of the irrigation channels feeding the terraces. The jhums also provide an intermediate zone that allows streams from the upper forests to warm up to temperatures tolerable by rice, and they also provide a buffer zone separating forest wildlife from the wet rice terraces, thereby reducing problems of crop predation. Finally, the jhums have historically provided an intermediate phase in the development of forests into wet rice terraces. Newly-cleared land was typically used for jhum cultivation for some years before villagers were eventually able, bit-by-bit, to carve it into terraces and dig a supporting irrigation system.

Khonoma's system of alder management in its jhums is also instrumental to the continued preservation of the forests above them. This comes about in two ways. Firstly, the shortened fallow period permitted by the alders means that less land is being cultivated more often, thereby reducing pressure to convert more forested land to agricultural use. Secondly, the steady flow of alder branches harvested when jhums are opened for cultivation contributes towards filling the village's needs for firewood and timber, again reducing harvest pressure on the forests. This is precisely the point made by proponents of agroforestry, who argue for on-farm wood production as a means of reducing harvest pressure on natural forest stocks. Khonoma is a good example of that principle working effectively.

The jhums also benefit the livestock sector, primarily by doubling as grazing grounds for cattle and mithun. On the first cropping year, celebration of the <u>Tiekede</u> festival in late November marks the cutoff date by which it is expected that all crops will have been harvested and cattle and mithun are then allowed into the jhum area to graze the residues. This happens again on the second cropping year, but this time after the <u>Tsünyi</u> festival in late August or early September.[48] The fields then remain open to free-roaming livestock for the duration of the fallow. Livestock weight gains during this time are thus an indirect byproduct of jhum cultivation. It

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[48] The millets that were traditionally the staple of the second cropping year are ready for harvest substantially earlier (August) than the Job's tears planted in the first year (October-November), giving livestock earlier access to the fields.

is worth noting that among the attributes making alder such an effective fallow species in the Khonoma context is that its leaves are bitter, and compared to other available fodder, it is not preferred by cattle and mithun.[49] Experience elsewhere has shown that attempts to introduce improved fallow species often fail because they are damaged by wandering livestock. Free-range grazing is almost universal to swidden communities and farmers are often hard-pressed to find enough labor to fence land under cultivation, let alone their fallowed fields. Alder's bitter leaves allow it to avoid this problem and co-exist with livestock without the need for protective fences. Regardless of its palatability, if new seedlings can survive the first year or two, their rapid growth quickly puts their leafy branches safely above the reach of livestock.

Finally, as crops are brought home from the fields, the steady flow of leaves, husks, cobs and other waste products from their processing are fed to the pigs and poultry. Amongst the jhum crops, one particular type of pumpkin known as semo is planted specifically as a pig fodder, and not for human consumption.

Other elements

Kitchen gardens. As their name implies, these are generally small plantings near the house, within easy reach for everyday use. They are also sometimes used as experimental plots where new crops or perhaps wild plants transplanted from the forest can be grown on trial. Those that prove to be useful may later be propagated and planted in other parts of the farming system. In the absence of kitchen gardens, these roles would most likely have been transferred to the jhum fields.

Perennial Gardens

Their position at the base of the village makes these fields conveniently near for intensive cultivation, and probably allows them to benefit from nutrient washdown from pig pens, latrines and other detritus above. A limited amount of livestock dung scraped up from the cattle corrals and pig pens is usually also applied to these fields.

Most obviously, these permanent gardens affect the wider farming system in that their creation has been at the expense of a commensurate reduction in the area of wet rice cultivation. But their intensive cultivation means that they also absorb a lot of household labor, and thus reduce both the need and the means to produce these same crops either by jhum cultivation or winter cropping in the rice terraces. One also suspects that the increased cultivation of leafy vegetables will lead to a reduced reliance on some of the wild plants that villagers have traditionally gathered from the forests (appendix 5-42).

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[49] Literature from Nepal however, often lists *Alnus nepalensis* as a fodder species. That is probably because higher livestock densities and fewer fodder resources provide less latitude for choice.

Livestock

The livestock act as scavengers, wandering throughout the other components of the land use system and converting available feed resources into valuable meat, fish, milk, eggs, honey – and dung. By allowing them to range freely and fend for themselves, these products come at the cost of very little labor to their owners.

However, recent changes in land use have brought the cattle and mithun into increasing conflict with settled agriculture. Jhum cultivation no longer rotates in the large, uniform blocks from which livestock can be easily excluded by the "social fencing" that worked so well in the past. The landscape has evolved into a more heterogeneous patchwork that is rendering such easy segregation unworkable. The jhum fields are increasingly scattered, with plantations of mostly cardamom and tea from which grazing livestock must be excluded. Other villagers are trying to extend their cropping season by planting winter crops, so their fields are no longer empty by autumn when cattle and mithun have traditionally had right of access to jhum areas to graze the residues. A storm is thus gathering on the horizon over whether field owners should continue to be responsible for fencing others' livestock out, or livestock owners should be responsible for fencing their animals in. It seems hard to justify the current situation, under which livestock owners enjoy all the profits, while the cultivators are saddled with fencing costs. The trend is that livestock movements are likely to become increasingly restricted. During the period of fieldwork, Khonoma adopted a resolution stating that stray livestock found destroying crops in others' jhum fields could be killed immediately, and the meat divided equally between the two parties. There were reportedly five to ten cases of this happening in 2000 (Meru, K., 2000). New regulations also require that pigs must now be reared only in confinement, but the number still wandering freely in the village shows that this is not being strictly enforced. The pigs, in turn, create an increased demand for firewood needed to cook large pots of mash every morning and evening, and therefore exert harvest pressure on alders in the jhums, and when this source is insufficient, other trees in nearby forests.

However, the relationship between crops and livestock is not totally adversarial. Livestock manure is a highly sought-after commodity that, some claim, is reason enough in itself to rear livestock.[50] In past times when cattle were kept in greater numbers, nobody descended to their rice terraces empty-handed. Every trip was used to carry a load of dry dung. But as cattle numbers have diminished and dung become less available, rice yields are also reported to have declined. Introducing fish into paddy fields may compensate to some degree, both by reducing insect pests and substituting another source of dung, but this remains of limited application. Apiculture may also be contributing to crop yields by ensuring pollination.

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[50] Husain's (1988, 183) rather odd claim that it is a social taboo amongst the Nagas to use cattle manure is certainly not true in the study area, nor probably anywhere in the Naga Hills.

Plantations

The current boom in cardamom and other perennial cash crops is occurring primarily in Khonoma's mid-slope zone that was formerly used exclusively for jhum cultivation. This transition is assisted in that the alder is usually retained as a canopy and the perennial crops planted as an understory. These fields are thereby transformed into long-term agroforests and removed from the jhum cycle. But this disrupts the jhum cycle in terms of the mechanisms that have been in place to work communally in clearing access paths, pollarding all trees to deny sanctuary to parrots and other birds that might damage the crops, excluding livestock, and so on. It also means a shrinkage in the pool of land available for jhum cultivation. This may have an impact on land-short villagers that have traditionally relied on renting or borrowing jhum plots from their more affluent neighbors (see discussion on land transfers in chapter 4). Access to land for such short-term use will almost certainly tighten up as more of it is converted into long-term plantations. There is also a more general concern that land closest to the village and with the highest agricultural potential is being tied up in plantations and by extension, cultivation of annual crops will be pushed further upslope. Good land use planning would probably recommend the reverse, given that plantations are far less demanding in terms of land quality and the frequency that they have to be visited.

Forests

The forested peaks surrounding Khonoma provided its people with a generous supply of wild food plants, medicines, and construction materials; a place to hunt and fish after the crops were harvested; and a refuge during times of trouble. Now that these roles are fading, the forest's remaining importance lies primarily in its ecological functions; in stabilizing steep slopes, protecting the water sources that feed the irrigated paddy terraces, and contributing to the cool, moist climate that is pivotal to the success of alder, cardamom, potatoes, and other semi-temperate crops that have become the core of Khonoma's economy. The forests also contribute to farm sales by providing grazing grounds for the highly-valued mithun.

The boundaries that separate forests and cultivation are often blurred. In times of shortage, villagers cleared temporary plots from the forests for rügu tei cultivation (chapter 3). Alternatively, when land use pressures are low, some of the uppermost jhums lapse into disuse and return to forest cover. The forest margins thus ebb and flow with the relative demand for agricultural land. Fields in this border zone are more vulnerable to wildlife venturing from the forests at night to feed on the crops.

Major Trends of Change in How Khonoma Uses its Land

During the first centuries of Khonoma's existence, its people relied on local fields and forests for virtually all their needs. Like rural communities everywhere, this dependence fostered an intimate knowledge of the environment and its plants. Over that half millennium, they experimented with the usefulness of both local wild plants and those from other parts of the world that made their way into the Naga Hills. This has resulted in the impressive diversity of plants that we find Khonoma using today (appendix 5-48). As summarized in table 7-7, our surveys recorded a total of 494 species, representing 294 genera and 104 families, that the village continues to use for a wide range of purposes. It should be pointed out, however, that much of the agrodiversity in Khonoma is contained in a relatively small proportion of the fields (see appendix 5-35). If only those crops widely grown by most farmers are considered, this represents only a small fraction of the total agrodiversity. The same applies to the use of wild plants. The list of those that actually continue to be frequently gathered would be a small subset of appendix 5-42. These trends are likely to accelerate as farmers are forced to specialize in those crops that they can grow at a competitive advantage, and depend increasingly on the market – and less on the forests – for many of their auxiliary needs.

Table 7-7. Diversity of Plants Exploited by Study Villages: An Overview†‡

	Families	Genera	Species
CULTIVATED †			
Wet Rice Terraces	14	27	33
Jhum Fields	22	49	62
Kitchen Gardens	50	95	118
Permanent Gardens	34	63	80
Sub-Total:	53	119	157
GATHERED ‡			
Wild Vegetables	55	90	137
Wild Fruit, Nuts and Berries	34	48	66
Medicinals	55	93	106
Livestock Fodder	33	53	59
Other Economic Plants	54	113	180
Ritual Plants	22	38	43
Sub-Total:	101	260	430
TOTAL:	104	294	494

§ The numbers of course do not add up because of overlaps among the categories.

† For details, see appendices 5-21, 5-25, 5-31 and 5-32.

‡ For details, see appendices 5-36 – 5-42.

As part of their early ethnobotanical knowledge, villagers began to distinguish between plants in terms of their effects on soil fertility (appendix 5-58).[51] This became of increasing interest as cultivation pressures mounted and farmers sought ways to bolster the natural processes by which fertility regenerated. These observations led to the dispersed alder management on the hillslopes that is the focus of this study, and a parallel system with *Albizia* in the terraced valley below. Conversely, the oaks, chestnuts and other trees seen as antagonistic to crop growth were targeted for removal. This manipulation of the vegetation, continued over successive generations, led to a narrowing of tree species on agricultural land to those that farmers found most useful.

The arrival of the cash economy throws into doubt how long Khonoma and other Naga villages will continue to exploit such a wide range of biodiversity. Indeed, there is a distinct danger that the pool of ethnobotanical knowledge built up by their ancestors over the centuries will be lost, as new generations of Nagas turn increasingly to the market for their needs. The instruction of Naga youth in traditional knowledge is being curtailed as they spend longer outside the village in pursuit of formal education. Given the office jobs that almost all aspire to, the indigenous technical knowledge of their ancestors is unlikely to have much utility in their lives. But the need to finance their education puts pressure on their parents back in the village to earn more cash. Now guided by the rules of neoclassic economics, they are responding by planting cash crops that thrive in cool mountain environments and can be produced at competitive advantage for the huge market on the Indian plains. Hence, just as centuries earlier it was the need to grow enough

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[51] A small experiment was undertaken to test farmers' assertions of which trees build the soil and which deplete it. It focused on eight species – three widely perceived as beneficial, and five as detrimental, to surrounding soils. The sample size was five individuals of each of these species. Samples were collected of both their foliage and the soils surrounding each tree. The leaves and soil were mixed to create a composite sample of each for each of the trees tested, and these were submitted to the Department of Soil Science and Conservation lab at Chiang Mai University for analysis. The results were not conclusive (appendices 5-49 – 5-51). The soil-building trees sampled included the two N-fixers that Khonoma has integrated into its fields – *Alnus nepalensis* and *Albizia stipulata* – and a third, *Hovenia dulcis*. Although the nutrient content of the foliage of the three trees reported to positively influence soil properties was marginally higher, the averages were thrown out by *Melia composita* – a tree that is widely recognized by agroforesters elsewhere as a soil improver (Young, 1997, 48). For example, cases of its use in managed fallow situations have been reported in Vietnam (Vien, 2007). But, curiously, our Naga farmers saw *Melia as* the opposite – a soil depleter. This disconnection is puzzling and requires further investigation. In the Naga Hills, cattle like to browse on *Melia* fruit and are a major agent for seed dispersal in jhum environments. Some farmers noted that the habit of cattle, in congregating around *Melia* trees in search of its fruit, compacted the soil and made it harder to till (Kikhi, 1997, 51). That would suggest that regardless of the fertilizing value of *Melia*'s leaf litter, farmers may be associating it with poor crop performance because of cattle damaging the soil's physical properties. One Naga forester logically suggests that *Melia*'s rapid growth may be at the expense of exhausting the surrounding soils (Yaden, 2001), but the soil samples do not appear to support that theory (appendix 5-50). In fact, the soils under the three trees that farmers viewed as soil improvers did not appear to be significantly better than the other five thought to have deleterious effects. These data could thus not confirm farmers' beliefs about the relative impacts of these trees on soil properties. Field trials to test crop performance in association with the trees would be a more accurate method of trying to replicate farmers' experiences and would presumably shed more light on the issue.

rice that drove construction of the irrigated terraces, today it is the pursuit of cash that looms large in farmers' decision-making.

We thus see a growing complexity of land use types as farmers move away from subsistence crops and instead specialize in market commodities (figure 7-30). The growth of Nagaland's off-farm economy is also fueling urban migration as people move from villages to towns to pursue education and jobs. This is both creating a growing class of absentee landowners and leaving villages with a dwindling labor force to manage their lands.[52] Those remaining behind have to concern themselves not only with generating more income from the land, but also doing it with less labor. Perennial cash crops such as large cardamom fit both criteria well and appear poised to radically change Khonoma's farmscape. And as villagers engage increasingly with the market economy, it seems inevitable that there will be a proportional decline in reliance on the wide range of wild plants that they once gathered from the forest.

Off-Farm Economy

In considering the off-farm sector of Khonoma's economy, it is appropriate to begin at a point when trade was about to expand rapidly as a result of the cessation of warfare and headhunting. When the British imposed law and order on the Naga Hills, the people of Khonoma were already well accustomed to traveling far and wide, and knew their region very well. Trade had long existed alongside the constant warfare and, much as it was dominant in the latter, Khonoma was also recognized for its leading role in regional trade (see chapter 4). There was already a long history of commercial relations between the hills and the plains of India. Nevertheless, the transition from raiding to trading was a painful one, particularly for the warriors of Khonoma.

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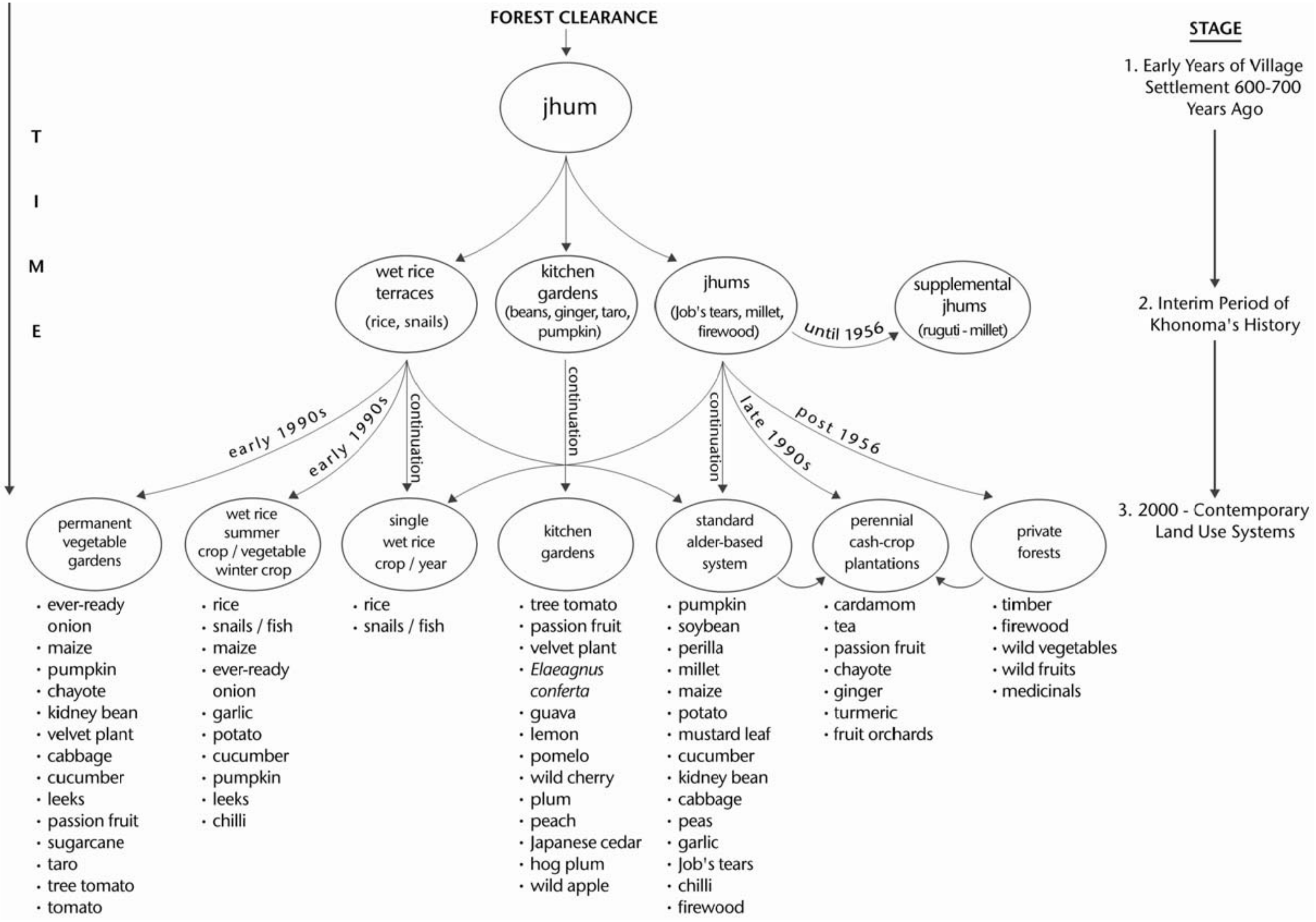
[52] This pattern is not consistent throughout Nagaland. The growth of the off-farm economy is naturally most pronounced near district capitals, and it is here that young people are migrating to urban areas to pursue better opportunities. Their home villages are left with dwindling labor forces and are often unable to cultivate the same area that their ancestors did. Villages near Mokokchung, for example, report that in recent years, their fallow periods have actually lengthened from nine to 12 years. But in more remote areas, without either alder fallow or wet rice, where the local economy remains limited to subsistence agriculture, there are few opportunities to absorb the growing population and pressure on land continues to mount. This is where we find fallow periods shortening and shifting cultivation under stress. The unevenness of development in rugged mountain areas means that both trends can co-exist in close proximity.

Figure 7-30. Simplistic Representation of Khonoma’s Changing Land Use Systems



Khonoma's Participation in the Naga Hills' Expanding Trade

Now shackled in its ability to bully smaller villages and extort tributes, Khonoma was forced to divert its energies to other economic pursuits that met with the approval of the District Commissioner. The women continued to occupy themselves in intensively cultivating the village's limited land base that was suitable for agriculture. But like a decommissioned army, it was the men who found that their traditional role as fighters and defenders of the village had become redundant. The youth in particular chafed that they could no longer prove their valor in battle and claim the decorations that would earn them respect as great warriors.

Khonoma's reputation gradually shifted focus from fighting to trading. People used to remark that it was an unusual day that a Khonoma trader was not met along the road, traveling as far afield as Rangoon, Calcutta and Bombay (Anonymous, 1908, 293; Allen et al., 2001, 478). They went in search of salt, thread, kerosene oil, iron, and guns, but eventually specialized in the beads, cowries and other shells that were very popular amongst the Nagas for making jewelry. These were ideal trading items in that they were small and easily carried, not overly fragile, and of high value. Moreover, they could be processed and assembled into valuable necklaces under village conditions.

The market was large since, with designs specific to each tribe, shell jewelry was worn by all Naga subgroups (Hutton, 1926f). Stories are told from that time, of Khonoma preachers traveling to other villages to evangelize, carrying a bible in one hand and pulling out jewelry to sell with the other. The Sema Nagas were reported to be a particularly good market since many considered it a profitable investment to buy necklaces for their daughters, thus raising their prestige and brideprice when they later married (Chase, K., 2000).

But the Nagas' horizons were to expand far beyond the sources of their raw materials for making necklaces. A labor force of 2000 Nagas was sent to France during the First World War to assist the British and Allied forces (although none were Angami). After their return, many continued to work with *Pax Britannica* as it set about developing an infrastructure and system for administering the Naga Hills (Reid, 1944). This period of construction brought not only opportunities to earn cash, but also new skills and resources. Those employed in building roads and graves learnt how to use the white man's tools for stonework. Others picked up carpentry skills. As roads and vehicles became more common, Nagas learnt to buy suspension springs in the market and hammer them into spear heads and other tools. With the passage of time, Nagas who had received some formal education began to take up low-level government positions such as police, truck drivers, gardeners and janitors, and climbed increasingly higher in the ranks as their qualifications improved. The graduation of A. Kevichusa with a Bachelor of Arts degree in Calcutta in 1924 made him the first Naga graduate, and showed that even under British administration, Khonoma continued to lead the way amongst Naga villages. As the professional civil service expanded in Kohima, it provided a market for Khonoma and other nearby villages to sell farm products and pick up contract jobs. By 1944, the Nagas again found themselves thrust into a World War, but this time the fighting came to their own doorsteps. Many accounts chronicle the Nagas' huge contribution to the British victory in halting the Japanese advance in Nagaland and preventing them from using it as a staging ground to push down into the Indian plains (Hutton, 1945; Rooney, 1992). Kohima was virtually destroyed in the fighting and had to be rebuilt from ashes.

The Painful Transition from British to Indian Administration

The door to the outside world that had been flung open so dramatically when Kohima became a major battlefield in WW II slammed shut again when the British left the Indian sub-continent, and India sent in its military to deal with Naga calls for sovereignty. The market economy that had begun to flourish in the first half of the 1900s evaporated overnight as two divisions of the Indian army and 35 battalions of the Assam Rifles and armed police poured into the Naga Hills in 1955 to clamp down on the Naga uprising (Iralu, 2003, 79).

Economic Diversification that Followed Peace in 1964

Flow of Money from Delhi. Macro-economics changed dramatically after the central government began pumping ever larger amounts of cash into Nagaland's economy (figure 6-1).[53] Up to the present day, the state has little revenue generation of its own and most of its annual budget (roughly Rs 23.5 billion in 2003-04) is a grant from Delhi.

Much of this budget is used in building up a civil service far beyond what is needed, and out of all proportion to any of the other northeastern states (Longkumer, 1996). It is widely acknowledged that this culture of subsidy has badly eroded Naga work ethics and stories abound of government servants arriving at their desks only once a month to receive their salaries.[54] Nagaland is also earning a growing reputation for corruption. Some of the funds trickle down to pay for government positions at the village level. Khonoma is typical of this trend, having 80

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[53] For further readings on the economy of Nagaland and the wider North East region, see Burman, 1984; Mahajan (Ed.), 1987, 1988; Saleh, 1989; Das and Purkayastha [Eds.], 2000; Sengupta and Roy [Eds.], 2003; Ray and Das [eds], 2004.

[54] And for those who do go to work, office hours are decidedly relaxed. At the beginning of my fieldwork, a Naga colleague advised me that if I arrived at government offices before 10:00 a.m., I would be too early to find anyone at their desks, but if I was later than 2:00 p.m., this would be too late and everyone would already have returned home. (Yaden, 2000). Bizo (1996, 27) confirms that "Offices work for no more than four hours each day", stressing the loss of work culture in Kohima.

government jobs[55] that bring an estimated Rs 418,400 into the village economy monthly (appendix 5-52).[56] To put this into perspective, a relatively high-paying teaching position might earn Rs 10,000 per month – roughly equivalent to the total value of the harvest from a first-year jhum field. In monetary terms then, it is the equivalent of harvesting a new jhum field every month! Interestingly, many of these government positions are kept within the same family and handed down from one generation to the next, just like a plot of land. The positions are therefore highly sought after and the subject of much lobbying. Throughout Nagaland, jobs are more often secured from kinship networks or political patronage than qualifications. Other central funds are channeled to villages through annual allocations to village development boards (VDBs)[57] or awarding government contracts. There are also various other state schemes, such as providing subsidized rice to households with shortfalls. All of this amounts to a village economy that is highly subsidized by Delhi and extremely vulnerable to cutbacks. While many Nagas still make bold statements about wishing to break away from the Indian union and establish their own country, the prospect of this actually happening has grown steadily dimmer as the state has built up a chronic dependence on handouts from Delhi. Instead of being spent judiciously to develop the state – so that one day Nagaland might be strong enough to stand on its own feet economically – much of the money has been mismanaged and channeled into private pockets. Those in positions of power, who might otherwise champion an independence movement, have too much to lose to risk Delhi's anger. India could bring Nagaland to its knees without firing a shot, simply by closing the spigot on the money pipeline.

The Village Economy: Expansion of the Private Sector (*plates 5-119 – 5-124*)

As money flowed freely and markets opened up, there has been a parallel diversification of the village economy in the private sector. About eight private shops have sprung up in the village, concentrated near the central bus stand. They sell an

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[55] 16 in the Public Works Department, 2 in the Department of Forestry, 32 in the Deptartment of Education, 14 in Medical, 5 in Veterinary and Animal Husbandry, and 11 in Public Health and Engineering, averaging Rs 5230/mo (see appendix 5-52).

[56] Many others have moved to Kohima, the state capital, to work with the government sector there. The total flow of funds from Delhi to Khonoma through government salaries is thus more substantial than these figures would suggest.

[57] At the time of this fieldwork, funds were disbursed by the Rural Development Department to Village Development Boards (VDBs) through three main schemes: Grants in aid, which makes an automatic payment of Rs 750 per household per year; the Jawahar employment scheme, which provides a further Rs 250 per household per year; and the Employment insurance scheme, which pays another Rs 1000 per household per year.Since funds are allocated on the basis of number of households, this leads to chronic over-reporting throughout Nagaland. If we calculate that Khonoma currently has 586 households (2001 census), that would constitute another Rs 1,172,000 injected annually into the village economy. All these funds are administered by the Village Development Board.In terms of revenue flow in the other direction – from the village to the state – an annual tax of Rs 20/household is the only direct tax paid by villagers. This would return Rs 11,720 from Khonoma back to the state coffers.

assortment of canned goods, biscuits, light bulbs and other dry goods that villagers consume daily in small quantities. Three locally-run buses ply from Khonoma every morning (except Sunday), two to Kohima and a third that runs all the way to Dimapur in the lowlands. A fourth bus is added during Christmas and other busy seasons. All return to the village in the late afternoon. Khonoma's convenient bus linkages to Kohima (one hour) and Dimapur (three hours) allow it to easily tap into these markets.[58]

The American Baptist and Roman Catholic churches, and the schools that they operate, provide 36 salaried positions that circulate a further Rs 99,500 within the village every month (appendix 5-52).[59] With many occupied by off-farm work, they in turn often depend on hired labor to keep their farms running. The market for agricultural labor thus fluctuates with times of peak demand and generally pays Rs 100 per day for men, and Rs 80 for women and children. A few hold jobs in shops or offices in Kohima, and either commute daily or more often return to the village only on weekends.[60] Many others live permanently in Kohima to avail jobs and other opportunities in the state capital, but continue to own land in the village. Most up-market cement houses that have sprung up in Khonoma in recent years have been financed by such outside money, and are used either as weekend homes or by family members who have remained behind in the village. This again involves substantial resources being channeled back to the village from outside.

Like agriculture, other village industries have become commercialized and are now forced to compete in the open marketplace. Some have prospered, others perished. As shown from our survey of village exports, Khonoma has developed a specialty niche in weaving high-quality baskets, generating sales exceeding Rs 1 million annually (figure 7-31). Khonoma's unique designs, a good supply of rattan from its own and nearby Zeliang forests, and the villagers' weaving skills combine to give them a competitive edge in the basket market. The intricate mekho basket (see code 6-10 in appendix 5-7) that is found decorating the walls of many homes across Nagaland is exclusively a Khonoma design. The quality of their baskets has even earned national recognition. Khonoma's elder craftsmen have brought home awards from arts and crafts competitions in Delhi (plate 5-120). Some of their more elaborate masterpieces, destined for well-heeled art collectors, are reported to sell for as much as Rs 10,000 to 20,000 for a single basket.

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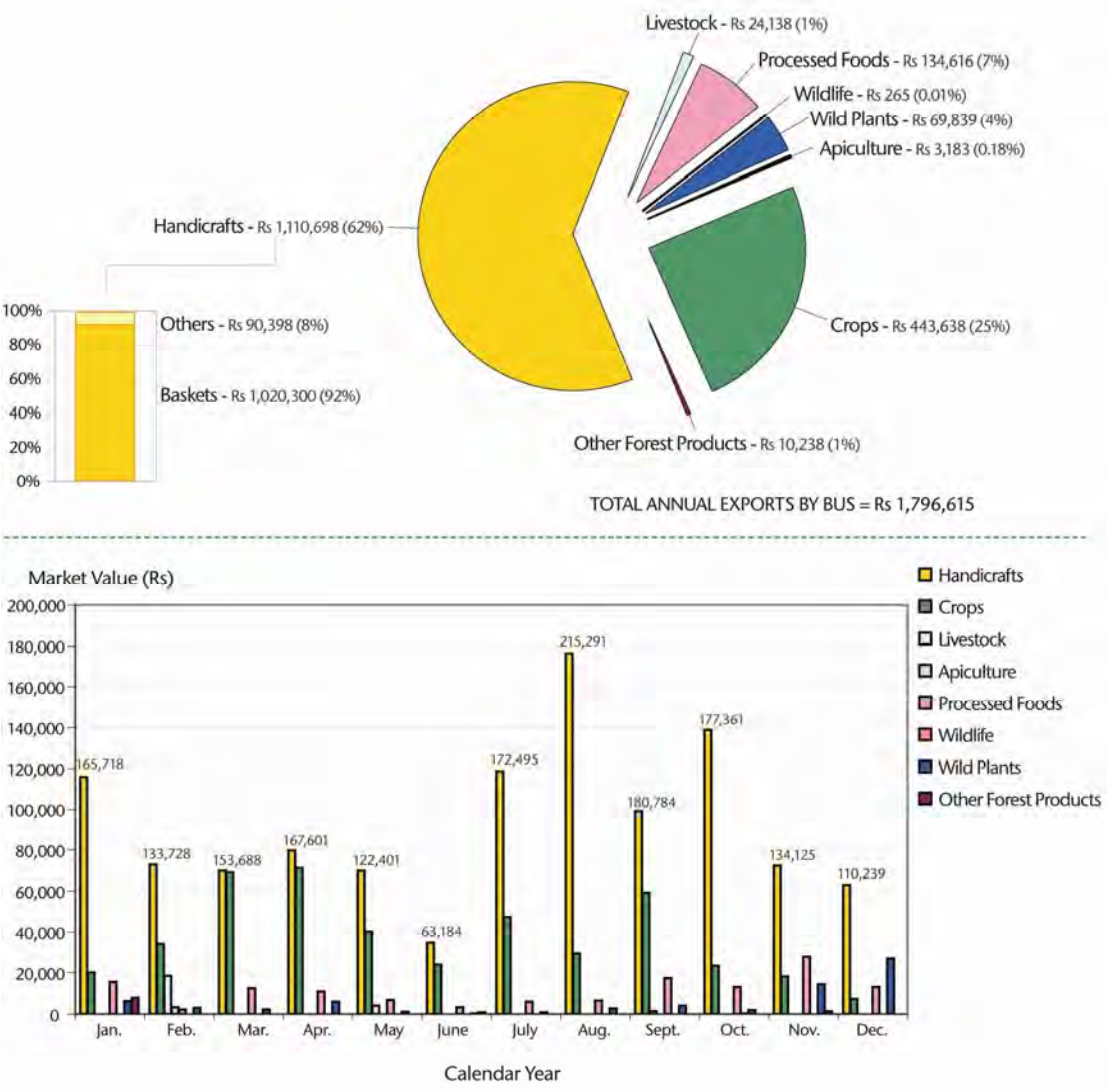
[58] Villagers trying to sell fresh vegetables in Kohima's markets or along its streets are, however, left at a distinct bargaining disadvantage by Khonoma's bus schedules. Consumers know that prices for Khonoma products will drop rapidly in the afternoon as it nears time for the buses to return to the village. Although asking prices start out high in the morning, cut-rate prices must be accepted in the afternoons, so vendors can avoid the need to take their unsold and now wilting vegetables back to the village,. Buyers have learnt that the closer their purchases get to bus departure time, the cheaper the prices will be (Kevichusa, 1995).

[59] The average wages paid for private positions are slightly more than half that of the government sector.

[60] The buses returning from Kohima to Khonoma are usually particularly full on Fridays and Saturdays as people return to spend their weekends in the village.

Figure 7-31. Products Exported from Khonoma by Bus Over a 12-Month Monitoring Period *



* Based on 118 days surveyed between 13 Jan. - 12 Dec., 2002 (12 mo.), roughly the first 10 days that the buses ran in each month, and then extrapolated for the entire year. Clearly this does not include larger volume commodities such as large livestock, firewood, timber, dressed stones, etc. that would be transported by truck.

Likewise, the village's plentiful supply of sedimentary rocks, combined with the skills and tools earlier acquired from the British, have helped Khonoma to develop stone masonry into an important village industry. It was nurtured by the British when they hired Khonoma masons for many state projects, including construction of the war cemetery in Kohima. Now, many Nagas building up-market homes in Kohima seek out Khonoma craftsmen to do the carpentry and stonework. Others remaining in the village earn roughly Rs 250-300/day cutting stone into blocks for export (Rs 5/block) (plate 5-121). There are also a few woodworking shops scattered around the village, producing lounge sets and other furniture.

Other small-scale industries withered as villagers adopted more western dress, and the kilts (kechünyi), skirts (mekhela), and rattan knee bands (phiso) that were once everyday attire were put into storage. They are now taken out only during festivals that celebrate Khonoma's cultural heritage. Some traditional items have survived by becoming novelties exchanged between Nagas on special occasions, and as the state opens up, sold to tourists as souvenirs. Several households still augment their earnings by making decorative spears for such markets (plate 5-124). Shawls have persisted as a part of everyday dress, but even here, local weaving is threatened by mass-produced imports from Manipur. Regardless of where the weaving is done, the silk and cotton fibers and natural dyes formerly used have been replaced by bright, chemically-dyed wool yarns (mozha) that are cheap and easily available. Weaving continues to be an important subsidiary activity for Khonoma women when they are not busy in their fields (plates 5-122 – 5-123), but other than some attractive patterns unique to the village (see appendix 3-36) and nearness to markets in Kohima, they have no particular competitive advantage in the weaving industry.

Even the necklace business that was the focus of much of Khonoma's early trading has almost completely disappeared. Nobody makes necklaces in the manner described by Balfour (1922) anymore, and only a few dabble in some casual buying and reselling. Anybody wanting a necklace can now choose from a large selection in any number of Kohima shops.

The blacksmith forges scattered around the village have also fallen silent, unable to compete with the flood of cheaper tools coming up from the lowlands. Even the few remaining spear-makers import the steel heads and tips from Imphal, and the scarlet goat hair from Delhi. Only the assembly is done in Khonoma. The gunsmiths have met a similar demise.

Market forces have thus forced Khonoma to narrow its village industries to those with some competitive advantage, while others unable to compete have collapsed. This also represents a loss of traditional skills, even as new ones more appropriate to the changing economy are acquired. Khonoma youth are now far more likely to know how to surf the Internet than hammer out a dao over an anvil. This will eventually have huge implications for the village's land use systems and very way of life.

Beyond its core population of full-time residents, Khonoma has an additional transient population that comes and goes. This makes it difficult to get accurate census data. Students make up a large part of this transient population, as all have to leave Khonoma to pursue studies beyond class 10. Not only do their families have to find money to support their education, but their labor is also lost to the household economy. This outflow of money from the village will hopefully reverse in the future when they graduate, find jobs, and begin assisting their aging parents.[61] If several children are studying or working in Kohima at once, their parents often decide to buy land there and establish a second house, rather than pay for rented facilities, so population and economy of Khonoma become further interwoven with those of the state capital. The best and brightest never return to the village, leaving the less scholastically inclined behind to cultivate their ancestral land.

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[61] Although bank loans remain inaccessible to most, money can be borrowed from wealthier villagers on the informal market at 6% interest monthly.

This overview has painted a picture of a greatly diversified village economy in which agriculture is playing a diminishing role. Men, now freed from their previous role as defenders of the village, have assumed the major role in this growing off-farm economy. While the men try to earn cash, the women continue to cultivate the land that remains the backbone of the village's subsistence economy. This resonates with Kelhou's observation that "a(n) (Angami) girl's duty was to work and not to earn" (1998, 56). But even that line is blurring as women generate increasing surpluses, both in agricultural crops and non-timber forest products, which are wrestled onto the morning buses and taken to town for sale. Being able to feed one's family is no longer enough. As Nagas engage more with the market economy, cash is needed to pay for household essentials, education, clothing and possibly some frills to satisfy rising expectations of their standard of living.

Exports Leaving Khonoma by Bus

Taking a morning bus from Khonoma is always fascinating, in terms of the eclectic variety of products bundled onto the vehicle on their way to markets in Kohima and Dimapur. What is on offer varies with the season. Bulky sacks of potatoes, garlic, or cabbage are hefted to the roof and tied securely in place. A few newly-woven baskets invariably hang near the front, so as to be easily grabbed as their owners disembark. Several spears may lean in a nearby corner. Passengers struggle up the steps, weighted down with an assortment of goods– bundles of leafy vegetables from both field and forest, bags of fermented paddy known as khekhrie, which is used as a yeast for brewing beer, or perhaps a basket or two of snails or crabs captured while working in the rice terraces. As one scans the now crowded bus, an odd chicken or duck may be spotted tucked under an arm here and there. If it is late fall, chances are good that sacks of wild apples will fill the aisle, forcing the final few passengers to scramble over them in search of seats. Others may clutch bouquets of *Cardiocrinum aruiculata*, *Ilex aquifolium*, *Anaphalis margaritacea*, *Delphinium* sp. or *Hedyotis* sp., found only in the higher forests and Dzükou Valley, and popularly used as dried flowers by people in Kohima as they decorate their houses for the Christmas season. Concealed discreetly on the floor underneath a seat may be a few bags of Khonoma's rich black topsoil, smuggled out against village regulations by someone who perhaps needs money to pay her children's school fees but has nothing else to sell. The early 5:30 a.m. bus will be particularly full of mostly women engaged in small-scale commerce.[62]

Given the obvious importance of the buses as a channel for exporting goods from the village, we undertook a year-long survey to develop a clearer understanding of what is being sold and when. The results are summarized in figures 7-31 to 7-32 (and the spreadsheet underlying these graphs is consigned to

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[62] Men will more often wait for the 6:00 a.m. bus. They usually go to Kohima (a one-hour ride) to visit government offices or on other official business so it is pointless to arrive too much before office hours.

appendix 5-54).[63] When reading these charts, it must be kept in mind that they are only a partial picture of Khonoma's total exports since they do not include the firewood, timber, stones, mithun and other bulkier products that leave the village by truck.[64]

The two graphs in figure 7-31 are designed with the same color-coding and presented together so that the reader's eye can move easily from the general picture of what is being sold (A) to how the sales are distributed across the year (B). A further breakdown of the four major categories of exports is provided in figure 7-32. Most striking is the dominance of handicrafts – baskets specifically – within the menu of exports; this single item represents 56.8% of the value of all exports (Rs 1,796,615/year) leaving Khonoma by bus. Since baskets are woven entirely by men when they are not busy in the fields, the volume and timing of basket sales provides an accurate barometer of when they are least busy with agricultural activities. Not surprisingly, the output of baskets drops off to a minimum in June when all labor is diverted to transplanting wet rice, and quickly climbs thereafter as the women are left to look after the fields. It dips again in September when the rice is being harvested from the terraces and then again towards the end of the year when it is time for the men to start pollarding the alder and opening their jhum fields for the coming year. There is thus a close dovetailing between the division of male labor shown here for handicraft production, and that presented in chapter 8 for agricultural activities.

Crops are sold in two consecutive waves. The first rises in March and April as the winter garlic crop is harvested and taken to market. After a brief trough, then a second wave peaks from July to September as chayote leaves, potato, mustard leaves, coriander and other summer crops mature. A spike in the "wild plants" category in November and December marks the season when wild apples are abundant in parts of Khonoma's communal land. They are essentially a "free crop" available to anyone willing to gather them for the Rs 60/bag (about 20 kg) that they fetch in Kohima's markets, and are an important source of additional income for some of the village's poorer households.

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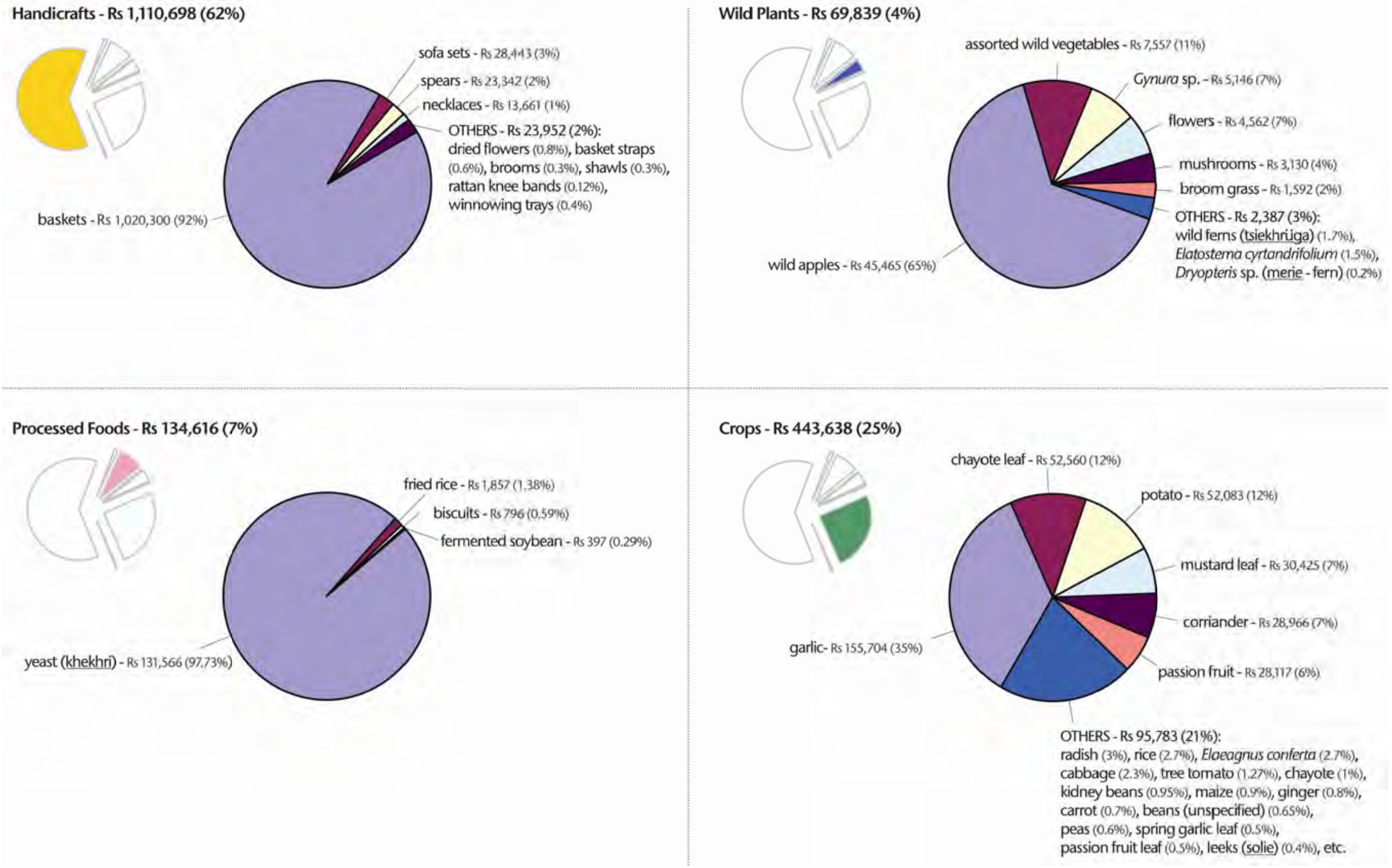
[63] An identical data set for Tsiesema is presented in appendices 5-55 – 5-57.

[64] The village administration keeps no records on this. Data could presumably be gathered through a survey that asks each household to quantify sales of these larger products within the past 12 months – although respondents might fear that the data will be used for taxation purposes and thus under-report. Alternatively, checkpoints could be set up on the roads to record the contents of trucks' loads as they leave the village. But that would require a huge logistical undertaking and might be risky in a setting where stopping vehicles along roads is usually associated with banditry or underground elements, often one and the same.

Figure 7-32. Breakdown of Major Categories of Exports from Khonoma (transported to market by bus)



The Household Economy

Since most decisions about the management of agricultural lands are made at the household level, we also wanted to examine family finances to understand their influence on land use. During the second year of fieldwork, we increased the book-keeping burden of our ten collaborating farmers in both study villages by asking them to keep detailed accounts of all their income and expenditures. The results of their work are graphed in figures 7-33 to 7-36. The data from both villages are presented side-by-side to broaden our sample size and facilitate comparisons.

Expenses. Throughout the fieldwork, farmers often repeated the complaint that although they had traditionally been self-sufficient in providing for their needs, it was no longer enough to provide their families with food on the table and a roof over their heads. As the economy became increasingly commercialized, they needed to find ways to generate more and more cash to provide for their families' needs and expectations for rising standards of living. Although the spending practices of individual households varied widely, the aggregate picture between the two study villages was remarkably similar (figure 7-33). By far the most money was being spent for household essentials (avg. 36.4%), which together with education (avg. 20.3%), and clothing (avg. 9.1%), already consumed almost two thirds of total household spending. That left them with only 34.2%, or about Rs 15,190[65], for all other types of expenditures during the year. According to their diary entries, our Khonoma collaborators were bigger spenders by about Rs 9,049/year than their Tsiesema counterparts, but neither appeared to have much room for discretionary spending.

A few other trends in spending habits were able to be gleaned by examining their distribution across the year (figure 7-34). Although both villages were spending a similar percentage on the groceries that had been categorized as "household essentials", Khonoma's food bill was relatively consistent throughout the year, whereas Tsiesema seemed to buy more in the early months and then cut back as its own fields started producing. Both however, saw a spike in spending in December when extra food was bought to celebrate Christmas. This also appeared to be the most popular time to buy new clothes, either for themselves or as gifts. The pattern of "loan repayments" in Tsiesema suggested that some might be celebrating Christmas on borrowed money and then paying it back over the following months. Education costs peaked in late January to February when school admission fees were collected and then levelled down to monthly fees for the remainder of the year. "Medical" expenses also hinted at slightly increased ailments during the rainy season.

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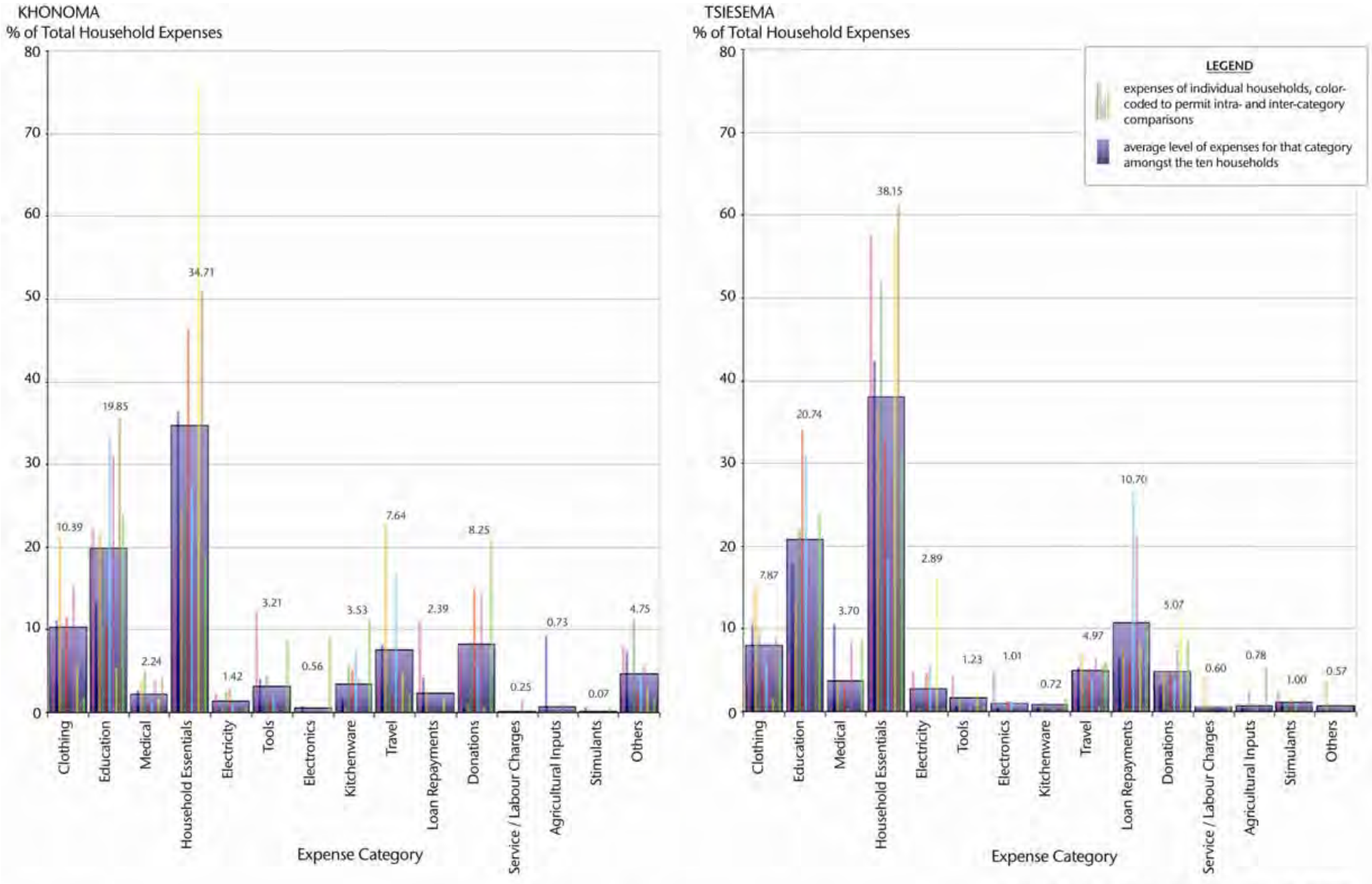
[65] About US $185.09, at currency exchange rates in effect on March 31st, 2002.

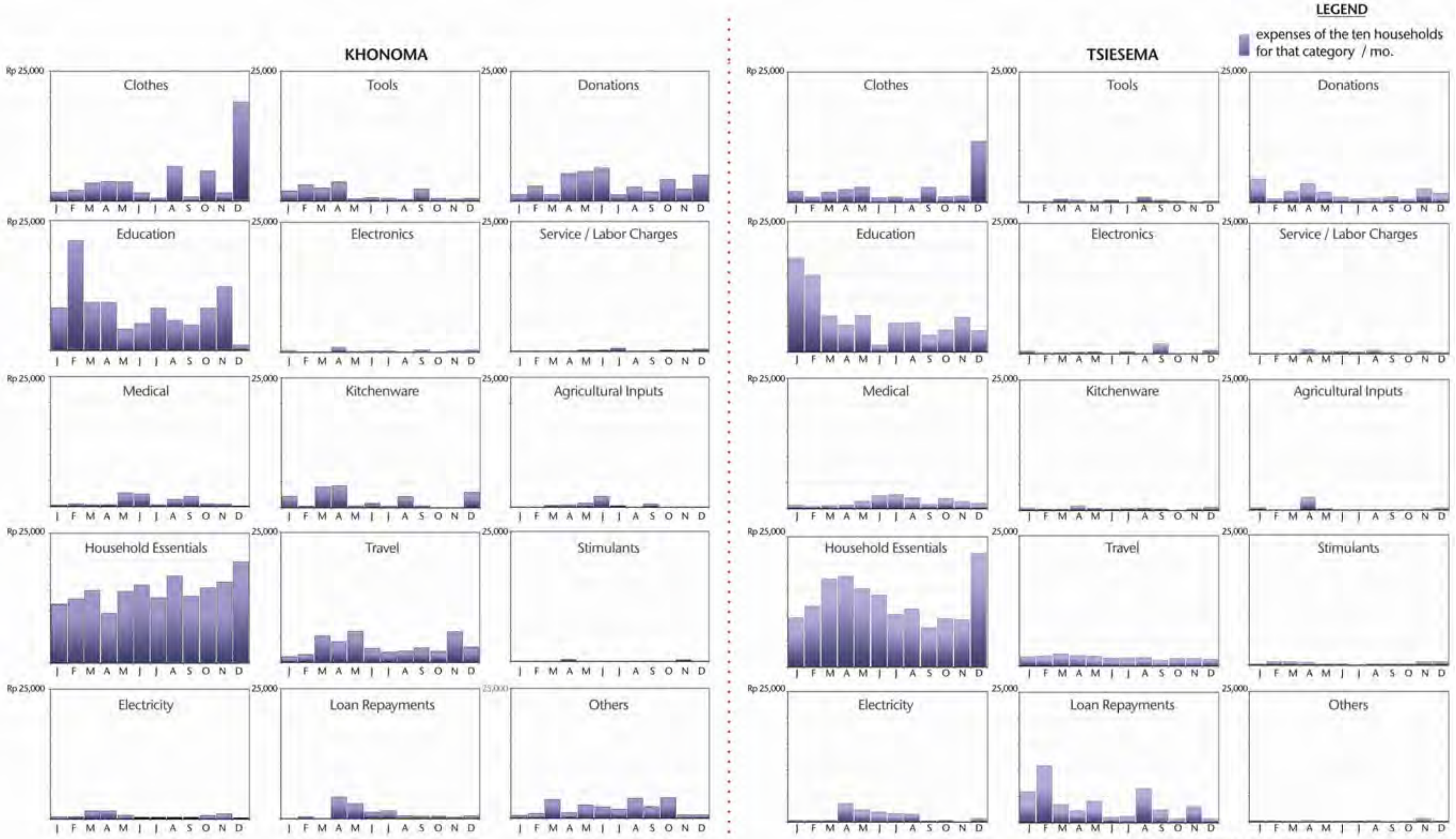
Figure 7-33. Breakdown of Annual Household Expenses of Collaborating Farmers in Khonoma and Tsiesema *



AVERAGE ANNUAL EXPENSES - Khonoma = Rs 48,939
Tsiesema = Rs 39,890
(US $1 = 48.89 Indian Rupees as of Mar. 31, 2002)

* Based on financial diaries maintained by ten participating households in each village from April 01, 2001 to March 31, 2002.

Figure 7-34. Monthly Household Expenses of Collaborating Farmers in Study Villages: Broken Down by Category of Expense*

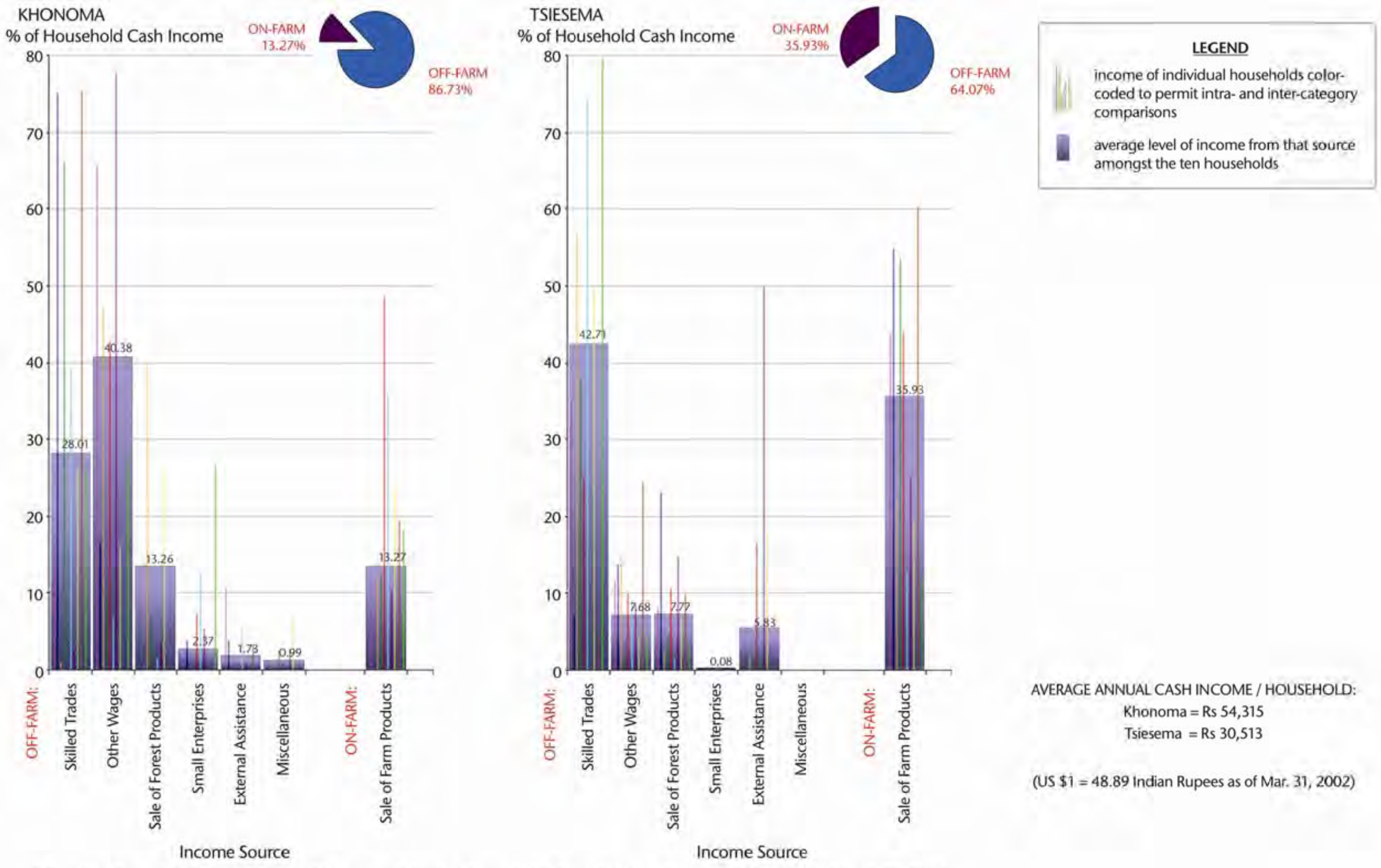


AVERAGE ANNUAL EXPENSES - Khonoma = Rs 48,939
- Tsiesema = Rs 39,890

(US $1 = 48.89 Indian Rupees as of Mar. 31, 2002)

* Based on financial diaries maintained by ten participating households in each village from April 01, 2001 to March 31, 2002.

Figure 7-35. Summary of Annual Cash Income of Collaborating Farmers in Khonoma and Tsiesema *

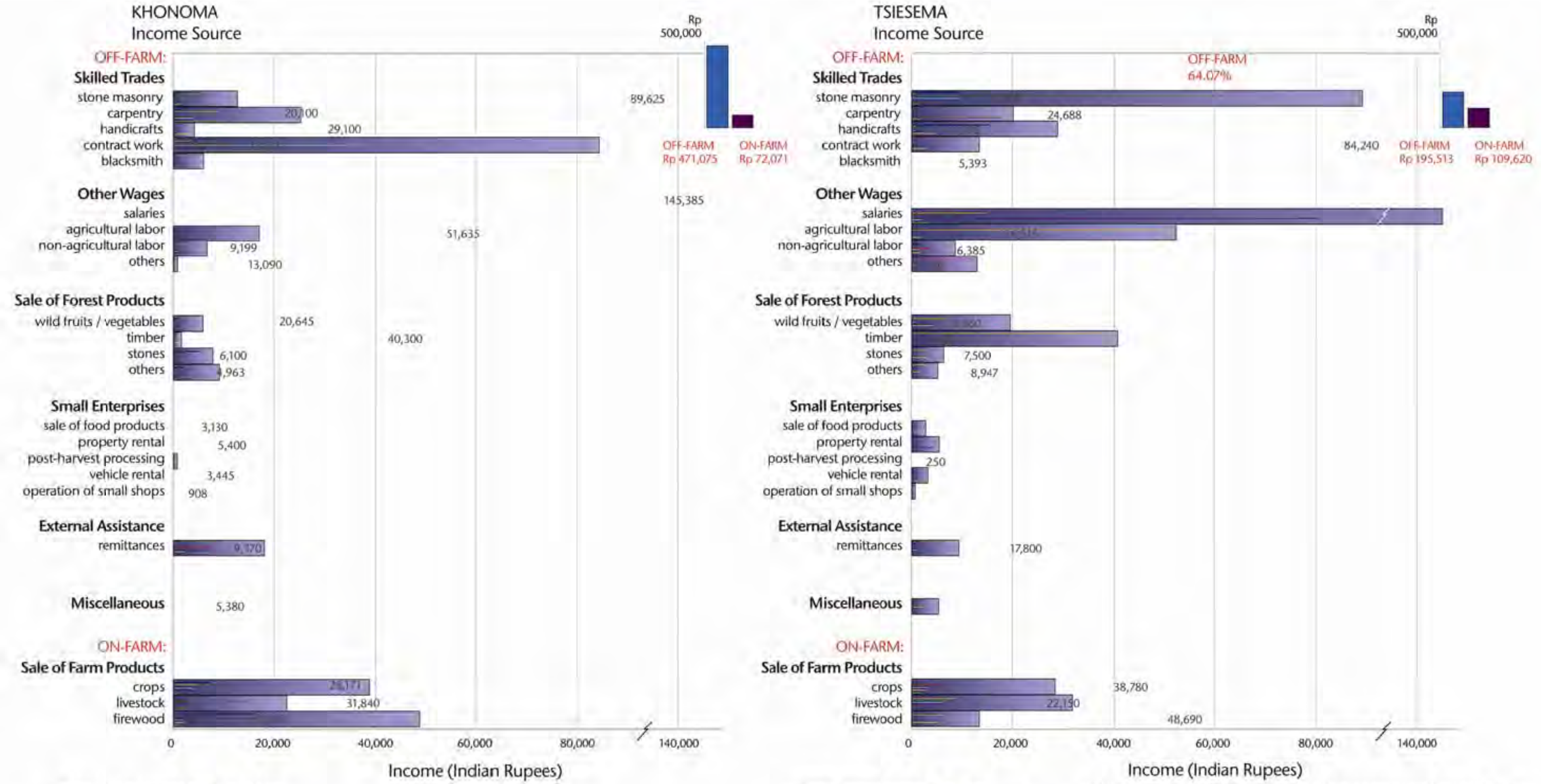


AVERAGE ANNUAL CASH INCOME / HOUSEHOLD:
Khonoma = Rs 54,315
Tsiesema = Rs 30,513

(US $1 = 48.89 Indian Rupees as of Mar. 31, 2002)

* Based on financial diaries maintained by ten participating households in each village from April 01, 2001 to March 31, 2002. Modest honorariums paid by the project to the farmers for their work in maintaining various diaries are not included.

Figure 7-36. Breakdown of Cash Economy in Study Villages: Income Sources of Ten Collaborating Households Over a 12-Month Period *



TOTAL CASH INCOME: Rp 543,146

TOTAL CASH INCOME: Rp 305,133

AVERAGE ANNUAL INCOME / HOUSEHOLD - Khonoma (off-farm) = Rs 47,108
(on-farm) = Rs 7,207
- Tsiesema (off-farm) = Rs 19,551
(on-farm) = Rs 10,962
(US $1 = 48.89 Indian Rupees as of Mar. 31, 2002)

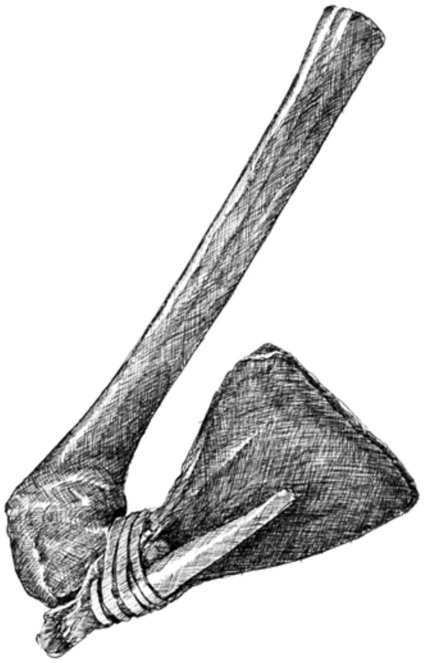
* Based on financial diaries maintained by ten participating households in each village from April 01, 2001 to March 31, 2002.

Income. How do villagers meet those expenses? What is most immediately striking is that agriculture in Khonoma continues to be aimed primarily at its own food needs, and villagers look elsewhere to earn money (see figure 7-35). This trend is also evident in Tsiesema, although it is there less extreme. This has large implications for gender roles. As will be shown in the following chapter, it is primarily women who are the farmers, and thus the caretakers of the subsistence economy. This has probably been the case for a long time. But having been freed from their traditional military role, men have shifted from gathering heads to gathering money. The economy has now diversified sufficiently that households can pursue different strategies to earn cash. The most favored would probably be a government position that pays well and demands little, leaving him or her free to do other things (and there are a surprising number of these; see appendix 5-52). But failing such a free lunch, some take on private jobs, which are less popular because they typically have to work much harder for half the money. Others pick up lucrative government contracts, particularly if they have clan connections to the budget administrators. Many develop skills in weaving baskets or cloth, or in stone masonry. These things provide high returns and can be done in a man's spare time. The most financially hard-pressed households are generally those that have not been successful in tapping into one of these niches and continue to rely solely on agriculture. The data presented in figures 7-35 and 7-36 show that our particular sample of households in Khonoma had developed a more diversified portfolio for income generation than their Tsiesema counterparts. They earn most of their money from salaries (26.8%), stone masonry (16.5%), agricultural labor (9.5%), selling timber (7.4%), and handicrafts (5.4%). So they rely relatively little on their farms for income generation (13.3%). In contrast, the Tsiesema sample earns significant off-farm income only from contract work (27.7%) and carpentry (8.1%), making them much more dependent on farm receipts (35.9%).

CHAPTER 8

Allocation of Land and Labor

Historically, the burden of agricultural labor fell largely on the shoulders of women in Naga society, as their menfolk were preoccupied with warfare and village defense. As Nagaland has become more peaceful, many men now turn their attention to seeking off-farm sources of income – leaving women to continue as the main farmers.



"The value of slaves and cattle is strangely estimated at the following rate, a male slave is worth one cow and three conch shells, a female slave is worth three cows and four or five conch shells.

"A cow, ten conch shells; a pig, two conch shells; a goat, two conch shells; and a fowl, one packet of salt.

"The price of salt in the plains is 7 rupees per maund of 40 seers or 80 lbs, and a conch shell is worth 1 rupee, so that a male slave is worth 13 rupees or 26s [shillings], a female slave 34 rupees or 68s., a cow 10 rupees or £1, a goat or pig 2 rupees or 2s. each."

(Mills, A.J.M., 1854, cited in Elwin, 1969)

INTRODUCTION – CHAPTER 1 REVISITED

To begin this definitive chapter we must revisit an argument set out in Chapter 1. By definition, shifting cultivators are short of labor compared to their land resources. If they were very land-short, then farmers' use of their land would have intensified to the point where they were no longer shifting, and they would have entered the domain of semi-permanent or permanent cultivation. Capital has historically played less of a role in what were mostly subsistence swidden economies, but as shown by the data presented later in this chapter, this is rapidly changing as the cash economy penetrates to even the remotest corners.[1] So as a shifting cultivator arises from his[2] bed in the mornings, his labor and that of his family members is the most precious asset that they have under their control, and they will invest it with the intention of maximizing returns. These calculations are becoming increasingly complex as the economy opens up and off-farm options become available. Gone are the days when their worries were limited to keeping a roof over their heads and full granaries.

Shifting cultivation is well adapted to this context of land abundance and labor shortage in that it uses fire energy to perform many of the necessary tasks of cultivation – thus reducing human labor inputs. Rambo lists six major benefits of burning:

"1. Clearance of unwanted vegetation from the field,

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[1] Cash of course can be used to purchase land and labor. This becomes particularly important for farmers wanting to purchase irrigated terraces, which are scarce and highly prized, or make their own.

[2] I refer to shifting cultivators in the masculine sense here out of tradition, but given the findings of the gender analysis presented later in the chapter, I acknowledge that this is problematic.

> 2. Alteration of the soil structure, making planting easier,
> 3. Enhancement of soil fertility by plant ashes,
> 4. A decrease in soil acidity,
> 5. An increase in the availability of soil nutrients, and
> 6. Sterilization of the soil and reduction of microbial, insect, and weed populations." (1984, 156)

With fire providing much of the energy input, swiddening becomes quite an efficient system by which human labor produces food. Of course, the crucial caveat underlying the sustainability of rotational shifting cultivation[3] is that land must be abundant compared to the population of dependent cultivators. Conklin, for example, estimated that the Hanunóo area in Mindoro could support 48 people/km^2 without deterioration (1957, 146-47), and Freeman calculated 20-25 as the maximum in central Sarawak (1955, 134-135), but Brown and Brookfield (1959, 25-32) showed that very efficient forms of shifting cultivation in the New Guinea highlands supported population densities nearing 500/mile^2 (193/km^2).[4] The general trend is that when increasing people to land ratios force an acceleration of the swidden cycle, shortened fallows become compromised in terms of their ability to perform their expected biological functions. The reduced fallow regrowth contains less biomass energy. "Unless yields are to decline precipitously, more and more human labor must be substituted for the work formerly done by the fire in cultivating, fertilizing, and weeding the land." (Rambo, 1984, 160) Farmers end up working longer and longer for fewer returns. They find themselves on the slippery slope of what has been described elsewhere as the "swidden degradation syndrome" (Cairns, 2007b).

Ironically, the very fire and fallow that underpin the system's benefits are also the elements that have attracted widespread condemnation of swiddening as wasteful and a leading cause of tropical deforestation. Chib exemplifies the type of dismissive reaction that shifting cultivation and its practitioners have typically received in Northeast India:

> "It is known to the social scientist the world over that the tribals have very limited wants and they solely live on necessities. Probably the words 'comforts' and 'luxuries' are unknown to them. In the name of entertainment and recreation, they have their occasional merry making and drinking. Being least ambitious, they have remained poor for long. The low rate of jhum yield compared to the one obtained under settled plough cultivation, coupled with the improvident habits of these people, the jhumias[5] are probably the most

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[3] "Rotational" is an important qualifier in describing shifting cultivation, in that it distinguishes it from the more destructive "pioneering" type that continues cropping until an area is completely exhausted.

[4] Brookfield (pers. comm) calls my attention to the fact that although others have casually described the farming systems of the New Guinea highlands as 'shifting cultivation', he and Brown (1963: 162), after first drawing attention to the permanent enclosure of large areas and the long cultivation of some land within them, wrote that 'the term is a misnomer'.

[5] "Jhumia" is derived from "jhum" and is widely used in Northeast India to refer to shifting cultivators.

> backward and their settlement is a major problem in the rehabilitation of Tripura economy." (Chib, 1984, 254)

While many have joined the chorus condemning shifting cultivation, they have been far less successful in providing alternatives appropriate to the conditions under which shifting cultivators work. Many projects aimed at "sedentarizing" shifting cultivation failed to pay sufficient attention to farmer labor and some even viewed it as a "free good" that could simply be ignored in cost-benefit analyses of tested technologies. Farmers thought differently. While new technologies might have proven to be technically viable in on-station trials, they were often rejected by farmers as too labor-demanding. It may work, but is it worth it? Contour hedgerows are one of the more prominent examples of a technology that has enjoyed a huge amount of R&D funding over several decades, but probably remains most remarkable for its lack of spontaneous adoption by farmers (Fujisaka, 1991a). Rather than question why contour hedgerows have been so widely rejected, the more interesting issue might be to ask why they were adopted at all in isolated cases. This often involves pressure from outside projects more than farmers' belief in the technology's inherent worth. Enters (1995), for example, wrote about farmers in northern Thailand planting "token lines" to satisfy project expectations, and Lee (1996) documented them being planted under coercion in Sumba, Indonesia. I personally retain vivid memories of touring with a team from the International Rice Research Institute (IRRI) and encountering a farmer in Chiang Rai, northern Thailand, busily uprooting contour hedgerows already established in his field. When questioned, he explained that a foreign project had paid him five baht per metre to plant the hedgerows in the first place, and now that the project was over, he was removing them to regain the full area of his field. It spoke volumes of his valuation of the technology.

Aside from dryland farming methods, expansion of wet rice terracing has been most heavily promoted as a solution to the "shifting cultivation problem". Early British administrators were impressed by the terracing skills of the Angami and Chakhesang Nagas and how effectively they reduced reliance on swiddening, and they tried to extend the model to other Naga subgroups. Hutton reveals that even in the early 1900s, some areas of the Naga Hills were already so short of land that swiddening was no longer viable and intensified forms of land use were desperately needed:

> "When there is enough land, seven years is usually reckoned the shortest time in which the land can become fit for recultivation, and 10 to 12 years is usually regarded as the normal period for it to lie fallow while 15 to 20 is regarded as the most desirable time to leave it untouched, though land near a village, being more convenient for cultivation, is rarely if ever left so long as that." (Hutton, 1921b, 59-60).

Some early extension programs, aiming to expand wet rice terracing into other districts, were quite innovative, including recruiting skilled terrace cultivators from the Angami and Chakhesang areas and sending them as demonstrators to other parts of the Naga Hills – an early example of farmer-to-farmer extension. Later efforts emphasized government subsidies to support terrace construction. But despite a century of extension efforts, the Nagas have not picked up wet rice terracing nearly as enthusiastically as its promoters had hoped. The current Director of Nagaland's Department of Agriculture concedes that these programs met with only limited success and terraces were often abandoned just as soon as the subsidy was discontinued (Keitzar, 1998, 47, 56) – not unlike the aforementioned farmer in Chiang Rai pulling out his contour hedgerows.

Many reasons have been proposed to explain why other Naga subgroups have been slow in adopting wet rice terracing. Biophysical constraints are undoubtedly important, such as the topography of the land, the availability of water sources, and the ability of soils to hold puddled water. At higher altitudes, the water may be too cold for available rice varieties. In an address on the challenges of reconstructing the Naga Hills after the Japanese invasion in WWII, Hutton offered his own views on why shifting cultivation was not easily replaced:

> "Rightly or wrongly, floods in the plains of Assam have often been attributed to the clearing of forest land for cultivation in the hills. And the usual method of hill cultivation does undoubtedly lead to denudation. On the other hand, that is often the only method possible. Irrigated terraces need a permanent water supply and that again is dependent on forest growth, so that when once these hill-tops have been stripped of forest, a vicious circle exists: no terraces without water; no water without forests; the forests have gone, and therefore there can be no terracing till they have been restored; meanwhile continual jhumming leads to still worse denudation, for the people must grow rice to eat." (Hutton, 1945)

Given that Hutton personally oversaw many programs to expand wet rice terracing during his long service in the Naga Hills, his opinion would have been better informed than most.[6] In earlier diary entries, Hutton also noted that some Nagas complained that minor crops such as sesamum, cotton, gourds, pumpkins and beans could not be interplanted in the flooded fields (1923b, 2), and others simply saw them as "too much trouble" (1929a).

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[6] Hutton was not alone in stressing negative hydrological impacts of shifting cultivation as an obstacle to creating more ponded fields. Lambert made the same argument in a 1938 diary entry:

> "The terraces between Khomi and Phülami are very fine, largely because they have had the good sense to plant plenty of trees on unused land and not to jhum the tops of the ridges. A distinct contrast to Chekrokejima who are jhumming higher than ever into almost virgin forest this year and then complain that there is very little water for new fields. Of course the problem is a vicious circle. If you don't jhum you don't get enough rice to eat. If you do jhum, you can't plant trees to help to conserve the water supply to get sufficient to open new terraces." (Lambert, 1938)

In a 1976 essay on Nagaland's agrarian structure, Das posited a few more possible explanations of why wet rice terraces were not embraced as enthusiastically as the authorities had hoped:

> "In the Angami and Chakhesang areas, terraced cultivation predominates but other tribes believe that jhums give comparable, if not better, yields than terraced fields and that terracing ruins the fertility of the soil. Apart from lack of irrigational facilities, these people believe that single families depending on their own labour would not be able to protect individualized terraced fields against wild animals and birds. In jhumming, all fields are adjacent in a continuous area and the job of protecting the area against birds and wild animals is done through a rotation system jointly by the entire village. As terracing will permanently separate individual holdings, that job will have to be done by each family for its own holding." (Das, 1976, 13)

In a more recent report emphasizing that jhum would continue to be the mode of cultivation of choice for most Nagas for many years to come, Keitzar had this to say:

> "There are reasons why terrace cultivation has been rejected by the farmers. Despite the high rainfall and the impoundment of run-off from up-slope, infiltration losses on terraces in many areas would be excessive because of the very porous soils. Soil physical and chemical properties also deteriorate under continuous cropping, and therefore heavy external inputs are required to sustain soil fertility. A high capital input is also required for the labor-intensive construction and maintenance of terraces" (Keitzar, 1998, 47)

Other socio-cultural factors also appear to be playing a role. As one travels northward along National Highway 150 from Kohima to Zunheboto, a bridge spanning the Mütürü River marks the departure from Chakhesang land (Dzülhami village) and entry into Sema territory (Kilomi village). It also marks the sudden disappearance of wet rice terraces (Hiese, 2000). It is unlikely that the biophysical conditions on opposite sides of the river would be sufficiently different to account for this. Hutton (1945, 5) raised another interesting possibility, claiming that "ignorance of appropriate magico-religious ceremonial" was one of the main obstacles to convincing villages to convert from jhum cultivation into irrigated rice. One also wonders if the systems of authoritarian rule amongst the Konyak (Angs [kings]) and Sema (chiefs) that concentrated land ownership in their hands would not have dampened their subjects' enthusiasm for terracing or making other types of long-term improvements to land that did not belong to them.[7]

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[7] The Sema, following the Gumsa pattern of social organization (see Preface), have at least for a long time been tenant cultivators, paying tax to till land belonging to their chiefs. That this discouraged them from making improvements to the land seemed to be confirmed back in 1980 by the reaction of Sema villages east of the Doyang River (particularly Litami village) to state government programs to promote wet rice terracing. They argued that if they were going to invest the substantial labor needed to develop wet rice terraces, then the land should belong to them. The Sema Students' Union supported the villagers by lobbying for the privatization of lands controlled by chieftains (Kevichusa, 2001).

In view of this rather daunting list of hypothesized obstacles to wet rice terracing, it may be a wonder that efforts to promote it had any success at all![8] But each would have to be weighed carefully to determine its relative contribution to farmers' reluctance, and examined as to why it does not similarly apply to the Angami and Chakhesang. Many might be overcome relatively easily if only farmers were convinced of the merits of wet rice cultivation. Kikhi (1997) hints at this with her observation that where wet rice terracing does get a foothold in a new area, it is often by way of a woman from a terrace cultivation area outmarrying into another tribe and taking the technology with her.

When farmers reject these technologies, they are quickly condemned as stubborn, fossilized, primitive and prisoners of their own traditions. There is a presumption that the new technologies are superior and that farmers are acting irrationally in rejecting them. But is this true? Hutton himself casts doubt on this with his claim that "good jhum land, cleared once in twelve or fifteen years, say, is said to produce a better crop than the 'pānikhēts' or terraced fields" (Hutton, 1969, 72). And McCabe (Deputy Commissioner of the Naga Hills District, 1881-1894) noted that despite the impressive appearance of their terraces, there was very little extra rice in Angami country compared to the heavy surpluses from Lhota swiddens (Anonymous, undated-a). Leach also argued that terracing was "not an economic procedure" and that it "only becomes economic when local population densities are great enough to create a serious shortage of land" (1954, 27). He noted that when the same Kachin community cultivated both taungya and hill terraces, "*the people concerned seem usually to regard taungya cultivation as the more rewarding*" (1954, 28). These observations suggest that there may be more behind the Nagas' persistence in shifting cultivation than being "primitive" and "unawakened" (Chib, 1984). But how well it rates also depends on whose shifting cultivation we are talking about. The sampling of yield data presented in table 8-1 shows swidden productivity to vary enormously across the region. It is possible that the lower yields indicate systems that are in varying stages of decline.

Robust analysis of the relative merits of various land use systems in the uplands is constrained by the paucity of reliable data. This is true to the extreme in Nagaland where the outbreak of war after the departure of the British prevented any research at all until recent years. But generally, farming systems research has tended to be done on-station and the results have uncertain relevance to the reality of the conditions under which farmers work. When contemplating a new way of managing their land, the first questions most shifting cultivators could logically be expected to ask are: "How much labor do I have to invest and what returns can be expected?" In truth, we have very little reliable data on their existing land use practices, let alone the innovations with which we propose replacing them.

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[8] Some estimates place Nagaland's total irrigation potential at 179,000 ha, of which 60,000 ha have been developed thus far (Directorate of Information and Public Relations, 1996, 12).

Table 8-1. Overview of Swidden Productivity

Location	Ethnic Group	Crop	Reported Yields	Reference
INDIA:				
Nagaland	Nagas generally	upland rice	865 kg/ha (350 kg/acre)	Husain, 1988, p. 158-159
Nagaland	Nagas generally	maize	1236 kg/ha (500 kg/acre)	Husain, 1988, p. 158-159
Naga Hills		upland rice	692 kg/ha (7.5 maunds/acre)	Anonymous, undated-a
Arunachal Pradesh	state average	upland rice	822 kg/ha	Chauhan, 2001, p. 8
Assam	state average	upland rice	792 kg/ha	Chauhan, 2001, p. 8
Mizoram	state average	upland rice	744 kg/ha	Chauhan, 2001, p. 8
Nagaland	state average	upland rice	696 kg/ha	Chauhan, 2001, p. 8
N.E. India	regional average	upland rice	820 kg/ha	Chauhan, 2001, p. 6
Burnihat		upland rice	536-1340 kg/ha	ICAR, 1983
Assam	state average	upland rice	800-900 kg/ha	Chauhan, 2001, p. 6
Assam		upland rice	190 kg/ha	Borthakur et al., 1978
Assam		upland rice	1200 kg/ha	Mishra, 1976
Meghalaya		upland rice	190 kg/ha	Borthakur et al., 1978
Burnihat, East Khasi Hills, Meghalaya	Khasis	upland rice	853 kg/ha	Sahu, 1978
Khasi Hills, Meghalaya	Khasis	upland rice	128 kg/ha (1.28 quintals/ha)	Yogi, 1991, p. 110
Garo Hills, Meghalaya	Garos	upland rice	505 kg/ha (5.05 quintals/ha)	Yogi, 1991, p. 110
Khonsa, Tirap District, Arunachal Pradesh	Nocte, Konyak, Wanchu	upland rice	408 kg/ha (4.08 quintals/ha)	Yogi, 1991, p. 110
Siang, Arunachal Pradesh	Adi	upland rice	832 kg/ha (8.32 quintals/ha)	Yogi, 1991, p. 110
MYANMAR:				
Chin and Shan States	state average	upland rice	750-1000 kg/ha	Win, 2003, p. 11
Chin and Shan States	state average	maize	250-500 kg/ha	Win, 2003, p. 11
Konesone, Kyaukmegyi village tract, Kyaukme township, northern Shan State	Danu	upland rice	1250 kg/ha (25 baskets/acre)	Win, 2003, p. 18
Konesone, Kyaukmegyi village tract, Kyaukme township, northern Shan State	Danu	maize	1937 kg/ha (28 baskets/acre)	Win, 2003, p. 18
Konesone, Kyaukmegyi village tract, Kyaukme township, northern Shan State	Danu	groundnut	700 kg/ha (35 baskets/acre)	Win, 2003, p. 18
Kyu Shaw, Kyaukme township, northern Shan State	Ngwe Palaung	upland rice	745 kg/ha	Win, 2003, p. 21
Nar Pon, Kyaukme township, northern Shan State	Shan	maize	(40 baskets/acre)	Win, 2003, p. 31
Nar Pon, Kyaukme township, northern Shan State	Shan	upland rice	(15-20 baskets/acre)	Win, 2003, p. 31
Thei zang, Tiddim township, Chin State	Chin (Thei zang group)	upland rice	1000 kg/ha (20 baskets/acre)	Win, 2003, p. 34
Thei zang, Tiddim township, Chin State	Chin	millet	(5 baskets/acre)	Win, 2003, p. 34

Location	Ethnic Group	Crop	Reported Yields	Reference
Sai zang, Tiddim township, Chin State	Chin (Sai zang group)	maize	(6-12 baskets/acre)	Win, 2003, p. 40
Sai zang, Tiddim township, Chin State	Chin (Sai zang group)	potatoes	480-650 kg/ha (300-400 visses/acre)	Win, 2003, p. 40
Saung pi, Tiddim township, Chin State	Chin (Khua no group)	upland rice	1000 kg/ha (20 baskets/acre)	Win, 2003, p. 43
Saung pi, Tiddim township, Chin State	Chin (Khua no group)	millet	(5 baskets/acre)	Win, 2003, p. 43
Dain Lo, Tiddim township, Chin State	Chin (Dim group)	maize	(10-30 baskets/acre)	Win, 2003, p. 46
Dain Lo, Tiddim township, Chin State	Chin (Dim group)	potatoes	1600 kg/ha (400 visses/acre)	Win, 2003, p. 46
THAILAND:				
Khun Sa, Mae Hong Son	Hmong	upland rice	<625 kg/ha (< 10 tang/rai)	Cooper, 1984, p. 152
Laykawkey village, Mae Sariang District, Mae Hong Son	Lua' and Karen	upland rice	1000 kg/ha (13 tang/rai)	Kunstadter, 1978, p. 109
LAO P.D.R.:				
Lao P.D.R.	national average	upland rice	1.3 t/ha for 1983-87	Fujisaka, 1991, p. 95
Luang Prabang	provincial average	upland rice	0.4-1.6 t/ha (year 1); 1.1 t/ha (year 2); 0.6 t/ha (year 3)	Fujisaka, 1991b, p. 98
Oudomsay	provincial average	upland rice	1 t/ha	Fujisaka, 1991b, p. 98
Laos	Lamet	upland rice	1410 kg/ha (1258 lbs/acre)	Izikowitz, 1951
Ban Houay Loua, Sepone District, Savannakhet Province, Lao P.D.R.	Tri (Lao Theung)	upland rice	140-320 kg/ha in nearby swiddens, 400-600 in those more distant	Rambo, 1991, p. 115
VIETNAM:				
Tua Chua, Lai Chau Province, Northwest Vietnam	Hmong	maize	180 kg/ha	Hao et al. , 2007
MALAYSIA:				
Nanga Sumpa, Lubok Antu District, Sri Aman Division, Sarawak	Iban	upland rice	350 kg/ha	Mertz, 2007
Sarawak	Iban	upland rice	30-40 bushels/acre on outstanding years	Freeman, 1955, pp. 254-5
Sarawak		upland rice	> 1000 kg/ha	Hatch 1980, p. 488
Baram, Sawawak	Kenyah	upland rice	0.8-1.4 t/ha	Chin, 1985, p. 196
Baram, Sawawak	Kenyah	upland rice	833 kg/ha unhusked	Chin, 1985, p. 265, pp. 351-3
Sarawak	Kenyah	upland rice	0.25-1.7 t/ha	Lian, 1987, p. 130
INDONESIA:				
Kalimantan	Kantu	upland rice	928 kg/ha	Dove, 1985, 289
THE PHILIPPINES:				
San Jose, Occidental Mindoro	lowland migrants	upland rice	600 kg/ha	Robotham, 2007
San Jose, Occidental Mindoro	lowland migrants	maize	1000 kg/ha	Robotham, 2007
Southern Vizcaya	Ikalahan	sweet potato	29-32 t/ha	Barker, 1984, p. 10

Measuring labor inputs is always a challenge in farming systems research, but particularly so in the case of swidden systems where fields are often distant, management variable, and many tasks are ongoing and often accomplished in spare time between other activities. There are many alternatives for managing the slopes that are currently farmed under shifting cultivation. Amongst the most heavily promoted options are: 1) as already discussed, carving the slopes into ponded terraces for wet rice; but also 2) digging bench terraces for permanent dryland cultivation; 3) planting multi-purpose trees in contour strips across the slopes, and thus facilitating natural terrace formation; 4) conversion into fruit orchards, or plantation crops such as timber, tea, cardamom, cinnamon or ginger; 5) conversion into fodder to support increased livestock husbandry; or 6) perhaps some combination of these. These alternatives may provide tangible benefits, but how much labor do they demand, and are they the best use of farmers' scarce time? If the timing of management inputs is critical, will this create conflicts with other components of the farmers' livelihood system? Without accurate labor data, we can only base our analysis on best guesses.

All the modifications listed above entail the replacement of shifting cultivation with something else. Khonoma is most significant as a case study in that it has managed to cope with intensified land use pressures not by discarding shifting cultivation, but instead, innovating ways to build on it and improve its efficiency.[9] One of the main mysteries underlying this field study was why Khonoma is exceptional for its management of dispersed alders in its jhum fields – and why the technology was not more widely adopted by other Naga villages.

But before asking *why the alder fallow system has not been more widely adopted*, we first need to take a step backwards and ask *if it is in fact worth adopting*. Intuitively, it appears to be an admirable agroforestry system that should offer considerable economic and ecological benefits, but we have no empirical verification of this. What are the tradeoffs in terms of (possible) additional labor inputs and increased productivity? If the data can not verify this to be a superior innovation, then the major question may have to be revised to "*Why are Khonoma and other practicing villages persisting with a system that does not represent an improvement over standard jhum cultivation practices? Are there non-economic reasons?*"

If we could not find economic or biophysical gains, that would suggest that we would have to search outside the realm of material advantages and look more closely at possible socio-cultural reasons. Considering that the Angami (and the Chakhesang) are somewhat unique amongst Naga subgroups for their skill in carving irrigated terraces into mountain slopes, this also raises questions about the

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[9] It is debatable however, whether the managed alders should be considered as an "improved fallow" – which implies a continuation of swiddening – or they should more properly be viewed as a "firewood crop" in their own right – insinuating permanent land use under a food crop-firewood rotation. Regardless of the terminology chosen, the salient point is that farmers were able to achieve this intensification by building on existing practices rather than having to adopt new technologies alien to them.

relative merits of wet rice cultivation relative to shifting cultivation. The Angami appear at heart to be wet rice cultivators, so why persist with the hard work of cutting down forests every year for shifting cultivation? Does shifting cultivation offer something that wet rice cultivation does not, or is it simply playing a supplementary role? Our two study villages were purposely chosen to facilitate comparisons both within-village between the vaunted wet rice cultivation and the much-maligned jhum cultivation; and between-villages to gauge whether Khonoma gained measurable benefits from managing alder in its jhum fields, when compared to Tsiesema where alder is not managed. Therefore, this chapter will make major use of data gathered from the secondary study site at Tsiesema.

METHODS

Collecting Field-Level Data on Inputs and Outputs

To undertake a cost-benefit analysis of wet rice cultivation and swiddening, in order to draw comparisons between the two land use systems, we needed a careful measure of labor (and planting materials) inputs and harvested outputs from the compared systems. This was done by carefully monitoring a sample of fields representative of both wet rice and jhum cultivation as practiced in both study villages (figure 8-1).

In a December 1999 visit, a Farmer Coordinator was recruited in Khonoma who was then asked to help select an additional nine households, representing a cross-section of all three khels, to participate in the research. In this way, a core group of ten farmers was assembled (plates 6-114 – 6-116). Each farmer (or more accurately, the household that he headed) was asked to keep records on both the jhum field that he was opening for the 2000 cropping year[10], and for one of his wet rice plots.[11]

Their record-keeping relied on maintaining two types of daily diaries:

1. <u>Labor Inputs</u> – in which all activities in monitored fields were recorded, by date, laborer/s (number of men, women and children) and number of hours each worked. These diaries helped to demarcate the agricultural calendar and inform analyses of labor inputs (total; by activity, season and gender).
2. <u>Material Inputs and Outputs</u> – in which all production inputs (primarily seed) and outputs (firewood, crops, foraged wild food plants, and hunted game) were documented. These data provided a measure of both the relative

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[10] As detailed in chapters 2 and 7, the general practice was that each farmer would open up a new jhum field every year and cultivate it for two years before allowing it to return to fallow. Therefore, farmers typically cultivated two jhum fields at any given time – a 1st-year field just opened in the current year, and a 2nd-year field that had been opened the previous year.

[11] Farmers owned varying numbers of wet rice plots, all of which they cultivated every year. Data collection was restricted to a single plot for each farmer, and then his other plots measured so that the findings could be scaled up from the field level to the household level.

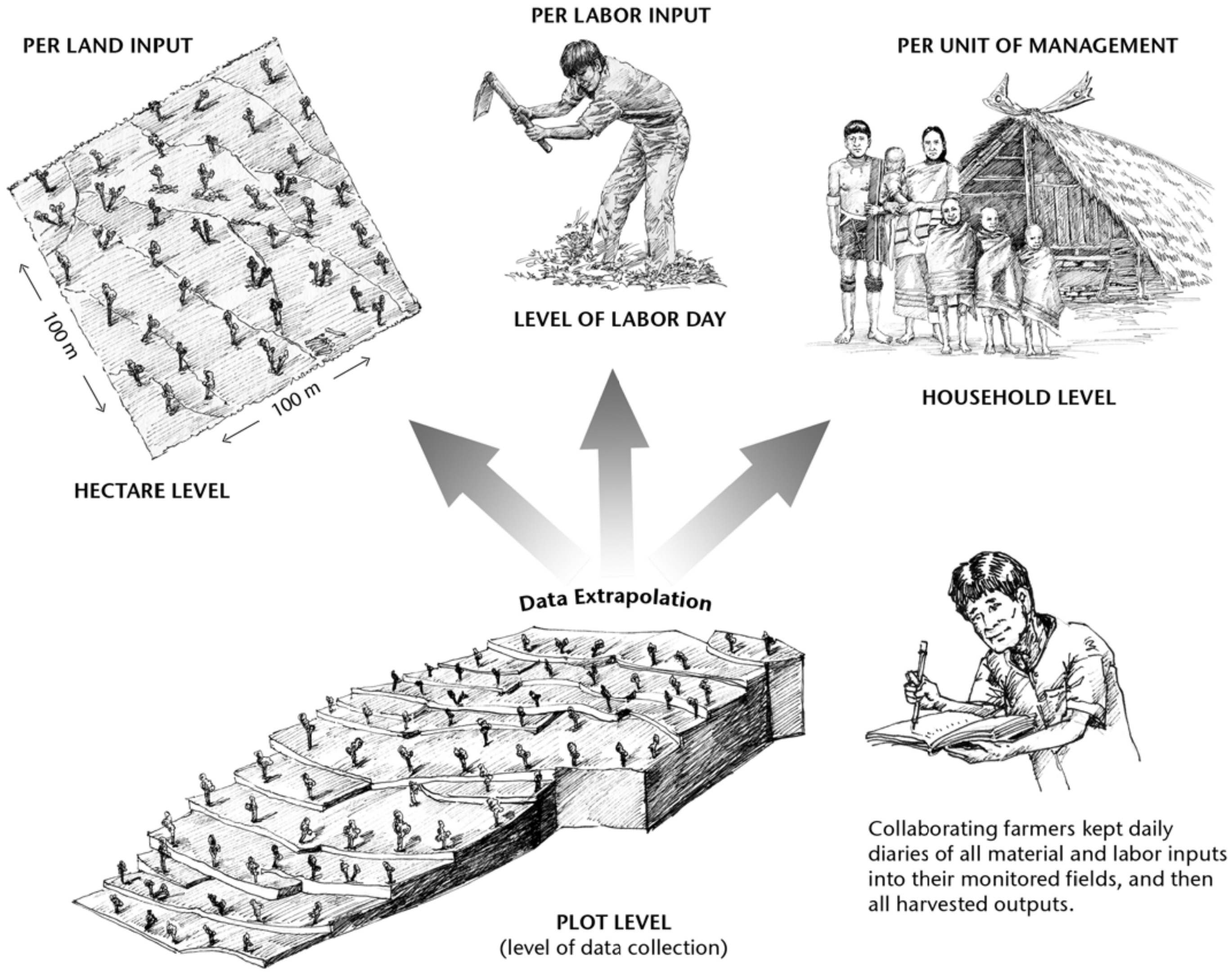
importance of each jhum crop, and total system productivity. Since we knew total labor inputs from the other diary, total returns on labor invested could then be calculated.

Since jhum fields are generally cultivated for two consecutive years before fallowing again, this meant that records had to be kept over 24 months (2000-2001) to obtain a complete picture of system productivity during the cropping phase. Firewood yields were recorded when the monitored jhum fields were opened in December 1999 - January 2000, indicating the productivity of the previous fallow period. This then provided the wider picture of total cycle productivity (i.e., cropping phase + fallow phase).

These diaries provided a clearer picture of the agricultural calendars, division of labor, and relative returns to shifting cultivation and irrigated rice terraces (on a land, labor and capital basis) within Khonoma, the key study village. Nearby Tsiesema was then selected for comparison – as a neighboring Angami village that did not manage alder in its jhum fields – and a parallel set of data was collected there (plates 6-117 – 6-119). This inter-village comparison sought insights on farmer decision-making in adopting or rejecting alder management in jhum fields and allowed evaluation of what (if any) benefits Khonoma farmers were enjoying through their use of this technology.

The collaborating farmers were not left unassisted with their record-keeping tasks. A local research assistant in each village regularly visited the farmers in their homes to oversee their diaries and ensure that they were being recorded in a rigorous and comparable manner. At the end of each cropping year, meetings were scheduled with each farmer to review his diaries line-by-line, translate them into English, and search for any anomalies that might signal problems in data quality. As part of this checking process, the two types of diaries were cross-checked to make sure that they agreed and were complete. For example, an entry of seeds planted in the 'Material Inputs and Outputs' diary should be linked to a corresponding entry in the 'Labor Input' diary that shows the labor expended in planting those seeds. Or conversely, a record of labor spent harvesting should find a corresponding entry as to what was harvested on that day. Besides cross-referencing between the two types of diaries, each diary was also scrutinized individually for any gaps in the farmer's entries. In the 'Material Inputs and Outputs' diaries, for example, a record of seeds of a particular crop being planted but no corresponding entries of it being harvested, would trigger questions as to whether harvest data were missing, or if that crop had indeed failed. Similarly, since we knew the standard operations that all farmers followed in cultivating their fields, this was used as a checklist in perusing the 'Labor Input' diaries for missing entries. This combination of close farmer supervision as the diaries were being kept, followed by careful verification at the end of each cropping year, was aimed at maximizing data accuracy to the extent possible. Irregular group meetings were held throughout the fieldwork to discuss any problems and make needed adjustments (plate 6-5).

Figure 8-1. Data Collected at Level of Sampled Fields and then Scaled Up to Household- and Hectare- Levels



Collaborating farmers kept daily diaries of all material and labor inputs into their monitored fields, and then all harvested outputs.

Data Tabulation and Analysis

With final verifications done in the field, the diary data were then entered into spreadsheets for analysis. As part of this process, farmers' diary entries had to be converted into a standardized system. For 'Material Inputs and Outputs', this necessitated creation of tables for converting local units of measurement (e.g., tins of paddy) into international standards (e.g., kilograms of husked rice) (appendix 7-8). The labor diaries required more interpretation because in recording what they had done in their fields, farmers sometimes used different terms to describe the same activity or more problematically, did not segregate labor allocations between two activities that were going on at the same time. The end-of-year reviews of the diaries, together with their authors, were thus very important for clearing up these issues.

Standard lists of field operations were developed for both wet rice terrace (appendix 6-5) and jhum (appendix 6-6) cultivation, and divided into six sequential categories – 1) wood harvest, 2) nursery management, 3) field preparation, 4) planting, 5) plant management, and 6) harvesting. As we reviewed each farmer's activities with him/her, line-by-line, to clarify what exactly was done, we then inserted the activity code that fitted best. This enabled us to reduce all the text into simple numbers, which could then be manipulated for statistical analysis.

Farmers recorded their labor in hours since, especially during nonpeak times, much fieldwork was done in small installments of only a few hours here and there as they could find time from their other activities. When later calculating labor in terms of days, it was considered that 8 labor hours constituted one full labor day.

As findings emerged from this analysis, they were taken back to the study villages for group discussion and validation with the collaborating farmers. After their painstaking efforts in maintaining the diaries, they were extremely keen to see the results. This generated some very animated discussions, as we probed the findings, underlying reasons and implications.

Measuring Field Areas in Order to Scale Up to Hectare and Household Levels

The farmer diaries provided data at the field level. Therefore, the area (m^2) of these monitored fields had to be measured in order to be able to convert the findings to a more meaningful per unit of land. Farmer collaborators were trained in using a compass, altimeter, and clinometer that, together with a 30 m measuring tape, allowed us to work together in quickly surveying the 40 monitored fields (10 wet rice terraces + 10 jhum fields in both study villages). The coordinates were then entered into an Excel spreadsheet and formulas applied to adjust the accuracy of the stadia (survey points).[12] The adjusted coordinates were then imported into ArcInfo to generate lines and create polygons representing each surveyed field. Finally, the file was opened in ArcView to compose the layouts, calculate the field areas, and then save them as tiff files for each surveyed field. The thumbnail maps thus generated are presented in the appendices 6-2 and 6-3. The boundaries of the monitored fields were also entered into a GPS and overlaid on electronic base maps of the study villages (maps 8-1 and 8-2), so that the diary data would be geographically referenced within the study site.

The analysis thus far provided data on inputs and productivity at the level of the monitored fields, and then extrapolated to per hectare of land. But the data also needed to be examined in terms of what it meant to the average village household, since it was here that most decisions were made on how agricultural lands were managed. The Angami system of inheritance described in chapter 6 fosters considerable disparity in land ownership. The research thus needed to look beyond the monitored fields, at the total land holdings of each of the collaborating farmers (appendices 6-1b – 6-1c). For the wet rice terraces, it was a straightforward matter of surveying all the additional plots – beyond the one monitored – that each collaborating farmer owned (appendices 6-12 and 6-13). This showed the total wet rice land cultivated by each farmer annually, and allowed the diary findings to be scaled up to the household level.

The extent of jhum land owned had quite different implications, however. Since every farmer who cultivated jhum fields usually opens only a single new field every year, an abundance of jhum land says more about the likely fallow length than it does about how much land will be cultivated in a given year. Also, since all jhum fields, except those under cultivation at the time (1st- and 2nd-year), were under various stages of fallow regrowth, they were less accessible and difficult to survey. An indirect proxy method was therefore used to estimate the area of additional jhum holdings beyond the single field that was being monitored for each of the ten farmers. Villagers themselves did not traditionally measure land in terms of its physical area, but rather by how much seed it took to plant it or the expected yield. Those were the parameters that were most relevant to them. By applying this traditional system to the monitored fields that were now of a known hectarage, farmers' reported planting rates and expected yields could be calibrated on a per hectare basis. This, in turn, allowed calculation of the approximate area of their additional jhum fields without having to actually survey them (appendix 6-24).

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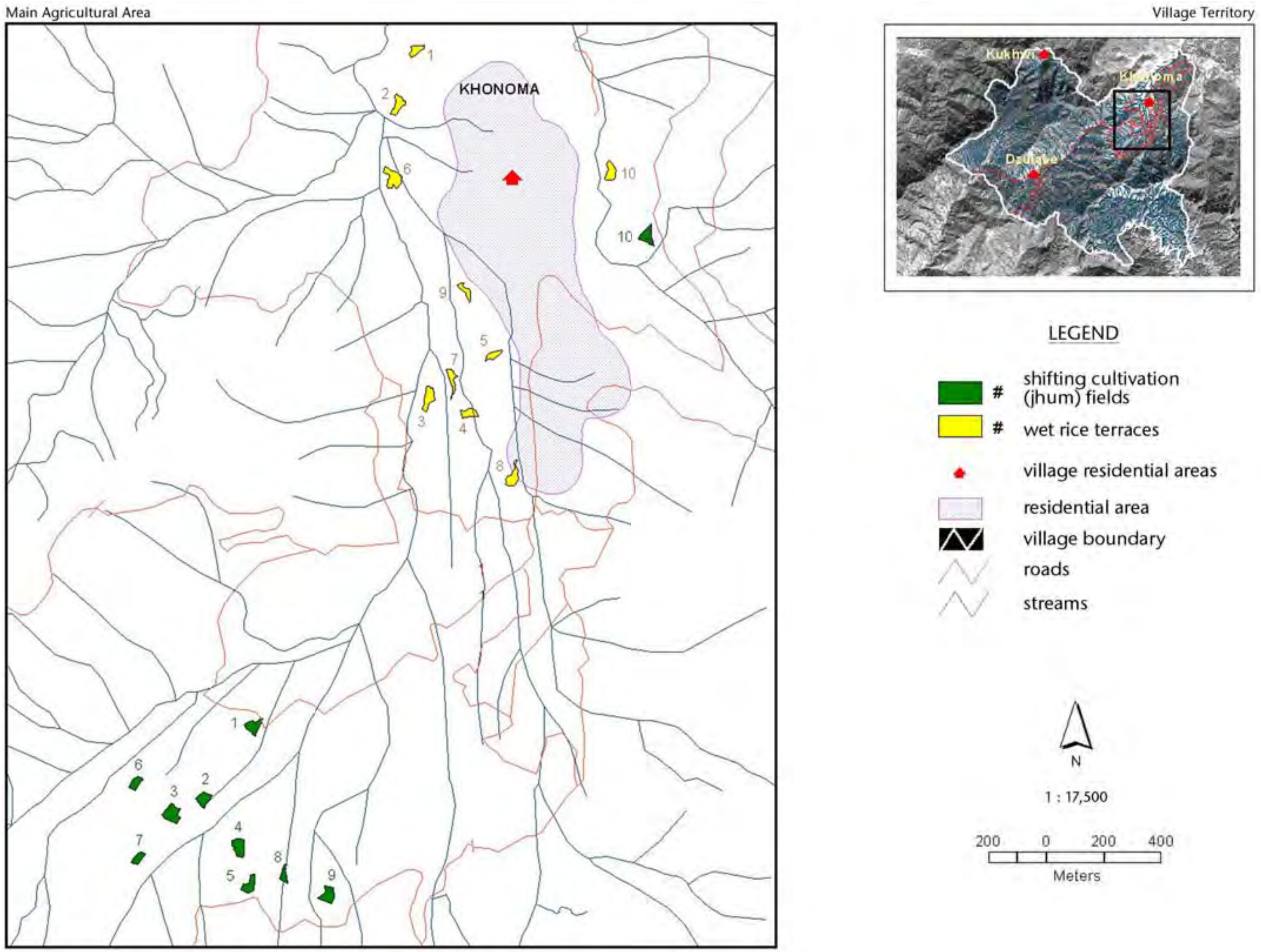
[12] To find the constant by which all survey points needed to be adjusted, the following formulas were used:

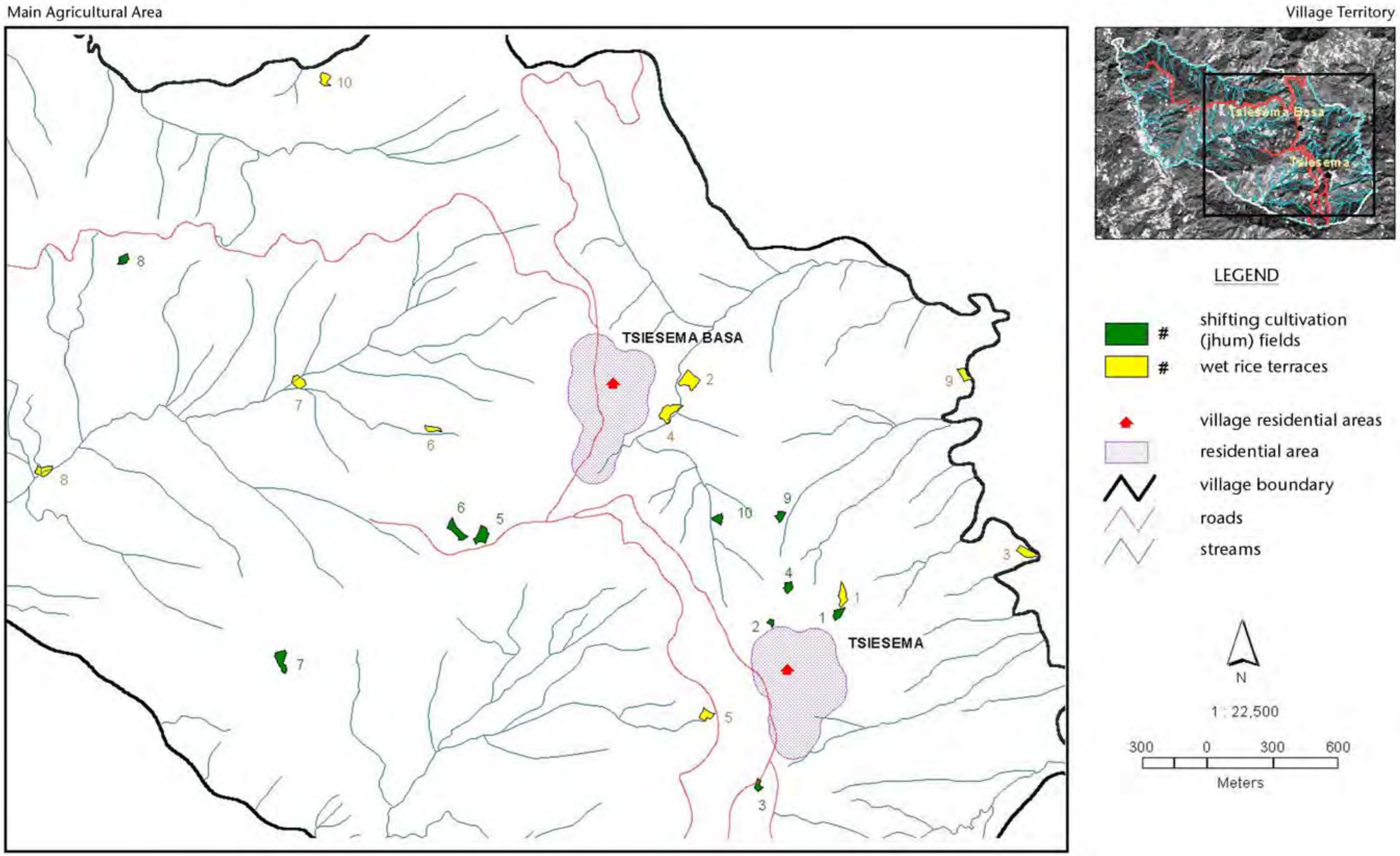
X (latitude) = distance x SIN (degrees x ∏/180)

Y (departure) = distance x COS (degrees x ∏/180)

Map 8-1. Locations of Wet Rice Terraces and Shifting Cultivation Fields Monitored in Khonoma during Nov. 1, 1999-Oct. 31, 2001 *



Map 8-2. Locations of Wet Rice Terraces and Shifting Cultivation Fields Monitored in Tsiesema during Nov. 1, 1999 – Oct. 31, 2001 *



To complete enumeration of the collaborating farmers' land assets, they were questioned about any land owned outside the villages. This was important only in Khonoma's case where, when forced into exile by the Indo-Naga war, many villagers acquired land to till elsewhere (Chapter 5; appendix 6-1e).[13] This was mostly irrigated paddy land. Although a ratio of seeds planted : yields harvested could be approximated based on farmers' testimony, none of these outside fields had been surveyed so we had no basis for converting to actual land areas. Most outside fields were located in the Ghaspani to Dimapur area where lower altitudes created warmer conditions and a very different agroecology than that under which rice is grown in Khonoma. Our data on seeding rates and expected yields for Khonoma's wet rice terraces could thus not be extrapolated to these outside fields for calculating their area. But again, the most important issue to the household economy is not the area of land owned, but rather how much yield they can expect to harvest from that land. In these terms, farmers can provide quite precise figures on whether they can produce enough rice for their own needs or generate surpluses (appendices 6-1f – 6-1g). This was the currency that they relied on not only to feed their families, but also to host the feasts that would earn them higher social ranking. Since outside rice fields were all cultivated by share-cropping arrangements with lowlanders, they made no demands on Khonoma's own labor and only 50% of their yields were returned to the village. The remaining 50% are kept by the sharecropper.

AN HISTORICAL PERSPECTIVE

Chapter 4 sketched out a picture of the volatile environment the British found when they began administering the Naga Hills and how this influenced land management. Although that era of warfare and headhunting has long faded into history, and the need for military security is no longer a major influence on farming systems, that era must nevertheless be understood in terms of its influence on the social organization of labor that is still evident today.

FINDINGS

How the Two Main Pillars of Angami Farming Systems were Performing at the Close of the 20th Century

Economics now plays a decisive role in Angami farming systems, and like farmers everywhere, Nagas are keenly interested in how their land can best be used to provide them with both food security and a cash income. But how effectively are their land use systems serving those purposes? And are there better alternatives?

This section of the chapter draws from the farmers' diaries to undertake a careful economic evaluation, first of the wet rice and then the jhum subsystems.

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[13] There is no comparable table presented for Tsiesema since none of the 10 studied households there owned land outside the village.

When relevant to the discussion, details of Tsiesema's management practices are provided as footnotes. Data from both study villages are presented side-by-side for comparative purposes. The locations of the monitored fields within each village's territory are shown in maps 8-1 for Khonoma, and 8-2 for Tsiesema. Further details on these fields can be found with the individual thumbnail maps presented in appendices 6-2 and 6-3. The times that it took farmers to walk to and from their monitored fields are presented in appendix 6-4 as a surrogate measure of distance, an important determinant in how intensively land is likely to be managed. The system used for classifying the many activities that farmers recorded in their labor diaries into broader categories to facilitate analysis is outlined in appendices 6-5 for wet rice and 6-6 for jhum cultivation. The prices at which farmers valued their planting materials[14] and harvests, and thus the figures used used in calculating system profitability, are listed in appendix 6-7. And finally, photographs of many of the crops are included in the accompanying photograph gallery (plates 6-6 – 6-85).

For this first look at the data, they are presented scaled up to household level as the unit most meaningful to farmer decision-making. These figures are later reexamined at the per hectare level in discussing their implications for land use intensity. (The monitored fields are themselves the least meaningful level of analysis since the data varied entirely with the size of the fields that happened to have been included in the study. The field-level data have thus been relegated to appendix 6-8.)

A Preliminary Note on the Organization of Labor

Before examining the diary data, a short explanation is needed on how labor is organized in the two study villages:

Household Labor

By far the majority of agricultural labor is performed by household members working in their own fields. This is particularly true in Khonoma where fields tend to be smaller and household labor relatively abundant compared to the land available for cultivation. There is less need for communal working groups.

Even when Khonoma descendants have moved to Kohima to work as teachers, medical doctors, and other highly professional vocations, it is not unusual to see them returning to the village at transplanting and harvest time to work, along with their families, in the terraced fields that they have inherited from their ancestors. They appear to take great delight in maintaining this tradition and show no

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[14] It was sometimes difficult to assign accurate values to planting materials for minor crops when the quantities involved were very small. Plate 2-27, showing a selection of seeds about to be planted in a jhum field, illustrates the small quantities that can be involved.

apparent belief that such manual labor is beneath them. Other family members that have remained behind in the village look after the fields during the rest of the year.

Cooperative Working Groups

In Tsiesema's larger fields, groups of often related farmers band together and work in turn in each member's fields in preparing the seedbeds, transplanting, and harvesting. Between these times of peak demand, labor reverts to household sources as each family tends its own fields. The use of such cooperative working groups makes it necessary for Tsiesema to build larger field huts that can accommodate up to 20 people as they eat their noon meals or take shelter from heavy downpours.

Hired Labor

Wage labor is a more recent practice that arrived with the British and the cash economy – and probably coincided with the disappearance of slave labor.[15] It is found most frequently when relatively affluent households, often with more lucrative off-farm sources of income, hire their less prosperous neighbors to work in their fields. These neighbors may have little land of their own to cultivate. It is thus usually a transaction between the most and least affluent strata of the village. During the period of field research, the standard wage rates for hired labor were Rs 100/day[16] for men, Rs 80/day for women, and Rs 60/day for children (<15 years of age).[17]

Peer Groups

The single busiest point of the agricultural calendar occurs in late May to early June when it is time to transplant rice from nurseries into the flooded terraces. Youth groups, usually associated with the churches, often hire themselves out to assist in transplanting. They move across the small terraces quickly, the boys hoeing vigorously in the lead as they finalize puddling and leveling, and the girls following behind transplanting (plate 6-90). There is a keen sense of competition as the workers strive to outdo each other and earn admiration from members of the

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[15] The British pursued a campaign against slavery in the hills of both N.E. India and Myanmar. Note the slave prices indicated in the Mills quotation that opens this chapter.

[16] US$ 1 = 48.044 Indian Rupees, as of December 31, 2002, at the end of the fieldwork.

[17] Angami villages are a bit different to those of some other Naga groups in that they generally rely almost exclusively on internal labor sources and seldom hire external labor. This is in contrast to, for example, Changki village in Mokokchung District that has valley land highly suited for wet rice terracing and is in the habit of employing a lot of external labor. This is probably due to a combination of this village's proximity to Assam where cheap labor is readily available, and the Aos' own distaste for working hard in the hot, humid climate of the lower valleys where their ponded fields are located. Assamese from the plains are acclimatized to such conditions, but the Nagas prefer the cooler, bracing temperatures of higher altitudes. Such import of labor is not found in the two Angami study villages.

opposite sex. The youth groups use the money to support their activities for the remainder of the year.

Share-Cropping

Some of Khonoma's wet rice is produced under share-cropping arrangements. When pond fields are rented, the usual terms are for the harvest to be evenly divided between the cultivator and land owner. This is also the standard arrangement by which Khonoma villagers cultivate all of the paddy land that they bought down in the Medzephema to Dimapur area. Distances make it impractical for them to try cultivating these outside fields themselves, so they instead contract lowland families, usually Biharis, Bengalis or Assamese, to manage them on a share-cropping basis. About 15 truckloads of bagged paddy arrive in Khonoma each autumn from these outside fields.

Share-Herding

Nepali families, usually staying in ramshackle accommodations on Khonoma's outskirts, tend the village's cattle in return for a share of the milk and calves (plate 5-58). Their standard of living is far below that of their Angami hosts.

Communal Herding

Mithun (gwi) wander in the forests in communal herds and receive little human handling until it is time to capture them for sale, usually to celebrate a wedding. The little attention that they do get is from herders (gwükhwemia) that camp in outlying sheds (gwiki – see plates 4-23 and 5-57, and code 9.4.3 in appendix 5-7) and, from time to time, blow on buffalo horns (ketsu – code 9.4.2) to summon the mithun for inspection.

These are the main ways that agricultural labor is organized in the study villages. Many maintenance tasks that the village would have formerly managed itself, such as cleaning along the roadsides or repairing water systems, have now devolved to become the responsibility of government employees (appendices 5-52 - 5-53). Many projects are also undertaken by social organizations such as khels (chienuo), age groups (thesü), or church groups (kehou krotho), but these are usually more in the nature of building infrastructure (e.g., rest houses, memorials, village gates, etc.), than agriculture.

Summaries of the labor data that farmers recorded in their diaries can be examined at a glance in appendices 6-10 and 6-11.

Wet Rice Terraces

The wet rice terraces, which earned such admiration from early British visitors, lie at the heart of Angami farming systems. From the earliest efforts in agricultural extension in the Naga Hills until now, wet rice cultivation has been promoted as the superior land use that should replace jhum cultivation.

Labor Inputs

The entire Angami agricultural calendar is built around the demands of their wet rice cultivation. The tempo of activities in the wet rice fields is guided by a series of rituals and festivals that are timed according to the lunar calendar (figure 7-1). The first hoeing is done individually during the winter months as each farmer finds time. But thereafter, all activities are synchronized and approached with an almost military urgency.[18] When work is required on the wet rice crop, everything else is set aside and the entire village can be found rushing down into the terraced valley. There is a palpable sense of competition and nobody wants to be seen finishing last or doing a less admirable job than his neighbor. The legendary Khonoma moshu (pride) is very much in evidence.

Khonoma. The rhythm of inputs into Khonoma's wet rice terraces is shown in figure 8-2. In summary, the first tillage is gradually completed over December to February. The rice nurseries are established in March, but otherwise there is a relative lull in March and April. There is a sudden spike in activity over May and June as the fields are puddled and transplanted, then declining demands in tending the crop from July to September. There is a final surge at harvest time, mostly in October (plate 6-1). This is the sequence of activities that has kept the Angami fed for as long as they can remember.

Tsiesema. The pattern is essentially the same in Tsiesema (figure 8-3)[19], but with a couple of noteworthy differences. Firstly, Tsiesema begins its first tillage about a

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[18] But, as explained in chapter 7, rice-planting begins first in the cooler ecology of the upper Ketsaju valley and then "ripples" down the valley, where lower altitudes and warmer temperatures nurture faster rice growth.

[19] Although Tsiesema uses animal draught power (see code 2.2 in appendix 5-7), and now even a hand tractor (code 2.3) to till some of its wet rice terraces, all of the 10 fields monitored during this study were hoed only by hand. Villagers claim that with a buffalo or pair of oxen, a single man can till as much land as 10 men working with hoes. As part of the initial cost of converting to animal draught power, some of Tsiesema's terraces had to be combined to create areas large enough to turn draught animals. The village now has a herd of about 35 buffalo plus calves, and four pair of oxen. Those who do not own their own buffalo can rent one for Rs 200/day, including the operator. (Those not having the Rs 200 fee can opt to provide one man and one woman to labor in the buffalo owner's fields for one day.) Villagers observe that the labor saved by introduction of buffalo has allowed them to expand the area of wet rice terraces that they cultivate and some suggest that yields are also increasing..

month later and does less of it (712 hrs/household [K] : 545 hrs/household [T]).[20] The second observation relates to the wider altitudinal spread of the Tsiesema fields (760 m – 1355 m asl), compared to those monitored in Khonoma (1331 m – 1527 m asl). Since the timing of agricultural activities is closely linked to altitude, we thus see a slightly more dispersed pattern in Tsiesema with, most notably, rice transplanting continuing over several months.[21] Since rice is photoperiod sensitive, the universal principle is that the higher and colder the fields, the slower the rice will grow, and the earlier it must be transplanted. As we move downslope to lower and warmer fields, then the transplanting dates accordingly become later and later. Farmers note that although paddy grows faster at lower elevations, that grown in colder, higher fields will keep for longer. In general though, Tsiesema uses June 21st as its target date by which all rice should be transplanted for best results. July 22nd is viewed as the cut-off date, after which any rice transplanted will not provide a successful harvest.

In summary, on average, the collaborating farmers in Khonoma invested 1705 hours cultivating 4183 m^2 of wet rice, while their counterparts in Tsiesema worked a significantly shorter 1280 hours on a larger 5568 m^2 of land.

Material Inputs and Outputs

The material flows into and out of the wet rice terraces are presented jointly in figures 8-4 for Khonoma, and 8-5 for Tsiesema. The data are shown separately for the two cropping seasons over which the farmers kept diaries to allow examination of any year-to-year variation.

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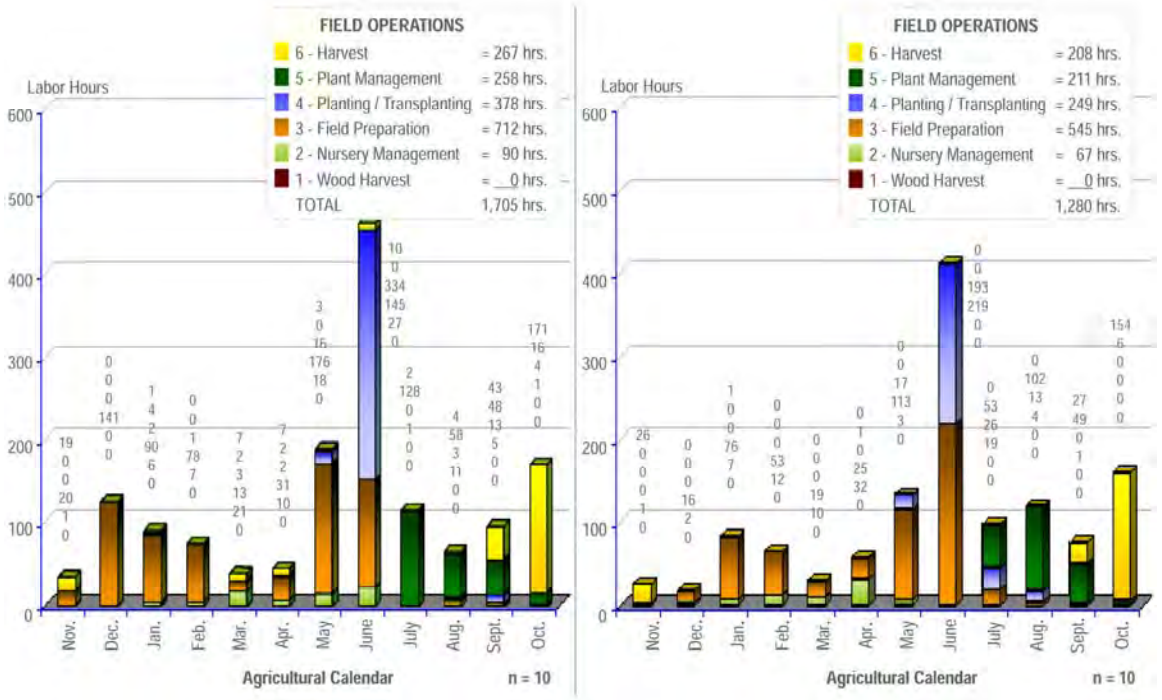
[20] As part of its field preparations, Tsiesema often has the added labor costs of repairing terraces and irrigation canals that have been damaged by land slips. Unlike Khonoma, Tsiesema does not have stone walls to stabilize the terraces and keep them from slipping down the slope. Repairing such slips is an annual chore and damage can be so bad and so frequent that terraces are abandoned. In a bid to stabilize its terrace bunds and reduce the need for annual repairs, Tsiesema plants fruit trees and timber trees, such as *Gmelina arborea* and *Terminalia myriocarpa* on the bunds. Another tree known locally as meshie (unidentified) is often found scattered in terraces because villagers believe that it not only helps stabilize the soil, but also “produces water”. Across Nagaland, *Salix* sp. (willow) are perhaps most commonly planted along terrace bunds, irrigation canals and stream banks to help anchor them in place (see plate 6-24). *Salix* flourishes in high-moisture areas, has a strong root system, and its branches can be periodically lopped for firewood.

[21] Although this discussion treats wet rice terraces as a homogeneous entity, this in fact glosses over substantial differences by which Tsiesema categorizes distinct types of ponded fields according to their type of irrigation and water source.

Figures 8-2 & 8-3. Labor Inputs into Wet Rice Terraces in Khonoma and Tsiesema Study Villages, Broken Down into Category of Field Operations*

Figure 8-2. Khonoma

Figure 8-3. Tsiesema



* Since, unlike jhum fields, there is little variation in how ponded fields are managed from one year to the next, the data collected during the 2000 and 2001 cropping years has been aggregated and is presented here as an average year.
See map 8-1 for location of fields from which these data were derived in Khonoma, and map 8-2 for Tsiesema.

Khonoma. The first thing that stands out from a glance at the pie charts in figure 8-4 is that the "wet rice terraces" in Khonoma are these days being planted to much more than rice. There is an expanding trend for terraces, formerly devoted solely to wet rice cultivation, to be converted into intensively-managed vegetable gardens. This is particularly popular on upper terraces that are closer to the village and may have a less reliable flow of irrigation water. While rice continues to be the major output from the irrigated terraces (75.3%), garlic (14.7%) and potato (3.6%) are gaining importance as cash crops, in addition to a wide variety of greens and other vegetables planted in lesser quantities.[22] This is happening under two distinct patterns. In some cases, several terraces of a field may be set aside from the standard flooding procedures, and vegetables planted as a summer crop instead of rice. The second way is that after the rice crop is harvested, the soil is quickly turned over again and the vegetables planted as winter crops. They will be harvested the following spring in time to prepare the land for the usual summer crop of rice (figure 7-24). This second pattern makes more intensive use of the land since the winter vegetables are an adjunct to the usual rice crop, not a replacement.

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[22] This diversification of cropping patterns shows up in the labor graphs and somewhat clouds the pattern of activities relating strictly to rice. Labor spent planting in September (figure 8-2), for example, is clearly not for rice, but rather for potatoes and garlic planted in the terraces as winter crops.

This is an extension of the same strategy that Khonoma farmers have followed in their jhum fields (chapter 2), by which the colder conditions that were once a liability for growing subsistence cereals have been transformed into an asset by converting to semi-temperate vegetables that prosper in cooler environments and enjoy high market demand on the plains. We thus see specialization in crops of competitive advantage, with expensive vegetables exported down the mountains in exchange for cheap rice from the plains. This is another example of agricultural systems adapting in response to lessening military conflict. When the British enforced the cessation of headhunting and intertribal warfare there was an expansion of cultivation. Now, the ceasefires that have finally quieted the long-raging Indo-Naga conflict are ushering in a new era of cash cropping as farmers have increasing access to outside markets.

Tsiesema. This conversion from subsistence cereals to vegetable cash crops has not happened in Tsiesema's wet rice terraces (figure 8-5), where hotter conditions offer fewer competitive advantages for producing cool-weather crops.[23] Although the terraces themselves continue to be planted almost solely to wet rice, Tsiesema does diversify its production with fruit (guava, oranges, bananas, peaches, pomello) harvested from the terrace bunds or the vicinity of the field huts. Tsiesema is thus using its own ecology to best advantage. These are all tropical fruits that prosper in Tsiesema's warmer fields, but are marginal at best in cooler Khonoma.

There is some rice-fish culture in both villages (see plate 5-41)[24], and although under-reported, wild fauna (frogs, tadpoles, snails, various grubs, native fish, crabs[25] and birds) are captured whenever possible.

Regardless of what is planted, the costs of planting materials are relatively modest in the context of the much larger investment in labor. But in absolute terms, our group of studied farmers in Khonoma was spending about three times as much (Rs 672) on planting materials for their rice terraces than their counterparts in Tsiesema (Rs 225). This was primarily due to the higher costs of potato sets (Rs

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[23] The diversification of Khonoma's terraces to other crops can be seen in appendix 6-14. Agrodiversity in the terraces is highly variable, depending on the basket of resources that each farmer has at his disposal and his strategy for managing them. Some continue the old tradition of planting only rice but other monitored fields were planted with up to a dozen other crops, in addition to the main rice crop. This trend is not happening in Tsiesema, where its warmer terraces continue to be planted primarily to rice, with occasional small amounts of maize, chilli, or tomato .Some Tsiesema farmers who are unable to produce all their rice needs plant higher-priced glutinous rice (Rs 20/kg) in their terraces, with the intention of selling it in the Kohima market (for making rice beer) and using the revenue thus earned to buy the nonglutinous rice they need at just Rs 12/kg. Many households also rely on sales of sticky rice to generate the money needed to pay their children's school fees. Glutinous rice is grown at a cost, however. Yields are roughly 25-33% lower than those from nonglutinous varieties (appendix 6-19).

[24] Of the 10 wet rice fields monitored in each village, three in Tsiesema were being used to raise fish together with the rice, but none in Khonoma.

[25] Tsiesema's wet rice terraces provide fewer crabs, perhaps, villagers suggest, because the fields are less rocky.

12/kg) and garlic cloves (Rs 10/kg) that are increasingly displacing rice (Rs 4.6-5.8/kg) in Khonoma's terraces. But even these costs are cushioned in that planting materials are generally not bought, but set aside from the previous year's harvest. In that sense, they represent forfeited income by reducing the volume of harvest available for sale, rather than a direct cash outlay.

In return for their investment, Khonoma farmers were reaping harvests valued at Rs 15,006 – 16,251 from their terraces, of which 71-80% was rice[26] and the remainder mostly garlic, potatoes and coriander. Despite their larger size (by about ⅓), Tsiesema's terraces were earning somewhat less at Rs 12,360 –13,370, of which rice comprised 79-91% of the value and the balance was mostly fish, guava and snails.

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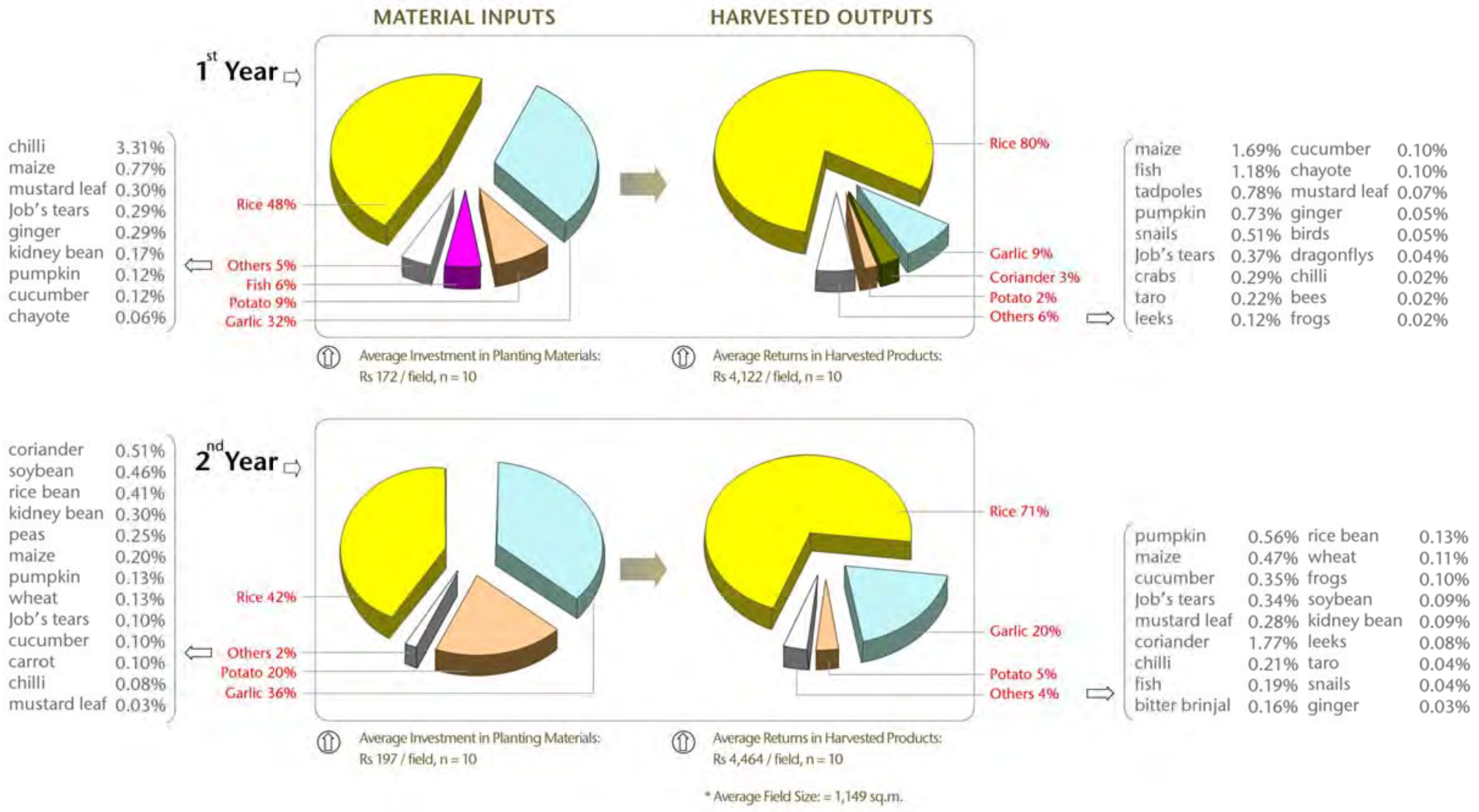
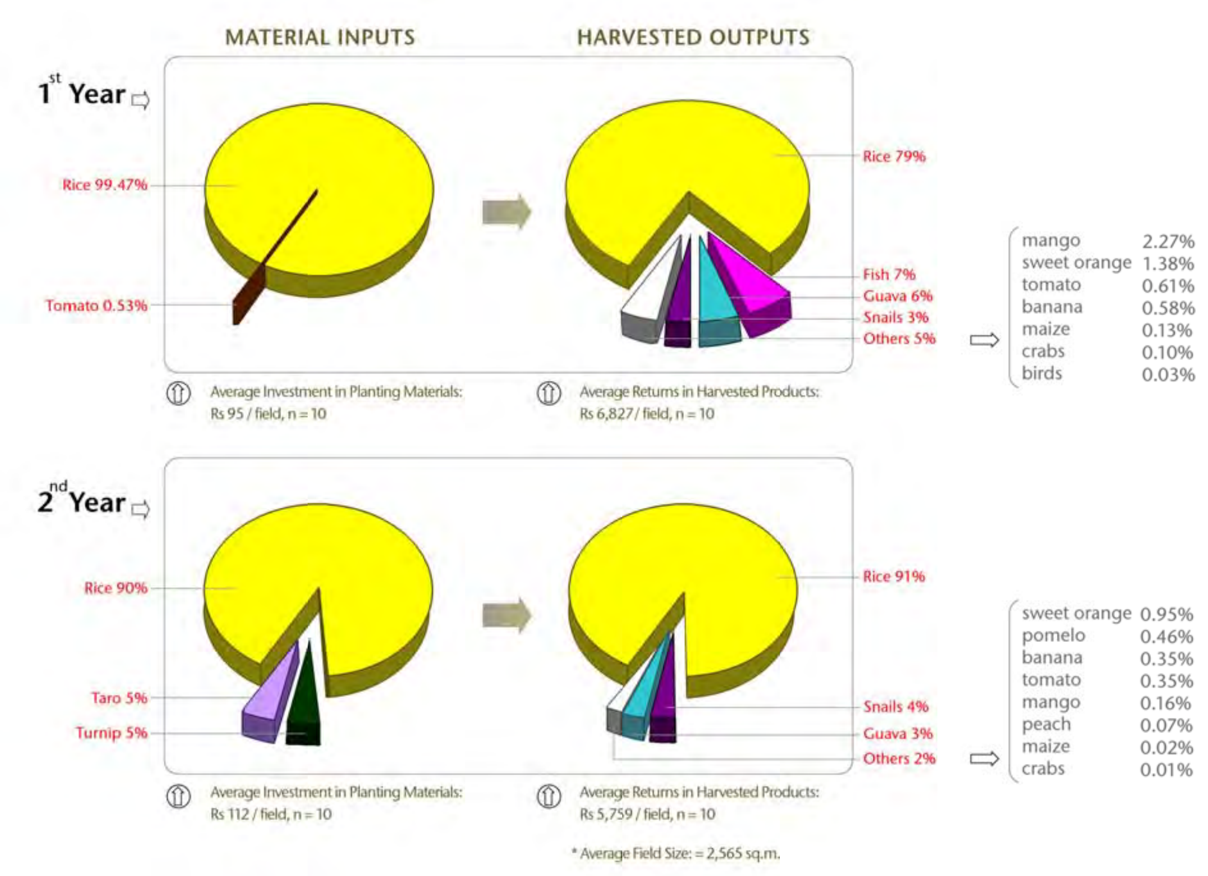
[26] These figures probably under-represent yields from Khonoma's wet rice terraces since most of the monitored fields were in the upper part of the valley (see map 8-1) where rice yields are thought to be lower due to the colder temperatures and less fertile soils. It is widely accepted that fields at the lower end of Khonoma's territory produce better rice yields and have higher populations of native fish – but are less suitable for vegetable cash crops.

Figure 8-4. Analysis of Investments in and Returns from Wet Rice Terraces* in Khonoma Village during 1st (2000) and 2nd (2001) Cropping Years



* Average Field Size: = 1,149 sq.m.

Figure 8-5. Analysis of Investments in and Returns from Wet Rice Terraces* in Tsiesema Village during 1st (2000) and 2nd (2001) Cropping Years



Cost-Benefit Analysis

So what do these data tell us about the costs and benefits of wet rice cultivation as practiced by the two study villages? The main findings of the diaries are summarized in table 8-2, and a more detailed breakdown of the data is provided in appendix 6-15.

Table 8-2. Summary of Data from Wet Rice Fields Monitored over 2000-2001 Cropping Seasons[a]

	KHONOMA [b]	TSIESEMA [c]	Difference [d]
SAMPLED FIELDS:			
Average Altitude *(m asl)*	1427	1093	+ 30.6 %
Average Walking Time to / from Fields *(min)*			
To Fields -	20	49	- 145 %
From Fields -	25	73	- 192 %
HOUSEHOLD LEVEL:			
Average Area of Wet Rice Cultivation / Household *(m^2)*	4183	5568	- 33.1 %
Labor Inputs *(hrs)*	1705	1280	+ 33.2 %
Planting Materials *(Rs)*	672	225	+ 198.7 %
Gross Harvested Outputs *(Rs)*	15,628	12,861	+ 21.5 %
Net Harvested Outputs *(Rs)* [e]	14,956	12,636	+ 18.4 %
Returns to Labor *(Rs/day)*	70	79	- 12.8 %
HECTARE LEVEL:			
Labor Inputs *(hrs/ha)*	4076	2299	+ 77.3 %
Planting Materials *(Rs/ha)*	1606	403	+ 298.5 %
Gross Harvested Outputs *(Rs/ha)*	37,361	23,097	+ 61.8 %
Net Returns to Land *(Rs/ha)* [f]	35,755	22,694	+ 57.6 %

[a] Data averaged over the two years (2000-2001) that the fields were monitored. See appendix 6-15 for a more detailed breakdown of the diary data.
[b] Main study village where alder is intensively managed in jhum fields.
[c] Compared village where alder is not managed in jhum fields.
[d] Expressed as Khonoma data compared to Tsiesema data.
[e] Net Harvested Outputs = Gross Harvested Outputs – Planting Materials
[f] Net Returns to Land/Ha = Gross Harvested Output/Ha – Planting Materials/Ha

At the Household Level. The studied farmers in both villages were, on average, each cultivating in the vicinity of ½ hectare of wet rice land, Khonoma somewhat less (4183 m^2) and Tsiesema a bit more (5568 m^2). This means that Tsiesema farmers had about ⅓ more wet rice land than their counterparts in Khonoma. But Khonoma was managing its smaller land area much more intensively, investing an extra ⅓ more labor (1705 hrs [K] : 1280 hrs [T]) and three times more in the cost of planting materials (Rs 672 [K] : Rs 225 [T]). These extra inputs enabled Khonoma to coax about 18% more harvest value from its limited land. Significantly, almost 25% of this harvest value (Rs 3858) comes from vegetable cash crops that are relatively new introductions.

At the Hectare Level. If we scale the data up to a uniform one hectare of land, this removes the effects of different-sized land holdings and allows a clearer comparison of land-use intensity between the two study villages. This magnifies the trends already noted at the household level. We now see that for every hectare of wet rice land, Khonoma farmers are investing an extra 77.3% labor and 298.5% in planting materials above that of their Tsiesema neighbors. This intensified management is providing Khonoma with returns of 57.6% more harvest value from a hectare of land than is reaped in Tsiesema. But even though Khonoma is earning more from its land, the same is not true of its labor. The law of diminishing returns appears to be applying here, and despite Khonoma's increasing adoption of high-value crops, Tsiesema farmers are still managing to earn almost 13% more (Rs 70 [K] : Rs 79 [T]) for every day that they spend working in their fields.

The picture that emerges thus fits with Khonoma's history as a village short in agricultural land. As the village population grew on a fixed land base, its fields had to be cultivated with increasing intensity to keep the village fed. It had to prioritize returns to land, as opposed to labor that was becoming increasingly abundant over time. This intensification was further encouraged by the closeness of Khonoma's terraces to the village residential area (walking times to/from fields avg. 22.5 min. [K]), so fields could be visited often without wasting much time in transit (appendix 6-4). But in Tsiesema, the population had never grown so high, its terraced fields were widely scattered across the landscape (walking times to/from fields avg. 61 min. [T]), and there was less pressure to intensify land use. Under continuing land abundance, its extensive management provided the best returns to their limited labor.

Jhum Cultivation

With flooded terraces supplying most of the Angamis' rice needs, the significance of their swiddens is proportionately reduced. Their role is of a more supplementary nature, providing additional grains and a wide range of dryland crops that add variety to the Angami diet. Swidden management is thus "fitted around" the exigencies of wet rice terracing – literally, in terms of where the fields are located, in terms of the flow of labor inputs, and the crops that it is expected to produce. While reading the following discussion of the findings from the farmers' swidden diaries, it should be kept in mind that this is the land-use component that state policy has long sought to eradicate in favor of wider use of wet rice terraces. The diary data provide compelling insights on why those programs have not been as successful as envisioned and farmers continue to cling tenaciously to shifting cultivation.

Labor Inputs

The labor data are presented separately for the two cropping years, with the 1st-year graph followed directly below by that for the 2nd cropping year. This provides a clear picture of total labor inputs throughout the two-year cropping phase. The graphs for Khonoma (figure 8-6) and Tsiesema (figure 8-7) are further presented side-by-side to facilitate comparison between the two study villages. Hence, moving vertically on the page allows comparison over time, and horizontally, between place.

Figures 8-6. & 8-7. Comparison of Labor Inputs* into 1st and 2nd Year Jhum Fields† by Household: Analyzed by Category of Field Operation across Agricultural Calendar

Figure 8-6. Khonoma

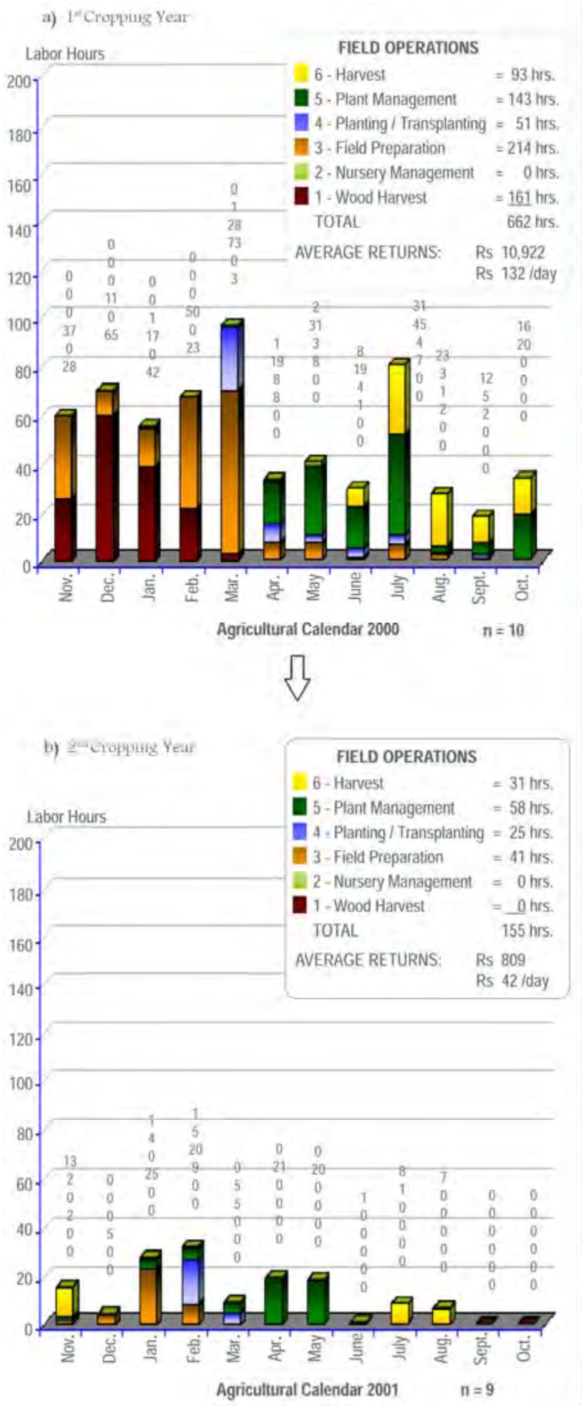
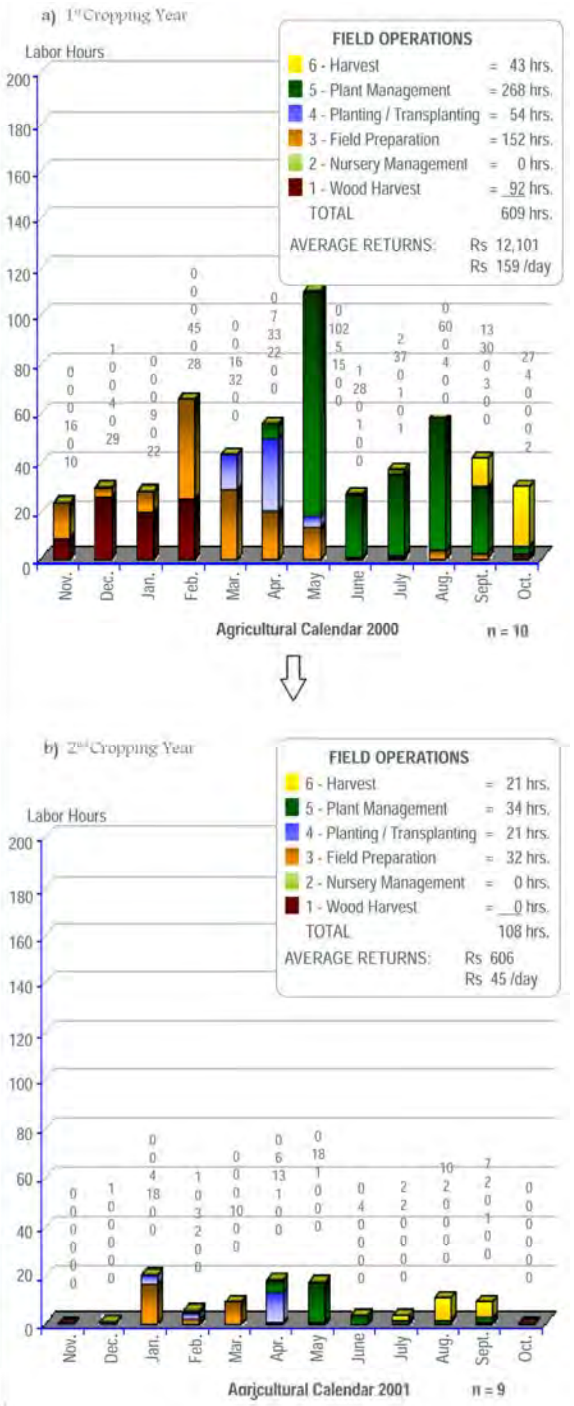


Figure 8-7. Tsiesema



* Extrapolated from labor diaries maintained by collaborating Khonoma and Tsiesema households over 2000 - 2001.

† Average field size: Khonoma = 3916 sq.m., Tsiesema = 4478 sq.m.

Khonoma. Starting with Khonoma, the graph shows jhum management broken down into roughly the following sequence of activities: the new jhum cycle begins with reopening the fallow and harvesting the firewood from November to February; field preparation follows directly behind, gaining momentum in February and March; the fields are then planted in March[27]; management of the crops dominates over the next four months from April to July; and finally, harvest begins in June and extends into November. Although these are the rough contours of the graph, it is also clear that small amounts of soil tillage and replanting continue throughout the summer months. This "noise" in the data represents Khonoma's increasing use of intercropping, relay-planting and crop rotations as it plants faster-maturing vegetables in intensified cropping patterns (see the cropping calendar in figure 7-26).

Glancing down to the data for the 2nd cropping year (figure 8-6b), we find a dramatic reduction in labor inputs (662 hrs [1st] : 155 hrs [2nd]). There is no wood to be harvested. The residues from the previous year's crop need only to be cleared away and the soil tilled lightly to get the seedbed into shape for replanting. This much-reduced field preparation is done mostly in January; followed by planting in February; modest labor inputs as the crop is cared for over the next three months; and finally, harvesting in July and August (see also figure 7-27). As autumn approaches, the alder coppices are already beginning to form a canopy and the yellow crop residues quickly disappear under a flush of weeds that mark the first stages of fallow succession. Although the succession of field operations over the two cropping years is still quite clear, it is obviously more dispersed, with more activities going on concurrently, than would have been the case earlier when Job's tears was the main crop of 1st-year jhums and a millet-perilla intercrop during the 2nd year.

Tsiesema. Now let us shift our focus further down the valley to what was happening in Tsiesema's jhums (figure 8-7). Here we find a cleaner, more distinct flow of field operations since Tsiesema jhums continue to be rice-based and have not adopted the intense cropping patterns that Khonoma relies on to squeeze more production from its limited land. Activities in Tsiesema's jhums tend to be done once and are then finished for the year (as can be seen in its cropping calendar in appendix 5-26). There is not the continual retillage and replanting that we find in Khonoma jhums as one crop is harvested and that piece of ground becomes available for another.

Jhum cultivation in Tsiesema begins with wood harvest over the winter months of November to February[28]; field preparations start in tandem with removal

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[27] In both study villages, the general practice on the first cropping year is to begin by broadcasting rice or Job's tears on the newly-cleared field and then performing a shallow hoeing to break up any soil clumps. Any remaining debris is then raked into piles and reburnt. But when Khonoma plants its 2nd-year jhums, it starts with an initial tillage operation, then broadcasts the mixture of millet and perilla seeds, and finally follows up with another light hoeing.

[28] As described in chapter 7 Khonoma's Merhümia khel rotates automatically between its four jhum blocks (map 4-4) and it is a foregone conclusion which area will be opened for cultivation each year. There is no

of the wood[29], peak in February and March, and are completed by May; planting begins in mid-March, peaks in April, and spills over into May[30]; plant management gets underway in April, becomes busiest in May (when the rice is hilled early in the month and then weeded again at the end), and continues for six months until September[31]; and concludes with harvest in September to October. We thus see a distinct "cascading" from one activity to the next throughout the agricultural year. As was the case with Tsiesema's wet rice terraces, the significant range in altitude amongst the monitored jhum fields (967 m – 1453 m asl) stretched out the time frame under which each field operation continued. Planting in the lower jhums, for example, could still be going on several months after completion of the last upper jhum.[32]

The second cropping year in Tsiesema (figure 8-7b) receives even less importance (108 hrs) than that in Khonoma (155 hrs), and sometimes does not happen at all.[33] It is often limited to planting a few vegetables in pockets of the field that were noticed to be particularly fertile. Tsiesema villagers claim that if rice were planted for a second year, they would expect the need for increased shallow hoeing to loosen the soil, increased weeding labor, additional fencing, and yield decreases of 50-60%. In partial compensation, the labor normally invested in opening a fallow

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such clear-cut pattern in Tsiesema and selecting the best field sites is important to the success of jhum cultivation every year. They describe the ideal site as: located on the warmer, lower slopes of the village where rice yields are higher; a "mature" fallow that has not been cultivated for 15 years or more; having thick, black soils; the vegetation will be dark-colored and vigorous, with an abundance of plants associated with soil conditions suitable for paddy (phirei [*Digitaria* sp.], sokrünuo [*Zingiber* sp.], zohe [*Carex* sp.]), and absence of unfavorable plants (kekhro, kezhü, tiepfetsa [*Musa* sp.]); and few weeds. They point out that even when the soil is fertile, care must still be taken in choosing rice varieties most suited to the site, particularly for red and yellow soils. Trees not felled, but selectively retained in jhum fields, are usually those valued for timber such as chiehu (*Emblica officinalis*), ze (*Albizia lebbek*), peü (*Albizia brocera*), tsie (*Lindera citrata*), chievü (*Bombax malabaricum*), thovü (*Gmelina arborea*), mecha (*Terminalia myriocarpa*), seirie (*Michelia champaca*), and pedo. But trees are not all equally suitable for integration with food crops. Villagers recognize some as having beneficial effects on crop growth (e.g., mego [*Albizia stipulata*], ze [*Albizia lebbek*], peü [*Albizia brocera*], chiehu [*Emblica officinalis*], rupro [*Alnus nepalensis*], and there [unidentified]), but claim others are antagonistic (e.g., phrie [*Quercus serrata*], phegü [*Castanea* sp.], khusie [*Melia azederach*], mecho [*Schima wallichii*], thovü [*Gmelina arborea*], chievü [*Bombax malabaricum*]).

[29] Tsiesema farmers tend to clear lighter fallows in November to early December. These lighter fallows have more weeds and shrubs whose roots, villagers explain, are "weaker" at this time and more easily killed. Clearing thicker forest fallows is usually delayed until late December and January. There is still a good chance of receiving some rainfall in November and December, and if the heavier wood is cut too early and becomes wet, then it is harder to burn.

[30] Planting will be finished in most jhum fields by April 20th, but extends into May in warmer areas.

[31] Since Tsiesema's wet rice terraces and jhum fields are both scattered in small patches across the landscape (appendix 5-18), they must be guarded more carefully against both livestock and birds, wild pigs, and other predators. If the ripening crops are being damaged, the field owner may be forced to sleep in his field to discourage nocturnal visitors.

[32] Villagers note that the colder fields near the village residential area must be planted at least 15 days earlier than the lower slopes or they will not grow properly.

[33] In discussing the length of their cropping phase, Tsiesema villagers recall that their ancestors used to say that jhum fields could be cultivated continuously for up to five years, but yields would decline steadily every year. Our collaborating farmers were very clear that their reasons for not extending cultivation beyond the second year were increasing weeds and declining yields. They preferred to invest their labor in opening a new fallow rather than fighting the weeds, and would be paid for their labor by the value of the firewood.

would be saved, but more seriously, the firewood harvest would be foregone. Some crops are more tolerant of second-year cropping. Chilli yields usually improve in the second year (assuming the original plants persist), sometimes even doubling. Maize, millet, cucumber and yam will still yield satisfactorily, but not the rice staple. In warmer, drier areas, rice yield declines in a second cropping year are reported to be less severe than in colder areas. There is one particular non-glutinous variety called "theke iha" that is normally used on the rare occasions when a jhum field is replanted with rice for a second successive year.

For the limited amount of second-year cropping that is done: the residual rice stalks from the previous year's crop are turned over with a light hoeing between January and March; most planting is done in April, followed by modest inputs in plant management from May to July; and finally harvesting occurs in August and September.

Since a two-year cropping phase is standard practice in both study villages, most farmers are cultivating both a 1st- and 2nd-year field at any given time. To provide the full picture of labor inputs into jhum fields then, the data from the 1st (a) and 2nd-year (b) graphs need to be added together. It is clear that both villages accord by far the most importance to 1st-year fields, newly opened from fallow. Their attitude towards 2nd-year fields appears opportunistic; the soil is still sufficiently fertile and weed populations not yet out-of-control, so they try to harvest whatever they can from the field with minimal inputs. The attention given to weed control ebbs to nothing as the crop approaches maturity and it nears time to surrender the field to fallow regrowth. But if a field is less than ideal (e.g., a poor harvest in the 1st year, far from the village, rocky, etc.), and the farmer has other options, it may be allowed to lapse back into fallow after only a single year of cropping.

Material Inputs and Outputs

Now let us look at the crops that were the foci of those labor investments. Figures 8-8 and 8-9 show material inputs (i.e., planting materials) and harvested outputs for Khonoma and Tsiesema, respectively, over the two-year monitoring period.[34] At first glance, the cropping patterns appear typical for swidden systems – a handful of primary crops, mixed with a wide array of secondary crops planted in small amounts for kitchen use.

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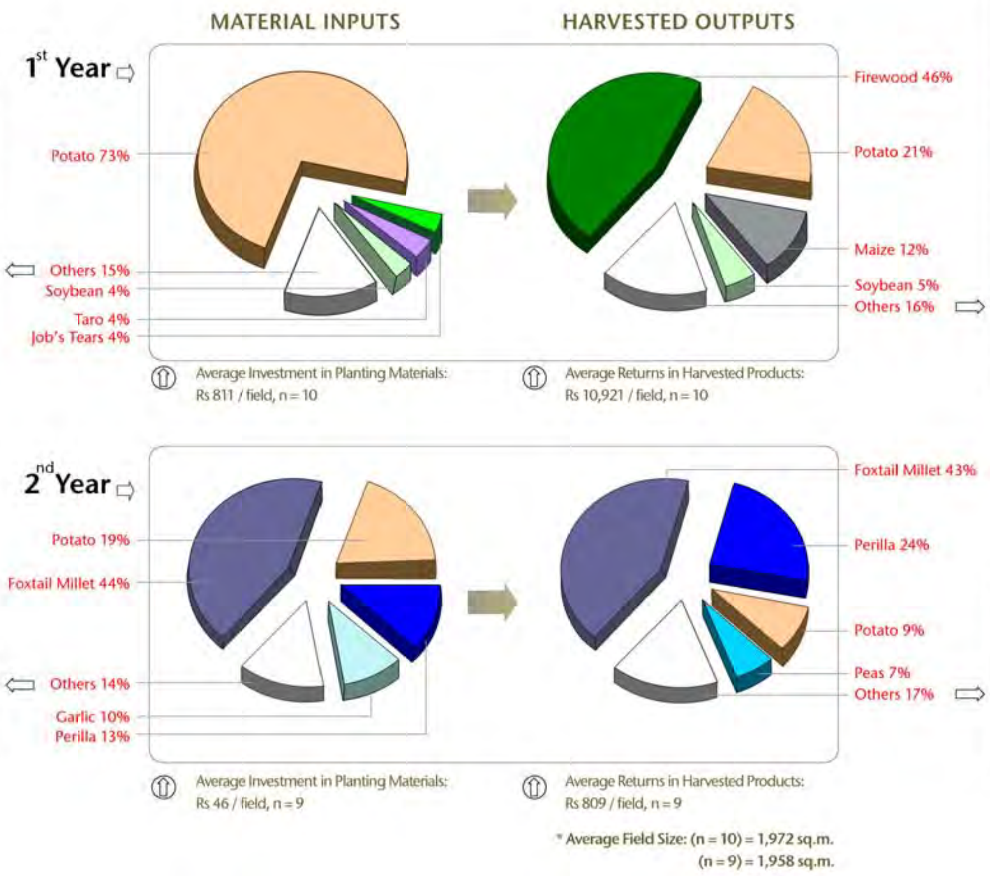
[34] This is imperfect, however. There are overlaps between the two years and, for example, taro planted one year may not be harvested until the next. Although this obviously affects year-by-year figures, it is irrelevant to the wider analysis of total system productivity.

Figure 8-8. Analysis of Investments in and Returns from Monitored Jhum Fields* in Khonoma Village during 1st (2000) and 2nd (2001) Cropping Years



1st Year, Material Inputs – Others 15%:

cucumber	0.21%	chilli	1.90%
tomato	0.13%	garlic	1.75%
flowers	0.12%	cabbage	1.66%
bottle gourd	0.12%	tree tomato	1.53%
mustard	0.12%	kidney bean	1.16%
yam	0.12%	maize	0.10%
bitter brinjal	0.11%	sweet potato	0.94%
chayote	0.09%	peas	0.89%
balsam pear	0.09%	radish	0.42%
perilla	0.06%	onion	0.37%
sweet basil	0.04%	coriander	0.34%
thick-leaved		mustard leaf	0.34%
lavender	0.04%	pumpkin	0.34%
hyacinth bean	0.02%	ground nut	0.24%

1st Year, Harvested Outputs – Others 16%:

Job's tears	4.52%	crabs	0.08%
cabbage	1.65%	balsam pear	0.07%
chilli	1.58%	sweet basil	0.07%
passion fruit	1.30%	chayote	0.05%
pumpkin	1.14%	flowers	0.05%
kidney bean	1.02%	birds	0.05%
cucumber	0.57%	hyacinth bean	0.04%
garlic	0.57%	thick-leaved	
mustard leaf	0.55%	lavender	0.03%
tree tomato	0.44%	carrot	0.02%
sweet potato	0.42%	bottle gourd	0.02%
radish	0.39%	rice bean	0.02%
coriander	0.39%	mustard	0.01%
taro	0.25%	tomato	0.01%
peas	0.22%	ginger	0.01%
bitter brinjal	0.17%	turnip	0.01%
ground nut	0.17%	brinjal	0.01%
onion	0.09%		

2nd Year, Material Inputs – Others 14%:

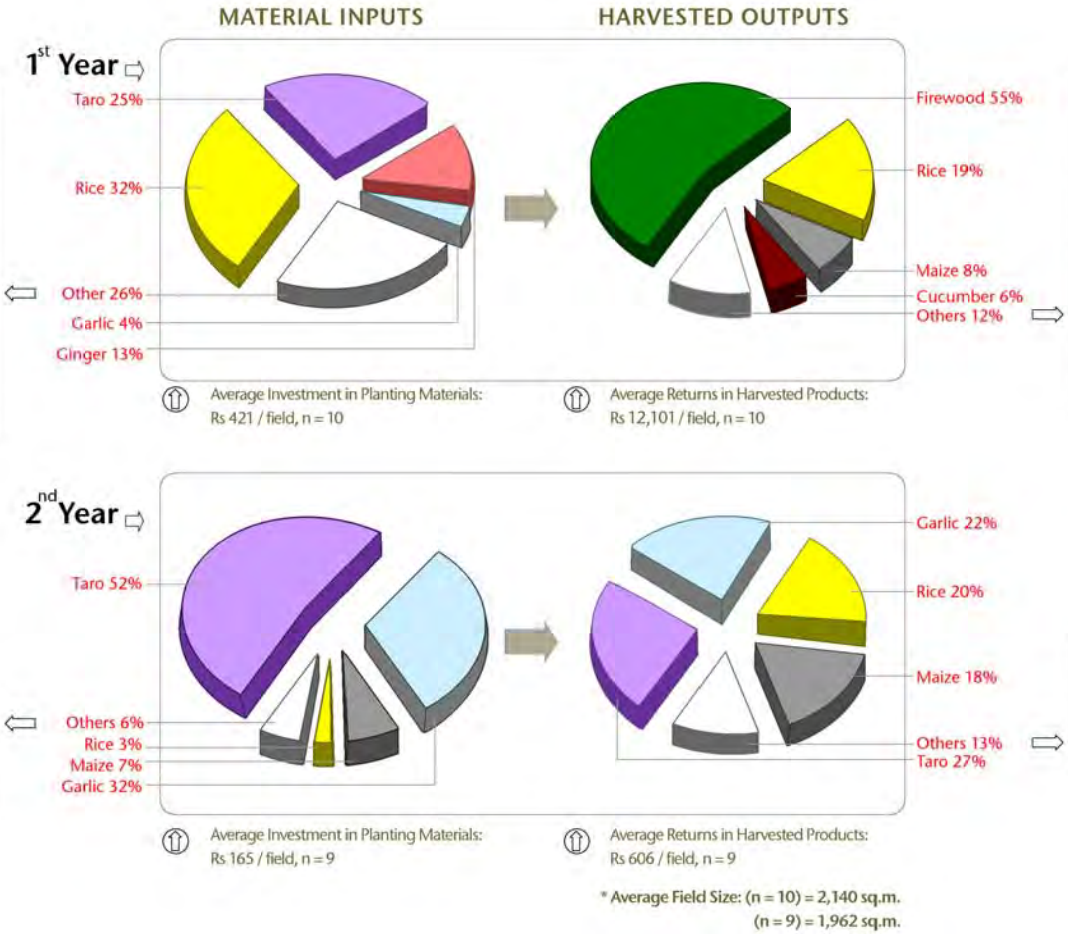
maize	5.93%
peas	3.26%
taro	2.90%
soybean	1.21%
chayote	0.60%

2nd Year, Harvested Outputs – Others 17%:

maize	6.50%	crabs	0.27%
taro	4.01%	mustard leaf	0.14%
garlic	3.57%	perennial	
yam	0.82%	buckweat	0.14%
soybean	0.69%	wild vegetables	0.07%
chayote	0.49%	grasshoppers	0.03%
pumpkin	0.41%		
chilli	0.27%		

* Average Field Size: (n = 10) = 1,972 sq.m.
(n = 9) = 1,958 sq.m.

Figure 8-9. Analysis of Investments in and Returns from Monitored Jhum Fields* in Tsiesema Village during 1st (2000) and 2nd (2001) Cropping Years



rozelle	0.45%
perilla	0.45%
sweet basil	0.29%
rice bean	0.29%
kidney bean	0.29%
thick-leaved lavender	0.29%
mustard leaf	0.24%
tree tomato	0.24%
sponge gourd	0.21%
balsam pear	0.17%
cowpea	0.14%
cabbage	0.12%
bottle gourd	0.10%
hyacinth bean	0.10%
cucumber	4.16%
cassava	2.47%
chilli	2.45%
potato	2.38%
maize	2.35%
Job's tears	1.54%
soybean	1.43%
passion fruit	1.19%
yam	1.07%
pumpkin	0.78%
tomato	0.62%
bitter brinjal	0.59%
brinjal	0.57%
sweet potato	0.55%
sugarcane	0.48%

taro	3.44%
garlic	1.21%
ginger	0.88%
chilli	0.80%
pumpkin	0.51%
tomato	0.51%
bitter brinjal	0.47%
Job's tears	0.43%
yam	0.38%
cabbage	0.35%
bees	0.30%
rozelle	0.25%
mustard leaf	0.20%
sweet basil	0.17%
cassava	0.15%
cowpea	0.15%
perilla	0.13%
soybean	0.10%
sugarcane	0.10%
sponge gourd	0.10%
potato	0.06%
kidney bean	0.06%
brinjal	0.06%
rice bean	0.05%
thick-leaved lavender	0.03%
balsam pear	0.02%

onion	2.02%
potato	1.62%
cucumber	1.01%
kidney bean	0.67%
chilli	0.54%
bitter brinjal	0.13%

cucumber	5.49%
ginger	2.74%
chilli	2.10%
potato	0.73%
pumpkin	0.55%
bitter brinjal	0.07%

Khonoma. Khonoma's crop data show a system in transition, in which traditional subsistence crops linger, alongside new introductions aimed at outside markets. This is most obvious in the first cropping year (figure 8-8). The Job's tears that had long been the forte of 1st-year jhums have been largely pushed aside by potatoes, now constituting 73% of total planting material costs (plates 6-2 – 6-3).[35] Soybean, taro and Job's tears each add another 4%, and another 36 minor crops combine for the remaining 15% (see appendix 5-25). On average, for the 1st cropping year, a total of Rs 811-worth of planting materials were being invested in jhum fields averaging 1972 m^2 in area.

The output data show that a staggering 46% of the total yield value came from the firewood harvested when the fallow was opened[36]; another 21% from potatoes; 12% from maize; 5% from soybean; and the remaining 16% from the wide range of minor crops grown in small amounts for kitchen consumption. This latter category includes small quantities of wild flora (perennial buckwheat and other wild vegetables) and fauna (birds, crabs, grasshoppers) that farmers collect as they work in their fields. In total, the Khonoma farmers participating in the study each harvested, on average, Rs 10,921-worth of products from an average field size of slightly less than 1/5 of a hectare.

Turning to the 2nd-cropping year, we find that the dramatic reduction in labor inputs, discussed earlier, is accompanied by an equally significant narrowing of agrodiversity (average 17.9 crops/field [1st-year] : 4.8 crops/field [2nd-year]). Cash crops have made fewer inroads here, and the millet-perilla intercrop that traditionally occupied all 2nd-year jhums still represents the largest expenditure in planting materials (44% and 13%, respectively). But the trend towards conversion from such subsistence crops to higher-value cash crops is nonetheless evident, with potato sets already comprising 19% of the cost of planting materials, 10% by garlic, and the remaining 14% by a handful of minor crops. The average investment in planting materials for the 2nd-year jhums was Rs 46, a mere 5.7% of what had been spent the previous year (Rs 811).

The bulk of the harvest value still comes from the traditional foxtail millet (43%) and perilla (24%) intercrop, with the remaining contributions from potato (9%), peas (7%), and a mixture of minor crops (17%). Together, they provide returns of Rs 809 from 2nd-year jhum fields, slightly less than had been spent on planting materials for the previous year's crop!

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[35] It should be cautioned that the cost of planting materials for various crops can not be used as a direct measure of the comparative area planted to each crop. Root crops are relatively more expensive to plant than cereals, both because the planting materials cost more per kg, and are planted at more kg/ha. It is likely that higher planting costs prevent some poorer households from planting potatoes, especially if the seed potato has to be imported from Simla. While their more prosperous neighbors earn good returns from potato sales, this poorer sector may thus remain stuck in a subsistence economy.

[36] The firewood should more properly be viewed as a product of the fallow period, but its value is included here with that of the 1st-year crops since that is when it is harvested. We will return to this point again later in the chapter.

Tsiesema. Tsiesema (figure 8-9) shows a slightly lower level of agrodiversity in its jhum fields (53 species [K] : 40 species [T])[37], and the nature of the fields is dramatically different from the intensively-managed market gardens, terraced and scattered with alders, found in Khonoma. Tsiesema's fields are more typical of swiddening in the region: rice-based, with a sprinkling of maize, chillis, tomatoes and other crops throughout, yams and cucumbers targeted at heavily-ashed spots where unburnt debris was piled and reburnt, field boundaries often marked by rows of maize or taro, and small patches of vegetables near the field huts, within easy reach for preparing noon meals (plate 6-4). The semi-temperate vegetables that Khonoma specializes in (potatoes, garlic, peas, cabbage) have almost disappeared in favor of more heat-demanding crops (rice, roselle, sticky maize, tomato, Raja chilli).[38]

Rice is thus the major expense in planting materials (32%) for the 1st cropping year, followed by taro (25%), ginger (13%), and garlic (4%) – all root crops and thus more costly – and the remainder comprises a wide array of minor crops (26%). On average, the studied group of Tsiesema farmers each invested Rs 421 in materials to plant jhums 2140 m^2 in area.

As was the case in Khonoma, firewood dominates the list of harvested products from Tsiesema's 1st-year jhums (55%), followed by rice (19%) and maize (8%) – both cereal staples – and finally cucumbers (6%) and other minor crops (12%). The total harvest value from these 1st-year jhums was, on average, Rs 10,058/field.

In the limited cropping that Tsiesema does in the second year, emphasis is shifted from cereals to root crops that are more nutrient efficient under conditions of declining fertility. The major costs for planting materials are thus for taro (52%) and garlic (32%), rice and maize are now reduced to 3% and 7% respectively, and the remaining 6% is for an assortment of minor crops. Total costs of planting materials for this second year average Rs 165/field.

Returns from Tsiesema's 2nd-year cropping average only Rs 608/field, of which 27% comes from taro, 22% from garlic, 20% from rice, 18% from maize, and 13% from a few minor crops.

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[37] Our inventories of crops grown in each subsystem suggested, however, that the lower agrodiversity of Tsiesema's jhums may be because they are instead planting some of these crops in their permanent gardens (appendix 5-32). We found a total of 75 crop species in the permanent gardens sampled in Tsiesema (n = 10), compared to a more modest 42 in Khonoma (n = 9). This trend of higher agrodiversity in Tsiesema's permanent gardens was also clear in the field-level data – that showed an average of 19.5 species/garden in Tsiesema and only 12.9 in Khonoma. Tsiesema manages these gardens relatively intensively, applying cattle dung and continually planting new crops as old ones are harvested. Villagers can harvest something to eat from their permanent gardens throughout the year, as well as feedstuffs to include in the mash that they boil for their pigs every evening. Surpluses are sold.

[38] But again, crops also change as we move across Tsiesema's own territory. Cucumber and brinjal are targeted to the colder fields at higher altitudes; Raja chillis thrive only in the lower, hotter areas; but the standard, small variety of chilli does well right across the landscape. Rice is also planted throughout, but the varieties are chosen to meet local climatic conditions.

Cost-Benefit Analysis

A distillation of the findings from the jhum diaries is presented in table 8-3 for easy reference, and a more detailed breakdown of the data is provided in appendix 6-16.

At the Household Level. The first thing we notice is the small size of Angami jhums, compared to those of other Naga subgroups that do not have wet rice terraces and thus have to rely on jhum cultivation for virtually all of their food needs.[39] The studied farmers in both villages each opened up in the vicinity of 1/5 of a hectare of new jhum land in 2000, Khonoma somewhat less (1972 m^2) and Tsiesema more (2140 m^2). Since each farmer opened only one new field, this meant that their sampled fields represented the entirety of their 1st-year jhum cultivation in 2000, and of their 2nd-year jhum cultivation in 2001.[40] In examining differences in their jhum management, it must be kept in mind that the fields monitored in Khonoma (1671 m asl) were, on average, about 400 m higher in elevation than those in Tsiesema (1264 m asl), and this had implications for both climate and crop selection (chapter 6). It is also noteworthy that while the jhums sampled in Khonoma were more uniformly clustered, from 25 to 40 minutes' walk from the village (map 8-1), those in Tsiesema were strung out from the village edge (5 minutes walk – 1453 m asl) down the slope midway to its most distant boundaries (110 minutes walk – 967 m asl) (map 8-2). The more distant jhums have higher costs, most significantly in terms of daily transit times to and from the fields, but also from the increased danger of predator damage and the increased likelihood that the farmer will sleep over in distant jhums to both cut down on time spent walking and guard the crop against wild boar and other nocturnal visitors. These issues have implications for their management and profitability.[41]

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[39] The size of jhum fields that each family opens depends heavily not only on land availability, but also on the size of its labor force. Keitzar (1998, 52) reports that the jhum area cultivated by Naga households varies from 0.5 to 2.5 hectares. Odyuo (undated) puts the figure at 1 hectare, suggesting that the size of Angami swiddens is only about 20% of the state average.

[40] This was unlike their wet rice cultivation, where farmers own varying numbers of plots, all of which they generally cultivate every year. This meant that each farmer's field-level data had to be scaled up to his total wet rice land holdings in order to see what was happening at the household-level. Hence, for jhum fields on both the 1st and 2nd years of cultivation, the field-level and the household-level are one and the same.

[41] Closer may not always be better, however. Field number 2 in Tsiesema was an interesting example of this. The field's location on the village edge (map 8-2) meant that the farmer did not have to waste much time traveling back and forth – but not without costs. Higher-altitude jhums around the village are considered to produce only half the rice yields of warmer fields at lower altitudes (appendix 6-19). On top of this, its closeness also left it vulnerable to the village's free-ranging cattle and the crop was badly damaged. It thus seems that time saved in not having to walk far to one's field may have to be traded off against lower rice yields and time spent building fences.

Table 8-3. Summary of Data from Jhum Fields Monitored over 2000-2001 Cropping Seasons [a]

	KHONOMA [b]	**TSIESEMA** [c]	**Difference** [d]
PER HOUSEHOLD:			
Average Field Size *(m^2)*	1972	2140	-8.5%
Average Altitude *(m asl)*	1671	1264	+407 m
Walking Time to / from Fields *(min)*			
To Fields -	33	33	0%
From Fields -	28	45	-60.7%
1st-Year Cropping:			
Costs -			
Labor Inputs *(hrs)*	662	609	+8.7%
Planting Materials *(Rs)*	811	421	+92.6%
Benefits -			
Gross Harvested Outputs *(Rs)*	10,921	10,058	+8.6%
Net Harvested Outputs *(Rs)* [e]	10,110	9637	+4.9%
Net Returns to Labor *(Rs/day)*	122	127	-4.1%
2nd-Year Cropping:			
Costs -			
Labor Inputs *(hrs)*	155	108	+43.5%
Planting Materials *(Rs)*	46	165	-258.7%
Benefits -			
Gross Harvested Outputs *(Rs)*	809	608	+33.1%
Net Harvested Outputs *(Rs)* [e]	763	443	+72.2%
Net Returns to Labor *(Rs/day)*	39.4	32.8	+20.1%
PER HECTARE:			
1st-Year Cropping:			
Costs -			
Labor Inputs *(hrs/ha)*	3357	2846	+18.0%
Planting Materials *(Rs/ha)*	4113	1967	+109.1%
Benefits -			
Gross Harvested Outputs *(Rs/ha)*	55,380	47,000	+17.8%
Net Returns to Land *(Rs/ha)* [f]	51,268	45,033	+13.8%
2nd-Year Cropping:			
Costs -			
Labor Inputs *(hrs/ha)*	786	505	+55.6%
Planting Materials *(Rs/ha)*	233	771	-230.9%
Benefits -			
Gross Harvested Outputs *(Rs/ha)*	4102	2841	+44.4%
Net Returns to Land *(Rs/ha)* [f]	3869	2070	+86.9%

[a] See appendix 6-16 for a more detailed breakdown of the diary data.
[b] Main study village where alder is intensively managed in jhum fields.
[c] Compared village where alder is not managed in jhum fields.
[d] Expressed as Khonoma data compared to Tsiesema data.
[e] Net Harvested Outputs = Gross Harvested Outputs – Planting Materials
[f] Net Returns to Land/Ha = Gross Harvested Output/Ha – Planting Materials/Ha

The data from the jhum diaries appear to parallel the same general dynamics already seen in the wet rice terraces. Khonoma is investing more, both in terms of labor (662 hrs [K] : 609 hrs [T]) and planting materials (Rs 811 [K] : Rs 421 [T]) in its smaller land area. This is earning it about 8.6% more gross harvest value than Tsiesema's fields (Rs 10,921 [K] : Rs 10,058 [T]). But although total output increases, the extra labor that Khonoma uses to achieve those gains receives declining returns (Rs 122/day [K]) compared to Tsiesema's less intensive management (Rs 127/day [T]).

Although both villages maintain a 2-year cropping phase, table 8-4 highlights the fact that their second year of cultivation is half-hearted, to say the least. Khonoma continues to put significantly more labor into 2nd-year cultivation than Tsiesema (155 hrs [K] : 108 hrs [T]). But Tsiesema's costs for planting materials (Rs 165) surge ahead of Khonoma's (Rs 46) as in the second year it plants more taro, a crop that is more tolerant of the declining fertility and increasing weeds, and can provide a harvest under very low levels of management. Although vegetable cash crops are gradually creeping into Khonoma's 2nd-year fields, they are still planted primarily to a foxtail millet–perilla mixture that is cheap to plant, but requires more weeding and intertillage to provide a successful harvest. Second-year jhums in both villages provide meager outputs (Rs 809 [K] : Rs 608 [T]) and abysmal returns to labor (Rs 39.4/day [K] : Rs 32.8/day [T]) – roughly one-third of what their labor had earned from the same land on the previous year. It is not a profitable enterprise in either village. Of all the activities comprising the livelihood strategies of Angami villagers (chapter 7), planting 2nd-year jhums is probably one of the least remunerative uses of their time, and it is easy to understand why it is often forfeited altogether if labor is more limited than usual, or field conditions less than ideal. Their objective seems to be to coax whatever additional productivity they can from their 2nd-year fields, while keeping labor inputs to a minimum. But it seems likely that farmers would be better off investing that additional labor in managing a larger 1st-year jhum and limiting the cropping phase to a single year.

At the Hectare Level. The amplitude of these trends is magnified when scaled up to a full hectare to allow clearer comparisons of intensity of land use. Briefly, we find Khonoma investing 18% more labor (3357 hrs [K] : 2846 hrs [T]) and over double the cost of planting materials (Rs 4113 [K] : Rs 1967 [T]) than Tsiesema in a hectare of 1st-year jhum fields – in return for which it reaps an extra 17.8% more harvest value (Rs 55,380 [K] : Rs 47,000 [T]). After deducting the costs of planting materials, Khonoma's net advantage over Tsiesema is reduced to 13.8% more harvest value per hectare (Rs 51,268 [K] : Rs 45,033 [T]).

Table 8-4. Decline in Investment and Productivity of Jhums from 1st to 2nd Cropping Years (*/ha*)[a]

	KHONOMA				**TSIESEMA**			
	Cropping Year		**Decline**		**Cropping Year**		**Decline**	
	1st	**2nd**	***Actual***	**%**	**1st**	**2nd**	***Actual***	**%**
Investment								
Labor Inputs *(hrs/ha)*	3,357	786	2,571	76.6	2,846	505	2,341	82.3
Planting Materials *(Rs/ha)*	4,113	233	3,880	94.3	1,967	771	1,196	60.8
Productivity								
Gross Harvested Outputs *(Rs/ha)*	55,380	4,102	51,278	92.6	47,000	2,841	44,159	94.0
Net Returns to Land *(Rs/ha)* [b]	51,268	3,869	47,399	92.5	45,033	2,070	42,963	95.4
Net Returns to Labor *(Rs/day)*	122	39.4	82.6	67.7	127	32.8	94.2	74.0

[a] Data derived from diaries of 10 collaborating farmers in each study village.

[b] Net Returns to Land/Ha = Gross Harvested Output/Ha – Planting Materials/Ha

Khonoma continues to make a more serious effort in its jhums on the 2nd cropping year.[42] Its investment in labor now balloons to 55.6% above Tsiesema's (786 hrs [K] : 505 hrs [T]). But Tsiesema spends over three times more than Khonoma in planting materials (Rs 233 [K] : Rs 771 [T]) as it changes to more taro that can "look after itself" under the minimal management accorded to 2nd-year fields. Khonoma's extra attention earns it 44.4% more harvest value than Tsiesema (Rs 4102 [K] : Rs 2841 [T]), although productivity levels of both are now extremely low. After the costs of planting materials are deducted, Khonoma is left with 86.9% higher net returns to land than Tsiesema (Rs 3869/ha [K] : Rs 2070/ha [T]).

Overall, the findings from the jhum diaries reinforce the picture of Khonoma as a land-short village that had to devise increasingly intensive ways to manage its limited land base. In doing so, it gradually made sacrifices in the returns to labor that shifting cultivators generally try to maximize, and instead prioritized returns to land. That it was able to boost its net returns to land by 13.8% above Tsiesema's (1st-year cropping), but at the cost of only a 4.1% reduction in returns to labor, is probably testimony to the success of Khonoma's innovations.

In explaining why jhum cultivation is valued, farmers frequently also point to the many months over which successive crops are harvested. There is flexibility in the system. Jhums can be managed with a minimalist strategy – such as near monocultures of maize or Job's tears – in which labor inputs are few. Or they can be managed extremely intensively, in which a wide menu of crops are interplanted in combinations of crop rotations, intercropping and relay-cropping patterns. This, in

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[42] Although the actual numbers are now much reduced, their variation as a percentage becomes larger.

turn, also provides flexibility in producing only enough for home consumption or marketable surpluses.

The other thing to note is the contrasting influence of environment on jhum cropping patterns in the compared villages. Our ten monitored fields in Khonoma averaged 1671 m asl with a northern exposure – too cold for rice, but ideal for potatoes and other cash crops that enjoy a strong demand in Dimapur and other lowland markets. Our Tsiesema fields averaged 1264 m asl with a predominantly western aspect, too warm for the semi-temperate jhum crops that Khonoma grows but quite satisfactory for rice. (See section on *Climate* in chapter 6 for more details on climatic differences between the two study villages.)

The major role of Tsiesema's jhums is primarily subsistence – supplementing yields from the terraces, to create a position of assured rice security. Even if drought or other perturbations cause poor yields from one sub-system, the other will usually do well. Khonoma, on the other hand, has learned to exploit its comparative advantages. While more cold-tolerant staples such as Job's tears and maize perform well in its cooler jhum blocks (mostly owned by Merhümia khel), they have low market value and do not generate the cash needed to pay school fees, electrical bills, buy clothing and kitchen supplies, etc. The role of these cooler southern jhums is thus cash generation, while the farmers rely on their wet terraces (and often additional land bought down around Medzephema area) for their rice needs. Supplementary rice can easily be purchased from the market in Kohima, provided that cash is available.

Rethinking Swidden Productivity: Separating the Fallow from the Field

In both study villages, the large contribution of firewood to the jhums' total harvest value is striking (table 8-5) (plates 6-84 – 6-85). The data show that on the first year a jhum field is reopened for cropping, Khonoma farmers are harvesting Rs 25,475/ha worth of firewood, before then continuing on to grow an additional Rs 29,905/ha worth of food crops. Firewood makes up about 46% of the total harvest value on the 1st cropping year, or almost 43% over the entire two-year cropping phase. Tsiesema farmers are harvesting Rs 25,850/ha worth of firewood, and Rs 21,150/ha of food crops. Firewood thus comprises 55% of total harvest value from Tsiesema jhums in the 1st cropping year, or 52% over the 2-year period that crops are grown. The numbers are higher for Tsiesema since its fallows are older, the trees are cut low (compared to only pollarding the alders in Khonoma's jhums), and it includes a lot of oak and other higher-value species.[43] This highlights the fact that in cutting down

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[43] Although Tsiesema does not manage its jhum fallows anywhere near as intensively as Khonoma, it nevertheless has less obvious ways of manipulating fallow vegetation to favor desired species. Melia, a species valued for its timber, provides one such example. As Tsiesema's jhum fields are left fallow, free-ranging cattle follow behind to graze the crop residues and fallow regrowth. These cattle are particularly fond of eating any Melia fruit that they can find. Cattle are usually cursed as the bane of managed fallows, but in this case, are playing a very important role in seed dispersal. When the land is later reopened for

trees, farmers are harvesting a firewood crop every bit as much as they are opening a jhum field. The beauty of the jhum system is that the same labor accomplishes both. This also emphasizes another important reason why the 2nd cropping year is given less priority: it offers no firewood to cut.[44]

Table 8-5. Contribution of Firewood to Total Jhum Yields* *(Rs/ha)*

HARVEST	1st YEAR		2nd YEAR		TOTAL JHUM CYCLE	
	(Rs)	*(%)*	*(Rs)*	*(%)*	*(Rs)*	*(%)*
KHONOMA						
Firewood	25,475	46	0	0	25,475	43
Non-Firewood	29,905	54	4,102	100	34,007	57
Total Harvest (gross)	55,380	100	4,102	100	59,482	100
TSIESEMA						
Firewood	25,850	55	0	0	25,850	52
Non-Firewood	21,150	45	2,841	100	23,991	48
Total Harvest (gross)	47,000	100	2,841	100	49,841	100

* Data derived from diaries of 10 collaborating farmers in each study village.

If we recognize the firewood harvested when jhum land is reopened as an important crop in its own right, then it becomes interesting to divide jhum labor according to whether it is related to management of trees or arable crops (figure 8-10). On average, we found that Khonoma farmers were earning roughly Rs 122/day for labor invested in their jhum fields, while their neighbors in Tsiesema were doing marginally better at Rs 127/day (table 8-3). But if we limit our analysis only to labor inputs and harvested outputs related to the trees (figure 8-11, then the enterprise becomes much more profitable. The individual activities that comprise that labor are related to harvesting (pollarding/felling trees; cutting and splitting firewood; gathering, carrying and piling firewood), later pruning back coppices from retained stumps to minimize shading on adjacent crops, and occasionally replanting new seedlings (see appendix 6-6).

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cultivation, the Melia seed germinates in tandem with the swidden crops and is then protected during subsequent weeding operations (plate 6-19). With no extra labor costs, this valued species thus has a high frequency in the subsequent fallow regrowth, constituting a form of improved fallow in its own right. Such extensive approaches to fallow management are eminently sensible in Tsiesema's current situation of land abundance and labor shortage. Cases of Melia's use in managed fallows have also been reported in Vietnam (Vien, 2007).

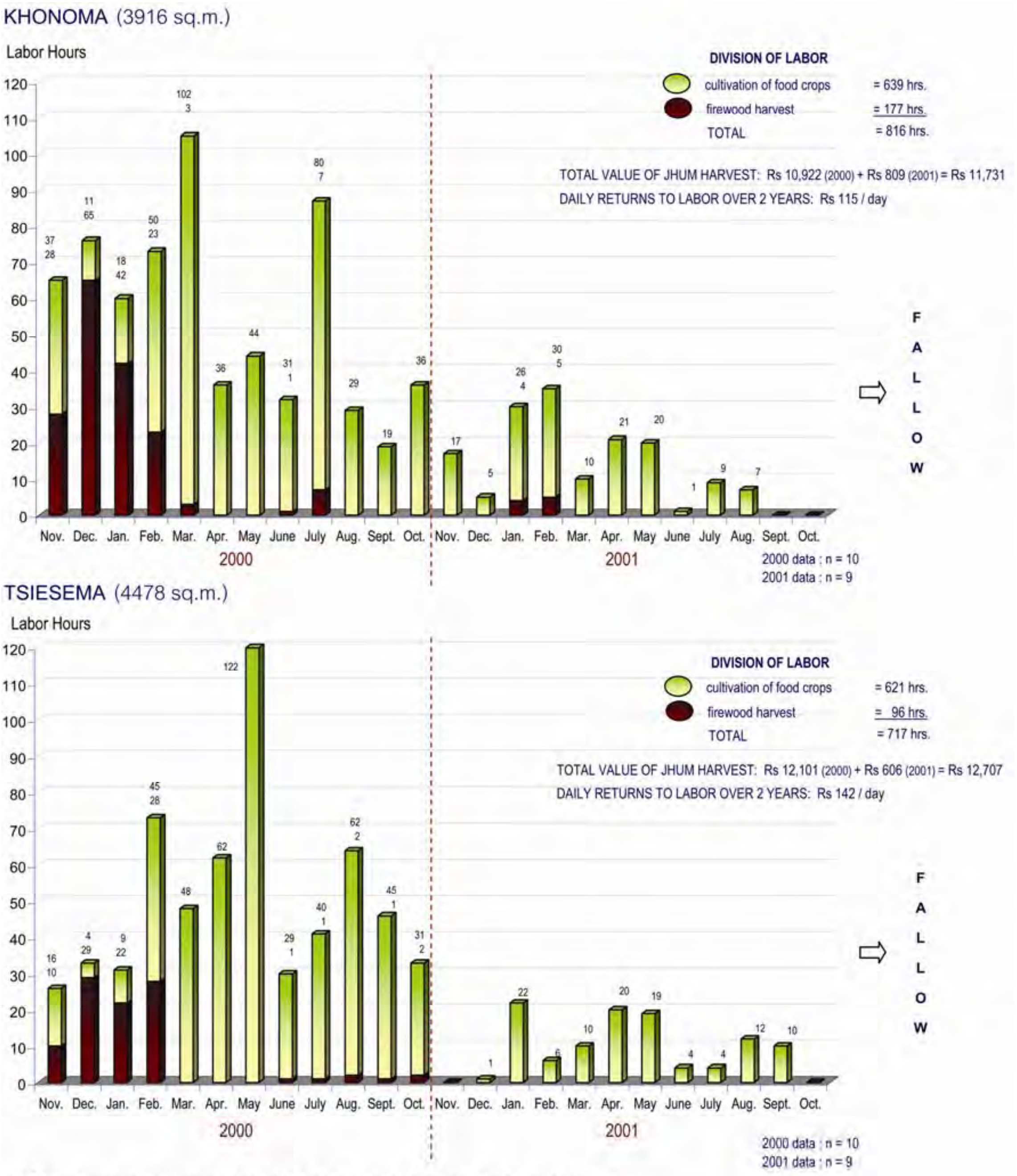
[44] Although nearness to the state capital probably creates a particularly strong market for firewood in the study area, a look at other villages confirms it to be an important jhum crop even in remote areas. Chingmei Village in Tuensang District provides a good example here. Chingmei is also well known for management of alder in its jhum fields, and is often compared to Khonoma in that respect. Informants there explained that when they open a fallow, they earn more from the harvest of alder wood than from the food crops that are then planted. Alder firewood is sold at Rs 200/stack, each stack measuring 3 ft. x 4 ft. x 3 ft. One villager noted that beyond satisfying his own firewood needs, he was able to sell another 28 stacks, earning him Rs 5600. In fields more distant from the roads, the pollarded alder branches may instead be sold as balli posts. Beyond its economic value, Chingmei villagers value alder's ability to smother out *Imperata* and accelerate recovery of soil fertility.

Several differences become apparent between the two study villages. Firstly, Khonoma's practice of returning twice to thin back the alder coppices in mid-year of the 1st cropping season (July) (plate 2-44), and at the beginning of the 2nd (Jan.-Feb.) (plate 2-79) shows up clearly. This was done much more haphazardly in Tsiesema, where coppices were not thinned so much as totally slashed back during weeding operations. With longer fallow periods, Tsiesema farmers were much less concerned about managing their trees for rapid recovery. The other notable difference was that Khonoma was investing about double the labor as Tsiesema, first in pollarding/felling trees (20 hrs/field [K] – 9 hrs/field [T]) and then in cutting and splitting the firewood (89 hrs/field [K] – 45 hrs/field [T]). It is understandable that it would take Khonoma farmers longer, as they move between trees, carefully peeling off epiphytes (ferns, orchids, etc.) from the alder stump, before climbing it and pollarding the coppices one-by-one with a dao, being careful not to damage the main trunk. It is a much more casual affair in Tsiesema, where there is no climbing or cleaning involved. Nor are there multiple stems to deal with. It takes them a short time to fell single-stemmed trees with a saw (faster than a dao for larger boles), before moving on to the next.

In terms of the cutting and splitting, there were unverified suggestions that Khonoma may split its firewood more finely. The necessity for this is not clear. In both villages, the firewood had to be cut small enough to be packed into the baskets that were then used to carry it out to the nearest motorable road, if not all the way to the village. Part of the explanation may be the same element of "moshu" (pride), that we saw driving Khonoma women to manicure their fields more beautifully and without a weed in sight (see plate 2-84, for example), compared to those of neighboring villages. Social expectations may compel Khonoma's women to spend extra time and effort ensuring that the firewood is split and packed neatly. To do otherwise would risk disapproval from their neighbors. After the trees are felled/pollarded, and the wood cut into firewood lengths and split, then both villages spend a more comparable amount of time gathering, carrying and piling the firewood (51 hrs/field [K] – 38 hrs/field [T]). But regardless of these details, we found that when considering only tree-related inputs and outputs, Khonoma's daily returns to labor doubled to Rs 228/day, whereas Tsiesema's multiplied by a factor of roughly 4.8 to Rs 605/day!

In contrast, the remaining labor is presented in figure 8-12, i.e., that related only to cultivation of arable crops. Here we find that the compared villages spent a remarkably similar amount of time in their jhum fields over the 2-year cropping phase (639 hrs/field [K] – 621 hrs/field [T]). When calculated as returns to labor, Khonoma's higher-value cash crops gave it a slight edge of Rs 84/day, compared to Rs 70/day earned by Tsiesema. This highlights that farmers are earning far better returns to their labor from harvesting firewood than they are from cultivating food crops (figure 8-13). In fact, harvesting firewood is probably the most profitable enterprise that they engage in all year.

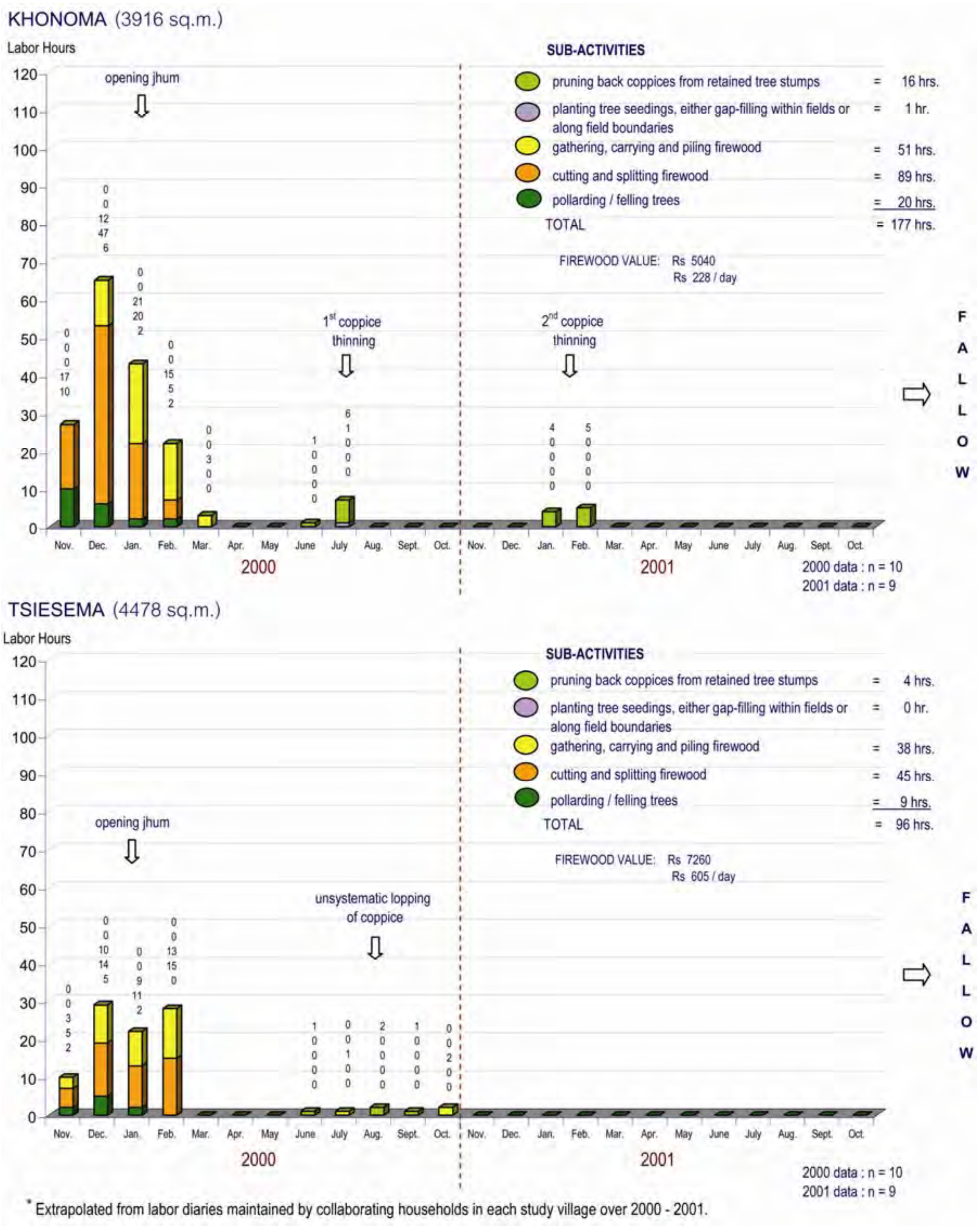
Figure 8-10. Division of Swidden Labor between Harvest of Firewood* and Cultivation of Food Crops†: Analyzed at the Field-Level over a Two-Year Cropping Phase



* Plus subsequent tree management activities, i.e., thinning coppices, planting new seedlings.

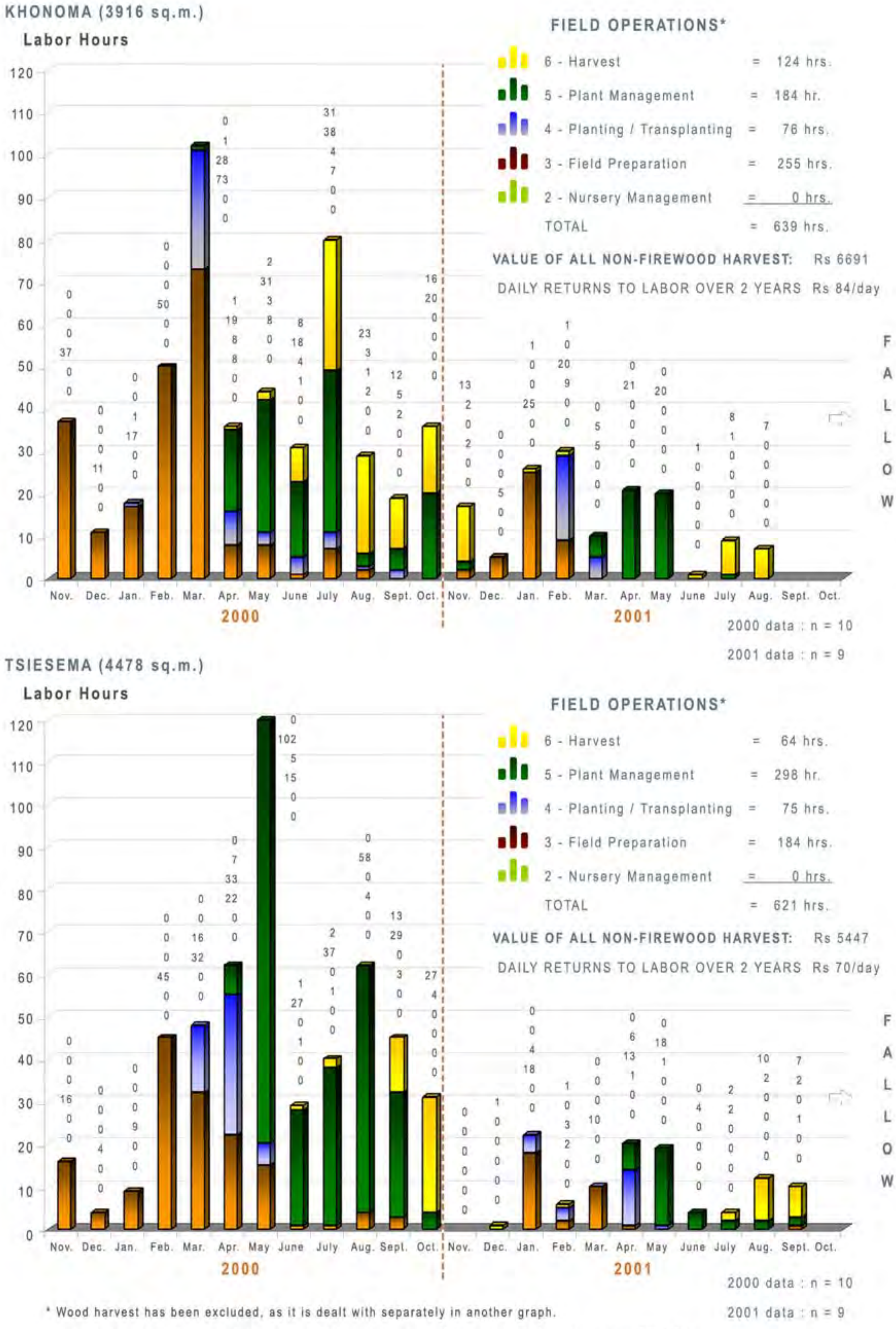
† Recorded in labor diaries maintained by collaborating households in each study village over 2000 - 2001.

Figure 8-11. Distribution of Swidden Labor Invested in Firewood Harvest and Other Tree-Related Activities*: Analyzed at the Field-Level Over a Two-Year Cropping Phase



* Extrapolated from labor diaries maintained by collaborating households in each study village over 2000 - 2001.

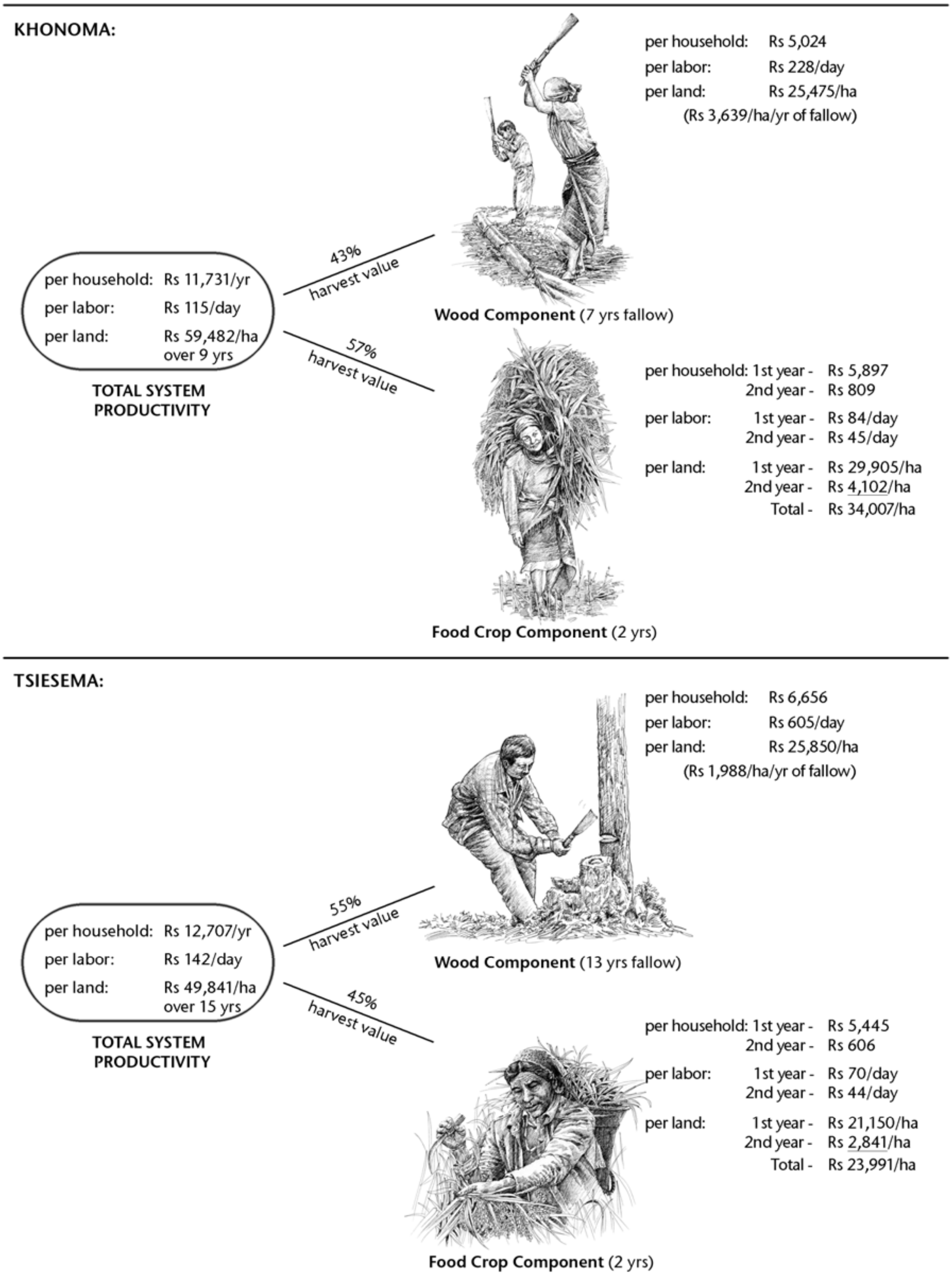
Figure 8-12. Distribution of Swidden Labor Invested Solely in Cultivation of Food Crops*: Analyzed at the Field-Level over a Two-Year Cropping Phase



* Wood harvest has been excluded, as it is dealt with separately in another graph.

Recorded in labor diaries maintained by collaborating households in each study village over 2000-2001.

Figure 8-13. An Overview of Jhum Productivity Broken Down into its Wood and Food Crop Components *



* See table 8-5 for more details.

The discussion so far has considered only the two years (2000-2001) that the fields were monitored. But we must remember that the fallows that produced Tsiesema's higher firewood yields were on average much longer (13 years) than Khonoma's (7 years) (appendix 6-1c). If we calculate firewood yields on the basis of annual production per land area (i.e., over the duration of the fallow), then the Khonoma system is far more productive (table 8-6). The alder fallows that occupy most of the hillsides surrounding Khonoma are all earning Rs 3639/ha/year – only slightly less than earnings from the second cropping year (Rs 3869 net) – but with no inputs (labor or material). Opening a fallow for cultivation is simply a byproduct of firewood harvest; the same work accomplishes both. The considerable ecological benefits (through N-fixation, weed suppression, soil stabilization, moisture conservation, etc.) are an additional bonus. This highlights the beauty of the system and the fallacy of considering fallows to be "abandoned land". Based on these data, a picture of the economic productivity of Khonoma's jhums throughout the cycle is shown in figure 8-14. We see a spike in labor investment and harvest value during the 1st cropping year, a quick slump in both by the 2nd cropping year, and then a slightly lower level of returns throughout the following fallow – but at no labor costs. A similar portrayal of Tsiesema's jhum cycle is given in figure 8-15. These findings raise serious questions about project interventions that aim to intensify land use in swidden systems by lengthening the cropping phase. If the additional cropping years provide returns equally as low as that of the 2nd cropping year, then it would simply not be worthwhile. The labor would be far better invested in opening a larger 1st-year jhum. Furthermore, continued cropping – and the extra soil tillage needed to keep weeds at bay – would damage tree roots and delay forest regeneration when the land was finally left fallow. And for what purpose? These economic data support the argument that these jhum systems should already be considered as permanent land use, under a food crops–firewood crop rotation. Even if it was technically possible to eliminate the fallow altogether, perhaps replacing it with green manures or fertilizer applications, farmers would still have to cut firewood somewhere. Beyond its commercial value, Khonoma's colder winter temperatures make a reliable supply of good firewood a necessity. Farmers would have to go to the forest to cut firewood in any case, so it is an added bonus that this objective can be fulfilled simultaneously while opening their jhum fields for cultivation. Supposing that interventions allowed farmers to permanently cultivate their dryland fields, just as they do their ponded fields, then it would simply mean that the firewood would have to be grown on other land. The arable cropping and wood components would be segregated and the synergies between them lost.[45] This would seem to be a step backwards in terms of sustainable land use systems.

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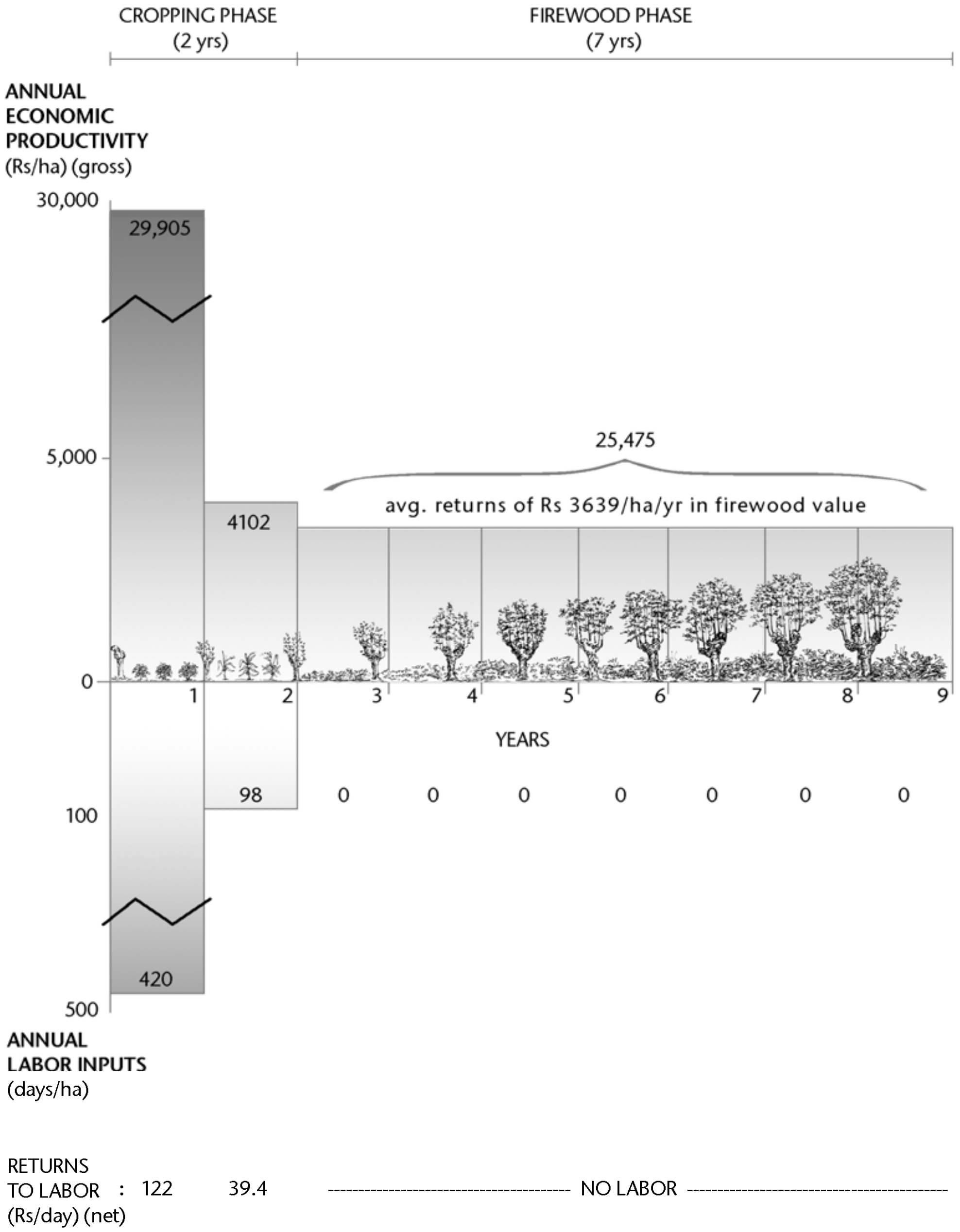
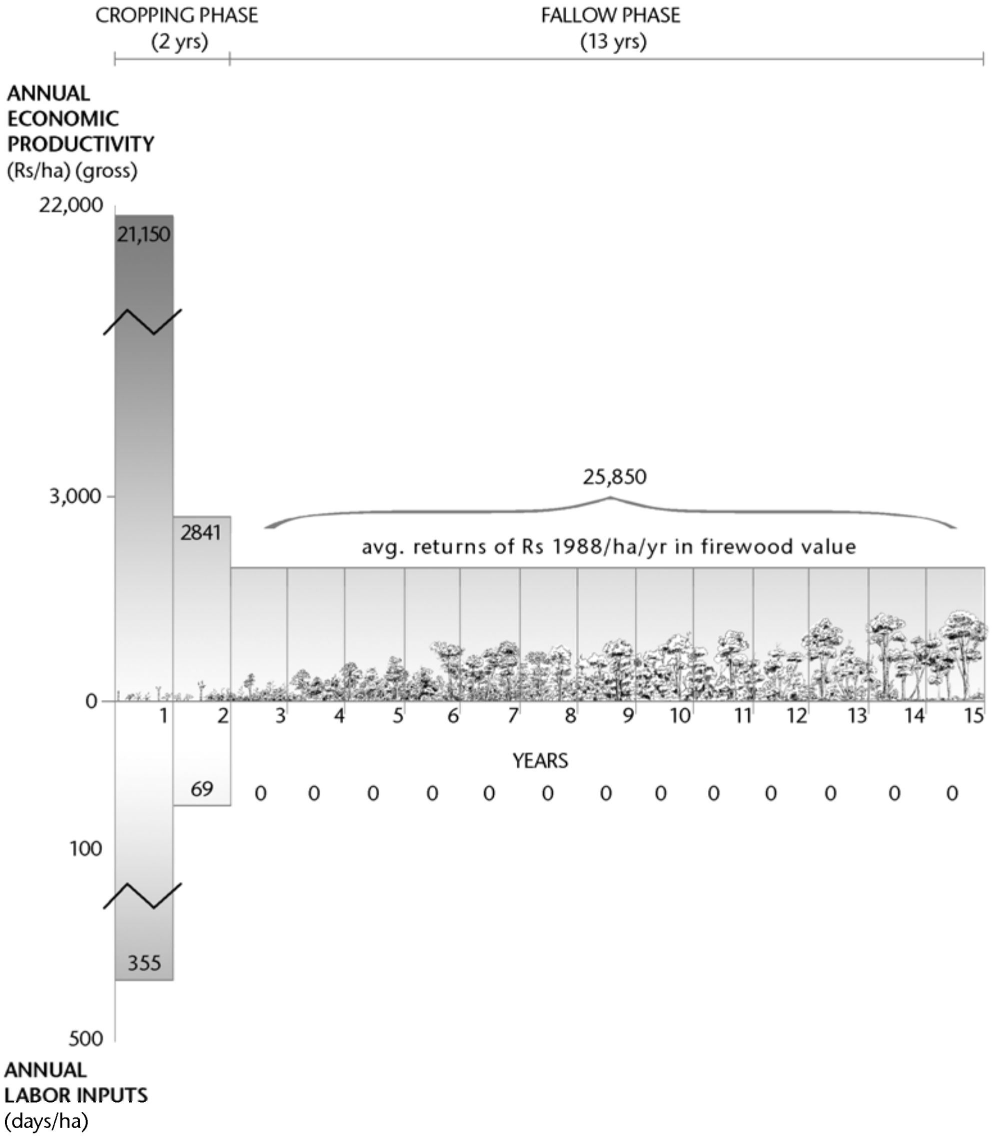
[45] One notable advantage of removing trees from the fields would presumably be that it would make mechanization easier. Tsiesema's use of animal draught power, for example, has had to remain limited to its wet rice terraces because they would continually get caught up in tree roots if they tried using buffalo to plough jhum fields.

Figure 8-14. Labor Investment and Economic Returns from Khonoma's Alder-Based Jhum System throughout a Cycle *



* US$ 1 = 48.04 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

Figure 8-15. Labor Investment and Economic Returns from Tsiesema's Jhum System, Representing Standard Swidden Practices of the Angami Nagas *



RETURNS TO LABOR (Rs/day) (net) : 127 32.8 -- NO LABOR --

* US$ 1 = 48.04 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

In most shifting cultivation systems where fallow periods have been shortened so dramatically, one would expect trees to disappear from the succession and be replaced by shrubs, *Imperata*, *Miscanthus* and other coarse grasses (see, for example, plates 1-36 and 1-38). That trees continue to persist under such intense cultivation is one of the remarkable aspects of the alder system. The same cool mountain temperatures that create a heavy demand for firewood also provide the conditions preferred by alder, but short of frost and snow.

Table 8-6. Annual Firewood Productivity of the Fallow Period* *(Rs/ha)*

	KHONOMA	TSIESEMA
Value of Firewood Harvest (when fallows opened for 2000 cultivation) - *Rs/ha*	25,475	25,850
Average Length of Preceding Fallow - *years*	7	13
Value of Annual Firewood Growth – *Rs/ha*	3,639	1,988

* Data derived from diaries of 10 collaborating farmers in each study village.

The "Fit" between Wet and Dry Cultivation

Beyond the performance of their individual land use components, farmers also had the practical worries of fitting them together into a manageable livelihood system. The diary data lend a more concrete understanding of some of the interactions between wet rice and jhum cultivation earlier described in chapter 7. They bring into clearer focus the wider picture of farmers' strategies in managing their resources.

From the Perspective of Land …

How land is divided between wet and dry cultivation is relatively straight-forward. The imperatives of terracing and irrigating make valley bottoms the logical choice for wet rice, leaving the adjacent hill slopes for dryland crops (figure 7-3). Just as surely as wet rice needs ponded water, potatoes and other dryland crops equally need slopes that allow rainwater to run off quickly and do not become waterlogged. The very different environment that each needs largely predetermines how the landscape will be divided between the two subsystems.

From the Perspective of Labor …

What is less clear – and over which farmers have more control – is how their labor will be invested in managing those lands. Figures 8-16 – 8-20 attempt to shed further light on farmers' labor management by examining their diary data from several angles. The graphical presentation of the data is accompanied by a short review of some of the main points arising from it.

The Type and Amount of Labor Invested in the Two Subsystems. We begin with a simple overview of the annual cycle of field operations, the labor invested in each, and returns to labor in both study villages (figures 8-16 – 8-17 and table 8-7). It should first be noticed that the studied group of farmers were, on average, cultivating a slightly larger area of wetland than dryland in both Khonoma (4183 m^2 wet : 3916 m^2 dry) and Tsiesema (5568 m^2 wet : 4478 m^2 dry). The next thing that "jumps out" from the graphs is that both villages spend roughly double the amount of time working in their wet rice terraces[46] as in their jhums (1705 hrs – wet rice terraces : 673 hrs – jhums [K]; 1280 hrs – wet rice terraces : 608 hrs – jhums [T]). This highlights that the Angami are essentially wet rice cultivators, with jhums playing a supplementary role in providing a wide array of other crops unavailable from the ponded fields. Each, of course, requires quite different types of labor.

Cultivation of jhum fields begins with clearing fallow vegetation and harvesting the wood – whereas wet rice cultivation has its own special demands for planting nurseries, cleaning out irrigation channels, puddling terraces and strengthening their bunds, transplanting, and then continued management of water levels throughout the growing season.

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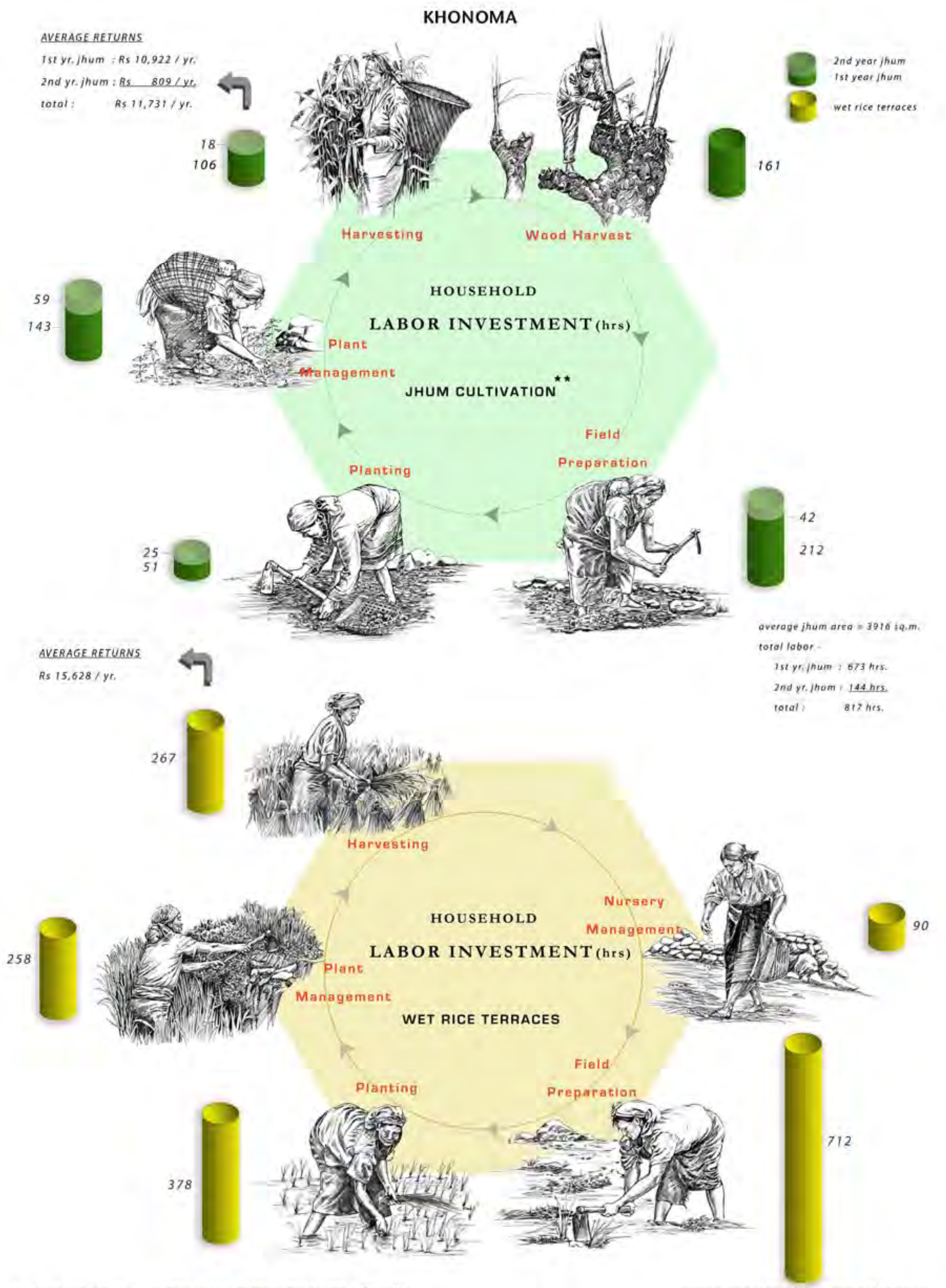
[46] I choose my words carefully here and specify wet rice "terraces" as opposed to wet rice "cultivation" in view of the fact that portions of Khonoma's wet rice terraces are now periodically being used for dryland cultivation. There were many practical difficulties dictating against the research trying to segregate between the wet rice and vegetables in its data collection in Khonoma's terraced fields. The number of individual terraces within a wet rice field that are not flooded, but instead set aside for growing vegetables, changes from year to year and thus would need to be carefully measured each time. It was further complicated in that sometimes the vegetables were grown as summer crops instead of rice, and other times as winter crops in addition to the normal rice crop. Finally, as farmers moved from terrace to terrace, hoeing, weeding, etc., it would not be realistic to expect them to report accurately in their diaries what amount of labor was spent in which terraces. Segregation of data to that level of detail could probably only be attempted in on-station trials – not the real world of farmers' fields. So for the purposes of this study, it must be kept in mind that, as seen earlier in figure 8-4, the data for Khonoma's wet rice terraces applies to a mixed cultivation of primarily wet rice (average 76% of harvest value during 2000 and 2001 growing seasons), but also some vegetables (average 24%).

Figure 8-16. Distribution of Annual Household Labor across Field Operations in Khonoma *



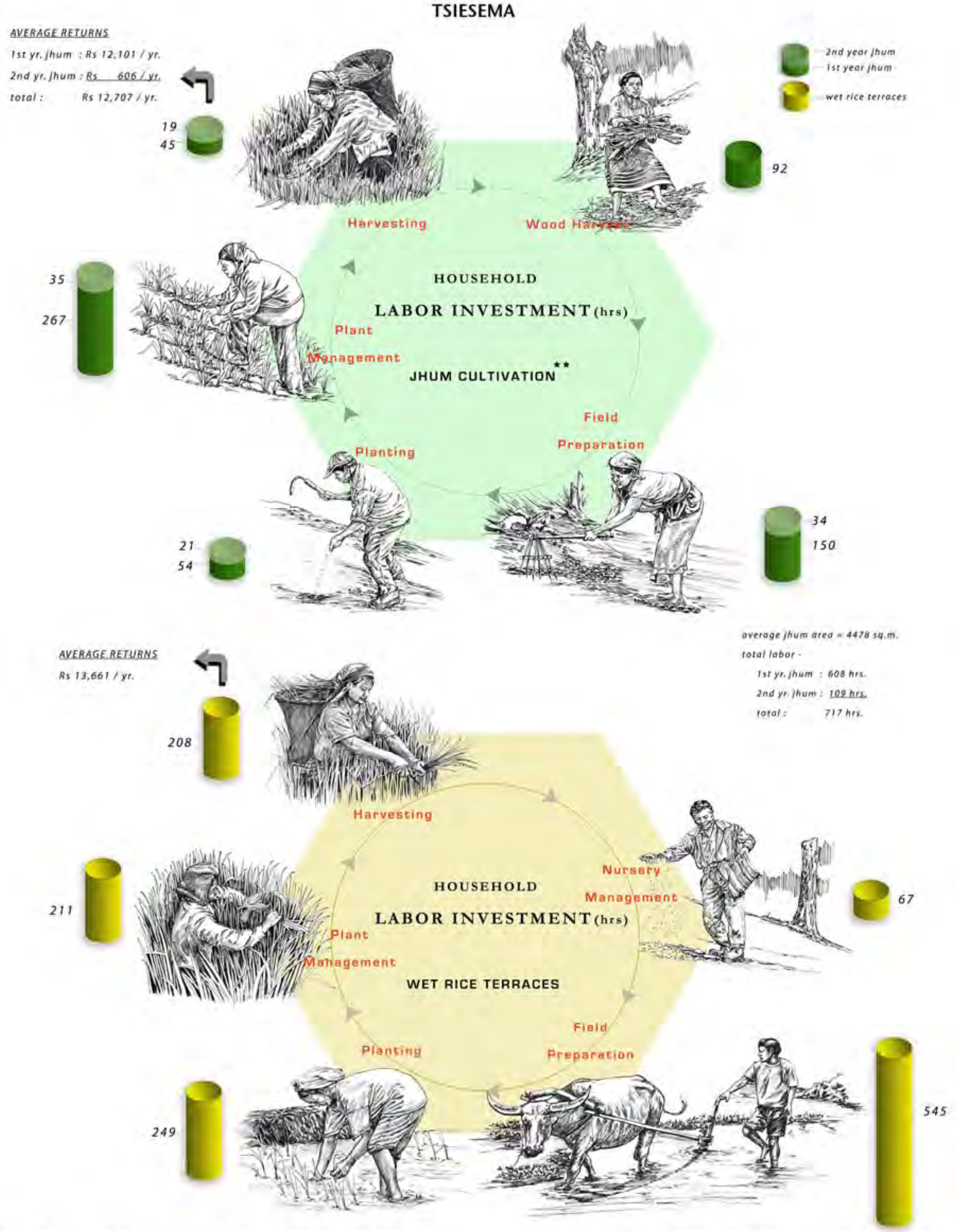
* Based on labor diaries maintained by ten households over 2000-2001.

** Each household generally cultivates two jhum fields (one each of 1st and 2nd year) in a given year.

average area of wet rice terraces = 4,183 sq.m.

total labor : 1,705 hrs.

Figure 8-17. Distribution of Annual Household Labor across Field Operations in Tsiesema *



* Based on labor diaries maintained by ten households over 2000-2001.

** Each household generally cultivates two jhum fields (one each of 1st and 2nd year) in a given year.

average area of wet rice terraces = 5,568 sq.m.
total labor : 1,280 hrs.

Table 8-7. Division of Annual Household Labor across Field Operations in Both Wet Rice and Jhum Cultivation*

Field Operation	1st-Year Jhum		2nd-Year Jhum		Wet Rice Terraces	
	hrs	*%*	*hrs*	*%*	*hrs*	*%*
KHONOMA						
Wood Harvest	161	23.9	0	0	0	0
Nursery Management	0	0	0	0	90	5.3
Field Preparation	212	31.5	42	29.2	712	41.8
Planting	51	7.6	25	17.3	378	22.2
Plant Management	143	21.2	59	41.0	258	15.1
Harvesting	106	15.8	18	12.5	267	15.6
TOTAL	673	100	144	100	1705	100
TSIESEMA						
Wood Harvest	92	15.1	0	0	0	0
Nursery Management	0	0	0	0	67	5.2
Field Preparation	150	24.7	34	31.2	545	42.6
Planting	54	8.9	21	19.3	249	19.4
Plant Management	267	43.9	35	32.1	211	16.5
Harvesting	45	7.4	19	17.4	208	16.3
TOTAL	608	100	109	100	1280	100

* Data derived from diaries of 10 collaborating farmers in each study village.

The high percentage of time spent in field preparation in both villages, particularly in the wet rice terraces (41.8% [K] : 42.6% [T]), points to the large amount of manual hoeing being done in the absence of any kind of mechanization. In fact, by the time the crop is planted, roughly ⅔ of the total year's work has already been done in the wet rice terraces (69% [K] : 67% [T]), and roughly ½ in the jhum fields (60% [K] : 49% [T]). Table 6-7 takes the breakdown of labor invested in each type of field operation and expresses it as a percentage of total labor invested in each type of cultivation. It finds remarkable similarity in how the two study villages divide their labor between field operations in the wet rice terraces, but Khonoma consistently spends roughly an extra ⅓ more labor than Tsiesema right across the board.

But turning to jhum cultivation, the figures tell a tale of contrasts in how the two villages are managing their fields. This has already been discussed elsewhere, so suffice to note here that, in the 1st cropping year, the dryland rice that Tsiesema plants in its jhums requires considerably more care during the growing stage (43.9% - plant management), but can then be harvested quickly (7.4%). For its part, Khonoma takes more time for harvesting wood (23.9% [K] : 15.1% [T]), preparing a fine seedbed (31.5% [K] : 24.7% [T]), and harvesting the wide array of crops as each ripens (15.8% [K]). This situation reverses somewhat in the 2nd cropping year, and it is Khonoma that plants a cereal (millet) that requires more early care (41% - plant management), but less time to harvest (12.5%). The taro that Tsiesema prioritizes in its 2nd cropping year appears to require relatively less care in the degrading conditions (32.1%), but its harvest is more dispersed and time-consuming (17.4%).

Before moving on from figures 8-16 and 8-17, a final point to notice is that farmers' investment of almost double the labor earns them 33.2% more harvest value from their wet rice terraces than from their jhums in Khonoma (Rs 11,731 – jhums : Rs 15,628 – wet rice terraces) and only 7.5% more in Tsiesema (Rs 12,707 – jhum : Rs 13,661 – wet rice terraces). This points to higher rates of returns to labor invested in jhum cultivation, an issue that will be explored in more detail later in the chapter.

Dovetailing of Labor Inputs between the Two Subsystems. The preceding cost-benefit analyses have already looked individually at labor inputs into wet rice and jhum cultivation as part of their cost accounting. This time, figures 8-18 and 8-19 present the two subsystems' labor graphs together to look briefly at how farmers divide their time between them. As before, Tsiesema's data are presented side-by-side with those of Khonoma to facilitate comparison between the two study villages. Hence, moving vertically on the page allows comparison between wet and dry cultivation within a village, and horizontally, between villages.

The main point to notice in these comparisons is how nicely the two subsystems dovetail in terms of their labor demands. We see, for example, that Khonoma works hardest on the first tillage of its rice terraces in December, and then in decreasing amounts over the following months until all fields are done by March. The opposite trend is evident in the jhum fields, where soil tillage has to wait until the wood is harvested and the fields are cleared (figure 8-18a). Here tillage begins in the earliest-opened fields in December and then gathers pace over the following months as more fields are cleared. Tillage reaches its peak in February and March, after which the fields are immediately planted.[47] During this critical period when the jhum seedbed is being prepared and planted, a glance at figure 8-18b reveals that there is relatively little activity in the rice terraces. But no sooner are the jhum fields planted, than attention is quickly diverted back to the rice terraces, which need to be quickly puddled, the bunds reinforced, and the irrigation channels cleaned in time for transplanting in late May or early June. This frantic period when the rice terraces are undergoing final preparations and then transplanted is the busiest point in the entire agricultural calendar, and all other activities in the village grind to a halt until it is finished. Even the schools are closed so that children can assist their parents in the fields. When the valley has at last been clothed in the emerald hue of newly-transplanted rice, the villagers then rush back to their jhum fields to control the weeds that have been building up over the past month while they have been preoccupied in the terraces. Most jhum crops are harvested in July and August and the fields fall relatively quiet by September when again, all attention returns to the terraced valley, this time to harvest the wet rice crop. The Tsiesema graphs in figure 8-19 show similar dynamics, but with the

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[47] As the cultivators divide their time between wet and dry cultivation, their hoes are clearly not left idle for long during these early months of the new agricultural year.

notable exception that the dryland and wetland rice ripen together and both subsystems are harvested primarily in October. The timing of labor demands for wet and dry cultivation thus intermesh well and farmers are able to manage both easily. Work in the jhum fields tends to be steadier and more flexible, whereas wet rice cultivation has peaks, particularly for transplanting in late May to June, that demand priority over everything else. It is the culture of the Tenyimia (the Angami, Zeliang, Chakhesang, Rengma and Mao Naga subgroups) to work nonstop while the crops are in the ground, but then to have festivals and relax after the harvest.

From the Wider Perspective of the Flow of Labor Inputs and Harvested Outputs from the Two Subsystems. Now that we have examined labor inputs in some detail, figure 8-20 steps back to present a wider picture of their distribution in relation to harvested outputs. (The data shown here have been scaled up to the hectare level; corresponding graphs for the field- and household-levels have been relegated to appendices 6-8 and 6-9, respectively.) The top graph, presenting Khonoma's labor data for the wet rice terraces side-by-side with those of the jhum fields, shows that between the two subsystems, the cycle of field work never stops. Work continues steadily during the first quarter of the year as seedbeds are readied and the jhum fields planted; pauses in April; builds to a crescendo during rice transplanting in June; dips again in August; peaks again as rice harvest gets underway in September and October; and finally grows relatively quiet in November. In comparison to these ongoing labor inputs, the harvested outputs are more seasonal. We can see the harvest of firewood as Khonoma opens its jhums from December to January; a few winter vegetables being harvested from the terraces in March and April; a more prolonged jhum harvest that begins in May, peaks in July and August, and continues into November; and harvest of the wet rice crop in October.[48] Tsiesema displays similar patterns, but its harvests are concentrated into an even narrower time frame since its jhums are planted primarily to dryland rice that is harvested together with the wetland rice in October and November.

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[48] Spring is the season when vegetables are likely to be in shortest supply – since the previous year's harvest has already been eaten and the new year's crop not yet available. Not surprisingly, reference to figure 7-28 and appendix 5-45 shows this to be the time when the study villages turn from their fields to the forests to gather many types of wild vegetables.

Figures 8-18 & 8-19. Comparison of Labor Inputs into Jhum Fields and Wet Rice Terraces by Household*: Analyzed by Category of Field Operations across Agricultural Calendar

Figure 8-18. Khonoma

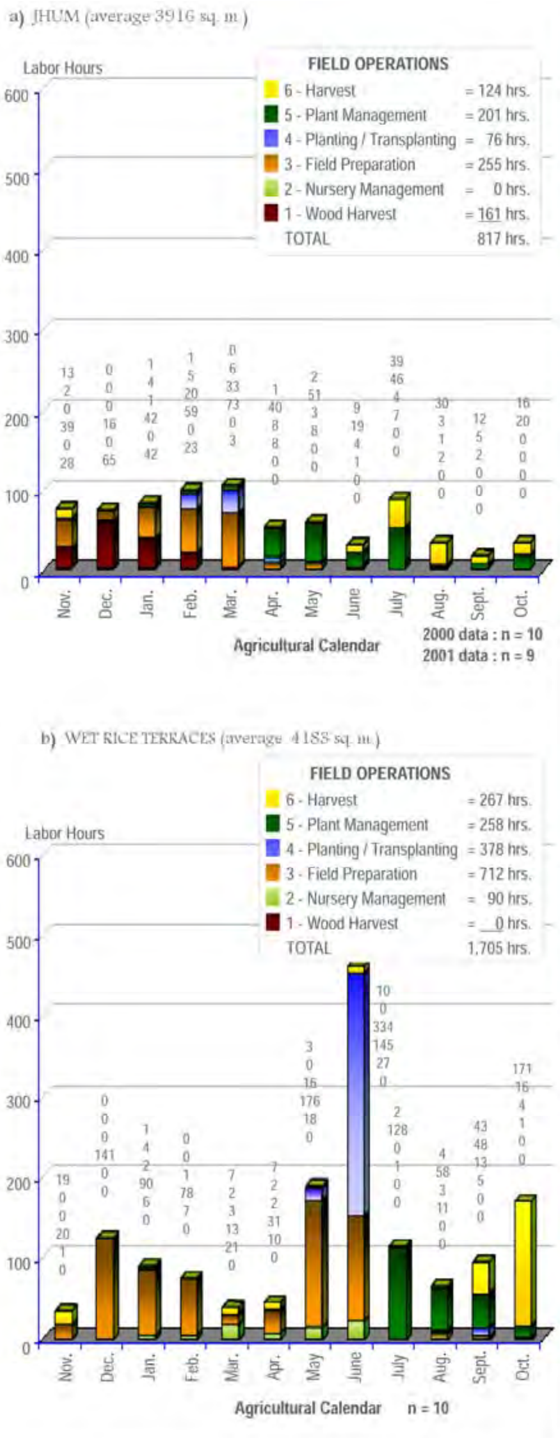
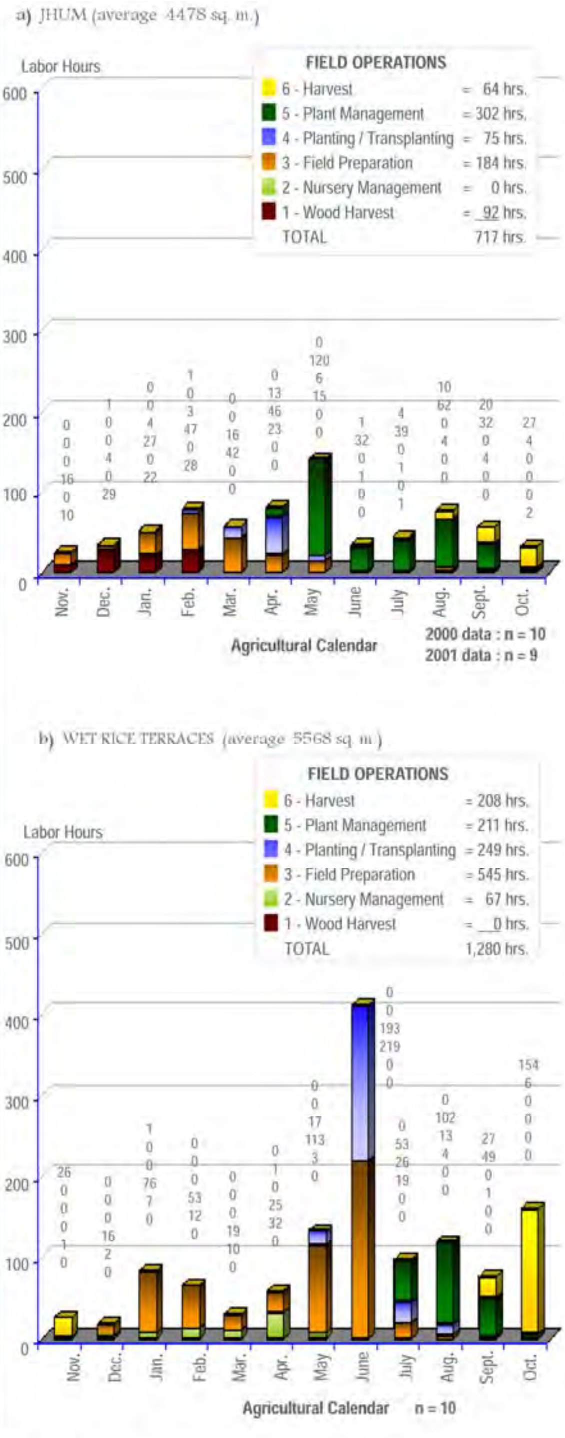
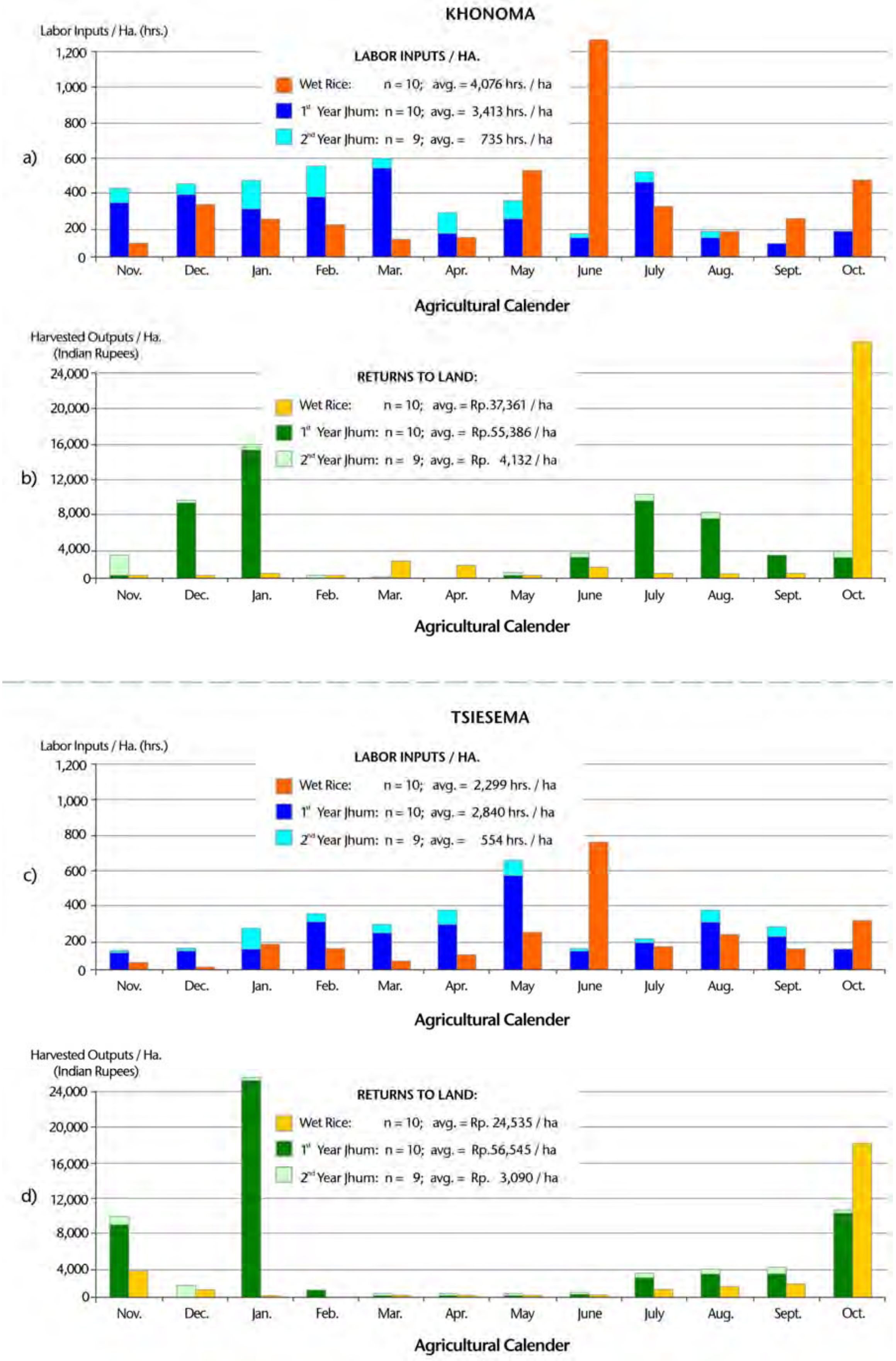


Figure 8-19. Tseisema



* Extrapolated from labor diaries maintained by ten Khonoma and ten Tsiesema households over 2000 - 2001.

Figure 8-20. Comparison of Land Use Intensity between the Two Study Villages: Labor Inputs and Harvested Outputs (calculated on a per ha basis)



For villages across the Naga Hills, the success of the October rice harvest was always critical to having the full granaries needed to survive the coming 12 months. If anything happened to that single harvest per year, whether it was damaged by inclement weather, predators or military attack, the continued existence of the village would be threatened. This highlights the predicament of villages that ran out of food several months before the next harvest was due, and according to the British diaries, the people were too weak from hunger to continue working in the fields.[49] We can also see why villagers were desperate that gennas not keep them out of their fields at that critical harvest time.

From the Perspective of Risk …

This brings us to another important aspect in the relationship between wet and dry cultivation – mitigating risk. Rice terraces irrigated from perennial streams are less subject to the vagaries of weather and thus, their yields more dependable.[50] But yields of dryland rice fluctuate more, depending on whether the rainfall that year comes at the right time and in the right amount (appendix 6-19).[51]

From the Perspective of Flexibility …

Finally, there is the issue of flexibility. We have seen many examples of the remarkable flexibility with which farmers manage their fields as they respond to new pressures and opportunities. But as we have noted, the boundaries between wet and dry cultivation are malleable and subject to change. For hundreds of years now, the Angami (and Chakhesang) have been carving dryland fields into terraces and channeling water to irrigate them – to the point where most suitable land has long ago been converted. The tide is now gradually turning in the other direction as improved market links allow the Nagas to import cheap rice from the plains. Especially in higher-elevation villages like Khonoma, farmers are now finding it more profitable to leave terraces unflooded and instead plant them with vegetable cash crops. This oscillation between wet and dry cultivation can even be an annual event, with the fields flooded for a wet rice crop in the summer, and then dried out to grow vegetables over the winter months.

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[49] In the northern Angami area, Tophema and Chiechama villages are reported to have planted, in their jhum fields, a fast-maturing maize variety that they referred to as kevinca (“*maize of the strong*”). The idea was that this maize could be harvested in June and would ensure that the village had something to eat during the busy season of transplanting the wet rice crop. The “*of the strong*” designator arose from the fact that food was in scarce supply at that time of year and only strong men would be able to protect their maize from being taken by others (Mere, 2001).

[50] This depends on the reliability of the streams that irrigate the terraces. Khonoma is relatively secure in that it benefits from numerous perennial streams and rivers flowing down from Japfü Range. These have never been known to dry up, and provide Khonoma with assured rice yields year after year. The water sources relied upon by Tsiesema to irrigate its terraced fields are mostly small seasonal streams that quickly dry up in droughts, putting the rice crop at risk. Farmers report that when they’re unable to maintain sufficient water levels in their fields, they also have more problems with insect damage.

[51] Appendix 6-19 provides an indication of the great fluctuations in jhum yields from year to year, and shows that harvests on a good year can be five times those on poor years. Villagers describe dryland rice cropping as somewhat of a gamble. The labor that they invest may either be rewarded with a good harvest, or lost if the crop fails. Either way, their labor investment will be the same.

The Bottom Line: What the Diaries Reveal about Returns to Land and Labor

The following discussion will summarize the relative productivity of wet rice and jhum cultivation and the returns to land and labor from each subsystem. Since costs of planting materials are modest and other external inputs, such as inorganic fertilizers, herbicides and pesticides, are not used, external capital is less important. Land and labor are the major production costs.

Table 8-8 and figure 8-21 outline labor investment and harvested outputs from wet rice terraces and both 1st- and 2nd-year jhums. Data for the wet rice terraces are averaged over the two years of data collection since management is similar from year to year, but the jhum data are presented separately since management of 1st- and 2nd-year fields differs dramatically. Analysis is shown at three levels: the 1) field level, at which data were collected, and then scaled up to 2) household and 3) hectare levels. The field-level is less important, other than providing us with a useful unit for data collection, and so will be given less attention in our analysis.

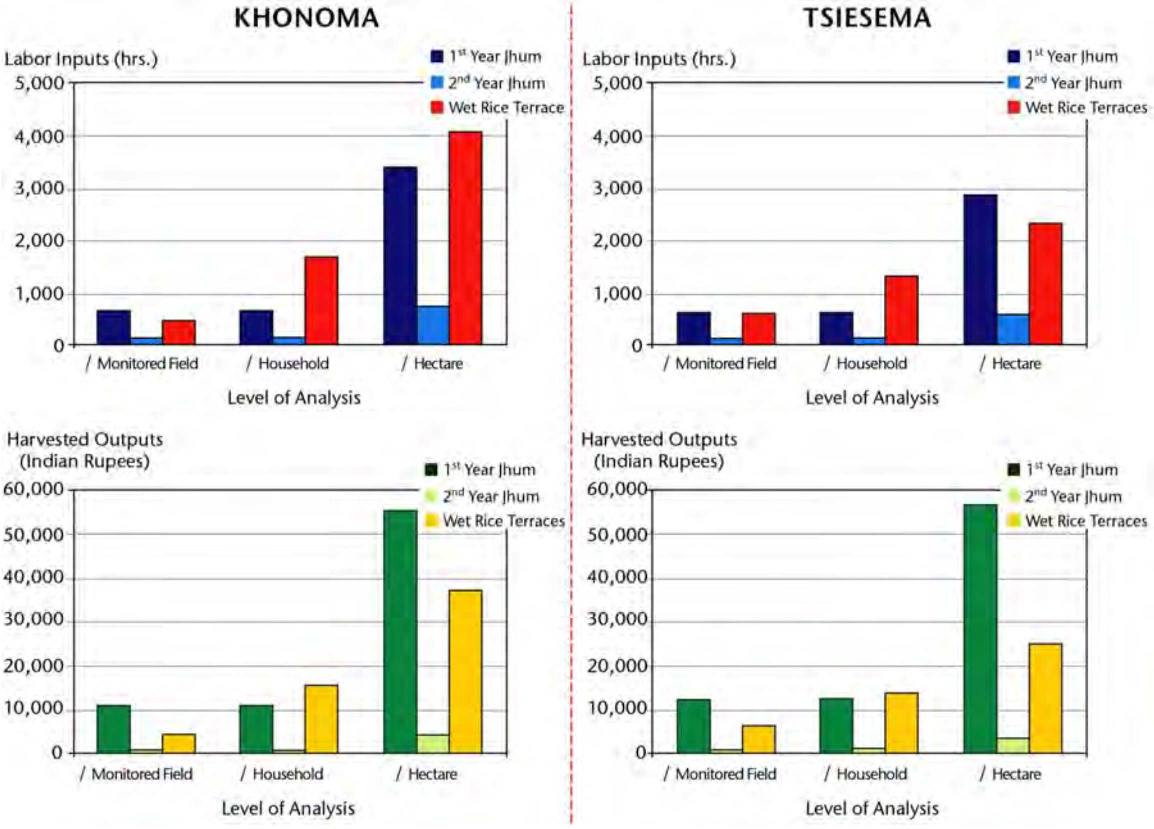
Table 8-8. Summary of Findings from Analysis of Labor Inputs and Harvested Outputs: Comparison between Study Villages*

FIELD TYPE	LEVEL OF ANALYSIS					
	/ Field		**/ Household**		**/ Hectare**	
	Khonoma	Tsiesema	Khonoma	Tsiesema	Khonoma	Tsiesema
LABOR INVESTMENT *(hrs)*						
Wet Rice Terraces	468	590	1,705	1,280	4,076	2,299
1st Year Jhum	673	608	673	608	3,413	2,840
2nd Year Jhum	144	109	144	109	735	554
HARVESTED OUTPUTS *(Rs)*						
Wet Rice Terraces	4,293	6,293	15,628	13,661	37,361	24,535
1st Year Jhum	10,922	12,101	10,922	12,101	55,386	56,545
2nd Year Jhum	809	606	809	606	4,132	3,090

* Data derived from diaries of 10 collaborating farmers in each study village.

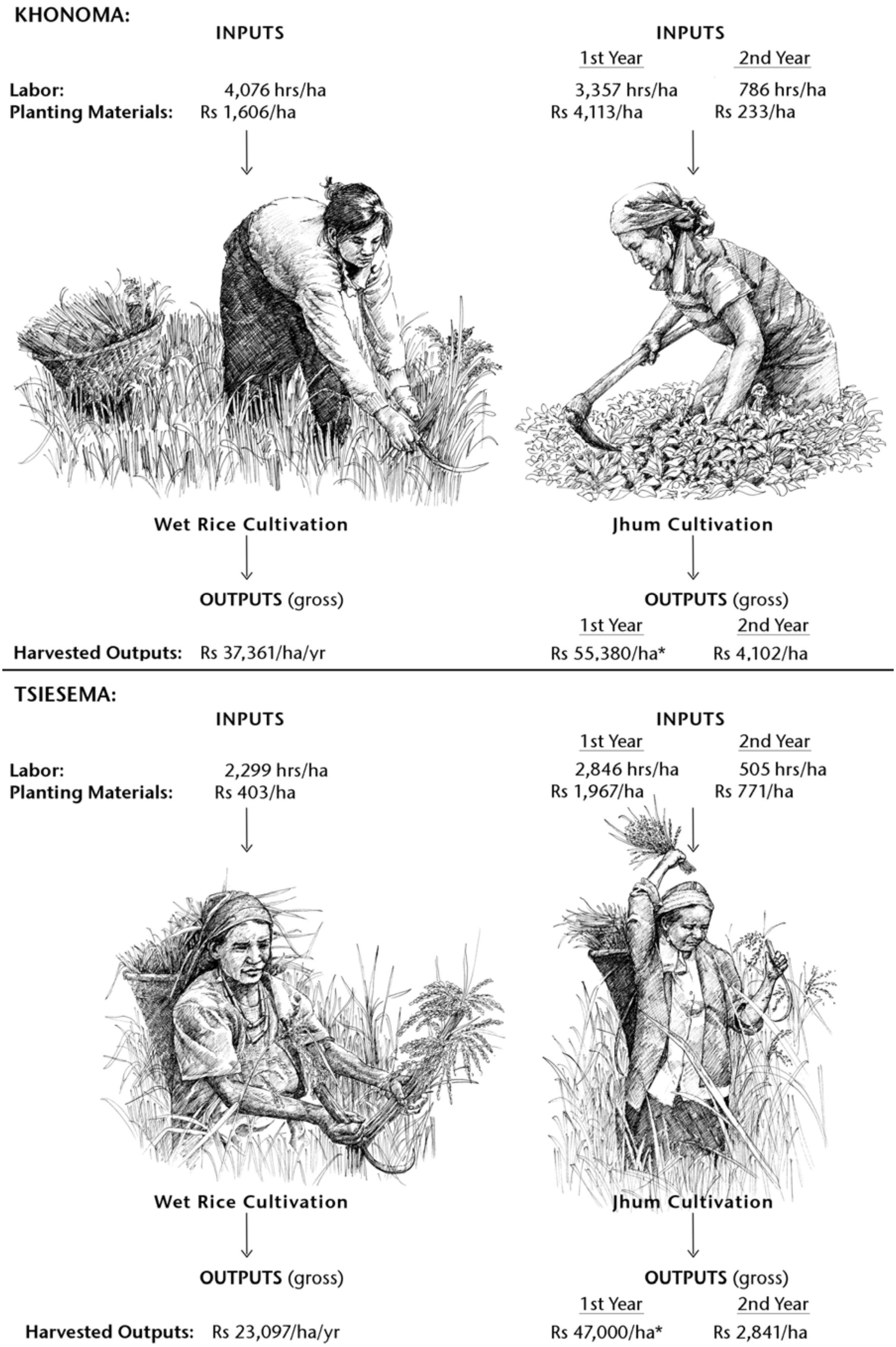
Firstly, we notice that the two villages are spending roughly similar amounts of time in their jhum fields (1st year - 673 hrs [K] : 608 hrs [T]; 2nd year - 144 hrs [K] : 109 hrs [T]), but that Khonoma works significantly longer in its wet-rice terraces (1705 hrs [K] : 1280 hrs [T]). When we scale up to a hectare basis, thus negating differences in field sizes, it becomes clear that Khonoma is managing its land much more intensively than Tsiesema. This resonates with Khonoma's reputation as a large village with limited agricultural land. But are these extra efforts being rewarded with higher crop harvests? Not from the jhum fields, at least. Again, we find similar levels of harvested outputs from both villages. Tsiesema households actually enjoy a slightly higher income from their 1st-year jhums (Rs 10,922/field [K] : Rs 12,101/field [T]), but this is largely due to the higher value of their firewood harvest. Khonoma does marginally better in the 2nd-year jhums (Rs 809 [K] : Rs 606 [T]), but both are so low that it raises questions of why they bother at all with a second year of cropping. These same trends hold true when we scale up to the level of a hectare, with both villages earning remarkably similar levels of income from their jhum land (1st-year - Rs 55,386/ha [K] : Rs 56,545/ha [T]; 2nd-year - Rs 4,132/year [K] : Rs 3,090/year [T]). In the wet rice terraces however, we find Khonoma's extra labor rewarded with higher returns at the household level (Rs 15,628 [K] : Rs 13,661 [T]), partly due to extra rice, but more significantly, from the garlic, potatoes and other high-value cash crops that were planted on portions of monitored fields. Given that average holdings of wet rice terraces in Khonoma are somewhat smaller than in Tsiesema (4183 m^2 [K] : 5568 m^2 [T]), their margin of superior returns magnifies to about 50% when we scale up to the hectare level (Rs 37,361/ha [K] : Rs 24,535/ha [T]).

Figure 8-21. Summary of Inputs and Outputs at the Field-, Household-, and Hectare-Levels



In summation then (figure 8-22), when comparing the two villages, we find broadly similar levels of labor investment and value of harvested outputs in their respective jhum systems. But in the wet rice terraces, Khonoma farmers are investing roughly 77% more labor per hectare than their Tsiesema counterparts, and reaping an extra 52% in harvest value.

Figure 8-22. A Comparison of the Productivity of Wet and Dry Cultivation in the Study Villages during the Period of Research †



† See tables 8-2 and 8-3 for more details.

* Includes firewood.

If we calculate returns to labor (table 8-9), then Tsiesema comes out on top in both wet rice terraces (Rs 73/day [K] : Rs 85/day [T]) and 1st-year jhums (Rs 130/day [K] : Rs 159/day [T]), and similarly dismal in 2nd-year jhums (Rs 45/day [K] : Rs 44/day [T]).[52] So every day a Tsiesema farmer works in his fields, he earns a bit more than his Khonoma neighbors. It is also clear that at current rates being paid for agricultural labor (Rs 100/day for men, 80 for women, and 60 for children under 15 years), it is uneconomic to hire outside help except for working in the 1st-year jhum fields. But even there, if the value of firewood is removed from the equation, then the returns from growing food crops in 1st-year jhums are insufficient to hire labor under prevailing village rates. Hence, farmers tend to work in cooperative labor groups, or rely totally on household labor.

Table 8-9. Returns to Land and Labor [a]

FIELD TYPE	Returns to Labor *(Rs/day)*		Returns to Land *(Rs/ha)*			
			Calculated Only for those Years While Under Cultivation		Calculated over All Years – Including Cultivation and Fallow	
	Khonoma	Tsiesema	Khonoma	Tsiesema	Khonoma [b]	Tsiesema [c]
Wet Rice Terraces	73	85	37,361	24,535	37,361	24,535
1st Year Jhum	130	159	55,386	56,545	6,613	3,976
2nd Year Jhum	45	44	4,132	3,090		
Aggregated to Household Level	86.8	106	33,722	27,268		

[a] Data derived from diaries of 10 collaborating farmers in each study village.
[b] Based on “2 years cropping : 7 years fallow” rotation.
[c] Based on “2 years cropping : 13 years fallow” rotation.

However, these data are not so remarkable for what they say about the relative productivity of the two study villages, but rather for what they tell us about returns to cultivation of wet rice terraces vis-à-vis swiddening. In both Khonoma and Tsiesema, farmers were earning dramatically higher returns to labor invested in their jhum fields than in their wet rice terraces (78% and 87% higher, respectively). This raises poignant questions about the wisdom of state policy to discourage jhum cultivation and instead expand wet rice terraces, and gives a strong indication of why farmers have resisted!

Does this mean that the alder-based fallows in Khonoma are not contributing to any measurable advantage in productivity over Tsiesema’s unmanaged fallows? No – because we are still missing an important part of the picture. And that is factoring in the differences in jhum cycles. Both villages have extensive tracts of sloping uplands, but there is a stark contrast in how they are managed. Although a smaller village, Tsiesema’s landscape is comparatively gentle and swiddening rotates around its entire territory (appendix 6-9). While there is considerable

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[52] In comparison, a stone mason can earn a much higher Rs 250-300 daily.

variation, a cycle of '2-years cropping : 13-years fallow' appears to be about average. But as we know, Khonoma's territory tends to be overwhelmingly rugged and high, with a relatively smaller area suitable for cultivation (map 8-2). That is why, even 150 years ago when the British first penetrated into the Naga Hills as far as Khonoma, they remarked on its acute scarcity of agricultural land. Land-use pressures are considerably less today, thanks largely to out-migration and off-farm sources of income. Although Merhümia farmers still speak of a '2-years cropping : 2-years fallow' rotation (probably in use until the outbreak of the Indo-Naga war in 1956), the fallow period had lengthened to about seven years for the fields that we were monitoring. (It should be noted though, that jhum fallow lengths vary considerably between the three khels, depending on land resources and use pressures within each.)

Thus, in a 45-year period[53], a Tsiesema *jhumia* would cultivate a given plot of land three times, while his counterpart in Khonoma would cultivate his plot five times (figure 8-23), a factor of about 1.7 times more often.[54] Hence, although earnings per hectare of jhumland were extraordinarily similar between the two study villages during the years of cultivation (1st year - Rs 55,386/ha [K] : Rs 56,545/ha [T]; 2nd year - Rs 4132/ha [K] : Rs 3,090/ha [T]), this changes considerably if we calculate earnings over the entire jhum cycle (Rs 6613/ha [K] : Rs 3976/ha [T]). Returns to land then become about 66% higher per year in Khonoma. This advantage would presumably have been even more dramatic prior to the Indo-Naga war when Khonoma was much bigger and Merhümia khel still used a 2-year fallow. Herein lies the key contribution that alder appears to have made in Khonoma. Through its rapid growth and soil-building properties, it permitted a dramatic intensification of the jhum cycle (much beyond what we see practiced today) – without sending it into the downward spiral of degradation reported across much of Asia-Pacific's uplands today.[55] This is a model highly appealing to policy-makers:

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[53] If villagers married and assumed responsibility for their own farms at around 25 years of age, and farmed actively until about 70, then 45 years would be roughly equivalent to a lifetime's cultivation.

[54] This is if we only consider the number of cropping years. But the planting patterns in Khonoma jhums also tend to be more intensive in a given cropping year, with mosaics of intercropping, crop rotations and relay-cropping. Residues of harvested crops are often pulled out and other short-term crops, such as radish, onions, potatoes and peas, planted. Planting and harvesting is a continual process. Planting of Tsiesema jhums, on the other hand, is a one-time affair. This skews the difference in cropping intensity between the two villages even further.

[55] Although Khonoma's shortening of its fallows to as little as two years is an extreme case, there are many examples of other Naga villages taking advantage of alder's properties to reduce their fallow lengths. During tours around the state, for example, Konyak informants in Shingwang village (Mon District) described a "2 years cropping – 4 years fallow" cycle, while their Chang counterparts in Chiengmei village (Tuensang District) reported using a slightly longer "2 years cropping – 5 years fallow" cycle. In Northern Angami area, farmers in Touphema village (Kohima District) explained that although alder dominated their cooler, sheltered jhum areas, oak was the main species on the warmer, more exposed slopes. They noted that alder did not compete with crops grown underneath it, but the soil under oak became dry and unsuitable for crops (see plate 1-58). The length of time that a particular jhum plot was left fallow in Touphema thus depended on which tree dominated – usually 8 years for alder areas and 15 for oak. Alder's ability to

intensified cultivation of limited lands with the highest agricultural potential, thus alleviating pressures on remaining forestal lands. A large tract of forests, centered around the Dzükou valley, was set aside in 1998 as a conservation area by the newly-formed Khonoma Nature Conservation and Tragopan Sanctuary Project (map 4-3). Some Khonoma villagers point to the wisdom of their ancestors, in learning how to harness the benefits of alders, as the reason why their wildlands have remained intact (Meru, 2001). In the words of J.B. Jasokie, a Khonoma native and former Chief Minister of Nagaland, "Khonoma could only exist because of alder trees" – referring to alder's role in permitting intensified cultivation of jhum lands, and thus supporting a larger population on a limited land base.[56]

In a way, alder has played roles of both integration and segregation; its integration into the farming system has permitted more intensive cultivation of swidden lands, and thus effected more segregation between agricultural and forestal lands. This buffering role suggests that alder and other types of managed fallows should have a vital role in buffer zones of national parks and other situations where authorities are trying to lessen the dependence of local populations on adjacent protected wildlands. Tsiesema, alternatively, shows the scenario more typical of the Naga Hills, where there is no segregation between jhum and forestal land, but it is one and the same. Its entire landscape is a patchwork of secondary forest fallows, almost all of which will eventually fall under the shifting cultivator's axe. Historically, such periodic use was probably important to demonstrate ownership, and to fend off rival claims by neighboring villages. In parts of Nagaland, this may continue to be a factor in discouraging intensification of land-use even today;[57] boundaries are still a major source of disputes at every level within Naga society.

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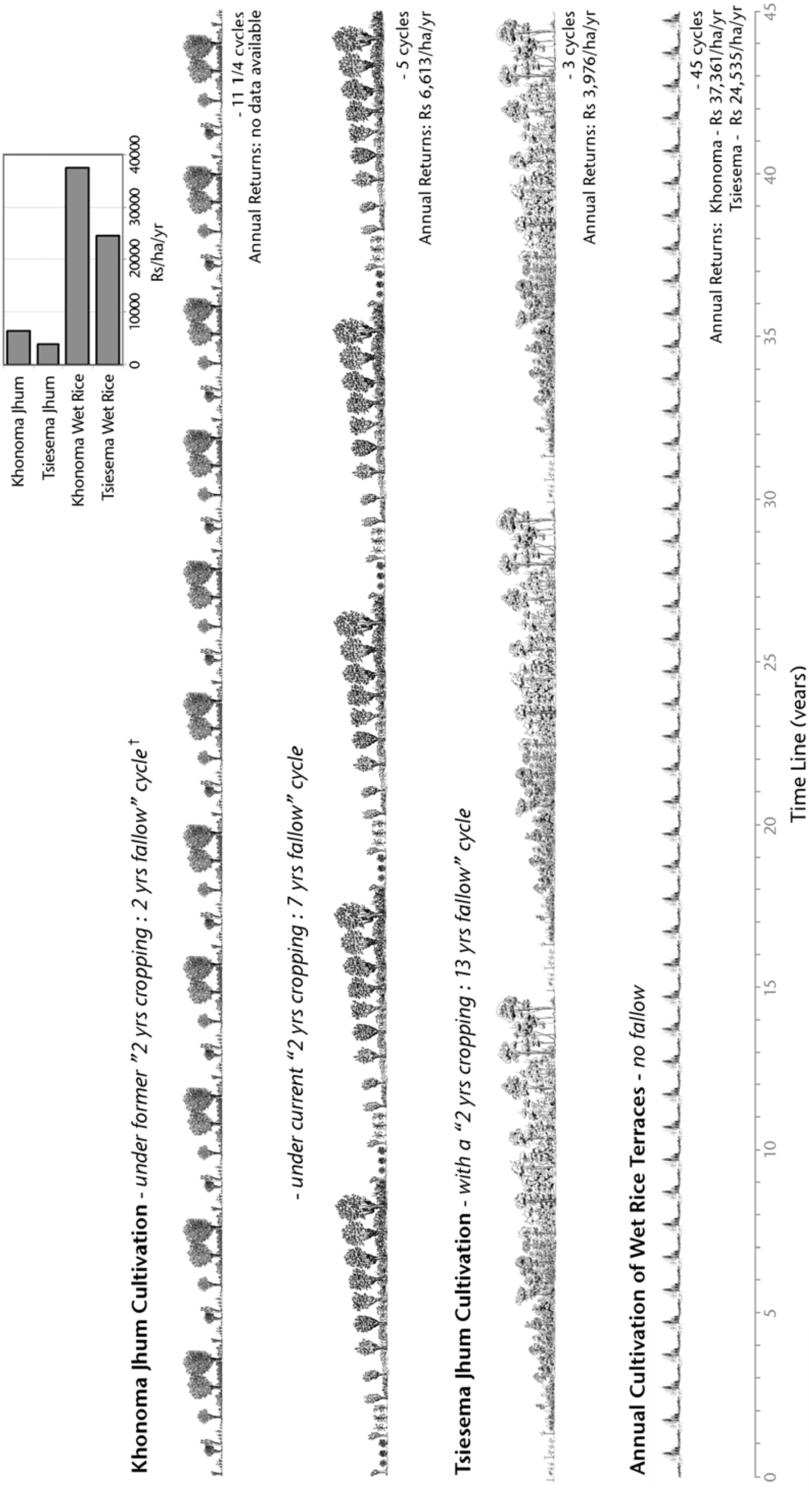
accelerate fallow functions only becomes critical in situations of land scarcity. If land remains abundant enough to support lengthy fallow periods, then the fallows will probably serve their intended purpose, regardless of what kind of trees grow. There is no need for management.

[56] See opening quote of chapter 2.

[57] There are still cases that demonstrate an important disincentive against land use intensification if there is any chance that village boundaries can be challenged by land-hungry neighbors. Most Ao villages have little or no ponded fields and rely almost exclusively on expansive jhum fields for all their rice needs. But Changki village in Mokokchung district is an exception. It has extensive terraced fields that have dramatically reduced its reliance on jhum cultivation and the few jhum fields that it does have are planted mostly with maize. With reduced jhum cultivation, there was less agricultural pressure on Changki's forests and formerly cultivated land was left fallow for over 50 years. This disuse encouraged neighboring villages to begin encroaching on Changki's forests, so to address this threat, the Changki village council passed a resolution making it mandatory for every household to open a jhum field and thus reinforce the village's claims over lands that were becoming contested (Yaden, 2001).

Figure 8-23. An Overview of Returns to Land under Compared Management Regimes, if Years Not under Cultivation are also Considered *



* US$1 = 48.04 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

† Merhümia khel is reported to have shortened its fallows to as little as 2 years, probably up until the outbreak of the Indo-Naga war when Khonoma was attacked and its population scattered.

But in villages such as Tsiesema, where peace prevails and boundaries are not contested, it is interesting to consider whether they could emulate the Khonoma experience. The entire village could conceivably engage in a participatory process of land-use planning, in which only forestal land with the highest agricultural potential (close to the village, fertile, gentle slopes, etc.) would be set aside for intensified jhum cultivation under a system of improved fallow management (not necessarily with alder, but the same principles might be adapted to *Albizia* or other local species), and the remainder removed from the jhum cycle and conserved as long-term community forest.

When we analyze returns to land over every year – and not just years of cultivation, then this is where wet rice cultivation begins to look very attractive (Rs 37,361/ha/yr [K] : Rs 24,535/ha/yr [T]). Even those figures have the potential to be boosted dramatically if Green Revolution technologies enabled more than one planting of rice per year, or alternatively, farmers took more advantage of the winter season when the terraces were otherwise idle to grow dryland cash crops. Clearly the more wet rice terraces farmers had, to consistently absorb labor and produce crops, the less they would have to rely on shifting cultivation. Naga subgroups cover the whole spectrum – from (almost) no wet rice terraces and complete reliance on jhum cultivation (e.g., Konyak, Ao, Sema) – to extensive wet rice terrace cultivation, with much smaller jhums playing a supplementary role (e.g., Angami, Chakhesang). The problem is that it tends to be wider society that places highest value on returns to land (and by extension, conservation of lands no longer needed for cultivation) – whereas farmers are most interested in returns to their scarce labor. As shown in the above analysis, these two criteria lead us in very different directions. Shifting cultivators are already amongst the poorest strata of society. Surely it is hardly ethical to demand that they shoulder the burden of a much more prosperous (and often poorly informed) society's wish that farming systems involving elements of fire and fallow must stop.

Gender Analysis: Who is Doing all this Work? (plates 6-86 – 6-113)

As soon as we knew what was being done in the fields, we wanted to look further at who was doing it. We knew from casual observation that Angami women performed a significant part of agricultural labor, and Khonoma women had a reputation for working especially hard.

Our data confirmed these observations (figure 8-24). In Khonoma in particular, it became clear that it was essentially the women who were the farmers. In the jhum fields, women performed 71.5% of the labor, compared to 23.5% by men and a further 5% by children (<15 yrs. of age).[58] This meant that for every one hour that men worked, women replied with over three hours. The trend was similar in

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[58] These data are based on both 1st- and 2nd-year jhums.

the wet rice terraces, where women supplied 64.4% of the labor, compared to 24.6% by men (roughly a 1:2.6 male to female ratio). We found more equality in Tsiesema, although women continued to log the longest hours in the fields. They did 66% of work in jhum fields, compared to 33.2% by men (a 1:2 male to female ratio); whereas men participated much more in wet rice terraces, providing 45.5% of labor hours, against 54.0% by the women (a 1:1.2 male to female ratio). The labor figures provide an uncanny parallel with the slave prices listed in the opening quote of this chapter, which show a female slave to have been valued at almost three times the price of a male (equivalent of 13 conch shells ♂ : 35 conch shells ♀).

With this aggregate picture as background, figure 8-25 (and appendices 6-17 and 6-18) now break the analysis down to the level of field operations to search for trends in how day-to-day labor is divided in the fields. The general picture that emerges is as follows;

Khonoma. Starting with Khonoma's jhums, we found women contributing the most labor to all field operations.[59] For their part, men were most active in wood harvest (30% ♂ : 65% ♀) and field preparation (30% ♂ : 66% ♀) in the early part of the season, but then the jhum fields were left mostly to the women to manage for the remainder of the year.[60] A small incident during a meeting with our group of studied farmers in Khonoma spoke volumes about the genderization of agricultural labor. It was mostly women who represented the collaborating households at the meeting, but a few men were also in attendance. I was using the meeting as an opportunity to collect data on which crop varieties they were growing in their jhum fields, questioning each in turn. The women watched with mirth as the men in the group scratched their heads and fumbled for answers. No longer able to contain themselves, the women finally burst into howls of laughter – brushing the tears from their cheeks – at the very thought that men might actually know which varieties were planted in their jhum fields. The men grinned sheepishly, finally suggesting that maybe I could check with their wives! This interaction was clearer and more convincing than any data I could hope to collect from their diaries.

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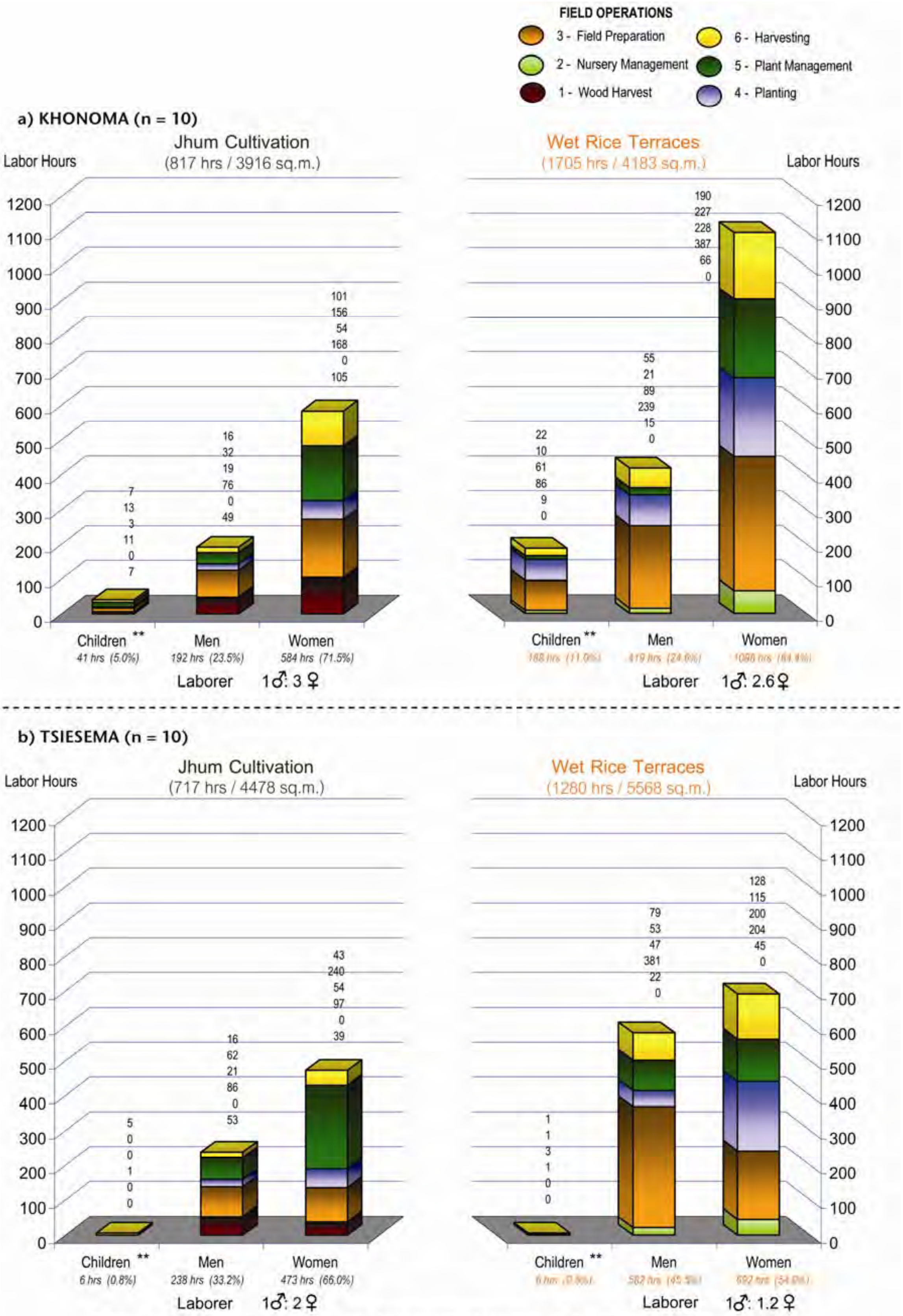
[59] This includes wood harvest and refutes Souza's claim that "Men cut the trees in the jhum field and burn the branches, but a woman will never perform these functions." (2001, 54)

[60] Appendix 6-17, displaying the same data as percentages, shows clearly that as the year progressed, the burden fell increasingly on women as men went to the jhum fields less and less. There was less urgency in the timing of jhum operations, so after pollarding the alders and helping to ready the fields, the men generally withdrew and left the rest to their womenfolk. The participation of children was fairly consistent throughout all field operations, at about 4.0-6.5% of labor hours.

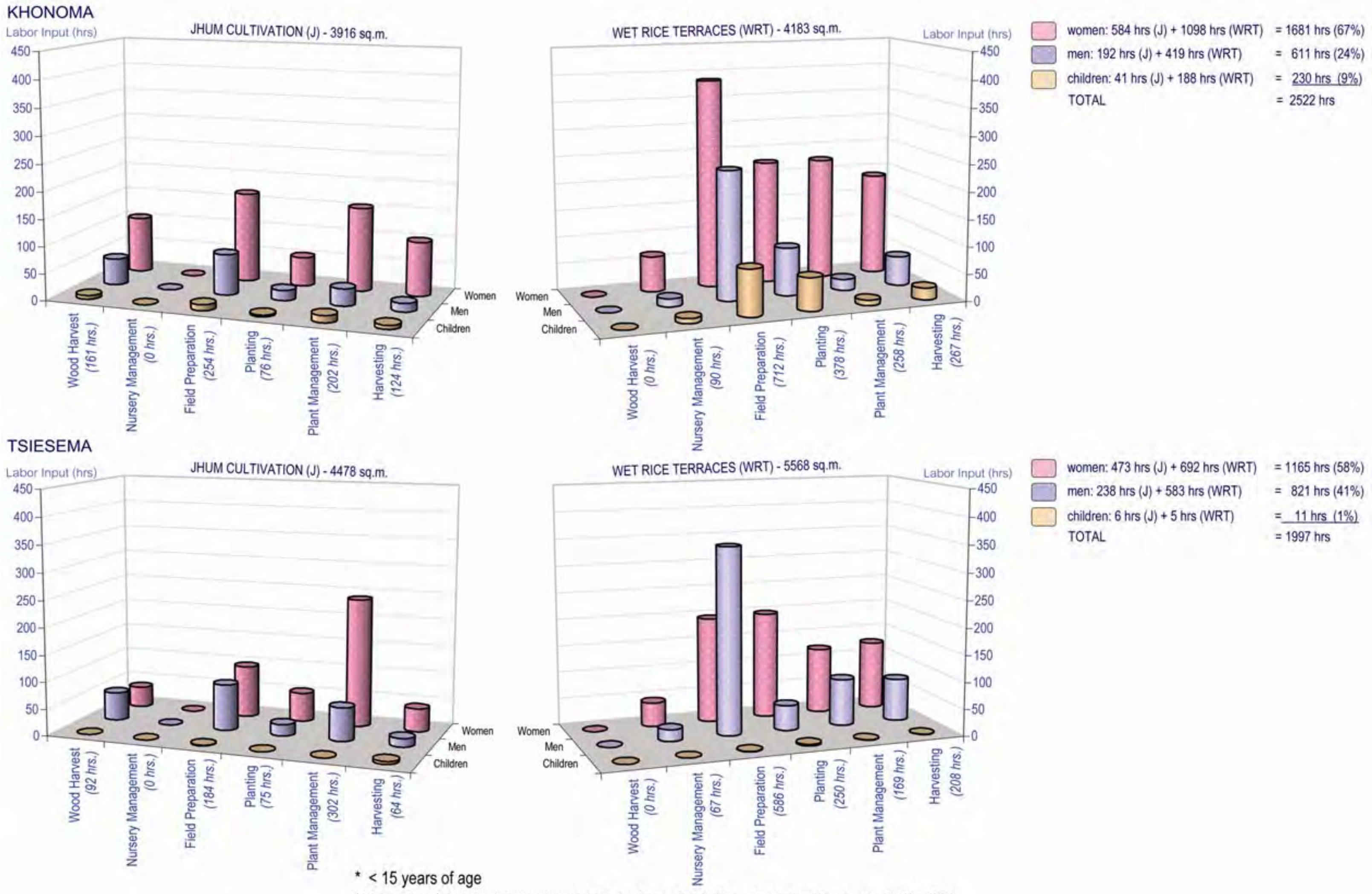
Figure 8-24. Overview of Household Labor Invested in Cultivation of Jhums and Wet Rice Terraces*: Analyzed by Category of 1) Laborer and 2) Field Operation



* Based on labor diaries maintained by ten households in each study village over 2000 - 2001.

** < 15 years of age

Figure 8-25. Division of Agricultural Labor between Men, Women and Children*: Analyzed by Category of Field Operations – on a Household Basis**



* < 15 years of age

** Based on labor diaries maintained by ten households in each study village over 2000-2001.

Shifting our attention to Khonoma's wet rice terraces, we were dealing with about double the amount of labor, but its division followed essentially the same pattern as seen in the jhum fields. Women were again contributing the most labor to all field operations, with men and children pitching in most early in the season with preparing the fields (34% ♂ : 54% ♀) and transplanting (24% ♂ : 60% ♀) and later, harvesting (21% ♂ : 71% ♀). These were the critical times when work had to be completed quickly for best results, and the village marshaled all available labor for this purpose. After the crop was in the ground, then it was generally left to the women to maintain it, and the men and children were not much involved again until October when the fields had turned golden and were ready to harvest. This pattern, of declining participation by men as the season progressed, and then their return to assist with harvesting, can be clearly seen in appendix 6-17.

Tsiesema. Similar patterns were evident in the Tsiesema data, but with several noteworthy differences. Jhum fields were still clearly the domain of women. As new jhum fields were opened, men did most of the wood harvest (58% ♂ : 42% ♀), and a comparable amount in field preparation (47% ♂ : 53% ♀)[61], but then it was largely left to the women to take it from there. In particular, the labor-intensive intertillage of the dryland rice (plant management) was done almost 80% by the women. We thus saw the same pattern as noted in Khonoma, of generally declining participation of men in jhum fields as the season progressed. They reappeared, along with children, at the end of the season to join in harvesting, but even then, women continued to do about ⅔ of the work.

Turning to Tsiesema's wet rice terraces, we found them receiving almost double the labor inputs of the jhum fields. But in contrast to Khonoma, there was a much clearer division of labor between the sexes during the busy transplanting season. Men appeared to take the lead in preparing the fields (64% ♂ : 36% ♀) and the women followed behind, transplanting (19% ♂ : 80% ♀). This reflects the Angami philosophy that the heavier, more physically-demanding work (hoeing, in this case) should be done by men, while those tasks requiring more patience and precision (such as transplanting) are best done by women. After the fields had been transplanted, women went on to dominate plant management and harvesting but men continued to make important contributions of roughly 40% of labor inputs. We thus saw a more sustained and equitable contribution from men to wet rice cultivation than in Khonoma. Children made relatively few contributions to fieldwork in our Tsiesema sample of households.[62]

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[61] During this busy period, wages are adjusted to Rs 140/day for hoeing and Rs 100 for transplanting. Otherwise, Tsiesema's labor rates are generally Rs 110/day for men, and Rs 80 for women.

[62] At first glance, it was unclear why children were working less in Tsiesema's monitored fields. The studied group of farmers in Tsiesema actually averaged more offspring (average 7.4) than Khonoma (6), of which a similar number remained living at home (4 [K] : 3.9 [T]) (appendix 6-1a). An explanation was found by looking more closely at the ages of our collaborating farmers' children. The median age of children still living at home (52 children [26 ♂+ 26 ♀] [K] : 40 children [16 ♂+ 24 ♀] [T]) – and thus positioned to contribute their

Some Observations on the Gender Data

The diary data seem to confirm Khonoma's reputation as a conservative village where traditional attitudes about the 'proper' roles of men and women have not changed much since the headhunting days of old. Some Nagas joke about the thick calves of Khonoma women, developed from struggling up steep slopes with heavy loads (figure 8-26). Even within Naga society, where women work hard as a general rule, the reputation of Khonoma women for strength and hard work is legendary. Felling or pollarding trees is generally considered 'men's work', probably partly because it would be considered immodest for women to be climbing trees (plate 6-86). Beyond that, men seem to participate chiefly during times of peak labor demand – such as soil tillage or transplanting – when a lot of work has to be accomplished in the shortest possible time. After the crop has been planted, women are largely left to maintain it through to harvest. Men, particularly those from Khonoma, become somewhat defensive when this labor imbalance between the sexes arises in conversation. While admitting that women spend more time in the fields, they protest that there are qualitative differences in their work. Men take responsibility for the hardest or most risky tasks, they argue, while women only have to concern themselves with lighter (but onerous) work.

Figure 8-26. The capacity of Khonoma's women for hard physical labor is widely known in Nagaland. Even without any load, climbing some of the steep approach paths up to the village leaves one winded and gasping for air – but village women routinely make the trip with heavy basket loads strapped against their foreheads and children tucked under their arms.

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labor in the fields – was somewhat older in Khonoma (19.3 years) than Tsiesema (16.1 years), thus leaving a larger group of children in the latter village falling under the <15 years of age category (13 children [K] : 17 children [T]). This seemed momentarily contradictory to the smaller amount of children's labor recorded in Tsiesema's diaries. But within the <15 years age group, many would be too young to participate in field work, and it would be those within the 10 - <15 years age bracket that we would expect to be most active in helping their parents in the fields. Then it made sense. Khonoma had more children than Tsiesema (9 children [4 ♂+ 5 ♀] [K] : 5 children [3 ♂+ 2 ♀] [T]) that fell within the category of being old enough to help out in the fields but younger than 15 years – under which their labor would be recorded as that of children in the field diaries. This then is why we were seeing more children's labor in the Khonoma diaries.

My research assistant in Khonoma, a young woman who had just finished a Bachelor's degree at St. Joseph College in Jakhama, often unintentionally provided interesting insights on labor relations between the genders. In my own rural upbringing in Canada, outside farm work was done mostly by men – and their wives played the equally important roles of maintaining the house, supervising the children, having hot meals ready when the men returned from the fields, and helping out in the barns and fields during busy times. But some women were happier working outside alongside their fathers and husbands every day and were more at home milking cows, driving tractors or combining barley than in the kitchen. Folks spoke admiringly of such women as "*working like a man*". It thus used to catch my attention when Zeroni-ü, describing unusual Khonoma men that worked alongside their wives in the fields, used to exclaim, "*He works hard, just like a girl!*" The reaction was the same, but the gender roles were reversed.

This cultural contrast in gender roles was also the source of many good-natured arguments with Zeroni-ü as we worked together. We both built up strong leg muscles during the fieldwork, hiking over much of Khonoma's rugged terrain to explore, map, take photos, and visit sites of particular interest. During these treks, Zeroni-ü would always try to shoulder my heaviest bags or pack my equipment into her basket – trying her best to leave me walking almost empty-handed, in true Naga fashion. I used to protest that I was not planning to carry a shield or spear, and that if chivalry was not completely dead, then the heaviest load should remain with me. We eventually learnt to compromise on this and divide up the loads fairly evenly. But it was at the cost to Zeroni-ü of often being scolded by older villagers met along the pathway, protesting that the white man should not be carrying his own bags – and what was wrong with her?!

When Zeroni-ü accompanied me to Tsiesema and other districts in Nagaland, I also used to observe her amazement when she encountered men carrying basketloads of firewood and performing other tasks that a Khonoma man would consider as an affront to his male dignity. We used to joke that it might be a good idea for her to search for a potential husband in such places.

It also appears that the same hyperpride (moshu) that demands that Khonoma's men remain "manly" at all times, equally compels its women to be feminine and excel in their own duties. Just as the men excelled on the warpath, the main areas for women to outshine their neighbors were in looking after their families and fields. This explains why Khonoma's fields are impeccably manicured, with scarcely a blade of grass out of place – far beyond what is agronomically necessary. It would be unlikely that yield gains from this extra grooming would be significant. Its real purpose appears to be in living up to the high standards demanded by Khonoma's moshu. An untidy field would be seen as a direct reflection on the landowner's wife and would be the subject of sharp ridicule by passers-by. During a group meeting with our collaborating farmers, they pointed out that "other villages don't clean their fields properly – but they don't feel ashamed because they don't have Khonoma's strong sense of moshu". Living up to these social expectations is probably pushing Khonoma's women to clean their fields beyond what is economically rewarding, and this is reflected in the high inputs of female labor recorded in their diaries.

In Tsiesema, men joined their womenfolk in going to the fields much more so than their neighbors in Khonoma. The explanation appears to lie in Khonoma's historical reputation as a powerful warrior village, in which the main role of men was in offence and defense, leaving agricultural work to women and children.[63] The following stanza from a popular Khonoma folksong hints at men's defensive role in the village, while agricultural labor was left more to the women:

'Uramia' ('*Our Villagers*')

"Man:
When war was on in our village and I was guarding the village
With my brew mug, I sat on my porch
And watched my lady love from where I sat.
My love went to the fields after others had gone
Covered her head with her cloth.
If you step into the midst of others (warriors), you are helpless.
If you die, your beautiful form will decay with you.
I picked up my shield and carried two spears
And with a war cry, ran after my enemies.

Woman:
Do not go beyond the river
But cross over to this side, having killed your enemies, my love."

If actively at war with another village, then armed warriors probably had to accompany the agricultural laborers to the field to stand guard. When it came time to return home, as the women struggled under heavy headloads of firewood or crops, the men would have walked behind, still holding their daos and spears in anticipation of possible attack (plate 6-92). It would be foolhardy to be caught unaware, hands occupied with a heavy load and unable to protect oneself. Women perpetuated this, seeing it as their duty to pamper their men and keep them strong and healthy for war.[64] Although tribal warfare and head-hunting came to an end

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[63] Although this would have applied to all Naga villages to some extent, it was exaggerated in Khonoma's case because it had earned so many enemies, both through fighting its own battles and acting as a protector of smaller villages.

[64] I recall one particular man, oftentimes encountered along Khonoma's pathways, who always stood out in groups of men returning from the fields as the only one that usually walked with a log over his shoulder. Upon inquiring, I learned that he had never married and thus had to carry home his own firewood. After reaching home, he would have to pause to chop the log into firewood lengths before beginning preparations for supper – all work normally done by women. He clearly struggled compared to his married peers, and was a reminder of the huge contribution of women's labor to the comforts of their menfolk.

almost a century ago, the legacy of that era can still be seen in the way men and women continue to behave. Khonoma – renowned for its history as a powerful warrior village and continuing conservatism – has held onto the past and not adapted to peace. What was a good thing that helped ensure their survival in the past, has now become a handicap. While some men appear to laze about drinking excessively, others have redirected their efforts to off-farm pursuits such as carpentry, cutting stones, contract work or small businesses (see discussion on off-farm economy in chapter 7). Thus, while women have continued as the main agriculturalists, the role of men has evolved from offense/defense to off-farm commerce or alternatively, unproductive use of their time.

The observations of Chosalie Kikhi, herself an Angami woman who grew up in Viswema village, resonate most closely with the findings of this study:

> "Even in farming, the more difficult tasks which involve fewer days are done mostly by men, whereas the so-called easier tasks which are back-breaking, monotonous, and require constant management are being done by the women. Shifting cultivation is called a 'female farming system' by an Angami widower from Merima village because ever since his wife died, he has never practiced shifting cultivation." (Kikhi, 1997, 68)

In a later related report, Kikhi concludes:

> "In both farming systems [wet rice terraces and jhums], women play a vital and crucial role and their labour contributions are not less than 70% of the total labour input." (1999)

A less diplomatically-worded appraisal, first published in the late 19th century, confirms that the overwhelming role that we see women playing in agriculture today is a continuation of something that has been going on in the Naga Hills for a long time:

> "As a rule the Nágá woman is a model of labour and industry, and is mainly valued on that account. She does everything the husband will not, and he considers it effeminate to do anything but fight, hunt, and cheat. The cultivation labours are all performed by the wife, the crops raised consisting of rice, cotton, and tobacco, as well as several kinds of vegetables. She also weaves, both with cotton and with nettle-fibres, and manufactures salt from the many salt-springs in the country, though she is not able to make it at less cost than is charged for the salt sent up from Bengal. The tending of cows, goats, pigs, and fowl likewise devolves on her in most places, and she of course cooks and performs every other household work besides." (Dutt, 1984, 151 [first published in 1884])

Nevertheless, the peace that has allowed the men to set aside their spears and pursue incomes off-farm has also brought developments that reduce the burden of work on the women. With the introduction of rice mills in the late 1970s (code 8.4

in appendix 5-7), the women can perhaps linger in bed a few minutes longer in the mornings, knowing that they no longer have to pound rice by hand. Nor do they have to walk so far to fetch water, now that the village's network of running water has been expanded. And while getting organized for breakfast, many now use a gas stove rather than lighting a fire to boil water for that compulsory morning cup of tea. Soon one of the children of the Nepali herders on the village outskirts will come knocking on the door to deliver fresh milk in time for the tea. As her own children rise to get dressed for school, she must sometimes feel thankful that their clothes are now cheaply available from the market and she no longer has to weave everything herself. Even for the shawls and mekhela (wrap-around skirts) that she does continue to weave in her spare time (appendix 3-36), she uses the brightly-colored yarns that are now cheaply available from the Kohima shops, and so does not have to spend time spinning cotton. Now that there is a regular bus service, it is much easier for her to take things to sell at the markets in Kohima and buy household supplies. With the children now gone to school, the house grows quiet as she gathers into her basket the tools that she will need in the field that day. She could never dream of having a vehicle to use, but at least the expanding network of roads in the village provide a good walking surface as she hurries off to the fields (plates 6-103 – 6-104). The roads have also made it possible to hire the Catholic Church's large flatbed truck to carry firewood from the jhum fields back to the village – saving her many back-breaking trips with her basket. Although many such modern conveniences have crept into village life, the agricultural implements wielded by Khonoma's women have remained essentially unchanged since iron was substituted for stone, and are as labor-intensive as ever.

Drawing on Farmer Experience to Generate Another Data Set on Land Use Productivity

The profitability of land use systems pivots heavily on what is grown and that has been a constantly changing picture in the study area, particularly since the arrival of the British and all the changes that they brought with them. Calculating agricultural productivity would have been somewhat simpler in the pre-market era when both wet and dry fields were planted primarily to food grains and a smattering of minor crops mixed in – all for farmers' home use. On the cooler slopes where its alder system evolved, Khonoma planted its 1st-year jhums to Job's tears, and 2nd-year fields to a millet-perilla mix. The ponded fields in the valley bottom provided their rice needs. Tsiesema, with its warmer climate, prioritized rice in both its wet and dry fields. Cropping patterns were relatively simpler, and farmers had clear ideas about the productivity of their fields, based on their collective experience, and that of their forefathers, in planting the same land to the same crops over successive generations.

They thought of the sizes of their fields not in terms of hectares, but rather how much seed was needed to plant them and the yields that they could expect on an average year. These were, after all, the only units of measurement that were of any practical significance. The fields monitored during the research provided a "bridge" that allowed calibration between farmers' traditional ways of conceptualizing field size and our empirical measurements. By applying farmers' knowledge of how much seed was needed for planting fields that had already been carefully measured, and the yields they expected from them, we could then calculate their seeding rates and crop yields on a per hectare basis. We had already used this as a quick proxy method for calculating the area of farmers' jhum fields that were under fallow and would have been difficult to survey. Using farmers' own data on the amount of seed that it would take them to plant a field and the anticipated yield, we could then calculate the approximate number of hectares.

This method also allowed some rough, "back-of-the-envelope" calculations of the productivity of fields in the era prior to the arrival of cash crops. This enabled us to calculate how profitable the study villages' previous cropping patterns would have been if they were continuing to use them today. This, in turn, allowed some "quick and dirty" comparisons with our carefully-collected field data, that gauged what economic advantages – if any – farmers had achieved by changing their crops in response to market signals.

Performance of Wet and Dry Cultivation before the Arrival of Cash Crops: How would they Rank Today?

Table 8-10 begins with a few statistics on the land currently used for wet and dry cultivation, and then goes on to summarize the main findings from farmers' testimonies on the productivity of their fields under former subsistence cropping patterns, and what the value of those harvests would have been under present-day prices. The sources of all data are carefully provided as table notes, and the underlying calculations are presented in appendices 6-20 – 6-23.

Table 8-10. Farmers' Accounts of Productivity of Wet and Dry Cultivation Prior to the Arrival of Markets (Summary of Findings from Appendices 6-20 – 6-23)

	JHUM	WET RICE TERRACES
KHONOMA –		
Land Used (at present):		
total land cultivated under each system per household (*ha*)	1.20 [a]	0.42 [b]
average number of plots per household	5 [c]	4.4 [d]
average plot size *(ha)*	0.24 [e]	0.10 [e]
Traditional Management and Yields (under previous subsistence economy)		
cultivation schedule	2 years cropping : 2-12 years fallow [f]	cropped every rainy season [f]
main crop	Job's tears [f]	paddy [f]
primary uses of main crop	distilled into alcohol, snacks, tea, fed to poultry and pigs [f]	steamed, brewed for beer, distilled into alcohol [f]
seeding rate *(kg/ha)*	31 [g]	128 [h]
cost of planting materials *(Rs/ha)*	88 [g]	593 [h]
reported yields *(kg/ha)*	2606 [i]	6287 [j]
ratio of seeds planted : yield harvested	1 : 88 [c]	1 : 49 [d]
harvest value *(Rs/ha)* (based on prices during fieldwork)	7454 [i]	29,045 [j]
TSIESEMA –		
Land Used (at present):		
total land cultivated per household *(ha)*	1.45 [a]	0.56 [b]
number of plots per household	2.5 [k]	3 [l]
average plot size *(ha)*	0.58 [e]	0.19 [e]
Traditional Management and Yields (under previous subsistence economy)		
cultivation schedule	1-2 years cropping : 8-25 years fallow [f]	cropped every rainy season [f]
main crop	paddy [f]	paddy [f]
primary uses of main crop	steamed, brewed for beer, distilled into alcohol, snacks, tea [f]	steamed, fried rice, baking bread, brewed for beer, distilled into alcohol, snacks, tea [f]
seeding rate	65 *(kg/ha)* [g]	301 *(bundles/ha)* [h]
cost of planting materials *(Rs/ha)*	265 [g]	– [h]
reported yields *(kg/ha)* [r]	1276 [i]	4603 [j]
ratio of seeds planted : yield harvested	1 : 25 [k]	1 bundle : 16 kg [l]
harvest value *(Rs/ha)* (based on prices during fieldwork)	5104 [i]	18,689 [j]

Sources: [a] Appendix 6-23; [b] Appendix 6-1b; [c] Appendix 6-20b; [d] Appendix 6-20a; [e] calculated from above 2 rows; [f] field notes; [g] Appendix 6-21b; [h] Appendix 6-21a; [i] Appendix 6-22b; [j] Appendix 6-22a.

Khonoma. Starting with Khonoma, the group of studied farmers each had, on average, almost three times more land under dryland cultivation than wet (dry - 1.20 ha : wet - 0.42 ha).[65] The actual number of plots of each was similar (dry - 5 : wet - 4.4), but the dry fields averaged 2.4 times larger in area than the wet (dry - 0.24 ha : wet - 0.10 ha). The small size of both types of plots hints at the heavy land fragmentation that occurred earlier in the village's history when population pressures were highest. The demand for land at that time forced a shortening of the fallow period to as little as two years in those areas where alders were most carefully managed (chapter 2), but it lengthened again after much of the village's population was dispersed by the outbreak of the Indo-Naga war in 1956.

The Job's tears that had been the main crop of Khonoma's 1st-year jhums prior to the arrival of market influences, was planted at low seeding rates (31 kg/ha) and at little cost (Rs 88/ha). It took comparatively more seed (128 kg/ha) and cost (Rs 593/ha) to plant the ponded fields with rice. But this greater investment was recouped by the rice yielding over double the harvest weights than the Job's tears (Job's tears – 2606 kg/ha : wet rice – 6287 kg/ha), and almost quadruple the harvest value (Job's tears - Rs 7454/ha : rice – Rs 29,045/ha). These figures consider only the principal cereal crops, and of course the jhum fields would be much more profitable if the value of firewood was also factored in. Nevertheless, these data do go far in explaining the high value that Khonoma attached to its wet fields.

Not only did the wet rice terraces provide a much higher harvest value (under today's prices), but their esteem was further heightened by their scarcity, the large labor investment needed to create them, and the fact that they provided the most reliable assurance of food security. The measure of a man's wealth or status lay in how many wet rice terraces he owned. If he had many ponded fields, then he could easily find a wife. But a bachelor who had few or no rice terraces for a future wife to work in would be a less attractive choice, because she would have to work very hard in the jhum fields to produce all of their food needs. The high value given to paddy land can also be seen in the Angami's strict property rights regulations that tightly control its ownership and ensure that it will continue to be passed down through the male lineages as ancestral land (chapter 6).

Tsiesema. Remarkably similar relationships can be seen in the Tsiesema data. The studied group of farmers there also owned an average of almost three times more land under dryland cultivation[66] than under wet (dry - 1.45 ha : wet - 0.56 ha). They owned only half the number of jhum plots as Khonoma (5 [K] : 2.5 [T]), but they were more than double the size (0.24 ha [K] : 0.58 ha [T]). This fitted with our understanding of Tsiesema as a village that cultivated larger jhums than Khonoma,

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[65] This includes all jhum plots – both under cultivation and fallowed.

[66] This does not include community-owned land that is also periodically opened up for jhum cultivation.

but less intensively.[67] The small number of plots owned by each farmer was but a fraction of what they needed to support their current "2-years cropping : 13-years fallow" cycle (appendix 6-1c), and showed that Tsiesema farmers relied on communal land for much of their jhum cultivation. They owned marginally more wet fields than dry (dry – 2.5 plots : wet – 3 plots), but terraced plots averaged only about ⅓ the size of the jhum fields (dry – 0.58 ha : wet – 0.19 ha). Similar to what we saw with the jhum plots, Tsiesema's ponded fields were about double the size of those in Khonoma (0.10 ha [K] : 0.19 ha [T]). The fact that much of Tsiesema's farmland continued to be communally owned, and that those fields that had become individual property were roughly double the size of those in Khonoma, pointed to the lesser degree of fragmentation of Tsiesema's land.

As in most of Nagaland, fallow periods in Tsiesema have declined steadily as demand for cultivable land has grown in tandem with the village population. One of our collaborating farmers observed that when his parents were married, the village population was much smaller (compared to 757 people in 136 households during the period of fieldwork) and jhum cycles were 20 to 25 years long. Today, Tsiesema's jhum land is divided between individually-owned fields that are closer to the village and cultivated on a 6-7-year cycle, and more distant communal lands cultivated on a 15-year cycle.[68] Both wet and dry fields are planted primarily to rice, but terrace yields are almost quadruple those from the jhums (jhum – 1276 kg/ha : wet rice terraces – 4603 kg/ha).[69] As was the case in Khonoma, this meant that Tsiesema's wet rice terraces provided about four times more harvest value of arable crops per hectare than its jhum fields. But again, the economics of the jhum fields improved dramatically when the value of the firewood was brought into the equation. It is interesting to note that despite differences in crops and ecologies, the relative

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[67] This, of course, is all relative. The extensiveness of Tsiesema's jhums is another order of magnitude below those found in Mokokchung and other districts in Nagaland where wet rice terracing is not traditionally practiced and jhum fields are relied upon to supply almost all food needs.

[68] Communal lands can only be opened by decision of the village council. They try to delay opening of these lands until the trees have reached a more economic size. After the village council announces that certain communal forests are to be opened for jhum cultivation, then each villager can open as much land as he has labor to manage. Some search for promising sites for cultivation (as described in footnote 6-28), but many are most interested in the wood value of the fallow vegetation. They thus prefer sites with good road access to facilitate wood extraction. In more remote fields, the wood is often converted into charcoal on site before being carried out. The main priority is the harvest of the wood crop, and the availability of land suitable for cultivation is only a byproduct of the clearing process. Many Tsiesema villagers rely on firewood sales to earn cash, particularly in times of need, such as sickness or financing a son's wedding. High incomes are earned by selling standing firewood to others, who then cut it and sell it. One jhum field, for example, was rented for Rs 60,000, largely on the strength of the sales value of its tree cover. To put that in context, Rs 60,000 is roughly 5.6 times the average value of arable crops that our collaborating farmers in Tsiesema harvested from their jhum fields over the 2-year cropping phase.

[69] Confirming this, members of the group of studied farmers in Tsiesema noted that they would have to sow 1 tin (15 kg) of rice seed in their jhum fields in order to harvest 6-10 bags (5 tins = 1 bag; see appendix 5-8). But by planting only a ½ tin in nurseries, from which seedlings would later be transplanted into their ponded fields, they expected a yield in excess of 10-15 bags. The main advantage of jhum, they explained, was that it also provided a wide assortment of other food crops.

productivity of wet and dry cultivation was strikingly similar in the two study villages before the arrival of the market economy.

What Benefits have Farmers Gained from Intensifying their Land Management?

Farmers' memories of their seeding rates and harvests in pre-market times invited one final comparison with the 2000-2001 field data. We knew that farmers had been modifying their cropping practices in response to new market opportunities – but what advantages had they reaped from these changes? If they had continued to plant the same crops as in the past, what would they have been worth in today's marketplace? And how did that compare with what they were earning by planting more cash crops? Table 8-11 presents the two data sets side-by-side to try to address these questions.

We need to recognize from the outset that the farmers' data is undervalued because it considers only the main crops, and not auxiliary crops and products that were undoubtedly harvested from the same fields. The 2000-2001 data are more comprehensive and include all harvested products of economic value. For this reason alone, without any changes in crops, we would already expect to see higher harvest values in the later data set.

Wet Rice Terraces

The fewest changes have taken place in the wet rice terraces. Our earlier review of their diaries noted that in addition to their rice staple, Khonoma farmers were increasingly planting garlic, potato, coriander and other vegetables in their valley terraces (figure 8-4), while those in Tsiesema raised fish and grew many kinds of fruit on the terrace bunds and around their field huts (figure 8-5). Both villages had evolved their own strategies for diversifying and increasing the productivity of their terraced fields.

Table 8-11. Evaluation of the Economic Effects of Farmers Changing their Cropping Patterns from Subsistence to Increasingly Market-Oriented *

	Subsistence Economy	**Market Economy at Turn of 21st Century**
	(based on farmers' experiences of planting rates and expected yields of primary cereal crop)	*(based on careful monitoring of sampled fields over 2000-2001 cropping seasons)*
KHONOMA		
Wet Rice Terraces:		
main crop/s	rice [a]	rice + garlic, potato, coriander [†][b]
cost of planting materials *(Rs/ha)*	593 [c]	1606 [d]
net harvest value *(Rs/ha)*	29,045 [e]	37,361 [d] (rice only: 28,133)
Jhums:		
main crop/s	Job's tears [a]	potato, maize, soybean, Job's tears, cabbage, chilli, passion fruit, pumpkin, kidney beans [‡][f]
cost of planting materials *(Rs/ha)*	88 [g]	4113 [h]
net harvest value *(Rs/ha)*	7454 [i]	29,905 [j] (Job's tears only: 2503)
TSIESEMA		
Wet Rice Terraces:		
main crop/s	rice [a]	rice + fish, guava, mango, sweet oranges, pomello, banana [§][k]
cost of planting materials *(Rs/ha)*	- [c]	403 [d]
net harvest value *(Rs/ha)*	18,689 [e]	23,097 [d] (rice only: 19,577)
Jhums:		
main crop/s	rice [a]	rice + maize, cucumber, taro, garlic, ginger, chilli, pumpkin, tomato [¤][l]
cost of planting materials *(Rs/ha)*	265 [g]	1967 [h]
net harvest value *(Rs/ha)*	5104 [i]	21,150 [j] (rice only: 8925)

[*] This does not include the value of wood harvested from jhum fallows, but only arable crops.

[†] Rice comprised an average of 75.3% of total harvest value from Khonoma's wet rice terraces over the two years that data were collected. (See figure 8-4.)

[‡] Job's tears had fallen to only 8.37% of harvest value of arable crops from Khonoma's 1st-year jhums during the period of data collection. (See figure 8-8.)

[§] Rice continued to provide 84.76% of total harvest value from Tsiesema's wet rice terraces over the two years that the fields were monitored. (See figure 8-5.)

[¤] Tsiesema's jhum fields continue to be rice-based, providing 42.2% of the harvest value of arable crops from 1st-year jhums. (See figure 8-9.)

Data Sources:
[a] field notes; [b] figure 8-4; [c] appendix 6-21a; [d] table 8-2; [e] appendix 6-22a; [f] figure 8-8; [g] appendix 6-21b; [h] table 8-3; [i] appendix 6-22b; [j] table 8-5; [k] figure 8-5; [l] figure 8-9.

Farmers' records of their harvests over the 2000-2001 study period revealed total harvest values higher in Khonoma by 29% (field data – Rs 37,361/ha : farmers' expected yields – Rs 29,045/ha) and 23% in Tsiesema (field data – Rs 23,097/ha : farmers' expected yields – Rs 18,689/ha), than what they would have expected from rice only. But if we deduct the value of all non-rice products that farmers recorded in their diaries, then the remaining value of rice only falls very much in line with their memories of expected yields during the pre-market economy in both Khonoma (field data [rice only] – Rs 28,133/ha : farmers' expected yields [rice only] – Rs 29,045/ha) and Tsiesema (field data [rice only] – Rs 19,577/ha : farmers' expected yields [rice only] – Rs 18,689/ha).[70] It is noteworthy that both villages have been largely successful in broadening the products harvested from their terraces without having to sacrifice rice yields.

The congruence of these data provides added confidence in their accuracy. The technologies that both villages use in cultivating wet rice have changed little since the arrival of the British.[71] They continue to plant only local varieties, use no external inputs, and harvest a single crop per year. It therefore seems likely that the increase of roughly ¼ in economic outputs that both villages are achieving from their terraced fields are attributable to the non-rice components that they have since added.

Jhums

The farmers' diaries showed that our study villages are now enjoying dramatically higher returns from their jhum fields than the value of the subsistence cereals that they had reaped in the past, about quadruple in both Khonoma (field data – Rs 29,905/ha : farmers' expected yields – Rs 7454/ha)) and Tsiesema (field data – Rs 21,150/ha : farmers' expected yields – Rs 5104/ha). As already noted, some portion of this increase can be accounted for simply because the farmers' estimates of yields expected in the past did not include the myriad of minor crops that are part of every jhum field, and were thus incomplete. More importantly, in Khonoma's case, farmers have been steadily abandoning the low-value Job's tears that were once the

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[70] Both the farmers' estimates (Rs 29,045/ha [K] : Rs 18,689/ha [T]) and our own "rice only" figures from the 2000-2001 field data (Rs 28,133/ha [K] : Rs 19,577/ha [T]) show Khonoma's ponded fields to have higher rice yields than those of Tsiesema. This was the reverse of what was anticipated, since conventional wisdom holds that the warmer climates of lower-altitude areas will provide higher rice yields. The 10 terraces monitored in Khonoma averaged 1,427 m asl, while those in Tsiesema were several hundred metres lower at 1,093 m asl (appendices 6-1b). Undoubtedly Khonoma has emphasized cold tolerance in selecting its rice varieties over the generations, and it may be that, faced with land scarcity, its more intensive management of its terraced fields has allowed it to overcome the climatic limitations that we would have expected.

[71] The notable exception is Tsiesema's recent adoption of animal draught power and even a hand tractor for tilling its ponded fields – but these technologies are most significant for their labor savings, and may not have much impact on yields. Although productivity per hectare may remain unchanged, productivity at the village level is reported to have increased, however, since the labor savings have allowed them to expand the area of wet rice terraces under cultivation.

staple of its 1st-year jhums, to the point where Job's tears comprised only 4.5% of total harvest value of arable crops from the monitored fields (figure 8-10).[72] The vegetable crops that they are planting instead are higher-value, often faster-maturing, and sometimes lend themselves to multiple plantings per year (see cropping calendar in figure 7-26).

Tsiesema is a bit different in that dryland rice continues to be the main jhum field crop, and represented 42% of the total value of arable crops from the monitored fields. But even if we momentarily ignore other crops, the data indicate that Tsiesema has increased the harvest value of its rice alone by almost 75% (field data – Rs 8925/ha : farmers' expected yield – Rs 5104/ha). This is particularly surprising since these yield data were collected on a year (2000) in which inclement weather was reported to have reduced jhum productivity. How they have achieved this is unclear and requires further investigation. Possible explanations include obtaining higher-yielding varieties, more effective control against pest damage, or perhaps planting more glutinous rice that is higher-valued – but all of this is speculative. Turning to the other 37 crops that together comprise the remaining 58% of value of arable crops harvested from its jhum fields, it appears that Tsiesema has also been quite effective in increasing the earning power of its jhums by integrating more minor crops and taking more things to market.

Comparing the two data sets shows that as farmers have increasingly embraced the cash economy, the wet rice terraces have lost their economic advantage and now trail behind jhum cultivation in providing returns to farmers' investments (figure 8-28).[73] This explains why, despite Government attempts to reduce it, jhum cultivation in Kohima District has instead been expanding (Keitzar, 2000). Farmers now see jhum fields as their main source of cash. By increasingly substituting high-value vegetables for low-value Job's tears, Khonoma has been able to increase the profitability of its jhum fields to the point that, if firewood is also considered, each hectare of 1st-year jhum fields now produces about 48% more harvest value than a hectare of wet rice terraces (1st-year jhum – Rs 55,386/ha : wet rice terraces – Rs 37,361/ha [gross]) and about 74.3% higher returns to labor (1st-year jhum – Rs 122/day : wet rice terraces – Rs 70/day) (table 8-9). The reversal has been even more dramatic in Tsiesema. Farmers there can expect to earn about double the harvest value from a 1st-year jhum plot than an equal-sized area of wet

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[72] Beyond economics, there are added social reasons for Job's tears' fall from favor. With the rising influence of the church, the distillation of alcohol that had been one of the major uses of Job's tears, is becoming less common. It would probably raise eyebrows to see a "good Baptist" with his jhum fields full of Job's tears! The church's influence on social behavior extended into how crops were processed. When sermons preached in Khonoma's Baptist Church extolled the evils of distilling alcohol from rice, Job's tears and millet, there was a sudden surge in the popularity of fermenting fruit juices. These had escaped the minister's condemnations and were thus still considered legitimate!

[73] It should be noted that the economic analysis of rice production presented in this chapter is based on unhusked rice (paddy) as it is carried from the field. If the value addition of milling was factored into the price of rice, then the profitability figures would become more attractive. The weight reduction during drying is about 20%, and another 50% after milling (appendix 5-9).

rice terraces (1st-year jhum – Rs 47,000/ha : wet rice terraces – Rs 23,097/ha [gross]) and about 60.8% higher returns to labor (1st-year jhum – Rs 127/day : wet rice terraces – Rs 79/day) (table 8-9). The Green Revolution technologies that have been so effective in boosting wet rice yields in the Punjab and other key rice-producing areas of India's plains, have had no impact in the study area. Rather, it is the jhum fields where farmers have been most successful in shifting from subsistence to cash crops and earning higher returns to their land and labor.

Figure 8-27. A Rough Estimation of Harvest Values from Wet and Dry Cultivation in the Past Subsistence Economy – Compared to Those Measured during the Fieldwork when Farmers were Switching Increasingly to Cash Crops[†]

PRE-MARKET ECONOMY:

Harvest Value (Rs) / Ha (net)

	Wet Rice Cultivation	Jhum Cultivation*
Khonoma:	29,045 (wet rice)	7,454 (Job's tears)
Tsiesema:	18,689 (wet rice)	5,104 (dryland rice)

* Considers only 1st year of cultivation. Does not include value of firewood or numerous secondary crops usually grown in jhum fields.

DURING 2000-2001 FIELDWORK:

Harvest Value (Rs) / Ha (net)

	Wet Rice Cultivation	Jhum Cultivation*
Khonoma:	37,361 (wet rice + garlic, potato,coriander)	29,905 (potato, maize, soybean, Job's tears, cabbage, chilli, passion fruit, pumpkin, kidney beans)
Tsiesema:	23,097 (wet rice + fish, fruits grown along terrace bunds or nearby)	21,150 (dryland rice + maize, cucumber, taro, garlic, ginger, chilli, pumpkin, tomato)

* Considers only 1st year of cultivation. Includes all harvested products of economic value,except firewood.

[†] See table 8-11 for more details.

DISCUSSION

What insights does this economic analysis provide into Angami behavior in managing their lands, particularly in explaining why they have largely ignored official efforts to discourage shifting cultivation? The Angami, more than any other Naga tribal group, are clearly skilled wet rice cultivators, so why do they persist in opening fields that can only be cultivated for a year or two before being left fallow again? And what benefits has Khonoma gained by modifying its natural fallow successions into a highly-managed system of dispersed alders?

Land scarcity and its intensified use has been a central theme throughout this study. Chapter 6 has already highlighted the ruggedness of Khonoma's landscape, and the fact that it has long been short of cultivable land (Allen, 1981, 80-81). Although the village spans over 104.43 km^2, only about 27.22 km^2 (26.07%) of it is highly suitable for agriculture (map 6-7). If the village population is currently about 2908 in 579 households (2001 census), then each square kilometer of cultivable land must support 106.8 people. But in fact, almost all of Khonoma's cultivation is restricted to the immediate sub-watershed surrounding the village, containing about 13.42 km^2 (45.98%) of the land suitable for agriculture (appendix 4-30). Therefore, a population density of about 216.69 people/km^2 of cultivable land is a more realistic assessment. Our own household survey undertaken during the fieldwork counted only 1892 people, about ⅓ less than the 2908 reported by the 2001 census. The difference of 1016 people – those that our survey did not find – represents that large group that now spends most of its time outside the village, studying and working, but is still counted by the Census of India as being in Khonoma. If our own count of 1892 more accurately reflects the population that remains back in the village, then that means that the population density is 141 people/km^2 of cultivable land. However, even though many students no longer live in the village, they continue to rely on the outputs from their parents' farms to pay for their education costs, and thus should be counted as part of the population supported by Khonoma's lands. Indeed, they are the most taxing segment of the population since they contribute the least labor but demand the most cash to pay for their studies and upkeep. Even if we accept the 2001 census figure, the consequent population density of about 216.69 people/km^2 of cultivable land is probably a fraction of what it was before 1956, when much of the village's population was scattered by the Indo-Naga war.[74] Although a much smaller village of only 21.6 km^2, Tsiesema's lower, more gently-sloped landscape is 90.09% highly suitable for agriculture (appendix 6-31). Its current population of 1019 people thus has about 19.46 km^2 of cultivable land to support themselves, a more modest density of 52.36

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[74] Khonoma estimates that two-thirds of its people now live outside the village (Greenridge Club, 1997), for the reasons described in chapter 5. If that population had remained in the village, there would be a burgeoning 650 people/km^2 of cultivable land and land use would have intensified far beyond what we see today.

people/km². This contrast in land use pressures underlies the different management strategies that the data show for each village.

In view of this disparity in land use pressures, it would be logical to postulate that higher input technologies may be applicable under Khonoma's situation of land scarcity – but rejected under Tsiesema's lower land use pressures where labor is more likely to be limiting. This is precisely what the diary data show to be happening. Khonoma recorded a higher investment of planting materials and labor into fields smaller than those cultivated by Tsiesema, while Tsiesema was cultivating larger fields, more than double the size in the case of wet rice terraces, with fewer inputs. Table 8-12 summarizes the difference in management intensity between the two study villages. The elements that are part of Khonoma's package of intensified management include more careful field preparation, replacement of low-value subsistence crops with high-value commodity crops, a movement away from single plantings to increasing use of relay-planting or crop rotations within the same planting season, and in the case of jhum, an intricate system of alder management that permits a shortening of the fallow period, while providing both biological and economic benefits.

Table 8-12. Comparing the Intensity of Land Use in the Two Study Villages, Using Labor and Planting Material Inputs and Harvested Outputs as Indicators *

	KHONOMA *(/hectare)*	**TSIESEMA** *(/hectare)*	**% by which Khonoma Exceeds Tsiesema**
WET RICE TERRACES:			
Avg. Size of Monitored Fields *(m^2)* [a]	1149	2565	- 123.2%
Planting Material Inputs *(Rs/ha)* [b]	1606	403	+ 298.5%
Labor Inputs *(hrs/yr)* [b]	4076	2299	+ 77.3%
Returns to Land *(Rs/yr)* [b]	37,361	24,535	+ 52.3%
Returns to Labor Inputs *(Rs/hr)* [b]	9.2	10.7	- 16.4%
1ST-YEAR JHUM:			
Avg. Size of Monitored Fields *(m^2)* [c]	1972	2140	- 8.5%
Planting Material Inputs *(Rs/ha)* [d]	4113	1967	+ 109.1%
Labor Inputs *(hrs/yr)* [d]	460.9	226.3	+ 103.7%
Returns to Land *(Rs/yr)* [e]	6613	3976	+ 66.3%
Returns to Labor Inputs *(Rs/hr)* [f]	14.3	17.6	- 22.4%

* *Sources*: [a] appendix 6-1b; [b] table 6-2; [c] appendix 6-1c; [d] table 6-3; [e] figure 6-25; [f] Returns to land (Rs/yr) ÷ Labor Inputs (Rs/hr) = Returns to Labor Inputs (Rs/hr)

The harvest data show these strategies to have worked effectively for Khonoma, providing it with significantly larger returns from its smaller land base. Most clearly, Khonoma is reaping 57.6% more harvest value (net) per hectare from its wet rice terraces than Tsiesema (table 8-2). At first glance, its margin of advantage appears more modest for jhum. Here, Khonoma's jhums are producing only 4.9% more harvest value (net) per hectare than Tsiesema's on the 1st-year cropping, and although this shoots up to 20.1% (net) on the 2nd-year cropping, the actual added worth is very little (table 8-3). But here, we must bear in mind that the real benefit of Khonoma's dispersed alders has not been in providing spectacularly higher yields, but rather in allowing a dramatic shortening of the fallow period without sending the system into a downward spiral of degradation. This permits Khonoma to currently cultivate its jhum fields almost twice as frequently as Tsiesema (fallows: 7 yr [K] : 13 yr [T]), but probably even up to 10 times as often (when fallows were: 2 yr [K] : 20 yr [T]) in the years prior to the outbreak of the Indo-Naga war. Thus, the end result is the same; increased productivity of land. If we look not only at the two years that fields are actually under cultivation, but rather more widely at the entire jhum cycle, then we find Khonoma earning 66.3% more per hectare from its jhum lands than Tsiesema (table 8-12). But Khonoma's gains have not been without cost. Although it has been successful in squeezing more productivity from its limited land, it has been at the expense of declining returns to labor. This is typical of what one would expect as land scarcity forces its intensified management, and farmers must prioritize returns to land rather than their own labor (Boserup, 1965). This is particularly true of shifting cultivation systems as they are intensified toward permanent cultivation and farmers must increasingly substitute their own labor for functions previously achieved through use of fire and fallow (Rambo, 1984).

This brings us directly to the next major finding – that there is far more underlying farmers' attachment to swiddening than the "primitiveness" or "backwardness" that their critics would have us believe. The diary data support the observations of Hutton (1969), Leach (1954) and others that good swiddens can be far more productive than wet rice terraces, and that the latter become economic only in cases of high population densities. In making this comparison, we must remain mindful that shifting cultivators are most interested in maximizing returns to their scarce labor, not necessarily their land. The data from both study villages show that their jhum cultivation provides nearly double the returns to labor invested, than cultivation of their wet rice terraces. Moreover, the margin of superior returns from jhum cultivation has grown as farmers have increasingly substituted high-value commodity crops for the food grains that they had planted in the past.[75] Wet rice cultivation has remained stagnant, benefiting from none of the technologies brought elsewhere by the Green Revolution.

This throws into question the wisdom of state policy to discourage jhum cultivation and replace it with wet rice terracing, and sheds light on why farmers stubbornly resist the transition. The policy is based on the fact that wet rice

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[75] Within the study villages, farmers participating in the research were learning from and responding to data as they became available. Analysis of their diaries, for example, confirmed what many probably already suspected – that planting potatoes and other vegetable crops is far more profitable than traditional staples such as Job's tears or millet. The following year (2002) witnessed a large surge in potatoes planted in jhum fields, particularly in Merhümia khel where black soils and cooler temperatures are highly suitable. Better information was improving their capacity to make informed decisions.

cultivation provides by far the higher returns to land – and our data bear this out. It envisions the day when Nagaland's rapidly-growing people-to-land ratio[76] will force a shortening of fallow periods to the point that shifting cultivation is no longer tenable. Its resulting collapse would inevitably be accompanied by serious environmental degradation, until farmers were no longer able to adjust and adopted more intensive forms of cultivation. Official policy hopes to pre-empt that cycle of degradation – and the rehabilitation that would have to follow – by encouraging Nagas to adopt wet rice cultivation sooner rather than later, and thereby alleviate swidden pressures on the mountain slopes. This would provide wider societal benefits, in that mountain slopes would remain under forest cover and the flooding, siltation and other downstream impacts that are commonly blamed on shifting cultivation would be avoided. While these are admirable goals, the problem is that the policy of abandoning shifting cultivation in favor of wet rice terracing, even if technically feasible, would be at a very significant cost to Naga farmers. Even if the state paid the entire bill for developing the terraces and supporting irrigation infrastructure, farmers would still be left with roughly half the returns to their labor that they had previously earned from shifting cultivation! This obstacle is seldom addressed by advocates of wet rice terracing.

A major reason for the superior profitability of jhum cultivation lies in the value of the firewood harvested when reopening fallows. Although their critics speak of farmers "wasting time cutting down the forests" to open land for cultivation, we need to recognize that firewood can be a critical output from the system, particularly at cooler altitudes and latitudes where it enjoys high market demand. In fact, the farmers' diary data showed firewood to be the single most important crop, representing 43% (Khonoma) to 52% (Tsiesema) of the total value harvested from their swiddens over the 2-year cropping phase. Little labor needs to be spent on the tree component, just some replanting and coppice thinning during the cropping phase, after which it is left to grow on its own over the fallow period. The only significant labor required is that for harvesting the trees at the end of the fallow, for which farmers earn far higher returns to their labor than they do from the food crops that follow (figure 8-13). The beauty of the system is that this same labor accomplishes dual objectives – harvesting firewood and opening the fallow for cultivation. While it would be easy to assume that 2nd-year swiddens might be valued by farmers since no additional labor is required to clear the forest, quite the opposite is true. They receive far less attention precisely because there is no firewood to harvest. This adds weight to the argument that, rather than shifting cultivation per se, *these systems should more accurately be considered as permanent*

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[76] As mentioned in chapter 1, The 2001 census calculated a population growth rate of 64.4% in Nagaland over the previous 10 years, one of the highest in all of India (Ao, M., 2002). The state's population was reported to be 1,988,636 at that time. With 16,579 km^2 of land area, that gives Nagaland a population density of about 120/ km^2.

land use under a food crop-firewood rotation. This difference in perception, if widely adopted, could have a huge effect on how these systems are viewed by policy-makers.

Of course, not all reasons for preferring jhum over wet rice cultivation fall within the realm of economics. Many observers point out that shifting cultivation is a way of life for mountain people, around which their social and cultural lives revolve When Indian newspapers carry accounts of desperate farmers drinking pesticide to escape their debt cycle, it is generally not shifting cultivators, but rather lowland farmers practicing many of the same methods that shifting cultivators are now being urged to adopt. Without the benefits of fire and fallow, farmers in the plains are instead forced to invest heavily in both labor and material inputs – leaving them economically vulnerable. A crop failure or price collapse can be devastating. It is hardly a convincing model for shifting cultivators to emulate.

Regardless of the merits of shifting cultivation, however, the reality of increasing population pressures in the uplands means that farmers will have no recourse but to continue to search for ways to intensify their land use. The diary data provide intriguing insights into the efficacy of three common approaches to swidden intensification:

Shift from Subsistence to Commodity Crops

Less fighting and more roads are gradually bringing Nagaland out of its isolation and into the mainstream Indian economy. Our two villages are particularly well-placed geographically since they are both within 20 km of Kohima, the state capital, and it is only a three-hour drive down to Dimapur and the vast markets of the Indian plains. This has enabled Khonoma in particular to shift from the lower-value food grains that had previously dominated its jhums to potatoes, garlic and other semi-temperate crops that thrive in its cool mountain environment and enjoy strong market demand from the Indian plains. This strategy has enabled both villages to roughly quadruple the value of their jhum harvests per hectare, compared to the pre-market era when they planted only food grains for subsistence use. This, of course, is at the cost of losing their economic independence and becoming subject to outside markets over which they have no control. It is somewhat worrying to see so many shifting cultivators across the Brahmaputra valley in the Himalayan foothills all following the same strategy of converting their land to large cardamom, ginger, turmeric and a handful of other cash crops. It raises questions about the elasticity of demand and whether markets are going to be quickly saturated and prices collapse. Equally, it raises concerns of vulnerability to widespread damage from insect or disease outbreaks. The stability that comes with diversity in cropping patterns will have been lost.

Extending the Cropping Phase

Many of shifting cultivation's critics view it as an inefficient form of land use because it provides only a couple of years of cropping before declining fertility and proliferating weeds force farmers to fallow the land again. This line of thought leads naturally to proposals to extend the cropping phase as a means to improve the efficiency of land use. Naga researchers, for example, report promising results from field trials that, after the standard 2-year cropping period, introduced viny legumes as green manure crops on the 3rd year and, with the improved fertility and weed control thus attained, continued planting food grains for a 4th and 5th year before finally leaving the field fallow again (Keitzar and Kikon, undated; Ao, N.T., 2000; Ngullie et al., 2006). In Tsiesema, where land use pressures are lighter, the reluctance of our studied sample of farmers to plant even a 2nd year's crop raises doubts about how receptive they are likely to be to technologies aimed at extending their cropping phase.

Both villages' diary data shed light on why this is so. We have already noted the huge contribution of firewood to the total value of harvest from 1st-year jhum fields. Second-year jhums are far less profitable and receive less attention because they have no firewood. Farmers' approach to 2nd-year cropping appears to try to capitalize on whatever additional yields can be had from their fields under minimal labor inputs. Indeed, we have seen that in Khonoma, the annual increment of firewood value after fields are left in fallow is 88.7% of what they earned during the 2nd cropping year, 70.0% in Tsiesema. And the firewood crop is at the cost of no planting materials or labor other than that used to harvest it at the end of the fallow. The comparison becomes even starker if looked at in terms of returns to labor. We find that Khonoma earns 5.8 times higher returns from investing its labor in cutting firewood than by cultivating its 2nd-year jhums, a staggering 18.4 times in Tsiesema. Table 8-13 sets out in clear terms why farmers are eager to open new jhums and 2nd-year fields receive less priority.

Table 8-13. Comparing Returns to Labor from Harvesting Firewood with those from First- and Second-Year Cropping

	Firewood Harvest [a]	**1st-Year Cropping** [b] ***(without wood component)***	**2nd-Year Cropping** [c]
Khonoma *(Rs/day)*	228	84	39.4
Tsiesema *(Rs/day)*	605	70	32.8

Sources: [a] Figure 8-11; [b] Figure 8-12; [c] Table 8-3

There are additional costs that should be considered in any proposal to lengthen the cropping phase. Shifting cultivators typically try to limit disturbance of the slopes that they farm, and thereby protect the forests' capacity to regenerate quickly after cultivation. We can see many examples of such conservation-oriented management throughout the swidden cycle. When opening fallows, trees are often cut at some height to reduce mortality and improve their coppicing vigor. A few mother trees are often left scattered throughout fields as sources of propagules. Burning the field creates a soft seedbed that can be dibbled directly. Eliminating the need for tillage not only saves labor, but also protects tree roots, shoots, and small seedlings that would otherwise be damaged by hoeing. The soil, undisturbed by hoeing, is left less vulnerable to erosion during the critical period when early monsoons have already begun but the crop has not yet developed a protective canopy to intercept rain impact. During later weeding operations, seedlings of valued trees are selectively retained, and coppicing stumps skillfully managed to create the most favorable shading for the crops (Ty, 2007). The forest thus begins regenerating amidst the farmers' crops. This overlap helps to ensure that after the crops are harvested that autumn, they will be rapidly replaced by fallow regrowth that protects the soil and begins the process of field rejuvenation. Farmers then try to protect their fallowed lands against run-away fires that would interrupt that renewal process.

Such farmer efforts to ensure a rapid return of the forest would be severely compromised by any extension of the cropping period. As cultivation is extended over successive years, new tree seedlings germinating from the soil seed bank are killed out by the continued hoeing and cleaning. The only source of new arboreal vegetation then becomes seeds blown in from the surrounding forest. During weeding operations, farmers routinely clean away coppices from the stumps to prevent shading of adjacent crops. Done repeatedly over continuous cropping years, this eventually kills out most of the meristems and exhausts the stumps of their food reserves needed to support coppice regrowth. Increased tillage damages roots and contributes to stump mortality. At the same time, ferns, *Imperata* and other coarse grasses increasingly flourish under the conditions of increased burning, declining soil fertility, and weakened tree growth. Extensive rhizomes make them fire-resistant and every successive burn strengthens their dominance over the succession, at the expense of more effective fallow species. Lengthening the cropping phase thus greatly retards the recovery of the fallow vegetation towards a secondary forest (Nakano, 1978).

Although the increased total productivity of an extended cropping phase might in itself look attractive (but at dubious returns to labor), missing from the equation would be the impaired fallow regrowth that follows, the likelihood of increased soil compaction and erosion, and the delay of soil fertility recovery and other fallow functions. The effects would be seen in future cropping phases, and could be the start of a long downward spiral into degradation. This highlights the importance, when trialing new technologies, of looking beyond the immediate effects to the wider system impacts.

Shortening the Fallow Period

Another major pathway for the intensification of swidden systems lies in the shortening of fallow periods. This is often forced on farmers when land scarcity leaves them with no recourse but to return and re-open fields prematurely. This is universally recognized as an ominous step down the slippery slope of swidden degradation – doubly so if it occurs in tandem with extended cropping. Nutrients lost during the cropping phase exceed the aborted fallow's ability to replace them; the slowed fallow regrowth is less effective at smothering out weeds; and the tree component may eventually be lost from the system altogether, replaced by shrubs and coarse grasses. Pushed beyond its ecological resilience, the system begins to collapse. Farmers returning to reopen these fallows can expect reduced soil fertility, more weeds and no firewood. They have to work harder and harder for less and less.

The key role of alder has been in preventing the above scenario. By keeping alder stumps dispersed throughout their jhum fields, Khonoma's farmers have been able to enhance and accelerate many of the same processes that, as described under the previous point, are impaired when cropping periods are extended. The extensive root systems of the alder stumps support rapid coppice regrowth that, by the time the 2nd-year crops are harvested, is already creating a closed canopy. The soil thus has continuous protective cover and light-demanding weeds are quickly smothered out. Nitrogen-fixation and copious litterfall accelerate recovery of soil fertility. The understory of alder fallows remains damp and unsusceptible to run-away fires. The continued rapid growth of the alder coppices provides impressive firewood yields even in short fallows. In most situations across Asia-Pacific where fallow periods have been shortened to as little as two years, the tree component has long ago disappeared from the system. The expansive *Imperata* grasslands of Indonesia and the Philippines are a good case in point (Turvey, 1994; Garrity [ed], 1997; Tomich et al., 1997; Menz et al. [eds], 1998).[77] That this has not happened is one of the remarkable aspects of Khonoma's story.

This has already been discussed in some detail in chapter 2, so suffice here to re-emphasize that Khonoma's alders have been effective in providing needed products and services in a shorter time and thus enabling farmers to return more quickly to recultivate the same plot of land. Ramakrishnan (1993) and others conclude that fallow periods need to be a minimum of ten years for swidden systems to remain sustainable, but alder has allowed Khonoma to reduce that by up to 80% (2 years) and still remain viable. The key role that alder has played in Khonoma is thus not of supporting exceptional crop yields, but rather in allowing a dramatic shortening of fallow periods and by doing so, providing a metaphoric bridge that allowed Naga farmers to move from extensive shifting cultivation to more

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[77] But as Potter and Lee (2007) and others have argued, the reputation of *Imperata* grasslands as unused wastelands is not always deserved.

permanent forms of cultivation, without falling into the abyss of degradation witnessed elsewhere across Asia-Pacific where land-use pressures have become too high. Equally important, alder management was developed gradually by applying sequential improvements to an existing system as land use pressure warranted. Such evolution by incremental change is more readily adopted by farmers than abandoning past practices in favor of wholly new systems.

By permitting more frequent cultivation of a smaller land area, alder blunted conversion pressures on nearby forests and allowed Khonoma to keep most of its forests outside the swidden cycle. That is why we see large tracts of relatively pristine forests in Khonoma today – a relative rarity in Nagaland. The Khonoma model holds promise for extension to other villages in the Naga uplands where alder grows well. It could play a similarly useful role in allowing intensified cultivation of land with the highest agricultural potential, and conservation of other forestal lands thus freed from the swidden cycle.[78] More fundamentally though, we need to understand the underlying concepts of how the system works, and for wider application, consider if analogous systems can be designed around other soil-building trees.

Finally, in explaining the rationality of how Nagas manage their lands today, we also need to reflect on residual influences from their volatile past when both food and military security were paramount for survival. Excerpts from British tour diaries revealed the precariousness of food supplies at that time when crop failures often brought starvation. Their long history of conflict with lowland populations also discouraged reliance on the plains for making up for any rice shortfalls. It would put them in a vulnerable position indeed if they had to rely on bartering with enemies for their food needs. The insecurity of the outside world forced each village to withdraw into the relative security of its own fortifications[79] and act as an independent republic, largely self-sufficient in its own needs. This was perpetuated by the long years of turmoil after India gained its independence and cracked down militarily on the Nagas when they tried to follow suit and claim their own independence (Iralu, K.D., 2003). As the Indo-Naga war raged, most villagers not actively involved in the fighting had to prioritize feeding their families. The fighting ensured that Nagaland remained isolated, and the market economy was unable to penetrate that isolation. The long convoys of lorries lumbering up the mountain roads from the plains carried only soldiers, not goods for trading.

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[78] In other cases, alder may provide an effective means for regaining some stability in stressed jhum systems. A good example of a potential target area for such an intervention are the six to seven villages situated on the Englan Range of Wokha District. Population pressures had already shortened their fallow periods to three to four years and then, to make a bad situation worse, much of their agricultural land was submerged by a hydro project. These communities have been granted state funds to trial the "Khonoma system" (as described in chapter 2) of swidden intensification by introducing and managing alder (Sema, 2000).

[79] But security was a relative concept. Given the frequency of bitter fighting between khels of the same village, even being inside the perimeter of one's own village offered few guarantees of security.

It is thus hardly surprising that Nagas today continue to place a high value on self-sufficiency in their own food needs. It appears that the study villages can buy lowland rice in the Kohima market considerably cheaper than they can produce it themselves. That extra cost (mostly their own labor) is the premium that they are willing to pay for an assured supply of their staple food. Farmers interviewed during the fieldwork were well aware that they could earn more by planting cash crops or working off-farm but, they reasoned, even if they had a lot of money, they still needed rice to survive. They saw cash as being fluid, quickly spent, whereas a granary full of paddy was a solid asset that provided assurance that whatever political upheaval, war, or flood might befall neighboring Assam, they would at least have the security of knowing that their families would have enough to eat that year.[80] History has taught them to be wary. As long as they continued to cultivate their wet rice terraces, then, even though the harvest value was less, they were sure that they could survive any calamity.[81] With that peace of mind, they could then roam around in search of other ways to earn needed cash.

The importance that Naga villages historically attached to rice self-sufficiency can also be seen in that many continue to enforce old policies to discourage or even prohibit sales of rice outside the village. Sales within villages are permitted, but often at controlled prices that are quite low. These rules are remnants of the earlier era. They were described in the British tour diaries, when starvation was a very real threat, and were intended to restrict individuals' freedom to market their rice surpluses to safeguard villages' food security. Prices for intravillage transactions were controlled on the egalitarian principle that the needy should be able to buy surpluses from their more affluent neighbors at affordable prices. In today's context, in which improved transportation and market linkages allow rice to flow efficiently from areas of surplus to those of deficit, this policy may have outlived its usefulness.[82] By placing restrictions on the market, it may now be

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[80] It was also widely believed that rice that villagers "grew with their own hands" was of superior quality and much tastier than that bought from the shops.

[81] Even when there are easier, off-farm options for earning a living, many villagers – especially the older generation – express their cultural attachment to working on the land. Zhazolie Meyase's (Merhümia khel, Khonoma Village) comments are typical:

> "We cannot live without cultivating. In towns, Nagas are planning to live without working. This is not good. When we work in cultivating the soil, we stay healthy and strong. But we cultivators work at our own pace and have much leisure. When we lose our appetite, it is good for us to have our meals in the fields. This is more enjoyable and the food tastes better. The government servants and babus [officers] do not live long, compared to the farmers. The government officials die earlier than the farmers because we do a lot of work and exercise. The cultivators are much stronger than government officials and they are not afraid of any eventualities." (Meyase, 2000)

[82] The global rice shortage that spurred skyrocketing prices, hoarding, and even rationing in some North American stores in the first half of 2008 shows, however, that protecting food security remains a concern into the 21st Century. In an interesting example of national Governments doing essentially what Angami villages did centuries ago, some major exporters (India and Vietnam) banned rice exports to safeguard national food security, and others were formulating plans to sell cheap rice to the poor.

playing a detrimental role by devaluing the revenue-earning potential of wet rice terraces. The reduced market value of rice is partially offset by the considerable prestige still associated with being wealthy enough to lend it to others.But the opposite is true of the borrower. His failure to grow sufficient rice for his own needs, and therefore his need to seek assistance from others, is a source of embarrassment. Borrowing rice is usually a secretive affair that takes place in the dark of night. Unless a dispute erupts between the borrower and lender, neither tells others about the transaction.

If peace continues, then it is likely that farmers will increasingly focus their efforts on cash crops that they can produce competitively for lucrative lowland markets, and use the earnings to buy their rice needs. This has probably been delayed somewhat by the Angami's strong cultural impetus to continue to cultivate the terraces inherited from their ancestors, and thus follow their tradition of maintaining full granaries as a buffer against an uncertain future. But the opportunity costs of insisting on rice self-sufficiency are mounting as improved market linkages with the plains offer both a supply of cheaper rice and demand for crops that thrive in cool mountain environments. Given that the fabric of Angami society has long been interwoven with wet rice cultivation, if and when market forces push them to give it up in favor of buying cheaper rice from the lowlands, the social impacts on village life will be profound (Sanyü, 2001).

The disproportionate contribution of women to agricultural labor remains as perhaps the most striking legacy from Nagaland's not-too-distant era of perpetual warfare and headhunting, when the role of men was primarily offensive and defensive, and farming was left largely to the women. Now that peace prevails, men have gravitated more to off-farm pursuit of income (see *Khonoma's Participation in the Naga Hills' Expanding Trade* in chapter 7), while women continue to work in the fields. Aside from their domestic duties, women in the study villages also worked 2-3 times longer in swidden fields and 1.2-2.6 times longer in wet rice terraces than their male counterparts (Tsiesema – Khonoma, respectively). Even though ownership of Angami land remains with the men, the burdens of tilling it fall upon those who can not own it – the women.

The dominant role of women in agriculture may be exaggerated amongst the (formerly) warlike Angami, but this is likely to hold true to varying degrees for all the Naga subgroups. . Even though peace prevails and the former military role of the menfolk is now redundant, the perception of agricultural labor as "women's work" still persists. When discussing Naga farmers, we therefore need to keep in mind that we are talking overwhelmingly about women. They will be the ones most affected by any outside interventions to influence Nagaland's farming systems.

CHAPTER 9

Conclusions

SOME FINAL REFLECTIONS ON KHONOMA

After all the evidence has been presented, the tale that emerges is one of a mountain-dwelling people and their strategies for dealing with land shortage, as suggested in the Preface. Khonoma became a very powerful village, partly because of the security of its site, and partly because the insufficiency of land to support a powerful community was ingeniously compensated by management of soil-building trees. This was most remarkable in its highly-evolved management of alders dispersed throughout dryland fields on the mountain slopes, but down in the valley bottoms, *Albizia* trees were also kept scattered throughout the wet rice terraces in a parallel system. In becoming powerful, the Khwünomia also developed both a gender division of labor and the Angami moshu cult in exaggerated forms.

This study potentially holds a place of importance in the swidden literature because it chronicles how alder management allowed a continuation of a system of shifting cultivation well beyond the point at which population pressures would otherwise have rendered it unsustainable. By permitting intensified cultivation of its limited agricultural land, alder carried Khonoma through a period when there would have been few other options to support its swelling population. The significance of alder thus looms well beyond agronomic interest, and helps explain how Khonoma became such a dominant village with such a pivotal role in modern Nagaland history.

This is, of course, an historical argument since the preconditions that originally gave birth to Khonoma's alder fallows no longer exist. Hence, this study has had to refer extensively to historical materials in reconstructing events in the Naga Hills and how they influenced land use. Khonoma's hegemony was eventually undercut by its defeats by the British in 1879 and the Indians in 1956, the latter the more devastating and leading to an enduring reduction in population. The land use pressures that had given rise to Khonoma's reliance on alder thus dissipated.

That the dispersed alder system has persisted for so long might at first seem to run counter to the sequence proposed by Ester Boserup (1965). In her scheme, Khonoma's farming should have intensified into a system with no fallow at all. The antiquity of the alder fallows can be explained by the role of warfare as a contributing factor in both their creation and preservation. This thesis has argued that the headhunting and warfare that prevailed in the Angami region of the Naga Hills in the pre-British era reduced the pool of cultivable land by making so much of it too risky to cultivate, and provided a strong incentive to intensify land use near the protective fortifications of the villages. If security issues played a role in the development of the alder-based fallows in pre-British times, then the continued hostilities that have prevailed post-independence have probably also played a role in preserving them – by continuing Nagaland's isolation and delaying expansion of market forces, leaving an economy still based on subsistence agriculture. As long as Nagaland remained a battleground, outside markets were inaccessible, and the rural population prioritized security in food grains. These ramifications were magnified in Khonoma, where the independence movement was born and A.Z. Phizo became known as the 'Father of Naga Nationalism'. Now that peace finally prevails and Nagaland is opening up to the outside world, the changes that have been held at bay for so long are gathering pace quickly.

Changes in Modern Khwünoria

Much has changed since the earlier era of land shortage that pushed Khonoma's ancestors to experiment with technologies that would allow them to cultivate their lands more intensively. The ravages of war and disease that, since 1832, accompanied Britain's increasing engagement in the Naga Hills, caused the first significant decline in the Naga population. The second major blow came with the outbreak of the Indo-Naga war in 1956, which claimed an estimated 300,000 Naga lives (Iralu, A., 2007). This toll is not yet finally ended, but now it is chiefly due to interfactional fighting amongst the Nagas themselves. Aside from war deaths, India's attack on Khonoma in 1956 scattered the village's population over a wide area and roughly two-thirds have remained outside the village. Many of those who did return had purchased wet rice land down in the plains to augment their ancestral lands in Khonoma, becoming absentee landlords of share-cropping tenants in the foothills and plains. The exodus from Khonoma continues today, but now it is the best and brightest that are leaving in search of better education and employment prospects. Most of those who do obtain a higher education aspire to office jobs and have no wish to return to farming. Indeed, education is seen as a passport away from the hard toil of village life. The flood of central funds into Nagaland has accelerated expansion of the off-farm economy and thus given enhanced scope to individual enterprise and choice. Land is no longer so vital to either their food security or identity. The old insistence that they must be self-sufficient in their own food needs is rapidly being replaced by the pursuit of cash, a portion of which can then be used to buy cheap rice from the plains. The sum effect of all of this is that while Khonoma's resident population has dwindled to about half of its former size, it now has significantly more agricultural land at its disposal (from purchases), but a much reduced reliance on that land as villagers increasingly participate in the growing off-farm economy. This has hugely alleviated cultivation pressures on Khonoma's land. The land scarcity that, centuries ago, had been the impetus for the alder fallows has faded into history.

The social organization of Khonoma's people was equally transformed by the changes that swept across the Naga Hills. The Western style of administration and Christianity brought by the British were the first powerful agents of change, followed soon by education. As Nagas began emulating Western culture, their own traditional values and institutions quickly faded from popularity. This acculturation process was interrupted when the British administrators departed in 1947, the missionaries were expelled by India in 1955, and Nagaland became isolated as a war zone the following year. Although there has still not been a political settlement between Delhi and the Naga dissidents, a series of ceasefires has gradually improved the peace and security situation since the 1990s.

Now that the guns have fallen (almost) quiet, the state Government has been trying to market Nagaland as a tourist destination with unspoilt mountain scenery and exotic people. A search of the Internet reveals that many Indian tour companies are now advertising Nagaland destinations. Khonoma is touted as one of the major attractions – given its historical importance, the rugged beauty of its landscape, and that it is only a 45 minute drive from Kohima. Interestingly, the alder fallows are being promoted as a special attraction for ecotourists. To enhance its appeal, the state awarded Khonoma funding under a "Green Village Project", aimed at making it into a model village for ecological sustainability. The project is supporting improvements in the village's infrastructure (roads, latrines, tap water), promoting the use of gas for cooking (to reduce the number of trees cut for firewood), and most curiously, requires that the roofs of all Khonoma houses be painted green! A few of the village's absentee population are busily refurbishing their old ancestral houses that had been left empty, with the intention of opening them as guest houses. The previously omnipresent soldiers are slowly being replaced by tourists clutching Indian rupees and US dollars.

However, the flow of human traffic is moving in both directions, and Khonoma's own people have become more outward-looking in engaging with the outside world. Students are increasingly leaving the state to pursue higher degrees elsewhere in India, and have more career options after graduation. Some who have relocated to Kohima now engage in petty trading, flying – for example – to Bangkok to buy the latest clothing fashions at cut-rate prices and bring them back to resell at the local markets. Even for ordinary villagers, who can neither afford travel costs nor leave their farms unattended, visits to more affluent relatives in Kohima or Dimapur often expose them to tales of foreign places. Satellite dishes have become common amongst the urban wealthy, and images from the BBC or CNN may well be glowing on a television screen in the background. Internet cafes that have sprung up around Kohima in the past few years are usually full of young Nagas surfing the web and contacting distant friends. Although there were no functioning telephones in Khonoma during the time this study was undertaken (December 1999 - December 2002), I now hear stories of farmers going to the jhum fields with cellular phones in their back pockets (Iralu, A., 2007)! After the lengthy isolation of almost half a century imposed by the Indo-Naga war, the current pace of modernization is almost dizzying.

Exposed to so many outside influences, Khonoma has changed to the point that it no longer bears much resemblance to the village portrayed in historical accounts of Angami society (chapters 3-5). The loss of old beliefs and customs that Hutton lamented in his prefaces to both editions (1921 and 1969) of *The Angami Nagas, With Some Notes on Neighboring Tribes* has accelerated since Nagaland began opening up. This is particularly extreme in Khonoma because of its close proximity to the state capital, Kohima, and now potentially because of the added effects of tourism.[1] The old days when all villagers had a similar package of resources at their disposal and earned a similar standard of living from tilling the soil are now gone. The arrival of a capitalist economy has brought with it increased social division of labor and wealth stratification. Khonoma's large absentee population increases the circulation of capital, with funds initially being sent out to pay for children's studies and later, after they graduate and find jobs, returning as remittances. The traditional feasts of merit that once redistributed local wealth disappeared with the arrival of Christianity, so there is now a meagre social safety net left to assist those who are less successful in the new market economy. The former communal ethos has been replaced by a growing individualism as each pursues personal advantage. The wider welfare of the clan and village are now given less consideration in individual decision-making because they are no longer essential to their security and prosperity. Instead, attending the right schools and church, or nurturing relationships with people in high positions, are now likely to be more important to building one's economic future.

The discontinuation of feasts of merit has also meant that the Angami can no longer earn the right to decorate themselves or their houses in particular ways to symbolize their prestige. Demonstrating one's material wealth has become the new way to earn the respect of society, perhaps by constructing an imposing concrete house, hiring servants, buying electrical appliances, or installing a satellite dish in the front yard. The knowledge and skills needed to prosper in this new economy are vastly different from those once taught by their elders in the morungs. A young village maiden is now more likely to be interested in a scholar with good job

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[1] Tourism can act as a double-edged sword in terms of its cultural impact. Tourists, some of whom might remain in the village for extended periods and develop long-lasting personal relationships, influence their hosts by the ideas, behavior, and the material possessions that they bring with them. History has shown that Naga villagers typically view Western visitors as more advanced and try to copy them, casting aside their own beliefs and customs in the process. Alternatively though, visitors' interest in Naga history and customs can help trigger a cultural renaissance, in which Nagas may take a renewed pride in their past. Tourism may, therefore, provide a strong economic incentive for taking steps to preserve elements of Naga culture.

prospects, a successful businessman, or a young man driving a new 4-wheel drive truck, as suitors who might offer her a more secure future. There is little place now for the skills of a warrior, and in many ways, the world of the Angami has been turned upside down. Those with the aptitude and skills that would have made them great leaders a few generations ago now find themselves irrelevant and ill-equipped to cope in the new society. This has struck a severe blow to the legendary Khonoma pride (moshu), and some have sought solace in excessive drinking.

Even though the Khonoma male's former role as a proud and feared warrior is now redundant, the strongly genderized ethos that was part of that era still lingers. While women remain as the main farmers, the men have become the main participants in the growing off-farm economy. Women's burden has become heavier because their children, who formerly helped them in the fields, are now occupied with their studies. Not only has their labor been lost, but they also require money to pay for their student fees. Hence, the household economy as a 'family farm' has come under increasing stress.

Prospects for the Agrarian Future

These final paragraphs are being written some years after completion of the fieldwork. With hindsight, it is clear that the study was almost too late to document the intricate system of alder management that Khonoma's ancestors perfected over the centuries. At the time of the fieldwork, the historical land use pressures that had given birth to the system had long since disappeared. Now the system itself is in rapid retreat. That there was a considerable delay between the two is due to the warfare and political upheaval that gripped Nagaland over the past half-century. We can only speculate that, if back in the early 1950s, T. Sakhrie and other voices of moderation had been successful in averting the Indo-Naga war, then the alder fallows would likely have been transformed years, even decades ago, into some other type of land use.

Now that some semblance of peace has returned to Nagaland, market forces are rapidly transforming its farming systems. Earlier chapters have already described how the need for cash has prompted a shift away from subsistence cereals to vegetables and other cash crops that grow well in cool mountain environments and enjoy strong market demand in the lowlands. With the revenue thus earned, farmers can buy rice from the plains more cheaply than they can produce it themselves.

But now, even intensive market gardening is coming under pressure as the supply of agricultural labor dwindles. This is likely to be a long-term trend. As more of Khonoma's youth migrate to urban areas to pursue better opportunities, they are leaving behind an aging population to cultivate their ancestral lands. Few of those who grow accustomed to an easier life in the towns and cities are likely to ever return to work seriously in the fields. Even those who do remain in the village, particularly the men, are diverting more of their time to off-farm activities. In the past, it was considered unimportant to educate women because they were expected to devote their lives to raising families and tending their husbands' fields. Now that girls are often outperforming their brothers in the classrooms, it raises an interesting question of how much longer women – who have long been the backbone of Khonoma's agriculture – will be satisfied to spend their days toiling in the fields.

The scales have thus tipped in Khonoma, from the historical situation of acute scarcity of agricultural land, which originally spawned the alder fallow system, to one of labor scarcity. This is encouraging less labor-demanding land use systems that produce saleable products. There are already strong indications that Khonoma will follow the evolutionary pathway of neighboring Himalayan areas that have preceded it in entering the market economy. This trend is being accelerated by extension efforts of several government agencies and the Canadian-supported NEPED project that are all promoting perennial cash crops. About 50 farmers joined together in 1999 to form the Khonoma Tea Plantation and Agricultural Society, under which each planted 500-1000 tea seedlings, often into alder jhums. Others are experimenting with passion fruit, chayote, ginger, turmeric and kiwi fruit under an alder canopy. Most significantly, since 2002 large cardamom has surged in popularity and every year, it is being planted under increasing areas of alder jhums. Cardamom prices have remained high in recent years, and it fits nicely with the "low volume - high value - low perishability" criteria needed for products from remote mountain environments. If this trend continues, then jhum cultivation may disappear completely as all of Khonoma's drylands will be converted into cardamom plantations. Other major cardamom-producing areas that use alder as a canopy tree, such as eastern Nepal, southern Bhutan, or Sikkim, may thus provide an accurate forecast of what Khonoma will look like in another 10 or 20 years. This reliance on monocrop plantations places farmers at risk of market volatility and outbreaks of insects or disease. Already, some of the cardamom suckers brought into the village were discovered to be diseased and had to be quickly uprooted and destroyed before the problem could spread (Yaden, 2007). As cardamom plantations continue to expand and jhum land becomes unavailable, this may also have a domino effect by pushing vegetable cash cropping down into the rice terraces on the valley bottom. This might see Khonoma's agrodiversity dwindling to a handful of cash crops that it can produce most competitively, and more and more of its rice needs will be purchased.

There are, of course, any number of external events that may alter Khonoma's agrarian future and prove these predictions to be completely wrong. The movement from subsistence to cash crops can obviously work in both directions. If there is renewed fighting, price crashes, or other market disruptions, then the Nagas may revert to traditional practices that prioritize food security and do not rely on external markets. Political and social events in the state and national capitals will also play a role in influencing what happens in Khonoma's fields. If, fueled by continued massive funding from central Government, Kohima continues its frenetic growth, then its urban sprawl may eventually spill over onto Khonoma's territory. As a suburb of the state capital, more of Khonoma's people would probably work in the off-farm economy and there would be less agricultural pressure. Alternatively, if Delhi decides that Nagaland has become too much of a burden on its national budget and cuts back on its grants, then Kohima's bubble economy may quickly burst and many of those that have grown dependant on government largesse might be forced back to the land to earn a living.

Khonoma and the world beyond Khonoma

This thesis has demonstrated the dynamism and complexity of upland livelihood systems, and shown how changes to any one component invariably have repercussions on the others. Shortage of land suitable for agriculture is a recurring theme that has driven many of these changes. Management of dispersed alders in jhum fields is only one of many strategies for dealing with that. Most notably, we find that Khonoma's own ancestors also innovated a parallel pollarding system with *Albizia stipulata* in the wet rice terraces. This invokes many of the same questions that we have posed about alder. *A. stipulata* is common throughout Nagaland at altitudes up to 1500 m asl and most farmers recognize it as soil-building. So why did Khonoma learn to manage it more systematically than its neighbors? What was it about Khonoma that fostered such innovation in managing trees on its farmscape? Both of these N-fixing trees appear to be parts of a wider strategy of response to shortage of agricultural land. The extent of farmer knowledge logically depends on how much reliance they have on that particular knowledge. With a burgeoning population on a limited land base, Khonoma was forced to find ways to intensify land use. Both *Alnus* and *Albizia* were biological tools that farmers learnt how to manipulate to get more from their land.

But more than useful trees were being lopped. Within the turbulent Naga Hills, Khonoma was notorious for lopping heads in smaller villages that refused to submit and pay tribute. Nineteenth-century British officials saw a direct causal link between Khonoma's infuriating habit of raiding other villages and its land shortage. Within this village of "trouble-makers", Merhümia khel was considered to be "the worst disposed of all Naga clans against the British" (Yhome, 1881, 32). Not only was Merhümia khel land-short, but it was also handicapped by cooler temperatures that reduced its rice yields leaving a wider deficit that had to be satisfied by other means. Of course, it was these same cool, moist conditions that proved ideal for alder and led to its intricate management as a fallow species. It was largely the belligerence of the so-called "Khonoma Group" that eventually forced British India to annex the Naga Hills in order to pacify them and bring an end to Naga raids on British subjects in the Assam plains. In that sense, the land shortage of this single village was instrumental in changing the course of history of the entire Naga Hills.

When the British did succeed in imposing law and order and Khonoma found itself no longer at liberty to bully resources from its neighbors, then it turned to trading, stoneworking, carpentry and other trades to supplement its agricultural activities. The need to travel as traders brought exposure to new ideas that were to have a huge impact on the village's view of the world and its role in it. It developed notions of identity and national status, ultimately leading to the birth of the Naga separatist movement in Khonoma and the 58 years of warfare that followed (1947-present) (Iralu, 2003).

The dynamism of upland farming systems raises questions about whether describing them as "traditional" holds any currency at all. The only thing constant about them is change. The pace of this change has accelerated over the last 15 years as fighting has lessened and the cash economy has crept into the Naga Hills. The wet rice terraces and jhums that have long been the two main pillars of Khonoma's strategy for feeding itself are undergoing seismic changes that throw their very future into question. These changes will have huge implications for the village's social organization.

For centuries, their rice terraces have given the Angami and Chakhesang an important advantage over other Naga sub-groups. Rice was synonymous with food security, and the terraces could be counted on to provide a crop every year. Those irrigated by reliable water sources were less vulnerable to the vagaries of weather. Villages well-endowed with terraces were assured of full granaries, even before they began clearing their jhums. This was in contrast to other Naga subgroups whose total crop needs relied solely on their jhum fields, and the timely arrival of the monsoons. The Angami and Chakhesang thus chose their village sites not only for defensibility, but also their suitability for rice farming. The wet-rice terraces that later evolved anchored them to these favorable sites and ensured the permanence of the villages. Their consistent yields allowed the villages to grow large and become a military threat to their neighbors. When the British were forced to mount expeditions into the mountains to exact punishment for Naga raids on their subjects in the plains, their targets were invariably these large Angami and Chakhesang villages supported by extensive wet rice terracing. And when the British burnt down these offending villages, it was a much more severe blow than when other tribal groups, with more temporary villages, suffered the same penalty. The more temporary dwellings could be rebuilt in days; this was not so for the large Angami and Chakhesang houses, with their arrays of animal skulls and elaborately carved front boards, posts and horns that had been built over lifetimes of feast-giving and displayed the ritual status of their owners.

The daily lives, festivals and rituals of these villages were inextricably interwoven with rice production. The common perception was that as long as there was sufficient rice and salt, life could be sustained (Kikhi, 1997). Paddy was not seen as a saleable commodity, but rather surpluses would be stored as a source of wealth and prestige. Some households in Viswema village, for example, are reported to hold paddy in storage that was harvested up to 40 years ago (Kikhi, 1999). Many villages prohibited the sale of rice outside the village to safeguard their food security. Despite rice now being readily available, many Naga villagers continue to view self-sufficiency in rice production as a security imperative. They see the lowlands as unpredictable – subject to flooding and other natural calamities, political upheaval and war – and are reluctant to rely on them for their rice staple. This sentiment can only have been reinforced by the turbulence that has reigned in the Naga Hills since the departure of the British. Caught in a drawn-out war and cut off from the outside world, every villager had to prioritize feeding his own family. After half a century of this, this mentality of self-sufficiency is undoubtedly deeply ingrained.

Another variation of this security theme is an often-heard observation that while weaving baskets, stone masonry and outside work are all more profitable, the cash earned is fluid and easily spent, whereas a granary full of paddy is a solid asset that assures food security and peace of mind. Even a rich man cannot survive without paddy, they say. By producing their own paddy, they can survive any calamity and continue to feed their families. With that assurance, they can then search for other sources of cash to pay for their children's education costs, and to buy milk, sugar, tea and other modest household needs.

Some point to Khonoma's rice terraces as being the village's heart and soul. Their cultivation is a tradition that has been handed down from one generation to the next over the centuries. But an agricultural economist would probably recommend that it discontinue growing rice altogether, and instead convert the terraces to grow semi-temperate vegetables that thrive in cool mountain environments. These could be sold to lucrative markets in the lowlands and the returns used to purchase the villagers' rice needs. There is already a trend towards this that looks poised to grow if Nagaland remains peaceful and market linkages continue to strengthen.

Changes to the jhum system are even more advanced. This extends far beyond the shift from subsistence food grains to commodity crops that has swept across the cooler, southern jhum block. A village-wide survey found that about one third of Khonoma households no longer even open a jhum on a regular basis. Symptomatic of this decline, elders complain that the alder trees are often not managed properly anymore. Indeed, some trees are even being removed as construction of new houses encroaches into the jhum cultivation area. With more young people leaving the village in pursuit of education and job opportunities, the village's labor force is dwindling and many households can no longer cultivate the same amount of land that their forefathers did. Pressures on land are decreasing. Since most jhum land in Khonoma was long ago claimed by individual owners and boundaries are well recognized, it can be left uncultivated without much danger that others will encroach or contest its ownership. But jhum cultivation needs a critical mass of practitioners synchronizing their activities in order to organize the communal labor that they rely on for clearing access paths, guarding against wildlife damage, and excluding free-ranging livestock. This now appears in danger of breaking down. The recent explosion of cardamom plantations suggests that Khonoma is following the same trajectory as other areas in the eastern Himalayas where market linkages have transformed shifting cultivation into perennial cash crops under an alder canopy (Cairns et al., 2007, 370-371). If present trends continue, it is doubtful if jhum cultivation will continue to be practiced in Khonoma, 25 years from now. Its disappearance is being accelerated by numerous state programs assisting farmers to adopt perennial cash crops. Fertilizer subsidies further undermine farmer incentive to manage soil-building trees. The only substantial book published specifically about shifting cultivation in Nagaland recommends "The chemical fertilizers should be provided at highly subsidized rates and the quantity and timing of their application should be adequately supervised by the experts of agriculture." (Husain, 1988, 183). Further comment would be superfluous.

These changes in the agricultural systems have been accompanied by equally large adjustments to the social organization of production. Hutton drew attention to the early stages of these in a 1945 speech addressing the challenges of reconstructing the (then) Assam Hills from the ashes of WW II. Besides fueling inflation, Hutton noted that intensified flows of cash "shifted influence and social leadership even in remote villages from the more or less hereditary guardians of custom and tradition to a younger generation of nouveaux riches, often sophisticated, and both ignorant and scornful of tribal tradition" (1945, 2).

Increasing access to education is itself an issue that will continue to have powerful implications for how land is managed in the future. Most who go on to higher studies have no intention of returning to the fields, but aspire to easier and more lucrative office work – what Mills described as "sitting-and-eating jobs" (Mills, 1932, 4). But most are returning to Nagaland with Bachelors- or Masters-level degrees in the Arts that have little demand in the work force. They are equipped for neither the fields nor the civil service that continues to do most of the hiring. This is costing the villages many of their brightest young minds and their labor. Those left behind have to search for less labor-intensive ways to manage their ancestral lands.

These trends appear set to intensify if peace prevails in Nagaland and it continues to shed the isolation imposed by half a century of fighting. As noted above, the state government is now enthusiastically promoting tourism – and already a tourist lodge is under construction and locals are offering their services as guides. Meanwhile, the migration from villages to the state capital is fueling rapid growth in Kohima. The resulting urban sprawl has already pushed into next-door Jotsoma village and, as I said above, Khonoma may also eventually find itself as a suburb of Kohima. As the off-farm sector continues to grow and provide easier ways of making a living, one suspects that the rich indigenous knowledge and agrodiversity underlying Khonoma's farming systems may be in grave danger of disappearing.

Implications for the Debate on Shifting Cultivation

It was because Khonoma stood out as an intriguing exception to the widespread trend of collapsing swidden systems that my interest was originally aroused to probe more deeply for an explanation. That led to the fascinating intellectual journey, described in this thesis, along which I explored the cultural ecology of this historic Angami village and documented its remarkably effective use of alder as a managed fallow species. I have argued that the intensification of land use permitted by the alder was so great that Khonoma had in fact used it as a “bridge” to make an effortless transition from shifting to permanent cultivation.

Alder should not be viewed as a panacea that can fix all of shifting cultivation’s woes, but the underlying concepts of the dispersed tree system should have wide application to other N-fixing trees in other environments. It is a promising addition to our basket of options for dealing with degrading swidden environments. Khonoma demonstrates convincingly how this technology can help absorb growing populations and thus divert pressures to clear more forests for agricultural use. This innovation was virtually forced on Khonoma in that only a limited area of the village’s rugged terrain was suitable for agriculture. But it is interesting to ponder if and how other villages, that have not yet reached a crisis point, might be persuaded to emulate Khonoma’s experience. By adopting this system on their best jhum land, the resulting intensification of land use should enable much of their remaining land to be set aside from the jhum cycle and conserved as forests. Done on a wide scale, this could have a dramatic impact in stabilizing swidden systems and rehabilitating the damage that has been done by swidden degradation.

Beyond management of alder, this case study demonstrates the importance of understanding historical influences on land use, linkages with other on- and off-farm components of the wider livelihood system, and other contextual factors that help shape shifting cultivation. It cannot be analyzed in a vacuum. Indeed, the most effective solutions for taking pressures off jhum lands may not lie within agricultural fields at all, but perhaps in improved farm-to-market roads, better access to education, or other attempts to diversify the economy.

Given that the depth of farmer knowledge usually reflects how much dependence they have on that particular knowledge, we can conclude that *Alnus nepalensis* has historically played a central role in Khonoma’s economy. But the use of alder as an improved fallow species is not unique to the Nagas. Many other upland minority groups in the eastern Himalayan foothills plant alder in their swidden fields (Cairns et al., 2007, 342-345). These alders are not pollarded as in the Naga system, but completely cleared every time the fallow is reopened and then replanted in a taungya pattern. This implies both wide farmer consensus on the value of alder and that its use in managed fallows is not overly site-specific. Yet one of the perplexing questions left unanswered by this study is why, amongst this wide community of alder users, was it only the Angami Nagas that learnt pollarding techniques and were thus able to reap the benefits of retaining the same trees over successive cycles?

The findings of this study provide strong justification for turning upside down the conventional argument that swidden landscapes are forestal lands periodically despoiled by shifting cultivators. Rather, these lands should more accurately be considered as agricultural lands on which farmers often intentionally encourage trees to grow on a cyclical basis as an integral phase of a sustainable farming system. This dramatically recasts the role of shifting cultivators from "wanton destroyers of forests" – to one of "forest planters and managers". When food crops are rotated with viny legume green manures to rebuild soil fertility, we have no hesitation in heartily endorsing it as a sustainable system of permanent cultivation. We would consider them to be progressive farmers and tour groups would beat a path to their doorways to learn from their expertise. So why should our attitude change to one of such negativity if, to accomplish the same results, farmers instead choose to substitute the viny legumes with nitrogen-fixing trees or any other woody regrowth that provides both soil rehabilitation and needed wood products? Is it any less of a permanent land use system? There is something very emotive and not quite logical when trees become involved. It no longer fits our binary belief that land must be either agricultural or forestal, and never the twain shall meet.

Unfortunately, something much more sinister can transpire when trees become involved. Although we should applaud shifting cultivators for nurturing trees on farm land, the dividends for them have been nothing less than tragic. Officialdom seldom recognizes forested fallows as agricultural lands, but rather, incorrectly categorizes them as state forests or wastelands. These lands are then appropriated by the state. At the stroke of a pen, they become forests that need to be protected from the very farmers that nurtured them. This single policy debacle is key to swidden degradation, loss of food security and growing poverty in the uplands. Denied access to their fallowed lands reduces shifting cultivators to landless poor and guarantees the collapse of their farming systems and very way of life. They become paupers on their ancestral lands, not because of any weakness inherent in shifting cultivation, but because of wrong policies. Case studies of successful farmer innovations, such as this thesis, highlight the need for renewed interest in traditional systems of agriculture. Furthermore, this study strengthens arguments that upland farmers can capably manage their resources and that customary tenure should be recognized and formalized by the state.

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THE ALDER MANAGERS:
THE CULTURAL ECOLOGY OF A VILLAGE IN NAGALAND, N.E. INDIA

PHOTOGRAPH GALLERIES

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CHAPTER 1

Introduction: How the Research Trail Led to the Naga Hills

PHOTOGRAPH GALLERIES

SHIFTING CULTIVATION ACROSS ASIA-PACIFIC AND ITS PRACTITIONERS

Plate 1-1. A Hanunóo girl in southern Mindoro, the Philippines, moves gingerly through her swidden, harvesting rice with a finger knife. It was Conklin's pioneering work on Hanunóo swiddening (1975) that began to foster wider awareness that there is much more to shifting cultivation than the mindless destruction of forests of which it is accused by its critics.

Plate 1-2. Further to the south, on Palawan Island, a Batak farmer also harvests her swidden. Like many shifting cultivators, the Batak are unable to grow enough rice to last throughout the year and endure a “hungry season” of several months before the next harvest is ready.

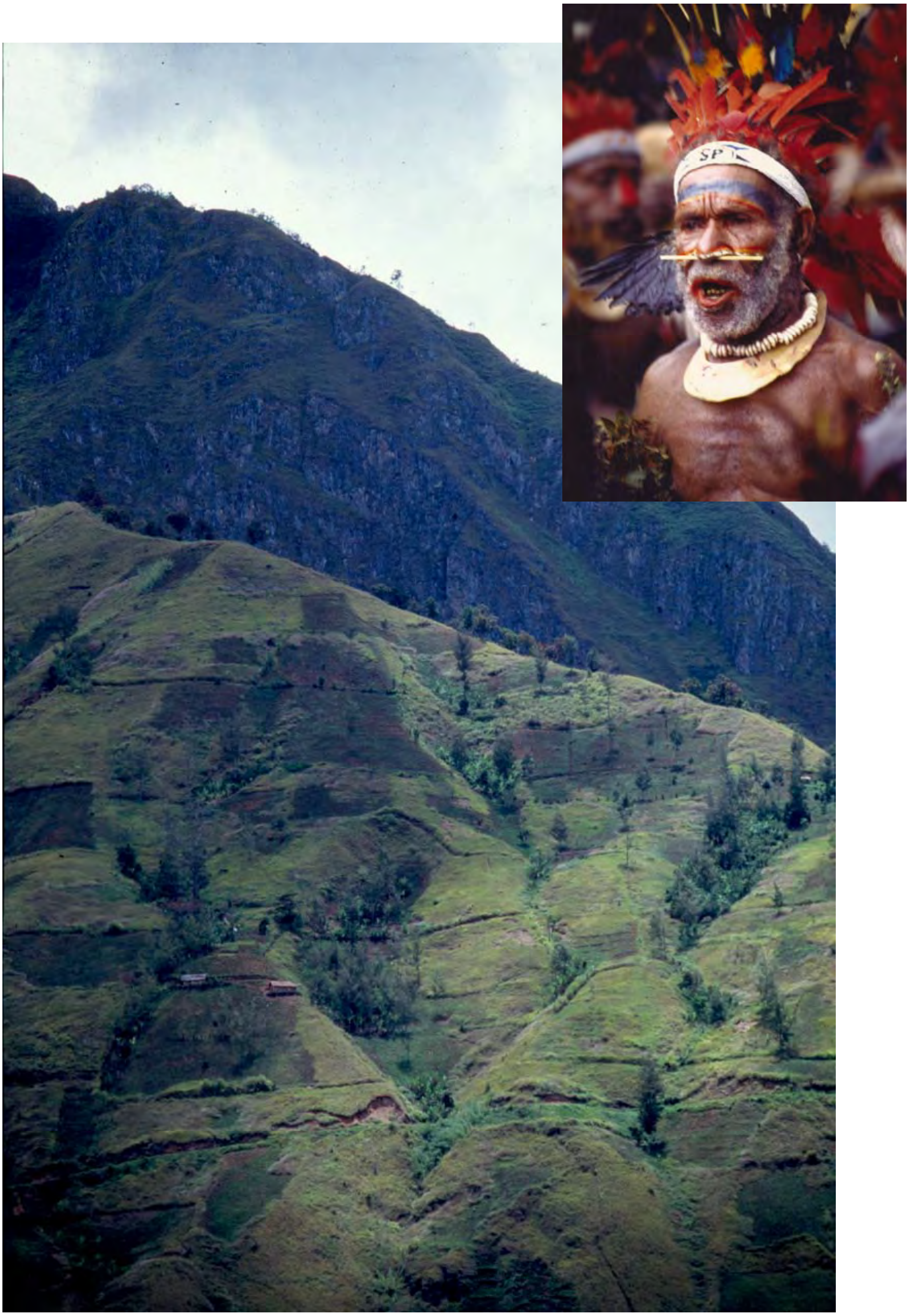
Plates 1-3 – 1-4. Batak swiddens are small patches carved out of the forest. The seed rain from the surrounding trees ensures that the forest springs back quickly after a single year of cropping. (See plate 1-38 for contrast.) This village is actually within the boundaries of the St. Paul Subterranean National Park, south of Puerto Princesa, but at such low population pressures, it is arguable that the Batak should be viewed as an integral part of the local ecosystem and not a threat to the park's conservation objectives. In the inset photograph, a Batak woman harvests her rice swidden.

Plates 1-5 – 1-6. This photograph in Nagaland's Zunheboto District is typical of many montane areas in South-Southeast Asia, where shifting cultivators work together in clearing entire mountainsides for cultivation. The spacing of field huts provides an idea of how much land is being managed by each household. Although the disturbance of the forests is obviously a quantum leap above the previous Batak example, pioneer trees will still reclothe the hillside as long as the cropping phase is no more than two years and the fallow phase no less than ten. The inset photograph shows a member of the Sema tribe that populates Zunheboto District.

Plate 1-7. Cultivation reaches a ridge-top in Mongar, central Bhutan, followed by a trail of fallows further downslope.

Plate 1-8. As fallow periods shorten, the labor needed for weeding increases. This Mang Khong (Lao Theung) villager in southern Laos will have to weed her rice three to four times before harvest in October. Weeding is the most labor-intensive task, and the area of land that each family clears for cultivation each year is determined by how much labor it has available for weeding (Amarathithada et al., 1990, p. 79). The productivity of these swiddens is low and provides sufficient rice for only two to six months of the year. (Photograph taken at Ban Alang Nyai, Sepone District of Savannakhet Province, Lao P.D.R.)

Plates 1-9 – 1-10. In the same Mang Khong village, this swidden uses a bomb crater for planting water-loving *Colocasia*. This area was heavily bombed during the American secret war against Laos and unexploded ordinance remains a serious threat to farmers (see SUAN, 1991). The heat of swidden fires often detonates such unexploded bombs, prompting the new term "slash-and-boom". In the inset photograph, local villagers stare curiously at a passing group of researchers.



Plates 1-11 – 1-12. About 43% of Papua New Guinea's 6 million people live in the highlands above 1200 m asl (Bourke, 2007). They grow sweet potatoes, Irish potatoes and vegetables in food gardens and depend on fallows of 3-15 years to maintain soil fertility. Pigs are reared in large numbers. Trees are often scarce in highland valleys because of the demand for firewood and timber to build fences around the gardens to exclude the pigs. Native forests on hillsides have continued to retreat and fallow regrowth is often mixed stands of shrubs, *Imperata* and *Miscanthus*. The Chimbu villager in the inset was dressed up for a fund-raising effort at the Goglme Catholic Church.

Plates 1-13 – 1-14. A grass-fallow system, known locally as 'pangshing', is practiced at elevations of 2500 to 4000 m asl in Bumthang district, Bhutan. As shown in the main photograph, the fallow vegetation in this cool temperate zone comprises short grasses, sedges and forbes, interspersed with blue pine (*Pinus wallichiana*). These lands are an important source of grazing for cattle during the 15 to 20 years that they are left in fallow. This workgroup is preparing to reopen a pangshing fallow. They will begin by cutting the topsoil with hoes to a depth of 5-7 cm and then allowing it to dry for several months. The dry topsoil will thus be collected in conical mounds about 2-3 m apart, creating between 1200-2500 mounds per hectare (inset). Small quantities of fuel, consisting of dry manure or blue pine needles collected on site or imported from nearby forest, are added to each mound. After the fire is ignited, the organic material in the mounds will burn slowly for several hours, reaching temperatures of 500ºC or higher. Buckwheat seeds are broadcast in April and may be covered by either a bullock-drawn plow or a hand rake. This burning of the topsoil increases pH, improves both K and P availability, and reduces the C/N ratio. Its major disadvantages are that it is labor-intensive, there are high gaseous losses of N and C, and the soil is left highly exposed to erosion (Dukpa et al., 2007).

Plate 1-15. Another innovation in response to shortage of fallow biomass is practiced by the Khasis around Shillong, Meghalaya. It is found at cooler altitudes above 1500 m, where the vegetation consists of sparsely-distributed pines (*Pinus kesiya*) with some shrub and herb undergrowth. The pine trees are not felled, but only their lower branches are pruned in December and the slash arranged in parallel rows running down the slope, and left to dry for several months. In March, soil is hoed on top of the slash, thus forming ridges alternating with furrows of compacted soil running down the slope, as can be seen in this photograph. The slash is burnt with slow controlled fires. Crops are then planted on the ridges, now enriched with nutrients from the fire. The compacted furrows running down the slope act as water channels and minimize the loss of nutrients that are concentrated in the ridges (Ramakrishnan, 2007).

Plates 1-16 – 1-17. Although seldom as visually striking as the dispersed alder system examined in this study, it is not uncommon for shifting cultivators to retain and manage useful trees in their fields. This swidden in Mongar, central Bhutan, for example, has retained *Ficus* trees as a source of livestock fodder. As fallows are managed and their economic productivity and/or biological efficiency enhanced, the lines are blurred as to what point they can no longer be considered fallows - and by extension, shifting cultivation ceases to exist. In the inset, an old man negotiates a deal at a Mongar market.

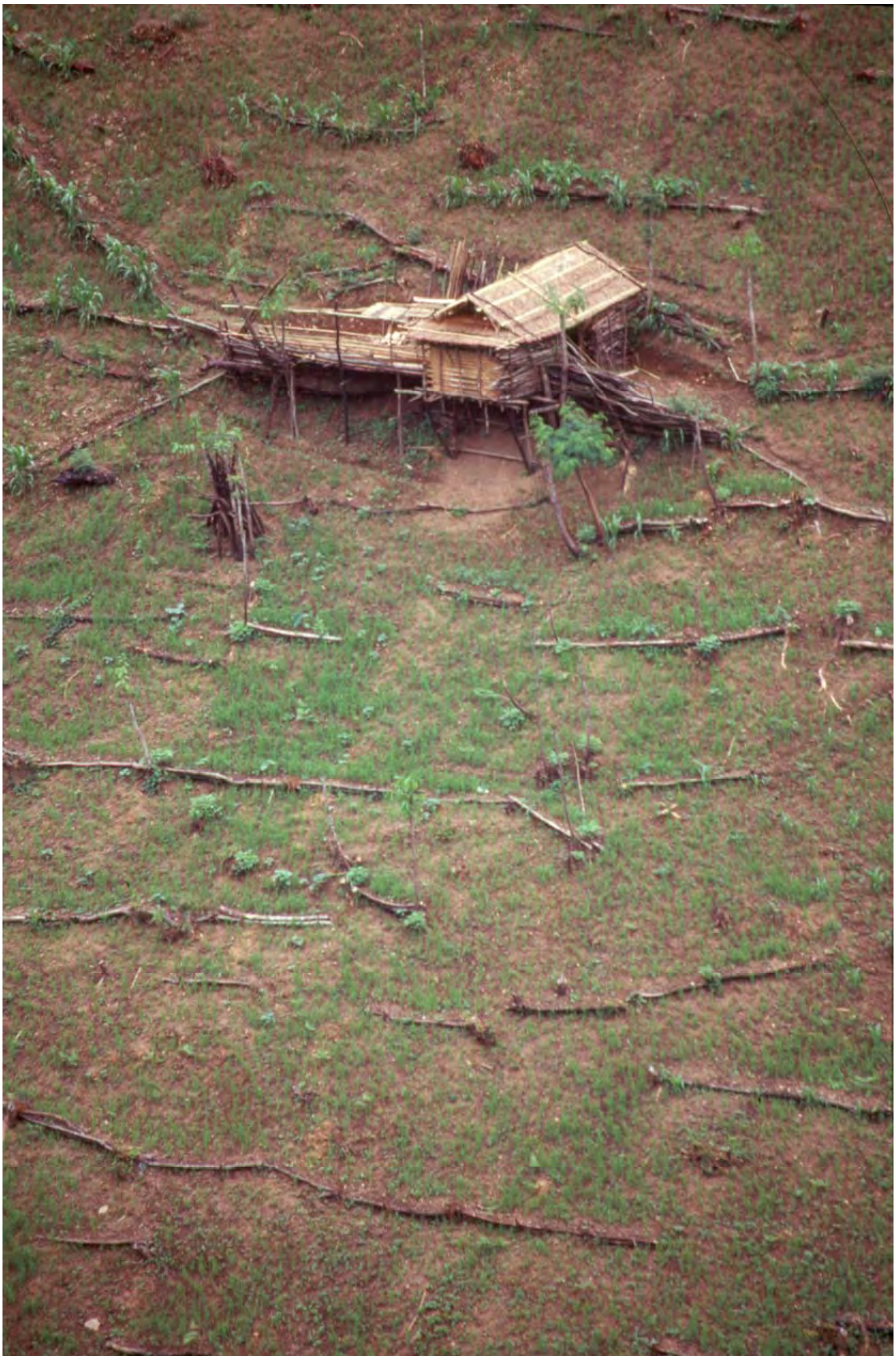


Plate 1-18. Shifting cultivators are usually keenly aware of the dangers of soil erosion, and take steps to minimize it, such as placing poles across slopes as shown here. When contour hedgerows, natural vegetative strips and other soil conservation techniques are trialed for their efficacy in reducing erosion, they should be measured against farmers' existing practices. Documenting farmer practices and building on them will be more effective than trying to parachute in new technologies from outside. (Photograph taken in Zunheboto District, Nagaland, N.E. India.)

Plates 1-19 – 1-20. Upland farming systems throughout the region often combine wet rice cultivation in the valleys with swiddening on adjacent slopes. The relative importance of each depends on the lay of the land.

On the right, Minangkabau farmers in West Sumatra, Indonesia, primarily cultivate wet rice in the central rift valley, but also grow dryland crops in bush-fallow rotations on nearby slopes (visible in background).

The emphasis is the reverse in the below photograph, where Lua' villagers in northern Thailand are primarily shifting cultivators but have taken advantage of the narrow valleys to carve out small pockets of irrigated terraces.

NOT ALL "SLASH-AND-BURN" IS SHIFTING CULTIVATION

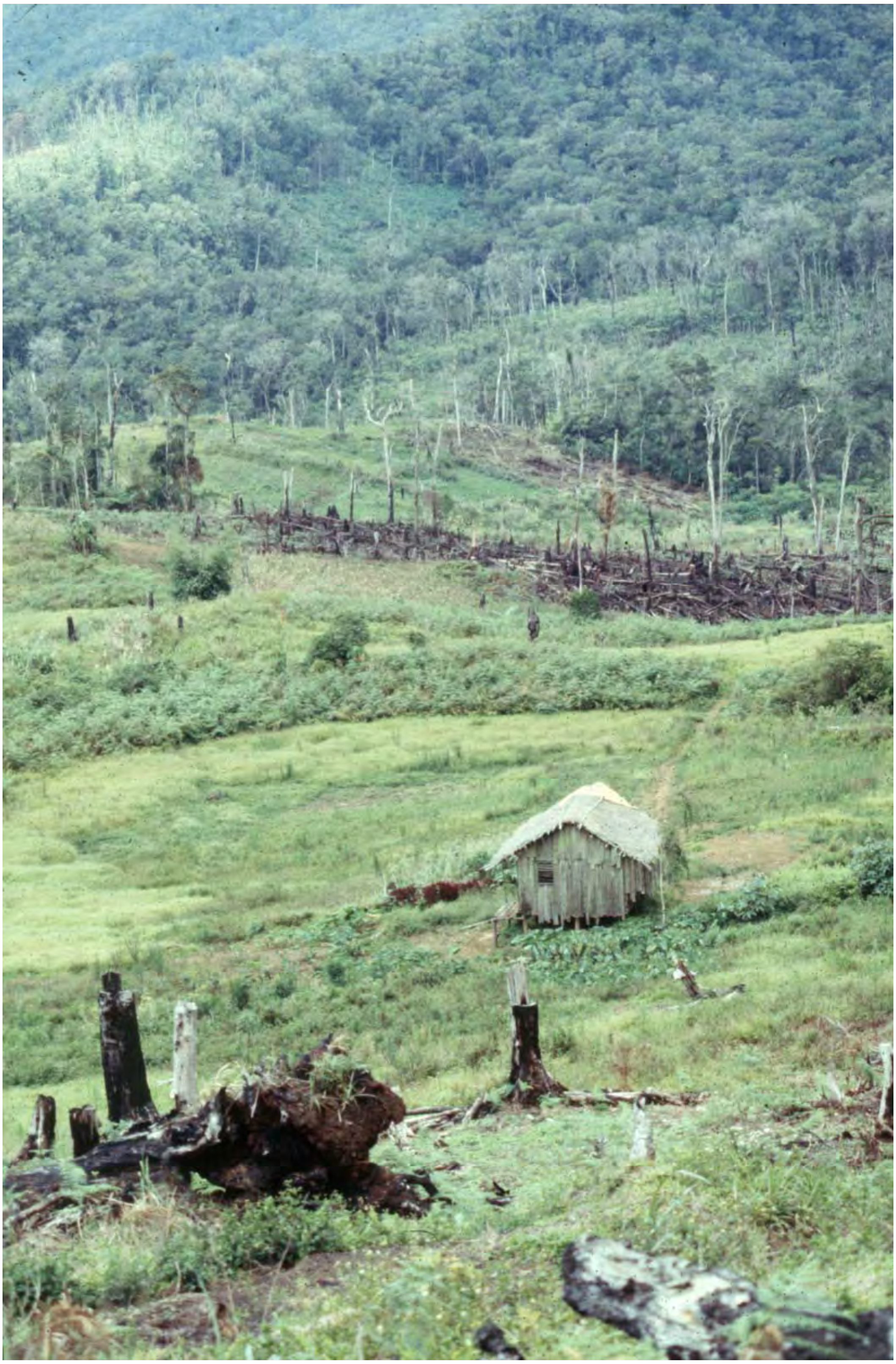
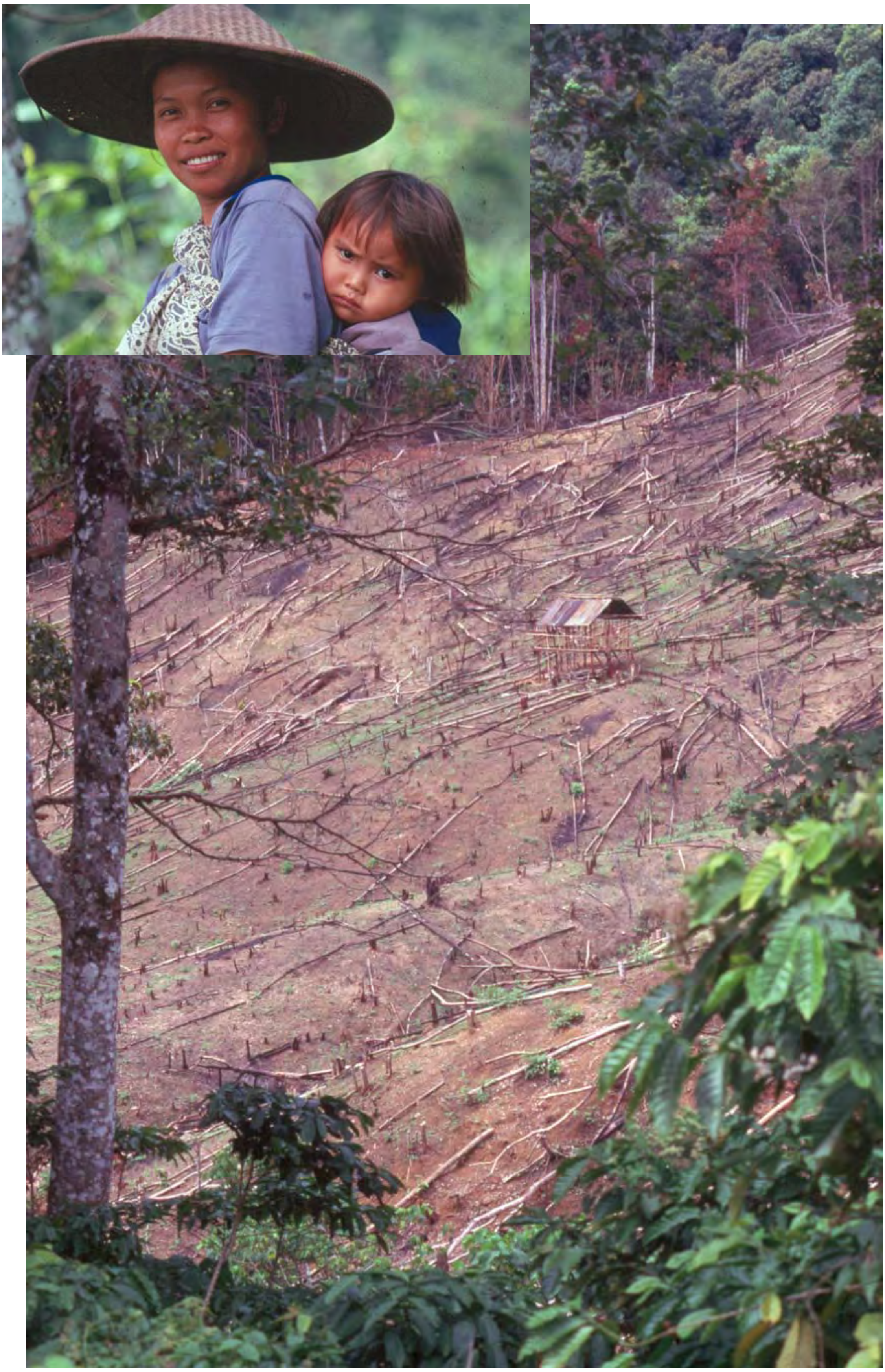


Plate 1-21. Agriculture continues to gnaw at Asia's forest margins. Shifting cultivation is often blamed on this deforestation, but often it is a case of immigrants from the lowlands using fire to convert the forest into permanent fields. They have none of the skills or knowledge that underlie the sustainability of rotational shifting cultivation, but are primarily interested in laying private claim to land from the forest commons. Some make it a business, securing ownership documents for the land, to sell it to speculators and then move on to repeat the process elsewhere. (Photograph taken in Bukidnon Province, Mindanao, the Philippines.)

Plate 1-22. While traditional shifting cultivators have indigenous expertise in farming mountain slopes, the same is not true of landless peasants from the lowlands that migrate upslope to the forest margins in search of land to cultivate. The lowland farming techniques that they bring with them are often unsuitable for sloping uplands. The damage caused by this group of migrant farmers should not be confused with shifting cultivation.

Plate 1-23. Many such migrant farmers in the Philippines are supported by shrewd financers, who lend them sufficient funds to pay for their personal needs and get the crop established. In return, the moneylenders will dictate what crop is grown – often potatoes, as shown here, or other crops in high market demand – and claim the right to buy the harvest at terms highly unfavorable to the growers. Despite this, the farmer will probably run out of money before the next planting season and have to return to the financer for another loan – repeating the cycle of exploitation yet again. This scenario does not encourage sustainable land management since the farmer has no legal claim to the land and thus little incentive to manage it sustainably, while the financer is only interested in maximizing returns to his investment. (Both photographs taken in the bufferzone of Mt. Kitanglad National Park in Bukidnon, the Philippines.)



Plates 1-24 – 1-25. Shifting cultivation is often used as a convenient scapegoat for almost any type of forest clearance. This newly-cleared field in Pasaman area of West Sumatra, Indonesia, could easily be mistaken for a swidden but in fact is being converted into a rubber plantation. In the inset, a Minangkabau mother pauses with her child on the way to the field.

SIGNS OF CHANGE IN AN AGE-OLD SYSTEM

Plate 1-26. After the world beat a pathway to the doorsteps of once-remote mountain villages, the social and environmental impacts have been swift and profound. Suddenly the quietness of the hills was shattered by new arrivals competing for land and resources that had previously been the sole domain of local villagers. This new access allowed the Dept. of Forestry to better enforce its claims that forested slopes were state land under their jurisdiction and villagers thus illegal squatters. Conservation groups clamored that remaining wildlands be gazetted as national parks and excluded from human use. Investors followed closely behind, searching for scenic locations to build resorts, golf courses, or plant fruit orchards. And landless migrants from the lowlands often followed the new roads in search of land to cultivate and claim as their own. All this has added immensely to the pressures on swidden lands. (Photograph taken in northern Thailand.)

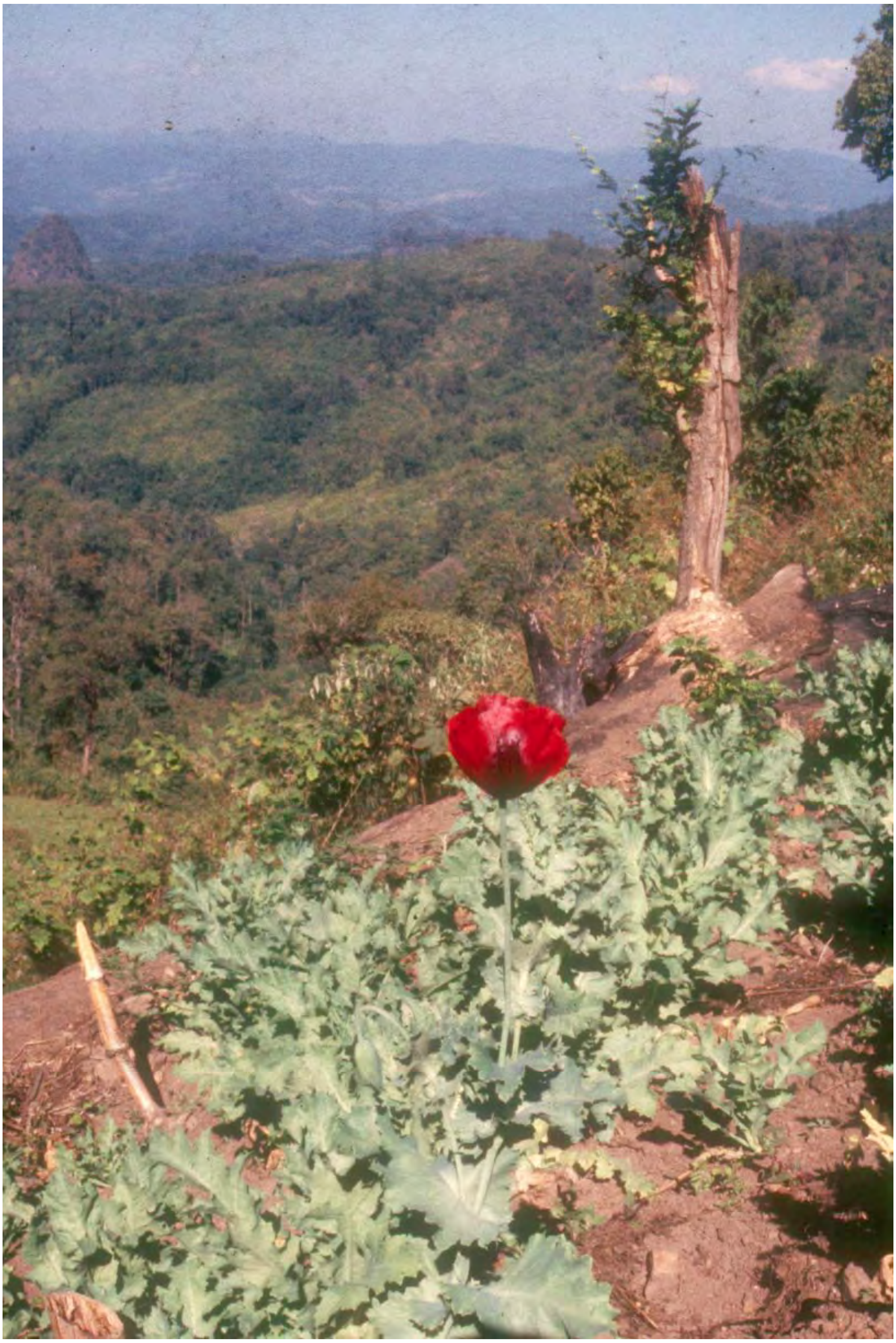


Plate 1-27. Many swidden farmers in the so-called "Golden Triangle" of Thailand-Myanmar-Laos had found the perfect cash crop in *Papaver somniferum* – the opium poppy. It fit all the needed criteria – high value, low volume, low perishability, opportunities for local value-added processing (into heroin), and insatiable demand from western markets. Small patches were sufficient to satisfy a family's cash needs. The only problem was that it was illegal. Although poppy eradication programs can certainly claim considerable success, there is little said about the impacts on environment and human health of the much larger acreages of cabbage, potatoes, garlic, fruit orchards, and other substitute crops that often need inorganic fertilizers, pesticides and herbicides as part of their routine management. Not only has this contaminated the waterways, but now many villagers suffer health problems from spraying chemicals without adequate protection.

Plate 1-28. The collapse of swidden systems often has disproportionate effects on the sexes. Men are most involved in the heavier work of cutting trees when fallows are reopened for cultivation. But the woody component decreases steadily as fallows are shortened – and trees eventually disappear completely from the system, replaced by shrubs and coarse grasses. There are no longer any trees left for the men to cut down.

But the impacts are quite the opposite for women. Theirs is the arduous task of weeding. The same shortening of fallow periods that removes the tree component also compromises the fallow's ecological role in controlling weeds. Weed populations thus explode – and women have to work much harder in trying to keep them under control.

Plate 1-29. A Kachin farmer near Myitkyina, in Myanmar, hacks at coarse grasses that survived the burn and are resprouting. A proper fallow would have suppressed such weeds, but failing that, additional human labor must now be spent in controlling them. This is symptomatic of a swidden system in decline.

Plate 1-30. The benefits of a good burn during field preparation are apparent in this photograph. Although weeds are springing up quickly on the newly-cleared land, the intense heat generated when this log was burning has killed out the weed seeds in the soil underneath and the ground remains bare. (Photograph taken in northern Thailand.)

Plate 1-31. As swidden cycles shorten, farmers have to invest increasing weeding labor to do the job that had previously been accomplished through fallow and fire. Many have turned to spraying saline solutions as a cheap method that is effective against broadleaf weeds, but not grasses. (Photograph taken in northern Thailand.)

Plate 1-32. As swidden fields become exhausted, some farmers switch from cereals to root crops that are more nutrient efficient under conditions of declining fertility. Cassava, as shown here, has the added advantage of being able to slow down the proliferation of weeds by creating a canopy that shades them out. When swidden systems come under pressure to intensify, a common strategy is to extend the cropping phase by planting the usual cereals during the first year or two, and then as fertility declines and weeds multiply, switching to root crops for several more years before finally leaving the land to fallow. (Photograph taken in Bukidnon Province, Mindanao, the Philippines.)

Plate 1-33. This is another example from northern Thailand of farmers continuing to cultivate their land in a bush-fallow rotation but as the fallow period declines, increasingly adopting techniques of permanent cultivation. Shifting cultivators generally do not till the soil prior to dibbling or broadcasting seed, but rather rely on fire to create a soft seedbed. Since the soil surface is not disturbed by tillage, this helps to reduce erosion on sloping fields. But this field has clearly been tilled, perhaps even by a tractor. As fallow periods are shortened, the reduced vegetative regrowth can only create a small burn when the field is reopened for cultivation. The energy from fire previously relied on to create a soft seedbed must increasingly be replaced with other forms of energy.

Plates 1-34 - 1-35. Cropped fields are usually surrounded by a patchwork of various stages of fallows, providing ideal habitat for pests. The photograph below (northern Thailand) shows severe destruction of the crop along the perimeter abutting bamboo regrowth.

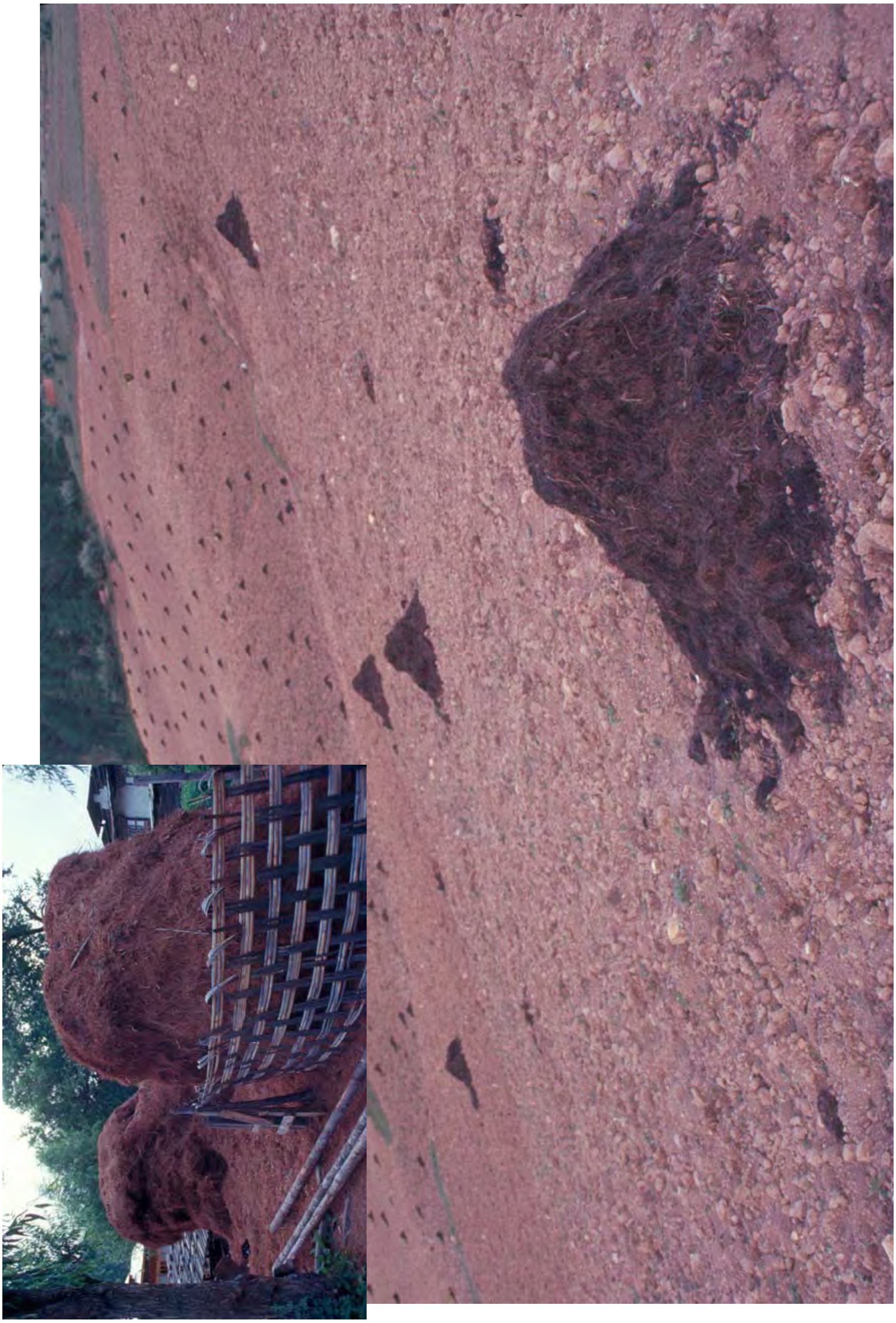
The photograph on the left (Bokeo Province, Lao P.D.R.) shows what appeared to be a vigorous maize crop – but closer inspection revealed that the rats had already stripped every cob clean. It is widely known by farmers throughout the region that famines often follow flowering of bamboo.

Plates 1-36 – 1-37. Frequent fires prevent regeneration of secondary forest on fallowed land and it instead becomes covered with a fire climax of coarse grasses and ferns. The inset photograph is of a young mother and child belonging to the Tala-andig tribe that counts this area as part of its ancestral domain. (Photograph taken in Bukidnon Province of Mindanao, the Philippines.)

Plate 1-38. Under continued pressure, forests retreat before expanding grasslands until they are reduced to small islands on hilltops. Given the low level of biomass produced, these grasslands will not regain much fertility, no matter how long they are left fallow. The extensive roots systems and rhizomes of grasses make them exceedingly laborious to remove when reopening a fallow and then keep under control while the crop is growing. If farmers can import nutrients into the fields to replace those lost, they may try to keep such land under permanent cultivation to keep the grass at bay. Otherwise, the alternatives are likely to be land abandonment, or conversion into grazing for cattle. (Photograph taken in hills above Loktak Lake in Manipur, N.E. India.)

Plate 1-39. A dismal maize crop in Clavaria of Misamis Oriental Province, Mindanao, the Philippines. There is typically an interim period – after land use pressures no longer permit adequate fallows but before farmers have compensated by adopting the new strategies needed to sustain permanent cultivation – when soils are degraded and yields plummet.

Plate 1-40. When you encounter farmers scratching at a tired piece of land such as this, there is no need for a survey to determine their economic status. The returns to their labor will be meager and they would not be doing it if they had any other choices. (Photograph taken in Tambon Wawi of Mae Suai District, Chiang Rai, Thailand.)



Plates 1-41 - 1-42. In cases where permanent cultivation is adopted and farmers can no longer rely on a fallow to rebuild soil fertility, they have to be much more judicious in recycling organic matter back to the fields. A typical example is shown in these photographs from Jakar, central Bhutan. Forest litter is carefully collected to first use as livestock bedding (inset). The resulting compost is then applied to the fields (main photograph). This obviously demands a lot of labor to collect biomass from forestal areas and relocate it to cropped fields where its fertilizing value is needed.

Plates 1-43 – 1-44. As these farmers in Ilam, eastern Nepal, work their way across the field planting ginger, they carefully apply cattle manure to the seedbed. Strong traditions of cattle husbandry in Nepal mean that most farms have a source of livestock manure to use as a soil amendment. Increased integration of livestock is one promising model for upland farming systems where land use pressures no longer permit a viable fallow period (Chapman et al., 1998). In the inset photograph, a local villager eyes the camera warily.

IF NOT SHIFTING CULTIVATION, THEN WHAT ARE THE ALTERNATIVES?

Plate 1-45. These women in northern Vietnam pause from transplanting to enjoy a laugh. Wet rice cultivation has long been promoted as an alternative to shifting cultivation. Particularly with the development of Green Revolution technologies, it allows an intensity of cultivation far beyond anything possible under shifting cultivation. But for how many shifting cultivators facing the need to intensify land use is this a practical option?

Plate 1-46. As land holdings decline, farmers often switch from planting cereals for their own consumption to higher-value commodity crops, such as the cabbage shown above. This can exacerbate environmental problems, however, as increased tillage leaves the soil vulnerable to erosion and chemical sprays are washed into waterways. (Photograph taken near Songco village, Bukidnon Province, the Philippines.)

Plate 1-47. Eventually these problems are usually mitigated by carving slopes into flights of bench terraces. The suitability of its cool mountain climate and the ready market of nearby Baguio have made this area into a centre for vegetable production. All the crops' nutrient needs are applied through fertilizers and the soil's function is reduced to simply providing a medium for plant growth. The productivity of this land can be extremely high – and is at the opposite pole of the spectrum of use intensity from shifting cultivation. (Photograph taken near Baguio, Benguet Province, the Philippines.)

Plate 1-48. Although many projects in Asia's sloping uplands over the past couple of decades have promoted contour hedgerows, it has been remarkable how little spontaneous adoption there has been. Or even farmers that continued with the technology after the projects came to an end. Its rejection by farmers has lent impetus to look more carefully at farmer innovations in fallow management that may be able to achieve the same goals.

Plate 1-49. In the Philippines, farmers found that simply by leaving natural vegetative strips (NVS) across field slopes, they could capture many of the benefits of contour hedgerows but without the labor costs. When presented with technology packages, it is common for farmers to pull them apart and retain only those components they find useful. (Photograph taken in Clavaria, Misamis Oriental Province, the Philippines, at an ICRAF research site.)

Plates 1-50 – 1-51. In southern China, government programs have taken much sloping land that had formerly been cultivated in a swidden rotation, and converted it into bench terraces for permanent cultivation. Now that the fallow has been lost, its regenerating effect must be replaced by importing nutrients in the form of chemical fertilizers. The main photograph was taken near Amo administration village, in Ximeng County of Yunnan Province, and the inset is of a local Wa farmer encountered in his field.

Plate 1-52. This farmer in northern Vietnam has converted his former swidden land into a cinnamon plantation. As improved roads have linked the uplands with outside markets, it has created many opportunities for shifting cultivators to plant perennial cash crops that thrive in cooler mountain climates. Agroforests such as this arguably provide many of the same ecological functions as natural forest cover.

Plates 1-53 – 1-54. All along the Himalayan foothills, there has been a recent surge in farmers converting their swidden fields into cardamom plantations. This cash crop has much to recommend it, but such heavy reliance on a single crop leaves these farmers extremely vulnerable to price collapse or outbreaks of insect or disease problems. The main photograph was taken in Ilam, a major cardamom-producing area in eastern Nepal, and the inset photograph is of a local villager.

Plates 1-55 – 1-56. Shifting cultivation is not viable in the cooler conditions of the Western Himalayas where vegetative regrowth is slower. Fields are under permanent cultivation here, and rely on legume rotations, farmyard manure, and inorganic fertilizers to maintain fertility levels. (Photograph taken in Hunza Valley, northern Pakistan.) In the inset photograph, a tribal elder in Peshawar warms himself in the early morning sun.

Plate 1-57. This Cebuano farmer was encountered clearing a swidden in Bukidnon Province of Mindanao, the Philippines. His story echoed that of many shifting cultivators across Asia – of a time when fallows were long, weeds few, and yields high. Now that he has no choice but to reopen his fallows after only a couple of years rest, he finds himself in a losing battle trying to keep weeds under control, and yields are a fraction of what they had been. He is working harder and harder for less and less. He is typical of the millions of shifting cultivators that desperately need to find sustainable pathways to intensify land use – and the potential clients of this study.

Plate 1-58. As farmers search for better ways to manage their land, they are keen observers of how different trees affect the soil and nearby crops. Tree-crop relationships are usually competitive for scarce growth resources of moisture, light and nutrients. The ring of influence around this oak tree, for example, can clearly be seen from the yellow, stunted appearance of the adjacent maize. But farmers have long known that some trees are soil-builders and actually improve crop performance. It is here that the story begins of a proud, war-like village in Nagaland and its unique relationship with an alder tree. (Photograph taken in Dzulake village, Nagaland, N.E. India.)

CHAPTER 2

Planting Amongst the Alders: How the System Works

PHOTOGRAPH GALLERIES

The Changing Face of Khonoma's Landscape throughout the Jhum Cycle ...

The following photographs support the text in showing the chronology of jhum management. They are thus arranged in the same broad categories of – 1) wood harvest, 2) field preparation, 3) planting, 4) plant management, and 5) harvest for the first cropping year; and two additional sections for 6) the less intensively-managed second cropping year, and finally, 7) the subsequent fallow period. They have been chosen to provide a sense of the rhythm of jhum cultivation amongst the alders – the management inputs, the changing landscape, the seasons and the harvests. A visitor to Khonoma would see only one snapshot in time, but this series of photographs takes the reader through an entire cycle. The images, of farmers as we found them working in their fields, also provide insights on division of labor between the sexes.

YEAR I:

1. Wood Harvest:

Plate 2-1. Reopening an alder fallow begins with slashing the underbrush, opening access to the field. The volume of biomass slashed appears similar to that of bush-fallow systems elsewhere of a similar age – but the big difference that makes this system remarkable is the alders scattered throughout the field, providing added firewood and fertility benefits.

Plate 2-2. With the shrub understory thus removed and the field now accessible, attention then turns to the dispersed alders.

Plate 2-3. Alder trees are pollarded to harvest the firewood and at the same time, open fallows for cultivation of food crops. This appears to be a task that falls almost entirely to men. With deft strokes of his dao, he sends the coppices crashing one after another to the ground below.

Plate 2-4. Other family members work below, trimming away side branches, and cutting some of the smaller material into firewood lengths. Pole by pole, the fallow canopy is thus cut away and the field opened to light.

Plate 2-5. The main coppices and other larger logs, such as the wild cherry shown above, are then cut into desired lengths with a cross-cut saw.

Plate 2-6. Firewood is the single most valuable crop harvested from the swiddens, representing 43% (Khonoma) to 52% (Tsiesema) of the total value of swidden harvests over the two-year cropping phase. Unlike most firewoods that need to dry first, alder splits easily even when green. It can immediately be split to a size that packs easily into the khorü carrying baskets (see plate 2-8).

Plate 2-7. The image of alder branches strewn about the fields thus gives way to one of neat piles of split firewood, awaiting transport back to the village.

Plate 2-8. At only 18,230-20,480 kJ/kg, alder wood does not throw as much heat as oak and other popular firewoods, but its lighter weight makes it easier to carry. But it remains hard physical labor. The village's expanding road network has helped to lessen this burden. Most firewood is now carried as basket loads only to the nearest roadside, from where trucks are hired to take it the rest of the way back to the village – or possibly to markets in Kohima or Dimapur.

Plate 2-9. These women were hired at Rs 80/day to assist the pastor of Khonoma's Baptist Church bring in his firewood. After splitting it, the firewood was carried to a steep spot on the hill, from where it could be thrown down towards the road below.

Plate 2-10. Women seldom return from the fields without a heavy load of firewood, vegetables, or perhaps *Colocasia* tops to boil for the pigs that evening. Khonoma has largely stuck to its traditional view that this is 'women's work', and a proper wife would never let her husband be seen sharing in it. (Photograph by Khrieni Meru.)

Plate 2-11. As the Khonoma valley echoes with the thud of daos biting into alder wood, the green canopy is gradually peeled away to reveal fields studded with bare stumps.

Plate 2-12. Unpollarded alders are left scattered across the jhum landscape as "mother trees", ensuring an adequate supply of seed. These seed trees are harvested for timber when they reach a large diameter and replaced with new ones. (Photograph by Amenba Yaden.)

2. Field Preparation:

Plate 2-13. Since most woody biomass is harvested, only small slash remains to be burnt in tightly-controlled fires. There are none of the huge conflagrations where an entire mountainside goes up in flames – the stereotype usually associated with shifting cultivation.

Plate 2-14. Under a cloak of smoke, women give the soil a first hoeing, pausing to pull up long roots and throw them aside for later burning.

Plate 2-15. As the smoke begins to clear and cleaning continues, the field is rapidly transformed into a neat seedbed. This woman is moving aside rocks to dislodge any remaining plants that had germinated within the wall during the fallow period, before carefully setting each rock back in its original place. Behind her, roots and other debris are being raked into piles by another family member for a final burning.

Plate 2-16. Working in jhum fields is usually combined with child care. This farmer busily hoes her way across a terrace, while her youngest child sleeps soundly on her back and an older sibling plays in the freshly-tilled soil.

Plate 2-17. Working up the seedbed amongst the alders. These black organic soils are ideal for potatoes and vegetable crops, but less suitable for rice. Note all the roots that she is pulling from the soil as she works, and throwing behind her for later burning.

Plate 2-18. As one of the final steps in field preparation, remaining debris is raked together into piles, covered with soil, and burnt slowly. These mounds turn a brick-red and are often used as nurseries (see plate 2-28).

Plate 2-19. A view of part of the jhum area opened in 2001, on the upper slopes. Beyond this, it quickly becomes too rocky, dry and windy for either crops or alder trees to grow well.

Plate 2-20. Khonoma's jhum fields are remarkable not only for a highly-evolved system of alder management, but also for the stone-faced terracing that usually accompanies the trees. Both appear to be innovations that hint at extraordinarily high land-use pressures some time in Khonoma's historical past.

Plate 2-21. As the field nears readiness for planting, the contour walls are repaired, carefully replacing stones knocked down by wandering cattle and mithun during the previous fallow period.

Plate 2-22. On upper slopes of Khonoma where stones are less abundant, farmers have to rely on more temporary measures. Poles pollarded from alders are pegged along the contours, creating a physical barrier against soil washing downslope.

Plate 2-23.

Plates 2-23 – 2-24. Finally a rough fieldhut is constructed, designed to be durable enough to last two years of cropping – before it then becomes part of the detritus decomposing under the regenerating alder canopy. This is another task performed almost totally by men, although thatch for the roof is usually collected by women.

Plate 2-25. Khonoma's dispersed trees and contour walls create an unusual landscape that speaks of great antiquity. The system seen today evolved over centuries of cultivation and incremental modifications. One could envision, in the early years of Khonoma's settlement, the stones being carelessly thrown to the side to make way for cultivation, before eventually being arranged into neat contour walls. This solved two problems: 1) it gave farmers a place to put all those stones, and in doing so, 2) created physical barriers that reduced soil loss to almost nothing. In tandem, as farmers recognized the beneficial properties of alder, passive protection of naturally regenerating trees gradually evolved into the active management documented in this chapter.

Plate 2-26. Even before beginning any detailed analysis, the very fact that Khonoma's management system has allowed cultivation of these lands at intensities of up to two out of four years without degradation is already impressive. When pushed to such intensive use, swiddening elsewhere in Asia's uplands almost universally collapses, trees are lost, and replaced with *Imperata*, *Miscanthus*, and other coarse grasses that thrive on degraded lands. That Khonoma has managed to defy this trend suggests that there is something exciting happening here that needs to be understood.

3. Planting:

Plate 2-27. Planting materials are carefully set aside from the previous year's harvest. In this way, traditional varieties selected over centuries of use are maintained.

Plate 2-28. In places where remaining slash has been raked together into piles, covered with soil, and burnt a second time (see plate 2-18), the soil turns a brick-red color as most of the OM is lost. These mounds are then spread out and often used as nurseries for crops tolerant of the now alkaline soil (see figure 2-15).

Plate 2-29. With expert flicks of her hoe, this farmer works her way swiftly across the terrace, opening holes in the soft soil and dropping in potato sets ...

Plate 2-30. ... while a few terraces below, her daughter does the same with maize seed.

4. Plant Management:

Plate 2-31. After pollarding, the fields are transformed into neatly kept gardens with plenty of space between the stumps for growing crops. This is part of the southern jhum blocks opened for cultivation in 2002. The tree spacing here is roughly 7 m, close enough for the coppices to rapidly regenerate a closed canopy during the subsequent fallow phase.

Plate 2-32. Jhum fields cultivated in 2002, with Khonoma village clearly visible in the background. This area has become the village's main vegetable belt, while the irrigated terraces on the valley floor below remain as its rice basket.

Plate 2-33. The bare alder stumps mark this photograph as taken very early in the year, before buds can begin to resprout in March. Clouds settling on the surrounding mountains hint that the monsoon season has arrived, marking the beginning of the growing year. The pace of village life then quickens as farmers race to keep up with the agricultural calendar.

Plate 2-34. A bird's eye-view of part of the same area shown in plates 2-31 – 2-33, taken with a telescopic lens from a ridge on the Barail Range that overlooks the valley. Note that the terracing continues from the wet rice fields lower in the valley up into the jhum area. It's early in the growing season and several field huts are still under construction and some piles of firewood remain to be carried back to the village. Rows of potatoes are already visible, occupying over 50% of the jhum area shown.

Plate 2-35. A young mother hand-weeds a rice nursery under the watchful eyes of her son.

Plate 2-36. Many of Khonoma's rice nurseries are planted amongst the alders on jhum terraces, and then transplanted to the irrigated terraces on the valley bottom later in June. But there is no dryland rice planted in the southern jhum block.

Plate 2-37. More often, a tool known as a phiero is used to rake out weeds and thin the rice seedlings to the desired density.

Plate 2-38. Market forces have followed closely behind peace in Nagaland. Khonoma farmers have responded by moving away from subsistence crops such as Job's tears, millets and maize traditionally grown in swidden fields – and now favor potatoes, garlic, and other vegetables that command lucrative prices in Kohima and Dimapur.

Plate 2-39. But in many fields, the new is mixed with the old and cash crops are intercropped with subsistence standbys. This strategy allows farmers to hedge their bets – in the event of a failure in one crop. The advanced stage of coppice regrowth (compared to the previous plate) shows this photograph to have been taken later in the year, suggesting that this is a second cropping.

Plates 2-40 – 2-41. Domestic duties such as child care and cooking are transferred to the jhum fields during the summer months.

Plate 2-40. Naga mothers routinely work in the fields with their youngest child on their back – seemingly almost oblivious to their presence. Young children thus grow up in the jhum fields and according to one Naga sociologist, many Naga children are probably also conceived there (Ao, A.L., 1995).

Plate 2-41. A farmer pauses from her fieldwork to prepare the noon meal. Field huts in Khonoma jhums are only temporary structures – enough for cooking and to provide shelter during particularly heavy downpours. The village is close enough that sleeping in the jhum fields is unnecessary – unlike many Naga villages where longer walking distances are involved.

Plate 2-42. When tree mortality leaves gaps in the field, these may be filled with new seedlings – usually transplanted during the first cropping year, so that they will benefit from routine maintenance operations directed at the food crops. This helps them to become established during the critical early years and by the end of the cropping phase, they are tall enough to compete with the pioneer shrubs that colonize the understory of alder fallows.

Plate 2-43. Encountered on the pathway one day, this farmer had been collecting alder wildlings to transplant into her jhum field. She viewed the alders as a renewable source of high-quality firewood that she would be able to count on in her advanced age.

Plate 2-44. First thinning of the alder coppices is done in July of the first cropping year. Typically, each tree will have sprouted 150-300 coppices, of which 5-20 are selectively retained, depending on the size of the stump (see plate 2-45 below).

Plate 2-45. Seemingly like silent sentinels rising out of the fog, these trees have just undergone the initial thinning of their coppices. Farmers probably retain extra coppices, keeping in mind that some may be broken by strong winds, others killed by sucking *Erthesina fullo*, etc. Reference to plates 2-94 – 2-97 confirms that typically only 4-8 of these will grow to a significant size in the subsequent fallow.

Plates 2-46 - 2-57. The above photograph sequence demonstrates how profuse alder coppices are thinned out. Although it appears labor intensive, skillful farmers move from tree to tree quite quickly. Each thinning yields a significant amount of biomass that is then distributed evenly over the soil as a green manure.

Plate 2-58. Farmer collaborators were trained in using a compass and clinometer that, together with a 30 m measuring tape, allowed them to map their monitored jhum fields. These maps were used to calculate field areas and sketch cropping patterns, which in turn, were related to the diaries they maintained on a) labor inputs and b) harvested outputs. The above photograph gives a good indication of how large the alder stumps can eventually grow.

Plate 2-59. The stone still perched on top of this stump indicates that it was pollarded this year for the first time. The flush of coppices has already been thinned back, leaving only 5-6 stems.

Plate 2-60. Hormones produced by alder's crown flow vertically down the bole to inhibit buds directly below from shooting. Since the hormone doesn't circulate around the tree's circumference, a wound like this that interrupts the downward flow of hormones causes buds directly below to release.

Examples of Cropping in the Alder Jhums ...

Plate 2-61. A bamboo fence serves a double purpose as a trellis for climbing kidney beans.

Plate 2-62. Vertical dimensions of the field are exploited by intercropping lower and higher stature crops – soybeans with maize, in this example.

Plate 2-63. Ginger, turmeric and other rhizome crops thrive in Khonoma's black organic soils. While many shifting cultivators across the Himalayan foothills are turning to ginger as a cash crop, it raises worrying questions about potential disease problems and market elasticity.

Plate 2-64. Elements of Khonoma's intensified cropping patterns are evident in this photograph. Although the cobs have already been harvested, maize stalks have been retained and climbing beans planted at their base. Radish has been broadcast throughout.

Plate 2-65. Another example of intensified cropping is the planting of a winter crop – peas, in this photo - after harvesting the summer crops. The autumn season can be judged by the advanced growth of the alder coppices. Sturdy fences are usually necessary to extend the cropping season this way, to prevent destruction by the cattle and mithun that are traditionally allowed free access to jhum fields after the Tiekede festival in November.

5. Harvest:

Plate 2-66. A potato intercrop is dug from between maize. Depending on the farmer's land and labor resources, another crop may be relay-planted into the maize.

Plate 2-67. A young boy helps his mother in plucking soybeans from their vines.

Plate 2-68. Maize is harvested in one fluid motion of bending over the stalk with one hand, so that it snaps at mid-height, while simultaneously pulling off the cob with the other hand. She then drops the cob into her basket while moving on to the next plant. After husking, maize is hung in bunches over the fireplace where the smoke protects it from insects.

Plate 2-69. Searching amongst the vines for cucumbers. Cucurbits are a good choice for making use of rocky areas in the field, where other crops can't grow.

Plate 2-70. Job's tears (*Coix lacryma-jobi*) was formerly the principal crop planted in 1st-year jhums – but is rapidly being displaced by potatoes and other more lucrative cash crops. Nevertheless, rows of Job's tears drying in the sun remains a familiar autumn sight in Khonoma. It is considered one of the easiest crops to grow and is usually the last harvested. It is used chiefly in brewing beer, and as feed for swine and poultry.

Plate 2-71. After drying for several days, the Job's tears are collected, one load at a time, and carried to a central mat for threshing.

Plate 2-72. Working from a bamboo mat, or now often a plastic tarpaulin, farmers use a tool called a lieda to thresh the Job's tears seeds from its panicles. They are then carried back to the village in basket loads.

Plate 2-73. After harvest, free-ranging cattle and mithun follow behind to graze crop residues – providing a fodder component to the jhum's outputs. The tradeoff is that these wandering livestock create problems for farmers who would otherwise like to extend their cropping season.

YEAR II:

Plate 2-74. With completion of the harvest, the jhum fields now fall silent – with only cattle and mithun visiting to graze the residues. The fields appear golden in the bright autumn light, dotted with the verdant green of coppicing alder trees. Note the gable end of this field hut closed in with cardboard boxing!

Plate 2-75. This is a similar view as shown earlier in plate 2-34, but now at the end of the cropping year. The previously bare stumps are now bushy with coppices, demonstrating alder's remarkable powers of renewal.

Views of the Jhum Landscape in Autumn ...

Plate 2-76. The smells, the whir of the cicadas, and autumn lighting on the cereal stubble are unmistakably familiar to anyone growing up with western farming systems.

Plate 2-77. As we move to jhum fields on the upper slopes, the elaborate stone walls disappear and are replaced by alder poles pegged along the slope contours. As seen here, this has also been quite effective in creating terraces (see plate 2-22 for a closer view).

Plate 2-78. The lull between first and second cropping years is now over – and work has already begun in cleaning up the previous year's crop residues and thinning the alder coppices (background).

Plate 2-79. As the jhum fields are groomed for a second year of cultivation, the alder coppices are thinned for the second and last time. These trees will not receive any further management inputs until after the fallow when they are pollarded again.

Plate 2-80. By January, farmers begin returning to their jhums to clear away weeds and residues from the previous cropping year, and prepare it for the second year's crop.

Plate 2-81. After piling, the dry maize and Job's tears stems are easily burnt in small controlled fires. (Photograph by Neichute Doulo.)

Plate 2-82. With the weeds and residues now burnt and the alder coppices thinned, a final hoeing is done to get the seedbed into good tilth. When millet and perilla are to be planted, their seeds are broadcast before the final tillage operation.

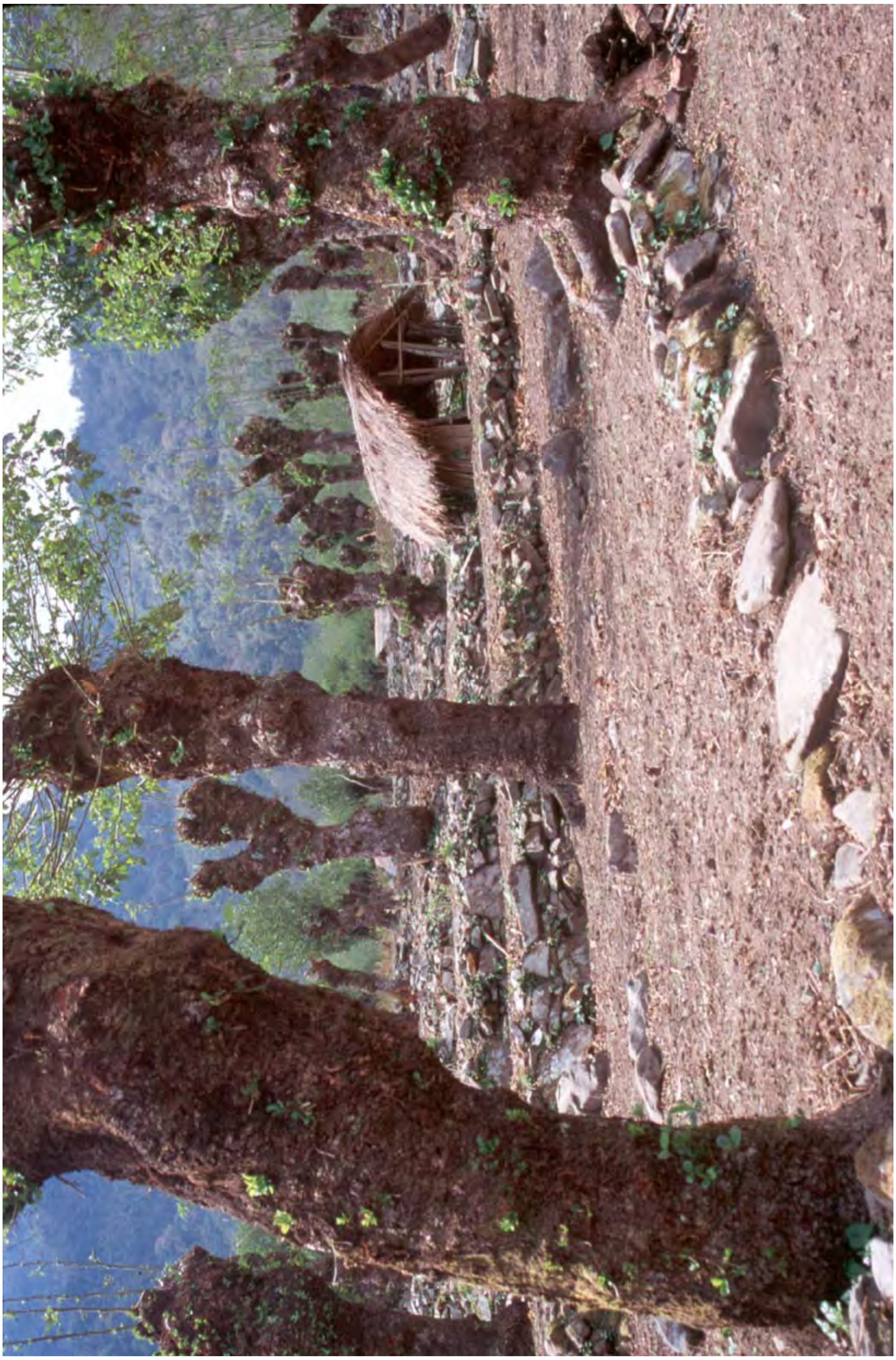


Plate 2-83. Ready to go for another year. The residues have been burnt, the soil tilled, and the alder coppices thinned – creating remarkably clean and tidy fieldscapes with hardly a rock out of place. Visitors often remark on how Khonoma jhums appear so clean and well cared for.

Plate 2-84. This field has now been planted with a mixture of millet and perilla. The photograph was taken on Feb. 27th, 2001, the day after Khonoma recorded 119.6 mm of rainfall in a single downpour (see appendix 4-19). Even though the soil had no ground cover to protect it, only minor rill erosion is evident in the bottom left corner of the photograph.

Plate 2-85. This is roughly the same view as shown in the above plate, but a couple of months later after the crops were well established. The seed had obviously not been washed away.

Plate 2-86. This is typical of a 2nd-year cropping pattern – a mixture of foxtail millet and perilla.

Plate 2-87. The foxtail millet is ready to harvest by August. Note the understory of weeds and advanced growth of the alder coppices. This field is already in transition to reverting back to a fallow. (Photograph by Khrieni Meru.)

Plate 2-88. Although it has little sales value, Khonoma villagers enjoy eating bread made from millet. It's a low input – low output crop suitable for 2nd-year jhum cultivation, when the farmer is investing most labor elsewhere in a 1st-year jhum. (Photograph by Khrieni Meru.)

Plate 2-89. The presence of birds' nests in the alder trees raises interesting questions about the trees' contribution to wildlife habitat, and what role the birds might be playing in insect control – or crop damage.

Plate 2-90. It's now October, and only the perilla remains to be harvested before the field is left to fallow. Cattle and mithun have been allowed access to these fields since the Tsünyi festival in August, but reportedly do not damage the perilla.

Plate 2-91. By the year's end, no food crops remain and the field is left in fallow – or more accurately, to firewood production. The access paths are quickly overgrown and even visiting these areas becomes difficult. The village's attention has swung to other parts of the jhum landscape and won't return here until the next cycle.

FALLOW / FIREWOOD PHASE:

Plate 2-92. In the early fallow stages, the alder coppices rapidly regenerate a canopy and shade-tolerant shrubs form an understory – creating a 2-strata structure.

Plate 2-93. As the fallow ages, a 3rd stratum of herbs and forbs develops under the shrubs.

Plate 2-94. A new access road was pushed through these alder fallows in 2001. This created ideal conditions for propagating seedlings – freshly exposed mineral soils and a plentiful source of seeds.

Plate 2-95. With the continued passage of time, a mixed community of ferns, orchids and other epiphytes establish on the alder stumps.

Plate 2-96. The straight growth of alder coppices makes them well-suited for construction purposes. But alder wood is not durable to repeated wetting and drying, so its use must be limited to unexposed conditions such as the frame and inner partitions.

Plate 2-97. If left long enough, individual alder coppices can reach sufficient diameter (i.e., 30+ cm) for use as small timber. The main danger in this is that the combined weight of these large coppices may become too much for the stump to support and, with a strong wind, could cause severe breakage to the stump. Farmers also complain that when an alder fallow like this is opened, they often have crop lodging problems, presumably due to excessive soil N.

Treescape 1 - Initial Pollarding of a Young Tree

Dec., 1999

June 29 - July 21, 2000

Oct. 26 - Dec. 6, 2000

Feb. 18 - Mar. 24, 2001

May 30 - July 14, 2001

Aug. 19 - Sept 25., 2001

Jan. 15 - Feb. 12, 2002

Mar. 26 - May 28, 2002

Nov. 3 - Dec. 14, 2002

Oct., 2004

Plates 2-98 – 2-107. This temporal series of photos tracks the changes of a single alder tree from the time of initial pollarding (plate 2-98) to the end of the cropping phase two years later (plate 2-104). It concludes with a photo (plate 2-107) taken during a follow-up visit to the fieldsite in October, 2004 – nearly five years after this tree was first pollarded. This gives some appreciation for the rate of coppice growth and how rapidly alder recovers after pollarding.

Treescape 2 - Cyclical Pollarding of an Old Alder Stump

Dec., 1999

June 29 - July 21, 2000

Oct. 26 - Dec. 6, 2000

Feb. 18 - Mar. 24, 2001

May 30 - July 14, 2001

Aug. 19 - Sept. 25, 2001

Oct. 16 - Dec. 15, 2001

Mar. 26 - May 28, 2002

Nov. 3 - Dec. 14, 2002

Oct., 2004

Plates 2-108 – 2-117. This series follows tree #13 in the sample jhum field discussed throughout this chapter. Compared to what farmers usually recommend, a relatively large number of coppices have been left to compete for limited growth resources. Note also the changes in the surrounding vegetation and weather.

Fieldscape 1 -

Feb. 18 - Mar. 24, 2001

May 30 - July 14, 2001

Aug. 19 - Sept. 25, 2001

Oct. 16 - Dec. 15, 2001

Jan. 15 - Feb. 12, 2002

Mar. 26 - May 28, 2002

Nov. 3 - Dec. 14, 2002

Plate 2-118 – 2-124. This series shows a panned view across the upper portion of the field (#5) examined in some detail in this chapter. The set is incomplete, however, in that it doesn't begin until the beginning of the second cropping year. It nevertheless effectively shows the transition from field to forest. The preceding series (plates 2-108 – 2-117) highlights one individual tree in this field. The spur of the Barail Mountains, that forms the eastern flank of the valley, looms in the background.

Landscape 1 -

June 29 - July 21, 2000

Oct. 26 - Dec. 6, 2000

Feb. 18 - Mar. 24, 2001

May 30 - July 14, 2001

Aug. 19 - Sept. 25, 2001

Oct. 16 - Dec. 15, 2001

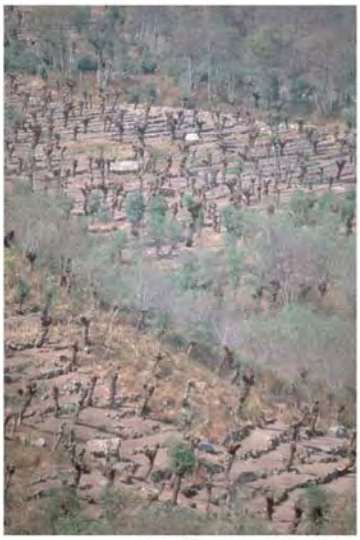
Jan. 15 - Feb. 12, 2002

Mar. 26 - May 28, 2002

Oct., 2004

Plate 2-125 – 2-133. Zooming out further, this series shows a wider swath of the same jhumming area shown in the previous sets (treescape and fieldscape levels) – but now photographed from the brow of a nearby hill, using the tree in the foreground on the right as a reference in aligning the camera. It provides a sense of the close integration – both spatial and temporal – of trees and crops in this system. Like a natural gap in a forest, a canopy cover quickly regenerates from the retained alder stumps. Khonoma's jhum landscape is thus a mosaic of different stages of this cycle.

Landscape 2 -



Feb. 18 - Mar. 24, 2001

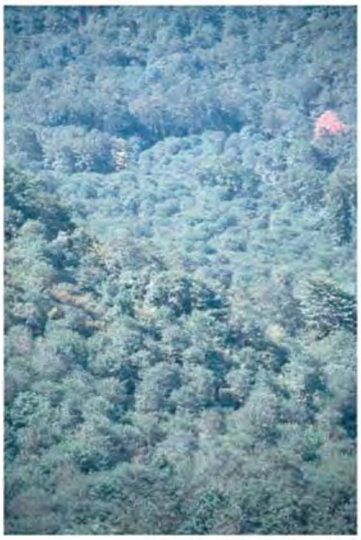
May 30 - July 14, 2001

Aug. 19 - Sept. 25, 2001

Oct. 16 - Dec. 15, 2001

Jan. 15 - Feb. 12, 2002

Mar. 26 - May 28, 2002

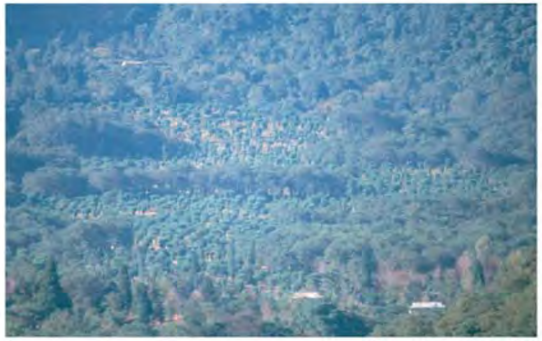


Nov. 3 - Dec. 14, 2002

Plate 2-134 – 2-140. Moving the camera's position a few metres to one side and zooming in, this series shows a subscene of the previous set. It again emphasizes the seamless transition between food and firewood production. Whether a passerby sees a field or a forest depends entirely on which phase of the cycle is encountered. That is why state administrators are usually at a loss as to how swidden land should be classified – and it often falls between the cracks of agricultural and forestry departments.

Landscape 3 -

June 29 - July 21, 2000



Oct. 26 - Dec. 6, 2000

Feb. 18 - Mar. 24, 2001

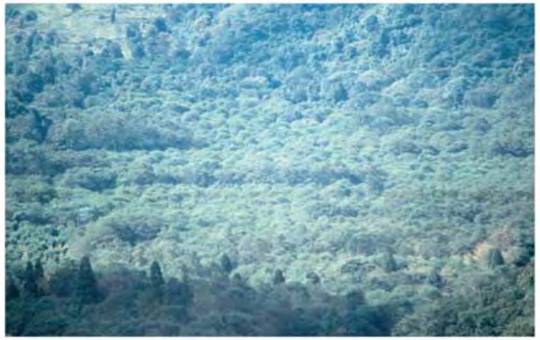
May 30 - July 14, 2001

Aug. 19 - Sept. 25, 2001

Oct. 16 - Dec. 15, 2001

Jan. 15 - Feb. 12, 2002

Nov. 3 - Dec. 14, 2002



Oct, 2004

Plate 2-141 – 2-149. This final series was taken from the doorstep of the house where I stayed while stationed in Khonoma. The area is the same as shown in all the preceding chronological series; only the view is different. The strip of unpollarded trees that cut horizontally through the middle of the photo provides a useful way of gauging the reclosure of the alder canopy after pollarding.

CHAPTER 3

Khonoma and its People

PHOTOGRAPH GALLERIES

Khonoma's notoriety ensured that it was visited often since the earliest days of British India's efforts to pacify the Naga Hills. By the early 1900s, British administrators were routinely carrying cameras and taking photographs to supplement their extensive tour diaries. The British of course left India in 1947, but by then, cameras had become commonplace enough as to have made their way into the hands of Naga villagers – and so the photographic records continued. These photographic archives provide fascinating glimpses of the progression of change in Khonoma and its people over the past century.

This photograph gallery thus leads the reader through five successive segments: a) it begins with photographic records of British administrators and other outside visitors during the first half of the 20th century (with the addition of some later photographs by M. Ganguli); b) then continues on to review photographs taken by the villagers themselves during the second half of the century. c) The next selection of photographs shows how the village appeared during the period of fieldwork in 2000-2001. d) The collection then pauses to present archival photographs side-by-side with those taken during the fieldwork when similar views were available that allowed interesting comparisons. e) It finally concludes with a selection of portraits of the villagers on whom the research was based. Together, these contribute a rich visual dimension to understanding Khonoma as it existed during the period of field research and the historical path that it had trod to bring it to that point.

a) Photographic Archives of European Visitors, Taken Mostly during the First Half of the 20th Century

The collection is grouped by photographer, starting with J.H. Hutton's (1913-1928), then those of J.P. Mills (1918-1945), C. von Fürer-Haimendorf (1936), W.G. Archer (1946-1948), a few by an anonymous photographer that appear to have been taken prior to World War II, and finally, later contributions by M. Ganguli (1965, 1977 and 1986). The descriptions provided by each photographer are provided as captions below the plates.

J.H. Hutton, 1913-1928

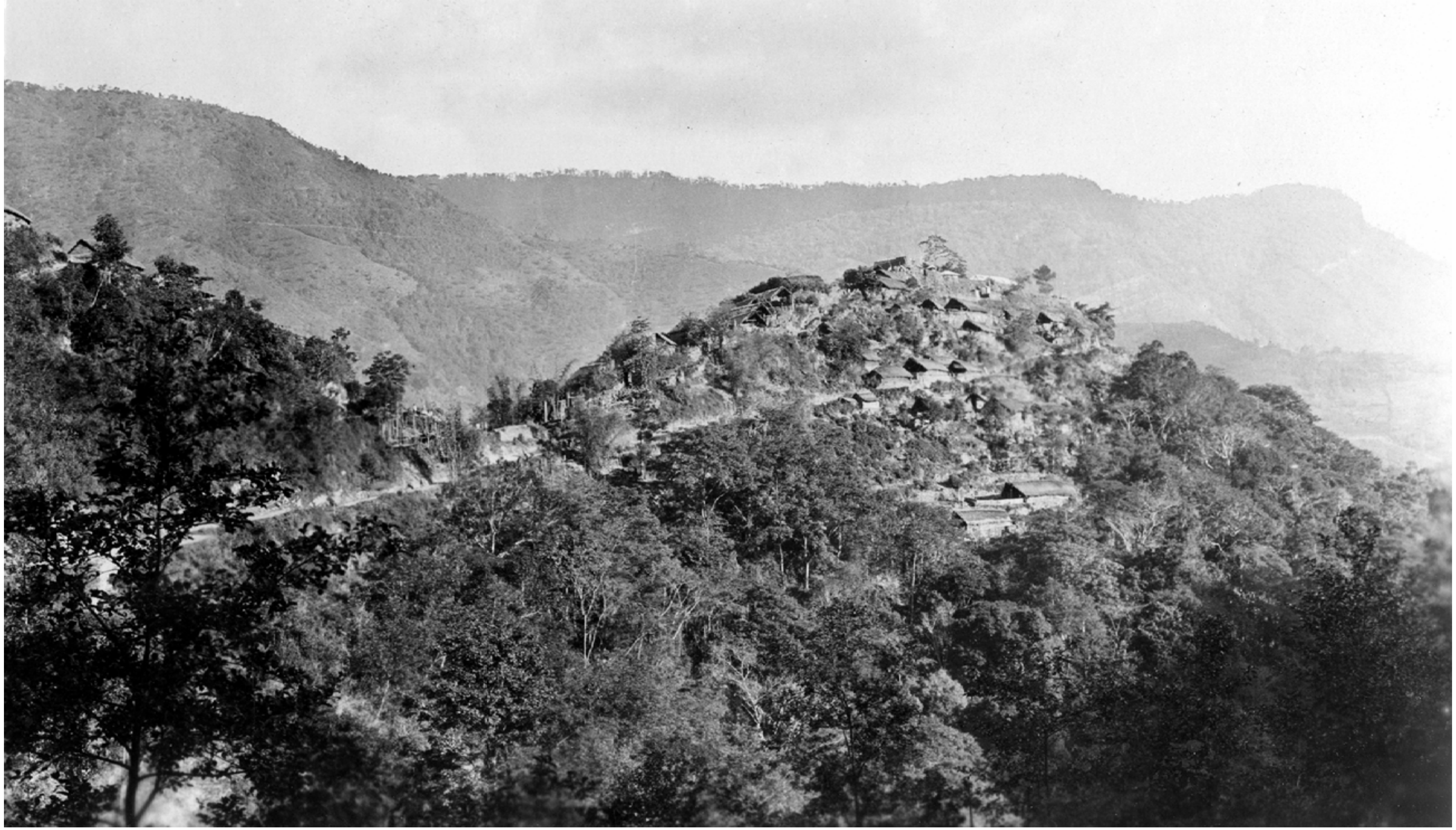


Plate 3-1. "Khonoma before the return of the Tevoma [Thevomia] and Semoma [Semomia] khels." Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-2. "Modern stone terraces, Khonoma." Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

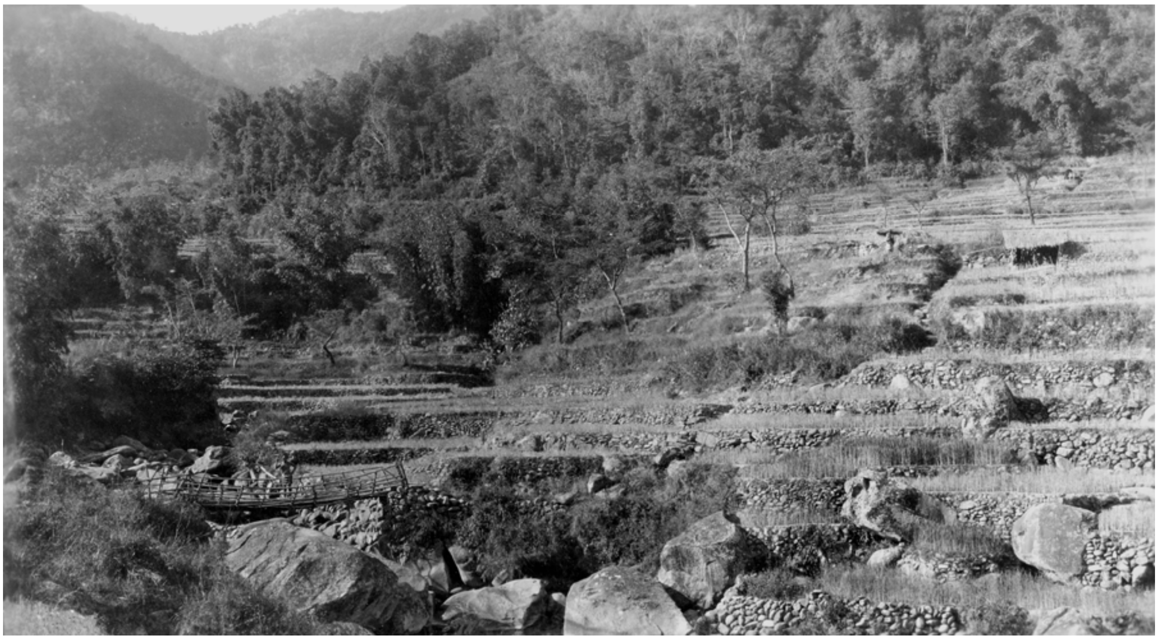


Plate 3-3. "Terraced fields between Khonoma and Mezoma." Photographer: J.H. Hutton, 1913-1923. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-4. “Great stone at Khonoma.” [This extremely large monolith was apparently erected, perhaps 200 yrs. ago, in honor of an old man who had been a great trader. The stone was already there – but had to be pulled up to an erect position. As the story goes, the warriors were not giving it their full effort – so the man crawled between the other half of the stone (still horizontal on the ground) – and the partially erect stone and threatened to die there if they did not give it their full strength and get the stone fully up.] Photographer: J.H. Hutton, 1924-1928. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

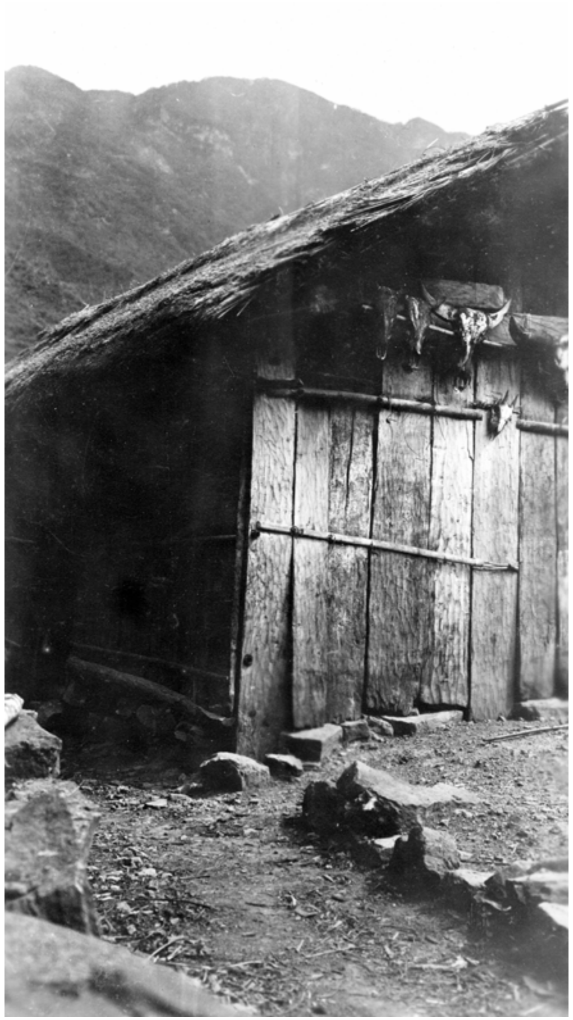


Plate 3-5. "Morung at Khonoma." Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-6. "Modern stone grave (?) at Khonoma." (Tomb built in 1922.) Photographer: J.H. Hutton, 1913-1928. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-7. "Modern stone watering place, Khonoma." Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

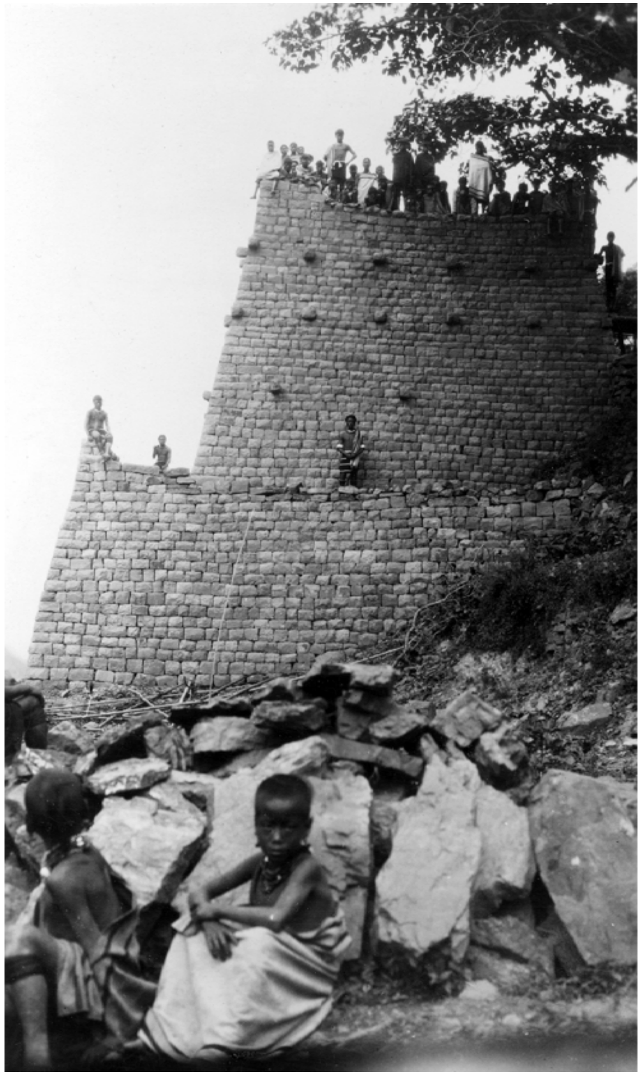


Plate 3-8. "The Semoma [Semomia] dahu (built in 1923), Khonoma." Photographer: J.H. Hutton, 1923. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford. [This photograph actually appears to be that of Merhümia khel, and is incorrectly labeled.]

Plate 3-9. "Rebuilding the Semoma [Semomia] dahu at Khonoma." Photographer: J.H. Hutton, 1913-1928. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford. (See also plates 3-182 – 3-183.)

Plate 3-10. "The Thevoma [Thevomia] dahu (built in 1923), Khonoma." Photographer: J.H. Hutton, 1923. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-11. "Half-length portrait of woman from Kohima. Wearing striped body cloths; bead neck ornaments including some with bone spacers, and brass wrist ornaments." Notes on PRM card – "Naga Hills. Assam. Angamis. Wusizowu of Khonoma." Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-12. "Head and shoulders portrait of man [Vizarr] of Khonoma. Wearing dark body cloth, waistcoat, bead neck ornaments, including one with bone spacers, ear ornaments." Photographer: J.H. Hutton, c. 1914-1923. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

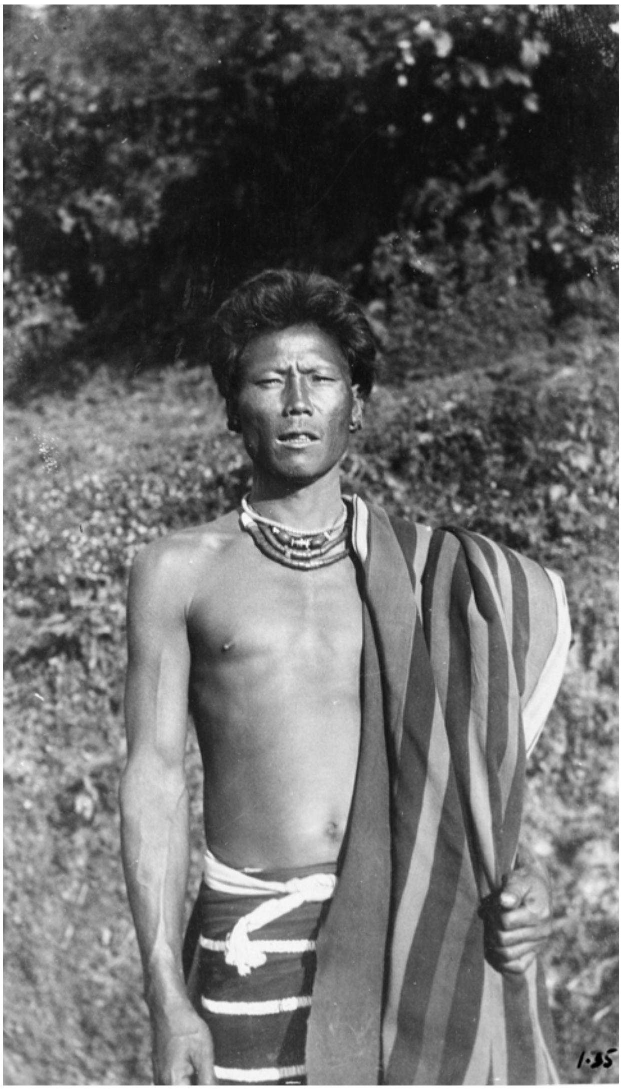


Plate 3-13. “Half-length portrait of man [Susalhu] from Khonoma. Wearing the black Angami kilt with lines of cowrie shells, striped body cloth; bead neck ornament, and ear ornament.” Photographer: J.H. Hutton, 1923. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-14. “Full length semi-formal portrait of man of Khonoma standing in a garden (Hutton’s?). Wearing striped body cloth, waistcoat, the Angami black kilt decorated with lines of cowrie shells, bead necklaces including one with bone spacers, metal key on chain, ear ornaments, and leg ornaments on both legs just below knee. Thepfuvitse of Khonoma.” Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plates 3-15. "Man dressed for Thekrangi [Thekranyi] genna, Khonoma." Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plates 3-16. "Girl dressed for Thekrangi [Thekranyi] genna, Khonoma." Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

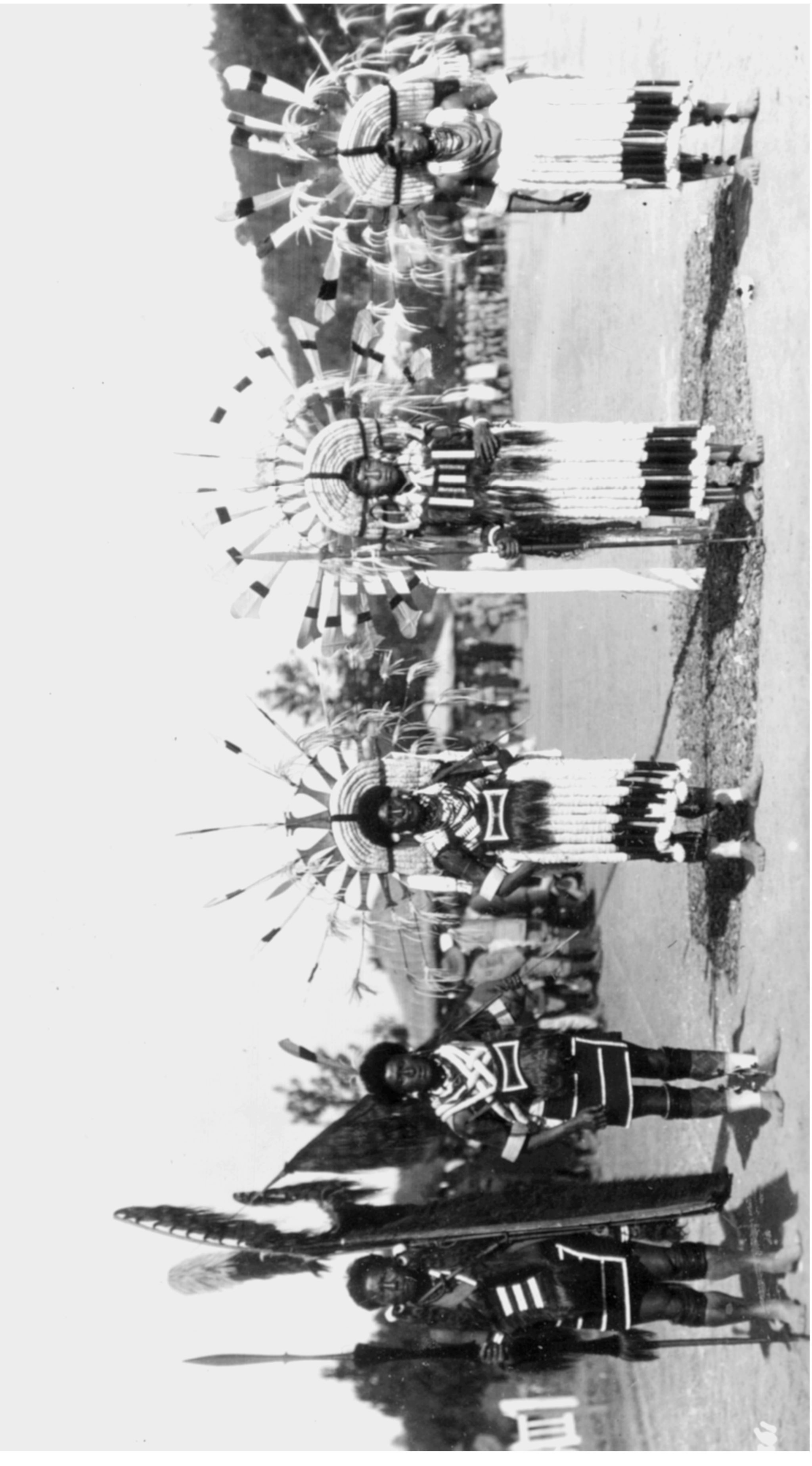


Plate 3-17. "Angamis of Khonoma & Mozemi [Mezoma]." Photographer: J.H. Hutton, 1921. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

J.P. Mills, 1918-1945

Plate 3-18. "View of Khonoma village. In the background, is a stone-built clan "fort" (dahu) – 'a more or less rectangular pyramidal building which the clan can use a coign of vantage in a riot with another clan' (JHH)." (See also preceding plates 3-8 – 3-9 for Hutton's photographs of the Semomia dahu under construction.) Photographer: J.P. Mills, 1918-1945. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-19. "Young girl with shaved head which denotes her unmarried status. She wears a white cloth with black marginal stripes, a bugle-shaped bracelet above the elbow, brass wristlets, bead necklaces hung from two half conch shells, and large brass earrings in the upper ear-lobes suspended by a band across the top of the head and another across the back of the neck." Photographer: J.P. Mills, 1918-1945. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

C. von Fürer-Haimendorf, 1936

Plate 3-20. “Circle of stones [thehou] in Khonoma village.” Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM). (See also plate 3-21.)

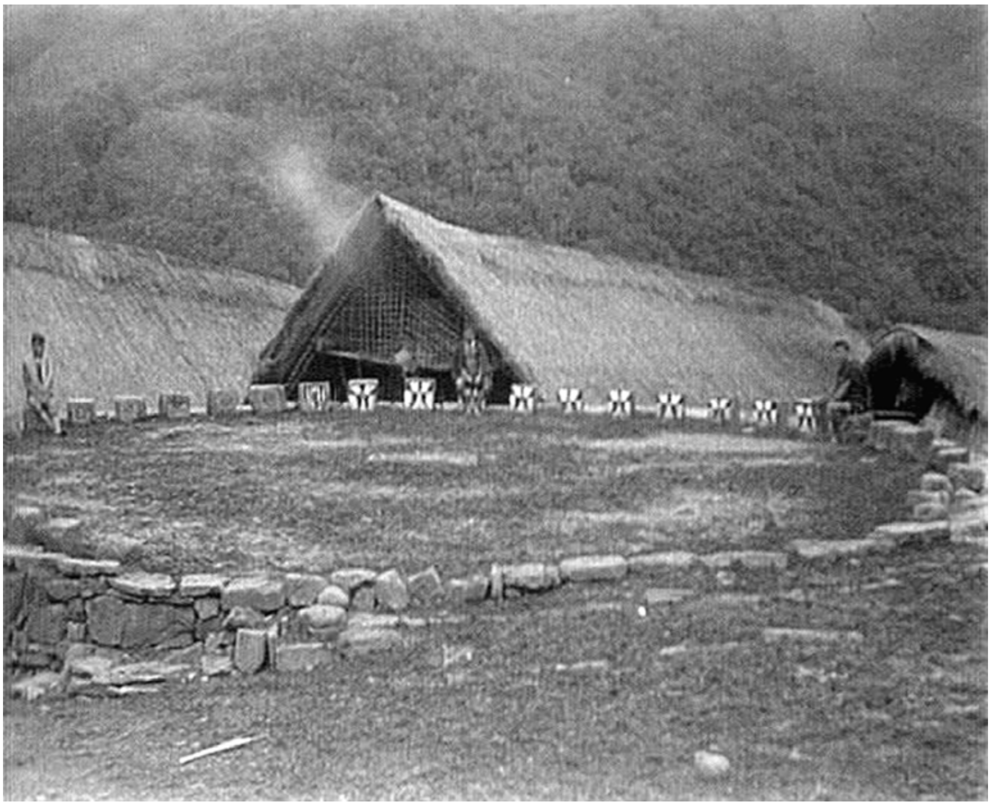


Plate 3-21. "Stone circles [thehou] representing the last stage in a feast of merit with three men sitting on painted stones, Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-22. "Circle of stones [baze] in Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-23. "Three men and boy standing on wall in Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-24. "Four older men including Dokalu in their blankets in Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-25. “Two gaonburas sitting in stone circle [thehou] in Khonoma village.” Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

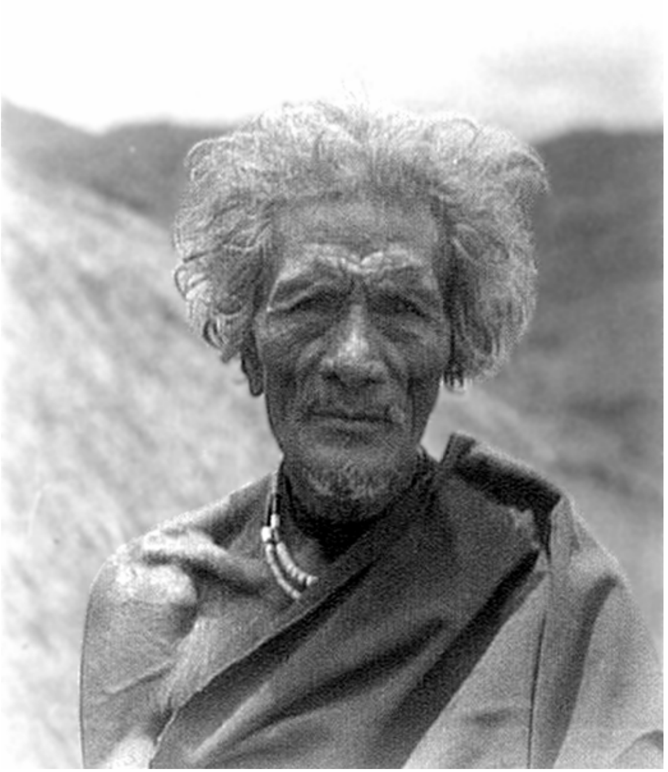


Plate 3-26. "Old man with beard at Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-27. "Part of huge 'dahu' built of stone at Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-28. "Megaliths with Khonoma in background." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

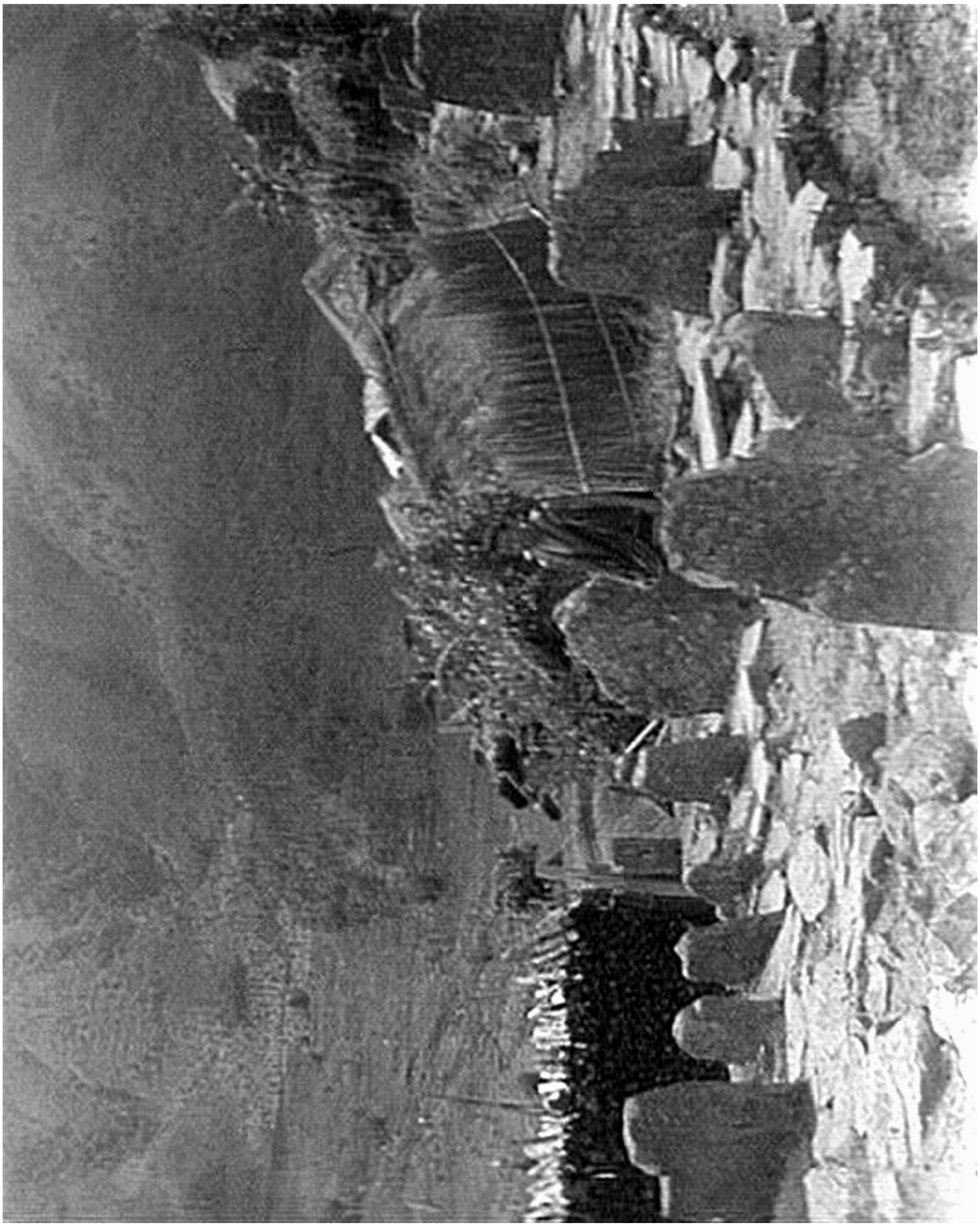


Plate 3-29. "Man walking between megaliths in Khonoma." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plates 3-30 – 3-31. "Megaliths with village of Khonoma in background." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-32. “New grave of a warrior, with feathers, leaves, beer bottles, Khonoma village.” Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-33. “Funeral monument with animal head, feathers, baskets at Khonoma village.” Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

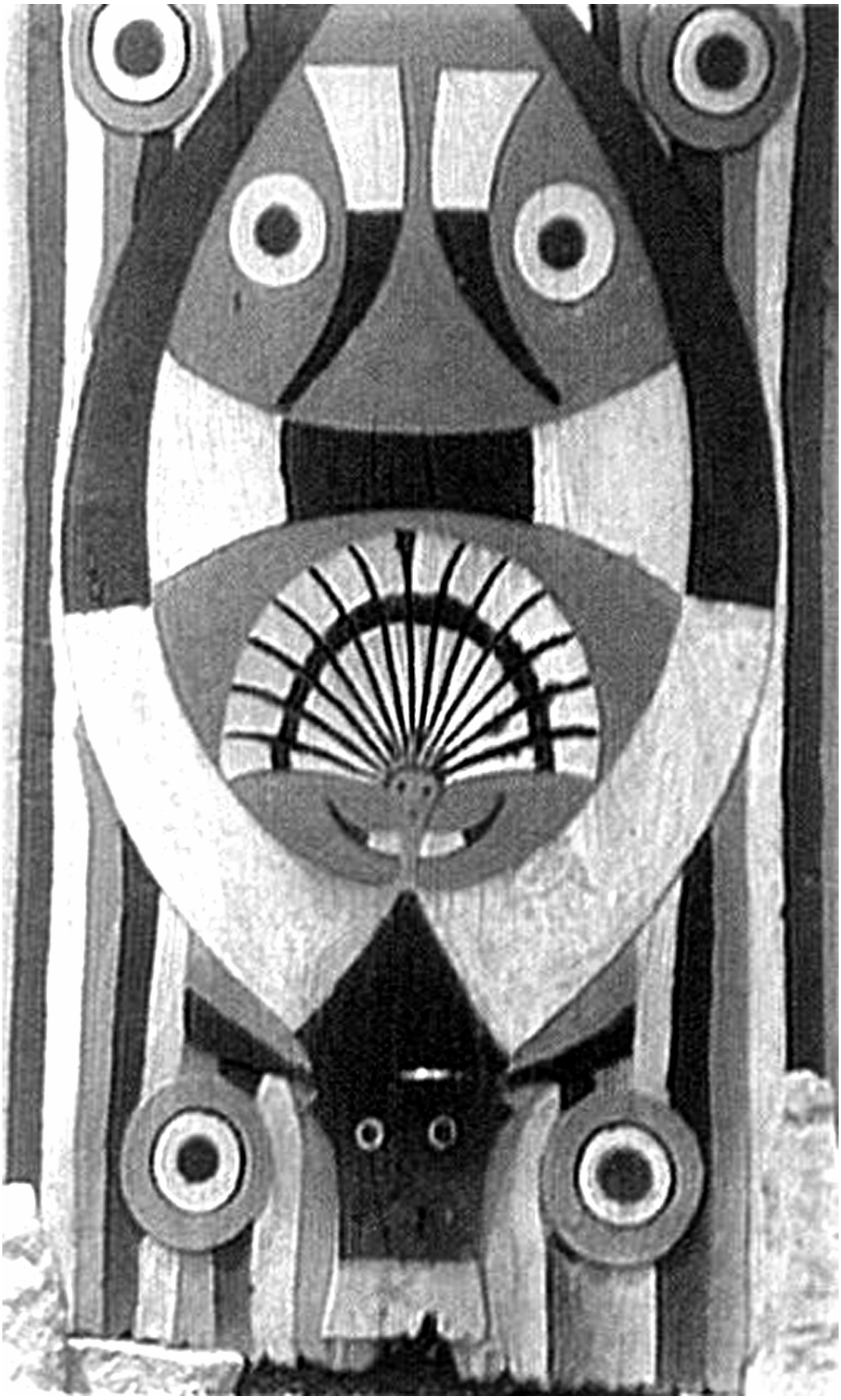


Plate 3-34. "Carved and painted wooden door of Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-35. “Flooded rice fields at Khonoma.” Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-36. "Women hoeing amongst boulders below Khonoma." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-37. "Working in rice fields outside Khonoma." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-38. "Working in rice fields outside Khonoma." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-39. "Young woman with child near Khonoma." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

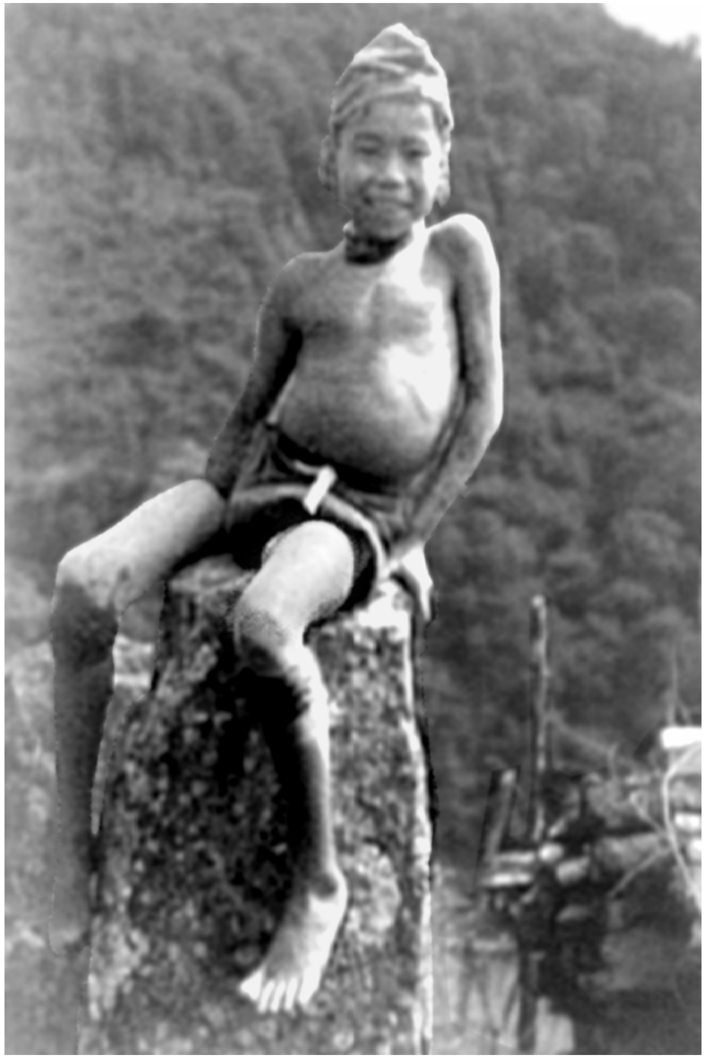


Plate 3-40. "Boy sitting on stone in fields below Khonoma." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plates 3-41 – 3-42. "Portrait of Dokalu in Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

W.G. Archer, 1946-1948

Plate 3-43. “House in Khonoma.” Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

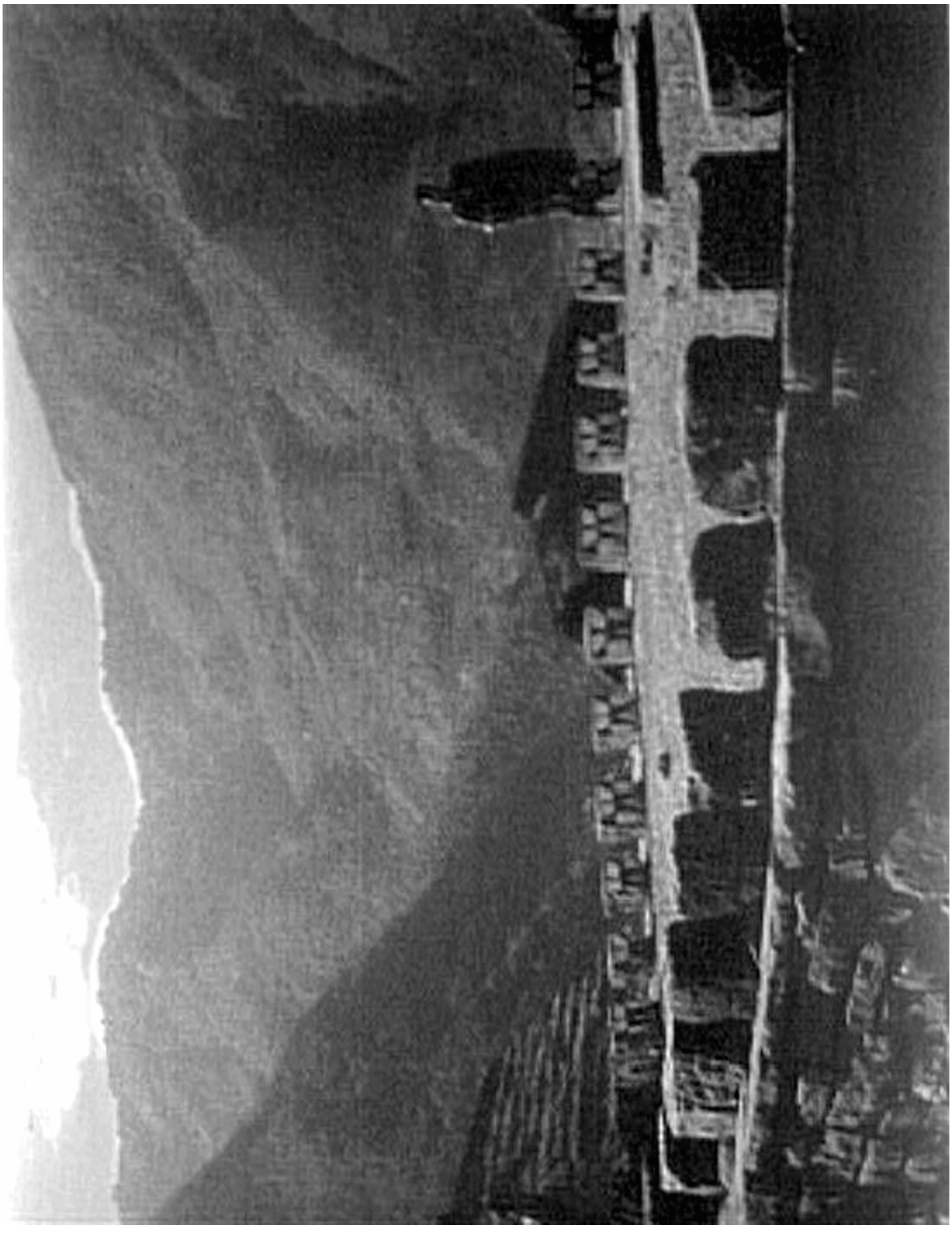


Plate 3-44. "Great stone circle [thehou] in Khonoma." Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plates 3-45 – 3-46. "Khonoma elders." Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

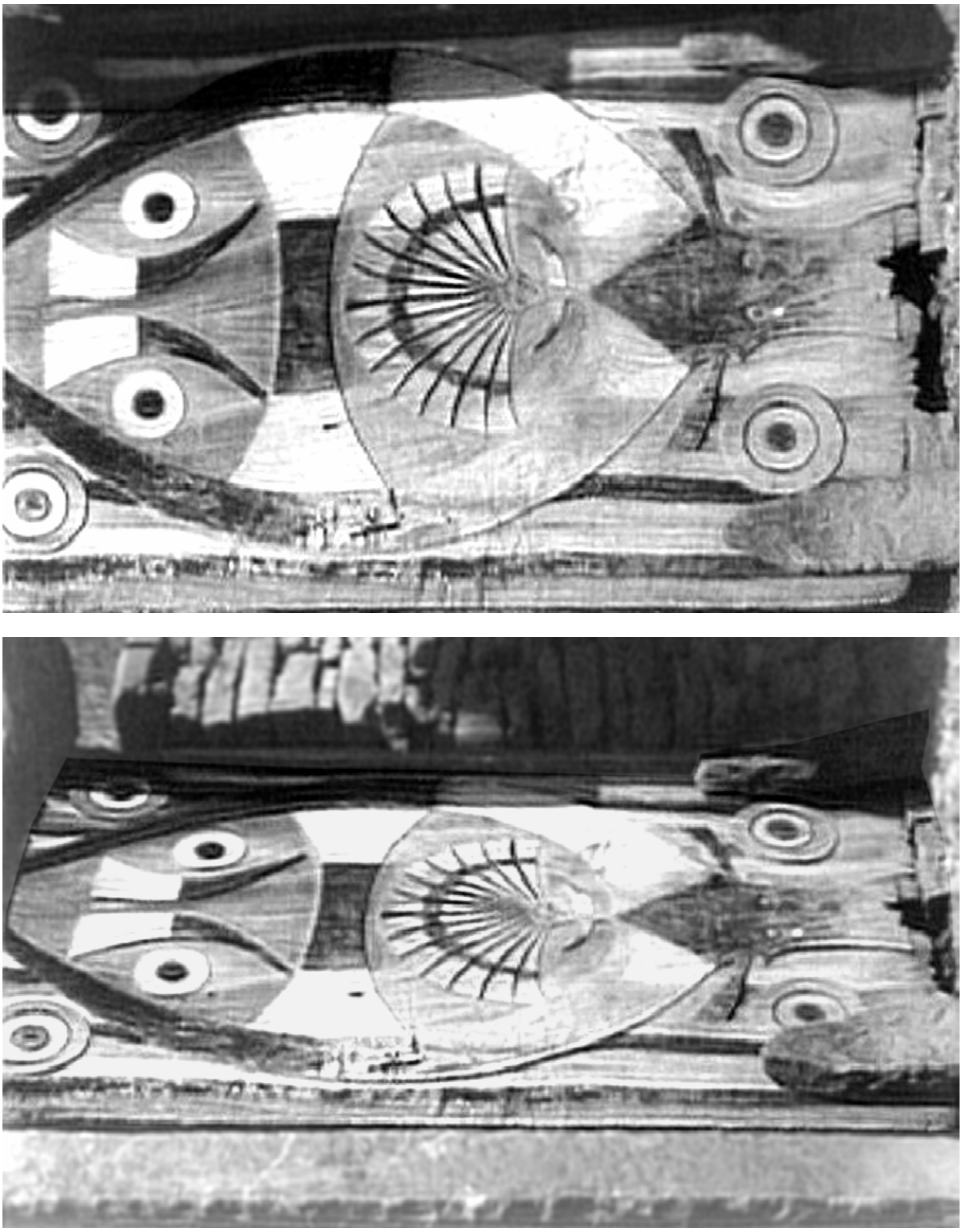
Plate 3-47. "Monolith near Khonoma village." Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-48. "A painted stone in Khonoma." Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-49. "Cones made of earth for the path-clearing festival in the fields near Khonoma." (See also figure 5-20.) Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-50. "'B' gate of the Chatouma [Chatsu?] clan, Thevoma [Thevomia] khel, at Khonoma." Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-51. "'A' gate at Khonoma." Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).



Plates 3-52 - 3-53. “‘C’ gate at Khonoma.” Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Anonymous, probably pre-World War II

The quality and timeframe of these photographs suggest that they were probably taken by Deputy Commissioner C.R. Pawsey or another British administrator. (The village elder who lent their use was unaware of their origin.)

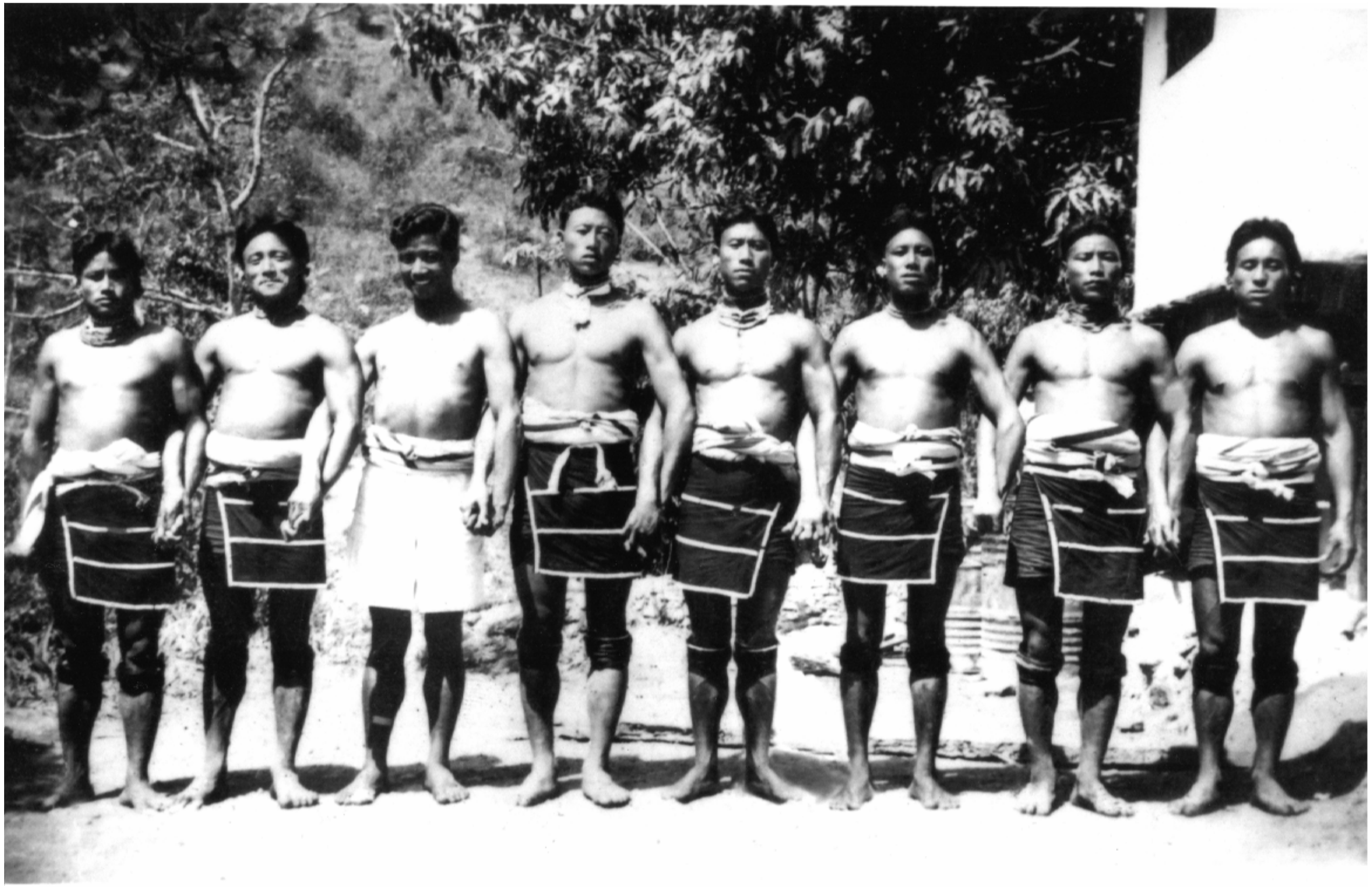


Plate 3-54. An early lineup of Khonoma's wrestling team. From left to right – Ngulhuto Siyie (S), Pelie Chase (M), Mhiesiu Chase (M), Seto Dolie (M), Solie Savino (M), Krusieu Sophi (T), Tsivilie Chasie (T), and Nikeso Kinie (M). The team was practicing for competitions in Delhi. Source: Arhi-u Meyase

Plate 3-55. Two Khonoma wrestlers square off to test their strength – Seto Dolie (M) (facing camera) and Krusieu Sophi (T) (back to camera). Source: Arhi-u Meyase

M. Ganguli, 1965, 1977, 1986

Plate 3-56. "Man standing by Khonoma village gate. Large wooden door with painted relief carving of face to scare enemy. Set in stone walls. Corrugated iron sheet on top, commemorative slab beside (?). Ritual significance." Photographer: M. Ganguli, 1965. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-57. "Woman serving food to her husband outside house. Using wooden dishes." Photographer: M. Ganguli, 1965. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-58. "Elder eating meal seated on house step. Food in wooden tripod dish, bamboo mug. Clothing – woven striped shawl. Ornament – necklaces." Photographer: M. Ganguli, 1977. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-59. “Men making wooden pounding table [code 8.4.4 in appendix 5-7], Khonoma, Nagaland.” Photographer: M. Ganguli, 1965. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-60. "Village gate, Khonoma." Photographer: M. Ganguli. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford. (There were no gates of this design in Khonoma during the period of research, raising suspicions that this photograph was actually taken somewhere else and mislabeled.)

Plate 3-61. "Girls wearing shawls, skirts & European blouses, bringing pith [from *Trevesia palmata*] from forest for Sekrenyi festival. fg. Carrying baskets full of pith & other plants." Photographer: M. Ganguli, 1977. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-62. "Three young boys wearing shawls seated in front of memorial stone. Playing with injured bird." Photographer: M. Ganguli, 1985. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-63. "Spearmaker [Kezhanulhou Khate] with his tools & materials, including dyed hair for decoration. Wearing black loin cloth with cowrie shell decoration, ivory armlets, neck ornament & cane leggings." Photographer: M. Ganguli, 1986. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford. (See plate 5-124 for a photograph of this same spear-maker during the fieldwork.)

Plate 3-64. "Girls in fields cleaning rice using winnowing baskets. Wearing white cloths, heads shaved in style of unmarried girls." Photographer: M. Ganguli, 1965. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-65. "Old woman and girl harvesting crop of Job's tears (*Coix lacryma-jobi*). Leaning on stack of cut crop, elder woman holding winnowing fork." Photographer: M. Ganguli, 1987. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

b) A Browse through Khonoma's own Photograph Albums

Very few of the villagers' photographs predate 1956 when Khonoma was attacked and destroyed by India. As the villagers fled, they only had time to grab some clothes, cooking utensils, weapons, and other necessities for surviving in the forest. They had no time to worry about photographs or any other records, and all would have been lost as fire engulfed the village.

Even when they began returning to resettle the village in 1958, photographs still attracted unwelcome attention from the Indian army – presumably on the chance that they might have some intelligence value. Photographs might be encountered, for example, that would incriminate family members as assisting the underground. It was thus safest not to leave any photographs lying around that would invite queries. One villager interviewed was perhaps typical, in lamenting that he had wrapped his family's photo album in a plastic bag and buried it to avoid problems – but the moisture had destroyed all the photographs. The following selection of photographs will thus mostly have been taken post-1958.

Plate 3-66. As the British pacified the Naga Hills and forbade headhunting, wrestling became increasingly popular as an alternative way to settle scores, prove one's manliness, and attract the admiring eyes of the village maidens. In this 1946 photograph, Sebie Dolie (L) (Merhümia khel) and Viphizo Whiso (R) (Thevomia khel) pause from their practice to pose for the camera. Source: Sebie Dolie

The Leadup to War …

Plate 3-67. In the early 1950s, the Nagas continued to pressure Delhi to recognize their independence. A voluntary plebiscite held on May 16th, 1951, confirmed overwhelming Naga support for an independent Nagaland. In the following year, the Nagas launched a civil disobedience movement and boycotted general elections for the first Lok Sabha (parliament). India responded with increasing force. The inscription on this gravestone of one of the early casualties is blunt:

"Zasibituo Naga, Zotshuma Village. A National Leader Died in the Freedom Struggle of the Naga Independence. Murdered by India on Saturday, 18th Oct. 1952 at 10:30 a.m. 28.4.1953"

Zasibituo, a judge of the Angami Tribal Court, was shot dead by police during a public demonstration against the Assam Police and Indian Security Forces for their use of torture against the Nagas. The deaths of Naga leaders at the hands of India became a rallying cry for resisting Delhi's insistence that the Naga Hills were an inseparable part of the Indian Union. Source: Tsolie Chase

Plate 3-69. Source: Arhi-u Meyase

Plate 3-68. (Photograph taken at NNC camp, in 1952, four years before Sakhrie's death.) Source: Kerino Khate

Plates 3-68 – 3-69. As the British prepared to give India her sovereignty, the Nagas' struggle for their own independence was born in Khonoma. The Naga Hills Tribal Council, later renamed as the Naga National Council (NNC), was formed in 1945. This was significant in that for the first time, Nagas were united in a single socio-political unit. Many of the key players were from Khonoma, including Theyiechüthie N. Sakhrie as the General Secretary, Jasokie Zinyü as Information Secretary (plate 3-68, left and right, respectively), and Angami Zapu Phizo (plate 3-69) who was later elected as President in 1950. Khonoma had effectively become the political capital for the Nagas' aspirations for freedom.

Sakhrie and Phizo made an effective combination; the fiery determination of Phizo was counterbalanced by the more thoughtful and articulate Sakhrie. It became a tragedy for Khonoma – and indeed all Nagas – when a rift developed between the two leaders in terms of the best means to achieve their shared objectives. Phizo advocated violence, but Sakhrie cautioned against setting the Nagas on a course for military confrontation with India for which they were ill-prepared. Sakhrie and other moderate members resigned from the NNC in protest in 1955. During a particularly fractious meeting in Khonoma on May 16, 1955, Phizo compared Sakhrie to a dog and denounced him as unfit to live. As if on command, the following Jan. 18th, T. Sakhrie was abducted and killed, his body brought back to Khonoma in a deplorable state from the torture that he endured before death (Nibedon, 1983, pp. 55-72; Ramunny, 1988, pp. 51-52; Maitra, 1998, pp. 41-47) . The voice of moderation and reason had been silenced. The Nagas were poised to plunge down a pathway of war and bloodshed that would continue for the next 50 years. The stage for this was set in Khonoma.

Outbreak of the Indo-Naga War ...

Plate 3-70. Naga troops practice their drills. Since guns were in short supply, many had to practice with wooden replicas. The hierarchy of the military was something new to the Angami, accustomed to extreme democracy in which each man was his own boss. Source: Pelhuhu Chase

Plate 3-71. Having only had to worry about cultivating their land and raising their families up to that point, many Naga men suddenly found themselves in uniform, hiding in jungle camps, and vastly outnumbered by the regiments of Indian soldiers that swept into Nagaland. Source: Pelhuhu Chase

Plate 3-72. Major-General Mosievile (Mowu) Chase of Khonoma's Merhümia khel earned the distinction of becoming one of India's most wanted men in Nagaland. He directed the Naga army until finally captured, along with 165 of his troops and their weapons, on May 16, 1969, while returning from China. He was the elder brother of Pelhuhu, one of the Khonoma farmers participating in this research. While browsing through Pelhuhu's small library, I encountered some of Mo-u's books, some containing inscriptions written from Indian jails during his incarceration. 1961. Source: Pelhuhu Chase

Plate 3-73. A Naga soldier poses in a jungle camp. Source: Pelhuhu Chase

Plate 3-74. The jungle canopy was the ally of the Nagas, shielding them against aerial surveillance. The leaves pressing against his plastic roof suggest that this soldier's accommodations were concealed under a tree. Source: Khrieni Meru

Plate 3-75. The warm dress of these soldiers suggests that they were camped at a high altitude, possibly members of the Dzükou Brigade. Source: Khrieni Meru

Plates 3-76 – 3-77. Naga soldiers practice their marksmanship. Source: Khrieni Meru

Plate 3-78. Members of the Naga army take advantage of the lull created by the 1964 ceasefire to have a picnic at their jungle camp in Kwikhiegei, Khonoma. Source: Pelhuhu Chase

Plate 3-79. Even young girls contributed to the military effort to repel the invading Indian army. The sign behind them reads, "20-1-1965 Lady Naga Army Tailoring Dept." Source: Khuwhesü Chase

The Rebuilding of Khonoma …

Plate 3-80. India moved its military into the Naga Hills to put down the separatist movement in 1956. One of its first targets was the troublesome Khonoma village. India attacked and burnt down Khonoma on July 5th, 1956, forcing the villagers to flee for their lives into the forests. Only some clans of Thevomia khel, that were prepared to declare their allegiance to India, remained behind. The rest spent the next couple of years in hiding from the Indian army, some moving about in temporary forest camps, others hiding in caves in Dzükou Valley, and many others scattered about in other villages, trying to blend into the crowds. When villagers finally began returning to Khonoma around mid-1958, they were not permitted to immediately reoccupy the old village site – but had to instead live in small satellite settlements on the village outskirts. This plate shows the new settlement, called Dzükhweke (named after a nearby spring), that Merhümia khel and Kuotsuma clan of Thevomia khel established in their jhum fields at that time. About 200-300 households occupied this site from 1958 until 1971. Semomia khel built a separate settlement, called Chayagei, on the other side of the village. It was not until 1969 that they were finally permitted to abandon these sites and return to the village proper. The relocation was complete by 1972 and the only remaining traces of these temporary villages are a few rare photographs such as this one (see also plates 3-198 – 3-200). Even until today, clan alliances within Khonoma are still strongly based on who chose to fight and were forced into exile – and who submitted to India and remained behind. The wounds of that division were deep and are far from healed.

As a side note, this photograph also shows that swiddens were being cultivated much higher on the slopes then than is the case today – probably because much of their best land normally used for jhum cultivation was occupied by the new village site, pushing cultivation further upslope. Source: Tsolie Chase

Plate 3-81. This shot of a young couple was taken in the Dzükhweke settlement in 1965 and by peering over their shoulders, permits us a view of the main village site at that time. With all of Merhümia and Semomia khels and some clans of Thevomia khel still not allowed to reoccupy their old house lots, much of the hill remains empty and grassy. At that time, Khonoma had been effectively segregated into three separate villages, each dominated by a different khel.

The boy appearing in this plate, incidentally, is Mekhrienisie Meru (Merhümia khel). He ended up marrying a different girl (Mhiechürüdono Punyü – Thevomia khel), became a teacher at one of Khonoma's public schools, and years later, one of his daughters became my assistant in undertaking the field research that is the basis of this dissertation. Source: Mhiechürüdono Punyü

Plate 3-82. Other photographs that provide closer glimpses of Dzükhweke village show the temporary nature of the houses (unlike the sturdy houses that the Angami usually build) and that they were scattered between the alder trees (note the stump on the right edge of the photograph). But at least it allowed them to begin cultivating their fields again and a return to some semblance of normality of village life. Source: Pelhuhu Chase

After the 1964 ceasefire, the interactions between Khonoma and the occupying Indian forces eventually became friendlier.

Plate 3-83. Life regained some degree of normality after the 1964 ceasefire, but the frequent appearance of Indian soldiers in Khonoma's photographs reminds us that the village remained under close scrutiny. India maintained a full-time military presence in Khonoma from 1956 until 1975. They later returned to establish a military camp on the village outskirts, near the present site of the Government Upgraded School (Kezieke), from 1990 to 1997. Source: Neikerüsie Punyü

Plate 3-84. Amidst the fighting, there were sometimes flashes of kindness shown by the occupying Indian forces towards Khonoma villagers. On this particular morning, some time after 1947, Üzekhono Punyü caught the attention of an Indian army officer as she rushed with her baby (Rokozoto Punyü) down to the Khu Rü (river) to fetch water. He took this photograph and then later sought her out to give her a copy. Source: Khono Punyü

Resumption of Life in Khonoma ...

Plate 3-85. Despite the turmoil that wracked the Naga Hills since the early 1950s, village life had to go on as normally as could be managed under the circumstances. They still had to work in the fields daily to keep themselves fed. And as this photograph reminds us, reproduction also continued. After fighting with the Naga army from 1958 to 1959, Khuwhesü Chase [Merhümia khel] returned to Khonoma and was married in 1961 – after which he appears not to have missed a beat in developing his brood! Pictures like this bring clarity to the issue of growing population and pressures on land with each successive generation. Source: Khuwhesü Chase, 1975

Plate 3-86. With their shaven heads, young Khonoma children had the appearance of Buddhist novices. Only orange robes would need to be substituted for the Naga shawls to complete the likeness. Source: Vipiahu Chücha

Plate 3-87. A family snapshot of young children with Khonoma in the background. Source: Khuwhesü Chase

Plate 3-88. A young Khonoma mother with her child. Prevented from growing their hair while still single, once married, many women went to the opposite extreme and grew very long tresses. Source: Sangutuo Chase

Plate 3-89. Three generations sit in their doorway, warming themselves in the sun – a warrior at the height of his powers, his aged parents, and his child. His dress suggests that either the photograph was taken during a ceremonial occasion or perhaps taking the photograph was itself the occasion. Source: Khuwhesü Chase

Plate 3-90. A Khonoma beauty (Memvübi-ü Meru) poses amongst thickets of dwarf bamboo (*Chimonobambusa callosa*) in the Dzükou Valley. Source: Sangutuo Chase

Plate 3-91. It has long been a popular outing for Khonoma's youth to climb up to the ridges overlooking the valley and admire the stunning view below. These ridges are at about 2850 m asl, making them about 1300 m above the village itself (1550 m asl). Source: Sangutuo Chase, 1973

Plate 3-92. The arrival of snow in the Dzükou Valley in January was a favorite occasion to visit and enjoy its novelty. Source: Khuwhesü Chase, 1983

Plate 3-93. By this time, the Nibuzie Rü Khro (river) that snakes its way through the valley (map 4-3) was also usually frozen. Source: Khuwhesü Chase

Plate 3-94. Khonoma youth prepared to collect wild vegetables during the Sekrenyi festival. The long bamboo poles are taken home for the purpose of chasing away the chickens that try to steal rice spread out on mats to dry in the sun. Source: Pelhuhu Chase

Plate 3-95. During Sekrenyi festival, the youth go to the forest together to gather wild vegetables. Their baskets are piled high with the soft white pith of *Trevesia palmata* (teirhü), used in decorating the morung walls (see plates 3-170 and 5-90). Source: Khuwhesü Chase

Plate 3-96. On the 5th day of Sekrenyi celebrations, the different age groups meet at their respective age-group's parents' houses to string together wild berries to be used as decorations. Source: Pezokhono Chücha

Plate 3-97. Angami in full traditional dress add tremendous color to the Thekranyi festival. Shown (L to R) are Niyiehu Sanyü, Mhiesihelie Khate, Peterüko Zetsuvi, and Megongu-ü Khate (now Meru). Source: Phenyü Meyase

Plate 3-98. As part of the Thekranyi celebrations, the villagers don full traditional attire and participate in long sequences of singing, known as Kelipie. This photograph shows Mekhrie Meru celebrating Kelipie at the old Dzukhweke village in 1966. Source: Mhiechürüdono Punyü

Plate 3-99. Celebrating Thekranyi festival at the old Dzükhweke village. Shown are (L to R) Khrielevono Chase, Rülhuzo Chase, Lolhu Chase, Pelhuhu Chase and Vikesu Chase. Source: Pelhuhu Chase

Plate 3-100. Khonoma villagers fall into line for a photograph during the Terhünyi festival in 1947. The celebrants shown here are (L to R) Kepelie Zetsuvi, Vitsühu Zetsuvi, Pekruvito Chase, Sebi Doli, Zakievilie Chase, Vikalie Meyase, and Üvilhu Chase. The photograph was taken at Hutobokha thehou in Merhümia khel. Source: Phenyü Meyase

Plate 3-101. In observance of the Liecapeli festival, a group of unmarried Khonoma girls have gone to the field in traditional dress and are preparing a 1st-year jhum field for planting Job's tears. On such special occasions, Angami women set aside the black lohe shawls worn on ordinary working days, and instead wore the white mhoushü shawls with their distinctive brown and black stripes on either side. The hair styles of these Khonoma girls suggest that the photograph was taken prior to their conversion to Christianity. Before the arrival of Christianity, girls were not permitted to grow their hair long until after marriage. The photograph was taken around 1966 or 1967 in Kiphoju area of Khonoma. Source: Sano Chase

Plate 3-102. Members of Merhümia khel pulling the stone that would be erected as a village gate in 1983. (See plate 3-152.) Source: Sangutuo Chase

Plate 3-103. Attending a Friendship Treaty between Thevomia khel of Khonoma village and Khamima khel of Kigwema village, at Kigwema from March 3-7, 1976. On the left is Neikerüsie Punyü of Thevomia khel. Source: Neikerüsie Punyü

Plate 3-104. Jiehie Talie. Source: Pelhuhu Chase

Plate 3-105. Niliebi Meru (L) and Jiehie Talie (R) at the old Dzükhweke village. Source: Pelhuhu Chase

Plate 3-106. Nilhusa Talie (L) and Khrielevono Chase (R). Source: Golano Talie

Plate 3-107. These Khonoma men (Vilasieto Casie (L) and Vilhubi Chücha (R)), exhibit cornelian and other types of necklaces that are popular amongst the Nagas. The one on the right is also wearing a lophie (see codes 16.5.6 – 16.5.7 in appendix 5-7), a twisted cotton rope that was likely presented to him by a female admirer as a token of her love. Source: Vipiahu Chücha

Plate 3-108. Two Khonoma girls (Viseno Meyase (L) and Vino Zetsuvi (R)), weighted down with an assortment of necklaces, with the rice terraces in the background. It is Angami custom that the oldest daughter will inherit her mother's ornaments. By the 1970s, girls were already defying the age-old tradition that they must shave their heads until marriage (see plate 3-101, for example), so it is not possible to draw any conclusions about the marital status of these two girls. The identity and status of Nagas are indicated by the ornaments that they wear. Source: Phenyü Meyase

An Invasion of a Different Kind - Christianity

Before ...

Plates 3-109 – 3-110. Photographs hint, at least on a superficial level, changes that some individuals underwent when they adopted Christianity. These two plates are presented as “before” and “after” photographs to illustrate the point. In the “before” photograph (above), this villager sits, relatively unkempt, nursing his beer while his wife hustles about busily in the background. He appears to be a changed man in the “after” photograph (right), now sober, scrubbed clean, neatly wrapped in a shawl with a bible (and probably a songbook) tucked under his arm, seemingly ready to stride off to church. Personal conduct aside, the arrival of Christianity was directly linked with improved hygiene and derived health benefits since it meant that at least once a week, villagers would get cleaned up and change their clothes to attend a Sunday church service (Meru, 2001). Source: Tsolie Chase

After ...

Plate 3-111. Khonoma saw an intense period of rebuilding in the 1970s as villagers that had been exiled were allowed to reoccupy their old house lots and the village finally became whole again (since its destruction in 1956). Amidst this reconstruction, between 1979 to 1982, an impressive Baptist church was raised that dominated the village skyline (see plates 3-133 or 3-138 for examples) and became a center for social activities. This did not really imply a reconciliation of Khonoma's people, however. The Merhümia and Semomia khels that had fought against India and had been exiled into the forest belonged to the Baptist Church – while the clans of Thevomia khel that had sided with India attended the Roman Catholic Church. The divisions remained, but were now cloaked in religious affiliations. Source: Khuwhesü Chase

Plate 3-112. Two Khonoma women, bibles clutched in hand, stroll to church. Source: Tsielie Sakhrie

Plate 3-113. Roman Catholicism arrived in Khonoma in the mid-1970s. It was more tolerant of the villagers' fondness for brewing alcoholic drinks (zu [rice beer], khe, and ruhi [distilled alcohol]), and thus earned many converts who were attracted to Christianity but did not want to give up all their old ways. This earned it the disdain of stricter denominations, who contemptuously labeled it as "the drinking church" [zu krie kehou]. Source: Phenyü Meyase

Plate 3-114. Along with Christianity, came Western traditions of how young couples should enter into matrimony. Source: Vipiahu Chücha

Plate 3-115. Many livestock were sacrificed at times of funerals and giving feasts, converting agricultural surpluses into prestige. This practice has continued in contemporary Naga society, but now as part of wedding celebrations. Source: Pezokhono Chücha

Improvement of Education ...

Plate 3-116. The arrival of Christianity was also associated with improved educational opportunities since it was missionaries that established many of the earlier schools. The Ao Nagas are perhaps the best example of this. They were the first to be Christianized and thus to receive formal education. They got that head start almost 130 years ago, but continue to enjoy a clear economic advantage over other Naga subgroups today. In Khonoma, both the Baptist and Catholic churches continue to operate their own schools that run parallel to the public school system. This photograph shows J.B. Jasokie – a Khonoma native [Thevomia khel] who went on to become Chief Minister of Nagaland for a stint in 1975 and then again from 1980 to 1982 – presenting an address in 1979 at the Don Bosco School in Kohima, in the company of its principal. Source: Pezokhono Chücha

A Period of Rapid Influence from Outside ...

Some Nagas suggest that Nagaland has suffered so much turmoil because they tried to move from the "stone age" to the "space age" in one giant leap. The following photographs hint at the rapid cultural borrowing and social changes that took place in Khonoma after World War II.

Plate 3-117. The images sometimes seemed surreal – of villagers dressed in suit, tie and gleaming shoes, stepping from thatched houses to pose in front of monoliths. This at least allowed the external appearance of the Western administrators and missionaries that they saw as representing more advanced civilizations and aspired to copy. Source: Tsolie Chase

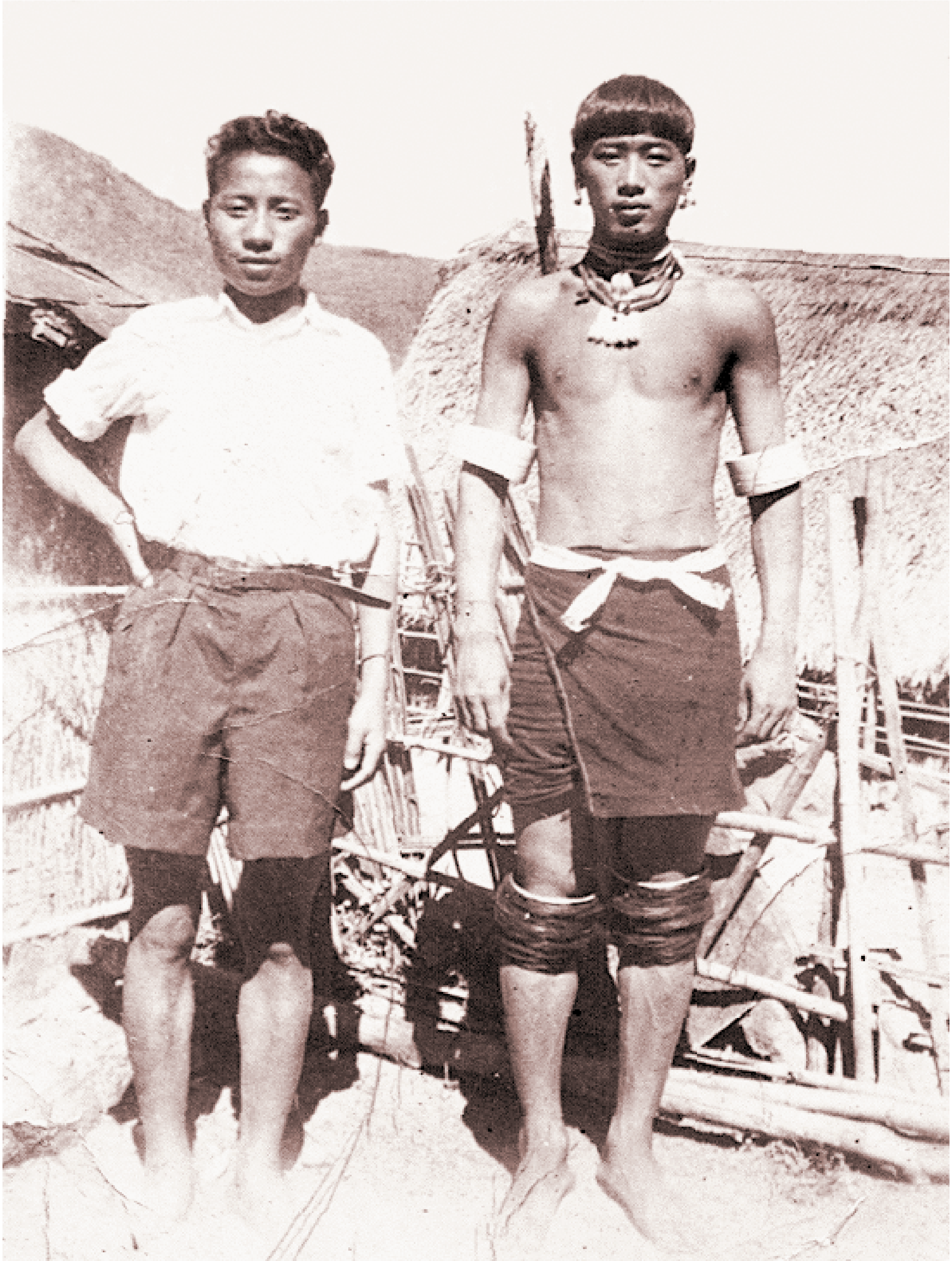


Plate 3-118. Despite the opinion of early British administrators that Western dress was totally inappropriate for the Nagas, it was quickly adopted after the 1964 ceasefire in the surge for all things associated with modernity. The bare chests, kilts with their cotton belts, armlets, rattan kneelets, and other ornaments that Khonoma men had traditionally worn (right) were quickly replaced by trousers and white shirts (left). Source: Mhiechürüdono Punyü

Photograph of Keri-u Tho-ü, taken at the old Dzükhweke village after returning from the forest.

Plates 3-119 – 3-120. These photographs, found in the same album, show the metamorphosis of a young Khonoma man from traditional (left) to Western dress (right - 1964). The shift from kilts to trousers took place mostly in the 1970s. Source: Pelhuhu Chase

Plate 3-121. The 1970s craze for bell-bottomed trousers penetrated even into the Naga Hills – even over-length white ones that dragged in the mud or dust (depending on whether it was the wet or dry season) with every step. Like fashion everywhere, vanity clearly took precedence over practicality. Source: Pezokhono Chücha

Plate 3-122. Women's fashions also changed dramatically, to the point that young Angami women could have been from major Asian cities anywhere and bore little resemblance to their older sisters of only a few years earlier. Source: Sangutuo Chase, 1972

The Invasion of Hollywood / Bollywood ...

Plate 3-123. Television arrived in Nagaland in 1982. Some photographs suggest that it brought new ideas of glamour and beauty ... Source: Sangutuo Chase

Plate 3-124. ... and foreign cultures. If it was not clear enough, somebody has scribbled “cowboy” in the upper left corner of this photograph. Source: Tsielie Sakhrie

Plate 3-125. Soccer and other Western games made inroads into the Naga Hills and largely displaced indigenous competitions, such as shot-putting stones (kechi piye), long jump (chatse / keva), high jump (mabeh), high kicking (pili / mhamesü), spear-throwing (rengu piye), mock fighting (thedze keya), war dancing (kedohoh), or spinning peg-tops (kwü thoh) (see Hutton, 1969, pp. 101-104). Wrestling (kenneh) has continued to be very popular amongst the Angami, Zeliang and Chakhesang Nagas. Source: Khuwhesü Chase

Going to the Picture Shop ...

Plates 3-126 – 3-129. As Nagas eagerly absorbed the ways of the outside world, it became popular to go to the “picture shop” to have their portraits taken. Backdrops were used to show the modernity of life beyond the Naga Hills ...

Plate 3-126. ... air travel ... Source: Sangutuo Chase

Plate 3-127. ... modern apartments ... (Neibouno Peseyie, while attending class VI at Kohima Science College in 1985) Source: Pezokhono Chücha

Plate 3-128. ... the Taj Mahal ... Source: Tsielie Sakhrie

Plate 3-129. ... or ideal English countrysides.

Plate 3-130. The shield behind Thepfücalie Rürhie (Semomia khel) was made from a tiger that he shot in 1972. Tigers were feared by Nagas and special ornaments were earned by those who had the courage to kill or injure one. After pacification, early British administrators often distributed guns to villages having problems with tigers preying on their livestock. Source: Chathasino

c) Khonoma Village as it was During the Period of Field Research (2000-2001)

Let us start this section with a brief look at Khezakenoma, believed to be the ancestral village from which many of the Naga subgroups migrated into their current territories.

Plates 3-131 – 3-132. Khezakenoma is an ancient Chakhesang village in Phek District, not far from the Manipur border. Khonoma is one of the many Naga villages that traces its origins back to Khezakenoma. The Angami, Lhotas and Semas all share a legend about a magical slab of stone (inset) in this village, on which paddy spread out to dry would multiply in quantity. It was over the use of this stone, so the story tells, that three brothers quarreled amongst themselves and then left the village to begin new settlements elsewhere.

Plate 3-133. Khonoma stands out amongst other Naga villages for its intensive management of alder in its jhum fields, and so was a natural choice as the main study site. Its notoriety for warfare and headhunting added to its fascination, and ensured it frequent mention in early British documents during the colonial era.

Plate 3-134. Khonoma had one of the most feared reputations in the Naga Hills. Its location on a saddle at the base of Japfü Range contributed greatly to its strength. It was highly defensible militarily and the surrounding valley provided security in rice needs.

Plate 3-135. The spur on which Khonoma perches is dwarfed by a much large massif that runs parallel to it and, like a curtain, secludes it from other Angami villages to the east (some of which are faintly visible behind the ridge, in the top left corner of the photograph). This makes it difficult to catch a glimpse of Khonoma from a distance and even many Angami know it only by reputation. Khonoma is also isolated in the sense that it occupies the extreme west of Angami territory, and many of its interactions were with the neighboring Zeliangrong Nagas. Many speculate that Khonoma's geographic isolation contributed to its reputation as a conservative village, suspicious of outsiders and fiercely protective of its territory.

Plate 3-136. The only village within eyesight of Khonoma sits on another ridge, directly north across the valley – Mezoma. Mezoma was actually a spinoff settlement from Khonoma, thought to have been established about 17 generations ago. The relationship between the two villages has oscillated between friend and foe over the intervening centuries and both earned notoriety as amongst the staunchest opponents to Britain extending its influence into the Naga Hills.

Plate 3-137. A trek up the spur toward the war memorial (plates 3-158 – 3-159) provides a bird's-eye view of the village below. The Merhümia khel fort occupies the highest point (see also plate 3-147).

Plate 3-138. While ascending the western ridge on the way to Kukhwi, a backward glance with a telescopic lens captures the Baptist church's domination of the village landscape. The other substantial building just across the road from it is the church's guest house. As the village has grown, its housing has gradually encroached on the upper rice terraces.

Plate 3-139. A view of the northern end of the village, populated by the Phetsuma clan of Thevomia khel. This part of the village has a reputation for being particularly conservative and clinging most to old traditions. Most of Khonoma's 65 households that have retained their traditional religious beliefs (known as the 'ancients') are concentrated in this part of the village, and those who have converted belong overwhelmingly to the Roman Catholic faith. This view also shows the congestion of the village, and why many are now choosing to build new houses on the village outskirts. The Thevomia fort is visible at the far end of the village (see also plate 3-147).

Plate 3-140. Village life becomes more relaxed after the terraces have been harvested and the rice safely stored in the granaries. On sunny afternoons, children can be found playing, the men relaxing, while the women continue to busy themselves placing the rice out on mats to dry in the sun.

Plate 3-141. This is a view of the Merhümia khel side of the village, taken from the roof of the Baptist church. The stairs on the right side of the photograph wind their way to the top of the hill, passing the Damant memorial (plates 3-156 – 3-157) and finally arriving at the Merhümia fort (plate 3-147). The gateway visible approximately 30 m up the stairs (circled in red) is that shown in more detail in plates 3-193 – 3-197. The sitting place (thehou) on the left (also circled in red) is pictured in the chapter. This is a favorite place for village elders to gather at the end of the day to compare notes (see plate 6-111).

Plate 3-142. A view of Khonoma from the terraced Ketsaju valley below. Mezoma is visible in the background on the opposing ridge. Khonoma is strategically located in being surrounded by extensive terracing that provides food security and is so nearby that little time has to be wasted in traveling to and from the fields. This, along with the ease of defending the spur against attack, was probably foremost in the thoughts of Khonoma's founders when they chose the site.

Morning …

Plate 3-143. Nagas often wander around during meals, an old habit that was facilitated by their 3-legged plates (codes 12.4.5 – 12.4.7 in appendix 5-7) that can be easily gripped with one hand while eating with the other. This photograph shows, after a cold winter night, some men of Thevomia khel congregating in an open space between houses to eat their breakfasts while basking in the warming rays of the sun as it breaks above the eastern ridges. All are carefully keeping their backs to the sun to protect their eyes from its brightness.

Evening ...

Plate 3-144. As the sun begins to dip below the western ridges, evening shadows first stretch across the terraced valley and then begin to climb up the spur to envelope the village in darkness. Houses located on the eastern side of the spur have the advantage of receiving the first sun in the morning, those on the west enjoy the last lingering rays in the evening, and those along the ridge have the best of both worlds. During winter months when daylight is shortest (see figure 4-2), darkness descends over the village, as shown above, as early as 3:30-4:00 p.m., making for long, cold winter nights. This highlights the importance of firewood – and the role that alder plays in providing a steady supply.

Plate 3-145. "Khwünoria Phe Meü Riathoko 1. Ratsa, 2. Khwükha, 3. Khate Uko kerükra nu piesiekeshuko 1. Sacha, Kigwema, 2. Kuovisie " 3. Neisalhoulie " 24:4: 2001"

Plate 3-146. "Khwünoju Phese Ko - 1. Kelhiekha, 2. Keviso, 3. Vükha, 4. Ratsa, 5. Khwükha, 6. Khate. Teisozha 15-1-88. Nhie Ketsie Ha-u Selie."

Plates 3-145 – 3-146. These two stone monuments tell a story of a passionate debate that is ongoing in Khonoma, over the identities of the original settlers of the village (phesemia) – and by extension, which families can claim the prestige of being descended from the village founders. The stone on the left records only three original settlers (Ratsa [Semomia], Khwükha and Khate [both Merhümia]), while that on the right acknowledges those three, but also extends the honor to a further three (Kelhiekha [Thevomia], Keviso [Thevomia], and Vükha [Semomia]), making a total of six. This is clearly a sensitive subject, and although there have been threats to pull down the stone with the opposing view, it is to Khonoma's credit that it has agreed to disagree on the issue and there have been no attempts to use violence to settle the dispute. This would not have been the case in the past.

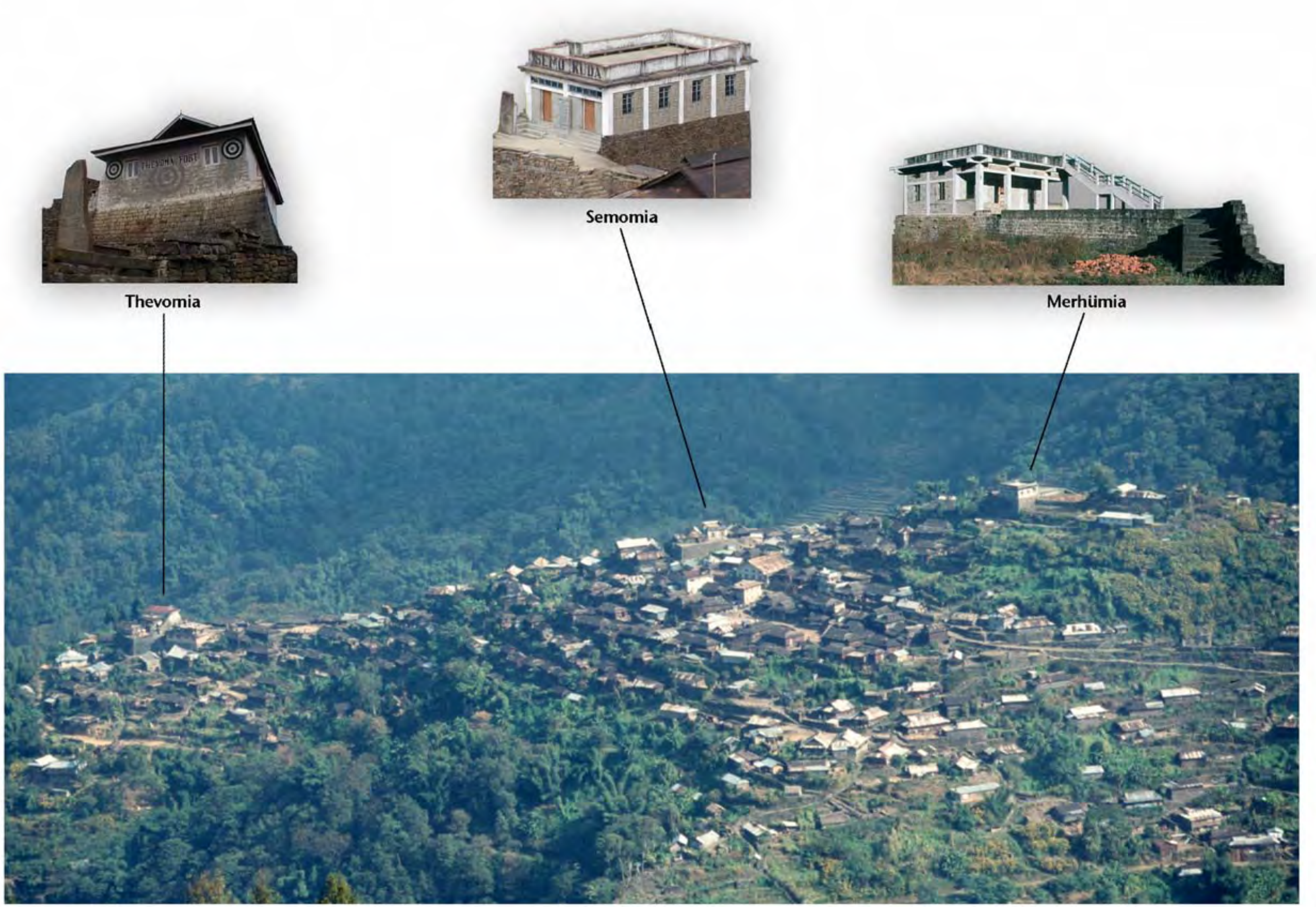
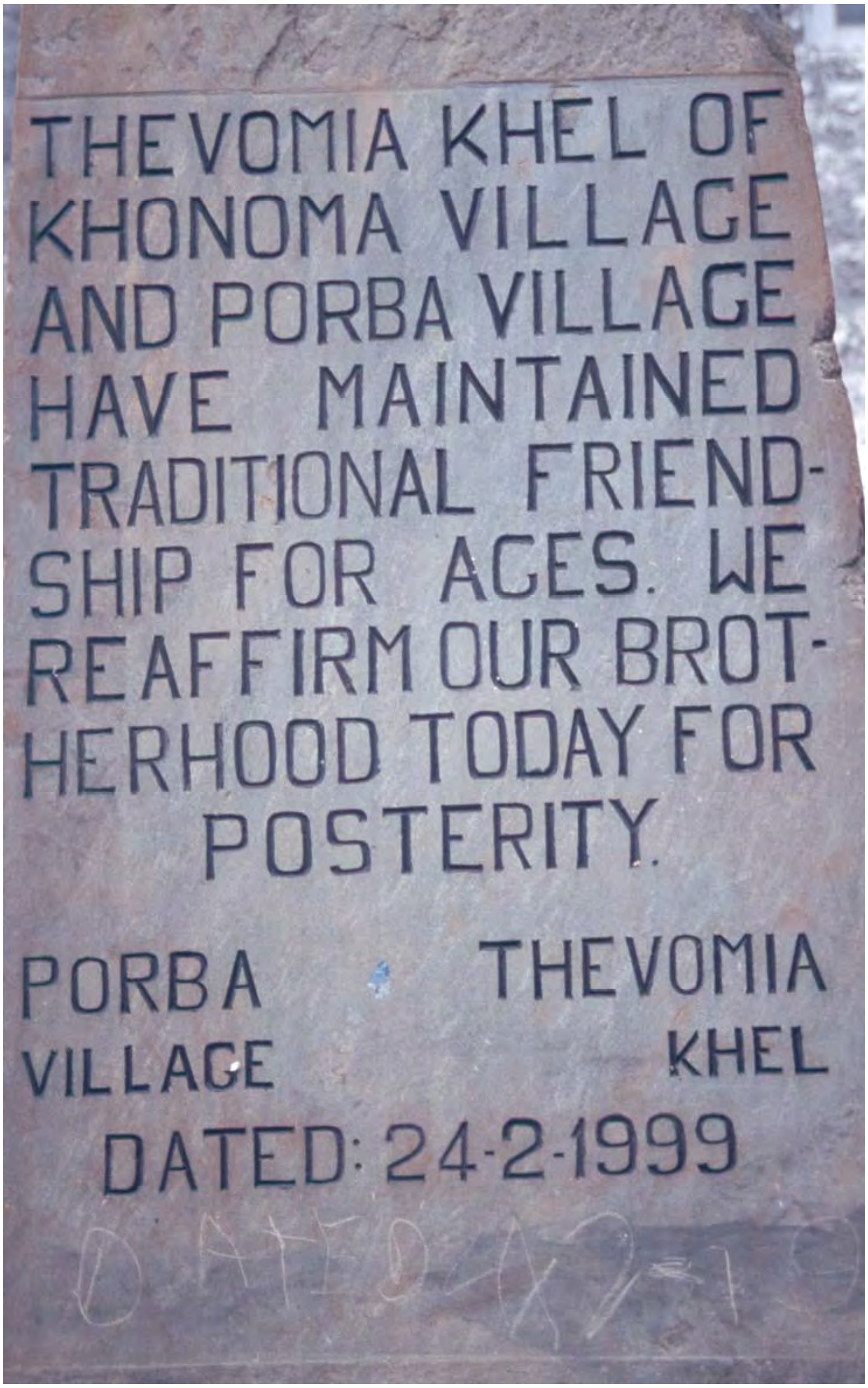


Plate 3-147. The locations of their forts (dahu) show the distribution of the three khels along the spur. This was determined during the earliest hours of Khonoma's settlement, thought to have taken place 600-700 years ago, when its founders each chose their locations. It was earlier versions of these forts that Hutton described and photographed (plates 3-8 – 3-10) being built in 1923. The forts are located at high points within each khel's land and were designed to provide military advantage in the event of attack.



THEVOMIA KHEL OF KHONOMA VILLAGE AND PORBA VILLAGE HAVE MAINTAINED TRADITIONAL FRIENDSHIP FOR AGES. WE REAFFIRM OUR BROTHERHOOD TODAY FOR POSTERITY.

PORBA VILLAGE

THEVOMIA KHEL

DATED: 24-2-1999

Plate 3-148. A stone monument erected outside the Thevomia fort records that khel's long-standing friendship with Porba, a Chakhesang Village in Phek District.

Plates 3-149 – 3-154. Patterns of some of Khonoma's village gates at the time of the field research.

Plate 3-149. Phetsu, Thevomia khel

Plate 3-150. Catsu, Thevomia khel, 11-5-1936

Plate 3-151. Kuotsu, Thevomia khel, 21-5-1946

Plate 3-152. Merhümia khel, 20-5-1983, the only gate carved out of stone

Plate 3-153. Semomia khel, at site where Damant was shot dead in 1879

Plate 3-154. Semomia khel, 1928

Plate 3-155. Like many Naga villages, Khonoma’s landscape is dotted with monoliths, commemorating past feasts and deceased ancestors.

Plates 3-156 – 3-157. Near the pinnacle of the spur that Khonoma perches on, stands a memorial (Chaha Mekhru) for G.A. Damant – the Political Officer that was killed at one of Khonoma's gates on October 4th, 1879, and two other British officers (Major Cock and Lieutenant Forbes) and a Subedar-Major that died during the punitive assault on Khonoma on Nov. 22nd. The death of Damant and many of his entourage led to an 11-day siege of the 118-man British garrison in Kohima by an estimated 6000 howling Angami warriors, until finally relieved by Colonel J. Johnstone and 2000 Manipuri troops (see appendix 3-3 for a first-hand account). Each of the participating villages was punished in turn and Khonoma itself finally submitted on Mar. 27th, 1880. This proved to be the turning point in British efforts to pacify the Naga Hills. That part of the inscription that is visible reads: "G.H. Damant N.A.C.S., Killed at Khonoma, 4th October 1879. Major C.R. Cock, D.A.A.G., Killed at Khonoma, 22nd November, 1879."

Plates 3-158 – 3-159. High on a ridge overlooking Khonoma stands a memorial of its final war with British forces in 1879. The engraved stone inside the structure reads, "In Memory of the War Between the Forces of Great Britain and the People of Khonoma 1879-80. Erected in 1991 by People of Khonoma". The site is adjacent to the old Chakra Fort, that Khonoma forces had retreated to in the darkness of night on Nov. 22nd and from which they managed to hold the British at bay for four months, until finally submitting on March 28th of the following year.

Plate 3-160. A large memorial stone in front of the Baptist Church commemorates Khonoma's fallen during Nagaland's struggle for sovereignty. It reads, "These Men and Women of Khonoma Gave their Lives for the Vision of a Free Naga Nation. We Remember and Salute Them and Still Hold Fast to their Vision. 1956-1992. ... Erected on 1:3:1995". This, of course, does not count the many more who were driven from the village by the fighting and never returned. This stone therefore tells much of the story underlying the decreased land use pressures found in the village today. The design at the top of the stone represents the flag of the free and sovereign Naga state for which these villagers sacrificed their lives.

Many of the gravestones around Khonoma provide further details of the military conflict that, almost since the departure of the British, has cost Khonoma so dearly in terms of lost lives and creating deep divisions within the village.

Plate 3-161. "Ura Uvie, Kha Mia Tsuhie Uraju Khrisa. Adjt. Capt. Arü, Khonoma. Naga Army 1939 – 21,9,1968. He lives in the memory of all who love our land. We gave one of our best blood. 17.3.83 Naga Army.

Plate 3-162. "In Deep Loving Memory of Shri Tisovisie Jhünyü who gave his life for Naga National cause and left us for his Heavenly abode on 22.7.1959 at Kukhwi forest camp. May his soul rest in peace." See Iralu, 2003, pp. 195-200 – for an account of the Kukhwi attack during which this man lost his life.

Plate 3-163. Terhuo Tsietshe Ki (translating to "evil spirit monolith rest house", referring to the monolith pictured in the adjacent plate) is one of the many rest houses scattered across Khonoma's landscape. This one was built by an age group from Merhümia khel, and the khel assembles here every year on the 4th day of the Sekrenyi festival. Few of these rest houses get much use but exemplify the elaborate projects that age groups undertake to demonstrate their prowess.

Plate 3-164. Villagers know this stone as Terhuo Tsietshe (literally "inserted stone") or the spirit monolith. According to a very old story, all of Khonoma was deep asleep one night – when everyone was suddenly woken at midnight by a mysterious "*oh-hoh*" chant, like that used by Angami when dragging a stone to commemorate a feast of merit. But who could be dragging a stone in the middle of the night? Fearful, the villagers remained rooted in their beds and did not venture out to investigate. The following morning, they found that this monolith had been erected overnight, still bound by thatch leaf. The spirits, it was said, used thatch leaf to drag stones. The monolith is shaped like an owl, and someone has applied paint to enhance that similarity. (narrated by Tsielie Sakhrie)

Plate 3-165. A woman chops alder firewood whilst her child waits behind with the basket to be filled. The large keprüchü basket for storing rice (code 7.2.5.1 in appendix 5-7) also serves for spreading out laundry to dry in the sun.

Plate 3-166. After returning from the fields and forest, the Naga kitchen becomes the centre of household activity as members prepare meals and chat around the warmth of the fire. They usually linger here until the fire is going out, the cold of night has begun to descend over the house, and it is time for bed.

Plate 3-167. Clouds swirl up from the valley below as Khonoma's young men and women parade around a thehou in full traditional attire. It is considered unlucky for rain to fall during the singing and dancing around the thehou, thought to be an omen of death. Thekranyi (also known as Kerunyi) is celebrated in late May or June every year to mark the start of rice transplanting. At the end of this 3-day festival, the Tekhusekhrüpfü will perform the 1st-sowing ritual, and then the rest of the village begins transplanting on the following day. Source: Khrieni Meru

Plate 3-168. On the afternoon of the second day of the Thekranyi festival, the men dressed in full traditional attire and often carrying mithun horns, move in a solemn procession around the village's main thehou. The girls are partnered off to the boys, each carrying a leaf cup and moving in a second rank on the inside of the boys. This is visually one of the most spectacular of all the Angami festivals. (See Hutton, 1969, pp. 205-208 for more details.) Source: Khrieni Meru

Plate 3-169. Obviously enjoying the opportunity to don traditional dress (with the exception of an out-of-place cowboy hat!), Khonoma villagers pause from their 2001 Sekrenyi celebrations for a group photograph. The sound of gunfire echoed throughout the village all that day.

Plate 3-170. Decorations made by an age group at its parents' house, as part of Sekrenyi celebrations.

Plate 3-171. During Chadanyi, a cow is slaughtered and the meat divided amongst households. The roads are cleaned during this time. It is part of the Thekranyi festival celebrated before rice transplanting begins.

Plate 3-172. On special occasions, young Angami boys wear diagonally across their chests two sashes, colorfully decorated in a green and red lozenge pattern (see code 16.6.4 in appendix 5-7). Source: Khrieni Meru

Plate 3-173. Under the careful scrutiny of the referee, each wrestler struggles to throw his opponent during competitions in Khonoma in 2002. The winners went on to represent the village at higher-level competitions. Wrestling was often used to settle disputes, believing that the spirits would intervene to ensure success of the person on the side of right.

Plate 3-174. Khonoma continues its old tradition of erecting stones – but now for different reasons. This one was erected in 1997 to commemorate the 100th year since the Baptist Church's arrival in the village. The inscription reads, "For Christ and His Kingdom. In Commemoration of Centenary Celebration, 1997, Baptist Church, Khonoma. Let everything that has breath praise the Lord. Ps. 150:6".

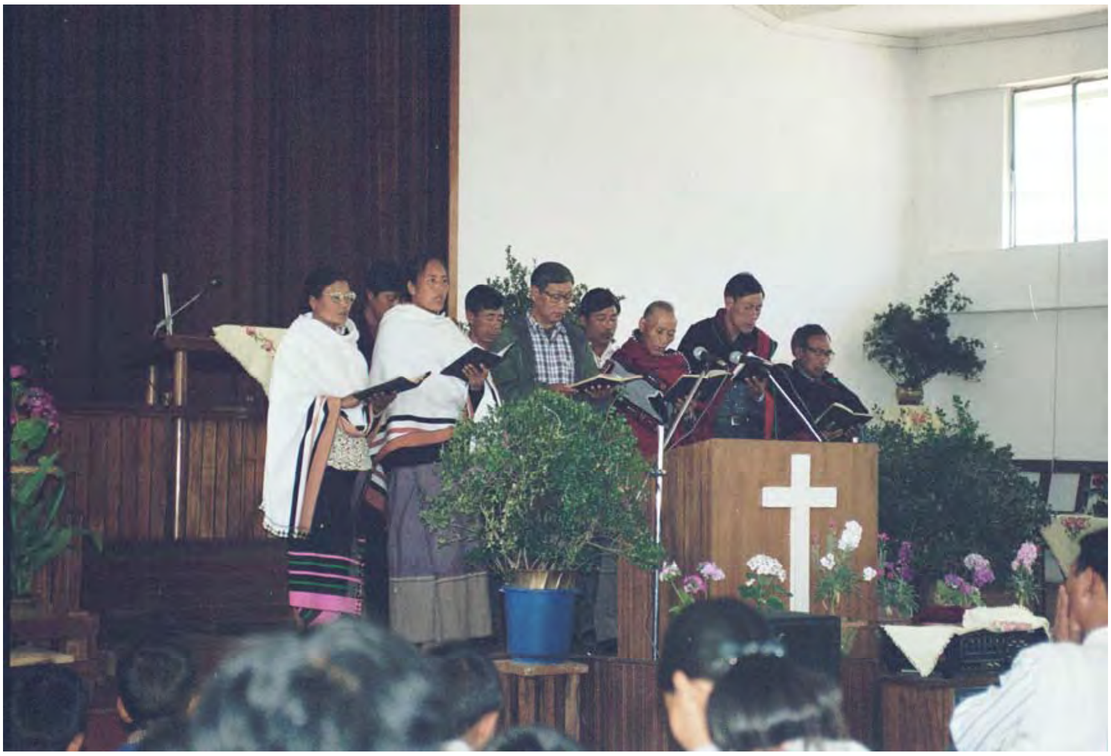



Plate 3-175. A choir sings a hymn during one of the Baptist Church's morning services. Several of the singers are from households that participated with the research by keeping diaries on their fields. Source: Khrieni Meru

Plate 3-176. A Khonoma couple get married in a Baptist Church in Kohima. As part of the Christianization of Nagaland, weddings have become very Westernized. But there continues to be a Naga flavor in that many pigs, cattle and mithun are slaughtered and their heads displayed to indicate the prestige of the marrying couple and their families (see plate 3-115).

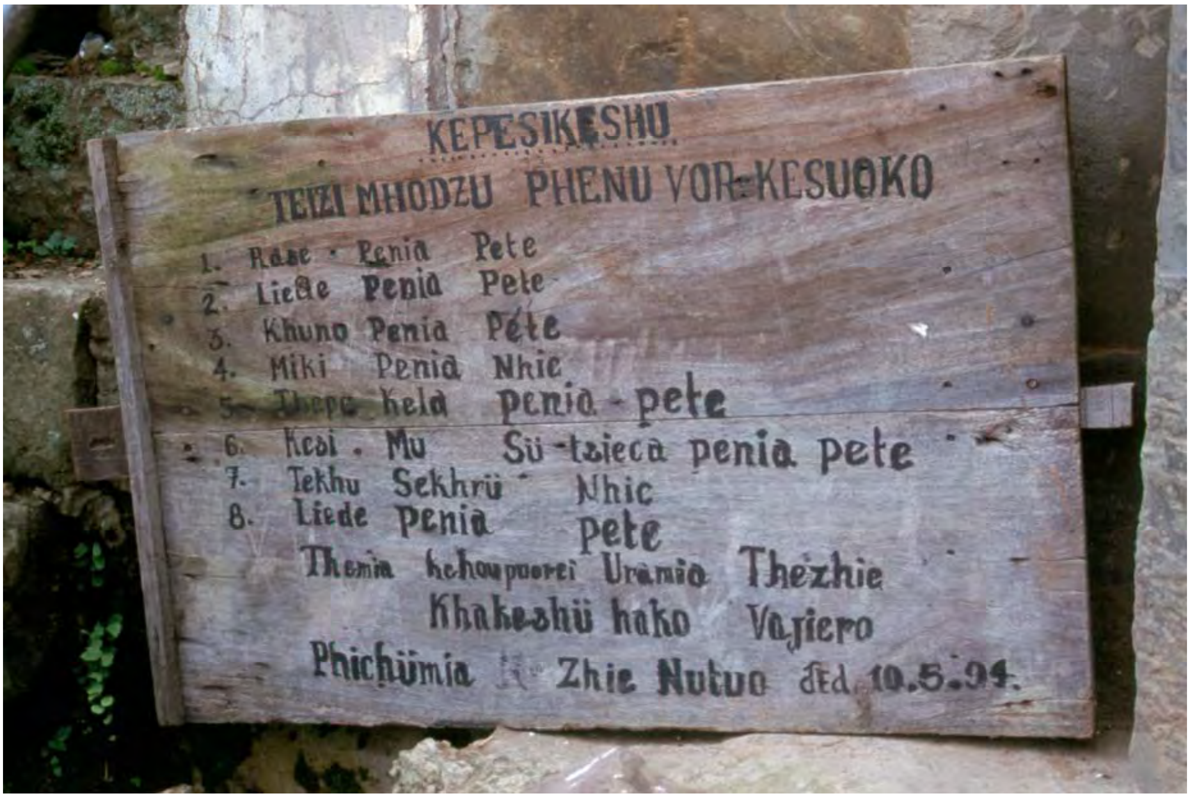


Plate 3-177. In the shadows of the towering Baptist Church, a wooden signboard feebly tries to assert the old rules of genna that were strictly followed prior to the arrival of Christianity. It translates as follows:

"Kepesikeshü (Notification)

No-work days on which returning to the village before dark is taboo:

1. On all Rase genna days.
2. On all Liede, harvest initiation ritual, days.
3. On all days that are genna for animals.
4. On miki ritual genna days.
5. On all thepe kela genna days, genna to ensure protection against epidemics and diseases.
6. On all sowing ritual days of paddy and Job's tears.
7. On rice transplantation initiation ritual days.
8. On all harvest genna days.

Anyone who violates these regulations laid down by the village shall be penalized as per custom. Date: 10.5.1994. (Translated by E. Iralu.)

The modesty of the signboard and its fading message mirror the declining authority of the "Ancients". Only 65 households, mostly in Thevomia khel, continue to follow their traditional religious beliefs.

d) Evaluating Change by Comparing Old Photographs with New

When examining photograph archives, it can be especially useful to juxtapose them against similar views photographed during the period of fieldwork. This can enrich our understanding of changes that have taken place in the interim. The following selection of photographs attempt to pair old and new photographs in just such a manner. When available, the photographers' original captions are presented along with their older photographs, and I have added my own comments to those taken during the fieldwork.

Plate 3-178. "Distant view of Khonoma village." Photographer: J.P. Mills, 1918-1945. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-179. As visitors approach from Kohima, upon rounding a bend in the mountain road, this is their first glimpse of the notorious Khonoma village that looms so large in the annals of the history of the Naga Hills.

Plate 3-180. "View of Khonoma village, showing circular stone sitting-platform (tehuba) [thehou] situated in front of house of the descendant of the village founder (Kemovo). Behind the houses are flights of irrigated terrace fields on which wet rice is grown, and on the hills to the right dry 'jhum' terraces for the cultivation of dry rice, Job's tears, etc." Photographer: J.P. Mills, 1918-1945. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-181. Besides the obvious changes in house construction, the landscape also hints at the reduction in land use pressures that has taken place in the interval since Mills took the first photograph. Tree cover has expanded, even to the point of reclaiming some of the upper rice terraces.

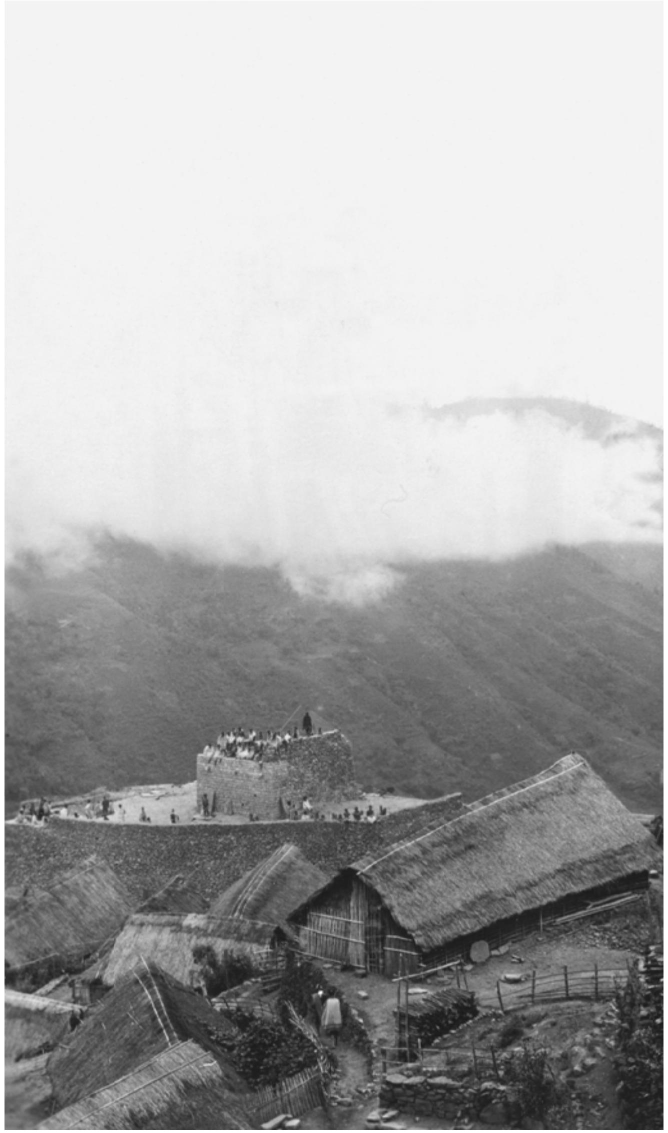
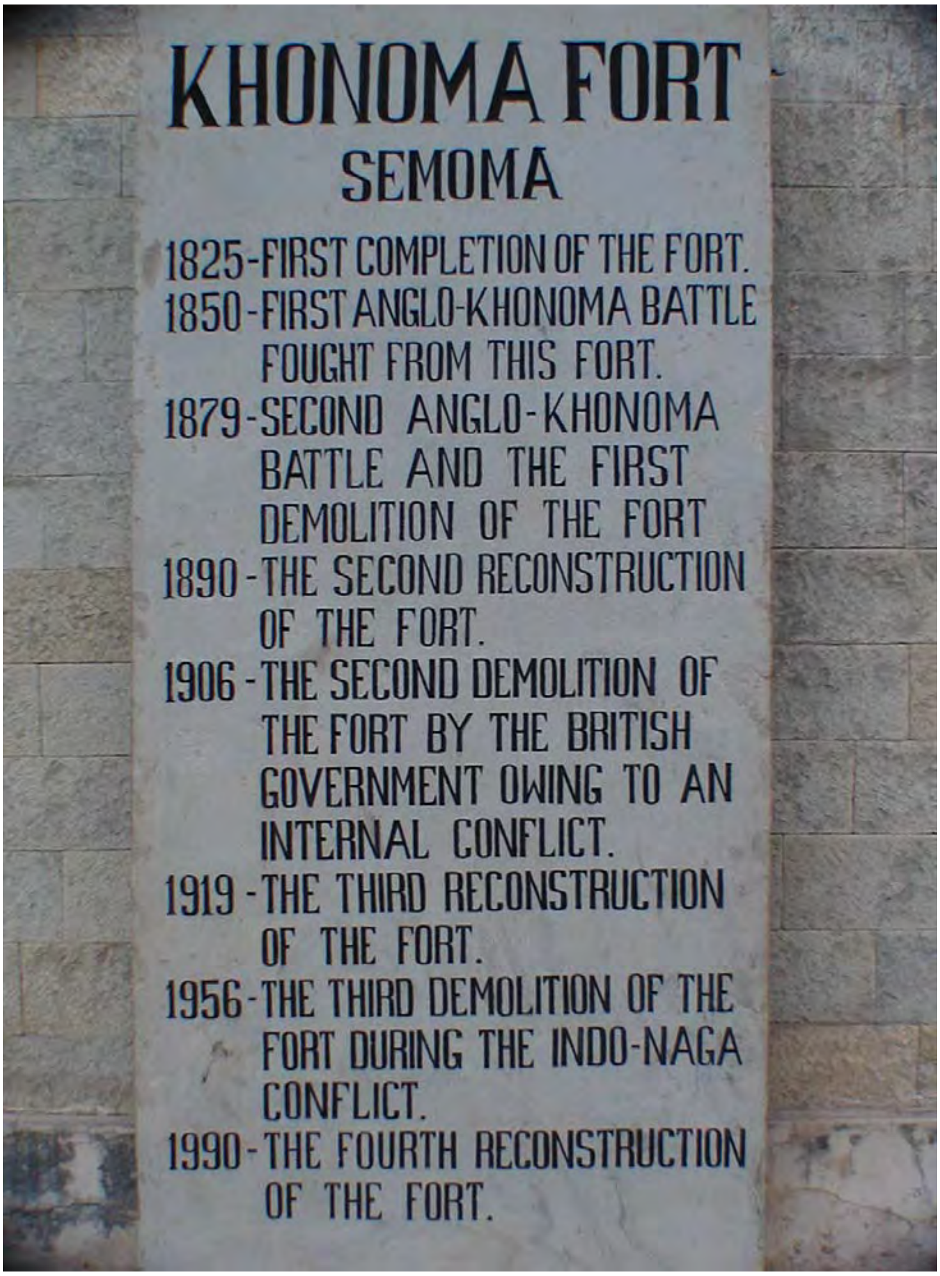


Plate 3-182. "The Semoma [Semomia] dahu (built in 1923), Khonoma." Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-183. Seventy-eight years after Hutton described Khonoma's khels competing to build the most impressive dahu, this photograph shows the changed appearance of the Semomia fort and its surroundings. Mezoma village is clearly visible in the background of the later photograph, but was shrouded behind clouds when Hutton recorded the building activities in 1923 (see appendix 3-9).



KHONOMA FORT
SEMOMA
1825-FIRST COMPLETION OF THE FORT.
1850-FIRST ANGLO-KHONOMA BATTLE FOUGHT FROM THIS FORT.
1879-SECOND ANGLO-KHONOMA BATTLE AND THE FIRST DEMOLITION OF THE FORT
1890-THE SECOND RECONSTRUCTION OF THE FORT.
1906-THE SECOND DEMOLITION OF THE FORT BY THE BRITISH GOVERNMENT OWING TO AN INTERNAL CONFLICT.
1919-THE THIRD RECONSTRUCTION OF THE FORT.
1956-THE THIRD DEMOLITION OF THE FORT DURING THE INDO-NAGA CONFLICT.
1990-THE FOURTH RECONSTRUCTION OF THE FORT.

Plate 3-184. This stone tablet standing in front of Semomia khel fort records the major events impacting on it since its original construction just seven years before the first British expedition penetrated into the Naga Hills in search of a route to Assam. The inscription reads:

"Khonoma Fort, Semoma

1825 – First Completion of the Fort.
1850 – First Anglo-Khonoma Battle Fought from this Fort.
1879 – Second Anglo-Khonoma Battle and the First Demolition of the Fort.
1890 – The Second Reconstruction of the Fort.
1906 – The Second Demolition of the Fort by the British Government Owing to an Internal Conflict.
1919 – The Third Reconstruction of the Fort.
1956 – The Third Demolition of the Fort during the Indo-Naga Conflict.
1990 – The Fourth Reconstruction of the Fort."

Plate 3-185. "Long view of Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

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Plate 3-186. Fifty-nine years after von Fürer-Haimendorf wandered around Khonoma with his camera (1936), I followed behind making my own exploratory visits (Nov., 1995). Interestingly, comparison of our photographs reveals that we both climbed some of the same slopes and framed some of the same views in our camera lenses.

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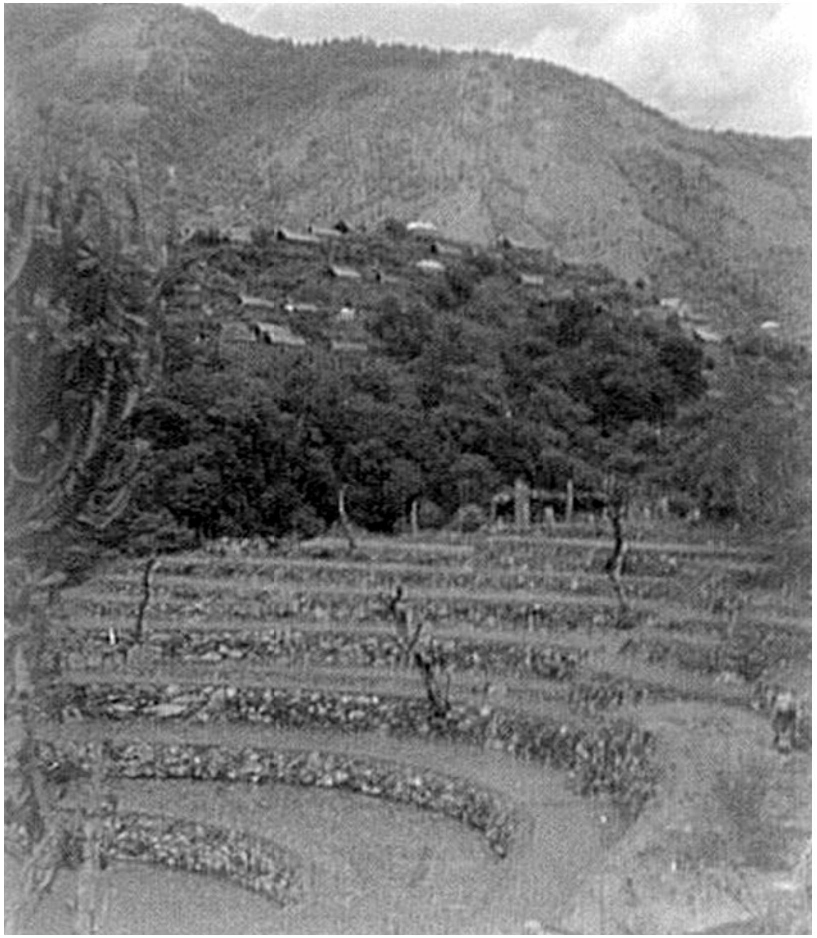


Plate 3-187. "Terraces of stone with village of Khonoma in background." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-188. The spur that Khonoma perches on now has a distinctly more crowded appearance than when von Fürer-Haimendorf visited in 1936 – but in fact, the village's population has dropped since then. Old British diaries often described Khonoma as a village of 600 to 700 households, but our own survey during the fieldwork counted only 391 that remain occupied. Many houses sit empty, their owners gone to Kohima, Medzephema or Dimapur in search of easier ways of making a living. Other types of infrastructure such as schools, churches, shops, latrines, water tanks, etc. may account for the increasingly congested appearance.

Plate 3-189. “Khonoma, Sept. 29, 1941.” Photographed by R.N. Reid. Source: Reid Collection: papers and diaries of Sir Robert Neil Reid (1883-1964), Indian Civil Service, Bengal 1907-42, Governor of Assam 1937-42, Acting Governor of Bengal 1938 and 1939, archived in the Oriental and India Office Collections, British Library, London.

Plate 3-190. Another view of the Khonoma hill reinforces the impression of increasing congestion and perhaps less organization. In the top photograph, captured by Reid in 1941, at least some of the houses were aligned in an east–west direction to take advantage of the sun. The houses were bigger, made to accommodate the livestock that crowded into the first two rooms every evening (see figure 3-11). By the time that Khonoma was rebuilt after its destruction in 1956, most villagers were aware of the hygiene problems of keeping livestock under the same roof as humans, and built smaller houses with cement walls and corrugated iron roofing.

Plate 3-191. "An Angami near Khonoma." Photographer: W.G. Archer, 31.12.1946. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-192. A similar view looking down the Ketsaju valley during the period of fieldwork.

This series of photographs revisits the same village gate three times: first with Hutton between 1913 and 1928; then returning with von Fürer-Haimendorf in 1936; and finally, during the period of fieldwork in 2000-2001.

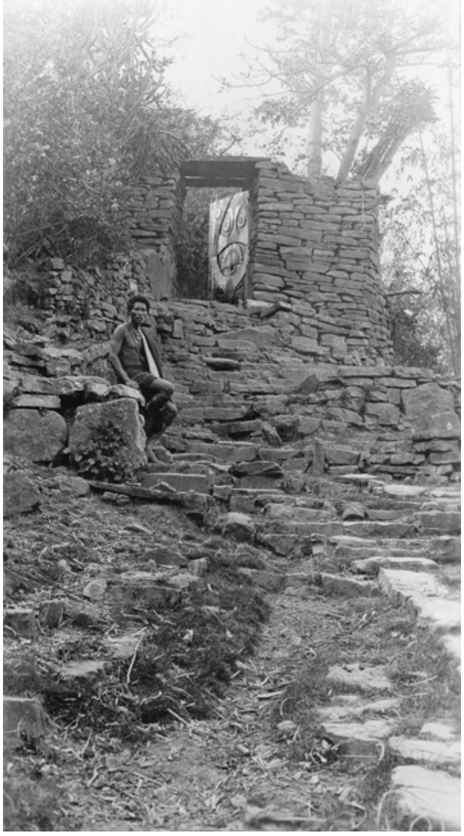


Plate 3-193. "Khonoma gate." Photographer: J.H. Hutton, 1913-1928. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-194. "Man standing in doorway of massive wall of Khonoma village." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-195. By the time of this fieldwork, the rough stepping stones had been transformed into a neat staircase of dressed stone (see also plate 3-141). This improvement was supported by a grant from the state Government. The work was divided amongst the various age groups, each taking responsibility for a different section of the staircase.

The main road that passes through Khonoma was also covered with stone through a similar division of work amongst the clans whose land is intersected by the road. One section of the road remains undone because the owning clan disagreed with the project – an interesting example of Angami democracy.

Plate 3-196. "Painted wooden gate at Khonoma." Photographer: C. von Fürer-Haimendorf, 27.06.1936. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-197. The wooden gate that von Fürer-Haimendorf photographed in 1936 can now be found leaning against a back wall, abandoned since 1983 when Merhümia khel replaced it with a gate of a similar pattern chiseled from stone (see plates 3-102 and 3-152). Source: Daniel Buckles, IDRC, 1996.

This photograph series was taken from the Merhümia khel fort, at the highest point of the village, and looking toward the southern jhum blocks (map 5-3).

Plate 3-198. This first photograph shows a distant view of the temporary Dzükhweke settlement that Merhümia khel and Kuotsuma clan of Thevomia khel established in 1958, after the Indian army allowed them to begin returning to Khonoma, but insisted that both they and Semomia khel remain outside the main village site (see plate 3-80 for a closer view of the Dzükhweke settlement). Source: Khuwhesü Chase

Plate 3-199. By the time of this second photograph, the Dzükhweke settlement had disappeared from the landscape and the area had returned to jhum cultivation. The houses visible on the left of the photograph show the fringe of Merhümia khel houses that began rejoining the main village in 1970. Source: Khuwhesü Chase

Plate 3-200. By the time of the field research, the pendulum had begun to swing in the other direction and families eager to escape the congestion of the main village (see plates 3-139 – 3-142) were returning to the village outskirts to build houses. This has become an increasingly attractive option as Nagaland has become more peaceful and numbers are no longer needed for safety.

This series of photographs reveals the changes that have taken place on a southern slope of Khonoma over the past half-century. This particular part of the village is owned by the powerful Merhümia khel – that historically provided the fiercest opposition to invading British and later Indian armies.

Plate 3-201. The first photograph is dated as 1958, and shows a virtually empty, grassy knoll (known as Nhakha) in the aftermath of Khonoma's destruction by the Indian army in 1956. Source: Tsielie Sakhrie

Plate 3-202. Although undated, this second photograph appears to have been taken sometime after 1970, when Merhümia khel was in the midst of relocating from the temporary Dzükhweke settlement (plates 3-198 – 3-200) back to its traditional lands within the main village. Corrugated iron sheeting had become available by this time, and replaced thatch roofing. Source: Khuwhesü Chase

Plate 3-203. By the time of my field research in 2000-2001, the density of houses had increased significantly and the skyline was dominated by the Baptist Church – constructed between 1979-1982.

Plate 3-204. In 1972, members of Khonoma's Baptist Church erected a cross on Whophera, one of the highest peaks (2868 m asl) overlooking the valley, to mark the diamond jubilee (75 yrs) celebrations of Christianity in Khonoma. Erecting crosses on high vantage points is commonly seen throughout Nagaland's countryside. Source: Sangutuo Chase

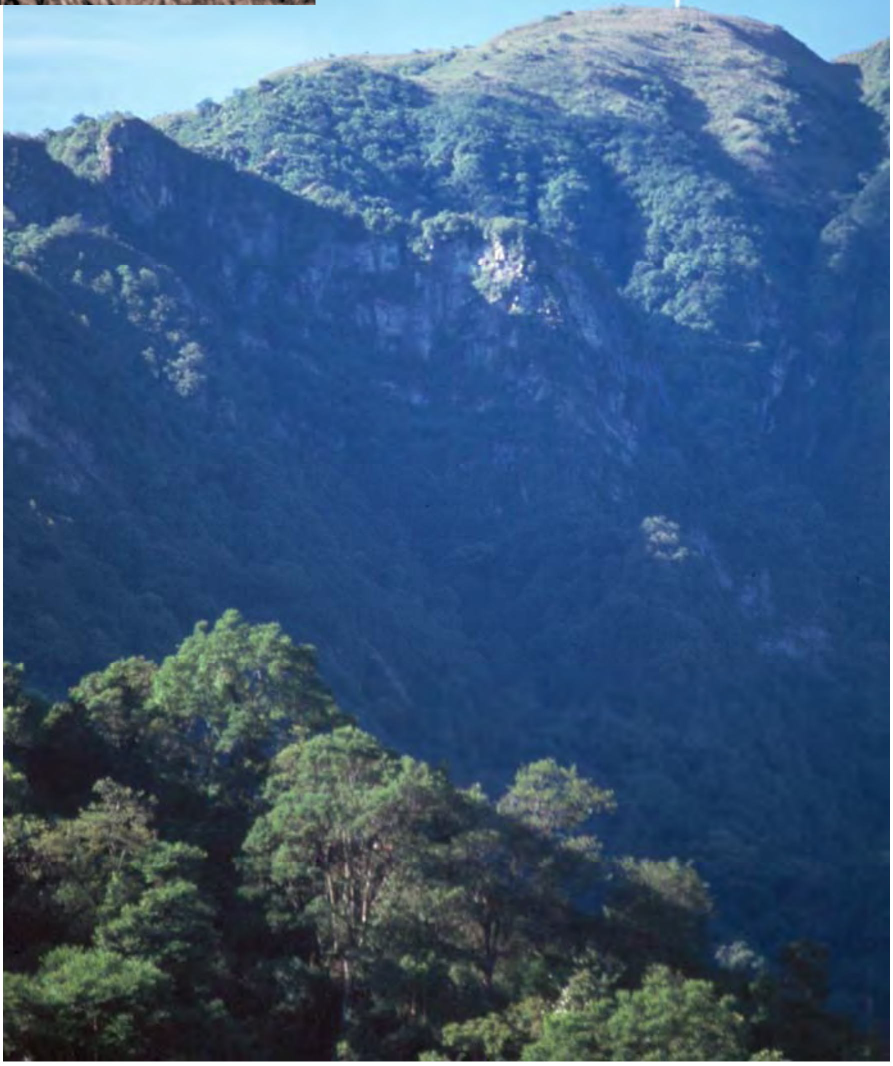


Plate 3-205. High on the ridges behind Khonoma, the cross gleams in the early morning light.

Plate 3-206. "Woman's grave, Khonoma." Photographer: J.H. Hutton, 1917-1923. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-207. Vilarhizo (Ngabi) mu Whevitoü unie ba. Unie Nuonuoko – 1. Pekruvito, 2, Zakievi, 3. Dovihu, 4. Vichühu, 5. Ningukhrieno. Title Chase. Dt. 6th Jan. 2000.

Plates 3-206 – 3-207. The arrival of Christianity also brought changes in Naga funeral ceremonies. It had been customary to place the deceased's possessions at the grave for use in the next world – but this has now been substituted for a grave stone. The stone shown above eulogizes the deceased's profession as a gunsmith.

Plates 3-208 – 3-209. At least superficially, Thekranyi celebrations during the fieldwork appeared very similar to the grainy photos of past years (1975 shown above). Now though, the unmarried women no longer shave their heads. And as hornbills have become rare in Nagaland, plastic replicas of its feathers are often used in the men's tsüla headdresses (code 16.5.4 in appendix 5-7). Source: Kono Punyü

Source: Khrieni Meru

Plates 3-210 – 3-211. Besides the unshaven heads, little appears to have changed in the tradition of young girls going to the forest during the Sekrenyi festival and accepting the offerings of admiring boys that accompany them. Returning with a basket piled high with wild fruits and vegetables, and usually the white pith of *Trevesia palmata* (tirhü) used in decorating, confirms the value of that girl in the eyes of her male peers. Source of upper photograph: Tsolie Chase

Source: Tsolie Chase

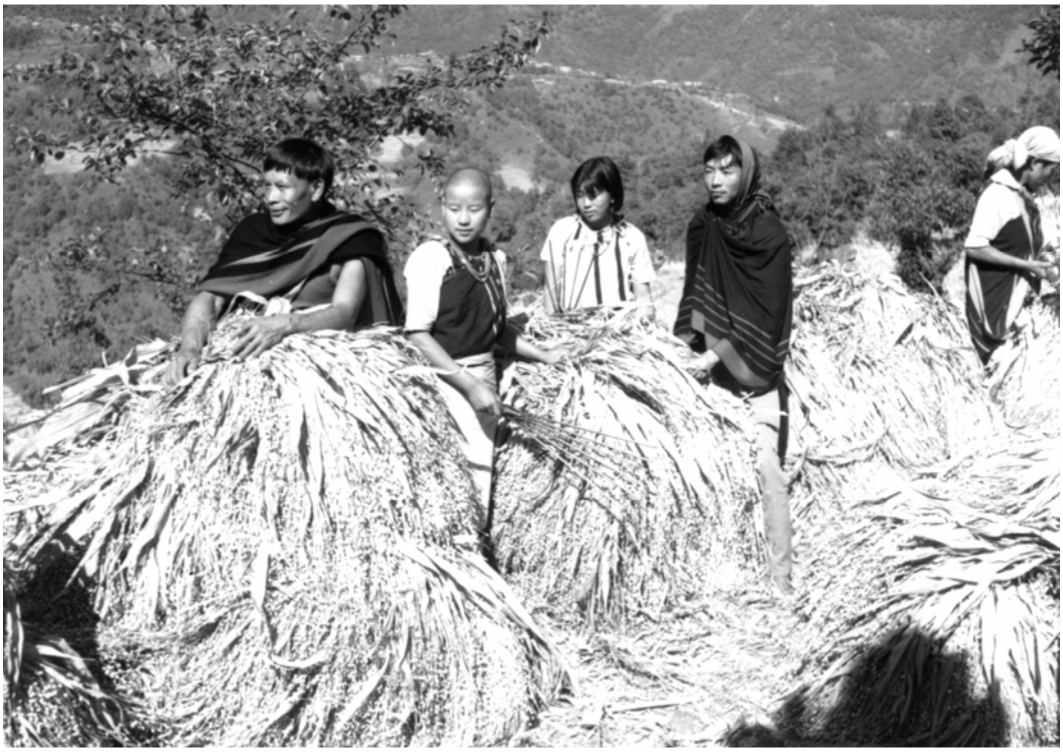


Plate 3-212. "Group of men and women harvesting crop of Job's tears (*Coix lacryma-jobi*)." [Note that as recently as 1986, at least some of the young women in Khonoma continued to shave their heads until marriage.] Photographer: M. Ganguli, 1986. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-213. The technology used in producing Job's tears had not changed, but the acreage planted was rapidly shrinking as farmers turned to commodity crops. Its demise was further hastened by the church's exhortations on the evils of alcohol – much of which had traditionally been brewed from Job's tears.

Golano Talie (L) and Nimegoto Talie (R). 1965. Source: Golano Talie

Plates 3-214 – 3-215. A young couple stand rigidly in this old black and white photograph – compared to the more relaxed demeanor of the pair that posed for me during the fieldwork. But the main difference is that when the older photograph was taken, those items of dress would still have been everyday attire – whereas my models had to get dressed up for the photo shoot. Traditional dress is now pulled out of storage only during festivals and other special occasions.

Plate 3-216. "Visarr dressed for Thekrangi [Thekranyi] genna, Khonoma." Photographer: J.H. Hutton. Source: Photograph and Manuscript Collections, Pitt Rivers Museum, University of Oxford.

Plate 3-217. Visie Thoü of Khonoma's Merhümia khel prepares to participate in the Hornbill Festival in 2001. A silver lining to Nagaland's long isolation from the outside world is that it has helped Nagas to retain their culture and sense of identity. That will come under increasing threat, however, as more Nagas travel outside for education and work, internet and satellite television contribute to the homogenization of world cultures, and Christianization continues to dismiss old cultural practices as primitive and sinful.

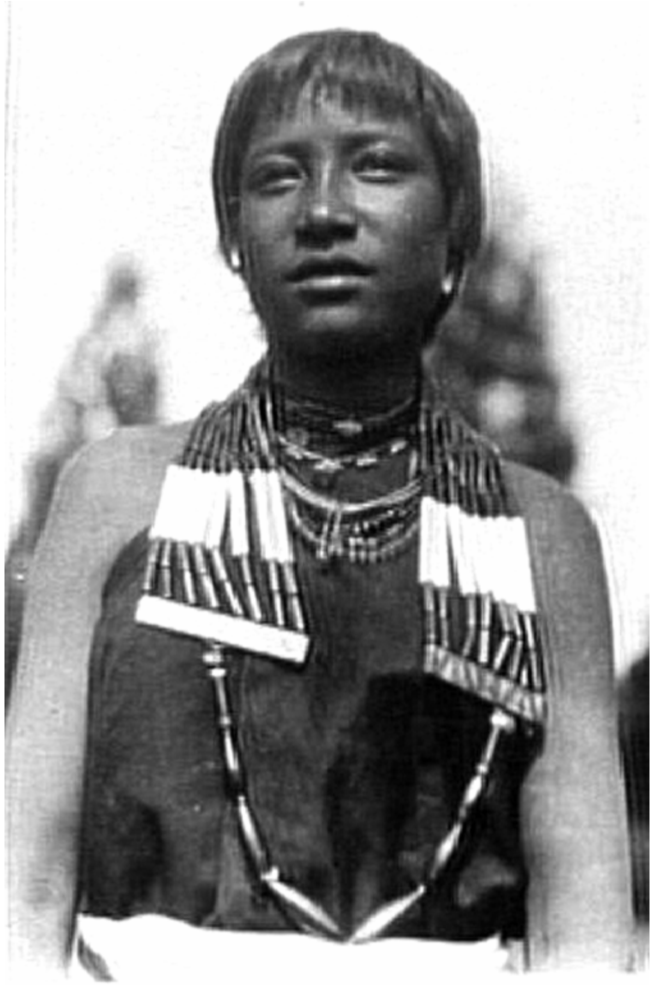


Plate 3-218. "Young woman with the growing hair which marks her status as a newly married woman. Western Angami, Khonoma village." Photographer: J.P. Mills, 1918-1945. Source: The Angami Nagas: A trial database of materials on British contact with the Angami Nagas (CD ROM).

Plate 3-219. The frank openness with which this young woman regards the camera hints at the increasing confidence of Angami women as they now often outperform their brothers at school and compete for jobs in the work force. This must be a particularly uphill battle in Khonoma where the men, even by Angami standards, are renowned for their extreme chauvinism.

Plate 3-220. Two young girls (Kelese Thoü (L) and Nichüsino Terhüja (R)) pose in their traditional finery, probably donned in celebration of the Thekranyi festival. The photograph was taken in the old Dzükhweke area in 1966. Source: Mhiechürüdono Punyü

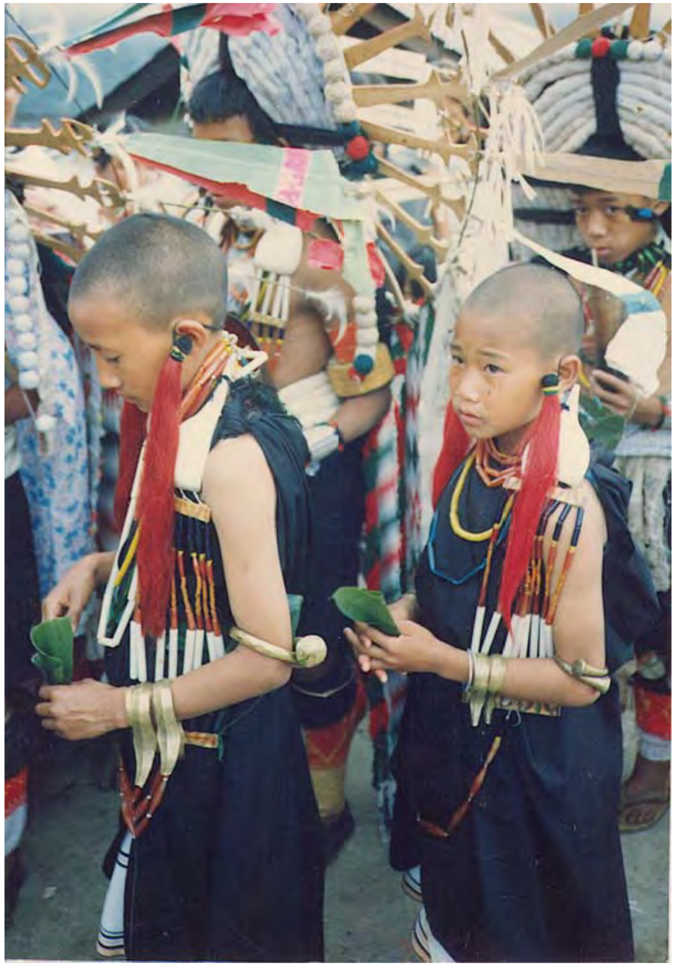


Plate 3-221. Sometimes mere children also take part in the Thekranyi festival. Source: Viu Meru

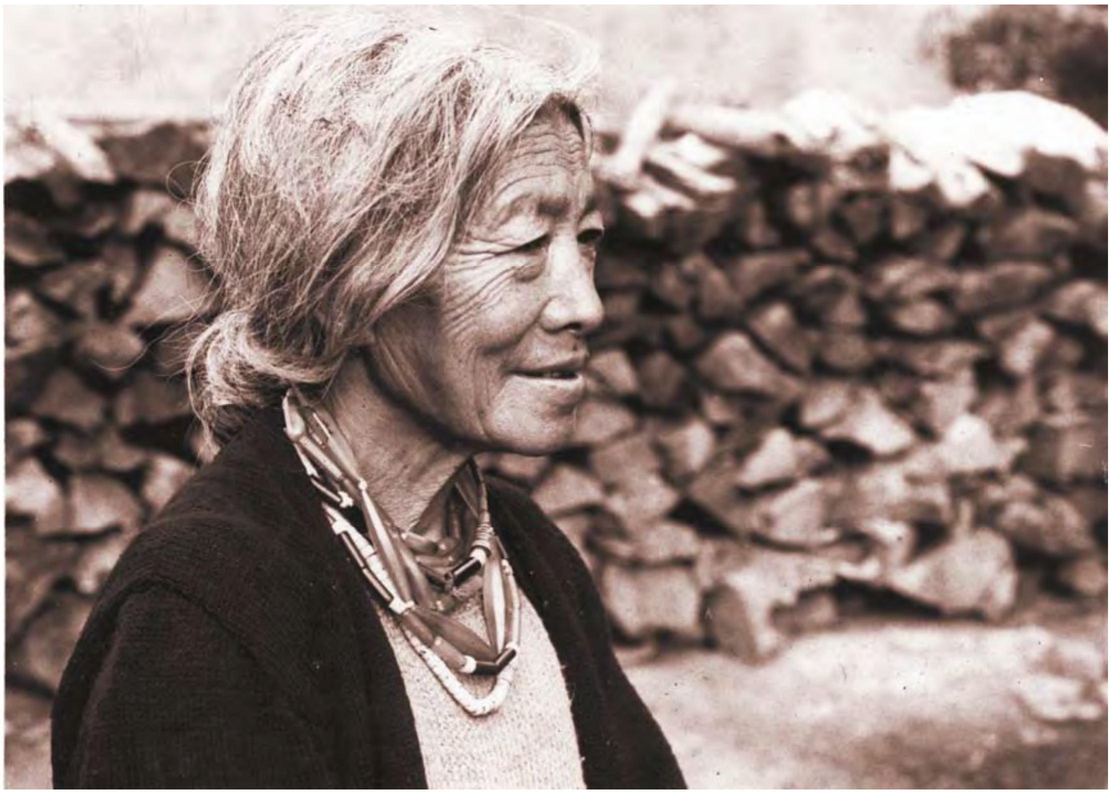


Plate 3-222. While searching through villagers' photographs, I often encountered younger images of people that I had become acquainted with during my stay in Khonoma. One such person was Kielano Thoü, whose husband (Miakonyü Thoü) continues to perform the first sowing rituals for the village every year. Source: Kielano Thoü

Plate 3-223. When I came to know her, Kielano's face still betrayed a twinkle in her eyes and warmth of character. She never failed to scold me for photographing an elderly woman like herself instead of one of the young village beauties, but nonetheless took obvious pleasure in posing. Although her strength was failing her, I nevertheless often met her on a village pathway fetching water or working in the fields.

e) Portraits of Khonoma Villagers Taken During the Field Research ...

During the 2.5 years that I lived amongst the Angami, my camera was never far from my fingertips. This provided invaluable opportunities to capture my hosts on film as they went about their lives. They were immensely patient with my photographic intrusions. As the research continued, my more successful attempts were posted on my office walls to remind myself of the Khonoma villagers that were the subject of my research. To conclude the photograph gallery for this chapter, I present – without comment – a selection of them.

Plate 3-224.

Plate 3-225.

Plate 3-226.

Plate 3-227.

Plate 3-228.

Plate 3-229.

Plate 3-230.

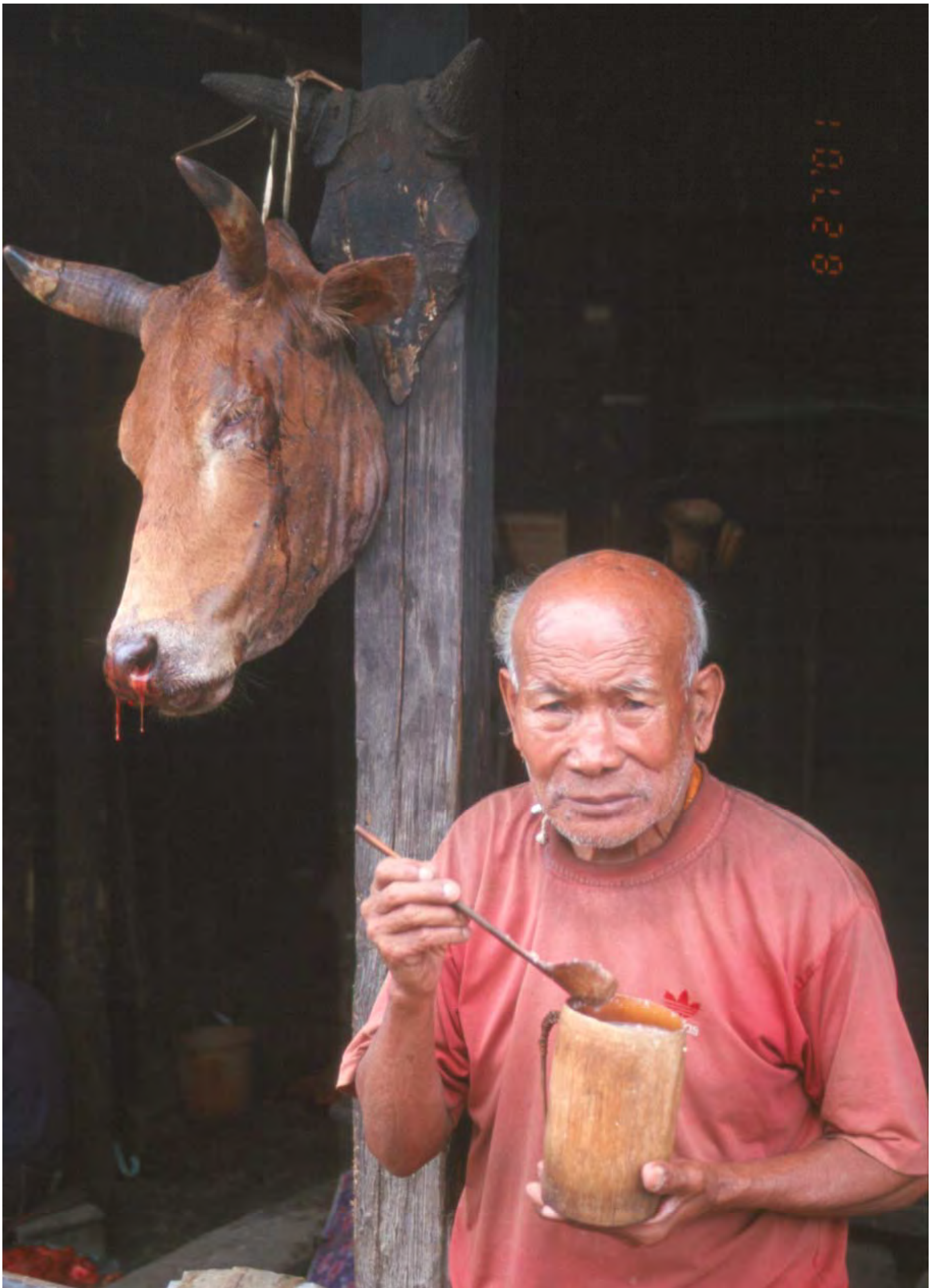


Plate 3-231.

Plate 3-232.

Plate 3-233.

Plate 3-234.

Plate 3-235.

Plate 3-236.

Plate 3-237.

Plate 3-238.

Plate 3-239.

Plate 3-240.

Plate 3-241.

Plate 3-242.

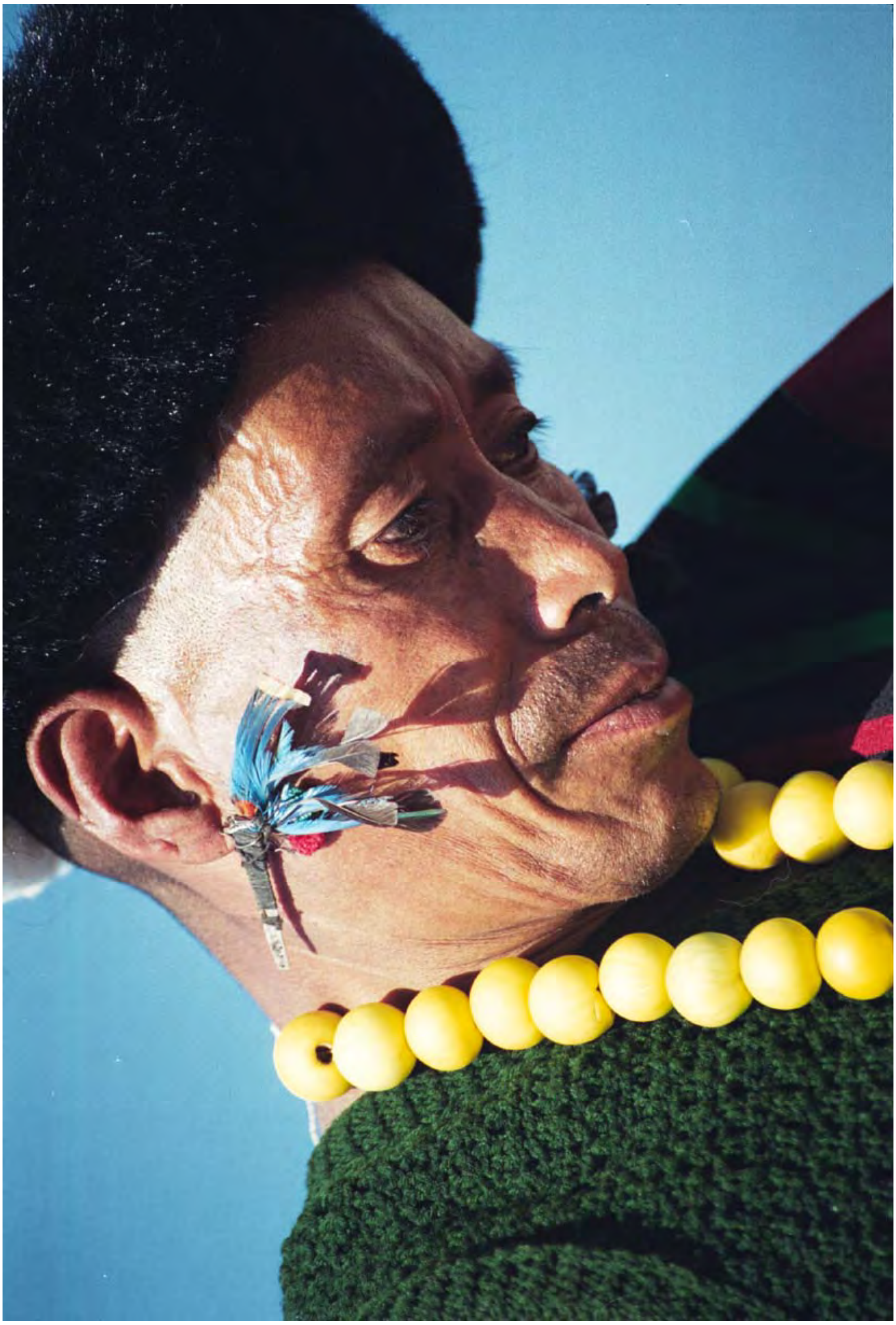


Plate 3-243.

Plate 3-244.

Plate 3-245.

Plate 3-246.

Plate 3-247.

Plate 3-248.

Plate 3-249.

Plate 3-250.

Plate 3-251.

Plate 3-252.

Plate 3-253.

CHAPTER 4

The Land and its Ownership

PHOTOGRAPH GALLERIES

The Land Known as Khwünoria ...

Plate 4-1. Khonoma looms large in the annals of N.E. India's history – as a warrior village that demanded wide tribute from less powerful Naga villages (pre-1841), as the most notorious of the Western Angami Group that fiercely resisted the British (1841-1879), and more recently, as the birthplace of the Naga independence movement (1947).

These opening photographs provide geographical context for the village and its surroundings. They support the mapwork in this chapter and help bring the landscape to life for the reader.

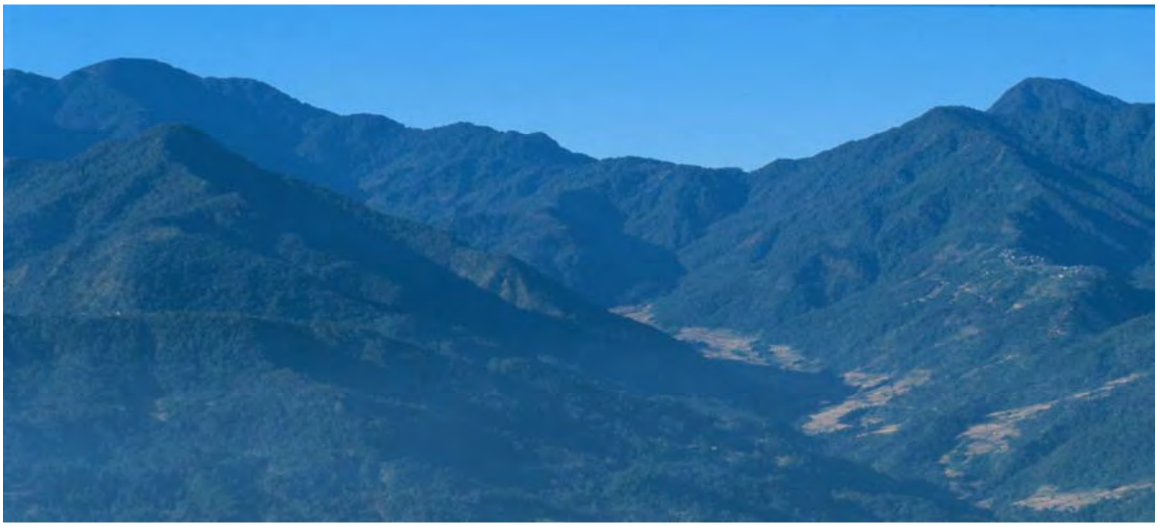


Plate 4-2. A long valley penetrates the heart of the Western Angami group of villages, much of it terraced for wet rice cultivation. Secüma village sits on a spur on the far right of the photograph.

Plate 4-3. This valley extends in roughly a south-west direction about 19 km, where it then veers south and ends abruptly in a basin surrounded by offshoots from the Barail range. Mezoma sits on a lofty perch on the northern side of the valley (right), directly across from what had been (prior to the establishment of Dzulake in 1848) the last Angami outpost – Khonoma.

KHONOMA VALLEY

The different faces of Khonoma …

Plate 4-4. … from the west. This angle shows Khonoma hidden behind a mountain from the rest of Angami territory.

Plate 4-5. … from the south, from a vantage point further up the same spur on which Khonoma sits.

Plate 4-6. … from the east. This is the angle that most visitors see as they approach the village from Kohima. If you continue past Khonoma and ascend the western ridge of the basin, then you enter the Dzulake Valley (plates 4-23 – 4-30) and beyond that is Zeliangrong territory.

Plate 4-7. ... and from the north. This is the view as seen from Mezoma. Beyond the ridge behind (south of) Khonoma is the picturesque Dzükou valley (plates 4-19 – 4-22) and then the Manipur border. Some postulate that Khonoma's isolation in this rugged corner of Nagaland probably contributes to the conservative nature of its people.

Plate 4-8. In winter, day breaks late over the eastern ridge – and by 3:30 p.m., the sun is already dipping behind the western peaks and casting a shadow across the Khonoma valley. This creates short days and long, cool nights. People go to bed particularly early this time of year because the days are short, the nights are cold, and the electricity is often out.

Plate 4-9. When Khonoma was settled some 600-700 years ago, its Angami founders were undoubtedly attracted to the potential of carving wet rice terraces into the wide valley floor.

Plate 4-10. But the upper reaches of the valley were too cold for rice, and thus retained as dryland for cultivation of Job's tears, maize, millets, chillis, beans and other crops needed to supplement the rice from the terraces below. The cold and damp conditions, sheltered by the surrounding mountains, provided ideal conditions for alder and was the crucible in which Khonoma's ancestors experimented with this useful pioneer species and eventually developed the dispersed alder system.

Plate 4-11. Behind the jhum cultivation area to the south, rise up perpendicular walls of grey rock and forests, providing a majestic backdrop to the village. During the monsoon season, clouds lying in the lower valleys during cool nights begin to move up the valley toward Khonoma as the sun rises and temperatures warm up. They are often trapped by the high ridges that tower behind Khonoma, leaving the village under frequent cloud cover.

Plate 4-12. High on a cliff behind Khonoma is a rock formation that appears eerily like a face contemplating the valley below. The villagers know it as 'shükhie-u' and considered it to be the spirit guardian of all wild animals. Its blessing was asked before hunting trips and when successful, some share – usually an ear – would be cut from the game and left for shükhie-u as a gesture of thanks. Failure to provide such a share, it was believed, would cause the meat to shrink in size. (See the opening page of chapter 8 for an artist's depiction of this belief.)

Winter Skylines in the Khonoma Valley ...

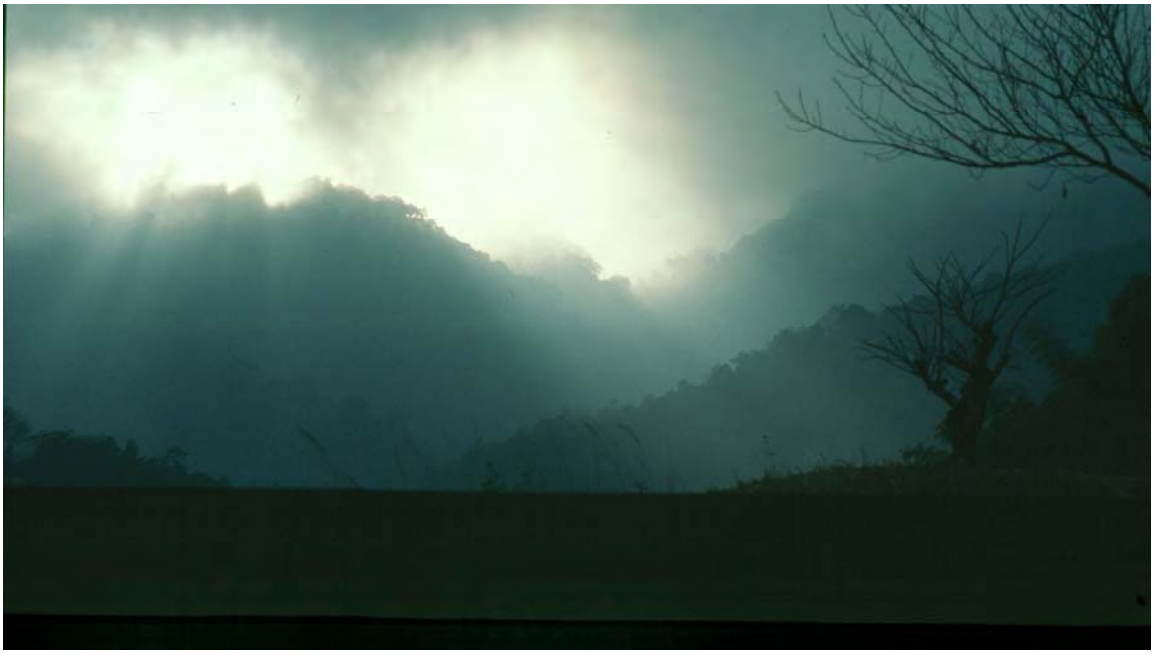


Plate 4-13. Shafts of late afternoon light break through the cloud cover, as the sun prepares to slip behind Khonoma's western ridge.

Plate 4-14. Clouds roll over the eastern ridge, with the memorial to Khonoma's 1879 standoff with the British silhouetted near the site of the old Chakra fort.

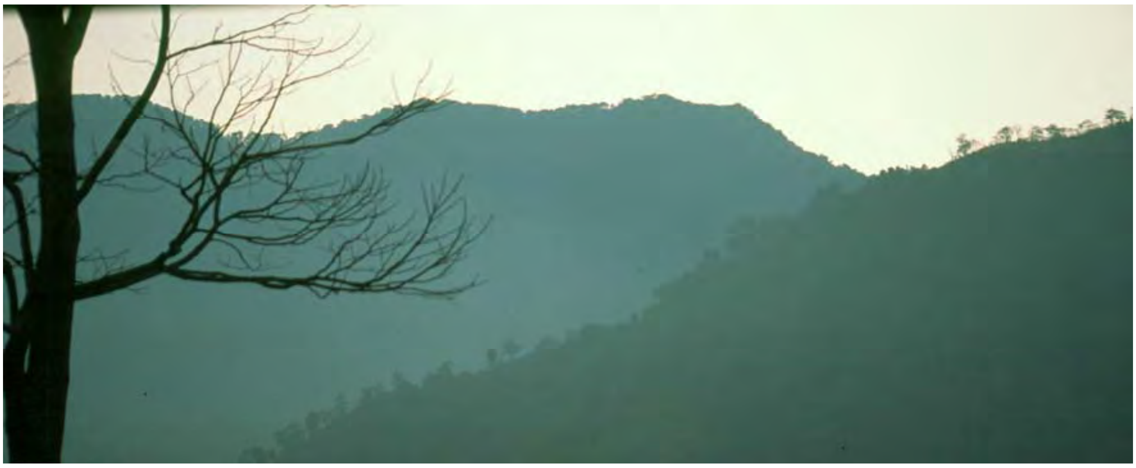


Plate 4-15. Although autumn days are generally clear and bright, evening skies are often grey and somber.

Plate 4-16. The Khonoma valley is often enveloped in thick clouds, accelerating the onset of darkness.

Plate 4-17. Ascending these cliffs, the vegetation transforms to temperate evergreen highland forest. Red and white rhododendrons become plentiful above 1800 m, and provide a spectacular display when they bloom in March.

Plate 4-18. Continuing upslope, by about 2400 m, more maples and oaks are encountered, often heavily bearded with mosses and lichens.

DZÜKOU VALLEY

Plate 4-19. By about 2740 m asl, one reaches the summit of the ridge and finds the picturesque Western Dzükou Valley spread below. The thickets of dwarf bamboo (*Chimonobambusa callosa* (Munro) Nakai) give it a carpeted appearance. Although snow-covered in winter, herds of Indian elephants are reported to have frequented this valley until about 1956.

Plate 4-20. The presence of the rare tragopan (*Tragopan blythii*) inspired Khonoma to establish the Khonoma Nature Conservation and Tragopan Sanctuary (KNCTS) in 1998 and set aside about 20.59 sq km of its most remote and pristine lands as a conservation area.

Plate 4-21. The *Gaultheria fragrantissima* Wall. bush (khwüno) from which Khonoma derives its name (Khwünoria = khwüno / people of) is common in this area.

Plate 4-22. Dzüpfü Dzüvo waterfalls near the border with Manipur. This brings us to the southern fringe of Khonoma's territory. (Photograph by Teisozhavi Theunuo.)

DZULAKE VALLEY

Plate 4-23. But if we travel from the village in a western direction, and climb up the dividing ridge and over the neck, we find ourselves in the Dzulake Valley at about 1700 m asl. There is no cultivation at this eastern end of the valley – only wandering mithun and sheds used by those charged with their care. The northern flank of the valley is heavily deforested ...

Plate 4-24. ... in contrast to the thick forests that clothe the southern side.

Plate 4-25. Dzulake village is situated near the western end of the valley, about 12 km by road (7.7 km as the crow flies) from Khonoma proper. It was established in about 1848 as an offshoot from Khonoma (Khate, A., 2000). It had grown into a prosperous settlement of about 50+ households by 1953-54, but with the outbreak of the Indo-Naga war, its people were forced to flee and many never returned. Today, it has about 18 permanently occupied houses. This photograph was taken with a telephoto lens, standing a few meters from the camp on the ridge of Dzükou Valley.

Plate 4-26. Parts of the upper slopes on the northern side of the Dzulake valley are too dry and rocky to support tree cover.

Plate 4-27. Smoke rises from the houses as the first rays of morning light penetrate into the valley.

Plate 4-28. The *Livistona* palm is silhouetted against the skyline on a rocky ridge above Dzulake, the only place where it grows in Khonoma's territory.

Plate 4-29. Given the low population and abundance of land and forests, land use is less intensive here. Cattle are an important part of the economy that takes advantage of the abundant fodder resources.

Plate 4-30. Dzulake did not have any rice terraces until about 1911-12, when a variety brought back from the Abor war proved cold tolerant enough to thrive at its 1680 - 1700 m altitude. Since the exodus during the Indo-Naga war, many of these terraces now remain uncultivated.

WESTERN FRONTIER

To reach Kukhwi, a second satellite outpost, one follows a trail that wends westward over the mountains roughly parallel with the village's northern border. This route climbs through forests up to 2560 m, before descending to Kukhwi at about 1342 m.

Plate 4-32. Wild orchids such as this *Otochilus alba* Lindl. are commonly encountered along the mountain trails.

Plate 4-31. The forests all along this route were badly degraded by uncontrolled logging during 1983-1993.

Plate 4-33. Most of Khonoma's forests are an extension of farming systems in that they provide browsing grounds for semi-domesticated mithun (*Bos frontalis*). These animals receive little human handling other than being fed salt from time to time. They are popularly slaughtered for weddings and a mature animal is worth about Rs 12,000.

Plate 4-34. Kukhwi reached its zenith after the Indo-Naga war began in 1956 and many Khonoma families sought refuge there. The Indian army eventually learnt of it and launched a major attack on July 22, 1959 (Iralu, 2003, pp. 195-200). Today, only a few buildings remain and the forest has reclaimed most of the old settlement site.

Plate 4-35. The treeline on the ridge above Khonoma is silhouetted by a winter sunset. Temperatures drop quickly as the sun dips behind the mountains, and villagers congregate around the hearths until bedtime.

CHAPTER 5

The Wider Livelihood System

PHOTOGRAPH GALLERIES

The photograph gallery for this chapter begins with a series of transects that show sweeping views of the various components that together, comprise Khonoma's wider system of land management. These subsystems are visited individually in the following photographs and aim to provide a more holistic view of how the landscape is managed.

VERTICAL TRANSECTS ...

Plate 5-1. ... looking southward towards the ridges that hide the Dzükou Valley behind them ...

Plate 5-2. ... to the west towards the Kukhwi outpost and the Medzephema area beyond that ...

Plate 5-3. ... and a lower angle that shows the transition from irrigated terraces on the valley floor to dryland jhums on the adjacent hillslopes.

… AND HORIZONTAL PANORAMAS

(both created by taking multiple photographs that sweep the landscape and then using graphics software to patch them together into single images)

Plate 5-4. This view from up near the war memorial shows Khonoma's strategic position on a spur that juts out into the valley, and surrounded by mountains. This was the bastion of strength from which Khonoma launched countless raids and earned a prominent place in Nagaland's history of resistance to the British and later India.

Plate 5-5. This is the view from Merhümia khel's fort, looking westward across the Ketsaju valley toward the opposite mountains. This is essentially the perspective depicted as a transect in figure 5-3. Mezoma can be seen perched on a ridge across the valley – the only other village visible from Khonoma. This 180° sweep is somewhat distorted by an exaggerated "fisheye" effect.

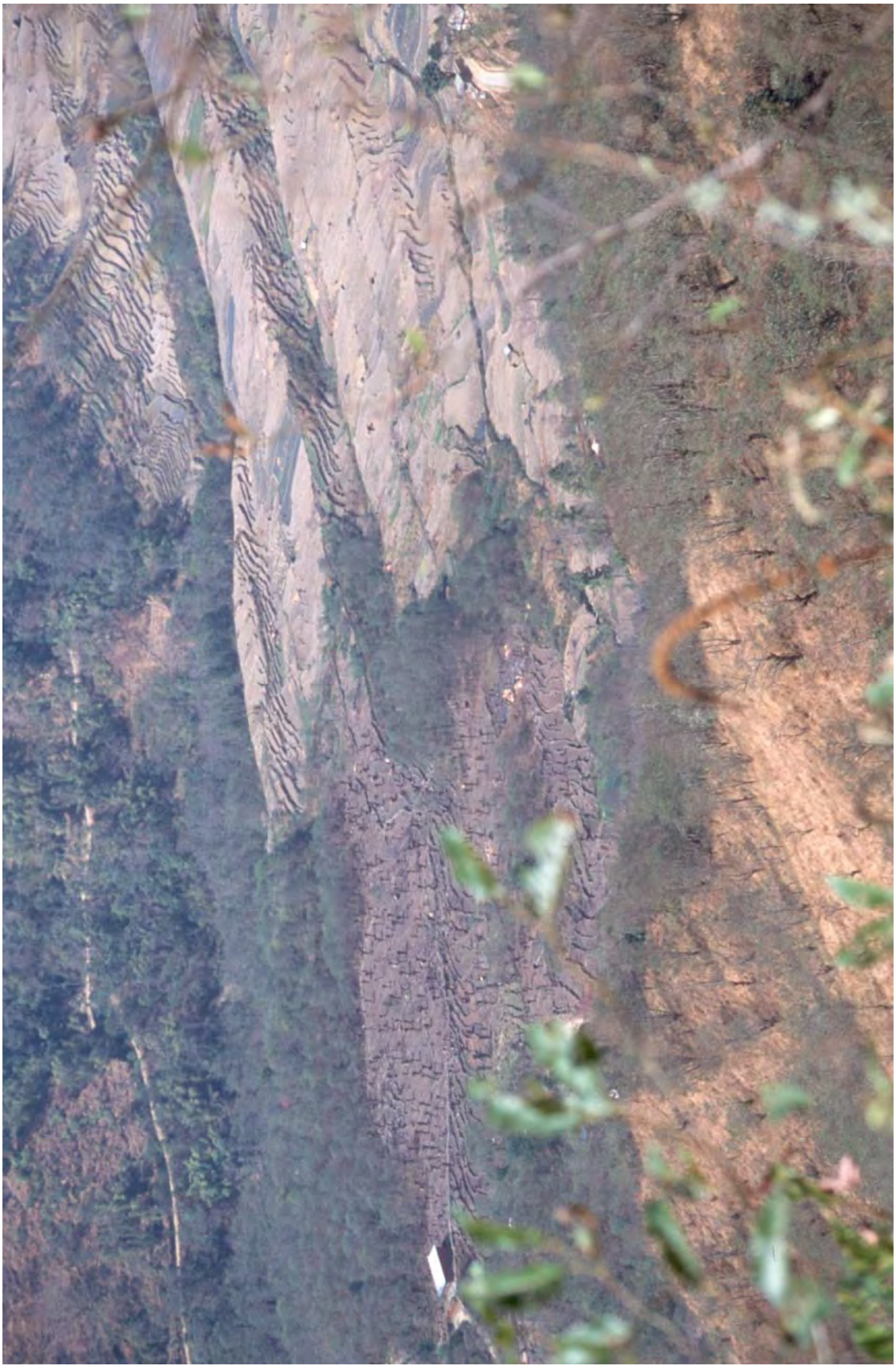
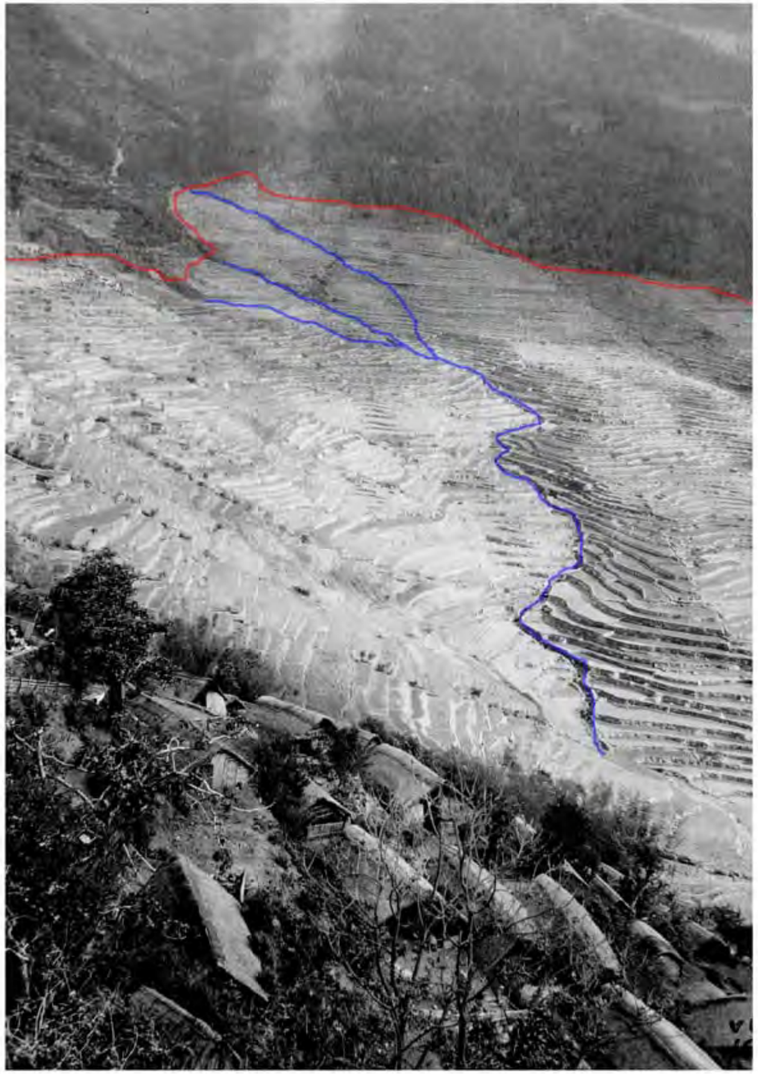


Plate 5-6. Many of the streams feeding Khonoma's terraces originate from the higher altitudes of Japfü Range. Only when they descend to about 1520 m asl does the water warm up sufficiently to support wet rice cultivation. This is thus the zone of transition where cultivation transforms from dryland to wetland. But as can be seen here, the terracing carries through both systems.

Plate 5-7. A closer look at the transition zone – where the lowest jhum fields abut against the highest wet rice terraces. The nature of the contour walls thus changes from loosely-packed rocks in the former – to watertight bunds faced with rock in the latter.

WET RICE CULTIVATION (tekhulie)…



Source: Photograph and Manuscript Collections, Pitt Rivers Museum

Plates 5-8 – 5-9. This photograph (left) that appears in Hutton's seminal work on the Angami (first published in 1921) – when compared to a similar view photographed during the fieldwork (right), shows a modest shrinkage in Khonoma's wet rice terraces over the past century. Some of these upper terraces were marginal for wet rice cultivation in that the irrigation water was either insufficient or too cold, so when warfare reduced land use pressures, alder was allowed to grow and they were converted back to dryland cultivation. See plate 5-44 for a closer look at one such converted field.

Source: Photograph and Manuscript Collections, Pitt Rivers Museum

Plates 5-10 – 5-11. The above shot taken by Milada Ganguli shows what Khonoma looked like during the time of her visit in 1965. The plate below shows a similar view of the village taken during the fieldwork in 2000-2001. The domination of the Baptist church on the village skyline is the most noticeable difference in the later photograph. Although less visible, there has also been a slight contraction of the terraces as many who fled the village during the Indo-Naga war never returned and more marginal terraces on the upper perimeter were converted into other uses.

Plate 5-12. The golden rice terraces slowly turn brown in December as villagers complete the first round of hoeing. The weather has turned cool and suitable for such vigorous physical work.

Plate 5-13. After every hoeing operation, a mallet-like tool called a niekromiedu is used to pulverize the soil lumps. These three women have a unified rhythm, working their way across the terrace almost as a single flailing machine.

Plate 5-14. After preparing a fine seedbed, seeds are broadcasted into rice nurseries in February to March – timed for the arrival of the first monsoon rains.

Plate 5-15. Wet rice often begins in jhum fields on the hillsides – and does not actually become "wet" until transplanted into flooded terraces in the valley in May to June.

Plate 5-16. The valley appears soggy and somber as the rainy season sets in. The seedlings are already well underway in nurseries, but there remains a lull until about May before work begins in earnest to prepare the terraces for planting.

Plate 5-17. The time for transplanting rice demands the largest single burst of concentrated labor within the agricultural calendar, as fields are first prepared and then planted. The squelch of hoes sinking into the mud, followed by the splash of overturned soil falling back into the water can be heard throughout the valley. Monoliths and *Albizia* trees loom out of the fog as silhouettes behind this worker.

Plate 5-18. In a process known as khupone, a bladeful of soil is hoed from the terrace bottom and in one continuous motion, transferred to the opposite hand and flipped on top of the terrace bund. This process is repeated around the entire perimeter of the field.

Plate 5-19. With the height of the bund thus built up, the added soil is then patted down by hand or foot, and then smoothed out. Extra piles of soil are scooped from the field and placed at intervals along the bunds to plug any breaches in the bunds, usually dug by rats or crabs, that might appear later in the season.

Plate 5-20. In a system that mimics the alder management detailed in chapter 2, *Albizia* trees scattered along the bunds of wet rice terraces are pollarded during rice transplanting in June.

Plate 5-21. Flowers and leaves of *Albizia stipulata* DC in June. Pollarding at this time of course prevents them from setting seed.

Plate 5-22. The woody *Albizia* branches are harvested for firewood, and the leaves are worked into the terrace mud as a green manure. Like the alder, farmers note that rice growing nearby the *Albizia* performs better. Climbing beans are often planted at the base of the stumps to take advantage of them as trellises. See also plates 5-178 – 5-181.

Plate 5-23. As the time for transplanting nears and the tempo of work accelerates, several tasks are often going on in a single terrace at once. In this plate, puddling and reinforcing the terrace bunds are progressing in unison.

Plate 5-24. Transplanting begins with uprooting rice seedlings from the nursery. An important part of this woman's work is separating the seedlings so that each will roll easily in the planters' hands.

Plate 5-25. Skillful transplanters are a pleasure to watch. Even as her right hand plunges repeatedly into the water positioning seedlings in the soft mud, her left hand, gripping her supply of seedlings, keeps pace in separating out the next seedling and rolling it down between the thumb and forefinger – ready to be snatched by the returning right hand. Skillfully done, the planting hand is a constant blur of motion and ground is covered quickly.

Plate 5-26. If bending all day was not already backbreaking enough, many Naga mothers work throughout the day with a child tied on their backs. Naga children thus grow up in the fields with an over-the-shoulder view of how the work should be done.

Plate 5-27. Youth groups take on transplanting work every year as a way to earn money to finance their activities. Such group work has a strong social element and many romances probably bloom from covert glances across the paddy fields. The rice in the foreground shows how it is bundled when brought from the nurseries.

Plate 5-28. Planting shoulder-to-shoulder, family members work their way down a terrace. Keeping several steps ahead of them, another member finalizes puddling and leveling in the background.

Plate 5-29. Like the final pieces of a jigsaw puzzle, villagers bend to the task of transplanting the last terraces. The Dzuzu River rushes by in the upper right corner of the photograph.

Plate 5-30. As Khonoma's ancestors gradually expanded terracing in the valley, stones cleared from the land were put to effective use in facing the bund walls. The labor in building them must have been great, but once in place, they have weathered successive centuries of use with little maintenance costs. This contrasts with Tsiesema, where the soil is prone to subsidence and terraces and fish ponds often slump down the hills. Yearly maintenance costs in repairing the terraces and irrigation channels are consequently much higher.

Plate 5-31. The water is released in July, and the terraces then given a thorough weeding. Note the tin can hanging from her side to receive any snails or crabs that she encounters. (Photograph by Khrieni Meru.)

Plate 5-32. With deft strokes of a hoe, the terrace bunds are shaved clean of vegetation, denying rats any hiding place. (Photograph by Khrieni Meru.)

Plate 5-33. By August, the valley turns an emerald green under a mat of rapidly-growing rice. Irrigated by perennial streams, Khonoma paddy fields are less vulnerable to the vagaries of weather, and thus afford the village with a degree of stability in its rice harvest.

Plate 5-34. Archer was probably contemplating a view similar to this in 1946, when he likened the rice terraces to glaciers flowing down the valley. (See entire text of his notes in appendix 5-23.) As autumn approaches, fields planted with the earliest-maturing varieties are already turning yellow.

Plate 5-35. The rice in this terrace has not been bunched, so it is a much slower and more painstaking job in directing all the individual stems into the path of the sickle. Each time her hand fills, she pauses to carefully deposit the harvested rice in the basket behind her.

Plate 5-36. The circular dance of rice threshing separates out the grains, before being carried back to the village.

Plate 5-37. This is a late autumn view of the Ketsaju valley as it falls silent after rice harvest. Note the rows of monoliths on the terrace bunds and the sprinkling of *Albizia* trees.

Plate 5-38. As evening draws near, a human caravan makes its way back up the hill to the village, straining under baskets of newly-harvested rice. A local joke pokes fun at the thick legs of Khonoma's women, made muscular from such heavy work.

Plate 5-39. On sunny days throughout the winter, the rice is retrieved from the granaries and spread out on mats to dry out in the sun. These must be watched closely, with a bamboo pole at hand, to keep the local chicken population at bay.

Plate 5-40. Afternoon shadows begin to stretch across the Ketsaju valley early in winter, with the sun dipping behind the western peaks by 3:30 p.m. The terraces appear brown and lifeless, mostly fallowed for the winter months. The valley is quiet.

Plate 5-41. Rice-fish culture is popular among Chakhesang and Angami. The Department of Fisheries in Kohima assists purchase fingerlings of both common and grass carp from Imphal. Natural scavenging is supplemented by insects, worms, cattle dung and marigolds. Fish are harvested at about two years of age, at 0.5-1 kg. In addition, farmers harvest a variety of natural protein sources from the terraces, including native fish, frogs, crabs, snails, dragonflies and a variety of other insects (table 5-4). Note the small *Albizia* sapling on the bund in the foreground.

Plate 5-42. About 10 years ago, farmers began experimenting with marigold as a winter green manure crop. Seeds are collected from the bunds in November and broadcast into the terraces. The marigold crop is slashed in April-May and the biomass worked into the soil with a hoe before flooding. Farmers value marigold's rapid growth, copious seed production and ability to soften the soil. *Eupatorium adenophorum* is also often cut from nearby sloping land and applied to rice terraces as a green manure.

Plate 5-43. Stepping away from Khonoma for a moment, other Angami villages such as Viswema (shown above), demonstrate the potential for growing a dryland cash crop in wet rice terraces over the winter months. Thus, the same land provides them their rice staple during the summer, and a major source of income over winter. Of course, this only became possible after the arrival of potatoes, garlic, cabbage and other semi-temperate vegetables well-suited to the local ecology. This is a niche that Khonoma has hardly begun to exploit. (Photograph by Chozhüle Kikhi.)

Plate 5-44. The transition from rice to forest can be swift – as shown by this field on the border between wet and dryland cultivation. Since it did not receive an adequate water supply for wet rice cultivation, its owner decided – about two years ago – to convert it back into jhum cultivation. With seed rain from adjacent jhum fields, alder has rapidly colonized the terrace. This small example of alder's colonizing ability hints how, half a millennium earlier, alder would have followed Khonoma's ancestors as they opened jhum fields from the forests and then left them to fallow. Whether they valued it or not, it would have dominated the fallow vegetation – thus providing them with ample opportunity to learn how to harness its useful properties.

JHUM CULTIVATION (nhalie) ...

The photographs of jhum cultivation presented in chapter 2 were all taken in the southern jhum block – the area that I have described as the 'epicenter' of Khonoma's dispersed alder system. But a comparative glance at swiddens in the other two jhum blocks reveals quite different land-use patterns in those areas of the village.

Plate 5-45. As we move out of the sheltered valley bottom and begin to climb the adjacent slopes, the vigor and density of alder quickly wanes in the drier, more exposed conditions.

Plate 5-46. Rocks are less abundant on the upper slopes, forcing farmers to rely on other materials in constructing mechanical barriers against the downslope movement of soil. In the case shown above, alder branches have been staked into place along slope contours. These log barriers of course decompose and have to be replaced every cycle when the field is reopened from fallow. This in turn reduces the amount of firewood that can be taken from the field.

Plate 5-47. Most strikingly, dryland rice is the principle jhum crop on the eastern side of the village.

Plate 5-48. *Hibiscus sabdariffa* L. (Rozelle plant) is an example of some of the other crops grown on this side that demand more heat – and are completely absent from the colder southern jhum block.

Plate 5-49. Alder trees are more sparse here, and management more casual. Some of the retained stumps here are actually *Schimia wallichi*, again hinting at the warmer conditions.

Plate 5-50. Beans, cucurbits and other climbers are often planted at the base of alder trees in the eastern jhum block, using the stumps as trellises. This of course interferes with proper pruning of the coppices. Much of this land is communally-owned – and thus likely to change hands from one cycle to the next. This probably explains why farmers prioritize the short-term benefits of using the stumps as trellises over the longer-term need to manage the coppices properly.

Plate 5-51. Even the field huts are designed differently on the eastern side of the village. The slopes are steeper here, and a bamboo verandah provides a sweeping overview of the field to keep an eye out for birds, stray cattle and other threats to the crop. Cucurbits usually climb over the hut's thatched roof.

Plate 5-52. Closer to the village and a bit higher in altitude, this jhum area shows alders of a density and stature more similar to those of the southern jhum block. Transect sampling here revealed luxuriant vegetative growth but reduced rice yields in the immediate vicinity around the alder stumps.

Plate 5-53. Jhums on this side of the village supplement rice yields from the irrigated terraces – but are less suitable for potatoes and other semi-temperate vegetables that are the biggest income-earners in the southern jhum block. Most jhum land here is communally-owned within Semomia khel, and thus farmers' management inputs are limited to what they can expect an immediate return from that cropping year. There is little incentive for longer-term investments in landesque capital (Blaikie and Brookfield, 1987) such as the careful terracing and alder management found in the privately-owned southern jhum blocks.

CONVERSION OF WET RICE TERRACES INTO DRYLAND GARDENS (tize) ...

Plate 5-54. Within the past ten years, there has been an increasing trend in Khonoma for upper terraces formerly used for wet rice to be converted into garlic, potatoes and other vegetable cash crops. (Photograph by Khrieni Meru.)

Plate 5-55. Villagers note that garlic grows much better when the beds are covered with an *Artemisia* mulch. Others claim that *Artemisia* growth is an indicator of fertile soils. The two observations may be related if, like many Asteraceae, *Artemisia* is efficient at scavenging nutrients – which farmers are then transferring to their fields when they use it as mulch. The leaves decompose rapidly.

LIVESTOCK (ukhurina) ...

Plate 5-56. Capturing mithun to be slaughtered and bringing them back to the village is part of the preparations for every wedding in Khonoma. The number of mithun slaughtered for weddings has become a status symbol amongst the Angami. This can cause serious problems to young couples who would like to marry and start families – but can not afford the needed mithun.

Plate 5-57. A villager charged with looking after mithun blows on a horn (ketsu) to summon his charges from the forest to the shed (gwiki), where they are given salt and checked. The owners will pay him for his services at a rate of two tins of rice/animal/year. This represents a value of about Rs 130 under current market prices. Hence, the owner will have about Rs 650 – and none of his own labor – invested in his mithun by the time it reaches five years of age and can b e sold for about Rs 12,000.

Plate 5-58. In a direct linkage between culture and farming systems, cattle numbers in Khonoma dropped dramatically after Christianity became widespread and they were no longer needed for sacrificial purposes. A contributing factor to their decline was that houses rebuilt, after the village was burnt down in 1956, were too small to house cattle in their traditional practice. The remaining herd is confined in communal stockades by night, and tended by Nepali herders by day.

Plate 5-59. This shows an example of more modern livestock husbandry – in which apparently a Devon pig is kept in a backyard pen. Kitchen wastes continue to be recycled through the pigs and contribute to weight gains. But this system is of course more labor intensive since the pigs are no longer able to forage for themselves and depend on the farmer to feed them.

Plate 5-60. A few remnants can still be seen of the old system in which livestock wandered freely in and out of houses and shared the same roof as their owners. This is fading though, as villagers have become more aware of hygiene and village regulations now instruct that pigs must be confined.

CONVERSION OF JHUM FIELDS INTO PERENNIAL CASH CROPS (pelhu) ...

Khonoma farmers are generally able to produce sufficient food for their own needs, but are increasingly pressed to also generate cash to send their children to school, pay the electrical bill, church fees, buy meat during festivals and so on. As shown here, farmers have responded by trying to harness the agronomic properties of alder in new ways, experimenting with a variety of shade-tolerant cash crops. These experiments are all quite recent and will likely attract more interest as rural Nagaland becomes more integrated into the cash economy.

Plate 5-61. The diversity of crops that had formerly characterized Khonoma's jhum fields has completely disappeared in some cases, and been replaced by monoculture cash crops such as the *Curcuma longa* (kotsievü), Zingiberaceae, shown here. This remains risky in view of the uncertainty of markets.

Plate 5-62. *Sechium edule* (kulukushü), Cucurbitaceae, climbs across a wooden trellis amongst the alder trees. This perennial vine produces heavily in cool mountain environments and requires little care. Although reportedly introduced to Khonoma in the 1940s, it has only begun to gain popularity in recent years when market opportunities emerged.

Plate 5-63. Native to South America, from Paraguay, Brazil and Argentina, *Passiflora edulis* (bell), Passifloraceae, is another introduction that has proven to prosper in Nagaland's cool mountain environment. It is a woody vine that needs a trellis to support its climbing tendrils. It is short-lived, maintaining good productivity of its tart fruit for four to six years. The fruit has good keeping qualities for transport to distant markets. Passion fruit prefers full sunlight and thus would not combine well as an understory with alder.

Plate 5-64. *Cyphomandra betacea* (seikhwüdi), Solanaceae, is shown here growing under an alder canopy. This perennial shrub is believed to be native to the southern Andes, perhaps Bolivia, where it flourishes between 5000 to 10,000 feet asl. It is reported to grow best in association with trees where a more humid micro-climate has formed, with less soil dehydration and where the light is diffused – so probably fits well as an alder understory.

Plate 5-65. The acreage of *Amomum subulatum* (eliachi), Zingiberaceae, is expanding rapidly in Khonoma, as elsewhere in Nagaland. This boom is being fed by a combination of suitable ecology, high prices, and government promotion programs. Its adoption in Khonoma is especially easy since it can be planted directly under the existing alder trees – a combination proven to work well elsewhere in the eastern Himalayas.

Plate 5-66. *Camellia sinensis* (sichanyü), Theaceae, under an alder canopy has proven to be an effective combination in Tengzhong County of Baoshan Prefecture in Yunnan Province, China. Some villages in Khonoma have taken advantage of generous government subsidies to trial it, but it remains to be seen if it will catch on as a serious cash crop. Small producers in the Naga Hills do not appear to have any competitive advantage over the nearby Assamese plantations in producing tea and certainly do not have the economies of scale.

Plate 5-67. Some jhum fields closest to the village are being converted to *Citrus* sp. (chühuo), Rutaceae, and other types of fruit orchards.

Plate 5-68. This was formerly a wet rice terrace on the southern edge of the Ketsaju valley. But it was found to be too cold for rice and cultivation was discontinued about thirty years ago. *Alnus nepalensis* (rüpo), Betulaceae, quickly colonized the field and is now being kept as a standing timber crop.

TIMBER & FIREWOOD …

Plate 5-69. The importance of firewood looms ever larger as we ascend – both in altitude and latitude – further into the Himalayas. It has also become an important cash crop in Khonoma since the seat of state government, Kohima, is just nearby and imports large amounts of firewood every year from surrounding villages.

Plate 5-70. Logs rolled down from the forest are sawn into planks in an upper jhum field. These will then be carried – and sometimes slid where topography permits, downhill to the nearest road. A truck will probably then be used to transport them the rest of the way to the intended construction site. Most forests in Khonoma are community-owned and villagers are free to cut lumber for their own use – but not for sale. This policy can become a problem if families that have long departed the village to live in Kohima or elsewhere still want to claim access to Khonoma’s communal resources as their birthright.

HUNTING, TRAPPING & FISHING ...

Plate 5-71. Virtually no wildlife is too small to escape hunting / trapping pressure. Children capture these small birds by coating branches and other landing places along streams with a sticky tree resin. Older farmers frequently lament that the loss of birds has prestaged an upsurge in insect populations, and concomitant damage to crops.

Plate 5-72. Monkey skulls.

Plate 5-73. Many Naga homes are decorated with hunting trophies. Nagas are keen meat-eaters but now raise few livestock. A deer may earn Rs 1200-1300 for its meat, but the emphasis placed on hunting is much more about pride than economics. Most of these were shot with the WWII muzzle-loading rifle hanging below.

Plate 5-74. A welcome addition to tonight's dinner. Such small baskets called khocu are usually worn tied to the waist while working in the wet rice terraces. Women can often be seen pausing to deposit snails, crabs, various grubs, and other small fauna in them.

Plates 5-75 - 5-76. This young boy's contribution to his family's dinner pot includes a praying mantis, cicada and grasshoppers.

Plate 5-77. While working in the fields, villagers quickly pounce on any crabs spotted scurrying away. This red variety is particularly tasty, either boiled or in a chutney.

Plate 5-78. These larvae (sonhe), dug from the jhum fields in September to October, are another minor protein source that add variety to the diet of Khonoma villagers. The eating habits of the Angami often draw comment even amongst other Naga subgroups.

Of the some 430 species of wild plants that this study has documented being used in the two study villages (see appendices 5-36 – 5-41), the following photographs show only a small selection of those most commonly used.

WILD VEGETABLES ...

Plate 5-79. *Polygonum plebeium* R. Br. (gagi), Polygonaceae, is an annual to short-lived perennial herb that grows in dense mats. Its young shoots and leaves are gathered as vegetables in the study area, and sometimes fed to pigs. It is used as a famine food in other parts of India.

Plate 5-80. *Houttuynia cordata* Thunb. (gatha), Saururaceae, is a perennial herb native to the cool mountain regions of eastern Asia. It spreads vigorously by fleshy rhizomes, often creating a dense ground cover. Villagers gather the tender stems, leaves and roots, both to eat as a vegetable and to treat stomach problems, diabetes, and high blood pressure. Elsewhere in Asia, the leaves are reportedly used in salads and garnishes, and the white rhizomes are cleaned and cut into lengths to make a spicy substitute for bean sprouts.

Plate 5-81. *Diplazium* sp. (tsiekhrüga), Dryopteridaceae, has provided a critical food source for Khonoma during times of conflict when the villagers were unable to cultivate their fields. After the village was destroyed by the Indian army in 1956, many families took refuge in the forests and survived by mixing tsiekhrüga with whatever rice they were able to obtain from neighboring villages. (Photograph by Amay Angami.)

Plate 5-82. *Plantago major* L. (gapa), Plantaginaceae, is a perennial herb that has become naturalized around the world and is widely recognized for its healing properties. In the study villages, its leaves and seeds are used to prepare a medicine to treat stomach-related problems. The leaves and young shoots are rich in vitamin C and eaten as a vegetable before the plant grows too old and fibrous. It is also fed to pigs.

Plate 5-83. The young shoots of *Polygonum runcinatum* Buch.-Ham. ex D. Don (phrügie), Polygonaceae, are harvested as a vegetable, fed to pigs, and used in preparing medicinal tonics.

Plate 5-84. *Zanthoxylum acanthopodium* DC. (ganyanyü), Rutaceae, is another multi-purpose species – whose fruit are used as a spice, young shoots and leaves boiled as a vegetable, and both the seeds and leaves eaten to treat stomach disorders. It is often planted in kitchen gardens where it will be handy for frequent use.

Plate 5-85. The leaves and tender branches of *Elatostema cyrtandrifolium* (Zoll. & Moritzi) Miq. (gajie), Urticaceae, are collected as a wild vegetable. This perennial herb is also reported to have medicinal properties. (Photograph by Amay Angami.)

Plate 5-86. *Trichosanthes palmata* Roxb. (gauri), Cucurbitaceae, is a wild cucurbit commonly found in jhum fallows. Its young shoots are eaten as a vegetable, its seeds crushed to make a soap, and the leaves and stems used in preparing a medicine to treat dysentery or bloody stool.

Plate 5-87. *Crassocephalum crepidioides* (Benth.) S. Moore (vilhunha), Asteraceae, is a ubiquitous component of early fallow successions. Although most literature refers to it as a weed, the Angami eat the young shoots as a vegetable, feed it to their pigs, and like many other Asteraceae, crush its leaves and apply the juice to wounds to stop the flow of blood.

Plate 5-88. Wild *Colocasia* sp. (thekrüno), Araceae, is gathered both as a vegetable and for feeding to pigs. (Photograph by Amay Angami.)

Plates 5-89 – 5-90. The white pith of *Trevesia palmata* (DC.) Vis. (tirhünyü), Araliaceae, is harvested during Sekrenyi festival, both for creating intricate wall decorations that resemble the cubi necklace worn by Angami women (inset), and for making headdresses worn during performance of ceremonies. Its leaves are also eaten as a vegetable. (Main photograph by Amay Angami.)

Plate 5-91. Angami recall that when starving Japanese soldiers crossed from Burma to invade Nagaland in 1944, many ate uncooked *Oenanthe linearis* Wall. ex DC. (gakra), Apiaceae, to help sustain themselves. (Photograph by Amay Angami.)

Plate 5-92. Although most memorable for its painful stings, *Girardinia heterophylla* (Vahl) Decne. (lovie), Urticaceae, was a multi-purpose plant in Khonoma. It was cooked with rice, thus softening its spines, and eaten in a preparation called galho. Fiber from its bark was used in weaving, and its leaves browsed by cattle and mithun.

Plate 5-93. *Bauhinia variegata* L. (teguo), Fabaceae, is one of the plants that helps mark the rhythm of Khonoma's agricultural calendar. Villagers know that is blooming in April to May coincides with the time that they should be planting their wet rice nurseries. The flowers and pods are also eaten as a vegetable, the bark crushed in preparing a dye, and the tree cut for firewood.

Plate 5-94. Several types of edible *Pleurotus* sp. (preinyii), Tricholomataceae, are found in the forests, growing in shelf-like clusters on dead logs and living trees.

WILD FRUIT, NUTS & BERRIES …

Plate 5-95. *Emblica officinalis* Gaertn. (khulhu), Euphorbiaceae, is an unusually rich source of vitamin C and widely used in Indian traditional medicine. Informants in the study villages report that the fruit and seeds are eaten raw for deworming and to treat diarrhea, dysentery and colds. The fruit ripens from January to March but can be left on the tree for a long time without any significant loss of quality or yield.

Plate 5-96. *Docynia indica* (Wall.) Decne. (kipho) Rosaceae, grow abundantly in several areas of Khonoma's communal land. They sell for Rs 60/bag in the Kohima market and provide a welcome source of income when they ripen in November. Some are dried as snacks and others fed to pigs. Trees are sometimes planted in jhum fields, despite its reputation for adversely effecting nearby crops.

Plate 5-97. The sweet fruit of *Ficus auriculata* Lour. (chiede), Moraceae, ripens in April to June. The leaf of this tree is also used in preparing a decoction for treating coughing and dysentery in children. In other parts of the eastern Himalayas where cattle are kept in larger numbers, it is widely used as a fodder tree during the winter season when other fodders are scarce.

Plate 5-98. Fallowed fields provide up to three different types of raspberries – red (*Rubus* sp. - sepfülicü), black (*R. indicus* Thunb. - mvüti) and shown here, yellow (*R. ellipticus* Sm. - mvüyha), Rosaceae.

Plate 5-99. In April to May, *Ficus fistulosa* Reinw. ex Blume (khavü), Moraceae, bears its fruit in clusters on woody knobs extending from the trunk and main branches. Its fruit and young leaves are enjoyed by both villagers and livestock.

Plate 5-100. *Diospyros kaki* L. f. (jiedi), Ebenaceae, is valued for its tasty fruit and its wood preferred for carving handles for large daos.

Plate 5-101. *Elaeagnus conferta* Roxb. (pechü), Elaeagnaceae, is a nitrogen-fixing, woody climber native to Nagaland. Spurred by market demand for its sour fruit, many farmers have begun domesticating it in their back yards and jhum fields. It ripens in March to April, when most other types of fruit are not yet available. (Photograph by Amay Angami.)

Plate 5-102. *Calamus erectus* Roxb. (tekhra), Arecaceae, playfully dubbed as the 'viagra palm', is used in making chairs, tables, baskets and for weaving special plates used during the Phichü Pelhie ceremony. Its fruit are also eaten. (Photograph by Amay Angami.)

Plate 5-103. In addition to its fruit, the young shoots and tender leaves of *Vitis* sp. (rieza), Vitaceae, are also eaten as a vegetable.

Plate 5-104. *Fragaria indica* Andrews (kijürom), Rosaceae, grows in cool and shady locations in the study villages. The berries are mostly eaten by children, and the plant sometimes used for treating fever.

Plate 5-105. The fruit of *Debregeasia longifolia* (Burm. f.) Wedd. (yiedu), Urticaceae, is eaten by villagers and the foliage grazed by mithun and cattle.

Plate 5-106. *Rhus semialata* Murray (tsomhu), Anacardiaceae, is another tree that provides both fruit and tender shoots and leaves to the Angami diet. It also boasts a long list of medicinal uses and its presence is viewed as an indicator of fertile soils.

Plate 5-107. The perennial shrub *Mahonia nepalensis* DC. (nthoüsi), Berberidaceae, is known in the study area as a treatment for malaria and other types of fevers. The bark is also used to extract a yellow dye and as the fruit ripens in March to April, it is both eaten fresh and processed into juice.

MEDICINAL PLANTS ...

Plate 5-108. Preparations made from *Litsea citrata* Blume (ciesi), Lauraceae, are used to treat a wide range of medical problems, the leaves and seeds are eaten as a condiment, and the wood used for fuel and timber. It produces an essential oil with an intense lemony scent that, in global markets, has become popular for aromatherapy and as an ingredient in soaps and shampoos. The scent is reported to have calming and sedative properties.

Plate 5-109. *Maesa* sp. (kourhie), Myrsinaceae, is used in several Angami ceremonies and rituals. The young shoots are also eaten, and the fruit crushed to create a moisturizing cream.

Plate 5-110. In the pre-Christian days, people sometimes held a few branches of *Artemisia indica* Willd. (penia), Asteraceae, or wore sprigs in their ears to repel evil spirits. These days, villagers are more likely to be seen using it to build rough fences or walls, or laying it over the top of their garlic as mulch (plate 5-55). Juice squeezed from the leaves will stop wounds from bleeding and if wiped over one's feet, will repel leeches. It is a major fallow plant and usually associated with fertile soil.

Plate 5-111. The leaves of *Kydia calycina* Roxb. (thezumhiku), Malvaceae, are crushed and made into a paste for application to aches, wounds, and skin diseases. The bark is squeezed of its juice to make a soap and shampoo, and the remaining fiber can be woven into a rope. Cattle browse the leaves and its wood is used for firewood.

Plate 5-112. *Datura meteloides* Dunal (mekrietise), Solanaceae, is common along roadsides in Nagaland and used in the study villages as a medicine to reduce swelling and treat hangovers; as a detergent, particularly for cleaning bamboo baskets; and as bee forage. There is no indication that it developed any of the religious importance that is reported for some Native American groups. The Aztecs, Zuñis, and some Indian groups in California regarded *D. meteloides* as one of the plants of the Gods and used it as a narcotic in religious ceremonies. Drinking tea steeped from its leaves, or chewing its seeds or roots produced hallucinogenic, hypnotic and narcotic effects. This was probably also behind its association with witchcraft in medieval Europe. But its use demanded care since all parts of the plant are toxic if taken internally.

OTHER ECONOMIC PLANTS ...

Plate 5-113. At least two species of *Trichosanthes* (jieru), Cucurbitaceae, are used as bait for trapping birds.

Plate 5-114 – 5-115. *Sinarundinaria nagalandiana* H.B. Naithani (rücü), Poaceae, was reported as a new taxa from Nagaland only in 1986. It is easily recognized by its prominent nodes, bearing a circle of conical, stout spines (inset). It is used in the study area for fencing, the shoots are eatens, and the skin is peeled and twisted into a rope.

Plate 5-116. *Erythrina indica* Lam. (hieto), Fabaceae, was formerly used to make a wooden effigy of someone who had been killed in war or for some other reason, the body could not be recovered. If obtainable, a clipping of the deceased's hair should be affixed to the head of this image. It then substituted for the real corpse and the funeral ceremonies were performed as usual (Hutton, 1969, p. 229). Hutton speculated that this was the reason why it was forbidden to use *E. indica* as firewood (p. 191). This practice was discontinued after Christianity was adopted and it is now commonly burnt for firewood. But the dwindling community that retains its traditional religious beliefs does continue to use it in performing the Thekirhü ritual to defer theft.

Plate 5-117. The fruit of *Cordia myxa* L. (chiemu), Boraginaceae, contains a viscid mucilage that Nagas use as a substitute for glue. Archaeological evidence from Cyprus suggests that its sticky glue had been used there to trap birds. Its young, tender shoots are eaten as a vegetable, and the wood burnt as fuel.

Plate 5-118. *Cymbidium iridioides* D. Don is one of many Himalayan Orchidaceae collected from the forest and brought back to the village as ornamentals. Nagaland is reported to have not less than 360 of the more than 1000 species of orchids found in all of India (Changkija et al., 1992).

OTHER SKILLS THAT CONTRIBUTE TO THE VILLAGE ECONOMY ...

BASKET-MAKING ...

Plate 5-119. Many men use their spare moments to weave baskets. A survey of goods being exported from Khonoma on the morning buses found that the village earns over a million rupees each year from this industry. The village is famous for one particularly intricate design of mekho basket (see code 6.10 in appendix 5-7).

Plate 5-120. One of Khonoma's most experienced basket weavers, Wherhisielie Meyase, receives recognition for his work at an arts and crafts competition in Delhi in 1994.

STONE QUARRYING …

Plate 5-121. The plentiful supply of young sandstones has spawned a quarrying industry in Khonoma. Skillful workers can earn up to Rs 250/day cutting rocks into blocks – compared to the standard wage of Rs 100/day for agricultural labor. By absorbing labor and generating income, this industry may alleviate harvest pressure on the forests. Nonetheless, there are concerns about the long-term effects of exporting so much stone on soil stability.

WEAVING …

Plate 5-122. After dying, the wool is hung in the sun to dry. This woman is holding up a Khonoma woman's shawl (mehakhwe pattern) to show what the finished product will look like. Weaving was formerly done with cotton, silk or even fiber from *Girardinia heterophylla* (see plate 5-92), but has now been replaced by wool yarns easily available from the lowlands.

Plate 5-123. With the year's crops safely harvested, Angami women spend much of September to December weaving. The pattern of shawl formerly told much about the wearer's status and origin – but as they became more freely traded in the marketplace, these conventions fell to the wayside and people now wear whatever appeals to them.

SPEAR-MAKING ...

Plate 5-124. Making spears has been a tradition in Kezhanulhou Khate's family for at least five generations. The spears he made are used mostly for decorative purposes these days, or given as gifts to mark a special occasion or achievement. He estimated that he sold about 60 spears a year to Kohima, receiving Rs 600 for the standard single-piece spear, and Rs 800 for a two-piece model that screws together in the middle of the shaft. He noted proudly that through this business, he was able to provide good educations for his children. Kezhanulhou passed away in 2001 and the business is now being continued by his grandson. (See plate 3-63 for a photograph that M. Ganguli took of Kezhanulhou in 1986.)

TIME SEQUENCE SHOTS …

These final series of photos attempt to show similar views over the duration of the fieldwork (Dec., 1999 – Dec., 2002) and thus provide the reader with imagery of how the landscape changes throughout the agricultural calendar. Similar time sequences showing jhum landscapes were earlier presented in chapter 2 – so the following series now focus on the wet rice terraces that comprise the other major pillar of Khonoma's farming systems.


Feb. 18 – Mar. 24, 2001


Aug. 19 – Sept. 25, 2001 (1)


Aug. 19 – Sept. 25, 2001 (2)


Oct. 16 – Dec. 15, 2001


Jan. 15 – Feb. 12, 2002


Mar. 26 – May. 28, 2002 (1)


Mar. 26 – May 28, 2002 (2)


Nov. 3 – Dec. 1, 2002

Plates 5-125 – 5-132. The war memorial area provides a panoramic view of the Khonoma valley stretched out below. When attacked by the British on Nov. 22nd, 1879, the villagers retreated up the ridge under the cover of darkness to a fallback position known as Chakra Fort. They held out there for the next four months, until finally surrendering on Mar. 27th, 1880. During that standoff, this is the view that they would have had as they scrutinized their occupied village below.

Feb. 18 – Mar. 24, 2001 May 30 – July 14, 2001 Aug. 19 – Sept. 25, 2001

Oct. 16 – Dec. 15, 2001 Jan. 15 – Feb. 12, 2002 Mar. 26 – May 28, 2002 Nov. 3 – Dec. 14, 2002

Plates 5-133 – 5-139. This series shows a cross-section that transcends the irrigated rice terraces, the jhumming zone, and behind that, peak that forms part of the southern ridge surrounding the Khonoma basin.

Oct. 26 – Dec. 06, 2000

May 30 – July 14, 2001 (1)

May 30 – July 14, 2001 (2)

Aug. 19 – Sept. 25, 2001

Oct. 16 – Dec. 15, 2001

Jan. 15 – Feb. 12, 2002

Mar. 26 – May 28, 2002 (1)

Mar. 26 – May 28, 2002 (2)

Mar. 26 – May 28, 2002 (3)

Plates 5-140 – 5-148. This view shows the breadth of the terraced valley bottom as it ends at Khonoma, after having meandered through the heart of Western Angami territory. The ability of this valley to produce large and consistent harvests of rice nurtured large and powerful villages along it – that provided stiff opposition to British pacification of the Naga Hills.

May 30 – July 14, 2001 (1)

May 30 – July 14, 2001 (2)

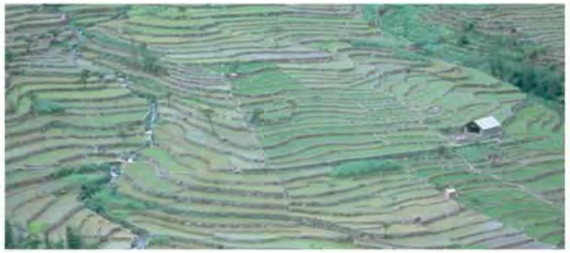
May 30 – July 14, 2001 (3)

Aug. 19 – Sept. 25, 2001

May 26 – May 28, 2002

Plates 5-149 – 5-153. Since the arrival of the British, most visitors to Khonoma have climbed the steps to the highest point of the village, where Merhümia-khel fort is now located, and looked down on this view of the Ketsaju valley. (This is the same view that appears in Hutton’s 1921 treatise (first print) on the Angami; see plate 5-8.)

May 30 - July 14, 2001 (1)



May 30 - July 14, 2001 (2)

May 30 - July 14, 2001 (3)

Aug. 19 - Sept. 25, 2001 (1)

Aug. 19 - Sept. 25, 2001 (2)

Oct. 16 - Dec. 15, 2001

Jan. 15 - Feb. 12, 2002

Mar. 26 - May 28, 2002

Plates 5-154 – 5-162. This series zooms in on a sub-scene of the previous set, showing the terraces in more detail. The structure to the right is a communal rest house (rüliki), erected in 1984 at a cost of Rp 5000 and 700 days of labor. The Khunodzükhü River rushes past on the left.

May 30 – July 14, 2001

Aug. 19 – Sept. 25, 2001

Oct. 16 – Dec. 15, 2001

Jan. 15 – Feb. 12, 2002

Mar. 26 – May 28, 2002

Nov. 3 – Dec. 14, 2002

Plates 5-163 – 5-168. This section of the Ketsaju valley falls between the Khünodzü Khurü (foreground) and Notsütrü Rivers. Like many Angami villages surrounding the Japfu Range, Khonoma is blessed with an abundance of rivers and streams that are tapped to irrigate the rice terraces and thus help provide consistent harvests every year.

Oct. 26 – Dec. 6, 2000

May 30 – July 14, 2001 (1)

May 30 – July 14, 2001 (2)

Aug. 19 – Sept. 25, 2001

Oct. 16 – Dec. 15, 2001

Jan. 15 – Feb. 12, 2002

Mar. 26 – May 28, 2002 (1)

Mar. 26 – May 28, 2002 (2)

Nov. 3 – Dec. 14, 2002

Plates 5-169 – 5-177. Descending a trail on the north-western flank of the village, the terraces are studded with monoliths erected over centuries of ceremonies and feast-giving. They offer some permanence as the landscape around them changes dramatically with the seasons.

Aug. 19 – Sept. 25, 2001

Oct. 26 – Dec. 6, 2000

Plates 5-178 - 5-179. Khonoma's use of soil-building trees was not limited to the alder fallows. An analogous system evolved in their wet rice terraces, this time with *Albizia*. What was it about Khonoma that made it so innovative in integrating trees into its farming systems? Many of the same questions that we have posed about alder fallows are equally relevant to the *Albizia* terraces. These photos show a segment of Ketsaju valley where *Albizia* is particularly prevalent, first during the growing season (above), and then after rice harvest (below).

Aug. 19 – Sept. 25, 2001

Jan. 15 – Feb. 12, 2002

Plates 5-180 - 5-181. This is another view of the same area shown in the previous two photos. It shows the contrast between the green vigor of summer – and the somber grey of winter. The whole valley appears to hibernate. Even the *Albizia* trees defoliate until the return of the monsoons.

CHAPTER 6

Khonoma Allocation of Land and Labor, and the Returns that Farmers Receive

PHOTOGRAPH GALLERIES

When confronted with a new innovation, we need some measure of its performance. What are its costs and benefits vis-à-vis alternative land uses? Some kind of cost-benefit analysis is necessary. Only after its superiority has been established should we begin to look at its possible domain for extrapolation.

Plate 6-1. But this calls for accurate data on farmers' inputs and outputs that are not easily available. The task of obtaining accurate numbers is much easier for monocultures such as irrigated rice (above) – for which the rhythm of labor inputs is routine and done in unison by the entire village, and a single crop is harvested within a relatively short time frame. But even this can become more complicated if the analysis attempts to take into account minor products such as the wild fish, crabs and snails captured during field operations; the small quantities of assorted crops often clustered around field huts; soybeans and other pulses planted on terrace risers and at the base of *Albizia* trees; and terraces planted to other crops, either as a summer crop instead of rice, or a winter crop following rice.

Plates 6-2 – 6-3. But the challenge of collecting reliable data becomes even more daunting in jhum fields where cropping patterns and management inputs are more complex. In Khonoma's jhums, each terrace often presents a different mixture of crops (above), associated in different patterns of intercropping, relay-cropping and crop rotations. Planting is often not a one-time event – but rather as one crop is harvested, another may be quickly sown in the ground thus freed up. Thus, every stage of management – from planting to crop management to harvesting – can all be taking place in the same field simultaneously. Harvest is a continuous process and each evening as they return from the fields, the women usually carry home a basket full of whatever happens to be ready at the time (inset). This ongoing harvesting in dribs and drabs makes it extremely difficult to accurately record total field outputs.

Plate 6-4. In the compared village, Tsiesema's jhums are rice-based – but nonetheless, the ten jhum fields monitored by the research were found to be planted to 40 crop species (see appendices 5-25 and 5-34) – all of whose yields needed to be recorded. Typically, maize and tomatoes are dispersed throughout the field in a shotgun pattern; taro planted along field boundaries or in contour strips to help check soil erosion; cucurbits targeted to climb over stumps, rocky areas, and fieldhut roofs; and vegetables clustered near the fieldhut within easy reach for preparing noon-time meals.

Plate 6-5. To gauge the respective performances of the land uses under study, a core group of ten collaborating farmers were selected in both study villages (see plates 6-114 and 6-117) and asked to keep careful diaries on all their inputs and outputs for the jhum fields that they opened for cultivation in the winter of 1999-2000 and one of their wet rice plots. These diaries were maintained over the full two-year cropping phase of the swidden cycle. Shown above, as the project got underway, collaborating farmers in Tsiesema met to discuss how their field diaries were to be maintained. Frequent follow-up was essential, but these diaries eventually yielded most of the data presented in this chapter.

In comparing the productivity of ponded and dryland fields in the study villages, it may be useful to briefly overview what farmers are growing in their fields ...

CEREALS ...

Plate 6-6. *Oryza sativa* L. (rice - telha), POACEAE - Grass Family

Plate 6-7. *Coix lacryma-jobi* L. (Job's tears - kesi), POACEAE - Grass Family

Plate 6-8. *Setaria italica* (L.) P. Beauv. (foxtail millet - sü), POACEAE - Grass Family

Plate 6-9. *Zea mays* L. (maize - zarusi), POACEAE - Grass Family

Plate 6-10. *Sorghum caudatum* (Hack.) Stapf. (sorghum - manyisu), POACEAE - Grass Family

Plate 6-11. *Colocasia esculenta* (L.) Schott (taro - dzüno), ARACEAE - Arum Family

Plate 6-12. *Alocasia macrorrhizos* (L.) G. Don (elephant's ear - dzüno), ARACEAE - Arum Family

Plate 6-13. *Manihot esculenta* Crantz (cassava – sidzümu), EUPHORBIACEAE - Spurge Family

Plate 6-15. *Ipomoea batatas* (L.) Lam. (sweet potato - dzümu), CONVOLVULACEAE - Morning-glory Family

Plate 6-14. *Dioscorea* sp. (yam - tsüpie), DIOSCOREACEAE - Yam Family

Plate 6-16. *Solanum tuberosum* L. (potato - kelu), SOLANACEAE - Potato Family

Plate 6-17. *Raphanus sativus* L. (radish - mola), BRASSICACEAE - Mustard or Crucifer Family

Plate 6-18. *Curcuma longa* L. (turmeric - kotsievü), ZINGIBERACEAE - Ginger Family

Plate 6-19. *Zingiber officinale* Rosc. (ginger - kevü), ZINGIBERACEAE - Ginger Family

Plate 6-20. *Allium cepa* L. (onion - piezü), LILIACEAE - Lily Family

Plate 6-21. *Allium sativum* L. (garlic - khuovie), LILIACEAE - Lily Family

Plate 6-22. *Allium porrum* L. (leek - solie), LILIACEAE - Lily Family

Plate 6-23. *Allium fistulosum* Linn (samara), LILIACEAE - Lily Family (Photograph by Amay Angami.)

Plate 6-24. *Dolichos lablab* L. (hyacinth bean – red cüba), FABACEAE - Bean Family

Plate 6-25. *Psophocarpus tetragonolobus* (L.) DC. (winged beans - suru), FABACEAE - Bean Family

Plate 6-26. *Mucuna pruriens* (L.) DC. (velvet bean - cüprie), FABACEAE - Bean Family (Photograph by Amay Angami.)

Plate 6-28. *Cajanus cajan* (L.) Millsp. (pigeon pea - dali), FABACEAE - Bean Family

Plate 6-29. *Vigna* sp., FABACEAE - Bean Family

Plate 6-27. *Glycine max* (L.) Merr. (soybean - südza), FABACEAE - Bean Family

Plates 6-31 – 6-32. *Phaseolus vulgaris* L. (kidney bean - kecüprei), FABACEAE - Bean Family, with seeds (inset)

Plate 6-30. *Vigna unguiculata* (L.) Walp. (cow pea - boti), FABACEAE - Bean Family (Photograph by Amay Angami.)

Plate 6-33. *Vigna* sp. (kerhu – small variety), FABACEAE - Bean Family

Plate 6-34. *Vigna* sp. (kerhu – large variety), FABACEAE - Bean Family (Photograph by Amay Angami.)

Plate 6-35. *Pisum sativum* L. (peas - motor), FABACEAE - Bean Family

Plate 6-36. *Solanum spirale* Roxb. (zierprü), SOLANACEAE - Potato Family

Plate 6-37. *Solanum barbisetum* Nees (bitter brinjal - ciepfü), SOLANACEAE - Potato Family

(Photograph by
Amay Angami.)

Plates 6-38 – 6-39. Two varieties of *Solanum melongena L.* (brinjal - khwüdi), SOLANACEAE - Potato Family

Plate 6-40. *Solanum kurzii* Prain (kikhwü kecü-u), SOLANACEAE - Potato Family

Plate 6-41. *Cyphomandra betacea* (Cav.) Sendtn. (tree tomato - seikhwüdi), SOLANACEAE - Potato Family

Plate 6-42. *Lycopersicon esculentum* Mill. (tomato - bienyieno), SOLANACEAE - Potato Family

Plate 6-43. *Capsicum frutescens* L. (chilli - chüsi), SOLANACEAE - Potato Family

Plate 6-44. *Capsicum frutescens* L. (king chilli - chüsi), SOLANACEAE - Potato Family

Plate 6-45. *Capsicum* sp. (bell peppers), SOLANACEAE - Potato Family (Photograph by Amay Angami.)

Plate 6-46. *Nicotiana tabacum* L. (tobacco - khüpre), SOLANACEAE - Potato Family

OTHER VEGETABLES ...

Plate 6-47. *Brassica oleracea* L. var. *capitata* L. (head cabbage - kobi), BRASSICACEAE - Mustard or Crucifer Family

Plate 6-48. *Brassica campestris* L. (mustard leaf - gakrie), BRASSICACEAE - Mustard or Crucifer Family

Plate 6-49. *Hibiscus syriacus L.* (Rozelle plant – white gakhro), MALVACEAE - Mallow Family

Plate 6-50. *Hibiscus sabdariffa* L. (Rozelle plant – red gakhro), MALVACEAE - Mallow Family

HERBS & SPICES ...

Plate 6-51. *Ocimum basilicum* L. (sweet basil - nitso), LAMIACEAE - Mint Family

Plate 6-53. *Eryngium foetidum* L. (nhadunyia), APIACEAE - Carrot Family (Photograph by Amay Angami.)

Plate 6-52. *Coriandrum sativum* L. (coriander – dunia), APIACEAE - Carrot Family

Plate 6-55. *Perilla ocymoides* L. (beefsteak plant - kenie), LAMIACEAE - Mint Family

Plate 6-54. *Anisochilus carnosus* (L.f.) Bth. (thick-leaved lavender - nimhvü), LAMIACEAE - Mint Family

CUCURBITS ...

Plate 6-56. *Cucumis sativus* L. (cucumber - tsüto), CUCURBITACEAE - Cucumber or Cucurbit Family

Plate 6-57. *Cucurbita pepo* L. (pumpkin - rümo), CUCURBITACEAE - Cucumber or Cucurbit Family

Plate 6-58. *Luffa cylindrica* (L.) M. Roem. (sponge gourd – pfüchü), CUCURBITACEAE - Cucumber or Cucurbit Family

Plate 6-59. *Lagenaria siceraria* (Molina) Standl. (bottle gourd – mekhwü), CUCURBITACEAE - Cucumber or Cucurbit Family (Photograph by Amay Angami.)

Plate 6-60. *Momordica pedata* L. (Molina) Standl. (kerela), CUCURBITACEAE - Cucumber or Cucurbit Family

Plate 6-61. *Momordica charantia* L. (bitter gourd – kerela), CUCURBITACEAE - Cucumber or Cucurbit Family

Plate 6-62. *Momordica cochinchinensis* (batkeriela), CUCURBITACEAE - Cucumber or Cucurbit Family (Photograph by Amay Angami.)

Plate 6-63. *Sechium edule* (Jacq.) Swartz (chayote squash – squash), CUCURBITACEAE - Cucumber or Cucurbit Family

FRUIT ...

Plate 6-64. *Carica papaya* L. (papaya - kopita), CARICACEAE - Papaya Family

Plate 6-65. *Prunus persica* (L.) Batsch (peach - zorüsi), ROSACEAE - Rose

Plate 6-66. *Pyrus communis* L. (pear - naspati), ROSACEAE - Rose Family

Plate 6-67. *Psidium guajava* L. (guava - moduram), MYRTACEAE - Myrtle Family

Plate 6-68. *Passiflora edulis* Sims (passion fruit - bell), PASSIFLORACEAE - Passion-flower Family

Plate 6-69. *Prunus domestica* L. (plum - plum), ROSACEAE - Rose Family

Plate 6-71. *Musa* sp. (banana), MUSACEAE - Banana Family (Photograph by Amay Angami.)

Plate 6-70. *Artocarpus heterophyllus* Lam. (jackfruit - kothal), MORACEAE - Mulberry Family

Plate 6-72. *Citrus limon* (L.) Osb. (lemon - shüpfü kekro-u), RUTACEAE - Rue Family

Plate 6-73. *Citrus maxima* (Burm. ex Rumph.) Merr. (pomello - chüho), RUTACEAE - Rue Family

Plate 6-74. *Citrus reticulata* Blanco (mandarin - shüpfü), RUTACEAE - Rue Family

Plate 6-75. *Punica granatum* Sims (pomegranate - touran), PUNICACEAE - Pomegranate Family

Plate 6-76. *Mangifera indica* L. (mango - merosi), ANACARDIACEAE - Sumac Family

Plate 6-77. *Vitis vinifera* L. (grapes - khube), VITACEAE - Grape Family

FLOWERS ...

Plate 6-78. *Celosia argentea* L. (Amaranth - nidza), AMARANTHACEAE - Amaranth Family

Plate 6-79. *Helichrysum bracteatum* (Vent.) Andrews (straw flowers - leshü niepu), ASTERACEAE - Sunflower Family

MISCELLANEOUS CROPS ...

Plate 6-80. *Ricinus communis* L. (castor oil plant - luluca), EUPHORBIACEAE - Spurge Family

Plate 6-81. *Cannabis sativa* (marijuana - ganjanyu), CANNABACEAE - Hemp Family

Plate 6-82. *Gossypium herbaceum* L. (tsosa), MALVACEAE - Mallow Family

Plate 6-83. *Saccharum officinarum* L. (sugarcane – nukrücha), POACEAE - Grass Family

AND WOOD PRODUCTS ...

Plates 6-84 – 6-85. Although swidden productivity is usually discussed in terms of what is grown during the cropping phase, this study found that the single most valuable “crop” was the wood harvested when the jhums were opened. Piles of alder firewood neatly stacked along the roads (above) are a familiar sight in Khonoma during Dec.-Jan. when farmers are busy opening their jhums. Others debark the alder coppices and keep them as full-length poles for construction purposes (inset).

The second major issue that this chapter looks at is the social organization of labor. Who pays the costs of labor inputs? The photographs assembled in the galleries throughout this dissertation have been selected without gender bias, and so already hint strongly at the division of labor.

Plate 6-86. Khonoma men explain that they continue to do the "hardest" jobs that require more physical strength, climbing, or construction. Pollarding trees is a prominent example of a job that is done almost exclusively by men. Men thus tend to work in bursts on harder jobs – while the more onerous tasks requiring continual attention are left to women.

Plate 6-87. When the jhums are opened, men then turn their attention to constructing field huts. With the fields thus readied, men appear to leave most of the remaining work to women and many hardly revisit the jhum fields for the rest of the year (see figure 6-27).

Plate 6-88. But at times of peak labor demand, particularly during the season for transplanting rice, everyone works shoulder-to-shoulder to complete the work as swiftly as possible. Although all jobs can be done by either sex, men are more likely to be preparing the fields and women following behind them transplanting.

Plate 6-89. Transplanting progresses efficiently by dividing labor across multiple activities at once. Shown above, ① a man on the lower paddy leads the way by reinforcing the bund walls (khupone); ② followed by someone else doing final puddling and leveling (sepuhi and rhe); and ③ finally, a group transplanting (tekhuse). A couple of women in the back terrace ④ are busy bundling seedlings from the nursery (thesuphe) in readiness for transplanting.

Plate 6-90. For those who can afford to hire them, youth groups also work together in transplanting to earn money to support their activities. This engenders a sense of competition as all are keen to demonstrate their prowess amongst their peers, especially members of the opposite sex.

Plate 6-91. Although no longer needed either for defense or hunting (now banned), some elders still habitually carry a spear when they go to the fields, probably using it as a walking stick more than anything else. They still recall the days when attacking villagers preoccupied with working in their fields was a favorite way to get heads, and working parties had to be routinely guarded by armed warriors. These were the dynamics that led to women doing most of the agricultural work, while the men focused on a military role. Both were necessary for the village's survival. (Photograph by Khrieni Meru.)

Plate 6-92. Old habits linger a long time. A couple make their way back to the village, the woman laboring under a heavy load of firewood while her husband strolls alongside almost empty-handed. In former days when warfare and head-hunting prevailed, all heavy carrying fell to the women, whilst the men carried spears and daos in readiness for possible attack. The threat of such attacks faded over a century ago but most men have retained their old habit of walking unencumbered.

Plate 6-93. Seemingly an artifact from its earlier history as a warrior village, the division of labor between the genders appears more extreme in Khonoma than most Naga villages. On a spring day in 2001, we spent some time photographing this group of women busily preparing the newly-opened jhum fields for cultivation.

Plate 6-94. On our way back to the village, we passed several Khonoma boys basking in the sun at a local waterhole. Their role in pollarding the alder trees was now finished, and they could relax as the women folk took over the work from there.

Plate 6-95. A pause from field work to give some motherly attention.

Plates 6-96 - 6-97. Most women have little choice but to take their infants with them when they go to work in the fields. Married women of reproductive age thus invariably work with their youngest child tied on their backs. Mills (1931) voiced concern when, after pacification, Naga women began adopting western style of dress, and noted that strapping children directly against their mother's warm backs helped to keep them healthy (see appendix 3-11 for full text).

Plate 6-98. As his mother busily threshes Job's tears, this youngster clearly decides to play it safe and stick close in the presence of a bearded stranger – clearly from a foreign tribe - pointing something at him.

Plate 6-99.

Plate 6-100.

Plate 6-101.

Plate 6-102.

Plates 6-99 - 6-102. Child labor is not viewed as a social evil in rural villages. Like all Naga subgroups, Angami girls learn from a young age to carry water (6-99), work in the fields (6-100), look after younger siblings (6-101), bring home firewood (6-102), and other tasks that are part of every village woman's daily activities.

Plates 6-103 – 6-104. The expansion of roads through Khonoma's jhum cultivation areas has helped lighten women's work load to some extent. This is most important at the time fallows are reopened – and trucks can be hired to transport firewood back to the village, or perhaps to markets in Kohima. But probably the vast majority of firewood is still carried, one basket-load at a time, on the backs of women (inset). For villagers that can not afford to hire a truck, the road's sole benefit is simply as a convenient walking path.

Plate 6-105. Khonoma women seldom go anywhere without their baskets. Smaller diameter firewood is often left stacked in the fields when jhums are opened. Then as the women work in the fields over the following months, each evening they will take a basket-load of firewood home with them when they return to the village. It thus gradually arrives back in the village without need for making any special trips.

Plate 6-106. Weaving is another example of an activity strictly divided along gender lines. Baskets are woven only by men – and cloth only by women. Shown above, a group of boys are being tutored in basket-making as a special course provided by Khonoma's Christian Welfare School. (Photograph by Khrieni Meru.)

Plate 6-107. But once woven, the basket is considered as a "woman's tool" and few self-respecting males would want to be seen carrying it, or risk the teasing of their friends. Here, on their way back up the hill to the village, a group of young people pause to rest and take in the scenery of the terraced valley below. Each girl carries a basket, and each boy undoubtedly a dao, defining their respective roles in village life.

Plates 6-108 - 6-109. Traditional dress accentuates the femininity of the women – and the rugged warrior appearance of the men. This reflected their roles in Angami society – the women as the farmers and nurturers and the men as the protectors. These two photographs show a singing session in which a group of men come calling on women waiting inside. Many of their songs are melancholy compositions about love, warfare and death.

Plate 6-110. At the end of the day, as women rush home from the fields to prepare the evening meal and feed the pigs, their brothers can often be found engaged in a game of volleyball or other social activities.

Plate 6-111. As the sun sinks behind the western ridges and shadows lengthen, village elders like to congregate in local thehous to watch the day draw to a close and chat with their neighbors.

Plate 6-112. While women spend a good part of their days working in the fields, the housework is always waiting for them on their return. Men joke that the only pot that they can touch is the one containing zu (rice beer). Note both the maize and meat hanging over the fire for smoking. The cat is a common feature of Naga kitchens to keep rats at bay.

Plate 6-113. Despite all their hard work, Khonoma's women are clearly a happy lot, with broad smiles and animated conversations often ending with spiels of riotous laughter. While Davis and others thought Naga women to become *"mere household drudges"* after marriage (cited in Hutton, 1969, p. 167), Hutton argued them to be quite powerful members of Angami society. Butler described Angami women as *"merry, and, unlike their brothers, never to be seen idle"* (ibid, p. 173).

Introducing the Group of Ten Farm Households that Collaborated with the Research in Each Study Village

Plate 6-115. Research Assistant, Zeroni-ü (Carolin) Meru

Plate 6-116. Farmer Coordinator, Khrieni Meru

Plate 6-114. FRONT – FROM LEFT TO RIGHT: Sano Chase and baby, Meno Meyase, Avino Chase, Khrielevono Talie, Vivino Punyü, Vilakhrieü Khate, Kuolhoutono Meyase
REAR – FROM LEFT TO RIGHT: Vingulie Viprü, Vilazosie Punyü, Vipiehu Chucha, Vitsolie Meyase, Pelhuhu Chase, Khrieni Meru (Farmer Coordinator), Gongu Meru

Plate 6-118. Research Assistant, Kuolie Mere

Plate 6-119. Farmer Coordinator, Zapuvi Mere

Plate 6-117. FRONT – FROM LEFT TO RIGHT: Thenuse-ü Mere, Vilhoukho-ü Yhor and baby, Neisalie-ü Mere, Keduorhie-ü Mere, Vizovonud Khro, Khriesale-ü Khro and baby, Neilie-ü Dzüvichü, Keviratou-ü Mere, Neikuo-ü Mere
REAR – FROM LEFT TO RIGHT: Visalie Mere, Ruloutsu Mere, Rüduoui-o Yhor, Mhasizolie Mere, Ketounei Mere, Vikelie Khro, Dieseketuo Khro, Kipfelie Dzüvichü, Zapuvi Mere (Farmer Coordinator), Neichutuo Chietsü

THE ALDER MANAGERS:
THE CULTURAL ECOLOGY OF A VILLAGE IN NAGALAND, N.E. INDIA

APPENDICES

MALCOLM CAIRNS

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APPENDICES

APPENDICES

Warfare and headhunting featured heavily in Naga song and dance. Amongst the Angami, the hornbill was highly respected as an emblem of bravery, the tiger as man's brother, and the mithun and cock were the most important sacrificial animals.

CHAPTER 1

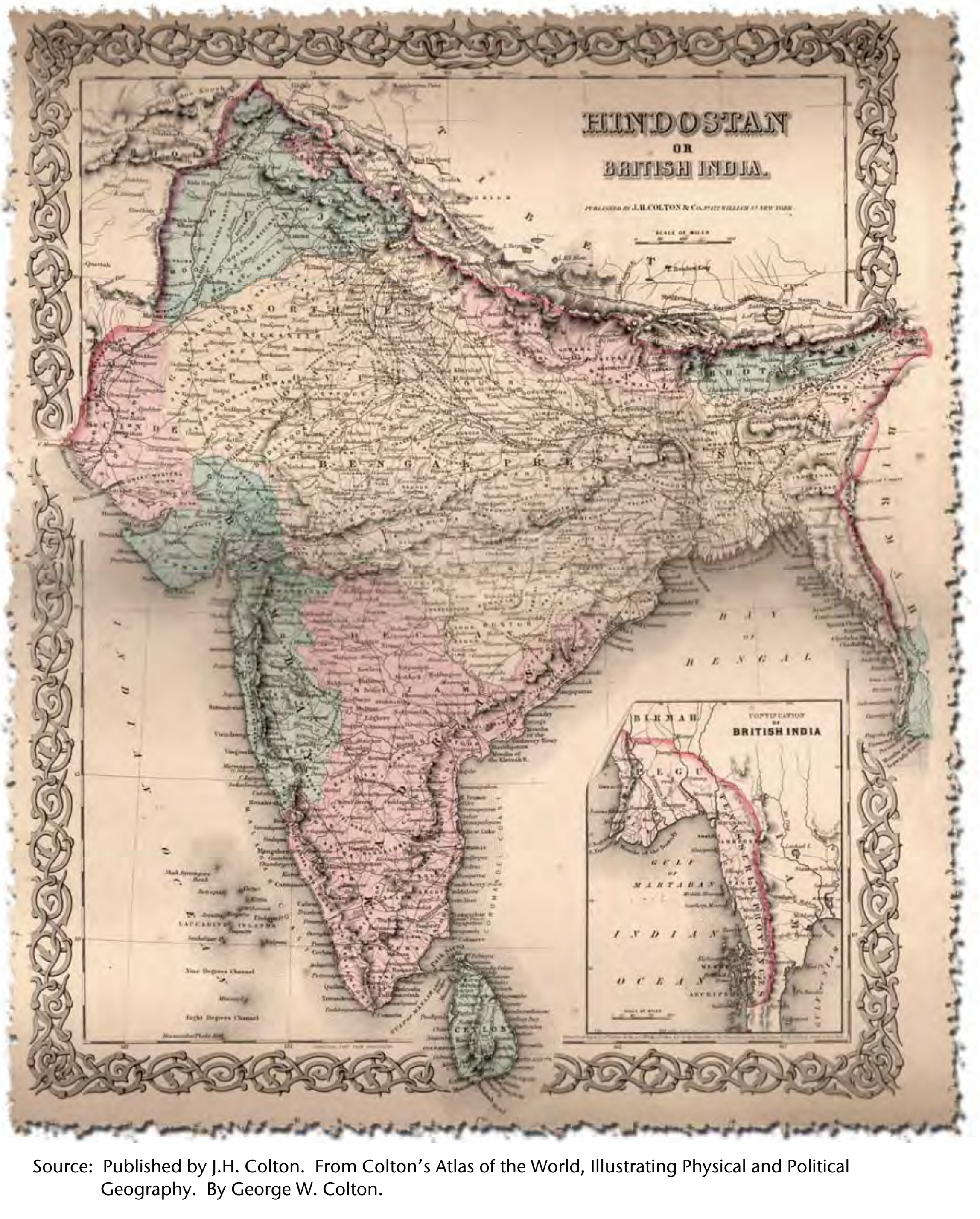
Introduction: How the Research Trail Led to the Naga Hills

APPENDICES

APPENDIX 1-1. Britain's View of Mainland Asia in 1870

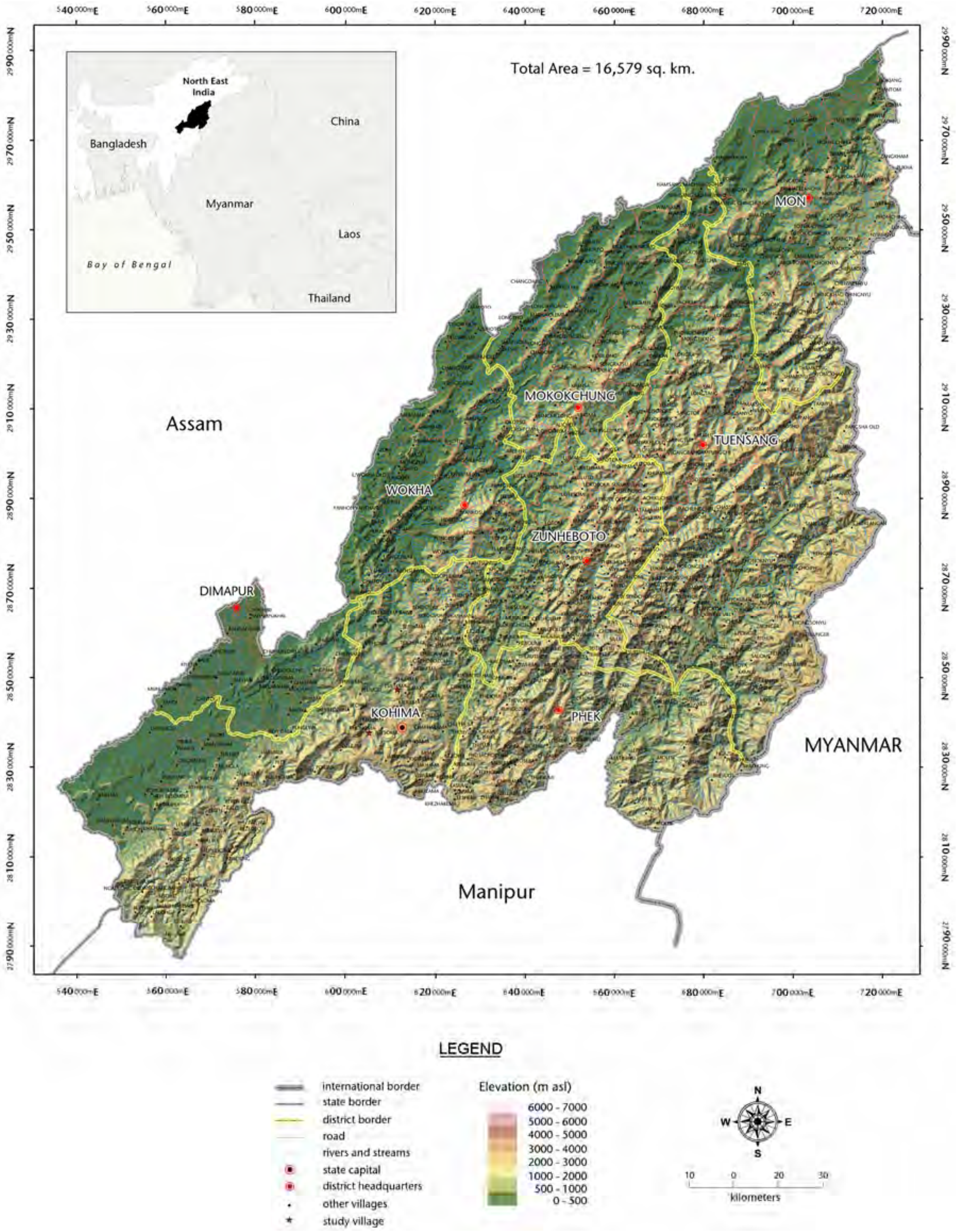
Source: McNally's System of Geography. Published in 1870. Drawn and engraved by Oliver J. Stuart.

APPENDIX 1-2. British India in 1856

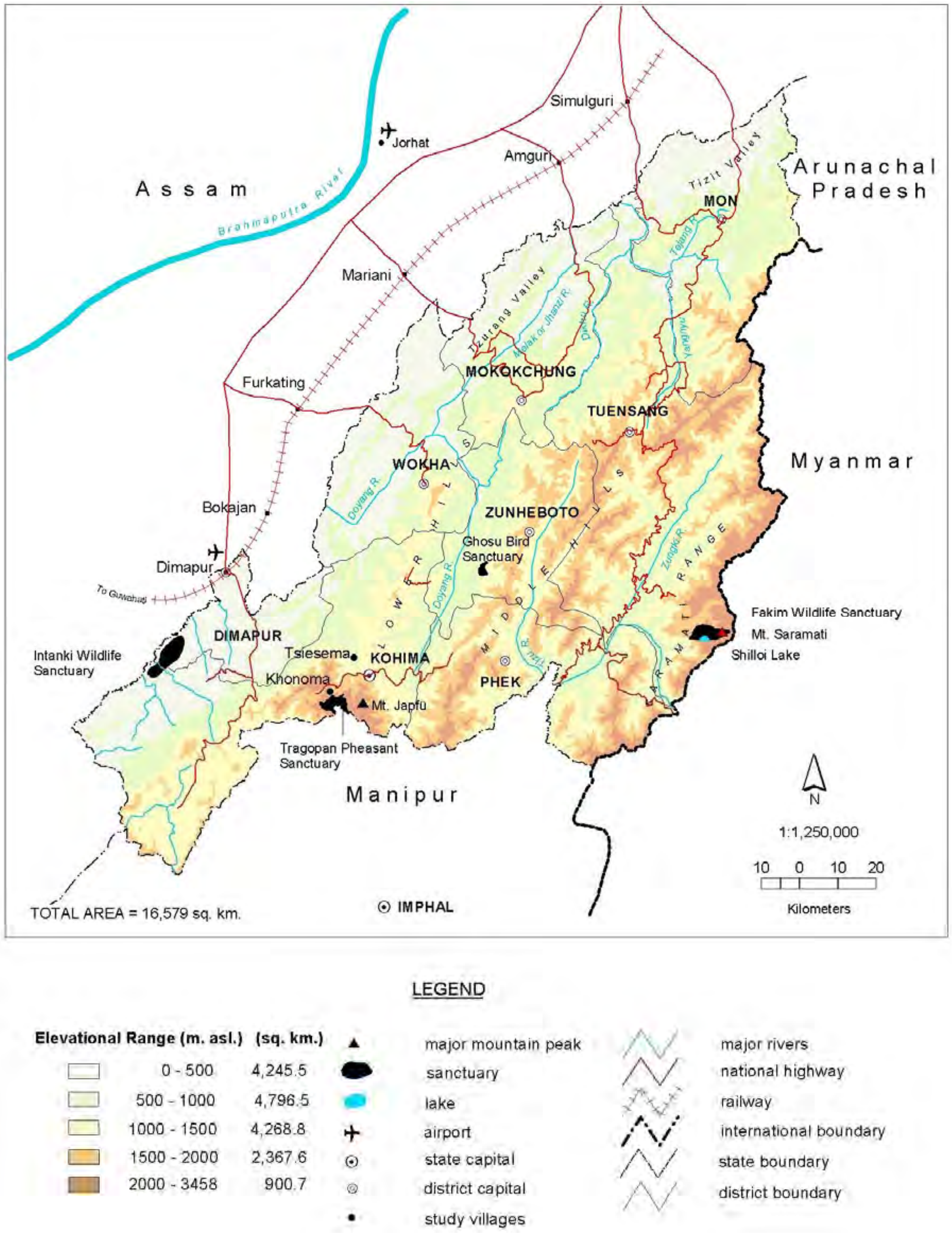


Source: Published by J.H. Colton. From Colton's Atlas of the World, Illustrating Physical and Political Geography. By George W. Colton.

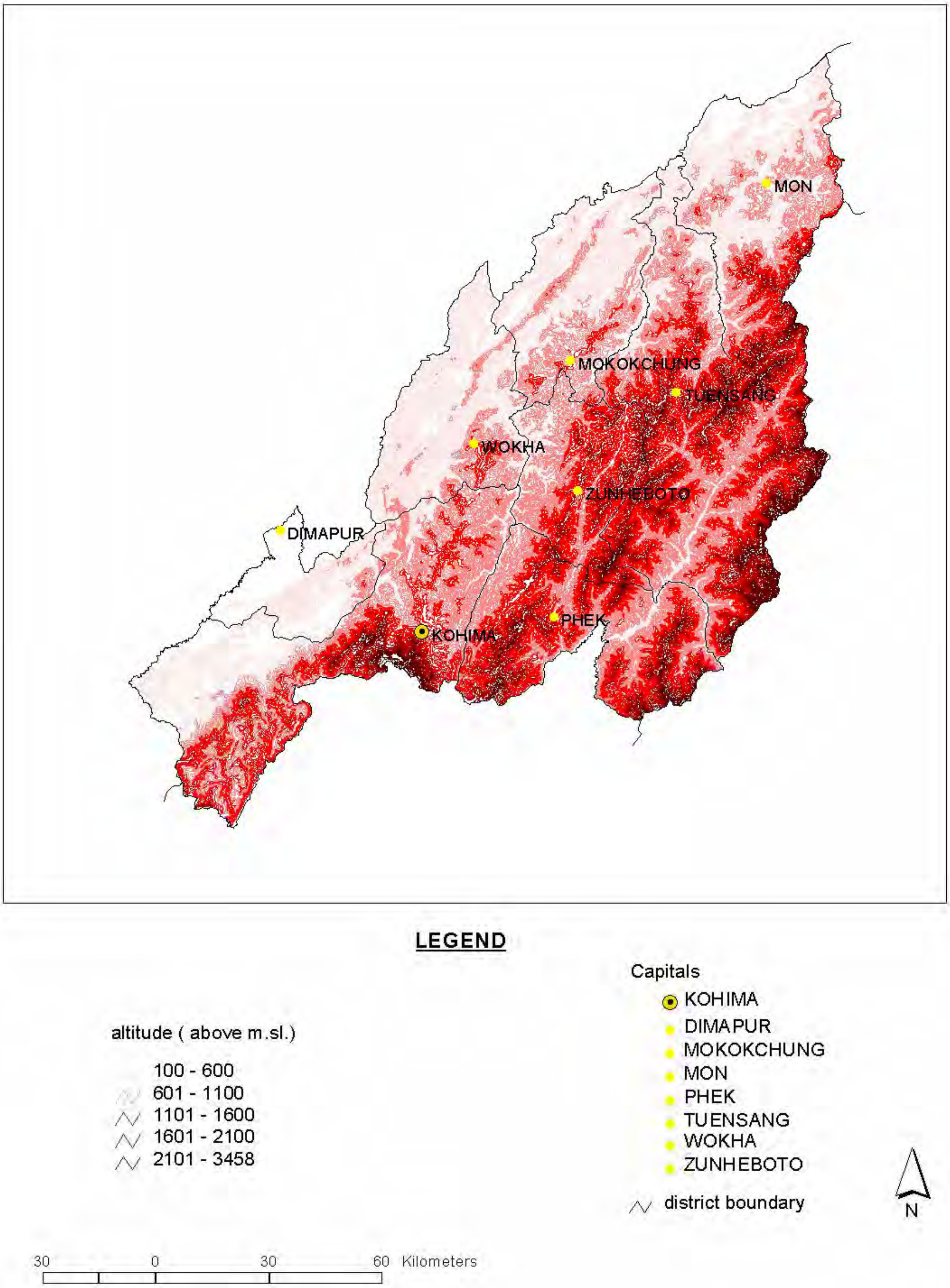
APPENDIX 1-3. Map of Nagaland during the Period of Fieldwork



APPENDIX 1-4. Major Geographical Features of Nagaland State

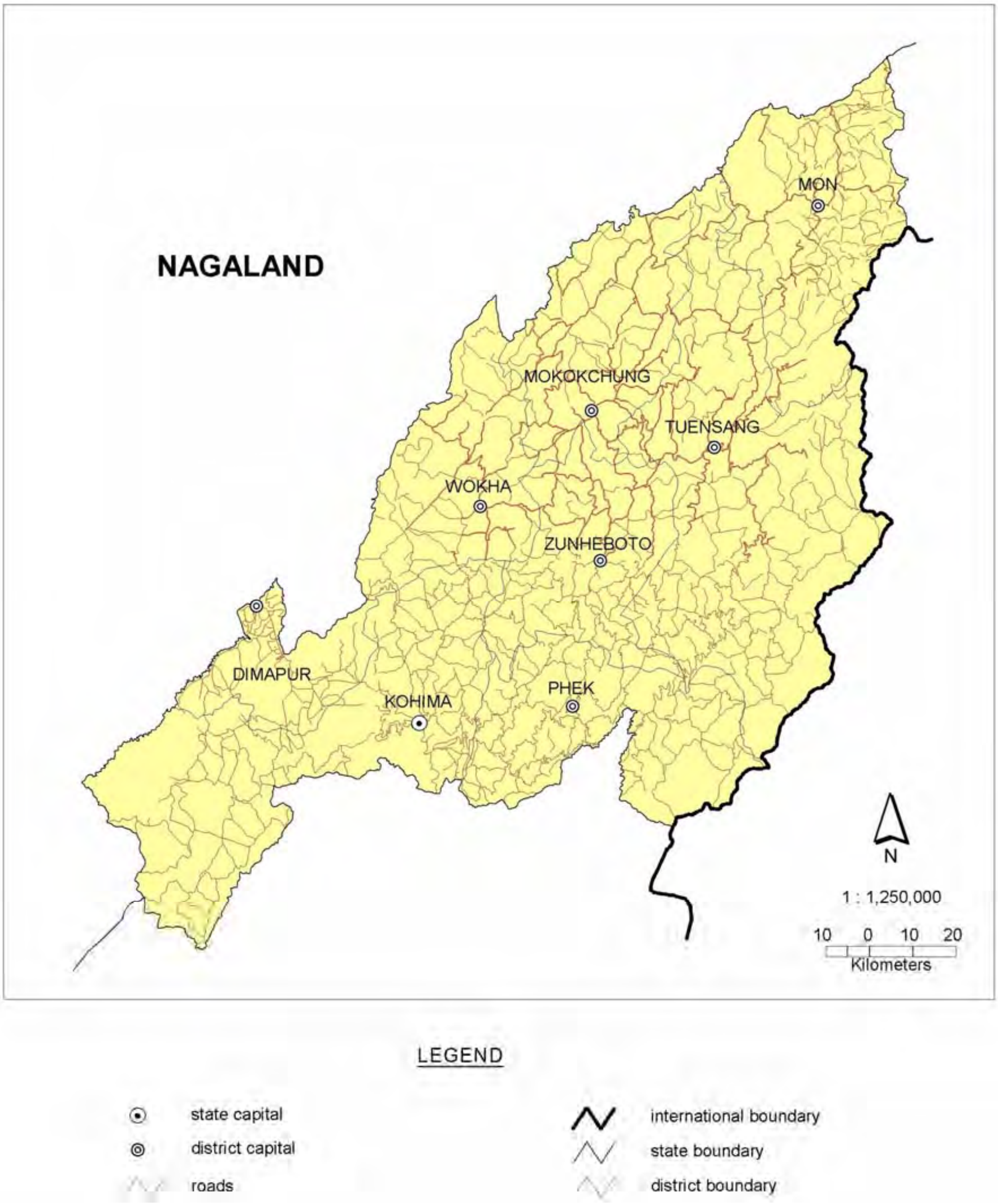


APPENDIX 1-5. Altitude

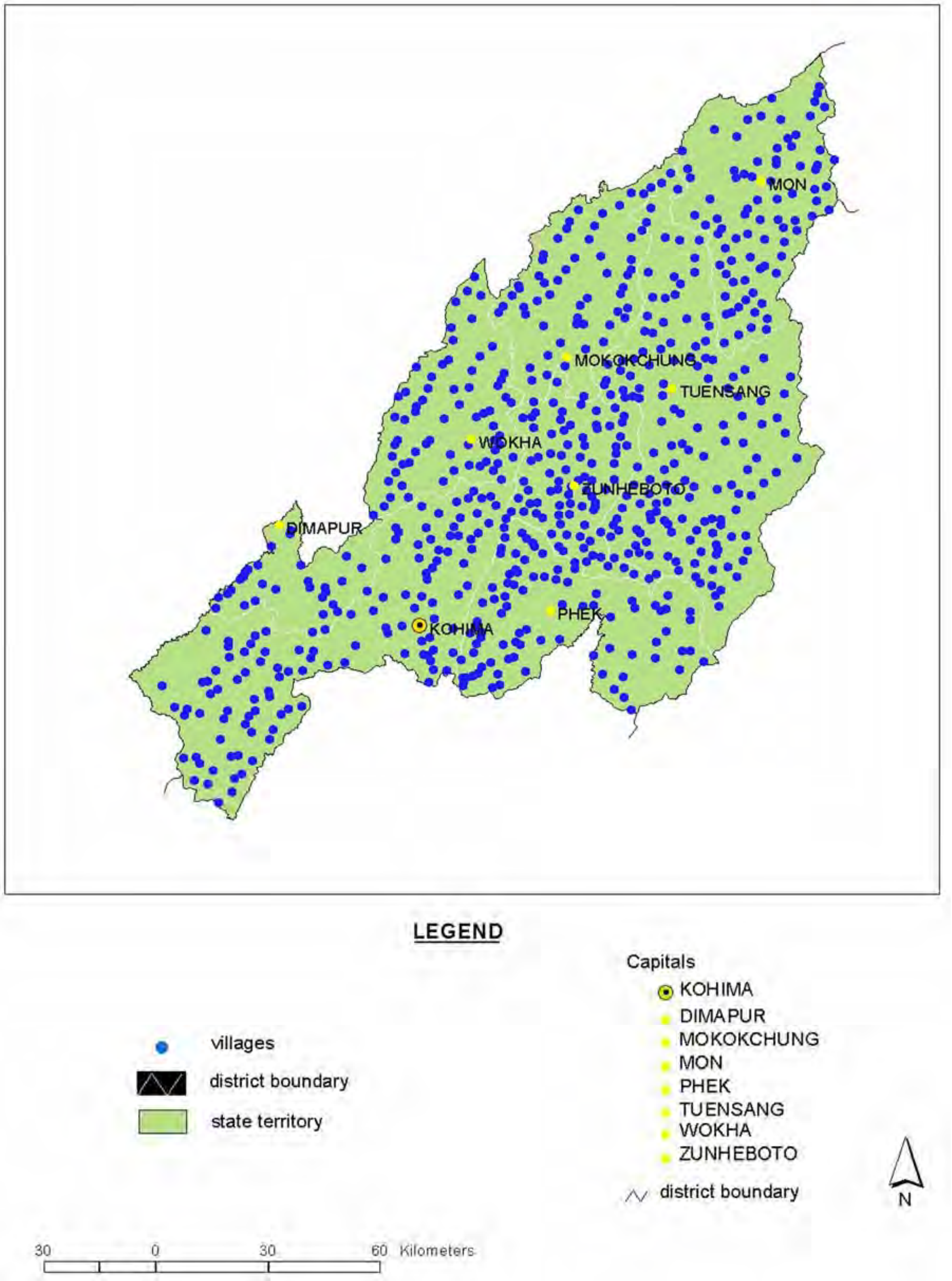


APPENDIX 1-6. Rivers

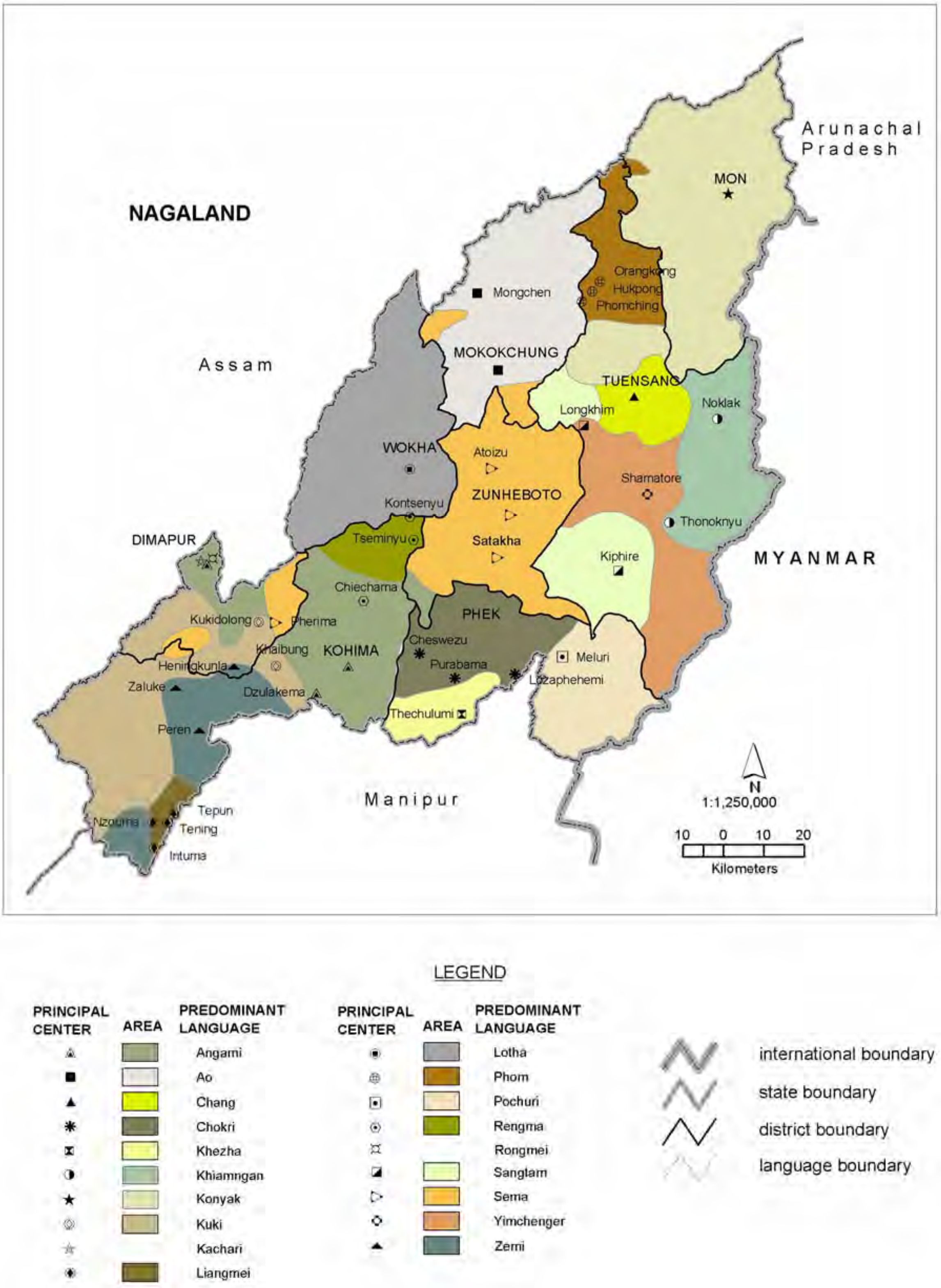
APPENDIX 1-7. Roads



APPENDIX 1-8. Villages

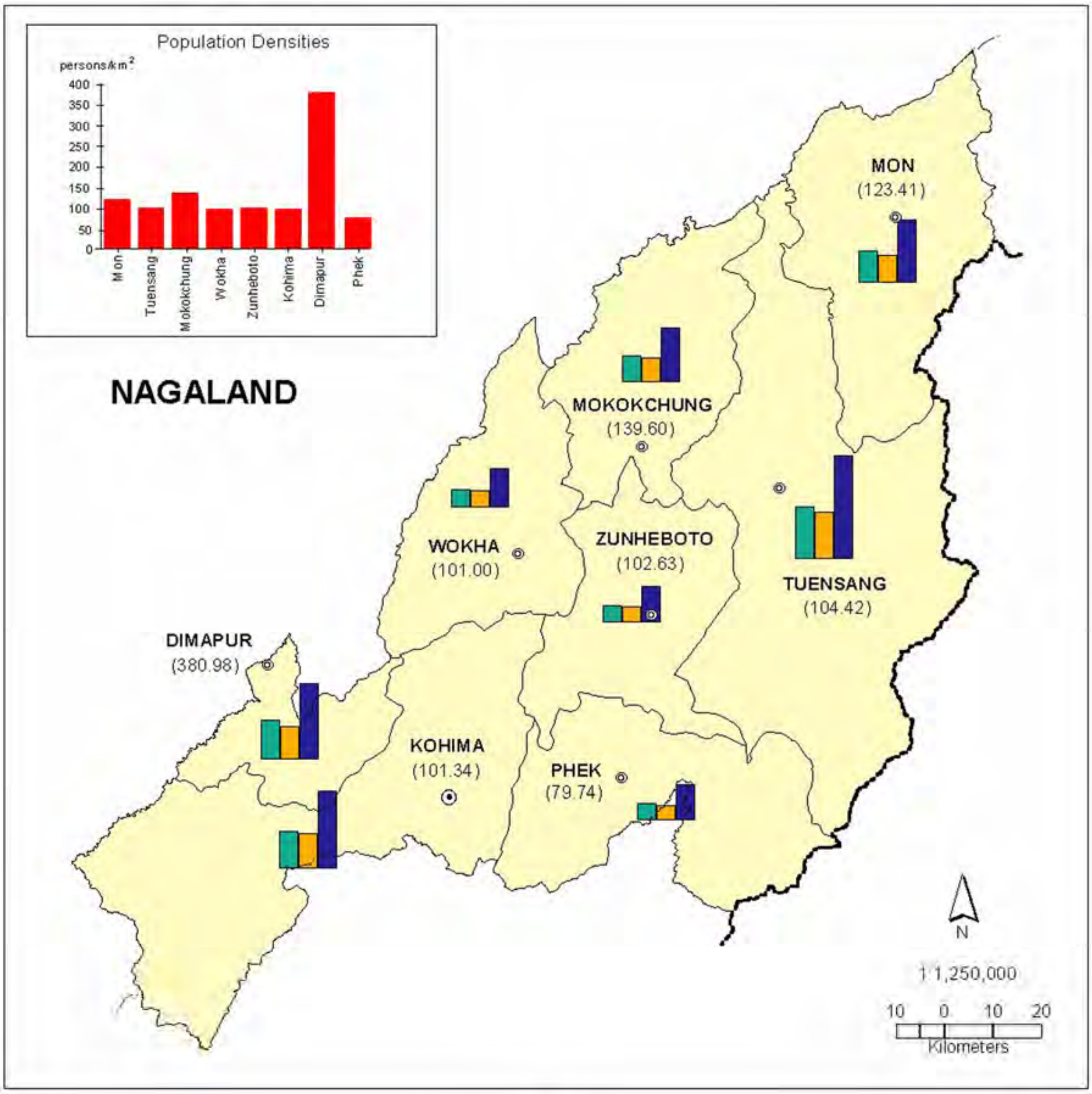


APPENDIX 1-9. Principal Centers of Languages in Nagaland *



* Adapted from Sreedhar, 1974

APPENDIX 1-10. Population Distribution across Nagaland *



LEGEND

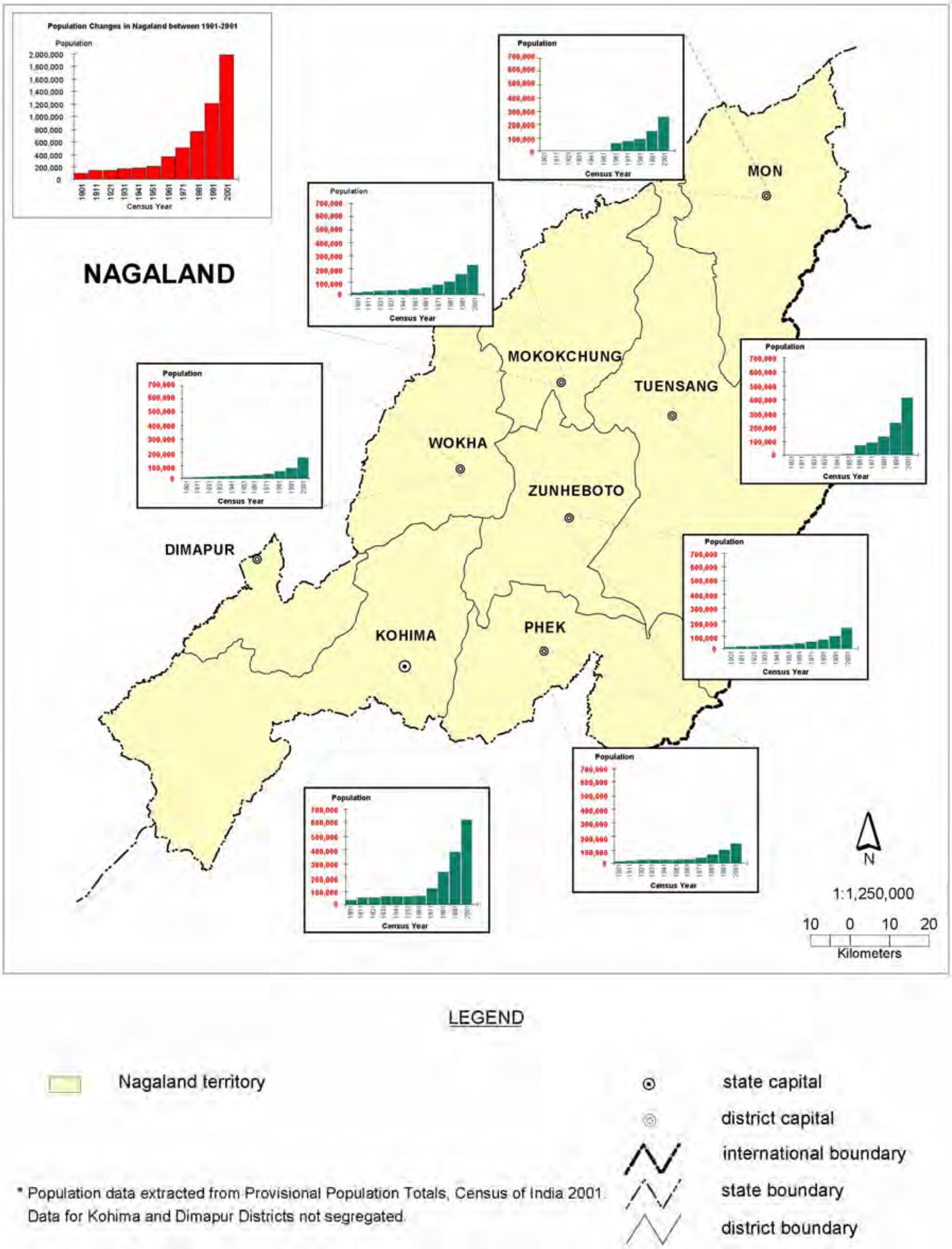
District Populations

Dimapur	308,382
Kohima	314,366
Mokokchung	227,230
Mon	259,604
Phek	148,246
Tuensang	414,801
Wokha	161,098
Zunheboto	154,909
NAGALAND	**1,988,636**

🟩	male
🟧	female
🟦	total
( )	district population density
⦿	state capital
◎	district capital
	international boundary
	state boundary
	district boundary

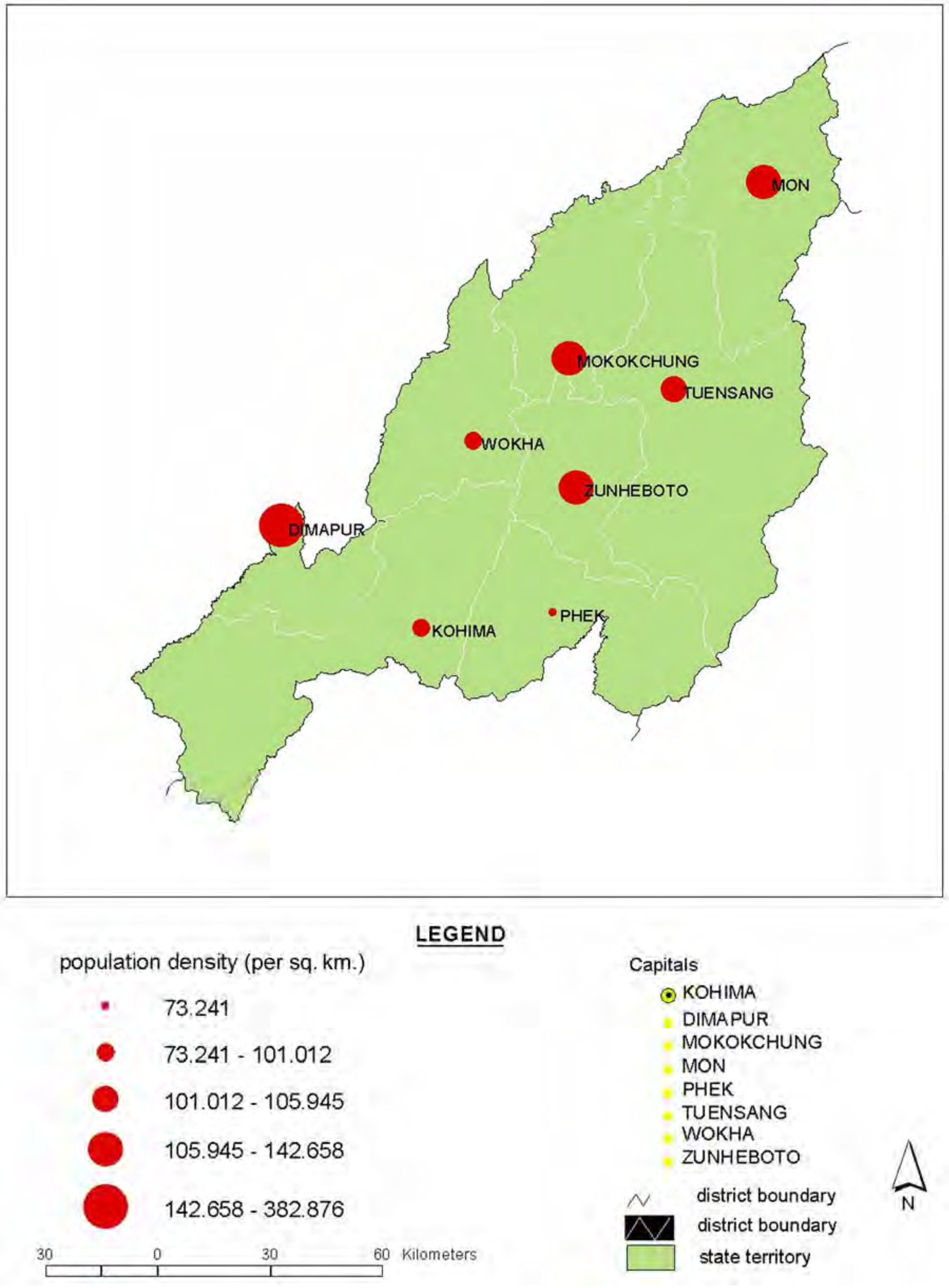
* Population data extracted from Provisional Population Totals, Census of India 2001

APPENDIX 1-11. Population Growth in Nagaland: Breakdown by District between 1901-2001*

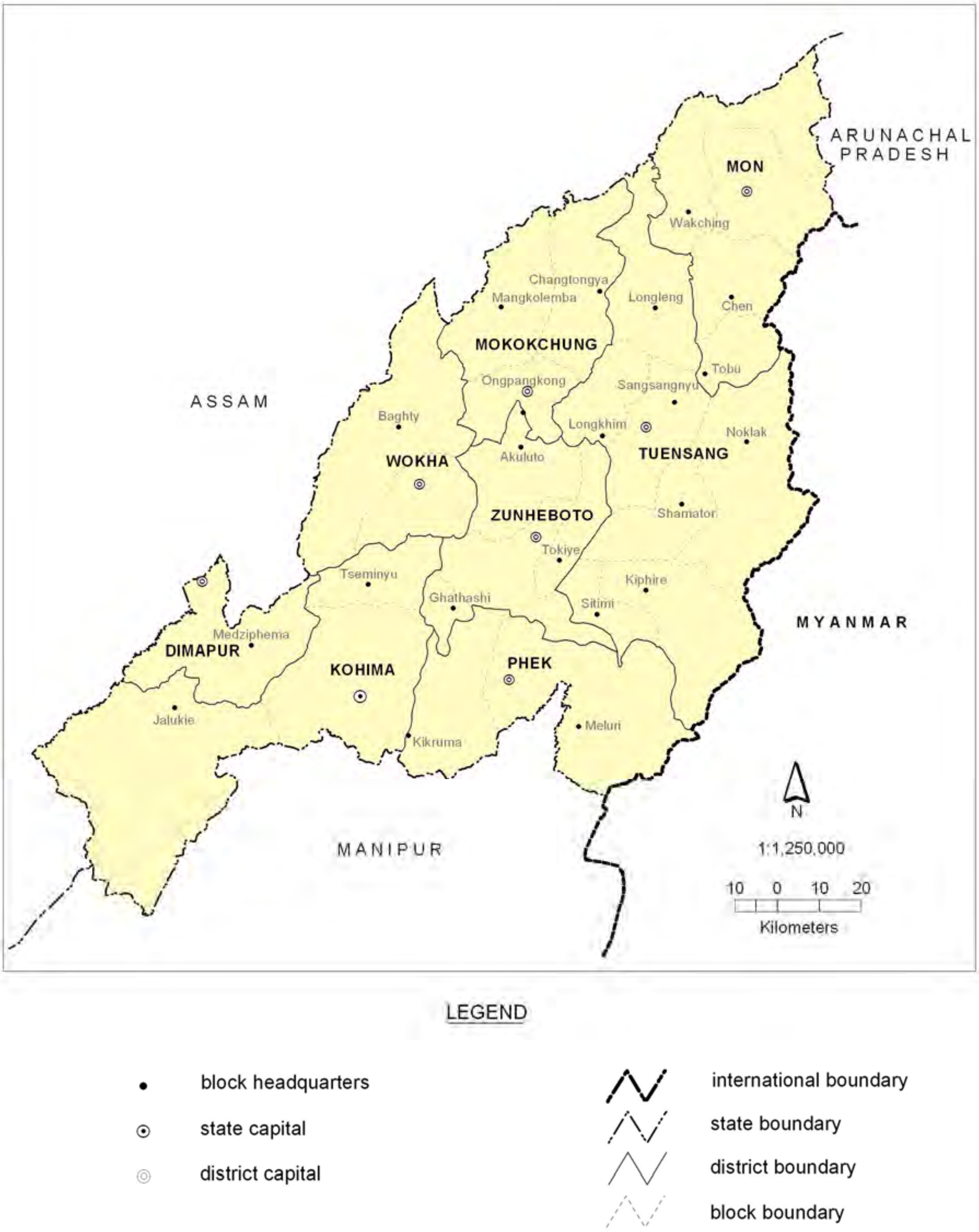


* Population data extracted from Provisional Population Totals, Census of India 2001.
Data for Kohima and Dimapur Districts not segregated.

APPENDIX 1-12. Population Density

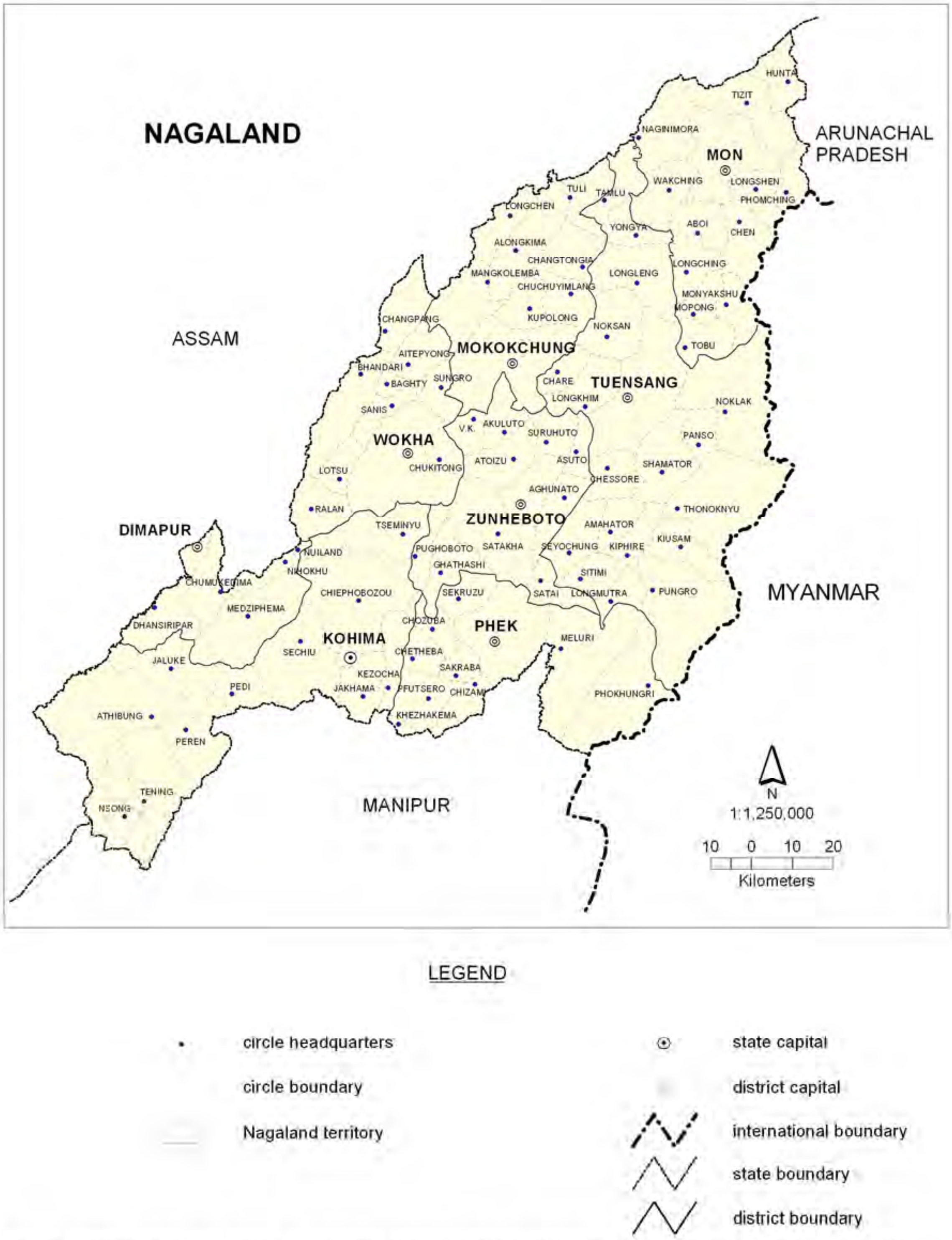


APPENDIX 1-13. Administration: Rural Development Blocks



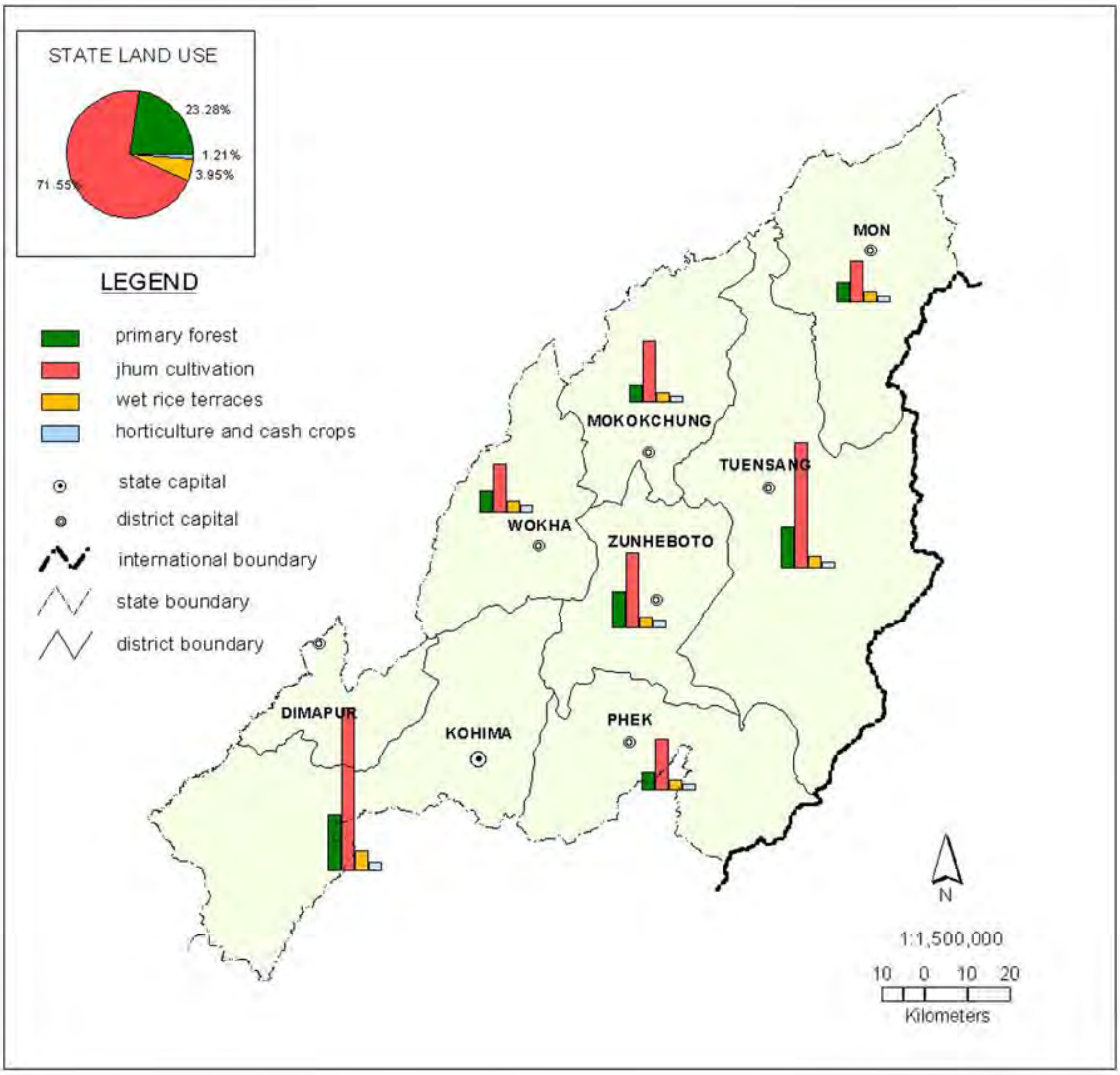
Source: Nagaland '92: Rural Development at a Glance. Directorate of Rural Development Blocks, Kohima, Nagaland

APPENDIX 1-14. Administration: Districts and Circles



Source: Census of India 1991, Series 18 - Nagaland, Part II - A General Population Tables. Directorate of Census Operations, Nagaland.

APPENDIX 1-15. A Rough Overview of Primary Land-Uses in Nagaland: Breakdown by District*

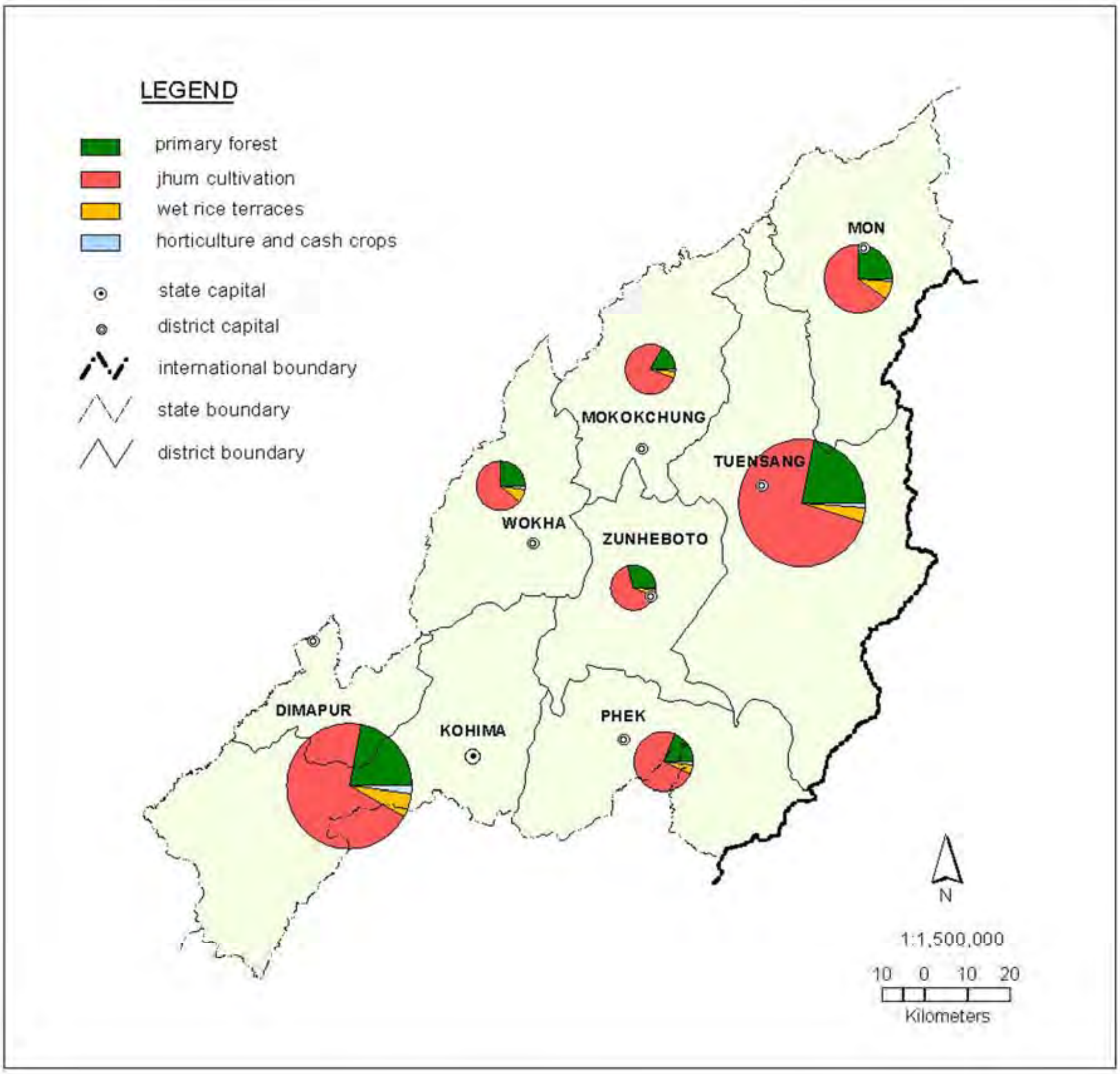


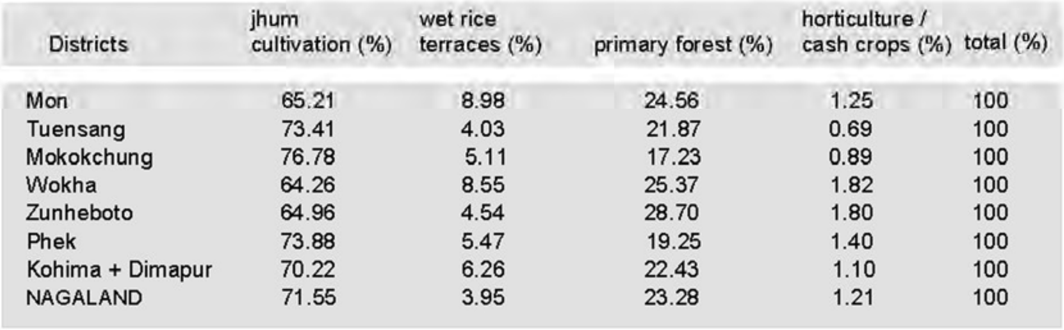
Districts	jhum cultivation (ha)	wet rice terraces (ha)	primary forest (ha)	horticulture / cash crops (ha)	total (ha)
Mon	62,633	8,624	23,593	1,199	96,048
Tuensang	211,359	11,613	62,954	1,988	287,915
Mokokchung	99,005	6,583	22,214	1,148	128,949
Wokha	73,710	9,807	29,097	2,090	114,704
Zunheboto	122,804	8,578	54,264	3,404	189,051
Phek	78,948	5,843	20,567	1,497	106,855
Kohima + Dimapur	275,866	24,597	88,104	4,311	392,878
NAGALAND	924,325	51,049	300,791	15,637	1,291,803

* Data for Kohima and Dimapur Districts not segregated.

Source: Kikon, Amen and Limachan, 2002. Village Profile 2001. Department of Agriculture, Kohima, Nagaland

APPENDIX 1-16. Land Use in Nagaland Calculated as Percentage: Breakdown by District*



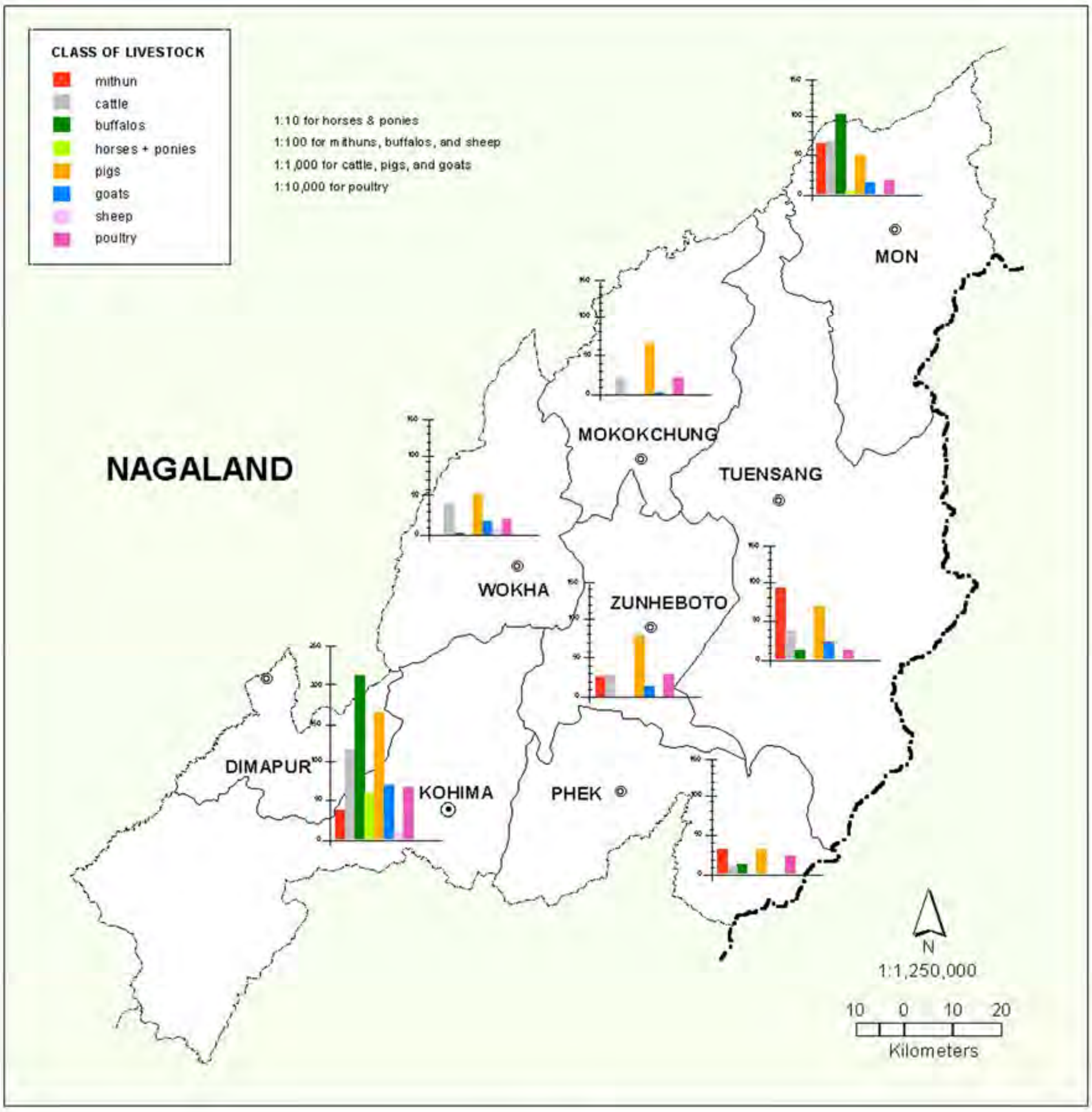


Districts	jhum cultivation (%)	wet rice terraces (%)	primary forest (%)	horticulture / cash crops (%)	total (%)
Mon	65.21	8.98	24.56	1.25	100
Tuensang	73.41	4.03	21.87	0.69	100
Mokokchung	76.78	5.11	17.23	0.89	100
Wokha	64.26	8.55	25.37	1.82	100
Zunheboto	64.96	4.54	28.70	1.80	100
Phek	73.88	5.47	19.25	1.40	100
Kohima + Dimapur	70.22	6.26	22.43	1.10	100
NAGALAND	71.55	3.95	23.28	1.21	100

* Data for Kohima and Dimapur Districts not segregated.

Source: Kikon, Amen and Limachan, 2002. Village Profile 2001. Department of Agriculture, Kohima, Nagaland

APPENDIX 1-17. Livestock Populations within Nagaland*



LEGEND

Districts	mithun	cattle	buffalos	horses + ponies	pigs	goats	sheep	poultry
Mon	6,445	67,430	10,203	416	50,445	15,078	-	178,779
Tuensang	9,408	39,464	1,328	-	71,549	23,307	-	130,571
Mokokchung	2	24,725	55	17	67,649	1,871	54	250,391
Wokha	125	40,932	291	31	55,741	19,952	761	212,311
Zunheboto	2,750	30,836	-	-	81,577	16,064	97	292,965
Phek	3,425	8,797	1,298	4	31,350	2,080	61	228,698
Kohima + Dimapur **	3,883	118,479	21,222	5,990	167,890	70,372	949	679,346
NAGALAND	26,038	330,663	34,397	6,458	526,201	148,724	1,922	1,973,061

⦿ state capital

◎ district capital

international boundary

state boundary

district boundary

* Source: Statistical Handbook of Nagaland 1996. Directorate of Economics & Statistics, Government of Nagaland, Kohima.

** Data for Kohima and Dimapur Districts not segregated.

CHAPTER 2

Planting Amongst the Alders: How the System Works

APPENDICES

APPENDIX 2-1(a). Steps in Jhum Cultivation (rasa) 1st Year - KHONOMA

ACTIVITIES			TIME FRAME	TOOL/S USED	
No.	*ANGAMI TERM*	ENGLISH DESCRIPTION		*ANGAMI NAME*	ENGLISH DISCRIPTION
1	*liepfü*	site selection	Nov.	*jie (da-u)*	Naga axe
2	*umhorünyü*	hearing the dreams	Nov.	*umho*	dreams
3	*chada*	cleaning access path	Nov.	*jie (da-u)*	Naga axe
4	*lievi*	slashing undergrowth	Dec. – Jan.	*jie (da-u)*	Naga axe
5	*siva*	pollarding the trees	Feb.	*jie, merü*	Naga axe, conventional axe
6	*sidu*	cutting and splitting firewood	Feb.	*jie, sigei, merü*	Naga axe, saw, conventional axe
7	*siketa*	gathering, carrying and piling firewood	Feb.	*mekho (khorü), ubi*	basket, hand
8	*lierie*	burning the field	Mar.	*mi, ubi*	fire, hand
9	*lierütsü*	cleaning up unburnt slash	Mar.	*mi, phiero*	fire, rake
10	*puchü*	repairing fieldhut	Feb. – Mar.	*keprü, jie (da-u)*	
11	*khupo kemie*	repairs to terrace walls	Mar.	*kejü*	spade
12	*tsiepu*	broadcasting seeds	Apr.	*ubi*	hand
13	*liephie*	soil illage	Apr.	*kejü*	spade
14	*lierei*	breaking up the soil and leveling within terraces	Apr.	*kejü*	spade
15	*lierü*	cleaning up unburnt biomass with take and reburning	Apr.	*phiero*	rake
16	*misekeza*	spreading out burnt mounds	May	*kejü*	spade
17	*kesikedu*	first intertillage with spade and simultaneous thinning	May	*kejü*	spade
18	*kesikephe*	second intertillage with spade	May	*kejü*	spade
19	*kesipfü*	hilling	June	*kejü*	spade
20	*kesipesie*	1st weeding	June	*kejü*	spade
21	*dima*	2nd weeding	June – July	*kejü, ubi*	spade, hand
22	*sirhie*	3rd weeding	June – July	*jie (da-u)*	Naga axe
23	*dikese*	4th weeding	July	*ubi*	hand
24	*sirhie*	1st thinning of sprouting alder coppices	July	*jie (da-u)*	Naga axe
25	*kesithi*	cutting Job's tears and leaving to dry	Oct.	*jie (da-u)*	Naga axe
26	*kesivü*	harvesting Job's tears and other jhum crops	late Oct. – early Nov.	*lieda*	
27	*kesihe*	winnowing Job's tears	Nov.	*mekho (khodi), liherü*	basket, winnowing tray
28	*kesimedo*	measuring	Nov.	*mekho (khodi), liherü*	basket, winnowing tray
29	*kesipfü*	carrying crops back to village	Nov.	*mekho (khodi), thula*	basket, sack

APPENDIX 2-1(b). Steps in Jhum Cultivation (lili or therie) 2nd Year - KHONOMA

ACTIVITIES			TIME FRAME	TOOL/S USED	
No.	*ANGAMI TERM*	ENGLISH DESCRIPTION		*ANGAMI NAME*	ENGLISH DISCRIPTION
1	*siekelha*	spreading out residue from previous crop	Jan.	*ubi*	hand
2	*rie*	burning crop residue	Jan.	*mi*	fire
3	*siguyha*	cleaning up and burning remaining crop residues and weeds, and repairs to terraces	Jan.	*kejü*	spade
4	*sirhie*	2nd thinning of sprouting alder coppices	Jan.	*jie (da-u)*	Naga axe
5	*sierie*	burning the weeds and other remaining crop residues	Feb.	*mi*	fire
6	*tsiepu*	broadcasting millet and perilla seed	Feb.	*ubi*	hand
7	*süphie*	soil tillage	Feb.	*kejü*	spade
8	*lieri*	breaking up the soil and leveling within terrace	Feb.	*kejü*	spade
9	*lierü*	raking up any remaining biomass	Feb.	*phiero*	rake
10	*sükedu*	giving spade the 1st time, along with weeding and thinning	Mar.	*kejü*	spade
11	*sükephe*	2nd weeding	Apr.	*kejü, ubi*	spade, hand
12	*süpesie*	3rd weeding	May	*kejü, ubi*	spade, hand
13	*sülhi*	cutting down the weeds from the bunds	June	*jie (da-u)*	Naga axe
14	*süthe*	harvesting of millet	July	*ubi*	hand
15	*medo*	measuring	July	*mekho (khodi)*	basket
16	*pfü*	carrying harvest back to village	July	*mekho (khodi) / thula*	basket, sack

APPENDIX 2-2(a). Steps in Jhum Cultivation (nhalie) 1st Year - TSIESEMA

ACTIVITIES			TIME FRAME	TOOL/S USED	
No.	***ANGAMI TERM***	**ENGLISH DESCRIPTION**		***ANGAMI NAME***	**ENGLISH DESCRIPTION**
1	*liepfü*	site selection	Aug. – Sept.	*da-u (zie)*	Naga axe
2	*umho rünyü*	hearing the dreams	day of selection	*umho*	dreams
3	*liezie*	slashing the grass	Sept. – Oct.	*da-u (zie)*	Naga axe
4	*seiva*	falling the trees	Nov. – Dec.	*da-u (zie)*	Naga axe
5	*seidu*	cutting into firewood lengths	Dec. – Jan.	*da-u (zie)*	Naga axe
6	*seipfü*	carrying firewood	Dec. – Feb.	*khorü khorha*	basket
7	*seicorho*	cutting small branches	Feb.	*da-u (zie)*	Naga axe
8	*lie the*	burning the field	Feb.	*mi*	fire
9	*lierütsü*	cleaning up unburnt slash	Feb. – Mar.	*da-u (zie), charuo*	Naga axe, bamboo rake
10	*pruchü*	building the hut	Feb. – Mar.	*da-u (zie)*, thech (*zoga*), bamboo (*kerie*)	Naga axe
11	*rükrüdze*	arranging the logs	Mar.	*da-u (zie)*	Naga axe
12	*ciecie*	hoeing the field	Mar. – Apr.	*kedzü*	spade
13	*siepa*	breaking apart lumps of soil	Mar. – Apr.	*kedzü, midu*	spade, mallet
14	*sierü*	collecting the roots and leveling the field	Mar. – Apr.	*charuo*	bamboo rake
15	*ganyali*	planting vegetables	Apr. - May	*kedzü*	spade
16	*nhapie*	weeding the field	Apr. - May	*udzie*	by hand
17	*dichü*	hilling / distributing the soil around the rice	Apr. - May	*dithodzü*	small spade
18	*dima*	second hilling	May	*dithodzü*	small spade
19	*sekrüpie*	collecting the wild bananas and cleaning the bush	May - June	*da-u (zie)*	Naga axe
20	*nhaphieda*	slashing the field perimeter	July	*da-u (zie)*	Naga axe
21	*dizhü*	pruning dead outer leaves from rice	Aug.	*udzie*	by hand
22	*dimesa*	second pruning of dead outer leaves	Aug. – Sept.	*udzie*	by hand
23	*lieshie*	making scarecrows	Sept.	*lieshie, pfe, kerie, mesü*	clothes, bamboo, bottle gourd
24	*liepfe*	guarding the field	Aug. – Oct.	*kebo, keto*	bamboo clappers, tin with stick
25	*siepruchü*	building a hut in preparation for harvest	Sept.	*da-u (zie)*	Naga axe, bamboo, wild banana leaves
26	*liere*	rice harvest	Sept.	*ziefinuo, khodi*	sickle, basket
27	*lienyü*	rice threshing	Sept.	*uphi, sei*	foot and stick
28	*telhapfü*	carrying rice back to village	Sept. - Oct.	*gakhropte,chünuo, khodi, thula*	baskets, sacks, large storage basket
29	*siepfü*	final harvest of remaining rice	Oct.	*ziefinuo*	sickle, basket
30	*ganyapfü*	harvesting vegetables	Nov.	*da-u*	Naga axe, basket
31	*dzünuoho*	harvest of taro and/or yam	Dec. – Jan.	*da-u*	Naga axe, spade, basket

APPENDIX 2-2(b). Steps in Jhum Cultivation (lili nhalie) 2nd Year - TSIESEMA

ACTIVITIES			TIME FRAME	TOOL/S USED	
No.	*ANGAMI TERM*	ENGLISH DESCRIPTION		*ANGAMI NAME*	ENGLISH DISCRIPTION
1	*pru chütuo*	repair the hut	April	*da-u (zie)*	Naga axe
2	*lili cie*	hoeing the husk (paddy)	Dec.	*kedzü*	spade
3	*lili rhepiethe*	burning the field	Feb.	*mi, charuo*	fire, bamboo rake
4	*lili rütsü*	cleaning the unburnt husk	Feb. – Mar.	*charuo*	bamboo rake
5	*chucie / perü*	planting millet or paddy	Mar. – Apr.	*kedzü*	spade
6	*siepa*	breaking apart lumps of soil	Mar. – Apr.	*midu, kedzü*	mallet, spade
7	*sierü*	collecting roots and leveling the field	Mar. – Apr.	*charuo*	bamboo rake
8	*nhapie*	weeding the field	Apr.	*udzie*	by hand
9	*dichü*	hilling / redistribution of soil	Apr.	*ditho dzünuo*	small spade
10	*dima*	second hilling	May	*ditho dzünuo*	small spade
11	*ganyapfü*	harvesting vegetables	June	*khorü*	basket
12	*sekrüpie*	cleaning the bush	Aug.	*da-u (zie)*	Naga axe
13	*dizhü*	pruning dead outer leaves from rice	Aug.	*udzie*	by hand
14	*dimesa*	second pruning	Sept.	*udzie*	by hand
15	*lieshie*	making scarecrows	Sept.	*da-u (zie)*	Naga axe
16	*liepfe*	guarding the field	Sept.	*kebo, keto*	bamboo clapper
17	*siepruchü*	building a hut for harvest	Sept.	*da-u (zie)*	Naga axe
18	*liere*	paddy harvest	Sept.	*ziepfinuo*	sickle
19	*sükoruo*	maize harvest	Sept.	*khorü*	basket
20	*lienyü*	paddy threshing	Sept.	*uphi, sei*	by foot and stick
21	*thelhapfü*	carrying paddy back to village	Sept. – Oct.	*khodi, gakhropfe*	basket, sack
22	*siepfü*	final harvest of remaining	Oct.	*khodi*	basket
23	*ganyapfü*	harvesting vegetables	Nov. – Dec.	*khodi, khorü*	two types of basket
24	*dzünuo ho rüphie*	harvest taro, yams	Dec.	*kedzü, khorü*	spade, basket

APPENDIX 2-3. Mounding Soil over Slash and Burning under Anaerobic Conditions: Effects on Soil Properties*

PAIRED SAMPLES	pH	CEC	O.M.	N	P	K	Ca	Mg	sand	silt	clay	texture
		me/100 gm.	*%*	*%*	*ppm*	*ppm*	*ppm*	*ppm*	*%*	*%*	*%*	
Ambient jhum topsoil, after burning and standard field preparation activities												
Sample 1	5.61	17.25	4.86	0.206	17.50	309.96	1575.00	160.00	40.56	14.96	44.48	clay
Sample 2	5.22	18.25	5.03	0.225	7.50	163.80	1425.00	265.00	40.96	12.96	46.38	clay
Sample 3	5.60	28.45	7.37	0.321	9.50	226.80	2450.00	247.50	44.76	34.56	20.38	clay
Sample 4	5.15	22.41	5.56	0.284	6.50	262.08	1000.00	155.00	39.16	39.36	21.48	loam
Sample 5	4.53	23.42	8.88	0.400	9.50	244.44	875.00	102.50	43.96	36.36	19.68	loam
Sample 6	5.22	21.91	4.59	0.229	24.00	317.52	1100.00	165.00	34.96	39.96	25.08	loam
Sample 7	4.78	18.76	5.99	0.282	5.00	214.20	900.00	105.00	35.56	37.96	26.48	loam
Sample 8	4.86	17.75	4.72	0.254	2.00	216.72	850.00	145.00	28.96	37.36	33.68	clay loam
Sample 9	4.53	18.38	4.49	0.229	2.50	181.44	575.00	72.50	25.16	46.56	28.28	clay loam
Sample 10	4.97	21.78	6.12	0.302	31.00	259.56	1100.00	106.25	18.96	58.56	22.48	silt loam
Avg.	5.05	20.84	5.76	0.27	11.50	239.65	1185.00	152.38	35.30	35.86	28.84	
Mounds of soil where slash has been burnt under anaerobic conditions												
Sample 1	7.48	7.43	0.202	0.028	29.00	161.28	400.00	47.50	61.40	30.68	7.92	sandy loam
Sample 2	7.34	9.82	0.538	0.038	25.00	216.72	625.00	67.50	62.40	26.68	10.92	sandy loam
Sample 3	7.61	12.46	0.360	0.057	32.00	209.16	1200.00	95.00	66.40	25.68	7.92	sandy loam
Sample 4	7.93	10.50	0.56	0.038	26.50	385.56	1825.00	175.00	60.40	29.48	10.12	sandy loam
Sample 5	7.78	21.91	0.82	0.473	32.50	1466.64	3650.00	562.50	52.28	36.69	11.12	loam
Sample 6	7.52	8.81	0.30	0.036	32.00	277.20	950.00	132.50	60.40	31.68	7.92	sandy loam
Sample 7	9.05	13.35	2.12	0.149	41.00	1345.68	2800.00	540.00	56.40	31.88	11.72	sandy loam
Sample 8	7.12	10.95	0.69	0.050	14.00	514.08	500.00	98.75	68.40	19.88	11.72	sandy loam
Sample 9	7.51	6.04	0.24	0.038	27.00	207.04	500.00	55.00	62.80	29.28	7.92	sandy loam
Sample 10	7.12	6.55	0.10	0.019	4.00	221.76	400.00	87.50	67.40	24.68	7.92	sandy loam
Avg.	7.65	10.78	0.59	0.09	26.30	500.51	1285.00	186.13	61.83	28.66	9.52	

* Analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University on May 18, 2001.
Methods used for analyses:

pH: fertilizer (g) : water (ml) = 10 : 40
CEC: Exchangeable CEC - Distillation
OM: Walkley and Black 1934
N: Kjeldahl Method
P: Brays Method No. 2
K: Flame Photometry (Exchangeable)
Ca: Titration Method - EDTA
Mg: Titration Method - EDTA

APPENDIX 2-4. Details of Individual Alder Trees in Monitored Jhum Field #5, Khonoma*

Farmers: Khrieni and Megonguii Meru Altitude: 1690 m asl, Area: 1714 sq. metres

Tree No.	**Height (*m*)**	**dbh (*cm*)**	**No. of coppices retained**	**red (*R*) or white (*W*) ?**	**average height of coppices at end of 2-year cropping phase (*m*)**
1	2.56	44	16	R	3.16
2	3.3	47	8	W	1.2
3	2.63	60	21	R	3.72
4	2.5	40	15	W	1.55
5	3.27	50	16	W	3.2
6	3	44	28	W	1.9
7	3.97	62	37	W (dying)	1.64
8	2.25	44	15	W	3.6
9	1.98	36	23	W	1.9
10	3.6	39	26	W	3.8
11	2.25	55	18	W	1.8
12	3.3	43	21	W	3.72
13	3.5	39	3	W	3.35
14	1.44	33	11	W	2.13
15	1.86	42	13	W	3.9
16	2.5	32	13	W	4.2
17	2.5	51	20	W	3.7
18	3.9	47	22	W	2.54
19	3.14	47	24	W	2.44
20	2.67	35	14	W	2.67
21	2.53	35	75	W	2.2
22	2.48	53	20	W	3.1
23	2.41	44	4	W	2.13
24	1.66	55	8	W	3.44
25	2.1	45	12	W	2.53
26	1.86	41	8	W	2.62
27	2.33	30	5	W	3
28	2.6	35	6	W	3.4
29	2	50	9	W	3.5
30	4.7	51	14	W	3.2
31	4.7	62	35	W	4.22
32	4.1	56	26	W	3.2
33	5	56	22	W	3.6
34	2.91	34	7	W	2.3
35	3.37	49	15	W	3.2
36	2	38	6	W	4
37	3.62	50	12	W	2.6
38	1.72	55	6	W	4.2
39	3.12	52	11	W	2.2
40	2.37	49	12	W	3.9
41	1.61	28	3	W	0.94
42	3.5	35	1	W	5
	2.83	**45.07**	**16.21**		**2.97**

* Cross-reference with Maps 2-2 and 2-4 to see individual tree locations within jhum field.
Refer to Map 6-1 to see field location within village landscape.

APPENDIX 2-5. Chemical Composition of 'Kelu Bo'[*] Samples [†]

Sample Designation	pH	OM	Total N	P	K	Ca	Mg	Fe
		g/100g	*g/100g*	*g/100g*	*g/100g*	*g/100g*	*g/100g*	*mg/kg*
Sample 1	10.31	76.0	0.772	0.055	3.37	0.864	0.372	1231
Sample 2	9.10	70.6	1.105	0.071	2.15	1.990	0.585	3518
Sample 3	9.28	60.4	0.923	0.074	2.46	1.210	0.510	7347
Sample 4	9.33	61.2	1.179	0.071	2.56	1.680	0.530	7809
Sample 5	9.93*	74.76	0.971	0.148	1.231	1.849	2.462	11,367
Sample 6	9.78**	64.115	1.075	0.145	1.233	2.025	2.467	11,602
Average	9.505	67.846	1.004	0.094	2.167	1.603	1.154	7146

[*] Droppings of *Batocera* sp. (longhorn beetle) larvae.

[†] Analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University on 03/06/02.

Methods used for analyses:

pH: fertilizer (g) : water (ml) = 10 : 40
OM: Walkley and Black 1934
Total N: Kjeldahl Method
P: Brays Method No. 2
K: Flame Photometry (Exchangeable)
Ca: Titration Method – EDTA
Mg: Titration Method - EDTA
Fe: Titration Method (Exchangeable)

APPENDIX 2-6. Weight of Coppices Thinned from Sampled Trees*

Field No.	Tree No.	Fresh Weight (*g*)		Dry Weight (*g*)		DM (%)	
		Branches	Leaves	Branches	Leaves	Branches	Leaves
1st Thinning							
Field 1	Tree 1-1	2,812	5,441	721.56	1,383.69	25.660	25.431
	Tree 1-2	721	1,490	185.01	378.92		
Field 2	Tree 2-1	5,307	8,243	1,241.74	1,842.89	23.398	22.357
	Tree 2-2	1,900	4,373	444.56	977.67		
Field 3	Tree 3-1	1,495	3,716	429.16	845.28	28.706	22.747
	Tree 3-2	3,664	8,516	1,051.79	1,937.13		
Field 4	Tree 4-1	111	305	29.34	67.70	26.436	22.198
	Tree 4-2	1,335	2,797	352.92	620.87		
Field 5	Tree 5-1	3,300	6,400	888.29	1,524.22	26.918	23.816 †
	Tree 5-2	6,000	10,300	1,615.08	2,453.05		
Field 6	Tree 6-1	2,759	2,264	818.20	689.66	29.656	30.462
	Tree 6-2	249	269	73.84	81.94		
Field 7	Tree 7-1	2,251	2,993	616.62	712.81	27.393	23.816 †
	Tree 7-2	1,046	1,593	286.53	379.39		
Field 8	Tree 8-1	7,540	15,154	1,931.37	3,609.08	25.615	23.816 †
	Tree 8-2	5,139	8,662	1,316.35	2,062.94		
Field 9	Tree 9-1	2,298	3,299	564.09	649.86	24.547	19.699
	Tree 9-2	1,088	2,094	267.07	412.49		
Field 10	Tree 10-1	3,193	4,186	831.41	996.94	26.039	23.816 †
	Tree 10-2	2,931	3,387	763.19	806.65		
Average		2,757	4,774	721.41	1,121.66	26.437	23.816
2nd Thinning							
Field 1	Tree 1-1	3,900	6,450	1,389.96	2,244.60	35.640	34.800
	Tree 1-2	3,700	6,200	1,318.68	2,157.60		
Field 2	Tree 2-1	4,850	6,850	1,857.55	2,157.75	38.300	31.500
	Tree 2-2	10,250	12,350	3,925.75	3,890.25		
Field 3	Tree 3-1	3,200	5,000	1,112.18	1,095.71	34.756	21.914
	Tree 3-2	5,900	9,500	2,050.58	2,081.86		
Field 4	Tree 4-1	3,850	4,850	1,441.34	1,524.02	37.438	31.423
	Tree 4-2	5,200	4,900	1,946.75	1,539.73		
Field 5	Tree 5-1	6,000	9,600	2,600.57	2,828.80	43.343	29.467
	Tree 5-2	5,600	12,550	2,427.20	3,698.07		
Field 6	Tree 6-1	4,500	8,550	1,662.50	2,458.13	36.944	28.750
	Tree 6-2	11,100	15,000	4,100.83	4,312.50		
Field 7	Tree 7-1	4,350	8,250	1,421.83	2,516.25	32.686	30.500
	Tree 7-2	3,600	5,950	1,176.69	1,814.75		
Field 8	Tree 8-1	4,900	9,600	1,546.14	2,663.08	31.554	27.740
	Tree 8-2	9,550	9,900	3,013.39	2,746.31		
Field 9	Tree 9-1	6,150	6,100	2,029.84	1,768.02	33.006	28.984
	Tree 9-2	11,400	13,250	3,762.64	3,840.36		
Field 10	Tree 10-1	2,500	2,800	1,027.05	854.00	41.082	30.500
	Tree 10-2	1,100	1,200	451.90	366.00		
Average		5,580	7,,943	2,013.17	2,327.89	36.475	29.558
TOTAL BOTH THINNINGS		**8,337**	**12,717**	**2,735**	**3,450**	**31.456**	**26.687**

*Calculated from composite sample from both trees in each field.

† Laboratory failed to record oven-dried weight for these four samples, so average DM% from other six samples has been used for calculations.

APPENDIX 2-7. Chemical Analyses of Coppice Thinnings [†*]

	N (%)		P (%)		K (%)		Ca (%)		Mg (%)		Fe (*mg/kg*)	
	B [♣]	L [‡]	B [♣]	L [‡]	B [♣]	L [‡]	B [♣]	L [‡]	B [♣]	L [‡]	B [♣]	L [‡]
1st Thinning												
Sample 1	1.455	3.47	0.129	0.207	1.237	1.372	1.045	1.058	0.237	0.301	590	520
Sample 2	1.416	3.339	0.167	0.221	1.592	1.69	0.523	0.674	0.154	0.215	2760	1400
Sample 3	1.66	3.1	0.173	0.274	1.007	1.623	0.67	0.586	0.167	0.265	1304.3	461.4
Sample 4	1.78	3.95	0.255	0.338	1.273	1.879	0.773	0.901	0.201	0.287	836.9	413.5
Sample 5	1.37	3.15	0.179	0.258	1.361	1.968	0.782	1.54	0.232	0.354	259.8	708
Sample 6	1.12	2.86	0.146	0.219	0.762	0.894	0.468	0.508	0.226	0.302	239.9	532.4
Sample 7	1.34	3.3	0.29	0.269	1.181	1.839	0.687	1.22	0.208	0.309	504.4	323
Sample 8	1.19	3.55	0.208	0.278	0.979	1.571	0.859	1.67	0.187	0.386	250.1	396
Sample 9	1.494	3.078	0.091	0.178	1.115	1.345	0.734	0.942	0.19	0.276	310	680
Sample 10	1.12	3.74	0.18	0.299	0.925	1.676	0.848	1.46	0.192	0.316	183.5	353
Average	1.395	3.354	0.182	0.254	1.143	1.586	0.739	1.056	0.199	0.301	723.89	578.73
2nd Thinning												
Sample 1	1.72	3.46	0.142	0.2	0.652	1.408	1.86	2.09	0.256	0.386	332.5	405.3
Sample 2	1.59	4.23	0.164	0.289	0.681	1.779	2.23	2.26	0.213	0.227	100.3	430.3
Sample 3	1.47	4.58	0.154	0.314	0.711	2.266	1.95	1.5	0.222	0.276	124.5	447
Sample 4	1.49	4.02	0.155	0.249	0.735	1.46	2.28	1.06	0.211	0.2	118.8	561.2
Sample 5	1.69	3.51	0.157	0.211	0.855	1.776	2.13	1.38	0.271	0.322	251.1	423.5
Sample 6	1.48	4.11	0.155	0.258	0.658	1.808	2.04	2.24	0.244	0.271	121.6	438.4
Sample 7	1.81	3.69	0.215	0.262	0.891	1.544	2.24	1.36	0.267	0.239	275.2	699.9
Sample 8	1.25	3.98	0.135	0.284	0.924	1.761	0.75	1.77	0.235	0.477	343.8	173.9
Sample 9	1.18	4.09	0.106	0.24	0.9	1.806	0.93	1.1	0.186	0.269	241.4	302.3
Sample 10	1.33	3.54	0.157	0.227	0.574	0.896	1.73	2.42	0.272	0.559	228.5	540.5
Average	1.501	3.921	0.154	0.253	0.758	1.650	1.814	1.718	0.238	0.323	213.77	442.23
AVERAGE BOTH THINNINGS	**1.448**	**3.637**	**0.168**	**0.254**	**0.951**	**1.618**	**1.276**	**1.387**	**0.219**	**0.312**	**468.83**	**510.48**

[†] Analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University over 2001-2002.

[*] Methods used for analyses:

N:	Micro-Kjeldahl Method	Ca:	Titration Method – EDTA
P:	Brays Method No. 2	Mg:	Titration Method - EDTA
K:	Flame Photometry	Fe:	o-Phenanthroline
P:	Brays Method No. 2		

[♣] B – branches

[‡] L - leaves

CHAPTER 3

Khonoma and its People

APPENDICES

APPENDIX 3-1. A Series of Tour Diary Entries by John Butler in the Early 1870s that Chronicle an Ongoing Feud between Khonoma's Merhümia and Semomia Khels

"9th February, Wednesday. [1870]

... A distance of about 12 miles, brought us into Mozemah [Mezoma]. ... At the present moment (about 8 p.m.) whilst I am writing I can hear firing going on on the opposite hill, between the rival clans of Khonomah [Khonoma].

10th February, Thursday. [1870]

Early this morning the Peumahs [chiefs] of the Suminah [Semomia] Khel of Khonowmah [Khonoma] together with their Dubasha [dobashis] came into camp to pay their respects and informed me that the Miremah [Merhümia] khel had made an attack upon them last night (which accounts for the firing I heard) and that they had succeeded in burning down three houses and hoped I would aid them in obtaining revenge which of course I refused to do, reminding them of the attack which they themselves had so lately made upon the village of Kenomah [Kenoma / Paplongmai – a nearby Zeliang village] and adding that I thought they were very foolish not to bring the matter before me and let me settle it for them peacefully instead of keeping up the fight from year to year which would only end in disaster to both but I only received the old answer "*Blood has been shed last by the Mirimah* [Merhümia] *and we must shed blood in return - if you order us we must obey, but our hearts will not be happy and we cannot say what may happen*" - all of which simply amounts to this - that if we want the tribes to be at peace we must run the risk of having to use force to get it.

12th February, Saturday. [1870]

I was rather amused at receiving another visit from Dhopoole and Veepomi of the Suniemah [Semomia] khel of Khonomah [Khonoma] who came up no less than three times in the course of the day, each time declaring they had something new to tell me and each time although commencing their oration with something fresh, ever ending with the same old story - "*Would I not aid them in an attack on the Mirimah khel?* [Merhümia]" and although I repeatedly told them that I would certainly not interfere in any way to avenge their private quarrel by destroying a clan that had never harmed me, yet it would not surprise me at all to have the whole question brought up again tomorrow for these savages never seem to be able to take a refusal and for downright stubborn importunity, I will back a Naga against all comers.

4th March, Friday. [1870]

This is all owing to the Summemah [Semomia] Khel of Khonomah [Khonoma] having made a raid upon this village [Kenoma / Paplongmai] in revenge for the Meremh khel [Merhümia] of Khonomah having attacked their allies in Tapamah. Kenomah [Kenoma / Paplongmai] only a few months ago was one of the most prosperous of the Kutcha Naga [Zeliang] villages containing 282 houses but 72 were burned to the ground in this last raid and there only remain now 160 houses of the Sumemah Khel [Semomia] and 50 of the Rehootzoomah.

7th January, Saturday. [1871]

Halted and was delighted at about l o'clock to see the 4 loads left behind yesterday conveyed in by the Kevemah men, true to their promise. In the afternoon I received a large deputation from Khonomah, among them were Viponu and Dhopule, the two chiefs of the Sumemah khel who were full of their grievances against the Merhemah clan, who undoubtedly are a precious bad lot though I have no sympathy for the former either. However as the Government have decided upon non-interference and I have been instructed not to express opinions opposed to the views entertained by Government, I refrain here from entering into any further details on the subjects of these disgraceful feuds.

11th January, Wednesday. [1871]

In the course of the day, I received a visit from Pulhutzo [Pelhou] of the Merhemah khel of Khonomah who came in to assure me that his clan were most friendly towards me and that the only reason that had prevented them from coming in to pay their respects to me at Samaguting [Chümukedima] was the existence of the feud between them and Sumema [Semomia].

15th March, Friday. [1872]

The Merhma [Merhümia] and Semoma [Semomia] clans, I regret to find, still continue to wage a relentless war that has now lasted for years and it appears the former have just succeeded in killing another man of the Semoma clan as a set off against the murder of Punitcha lately committed by the Semoma clan, and under these circumstances, I am afraid it is a hopeless task to attempt to reconcile these two clans by mere advice or argument. However, as the Semoma men have asked me to halt here tomorrow as a special favour, I hope to make the attempt, forlorn though it may be.

16th March, Saturday. [1872]

After breakfast or rather tiffin, for it was past 1 p.m. when we got back from our morning stroll, I paid, according to previous arrangement, a long visit to Pelhu and the other chiefs of the Merhma [Merhümia] clan who had all assembled to meet me. We had a very long talk together, the substance of which was that the Merhmah [Merhümia] clan were quite ready to obey any order I might give them even to paying me a regular revenue and keeping the peace towards all men, but it was quite impossible that they could do the latter and make peace with the Semoma [Semomia] men voluntarily and of their own accord.

On enquiring into the affairs regarding Rallutomah, I was surprised to learn that the Munniporries [Manipuris] had accepted Rs. 20 to say no more about it. However in the absence of the Political Agent, I thought it inadvisable to enter further into the matter.

I next visited the Semomah [Semomia] clan with whom I had to undergo much the same kind of ordeal I had had with the Merhma men for like them, the Semoma assured me they were quite ready to do anything except make peace, and so I was compelled to my great sorrow to let things take their course and I suppose many days will not pass before I hear of the death of another victim to this cursed vendetta. Both clans, I may add, gave me a hearty welcome and each presented us with the usual offerings of spears, fowls, rice, a pig, etc., and did all that lay in their power to make us enjoy our visit.

4th December. [1872]

I did intend to have marched back today to Piphumah [Piphema] but as I hear the Khonomah men have been fighting again (one of the Merhama men was shot 5 days ago) I have sent out Mema Ram to tell them that I am encamped at Mozumah [Mezoma] and if they will lay their quarrel before me I will settle it for them, etc., etc. The Merhamah [Merhümia] men have now lost 37 and the Samamah [Semomia] 40 men since war first broke out between these clans and I should like to bring this bloodshed to an end if possible.

5th December. [1872]

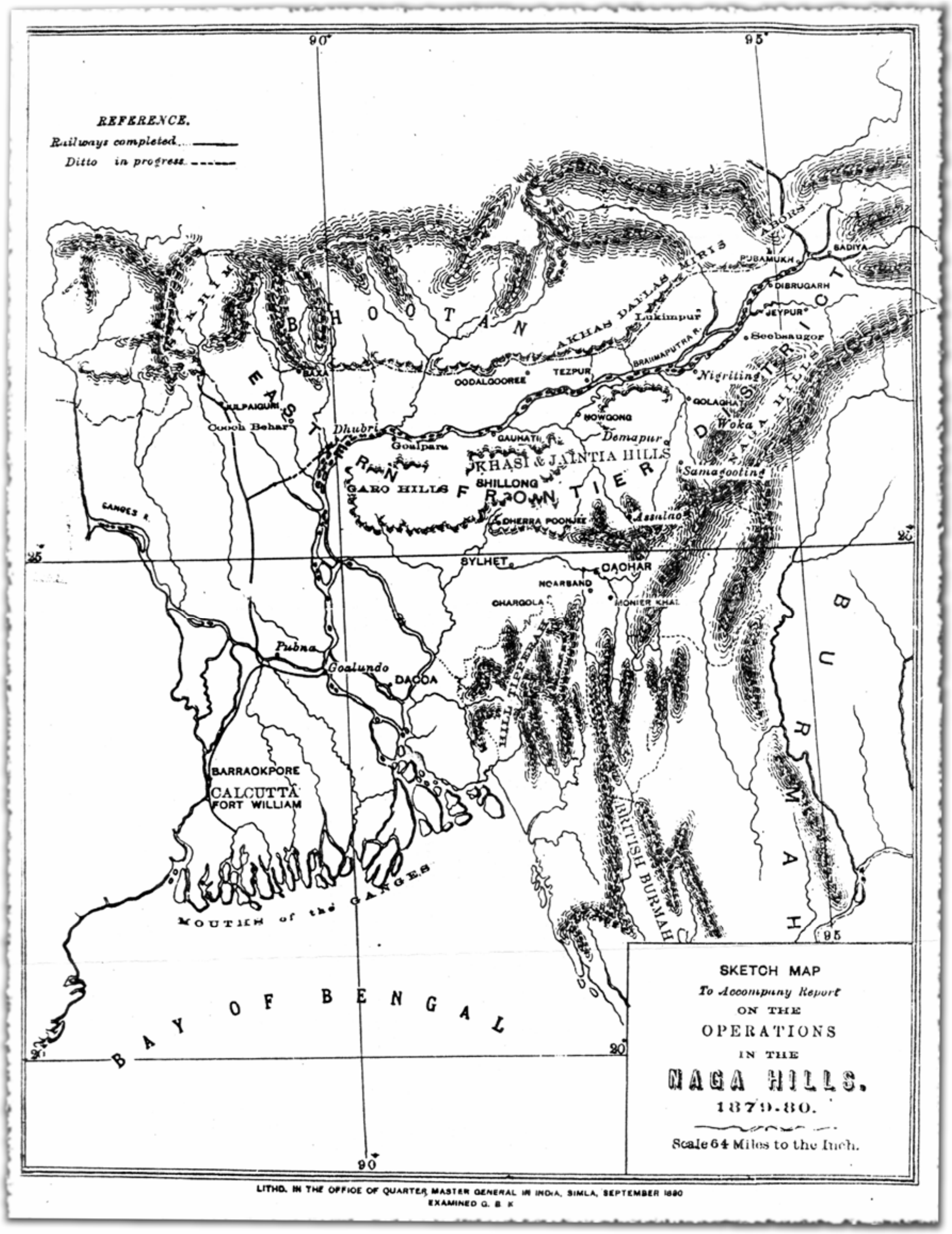
Halted at Mozemah [Mezoma]. Inspector Memaram returned from Khonomah yesterday evening and reported that he had visited both the rival clans (i.e. Sememah and Merhemah) and had tried very hard to induce them to come in and lay their quarrel before me but had failed - each clan declaring that they were quite ready to obey my orders in everything but that no Tengimah [Tenyimia] can voluntarily abandon a blood feud until one party or the other has been completely subdued. The Samemahs clan having drawn blood last (by shooting one of the Merhamah men only a few days ago), would, from what I hear, be rather glad to make peace just now whereas, of course, the Merhamah clan won't hear of making peace until they have succeeded in murdering another Samemah and so it will go on ad infinitum and in the meantime, I suppose I must content myself with giving sage council to which neither party will pay the slightest attention.

1st January. [1873]

A short and easy march brought us into Khonomah today where I found the two rival clans of Samensah [Semomia] and Merhamah [Merhümia] were each anxious that we should encamp in their half of the village, but in order to avoid any appearance of our sympathizing with either side, we determined to pitch our tents on neutral ground and so encamped on the terraces belonging to the Nachatchumah clan, after which I ordered the Chiefs of each clan to come into me, which after considerable delay they did do when I explained to them fully in the presence of Colonel Thomson and Major Roma Sing the nature of the boundary that had been laid down between Assam and Manipur and most solemnly warned them against committing any raids across the border for the future."

(Butler, 1870b)

APPENDIX 3-2. British Map Showing Location of Naga Hills where the Angami Nagas Revolted in 1879-1880



Source: Dr. Alan Macfarlane, Department of Social Anthropology, Cambridge University

APPENDIX 3-3. The Siege of Kohima (1879)

By Mrs. Cawley

"On the morning of the 13th, October/79, Mr. Damant, the Political Officer of the Naga Hills, left Kohima with a guard of 80 men, to visit the three large Naga villages of Jotsoma, Khonoma, and Mezoma.

His intention was merely to impress upon them the necessity of their supplying coolies when required to do so. He had no intention of seizing ammunition or of attacking either of the villages as has been stated.

Dobashis (interpreters) had previously been sent to inform each village of the intended visit of the Political Officer, and to give them orders to collect material for the construction of huts for him and his party.

On the night of the 13th, Damant remained at Jotsoma, where he encountered no opposition, and on the morning of the 14th, he started for Khonoma. The village of Jotsoma supplied him with coolies for his baggage. Before leaving for Khonoma, he was warned that the men of that village intended to oppose him and was strongly urged to take the road which leads to the upper portion of the village and not the lower road.

Every Naga village is divided into khels, or clans, and these khels are frequently at feud with each other. This was the case at Jotsoma. Sata, the dobashi of one khel was disposed to be friendly to us, and he therefore did all in his power to persuade the Political Officer to visit Mezoma first, instead of Khonoma, or to avoid the lower road to the village. He accompanied the party some distance on the road, but when he found that his advice was not followed and that Mr. Damant intended to proceed by the lower road, he refused to go any further.

The native officers (and some of the constables as well) then urged Mr. Damant either to take the upper road or to send for the gaonburas (head men) to come and meet him, and escort him and his men into their village. This was what was usually done. For reasons which can never be known, he did not listen to their advice and advanced towards the village by the lower road and thus fell into the trap which had been prepared for him.

This account is from what the survivors told me – some of whom were close to Mr. Damant.

The approach by this route was by a narrow pathway which cut along the edge of a steep decline, and was flanked by a stone defense.

A heavy gateway closed the entrance. Both the walls and gateway were well provided with loopholes. There was no sign of any opposition until Mr. Damant was within a few yards of the gate (which had been hidden by a bend of the road) when it was observed that it was closed. At that moment, a shot was fired which struck a man close to Mr. Damant, who immediately took his rifle from his orderly's hand and was in the act of firing a return shot when a bullet struck him in the head and he fell. A shower of bullets poured upon his unfortunate escort, some of whom were shot dead, others were wounded and fell over trench, while others availed themselves of the nearest shelter and opened fire on the enemy. The "retire" bugle sounded from the village and the men fell back and assembled there.[1] At this time, Mr. Damant's orderly was seen to bend over his master and to take his rifle (he himself was carrying Mr. Damant's second gun and cartridges) and a bag of cartridges. He also attempted to take his revolver, but being hampered with two heavy guns, could not succeed in doing so. This man made his way back to the station on the fourth day after the disaster, having wandered in the jungle without food, and hunted by Nagas to the very gate of the

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[1] Note: No order had been observed in approaching the village & Mr. Damant gave no order to the men when the first shot was fired.

stockade. Finding he was unable to protect himself while carrying both guns, neither of which had straps, he broke one of them on a stone and threw it away. It was afterwards found in Khonoma neatly mended. He brought in the cartridges, so the gun was useless to the Nagas. With the rifle he retained, he kept the Nagas at bay during the day and crept towards the station as soon as it was dark. (There were three of the police with him.)

The men appear to have collected in the valley in very fair order and it is probable they would have made their way back to Kohima without much difficulty had they had officers to lead them, but one of the police native officers was shot dead (after killing several Nagas, it is said) and the other badly wounded. The native officer of the 43rd had only been in the hills a few days and the country was quite new to him and his men. The men broke up into small parties, the Nagas attacking them on all sides and they scattered in all directions. Many of them fell back on Jotsoma, thinking that village was friendly but Sata's khel was the only friendly one and the others turned out and cut up our men as they were retreating.

Killed and missing 38 of the escort. 4 noncombatants.

Many of the wounded men crept back to Kohima through the jungle and arrived there even as late as the seventh day.

No news of the intended opposition of Khonoma was sent to Kohima by Mr. Damant or any one else. The first intimation of the disaster was received at Kohima late in the afternoon of the 14th when a head constable who had been up in the Kohima village reported that shots had been heard in the direction of Mayoma [Mezoma] (Khonoma also being in that same direction) this report being confirmed by some Nagas shortly afterwards, a few precautionary measures were taken such as Naizies being put down round the western stockade. It is everyone's opinion that he would have been safe if he had taken the proper precautions in approaching the village – viz – made the gaonburas come to meet him and escort his party in proper order with advance guards, etc.

No apprehension was felt as to Mr. Damant's safety as with such a large escort, he was considered quite safe from any serious reverse.

It was not until some hours later that the first fugitives arrived bringing the news of the disaster. The worst consequences were immediately anticipated and no time was lost in putting the station in a state of defense, no easy task as the only measures which had been taken – in case of an attack – was the construction of two large and ill-shaped stockades. Each stockade was from 1200 to 1300 feet in circumference. To defend this extent of palisading would require 400 men at the very lowest computation. Each man could only fire straight in front instead of being able to attack on either side of him.

The stockading consisted of rough wooden palisading from 8 to 10 feet high, with no proper flanking defenses, and loopholes every few feet. A ditch had been dug round a portion of the outside of the eastern stockade; beyond this, nothing had been done to make the place tenable against an attack. Large gateways had been constructed, but the gates had never been made.

Both stockades were more or less surrounded by jungle, and stumps of trees were particularly the Western one, the buildings also in this stockade were even more numerous than in the Western one, so much so that the Nagas would have found no difficulty in firing them, some of them being very near the stockading. The position of the stockades was good – could both have been held – but this was quite impossible with the small number of men available at the time. The Station was supplied with water by means of an aqueduct about 2½ miles long. It ran within 150 yds of the stockades but was not commanded at that distance by either of them being below the brow of the hills. This was of real importance as it could be cut off anywhere within the 2½ miles, by the removal of a couple of shovelfuls of earth. There was a small spring some 30 yards from the eastern stockade, but this was also unprotected as it was in a hollow on the side of the hill and surrounded by dense jungle. The water from this spring dribbled slowly from the side of the hill, with a small excavation whence it could be dipped out for use. There were one or two springs round the hill but all too small and far off to be of any use. This was all the garrison had to depend on, there being no tanks for storing water.

On the north-eastern side of the eastern stockade, the ground falls somewhat abruptly into a valley, on the other side of which a hill rises to about 400 feet on the summit of which the village of Kohima is situated (one of the largest in the Angami country). Thus the eastern stockade is to some extent secure against sudden attack on the north-eastern side. The native bazaar with a few shops, cow houses and stables was a short distance off.

On the 14th Oct., the garrison consisted of about 60 of the 43rd Assam Light Infantry under Capt. G.O. Reich, and 72 (IW 32 of whom were recruits) of the Frontier Police under Mr. G.J. Cawley, District Supt. Police and Assistant Political Officer. The men of the 43 MI had not recovered from the effects of their recent journey from the plains during the most unhealthy time of the year. And the police had suffered from a series of most trying privations throughout the rains owing to the difficulties of obtaining provisions. (Man cannot live by bread alone; neither can a native live on rice alone, and for weeks together, the police had nothing else and sometimes not enough of that. The regiment had their rations regularly but their officers had great trouble to get it brought up.)

There was at this time only 2 marmels (240 pounds) of rice in the civil quarters and no other article of food, (except some Naga dal, a sort of coarse bean that cattle are fed on [*Vigna* sp.]), not even salt. There were considerably over 300 non-combatants so that there was not food for one day. The Regiment had about sufficient to last them for one month.

Immediately upon hearing of Mr. Damant's death, Mr. Cawley dispatched a head constable with a letter to Mr. Hinde, the officer in charge of the Wokha sub-division, asking for immediate assistance.

These men had to pass through the village of Kohima. Two Naga boys who were in service in the station – one of them was the son of the gaonburas through whose khel the Wokha road passed – were sent with them as far as the village, and they passed through without opposition. Half an hour afterwards, communication by that route was stopped by the hostile Nagas, as it had already been on the Lomaguting route over a portion of which lies the road to Khonoma. I offered 200 rupees to any one who would take a letter to Lamaguting but even the Naga boys refused to go, at was certain death they said. Half an hour afterwards, the news was brought in.

The six constables volunteered for this hazardous service. Had any delay occurred in sending them off with the news of the disaster, many days would have elapsed before any reliable information could have reached the authorities. The scene of confusion in the station on the night of the 14th was beyond description. It was decided at once to abandon the western stockade. It was expected that the Nagas would attack the station at daybreak – if not in the night and it was absolutely necessary that the abandoned stockade should be destroyed, at least that portion of it which would have given cover to the enemy (This was done by my husband and his men.) – and all the houses dismantled.

The women and children from the police lines and bazaar, the baboos [Indian clerks] and their families, were all hurried into the eastern stockade. Fortunately, the rain which had fallen heavily all day had cleared off, but the night was very dark and the ground slippery. This added to the confusion. Wounded men and fugitives frequently arrived from Khonoma and it was pitiful to see the eager anxiety of the women whose husbands had gone with Mr. Damant, when the news of any fresh arrival was brought to them. Many of them knew before the night was over that they had nothing further to hope, their husbands had fallen, many others passed weary days and nights of suspense before they could give up all hope. Some heard that their husbands had been wounded and fallen in the jungle.

Desperate efforts were made to be ready for the attack which was hourly expected, but fortunately, the Khonoma men were too much elated by their success and counted too surely on their future victory over the small garrison of Kohima to care to hurry themselves. They delayed the whole of the 15th burying their dead, feasting and rejoicing, and dividing the spoils. The time thus gained was spent in destroying the remains of the stockade and dismantling the buildings, all the walls of which were pulled down. A trench was dug and earthworks thrown up on the inside of the eastern stockade to protect the men from the fire of the enemy. Every man who could hold a gun was hastily instructed in the use of it (but in more than one case, the rifle bullet was found to have been put in the wrong way). There were 32 recruits who had never used their guns. The Assistant Political Officer personally supervised these works, and was most energetic in taking every precaution that could be thought of for the protection of the garrison.

First the police ammunition and magazine stores had to be removed, then the spare arms and accoutrements and as much of the Government property as possible. Private individuals had to look after their own, for every available hand was required to pull down the stockading, to dismantle the buildings, etc., etc.; here the Nepalese coolies did good service, working hard the whole night – their own property being fortunately in the eastern stockade. In an emergency like this, the safety of the whole community had to be thought of before private property – this is what no native can understand – everyone tried to save his own goods and many a man was made to throw his load and assist in demolishing the stockade. It was no time for slow deliberation and mild measures for at that very time – within a mile of the Station, the Nagas were killing as many of the survivors from Khonoma as they could find.

One of the khels then hostile to us belonged to the village of Kohima itself. The sepoys [soldiers] who were armed with breech-loading rifles fired off nearly all their ammunition before leaving Khonoma, and so fell an easy prey to the Nagas when retreating. The police having been armed with muzzle-loaders were not able to reload so quickly so had more ammunition to expend while retreating. Many of them reached the station without a round in their pouches, although they had taken all they could from their fallen comrades. No reserves of ammunition had been taken when the escort left Kohima on the 13th, only what each man had in his pouch.

I mention this as some slighting remarks have been made about the Frontier Police – the number of sepoys who escaped being comparatively few is considered as a proof that they behaved better than the police – this is not the case – the fact of the police being well acquainted with the hills was also in their favour.

On the night of the 15th, the enemy fired the huts in the dismantled stockade; the wind most providentially was blowing from the east and carried the flames away from the garrison buildings. Rain fell at intervals throughout the night and the thatches being wet decreased the chance of their catching fire. Twice the Nagas set fire to the ruined houses but they did not burn freely.

The bungalow intended for the Civil Surgeon (there had been no surgeon since May) was dangerously near the stockade buildings and was still standing (the walls had been thrown down) as well as that of the Political Officer. Mr. Cawly therefore sent out a party of police to set fire to them as it was too favourable an opportunity to be lost. They then blazed away furiously and the garrison watched the flames rising from them with intense anxiety. All fear of fire was however soon over and the western stockade was a mass of smoldering ruins.

On the 16th, the enemy began the attack and harassed the garrison greatly. At first their bullets whistled harmlessly over head but after a little practice, the Nagas found out their mistake and kept up a steady fire upon the buildings and all exposed places. They could get very good shelter in the jungle and behind the trees and stumps that were so unfortunately plentiful in the vicinity of the stockade, and thus had a great advantage over the garrison, as most of the buildings were exposed to their fire, and being built of exceedingly light materials, afforded very little protection.

The regimented lines were quite untenable. The sepoys did not require them as they were all on duty in the trenches, but the women and children who had taken shelter there were obliged to vacate them and make for any shelter they could find. Our bungalow was the only place they had to go to and there were frequently upwards of 30 women and children in our small back room. The coolie lines were also riddled with bullets, the cutchery [magistrate's court] and one half of the police officer's bungalow were greatly exposed, and also the bungalow - if it could be so called, being merely a mud hut – of the Military Officer. The two European ladies and the two children took refuge with some native women in a small oven house which being in a somewhat sheltered spot, was safer than the bungalow. They piled up boxes, tables, bundles of clothes and empty tins, round the walls and as only spent bullets could reach it, it was tolerably safe but very uncomfortable refuge. The Nagas did not attempt any steady attack at this time, that is to say, they did not attempt to force the stockade but they surrounded it on all sides and kept up a hot fire for the best part of the day. Towards evening, the firing became less, but was constant, a dropping fire that was most harassing as it prevented the garrison from taking any rest. From the evening of the 14th to the evening of the 16th, the men had had no rest whatever, and were working hard all the time – so that a few hours' rest were absolutely necessary for them, and as the night closed in, the Nagas became quieter and enabled some of the wary men to lie down in the trenches for an hour or so. The alarm bugle sounded several times in the night, however; the enemy never allowed more than a couple of hours to pass without making their presence unpleasantly known.

On the morning of the 17th, as they appeared to be gathering in considerable numbers to the west of the stockade, a sally was made and they were driven off, only to re-assemble in greater numbers. A skirmishing party was also sent to drive off those who were on the eastern side, so as to enable the coolies to bring in some water.

The small spring was quite insufficient to supply so many people with water even in times of peace when it could be drawn at leisure, and when the coolies crowded round it and dipped their buckets and dirty tins into it in a great hurry, it became exceedingly muddy and dirty. However, they brought in all they could.

It was a great annoyance to the garrison having the village of Kohima in such a position above so that everything that went on inside the stockade could be seen from there. The Chotonema khel was in the most favourable position for observing the movements of the garrison, and there were always watchers on the roof of the houses who by their various cries, gave instant news of the movements of the garrison to their friends below. The dobashis of the friendly khels came down frequently and would have rendered assistance had they dared to do so, but the hostile Nagas threatened to shoot any one of them who brought his rice, water or in any way attempted to assist the garrison; they did attempt to carry some letters but were intercepted, and the letters torn up. From the manner of these dobashis and gaonburas, it was evident that they fully believed the Khonoma men and their adherents would do as they had sworn to do – exterminate the hated invader. The garrison of Kohima was to be "wiped out".

The position of the friendly Nagas would in this case be one of great danger, as the hostile villages would have exterminated them also – if they had given any assistance. The utmost the friendly khels of Kohima could do was to remain neutral and even this was a great gain to our side, as numerous small villages followed in their wake and would have joined the enemy with them. Morgama [sp?] also remained neutral, and these men deserve the greatest consideration for resisting the tempting opportunity of joining in a general rising which promised to be so successful. The Nagas themselves had little or no doubt that the garrison would have to surrender eventually, but some of them were wise enough to know that thousands of troops would be sent to avenge them.

The want of provisions began to be sorely felt. The police and all outsiders had received only one quarter rations from the 15th, the military only half. All were now put on one quarter rations. It was doubtful if another sally could be made for water, as the number of the foes hourly increased. To the intense relief of the garrison, a party of 70 men brought over by the Assistant Political Officer of Wokha (Mr. Hinde) arrived on the 19th and marched into the stockade without opposition. It was little short of miraculous that this small party was not cut up on the road, and it was entirely owing to Mr. Hinde's judicious management and his perseverance in pushing forward in spite of all opposition, no less than the courage he showed in undertaking such a march that they got through safely.

He brought them through the hostile country without losing a man, passing through the very villages where the Nagas who had been sent to intercept him – were sleeping. He arrived unexpectedly at the Kohima village (through which the Wokha road passed).

Some of the Chetonema khel who were in their village, turned out to oppose him but the gaonburas and dobashis of the other khels exerted their utmost influence, and after some delay he succeeded in passing through without any active opposition.

The approach of this reinforcement was first made known to the garrison by the enemy themselves. The watchers on the house-tops cried out to the Nagas who surrounded the stockade, and their cries were intercepted by a little Naga bearer boy of the late Mr. Damant: *"Lots of sepoys coming; hide yourselves."*

The attacking party took the advice given them, and not knowing how small the reinforcement really was, did not venture to attack them; before they were aware of their mistake, the party were safe inside the stockade. The following day passed in greater quietness than had been experienced since the siege began. The Nagas seemed to be rather taken aback by the arrival of a reinforcement which they had confidently hoped to intercept on the road. The weary men were enabled to cook, and eat in comparative peace their scanty portion of flour and water. The latter valuable necessity was again brought in, and every available vessel was used to store it in. Air tight tins and boxes were turned into water tanks – the few waterproof sheets that had not been lost with the police force at Khonoma, were made of use, and filled with the thick muddy fluid. It was fortunate that this was done, as later in the day, the water that was being brought in was very offensive, and it was discovered that a human head in a state of decomposition had been thrown into the small pool.

On the morning of the 20th, it was seen that the enemy were building a strong defense on the main road, within 60 yds of the stockade.

A marksman of the 48th shot one of the Nagas engaged in this work, and this deterred them from continuing their labours in the day but they completed it in the night. A party of men was sent out on the 21st that attacked this defense (Keelaor Sanga) and took it.

It was destroyed and the party returned without having lost a man in the actual attack, but one was killed in retreating and several wounded. The Sanga was rebuilt during the night.

On the 21st, a party was also sent who skirmished round the site of the western stockade and drove the enemy off.

Coolies were then sent to build a small stockade on the highest point of this site, the wood of the old stockade being used for the purpose. It was intended to put a strong picquet [guard] there and could it have been done, it would have enabled the garrison to hold a most important position, but it was found to be impractical as the men were so wearied and disheartened by continuous hard work, want of rest and food, that they could not be trusted to have held it with the small force that could be spared, (and that not without seriously reducing the number of men guarding the large stockade) and it had to be again destroyed. The want of sufficient or proper food was beginning to tell very seriously on the men, but the worst was yet to come.

At daybreak on the 23rd, the enemy made a desperate attack which they evidently intended to be a final one. They had raised sangas [breastworks] of wood and stone in the night, and had trenched into an excavation where the police magazine had formerly been, from which they could keep up a steady and annoying fire. Many of the most exposed buildings had been unthatched and the thatch buried. It was most fortunate that this precaution had been taken; this had to be done in the dark when the moon went down and very quietly, so as not to let the Nagas know what was being done – a chance shot killed one coolie employed on the roof. The enemy tried by every means they could devise to set the building on fire. The Nagas are not wanting in cleverness or intelligence and some of their devices were truly ingenious. The hinges of the Political Agent's doors and windows were turned to account. The holes were plugged with cloth – it is difficult to say if these strange missiles were ignited and thrown by hand or from a very large gun. They fell inside the stockade while burning, and would inevitably have set fire to any thatch they had fallen upon, had they not been rapidly swept off and extinguished by the anxious watchers. Another plan they tried was by tying some gunpowder in a rag and fastening it to an arrow-pointed stick and firing it from their guns, the gunpowder ignited and set fire to the rag – the point of the stick was intended to stick into the thatch and thus bring the burning rag in direct contact with it. The utmost care had to be taken to prevent any of these fiery missiles from taking effect. Two long bamboos – the only ones in the place – had been planted in a sacred mound of earth by a Nepalese priest – these were most useful as being very long, they were employed to brush away the burning sticks and bolts from the thatches. It would have been impossible for men to have climbed up to extinguish the fire had it once burst out, even had water been available for the purpose. The Nagas always aim at killing the officers first, and it was evident that such was their desire on this occasion. The bungalows of the two officers were particular objects of attention, and received numberless bullets and lighted sticks. The officers themselves were marked down by their voices. Wherever they were heard, a hot fire was kept up. They were in the trenches the whole day directing and encouraging the men. I mean my husband and Mr. Hinde – Capt B. was always in his bungalow. This has been officially stated, or I would not mention it. It might do Capt. B. much injury.

There was no cessation of the firing. The Nagas advanced slowly and surely, trenching as they advanced, and erecting barricades from the trenches. This they did so cleverly that they never exposed themselves in the least. It was like an invisible but by no means noiseless enemy creeping on step by step. The howls and war cries of the thousands of Nagas who surrounded the stockade were truly awful and were not without their effect on the nerves of the enfeebled garrison. As no man could leave his post, the servants and noncombatants were set to work to cook their flour and water for them and they ate this heavy and unpalatable stuff – with their guns in their hands – there were few who thought of their caste prejudices in this fearful extremity. The attack continued all through the night. The wounded had been removed from the temporary hospital and were lying in the open – no building being safe from fire and bullets. There was no water to wash their wounds, a few mouthfuls only for them to drink.

Throughout the night, a voluble Naga who spoke Assamese and Hindustani fluently, taunted the wretched garrison. The men were so thoroughly exhausted that they could hardly hold their guns – the bravest of them lost hope, and felt it was impossible to hold out until reinforcements could arrive. It required increasing vigilance and energy on the part of the European officers to keep the men at their posts. The only news that reached the garrison was of 39 men having reached Samaguting. This was most disheartening as such a small body of men could never have cut their way through Kohima.

When the sun rose on the morning of the 24th, very few of the garrison hoped to be alive to see it set. The officers themselves could not have held out much longer. Want of rest, and ceaseless anxiety and exertion for so many days and nights told upon them as well as upon the men.

Had the enemy made a final rush at that time, they could not have failed to have forced the stockade – but Nagas – unlike Zulus – value their own lives too much to risk them in the open. Had they chosen to risk the loss of 50 – or even fewer – of their men, it would have been an easy matter for them to have made a rush at the stockade and either cut or pulled down the weak palisading and have poured into the place by hundreds before the single line of men who defended it could have re-loaded.

Instead of doing this, they suddenly ceased firing and at about 11 a.m., the friendly gaonburas and dobashis of Kohima came in to say that the enemy was desirous of a cessation of hostilities.

This was an unexpected turn in events that could not be accounted for, but it was none the less acceptable on that account. It was afterwards ascertained that it was due to the Nagas having heard of the approach of Col. Johnstone, the Political Agent of Manipur, with a large force of Manipuris and Kukis. They hoped to accomplish by treachery what they had failed to do by force. Their subsequent behavior left little doubt on this point.

The conference that ensued gave a slight respite to the exhausted garrison. The terms offered to the enemy were that the garrison should be escorted safely to Samaguting, on the condition of the stockade being given up. The day was passed in anxious consultation – no news had arrived of any assistance from the plains or from Manipur. It was not even known if the letter which the Assistant Political Officer had sent at the commencement of the outbreak – had reached Col. Johnstone. It was impossible to hold out without water or sufficient food. The head men of several of the villages bound themselves by their most solemn oaths to conduct the garrison in safety to Samaguting – Then the question about coolies arose – how could the women, children, and sick be moved without any carriage? This question was still unsettled when the evening closed. Some water had been brought in during the day. The small pool had become so foul that the liquid that was brought in hardly deserved the name of water. Offensive as it was, it was eagerly drunk. The women and children were told to hold themselves in readiness to leave for Samaguting the next morning – if necessary. The night was spent in throwing up more earth works and further strengthening the place. The Treasure was buried, the Government Stamps, etc. burned to avoid the chance of their falling into the enemy's hands. Some show of vacating was made on the morning of the 25th. The women and children were ready – no escort could be sent with them, as it would only have tempted the enemy to cut them up for the sake of their guns. When the Nagas became aware that the women and children were to be sent in charge of the Kohima Nagas alone, and that the garrison would not vacate the stockade until they heard of the safe arrival of the party at Samaguting – they objected to let them go, and raised their cry again. Hostilities were on the point of being resumed, but after a time they quieted down, and consented to let them go. It was however, evident from this outbreak that they were not to be trusted – the ground had been tried cautiously, and found to be unsafe. The lateness of the hour was an excuse for not sending anyone away that day and the delay was invaluable. On the 26th, the Kohima dobashis again strongly urged the departure of the whole garrison, as it would soon, they said, be out of their power to give them a safe conduct.

(I have omitted to mention Mr. Lane; his story is a sad one – he was a young man of good family, I believe, but debarred from any great advancement in Government Service by the fact of his having a deformed hand and arm. He was holding a subordinate position under Mr. Damant and was employed in superintending the repairs on the road to the hills. This road is considered so unhealthy that the military authorities refused to allow any sepoys to pass through the forest through which it runs – during the rains but this poor little man lived there until late on in the rainy season. He was obliged at last to go to Samaguting – very ill. When a little better, he was moved on to Biphima – 20 miles from Kohima, to look after the road there – but being unable to shake off his fever, he came on to Kohima shortly before the outbreak. He never left his hut after his arrival. Mrs. Damant and I did all we could for him and the native doctor was very attentive. On the evening of the 14th, I saw him and gave him some food (he had been so weak that he was obliged to be fed for many days) and he thanked me and seemed quite conscious. A few hours afterwards, he had to be moved from his hut, to a safer place, and when I again saw him, he was apparently unconscious – he took no water of anyone, although he swallowed some wine – from that time, he gradually sank and died very quietly on the evening of the 18th. It is impossible to say if the alarm and confusion hastened his death. Everything was done to reassure him and he had all he required – but we could not even tell if he heard the firing – or what we said to him. He could not have lived long, as his constitution was completely ruined and his lungs affected by repeated attacks of jungle fever contracted in the Namba Forest.)

As many more villages were about to join with those already in revolt, over which they had no influence. The question of coolies was still unsettled and no measures were taken by the head men to provide any for the removal of the noncombatants. During the day, the Nagas broke their promise by molesting some coolies who were out for water. The Kohima dobashis promised to take charge of any property and during the 26th, several of them were entrusted with bundles of clothing, etc. By these means, further delay was obtained. The forethought and caution of the officers in thus availing themselves of every excuse for delay, and in refusing to remove the actual garrison until the safety of the noncombatants was assured, frustrated the treacherous designs of the Nagas. The news of Col. Johnstone's approach with 2000 Manipuris arrived that same evening – the messenger being a Chetonema man who was in Col. Johnstone's service. This news removed all need for further negotiations and the Nagas rapidly disappeared – they seemed to melt like snow before the sun – and when Col. Johnstone arrived on the 27th, there was not one to be seen. The prompt measures taken by Col. Johnstone to march to the relief of Kohima directly when he heard of the rising of the Nagas and the death of Mr. Damant, saved the garrison. It was the knowledge of his approach that made the Nagas change their tactics – just as victory was within their grasp.

From the time of his arrival, all danger was at an end, but of course, it took some time to bring up sufficient supplies of food for them. Half rations were served out and this was a treat to men who had had only quarter rations – the military for 8 – the police and noncombatants for 13 days. The poor children suffered greatly from want of food and water. When it had been impossible to light fires, they had lived on raw Naga dal (the coarse bean already mentioned) and such food as could be given from the stores of the Europeans.

It was a pitiful sight to see the poor little creatures crowding together, holding out their cups for a portion of the unwholesome-looking mess of corn flour boiled in dirty water – which was all that could be given to them.

The sick men suffered too, more than can well be described, although every effort was made to relieve their wants.

As was to be expected, a great deal of sickness followed this time of trial and privation and the want of a Civil Surgeon was greatly felt.

One or two things occurred during the time that I have been describing and which I have omitted but which may be of interest.

On the night of the 13th, one of the women, who heard that her husband was wounded in the jungle near Khonoma, started off in the rain and darkness with her child on her back, to look for him. She was a Naga woman of Samaguting. She found her husband's body lying headless where he had fallen. The Khonoma men spared her and the child and she returned to the station some days afterwards. She promised to take a letter to Samaguting and concealed it in her hair, but the Nagas suspected her and detained her. She kept her secret and privately gave the letter to another woman, who delivered it some time afterwards to one of the officers who were on their way up to Samaguting. As soon as the siege was over, this woman returned to the stockade, not caring to remain with her own people.

The little Naga bearer boy of Mr. Damant's who was with his master when he was shot, has left the hills with us, and is now in our service. (I have mentioned all about him in my home account.)

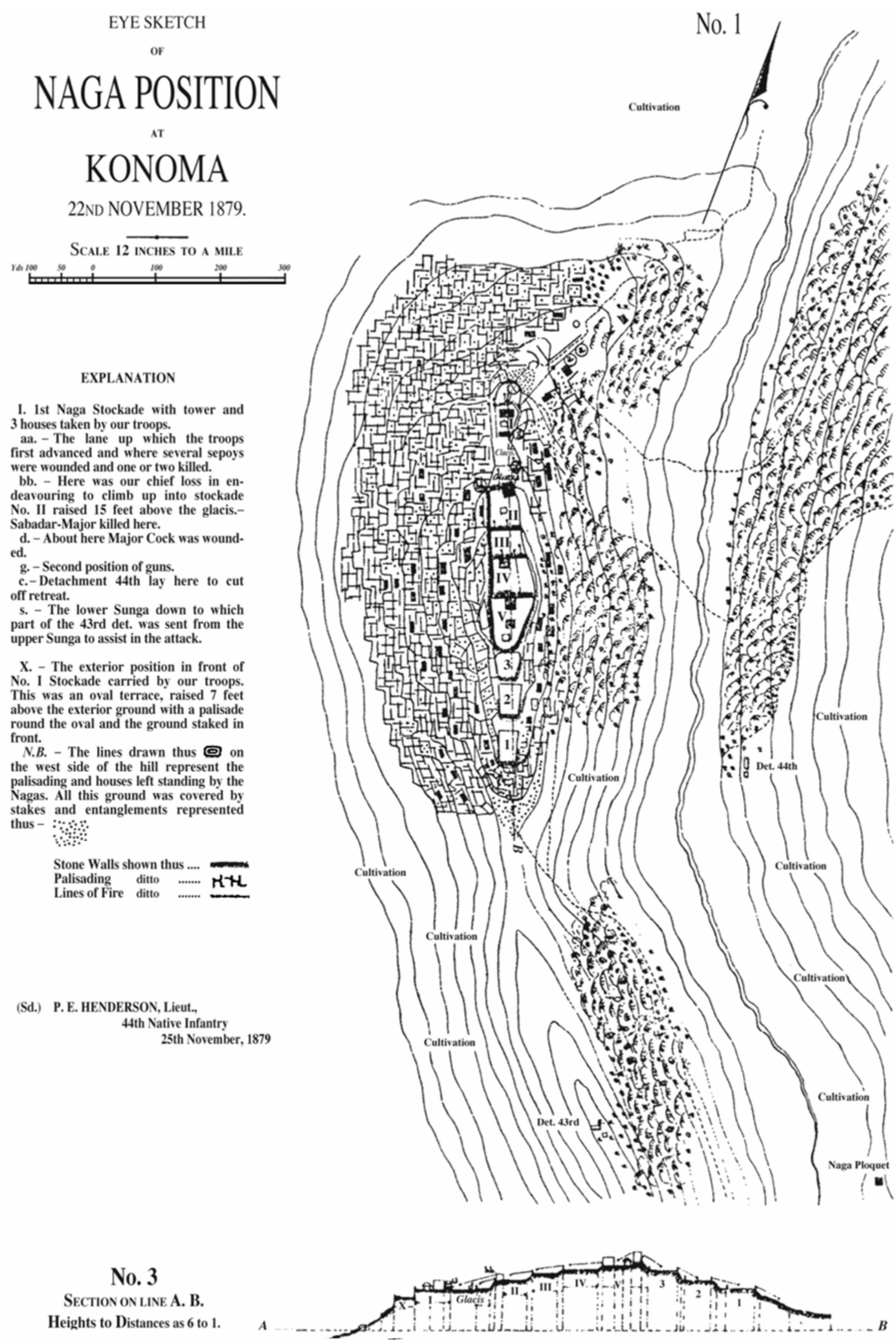
Kare Sing, the Native Police officer who was badly wounded at Khonoma when he fell, was picked up and carried off by his men. He was a very tall heavy man, and knowing that by delaying to carry him, his men were risking their own lives, he told them to lay him down in the jungle and leave him, and to save themselves. They did so, and thought he was dead, as a bullet had entered his side and he had lost a great deal of blood, but 4 days afterwards, he returned to the stockade having crawled through the jungle hiding from the Nagas. He was fired at repeatedly as he made his way across the open ground in front of the stockade but was brought in safely, and is now well and strong and on duty again. A bullet had entered his side and passed round his body to the back – it was a fearful wound when he came in.

Sata – the Jotsoma dobashi who warned Mr. Damant, behaved very well. He brought in 7 of the fugitives from Khonoma who were hiding in the jungle and would have saved another but failed – he tried to take the gun from the Naga who was shooting him, but could not do so, and had to leave the unfortunate man to his fate while he brought in the other seven. When the siege was over, he brought his wife and family into the stockade, as he was afraid of the vengeance of the other Nagas.

A sepoy of the 43rd who was escaping from the Khonoma disaster was found by some Mezoma and taken to their village. They fed him and in no way ill-treated him, evidently keeping him as a trump card to play if the Nagas should not be as victorious as they expected. He was kept 17 days. He was uninjured but had lost his wits from fright and had not recovered them fully when I saw him months and months afterwards.

So fully convinced was our washerman that our fate was fixed and that we were all to be killed that he generously gave away the bundles of clothes that had been used to help in making his oven-house bullet-proof, to whoever wanted them. My Naga woman profited by his generosity. ”

APPENDIX 3-4. A Sketch Map Outlining How the Battle Unfolded when the British Attacked Khonoma on Nov. 22, 1879 in Retaliation for Damant's Murder and the 11-Day Siege of the Kohima Stockade



EYE SKETCH
OF
NAGA POSITION
AT
KONOMA
22ND NOVEMBER 1879.

SCALE 12 INCHES TO A MILE

EXPLANATION

I. 1st Naga Stockade with tower and 3 houses taken by our troops.

aa. – The lane up which the troops first advanced and where several sepoys were wounded and one or two killed.

bb. – Here was our chief loss in endeavouring to climb up into stockade No. II raised 15 feet above the glacis.– Sabadar-Major killed here.

d. – About here Major Cock was wounded.

g. – Second position of guns.

c. – Detachment 44th lay here to cut off retreat.

s. – The lower Sunga down to which part of the 43rd det. was sent from the upper Sunga to assist in the attack.

X. – The exterior position in front of No. I Stockade carried by our troops. This was an oval terrace, raised 7 feet above the exterior ground with a palisade round the oval and the ground staked in front.

N.B. – The lines drawn thus on the west side of the hill represent the palisading and houses left standing by the Nagas. All this ground was covered by stakes and entanglements represented thus –

Stone Walls shown thus ....
Palisading ditto ....
Lines of Fire ditto ....

(Sd.) P. E. HENDERSON, Lieut.,
44th Native Infantry
25th November, 1879

No. 3
SECTION ON LINE A. B.
Heights to Distances as 6 to 1.

* See also map 3-3 for a related map.
Source: Dr. Alan Macfarlane, Department of Social Anthropology, Cambridge University

APPENDIX 3-5. Excerpt from Captain P.J. Maitland's Report, Describing the British Assault on Khonoma on Nov. 22nd, 1879

"At Sachima [Secüma], General Nation was within easy striking distance of Konoma [Khonoma], reported to be held by three to four thousand Nagas, the choice fighting men of almost every Angami village, who avowed their intention of defending it to the last. It was known also that they were fortifying the naturally strong position by every means in their power; and, although the advance of the troops up to this point had been more rapid than could have been expected, still the enemy had had a full month since the death of Mr. Damant to look the consequences of their act in the face and prepare for resistance.

The arrival of the guns (which had reached Dimapur on the 17th) was now anxiously expected to enable the assembled force to attack this stronghold of murderous savages. In spite of the disparity of numbers, and the serious natural and artificial obstacles in the way of an assault, it was confidently hoped that the village would be carried without much difficulty.

While awaiting the guns, the troops at Sachima were employed in entrenching the camp, improving communications, &c. On the 19th November, Lieutenant MacGregor, 44th Sylhet Light Infantry, and Lieutenant Raban, R.E., both of whom had joined General Nation's staff two days previously, made a reconnaissance towards Konoma. They advanced with an escort by the Mozima [Mezoma] road, and observed the enemy's position from near that village. "*Large bodies of armed Nagas came out of Konoma with the intention of intercepting the party. Shots were exchanged with no loss on our side, and the party returned to camp, having obtained the desired information as to the attitude, &c., of Konoma, and having selected the best place to put in position the guns and rockets on the day of attack.*" (General Nation's No. 15, Movements, 26th November 1879.)

On the evening of the 19th, the Brigadier General sent Major Evans and Lieutenant MacGregor to Kohima, with a convoy of provisions. They returned on the following day with a reinforcement of sixty-five men of all ranks, and, accompanied by Colonel Johnstone, Chief Political Officer, and Captain Williamson, Assistant Political. The party was fired at when crossing the Zubzu, but no casualties occurred.

Next day (20th November) the guns arrived at Sachima under escort of a detachment 44th Sylhet Light Infantry. On this day also, Deputy Surgeon General DeRenzy joined Head Quarters. The 21st was spent in making final preparations for the attack on Konoma.

On the morning of the 22nd November, about 7 a.m., the Brigadier General left Sachima with a force as below to attack the Nagas in their stronghold:-

Infantry:

43rd Assam Light Infantry: 2 British Officers, 4 Native Officers, 359 Rank and File.

44th Sylhet Light Infantry: 7 British Officers, 10 Native Officers, 359 Rank and File.

Artillery:

Two 7-pounder mountain guns. 1 British Officer, and 3 Non-Commissioned Officers, Royal Artillery. 44 Sylhet Light Infantry. 1 Native Officer. 30 Rank and File. 26 Constables. Frontier Police: 3 Inspectors.

The troops marched without baggage, bedding, or great coats. One day's cooked provisions were carried in the haversacks. It was the intention of General Nation, after storming the village, to leave a strong picquet [guard] in the place, and return with the main body to Sachima. All ranks started in the highest spirits, only fearing that the enemy might fly into the jungle before the troops could close with them. In fact, the villages hitherto attacked had been so easily captured, that, although Konoma was known to be strong by nature, elaborately stockaded, and held by the picked warriors of all the hostile clans, it was not unreasonably supposed that no very serious resistance would be offered; and the plans of the General were no doubt greatly influenced by this supposition.

Konoma stands, or rather stood, on the crest of a steep spur. In this case, the spur terminates in a hog-backed hill, rising abruptly from the plain of the valley to a height of about twelve hundred feet. Its summit is crowned by the village, which also extends some way down the western slope. At the foot of the hill in front, and on both sides, there is tolerably level ground, which has been carefully terraced for rice cultivation. In rear, the hill descends abruptly to a saddle, behind which the crest runs steeply up to join the peaks of Japvo [Japfü]. The ascent on either side of the ridge is so steep and wooded as to preclude the possibility of attack from the flanks. The village, therefore, lying lengthwise along the crest had necessarily to be assaulted in front or rear, at one or both of its narrow extremities.

The north end of Konoma faced the advancing troops, and Brigadier General Nation determined on attacking it, rather than the south end, where the ground was less difficult, as "*the enemy had other posts higher up the hill, and the guns would have been placed between two fires, to say nothing of the very great difficulties to be encountered in getting them there, as the coolies carrying them would have had to pass through a very heavy musketry fire for over a mile. The valley through which the only route lay is terraced for rice cultivation, with drops from terrace to terrace of from three to eight feet, and is not more than one thousand yards across at its widest point; it is thoroughly commanded by the village of Konoma on the one side, and, on the other, by mountain sides covered in part with dense jungle which held Naga skirmishers.*" (Konoma Dispatch.)

The march from Sachima of about six miles, (Konoma Dispatch.) to within a mile of the foot of Konoma hill, was difficult and toilsome, especially for the guns, which were on this occasion carried by Manipuri coolies. Pausing there, the General made the following dispositions:-

The detachment 43rd Assam Light Infantry under Major Evans, and the party of Frontier Police, in all 159 rifles, out of the 518 present, were ordered to advance up the valley on the right, and take post on the ridge in rear of the village to intercept the anticipated flight of the enemy. A detachment of the 44th Sylhet Light Infantry under Lieutenant Henderson was also directed to take up a position on the hill side to southeast for the same purpose.

The guns were placed in a hill to right (northwest) of the village, and opened fire at a range of about 1,200 yards. The rocket party under Lieutenant Raban, R.E., took post half way up the Mozima Hill on the same side. It was hoped the rockets would have set the village on fire, but they all proved defective. (Lieutenant Mansel reports having tried the rockets when on his way up the river. They then appeared to act very well; after entering the hills, however, the elephant which carried them fell over a khud; his load, of course, getting a tremendous shaking. To this accident the subsequent irregularities of the rockets were ascribed.)

The main body, consisting of about 300 of the 44th Sylhet Light Infantry, under Colonel Nuttall, C.B., was to attack the north end of Konoma. General Nation placed himself at first near the guns, where he could watch the whole affair.

By 10 a.m., the detachment 43rd and Frontier Police were skirmishing up to the valley to the right, exchanging shots with the Nagas as they went. Before gaining the position assigned to them, they carried one of the enemy's outlying entrenchments after a sharp encounter. About the same time, the guns opened fire, and shortly afterwards the main body advanced to the attack, two companies extended, two in support, and one in reserve. There was little choice of ground, as progression was absolutely impossible save by a few beaten paths.

It was soon apparent that the strength of the defences was much greater than had been supposed. Immense labour had been expended on them, and it is said that no less than four hundred houses, out of the six hundred in Konoma, had been destroyed to clear the ground and perfect the entrenchments. These consisted principally of a series of terraces, their scarps riveted with stone, and topped by walls or stockades, perfectly bulletproof and admirably loopholed. Each terrace formed a separate fortification defensible from either side. The whole place was a mass of redoubts, and retrenchments within retrenchments, so that an entrance gained at any point only gave possession of a small area, and as the hill rose towards the centre, the inner entrenchments successively commanded those below them. Outside, the ground visible from the walls had been carefully cleared of jungle and covered with obstacles in the shape of "pangies" (strong, sharp-pointed stakes, driven deep into the ground) and bamboo entanglement. These were also set in front of the inner defences. The only defects in the whole elaborate system were: first, a deficiency of flanking fire; and, secondly, that each portion of the entrenchment being adapted for all round defence, would afford, when taken, some shelter to the assailants.

Covered by a well-directed fire from the guns, the portion of the 44th directed to storm the village essayed the difficult task before them. The Nagas calmly awaited the attack, and remained so still behind their walls that some fancied the place was undefended. At first the assailants were protected by the steepness of the hill, and by numerous stone terraces. Soon they were forced to abandon the attack formation and advance as they could by steep and narrow paths. The larger portion, led by Colonel Nuttall in person, found themselves in a narrow lane, near the top of which they came suddenly in view of the enemy, who at once opened fire. Four sepoys were instantly struck down, and Colonel Nuttall was grazed in the face by a bullet which passed through the thigh of a man behind him. Breaking from the lane, the sepoys took up such cover as they could find, and briskly returned the fire of the enemy, while search was made to right and left for some practicable point to assault. A spot which appeared somewhat easier than the rest having been discovered, the men gathered towards it, and, on the signal being given, the first line of defences was carried with a rush; the little Goorkhas of the 44th dashing forward most gallantly at the heels of their officers.

The portion of entrenchment thus won was that at the extreme north end of the village. It was enclosed on three sides by a stone riveted bank, surrounded by, and thickly set with, obstacles; on the top of this was a loopholed barricade five feet high. These were the defences just carried. The interior, a level space of no great extent, contained two houses and a square stone tower some fifteen feet in height. On the fourth side of the entrenchment, namely, that towards the village, was a stone wall and barricade defensible from the interior; beyond was an open space, on the further side of which rose a stone-faced scarp surmounted by a loopholed stockade. The two together were nearly twelve feet high, and formed the enemy's second line of defence. To right and left, the first line of defence was continued to the flanks of the scarp and beyond it, forming the outer walls of the village.

The storming party now got cover under the wall facing the enemy, and from that position and from the tower commenced a heavy fire on the stockade, steadily replied to by the Nagas behind it, who showed no signs of weakness or retreat. Meanwhile, the guns had been advanced to within 800 yards of the works; and here a coolie was wounded by a shot from the village. A few rounds were fired from the new position, but without much effect; and then the General, who had observed the stormers dash into the village, and believed the whole must be in our hands, stopped the firing, and advanced himself to Konoma, accompanied by Major Cock, Deputy Assistant Adjutant General, and Lieutenant Colonel Johnstone, Political Agent, Manipur.

The latter writes:- "*As we neared the fort where we had last seen Colonel Nuttall's party, ominous sights met our eyes, dead bodies here and there, and men badly wounded; while sepoys left in charge of the latter told us that all was not yet over, and that the Nagas still held the upper forts. After advancing a few steps further, we had to pick our way over ground studded with panjies and covered with thorns, exposed to the fire of the enemy; and passing the dead bodies of several Nagas, we ascended a kind of staircase, and, after again passing under the Nagas' fire, climbed up a perpendicular stone wall and found ourselves in a small tower, which, with the adjoining works, was held by a small party of the 44th Native Infantry. I asked Colonel Nuttall where all his men were, and he pointed to the handful around him, and said, these are all. The situation was indeed a desperate one, and I felt that, without some immediate action, our power in the Naga Hills for the time being trembled in the balance.*" (Extract from Diary of Political Agent, Manipur, for 22nd November 1879.)

The General determined to bring up the guns at once to the support of the infantry. About half past three in the afternoon, they were placed in position within the captured portion of the entrenchments, and not more than sixty yards from the works still held by the enemy. At first only one gun could be got to bear, through a gap in the retrenchment wall. Lieutenant Mansel and the non-commissioned officers, Royal Artillery, were completely exposed while laying the gun, but fortunately escaped without injury. The gun escort was a welcome reinforcement to the weakened storming party.

After a few rounds of shell and case shot had been fired into the stockade, the 44th, headed by all their officers, and Major Cock, Deputy Assistant Adjutant General, dashed out of their cover with a shout. They were received by a well-directed fire, and a shower of rocks, stones and spears. In an instant, the open space was cleared and the stormers were at the foot of the scarp. Here they found comparative safety, as there was little or no flanking fire, but some casualties occurred from spears hurled into the air and dropping perpendicularly among them. The material obstacles of the high wall and its stockade appeared, however, to be insurmountable; and the retreat being sounded, the men regained their cover with a loss of two or three killed and several wounded.

Once again, the guns opened fire; but, although so close, their effect on the revetment of the scarp was nil, while the stockade, when shattered, was rapidly repaired by the Nagas, who appear to have provided materials for the purpose. In a short time, Lieutenant Mansel announced that his ammunition was expended.

It was now near five o'clock in the afternoon, and the handful of assailants had been fighting since 11 a.m. They had lost heavily, and were nearly exhausted by their exertions.

The Brigadier General determined to make one last effort. It was explained to the men that the place must be taken before night; so all, both officers and soldiers, nerved themselves for a final attempt. The three easiest-looking places were selected, and then, in three bodies, led by nine European Officers (Brigadier General Nation, Colonel Nuttall, Major Cock, Major Walker, Lieutenant Ridgeway, Lieutenant Raban, Lieutenant Boileau, Lieutenant Forbes, and Lieutenant Colonel Johnstone.) including the General himself, the gallant 44th once more rushed forward. With undaunted devotion, the sepoys strove to lift and push one another over the defences, but every attempt to surmount the scarp and barricade failed. One man only, Narain Sing, Lieutenant Colonel Johnstone's orderly, reached the top of the stockade, and he was immediately pulled over and killed by the enemy inside. The assailants were too few, and their isolated efforts were everywhere met by overwhelming showers of stones and missiles of every description. In the centre Lieutenants Forbes and Ridgeway were struck down, the former by a spear descending from above, and the latter by a shot in the shoulder at ten paces distance. Discouraged by their losses, utterly exhausted, and convinced of the impossibility of carrying the defences without artillery or scaling ladders, the remnant of the 44th at last fell back. Major Cock was mortally wounded while retiring, and the Subadar Major of the 44th was shot dead while walking away close behind Colonel Nuttall.

As nothing more could be done that day, and darkness was fast closing in, the General determined to remain all night on the ground already won. He hoped by morning to obtain a fresh supply of gun ammunition, and determined then to renew the assault from both sides. The Manipur coolies were accordingly set to work, under the direction of Lieutenant Raban, R.E., to put the position occupied in a state of defence; and by 7-30 p.m. this was accomplished, and the men were enabled to take a meal. The detachment of 43rd Assam Light Infantry under Major Evans, and that of the 44th under Lieutenant Henderson, were also recalled, and were fortunately able to reach the main body in safety, about 8 o'clock. The former was guided by Captain Williamson, Assistant Political, whose local knowledge was here, and on other occasions, of considerable value. Major Evans left twenty rifles to hold the small entrenchment captured in the morning.

Some apprehension was entertained of a counterattack by the enemy under cover of the darkness; and, although the small force was now concentrated, and in a fairly secure position, such an event would have been very undesirable. However, between 9 and 10 o'clock in the evening, the Nagas fired the stockades and houses in the upper village, and a reconnaissance at daybreak showed that Konoma was entirely evacuated. It was soon ascertained that the enemy had moved about a mile up the spur to a high and strongly-entrenched position, afterwards known as the "Chaka forts" [Chakka].

The stoutness of the defence created surprise. It was indeed believed that several thousand men, the flower of the Angami race, were behind the walls and stockades of Konoma, and about half of these, it was supposed, were equipped with firearms, including many of our own sniders and enfields; but such preparations, and such stubborn resistance, were a new feature in Naga warfare. It was afterwards known that during the day, the enemy made two attempts to break away in rear; but was each time driven back by a heavy fire from the detachments purposely placed to prevent their escape. The loss of the Nagas was acknowledged by themselves to have been between seventy and eighty killed or seriously wounded. It is thought to have been greater. It is not known whether any of the actual murderers of Mr. Damant were among the killed. No prisoners were taken.

General Nation's Casualty Return is appended:-

BRITISH OFFICERS:
General Staff Major C.R. Cock. Mortally wounded, (died on 23rd)
44th Native Infantry, Colonel J.M. Nuttall, C.B. Slightly wounded
Ditto Lt. R.K. Ridgeway. Severely wounded.
Ditto. Lt. H.H. Forbes. Severely wounded. (since dead)

NATIVE OFFICERS:
44th Native Infantry Subadar Major Nurbir Sai. Killed
Ditto Subadar Mahaboola Khan. Slightly Wounded.
Ditto Subadar Rajman Rai. Slightly wounded.

RANK AND FILE:

CORPS	KILLED	WOUNDED			TOTAL
		Mortally	Severely	Slightly	
43rd Native Infantry	2				2
44th Ditto	14	3	15	7	39
Followers Manipur gun coolies	1		2		44
Total	17	3	17	7	

Lieutenant Colonel Johnstone's Manipur troops did not cooperate, owing (the Brigadier General reports) to “sickness and other causes". About one hundred (number variously stated) Kukies, however, sat all day on the top of a high hill watching the engagement; these men would no doubt have pursued the flying Nagas had the latter given them a chance. The Manipur gun coolies behaved excellently.

Brigadier General Nation, while acknowledging the gallantry displayed by all the officers, Native officers, and men engaged, specially mentioned Colonel Nuttall, C.B., who personally led all the assaults. He also recommended Lieutenant Ridgeway for the Victoria Cross, which well-deserved decoration that officer has since obtained.

As soon as the retreat of the enemy was discovered, on the morning of the 23rd November, the remainder of the village was occupied. That day and the next, the headquarters and troops remained at Konoma, the men requiring some rest after their exertions. The work of destroying the enemy's entrenchments was also commenced.” (Maitland, 1880)

APPENDIX 3-6. Treaty between Political Officer, Captain Williamson, and Khonoma Chiefs

The terms upon which peace is concluded between the Chief Political Officer, Naga Hills Field Force, and the three khels (Merrima [Merhümia], Tebboma [Thevomia], Semama [Semomia]) of Khonoma are as follows:-

(a) Evacuation of the Chakka forts, and their occupation by our troops. (Complied with 28th March 1880)
(b) Surrender of all firearms and of all Government and private property acquired at the time of Mr. Damant's murder, 14th October 1879, and subsequently.
(c) Cash payments for non-delivery of articles known to have been taken, and not surrendered (complied with in full).
(d) Village site of Khonoma and all lands appertaining to the village to be confiscated. Village site never to be re-occupied. A monument to be erected on the summit of the Khonoma Hill, and placed in charge of the Nagas of Mozemah [Mezoma], who will be held responsible that it is not damaged in any way.
(e) The Semama khel of Khonoma to be located on a new site near the place where the political path crosses the Zubza River, the Merrima and Tebboma khels to be settled on the unoccupied lands of the Phessama [Phesama] village. The site of the new Semama [Semomia] village had been pointed out by Lieutenant Maxwell, Assistant Political Officer, to Lohetzo, Gaonburah [gaonbura] of the Semama khel; it will be called Zubzuma.
(f) The Tebboma and Merrima khels of Khonoma to be fined Rupees 500 each. The Semama khel Rupees 200. (paid)
(g) The Tebboma and Merrima khels to pay a fine of 1,000 coolies each for transport purposes between Piphima [Piphema] and Kohima.
(h) Inhabitants of Khonoma to pay the same rates of revenue, and same contribution of free labour as other villages. Same condition [used for] nomination [of] headmen as in other villages.
(i) The Khonoma village lands to remain fallow until further orders, and then to be disposed of at the pleasure of Government. Probably they will be settled with the villages of Mozemah and Jotsoma.
(j) An amnesty to be granted for past offences; but this amnesty not to include the Khonoma dobashia [dobashi], and the Khonoma Naga Tepuchacha, who enjoys the reputation of having killed the late Political Agent. A reward of Rupees 250 for each of these men is offered.
(k) The upper fort of the Chakka, and our present position on the village site of Khonoma to be held at least until the season of cultivating has passed for this year, and, if possible, until the monument is completed and these terms fully complied with. The Chakka forts to be destroyed as far as possible.
(l) Hostages to be given from each khel for the performance of these conditions.

Camp Mozemah [Mezoma]
The 28th March 1880.

Sd/- W.J. Williamson, Capt.,
Chief Political Officer,
Naga Hills

Source: Changkiri, 1999, 223-224

APPENDIX 3-7. A Khonoma Elder's Account of Recent History

"In the past, nobody governed Nagaland. We never used money. We were head-hunters but not all villages were enemies. After fighting, there would be treaties and peace. The British conquered India and later came to Nagaland. Nagas fought them to protect our land. When they came to Khonoma, our elders told them that they would not allow themselves to be ruled – but would fight. We had not yet heard that Nagaland had been given to the British.

They summoned Khonoma villagers to supply labor but a refusal was sent to Kohima – so Damant came. In the meantime, Khonoma's warriors had prepared for a possible fight, so when Damant arrived, they killed him straight away. Anticipating war, they then dispatched the women and children to nearby villages where they would be safe. After the British attacked, our people eventually retreated to a nearby mountaintop (Chakka Fort). The British did not follow. When the commanding officer was later asked if they had been successful in capturing Khonoma, he replied that "*If you can catch the stars, then you can capture Khonoma!*"

Finally the British went to Mezoma and invited Khonoma to join them there to make a peace treaty. Within the three khels of Khonoma, there was a difference of opinion over whether they should accept. But Mezoma and other neighboring villages encouraged them to enter into the treaty. The British administration sent word that if Pelhou Dolie came, they would make peace with him. Pelhou was a leader at that time and one of Khonoma's best warriors. He was later to become the grandfather of A.Z. Phizo (a separatist leader – plate 3-69). An old man from Mezoma placed Pelhou's spear on the seat at the meeting venue – but the British responded that until he arrived himself, no treaty would be made. For the welfare of the village, Pelhou finally agreed and arrived carrying a tragopan (*Tragopan blythii*, a native pheasant that is now the state bird of Nagaland). On his arrival, the British officers rose up to shake his hand. Khonoma never surrendered – but entered into this peace treaty. The capture of the whole of Nagaland began with this treaty that was signed by Pelhou.

India has now managed to divide the Nagas into factions. We feel that the Indians are not the rulers of Nagas – nor do they have any love for the Nagas. We are not very happy with the British since their actions led to these circumstances. When the British were leaving, Naga elders insisted that we wanted to be a separate country – totally separate. But the British did not make a clear demarcation, nor stipulate that the Nagas should be separate. Otherwise we would have a much more advanced and separate country today. The Nagas believe that God created everything, and everything in Nagaland was created for the Nagas. But we are thankful to the British for providing sanctuary to Phizo and other Nagas. We heard stories that the sun never sets on the British Empire. There are many great countries and God created them all. In reality though, our ancestors migrated here from China and Thailand." (Pelhou was later appointed as the first gaonbura (village headman) for Khonoma under the British system of administration (Meyase, 2001, 81). "

(Narrated by Pfürüko Khate. Translated by Zeroni-ü Meru.)

APPENDIX 3-8. Deputy Commissioner's Account of Attempts to Capture a Khonoma Fugitive - 1892

"11th and 12th. – At 10 p.m. on the 11th, I left Kohima for Khonoma with an escort of 25 men and a native officer of the Military Police, to capture Kemhakre, a noted bad character, who has been wanted for the last few years on account of burglaries committed in Kohima station. Just before 1 a.m. on the 12th, we reached the hut he has been living in recently, which is situated about two miles this side of Khonoma in the jungle some 300 feet below the Government road. Having completely surrounded the hut, I called on Kemhakre to surrender himself, and was at first told that he was not at home. I then ordered his wife to open the door and let me search the house. This she did, and on my going round to it, Kemhakre himself appeared at the door of the inner room of the house. I ordered him to come out and give himself up. He then went back in the inner room, saying that he would put his clothes on and come out. Having been inside the house for about ten minutes, he reappeared, this time with a spear in each hand, and having executed a war dance, shouted out that he would not give himself up, but would die where he was. For the next hour and a half, I did all I could to induce Kemhakre to put down his spears and give himself up, being unwilling to shoot him or to run the risk of having one of my men killed in an attempt to capture a fully-armed and desperate man. But all the answer I could get out of him, when he was not engaged in actively defying me, were requests on his part that I should enter the house and have a talk with him. To have done so would have been sheer madness. Finally, all endeavours to induce him to give himself up having failed, I went up on the terrace just above the house, and having made a hole in the thatch, called out to him to put down his spears, or I would shoot him. All the answer I got to this was a spear jabbed out at me through the roof, which came unpleasantly close to my hand. Realizing then that it was hopeless to expect the man to give himself up, I took the first opportunity I could and shot him through the roof. He fell mortally wounded. I had used buck shot, and had tried to disable him by hitting him in the legs. The shot, however, the light being bad for aiming, went higher than I had intended, and with the result as above stated. He was shot shortly after 2:30 a.m., and died about 9 a.m., the native doctor whom I sent out from Kohima as soon as I got back there, in hopes of saving his life, having arrived just half an hour after his death.

I regret the result of this affair, but consider that it was unavoidable. I took with me the large number of 25 men, thinking that, when Kemhakre realized the hopelessness of trying to escape, he would give himself up quietly. To have attempted to capture him alive would most certainly have resulted in the death or serious wounding of at least one of my own men and most likely in Kemhakre's death as well, as he would have been pretty certain to have got a bayonet through him. I did not, however, think myself justified in risking my own life or that of one of my men in an attempt to catch a Naga thief, and suspected murderer. Kemhakre was a man of the worst character. He was the head of the local gang of burglars who were so active in 1890 and part of 1891, and has been concerned in nearly every case of house-breaking that had taken place at Kohima within the last seven years. He was also suspected of being concerned in the murder of the Public Works Department coolie murdered near Pherima in the beginning of 1891. His house at Khonoma was once before surrounded in 1890, when I was at Mokokchang, but, owing to mismanagement on the part of the Sub-Inspector in charge of the party, he was allowed to make his escape. A large amount of stolen property was then found in his house. Since then he has been always on his guard, and up till the 11th, I had been unable to get any reliable information as to his movements." (Davis, 1892, 1-2)

APPENDIX 3-9. Hutton's Diary Notes Describing the Rebuilding of Khonoma's Forts in 1923

"17th. [June] ... Khonoma has a building craze. For the first time, anyway since 1909, all three clans have agreed on keeping a permanent peace, and each will allow the others to erect any sort of mound and stone business they please without objecting, whether it is a baze [stone sitting place where the male villagers sit together to discuss village affairs and any problems], a kwehu [khwehou – stone sitting place commemorative of a feast] or a dahu [fort]. All want to build, and as no one else objects, I see no reason why I should. It will keep the young bucks out of mischief and liquor smuggling for a time at any rate, and there is no question but the village believes that these erections enhance their material prosperity. I think they are really dwelling places for the ancestral spirits on whom depend the fruits of the earth. All three khels are to begin on the same day and build for two months, when they must stop. Otherwise, without a limit, this game would most certainly lead to serious quarrelling. I do not anticipate any quarrels during these two months. At the end of them I am to come back and see whose erection is the best. The proposed building plots were already flagged out for my approval when I arrived. Merhema [Merhümia khel] proposes to build a latter-day tower of Babel, I gather, but the time limit will considerably handicap their very ambitious scheme." (Hutton, 1923a, 5-6)

"9th. [October] To Khonoma, and back, to see the new "forts" and put a stop to further building.

The three khels have erected such a big stone dahu. These will not be added to without permission, and the khels are warned that I regard them as a sort of security for good behaviour and shall not hesitate to demolish all or part of any one or all of them if the clans riot and use these dahu in the course of the riot.

They have cost a tremendous lot in labor and expense, and are magnificent to look at specimens of Angami stone-work which cannot be approached in any village in the hills. They contain a great deal of dressed stone, which of course the older erections did not, though Samagating claim to have used dressed sandstone for graves before the British occupation. The Merhema [Merhümia] dahu has stone water-spouts, and projecting stones bored with holes to carry the bamboo scaffolding used to build the upper part of the wall. In the case of this dahu, the parapet round the top is dressed to a fine edge instead of being merely composed of flat stones. The Semoma [Semomia] dahu has a very large platform of rough stone filled with earth and a rather smaller tower, made partly only, of dressed stone, with the usual sitting place in the top. The lower platform is to be partly paved later to cover the graves that there are in it. The Thevoma [Thevomia] dahu is at present much like that of Merhema, bigger but not quite so well built; the lower platform to have been much broader on one side, though not so big as Semoma. The ground however, has slipped the whole gone. It was flagged out with stick and strings, and I gave leave for it to be rebuilt to the extent for which it had slipped. Thevoma and Semoma as well had asked leave to put an inscription with my name on stating that I had given leave for the erection of these dahu. I said that if they used my name, they must show me what they were going to put up first and that they could not in any case use it unless they added that I had also said that I would pull the dahu down again on the least provocation. Merhema had a blank tablet ready and a written inscription to be vetted from which I cut out my name and passed an inscription saying that the dahu had been built with the permission of the D.C. Semoma had already put up an inscribed tablet in better English than I should have expected stating forth the history of the affair in a quite unobjectionable manner, but adding that "*J.H. Hutton Esqr., C.I.E., I.C.S.*" had given leave for the erection of the dahu on which account "*they were heartily pleased to erect this stone to the memory of Mr. Hutton*", and requested Govt. officials not to interfere with it. This seemed a little premature and as they had of course added nothing about my threat to pull the dahu down again, I ordered them to put up a revised inscription leaving me out of it. A dahu is a better thing to have called after one than a Law College, but unless I had built them myself, I would as soon pave my name on a sewage-farm as either. Thevoma had wisely refrained from any sort of tablet. They nearly always show better taste than the other two clans, to that extent justifying the claim of the Thevoma as the aristocrats of the Angami tribe." (Hutton, 1923b, 1-3)

APPENDIX 3-10. Examples of Prayers Invoked as Part of the Angami Traditional Religious Beliefs*

Blessing of Chücha

1. We have brought in the good blessings of rüde
2. in order to receive the blessings of our wives.

(After these, the phichüpelhie blessings are pronounced.)

Blessing of Kesiamero (burial ritual)

1. *We*, in your life together
2. *We*, some words of stinging abuse may have passed in between.
3. Therefore, we undertake to dismantle these obstructs to your welfare.
4. *We*, we endeavor that you may inherit all that is good.

(After these, the phichüpelhie blessings are pronounced.)

Geida Blessing

1. This morning at the break of dawn,
2. to remove the obstacles of kemekhrü kemerho, obstacles to health and smartness,
3. I bring this unblemished chicken of mine
4. to break the ills of your geida
5. and let you be well again.
6. May you be solemnly healthy, gently healthy and bloomingly well until the end, healthy as the clearness of waters,
7. in health, meet the rising of the sun,
8. in the community house or along the field paths.
9. If others have said of you ill words or aught that have offended you,
10. I cut away all the ill effects of those words spoken by others
11. that you may be healthy and well.
12. As long as the sun shines,
13. you may be made well.
14. Kha 6 times.

Visieu, 25-06.1970

Terharogi Blessing

1. Perchance by the power of the ill spirit of the household and ill spirit of the woods,
2. this sickness has come upon you.
3. My unblemished chicken shall cut away all influences that cause you to be sick
4. and let you be well again.
5. Words of anger spoken in the house, ill effects of the hearth and firebrand,
6. if by these unawares have come your ill health,
7. this unblemished chicken of mine will be used to cut through their ill influences
8. and cause you to be well again.
9. Perchance as you tilled fields in distant regions,
10. unknowingly, if you have gathered up shrubs and fallen leaves
11. and covered the mouths of springs with it (and thereby fallen sick),
12. *we*, this clean chicken will be used to undo all those influences
13. and cause you to be well again.
14. *We*, in the course of hunting game,
15. some ill has perchance fallen upon the man's spear or machete
16. and covered it with its influence,
17. or if upon the woman's being,
18. some ill has fallen and enveloped it
19. and if, by it, a disabling sickness has befallen you,
20. this unblemished chicken will be used to cut away its powers
21. and cause you to be well again.
22. Perchance from unknown regions,
23. as you gathered wood and straw
24. and erred as you tied the knots upon your house,
25. my unblemished chicken will pick at its ill influences
26. and cause you to be well again.

Translated by E. Iralu.

* Found pasted on a wall in a Thevomia morung.

APPENDIX 3-11. Notes on the Effect on Some Primitive Tribes of Assam of Contacts with Civilization, 1931

“The effect on the tribes of the Naga Hills district of contacts with civilization, by Mr. J.P. Mills, I.C.S.

The conditions obtaining throughout the Naga Hills district being fairly uniform, to deal with each tribe separately would entail much unnecessary repetition. I will therefore note on the district as a whole, drawing my examples from the Angami, Sema, Ao, and Lhota Nagas, and the Thado Kukis.

In this area, contact with civilization is brought about in two ways – by the visits of tribesmen to the plains lying along the base of the hills, and by the penetration of foreigners into the hills. The latter is by far the most important. Foreigners residing in the hills influence the culture and mode of life of the indigenous inhabitants in numerous ways – by administration, by missionary propaganda, by the innate tendency to imitate foreigners who display a culture in some way regarded as “higher”, by objects of trade imported from without, by the introduction of disease, by medical work, by communications that make traveling everywhere easy and safe, by the presence of an armed force strong enough to suppress any rising or inter-tribal war, and by countless subtle influences that react on the mentality of the villagers, usually to the detriment of their pride in their customs and history.

There has been little or no exploitation of forests, minerals or agricultural land, but the future can not be held to be secure as long as the ruling of Government stands that jhum land, which the owners have bought or inherited as immovable property, which can be validly held by an individual or a clan, is all unclassed State forest at the absolute disposal of Government, on which there is no liability to pay compensation in the event of its being taken over.

There is no systematic recruitment of hillmen for work in the plains. Gangs, especially of Semas and Aos, go down in the cold weather to work on tea gardens in order to earn cash for their house tax. They come back none the better for the journey. Women do not go down with the men in any large numbers, but when they do go, girls are not infrequently lured into a career of prostitution by the prospect of an easy life, being unable to distinguish between the easy-going moral code of their own villages and the systematized vice of the plains, with their so-called higher culture. The men are apt to waste money on rubbish they see displayed in the shops, and on distilled liquor for which they acquire a taste. Gangs going year after year to the same garden are paid regularly and well, but those working for petty contractors are cheated of their earnings with regrettable frequency. They cannot bring suits in the plains – the expense, the distance and the endless adjournments are all against them. When they find that Government is prevented by its own legal methods from settling their claims equitably and quickly, their respect for it naturally suffers.

Improved communications, while they have immensely facilitated internal trade, have undoubtedly spread disease. All Nagas assert definitely that since their country was taken over, illness has increased. Not only have specific diseases, such as venereal diseases and tuberculosis, been introduced, but epidemics spread more quickly. In the old days of war and raiding, villages remained more or less constantly segregated. Nowadays people travel freely everywhere and disease spreads quickly. Tuberculosis is definitely established. So far its spread has been slow, but the time may come when it will become rampant and the Nagas and Kukis of these hills will follow other primitive peoples into oblivion.

The national drink of the hills tribes of Assam is rice beer. Foreigners have brought in distilled liquor, and its effects are evil. The casual labourer working away from his village, himself the product of contact with civilization, has no wife with him to brew his rice beer and buys spirits instead. Later, he comes to regard distilled liquor as a necessity. Nagas are fully aware of the evils, and certain Angami villages have sworn oaths that no member will indulge in it.

Opium is only consumed in certain areas. The Konyak Nagas are inveterate opium addicts, having acquired the habit from plainsmen, with whom they have been in close contact for a very long time. A limited number of Ao Nagas have also taken to the habit. A few years ago, a village founded by the American Baptist Mission as a Christian village contained more opium addicts than the whole of the rest of the tribe. The reason was that the Mission had forbidden alcoholic liquor and their converts had taken to opium as a substitute. I believe things are much improved now. In the rest of the district, there are few addicts except detribalized Nagas living in Kohima bazaar. With them, the vice must be directly put down to contact with foreigners.

The opening up of the cart road to Manipur has undoubtedly led to an increase in prostitution. Except to a limited extent among the Eastern Angamis, prostitution, in the sense of women selling themselves for money to all and sundry, is not an indigenous Naga or Kuki custom. In many tribes girls before marriage allow their lovers every privilege, but this is very different from a commercial transaction. Foreigners coming into the hills by the cart road often demand women, and where there is a demand, a supply is apt to be forthcoming. Some women even visit the cart stands and offer themselves to the bullock drivers.

While the extension of communications had led to the introduction of much foreign rubbish and cheap jack ware, it has also stimulated genuine Naga trade. For example, in the old days the supply of ivory armlets was very limited, as they could only be obtained from the very few elephants killed by Nagas themselves. Now Angamis bring large numbers up from Calcutta and trade them through the hills. Similarly, Naga ornaments which are only made in a few places, such as the baldrics [a wide ornamental belt or sash, typically used to carry weapons] made in the Sema village of Seromi, are far more easily distributed. I have no doubt more Naga ornaments are worn now than were worn in the days before the hills were taken over, and for this, peace and easy communications are responsible.

Before the hills were taken over the important village of Khonoma, with insufficient land to support its population, raided far and wide for beads, tribute, loot and prisoners they could hold to ransom. Now they have substituted trade for raiding, and landless men wander right into Burma selling beads. The prestige of the village enables them to keep almost a monopoly of this trade.

I have mentioned above the increase in prostitution due to the cart road. Far more serious in this respect is the presence in Kohima of a large number of unmarried foreigners, including the unmarried men of a battalion of Assam Rifles, and of Naga subordinates living away from their villages. A population is growing up of persons with no tribe or customary law and religion, and their settlement is a plague spot. Any girl who quarrels with her parents in a Naga village and can bolt to this sink of iniquity can find an old hag ready to take her in and start her without delay on a career which can only end in disease and misery.

Education of the type which is given has been on the whole an evil rather than a good. Some men have withstood its evil influence and have remained good Nagas, with something else very useful added. Not so the majority. Very rarely indeed does a Naga regard education as something which is going to make him more fitted for his ordinary life; he regards it as something which will fit him for a very different life, and he expects that life to be offered to him in the form of a Government post – most aptly described to me once as a “sitting-and-eating job”. When boys apply to me for scholarships, my custom is to ask them what they intend to do when they have finished their education, and the reply almost invariably is “*I hope Government will find me a job.*” The result is a surplus of half-educated youths, unwilling to go back to the village life of their fathers and looking in vain for employment which they consider suitable to their talents. The situation is especially bad among the Aos. A few educated Angamis have ventured into commerce, usually with disastrous results, borrowing money wildly and expecting that somehow their education will bring them enormous profits.

Foreign dress is spreading slowly, but steadily. For this, the blame must fall both on certain departments of Government, who allow their employees to wear it, and on Missionaries whose active encouragement has not always as yet been reduced even to connivance. It is certainly definitely connected in the Naga mind with education, and a smattering of superficial knowledge is considered to entitle the possessor thereof to a pair of shorts, while a suit complete with watch chain and Trilby hat almost corresponds to a doctor’s robes. The custom is bad from every point of view. It entails waste of money where money is hard to find. It encourages dirt, since no Naga can afford the changes he ought to have in the damp heat of Assam. It spreads disease in two main ways. Adults become more liable to chills and phthisis [tuberculosis] since they do not change their wet clothes, and children who are carried against wet “short waists” instead of against their mothers’ warm backs suffer as a result. From the artistic point of view, it is especially and utterly to be condemned. To substitute soiled and poor quality western clothes, or more often a caricature of them, for the exceedingly picturesque Naga dress is an aesthetic crime. More of the body is covered up, but I have yet to find that this leads to stricter morality.

Nagas who have taken whole-heartedly to foreign customs often build houses resembling the worst type of “shack”. A Naga house as all fittingly built houses are blots upon it. They are expensive and stuffy. The fashion has been encouraged, I fear, by the Baptist chapels, which as artistic productions are execrable, and, widely spread as they are, tend to kill the Nagas’ unconscious but innate sense of architectural fitness.

Only two ancient customs have had to be put down by Government – the sacrifice of mithun and head hunting. The suppression of the first is wholly good, and more humane methods of killing can be substituted without detriment to the rites. The suppression of head hunting, though necessary in any area which is fully administered, has probably not been for the benefit of the tribes. The very fact that, far from being an honour, it is a disgrace to be killed in war, makes all Nagas very careful of their own safety, and their wars were singularly innocuous affairs. In a war between two big villages, each side might lose one or two men a year. The number of lives saved by the suppression of the practice is therefore negligible, and is far more than balanced by those lost through the spread of disease made easy by safe traveling everywhere. In addition to this, there is a very real loss in virility and keenness. Unbroken peace is no better for Nagas than it is for any other race.

Realizing that on the preservation of customs developed exactly to fit the environment and tested by centuries of use depends the whole fabric of tribal society, Government has been at pains to preserve them to the utmost limit possible and ensure that such change as must inevitably come shall not be destructive in its suddenness. In strong contrast has been the attitude of the American Baptist Mission. As religion plays a part in every Naga ceremony and as that religion is not Christianity, every ceremony must go. Such ceremonies as the great Feasts of Merit, at which the whole village, rich and poor alike, is entertained, and of which the religious aspect is far less important than the social, have not been remodeled on Christian lines, but have been utterly abolished among converts. This has been the fact, too, of all village sacrificial feasts. The place of these is not adequately taken by small parties meeting to drink tea. The suppression among Baptists of the ancient feasts in which all joined is not only loss to the would-be hosts, but to the village as a whole, and not least to the poor, who always get their full share of good cheer at Animist festivals. To abolish these feasts is to do away with the very few occasions on which the awful monotony of village life is broken. They are, too, the natural Naga and Kuki way of distributing wealth. I have heard a Baptist teacher boast that his granaries were so full of the store of years that some of the grain was black with age. Had he been an Animist, that grain would not have been left to rot uselessly but would have been eaten by his fellow villagers.

To any one who, unable to reject some of the most hallowed passages in Scripture, regards fermented liquor in moderation as not only harmless but beneficial, the strong prohibition policy of the Mission cannot but seem a grave mistake. Few of its advocates attempt to justify it from Scripture. They use the arguments which brought the Volstead Act into being. Such an obsession has abstention from fermented drink become among converts, that teetotalism is often regarded as the outstanding mark of a Christian. Among the Aos, “teetotaler” and “Christian” are used as synonymous terms in ordinary conversation. The substitution of opium for rice beer is probably rare among Christians now, but as in America, a secret drinking goes on, with results that are morally evil.

It is at the big feasts that singing and dancing are indulged in and full dress worn. These have been entirely suppressed among the Ao, Lhota and Sema Christians, the men of whom wear no ornaments at all, having stripped their beads from the necks, their ivory armlets from their arms and even the cotton wool from their ears. The women are more conservative and still often wear their beads, through I doubt if a girl would actually wear her ornaments at a Mission school. Angami men too are difficult to dislodge from their ancient ways. The best of them do not give up their picturesque dress and are quite ready to put on all their finery and take part in the ceremonial singing parties which are such a feature of their village life.

Of the material arts in these hills, wood-carving is the chief. It is displayed on the houses of those who have given the great Feasts of Merit, on the "morung" posts of the Aos, Konyaks and Lhotas, and on the big xylophones [drums] of the Aos. This is doomed to extinction as the power of the mission increases. Feasts of Merit are forbidden among them and no attempt is made to induce rich Christians to decorate their houses in the old way. No Christian boy is allowed to go through his time in the "morung" and they are not built any more in Christian villages. In such villages, too, the old xylophones can be seen rotting in the jungle.

The suppression of the wearing of all ornaments or tribal finery, of dancing, of singing (except hymns), of village feasts and of all artistic outlet is spreading an unspeakable drabness over village life. Old songs and old traditions are being rapidly forgotten. Told year in and year out that all the past history, all the strivings, all the old customs of his tribe are wholly evil, the Naga tends to despise his own race, and no night of the soul is blacker than that.

The suppression of the "morung", in which young Animists learn to be useful citizens, is unwarranted by any good reason that I have ever heard. It is part of the tendency to abolish old things just because they are old, and substitute for the strong communal feeling which has enabled the tribes to survive for so long an individualism which is really foreign to them. Not only is this individualism wrapped up with the strong emphasis on personal salvation; it is also the direct and natural reaction against the destruction of all the old things that mattered in village life and all the old expressions of the artistic and social genius of the tribe. "*My tribe has erred hopelessly*" says the convert "*all through the centuries it has tried to work out its destiny. I will work out mine, and mine alone.*" An Animist puts his village before himself. A Baptist puts himself before his village. No Semas are as prone to disobey their Chiefs as Christian Semas, and Christian Aos have often refused to take the part in village Government to which their years and experience called them. A "Civilized" Naga is apt to call customary discipline restraint, and many of them are eager to leave their villages and live free of all control.

Times are changing and new influences and tendencies are appearing. Tribes and villages acting as units will be able to judge of them and resist them if need be. Individuals will find them too strong. Will the time come when these hills will be inhabited by scattered families, without pride in the past or hope for the future, without arts and without recreation, dressed in nondescript garments as drab as their lives, and busy only to win from the steep, rocky slopes enough sustenance to enable them to beget children and die?

Julian Huxley in one of his articles which he quotes in the introduction to his book African View sums up the exactly similar problem of that continent as follows: -

> 'On the top of all this variety of nature and man there impinge Western Civilization and Western industrialism. Will their impact level down the variety, reducing the proud diversity of native tribes and races to a muddly mixture, their various cultures to a single inferior copy of our own? Or shall we be able to preserve the savour of difference, to fuse our culture and theirs into an autochthonous civilization, to use local difference as the basis for a natural diversity of development?' "

(Mills, 1931)

APPENDIX 3-12. Henry Goldsmith's Good Work in Kohima: The Story of the First School among the Angami Nagas

By Chas D. King

"Some surely want to know the story. There are a few already who know that it is interesting; but my eye looks forward to the day when, because of some noble achievement or eminent worth among Christian in this tribe – many will want to know who first planted the good in this field, among these notorious "head-hunting".

It is without embarrassment and with no necessity for careful balanced phrases to avoid the appearance of self-commendation, that I - the pioneer missionary to this tribe - can tell of the first Christian teaching among Angami Nagas. For it was not I who did it. It was another; and of him and of circumstances which led up to the opening of the school he taught in Kohima, I am qualified to write some things that might otherwise not soon be fully written by anyone else.

We must go back to the month of November, in 1881; for it was then that Henry Goldsmith arrived in Kohima (Koheema). I myself had been there since February, and for much of this time had been pondering, planning, advising, corresponding, negotiating, coercing, hoping, praying over the matter of getting a teacher for the school I so ardently desired to open for Angami boys. I had come there from the plains of Assam with a stammering half-acquaintance with the Assamese language, taken up first of all the great task of learning and reducing to writing some one dialect of the strange conglomerate of uncouth sounds, varying from village to village, that was heard from the mouths of Angami Nagas – a dread language that no man other than a Naga had yet mastered.

It would be a long time yet before it could be said of any man in all the world that he was qualified to begin preaching intelligibly to these hardy, self-reliant, and by no means unapproachable Angamis. But among some of the growing boys of Kohima, I saw a chance to begin school work at once if only a suitable teacher could be obtained.

This whole Angami tribe had, during the last two or three years, been taking on a new education. It had been a time of general excitement and keen intellectual activity in connection with new problems and new conditions. Their hitherto secure "mountain fastenence" hidden away behind the stretches of the dense Namber forest, had now been invaded by an organized band of legalized trouble-makers known as an arm of the Imperial British Government – a rather small band, to be sure, but well supplied with guns.

To all the Angami villages, widely separated and each sitting apart on its own peak, suggesting not inaptly the populous stronghold of some old medieval crag-baron, there had come a word – no persuasive word but an actual command, if you please – that every householder must pay an annual tax to the new interlopers. And other humiliating conditions and requirements were insisted upon. For one thing, the Angamis must abstain from acquiring firearms; and they must above all things else, put an absolute and final taboo on such hilarious and practical jokes as their hitherto altogether too frequent murderous and marauding raids into the thinly populated Assam valley – raids and outrages which had now caused their portion of the wild hill country to be annexed to Assam, and so brought under an orderly scheme of government.

But an orderly scheme of foreign-imposed government was not at all to their liking. Had not Angamis always been their own masters? Never had they been dictated to or "governed" by any class of potentates, petty, pompous, or proud. In their independence and prowess, they regarded themselves as vastly higher in the scale of true manliness than any of the plain-dwellers down in the low country by the big river, who of course were, and suitably enough, subject to the British Raj. Resistance to the new government scheme was inevitable; and it soon came to a head, not in Kohima village, adjacent to which the new government headquarters had been established, but in Khonoma – miles away – Khonoma proud, rich, prosperous, with its hundreds of stalwart braves, many a want of them carrying about with him in the symbolic ornamentation of his spear, black bands of closely cropped hair interspersed among larger areas of goats' hair dyed red – each black band adding greatly to his acknowledged rank and importance; for it was these black bands, made from the hair of his human victims, that told the number of his already achieved most honorable exploits resulting in the taking of heads. It was known too that more than one of these Khonoma braves was the proud possessor of a gun.

When the spying English explorers had first "looked about" Khonoma, they were much impressed with the evidences they seemed to find of the long time during which this village must have occupied its present enviable site, while growing to its present pinnacle of prestige. These Englishmen were familiar with the custom of some of the other hill folk of Assam who, choosing some likely spot for cultivation, build frail huts for themselves and thus establish a new village almost as early as a company of Arabs might pitch their tents for a night, and occupy this site for perhaps two or three years, till the heavy rains have washed away the loose soil from the steep hillsides, when they, deserting their by-this-time old huts, again pitch their village in a new place. But in striking contrast with this custom, permanence of site seemed to characterize the Angami villages. The Angami houses were seen to be large and most securely and even artistically built.

And the Englishmen, measuring with their eyes the deep-worn path on which the ascent to this particular village was made, asked themselves how many years it must have taken the bare feet of Naga men and women and children and the hoofs of their cattle, aided by the down-rush of water that must follow this path during every rain, to wear away the rocky formation to such a depth. The path had become a deep narrow sunken defile along which a tall man walking erect and carrying on his back a grown pig or a huge basket of rice might in passing be, for at least a part of the way, entirely hidden from view, and not at all able himself to look out over the usually jungle-grown border.

And some time before coming upon this particular evidence of the long-established permanency of Khonoma village, our Englishmen had seen something else even more impressive. One could not come very near to Khonoma without seeing that the neighboring hillsides all about this village presented a very peculiar appearance. And even when miles away, one begins to have an idea of the nature of the change that had been wrought upon them. That which had caught the eye at a greater distance, now revealed itself a far extensive and laboriously prepared array of rice growing terraces. And the more they were inspected, the more the wonder grew.

Angami in other villages were as a rule able to find, by going far enough (often as far as seven miles and more), suitable patches of comparatively low-lying and comparatively level land on which to grow their rice. But Khonoma, situated among steep and thickly clustering peaks, must be provided by some peculiar and more heroic method.

The hillsides here were steep; terraces therefore must be narrow and even so, the distance from one up to the next must be considerable. And nothing would ever keep them from crumbling away or being washed away, except some such measure as these men of Khonoma had resorted to. But to the English officers, it was truly a matter of great wonderment to see how, among these untaught hill men, whole vast reaches of well protected and thoroughly permanent terraces all securely faced up with stone. They represented what must have been an enormous labor carried out for years.

And it was soon discovered that there was in connection with these "narrow curving garden beds" clinging thus to the steep sides of the hills, a rude but effective irrigation system bringing water onto these terraces in little winding channels that followed the curves of the hillsides in and out for miles, never deviating very far from what would have been pronounced a thoroughly scientific grade. This whole enterprise was a wonderful proof of the sturdiness and industry of the men of Khonoma and a most remarkable feat of engineering when considered as the achievement of men so low in the scale of development as Nagas had always been supposed to be.

No doubt it seems to all the Angamis a fitting natural select that Khonoma should be the first village to openly defy the British government. At any rate the men of Khonoma, ignoring the demand for tribute money – not because rupees were scarce, for this was a village which had often sent trading bands to the plains and which therefore knew and handled many rupees – went on undauntedly and industriously, if also as secretly as possible, accumulating more guns and ammunition. Theirs was a policy of preparedness.

At length, there came a day when the government as the Angamis must have regarded it – the government in the form this time of one English officer, the political agent, accompanied by interpreters and attended by an armed escort of about forty sepoys [soldiers], proceeded on foot to Khonoma for a friendly confab and expostulation. This august embodiment of power approached the village, meeting with no protest but also with no welcome, and when the Sahib, having left apart of his guard at the feet of the ascent, was making the tiresome climb along the deep sunken path that led up to the village, he and his men were fired upon point blank from ambush and at closest range, with the result that the Sahib, Mr. Damant (a good, kind, affable man with whom my wife and I were personally acquainted), was instantly killed as were several of the sepoys, the rest escaping by precipitous flight.

From this time on, new and expanding ideas in regard to the British and their governmental enterprise had been rapidly acquired. And long before I was allowed to come upon the scene, a common saying among the Angami was, "*It does not pay to try to drive them out or to kill them off for if we kill one, a hundred more will come in his place. Where do they all come from?*"

These Angamis had seen long columns of native troops, profusely armed and accompanied and commanded by British officers, marching up the long winding way – then scarcely more than a bridle-path – which led to Kohima, were after doing their share in giving Khonoma its lesson they had now a part of the permanent cantonment. "*And whoever saw so many guns?*" Even something new and strange in the way of guns had been seen; for what were those two tremendously thick, short guns on wheels, that had been brought up to Khonoma on the backs of those queer splendid creatures that looked like overgrown horses, but were said to be army mules?

There had also been seen here a great number of Her Majesty's red-coated British soldiers coming (and taxing as is said, with their burdens and equipment, for that part of their journey which drags its length through the big forest jungle, the carrying ability of more than hundred elephants) all the way up to Kohima to be on hand to overawe Khonoma, or perhaps to impress the minds of all the Angamis.

Speaking about the Angami students, King wrote thus:

> "They are independent, self-reliant boys, who support themselves and ask no favors of anybody. In age, they cannot be more than from ten to fourteen. They find employment in the station, usually as assistants to the regular servants of officers and others. It is their leisure time (of which they have abundance) that they are giving so industriously to the school.
>
> If the demand for slate-pencils has outrun the supply, away goes some boys to yonder landslip, two miles from the station, where he finds the right kinds of stone to make pencils, and soon every boy has a pencil of his own fashioning.
>
> One serious illness after another and another, following in quick succession and prostrating all of us, had finally driven home the conviction that Mrs. King and I with our two children, born in Kohima, must get away from the climate of Assam and go home to America. We started on Dec. 1, 1886."

If anyone shall ask, either now or at some later date, "*Who first planted here the seeds that have produced all this?*", the answer is, *'Henry Goldsmith'*. "

(King, undated)

APPENDIX 3-13. Excerpt of Letter from Jawaharlal Nehru (President of Indian National Congress) to T. Sakhrie (Secretary of Naga National Council), Outlining his Intentions on Indian Policy towards the Nagas, Dated August 1st, 1946

"It is obvious that the Naga territory of eastern Assam is much too small to stand by itself, politically or economically. It lies between two huge countries, India and China, and part of it consists of rather backward people who require considerable help. When India is independent, as it is bound to be soon, it will not be possible for the British government to hold on the Naga territory or any part of it. They would be isolated there between India and China. Inevitably, therefore, this Naga territory must form part of India and of Assam with which it has developed much close associations. At the same time, it is our policy that Tribal areas should have as much freedom and autonomy as possible so that they can live their own lives, according to their own customs and desires. Thus the solution would be that the Naga territory should be an internal part of Assam province and yet should have a certain measure of autonomy for its own purposes. How this should be worked out is a matter of further consideration between the peoples concerned. So far as I can see, there is no reason why there should be any excluded area apart from the rest. The whole Naga territory should go together and should be controlled in a large measure by an elected Naga National Council. At the same time, the Nagas should have representatives in the Assam provincial assembly and should participate fully in the life of the province.

I am glad that the Naga National Council stands for the solidarity of all the Naga tribes including those who live in the so-called unadministered territory. I agree entirely with your decision that the Naga Hills should constitutionally be included in an autonomous Assam in a free India with local autonomy and due safe-guards for the interests of the Nagas.

As for separate electorates for the Nagas, I am not clear in my mind as to how this will work. Generally speaking, we are against separate electorates as these limit and injure the small group by keeping it separated from the rest of the nation. But if the Naga territory is given a measure of autonomy, some arrangement will have to be made for their proper representation.

As you know, the Congress is opposed to any forcible grouping of Assam with Bengal. We are of the opinion that this is a matter for each province to decide. Assam has already expressed its opinion on the subject. What the future will be, I cannot say, but I cannot conceive of Assam being compelled against its will to form a group with Bengal.

An Advisory Committee will be elected by the Constituent Assembly. It should have representatives of the Tribal areas and I hope the Tribal territories of Assam will be directly represented on it. The findings and decisions of the Advisory Committee will probably not be finally binding upon the Constituent Assembly but they are bound to carry great weight. I imagine the findings will be accepted almost in their entirety unless they go against some direct provision in the Constitution.

As I have said above, the Excluded areas should be incorporated with other areas. It may be that certain special provisions for their protection and development will be made. I should like them to be treated as part of the entire Naga territory.

I see no reason whatever why an extraneous judicial system should be enforced upon the Naga Hills. They should have perfect freedom to continue their village panchayats, tribal courts, etc., according to their own wishes. Indeed it is our wish that the judicial system of India should be revised, giving a great deal of power to village panchayats.

About the unadministered territory which still contains, according to you, a number of head-hunters, I cannot definitely say how soon and in what manner it should be brought into the province. This is to be devised in consultation with the people concerned. Naturally, some special provisions will have to be made to develop these people.

The question of common language must also be finally decided by the Naga themselves. The only two possible languages which would be helpful to them are Assamese or Hindustani. Most of them know some Assamese already. I think it would be desirable to encourage Hindustani as this will bring them in touch with the various changes and developments taking place in India.

Assam is still largely undeveloped and there is plenty of room for agricultural, horticultural and industrial development. This development should be so organized as to benefit the people of the soil. Certainly the people of the Naga Hills should not be exploited by others, and their right to own and work on the soil should remain with them. We should be entirely against the development of large estates owned by outsiders there. What form land ownership should take, whether it should be communal, co-operative or kind of peasant proprietorship, should be determined in consultation with the people concerned.

I might add that I am especially interested in these Tribal areas not only in the north-east of India but in the north-west as well as the centre. They present different problems. I hope that in an independent India, there will be a special department, both in the Centre and in the provinces concerned, for the protection and advancement of Tribal areas. I do not want them to be swamped by people from other parts of the country who might go there to exploit them to their own advantage."

(Jawaharlal Nehru, as cited in Yonuo, 1974, 193-195)

APPENDIX 3-14. List of Angami Villages *

Chakhroma Group	Northern Group	Southern Group	Western Group
1. Bade	1. Botsa	1. Chakhabama	1. Dzüleke
2. Chatouphe	2. Chiechama	2. Jakhama	2. Jotsoma
3. Chümukedima	3. Chiedema	3. Kezoma	3. Khonoma
4. Khanakhur	4. Chiephobozu	4. Khuzama	4. Kiruphema
5. Khriezephe	5. Chieziema	5. Kidima	5. Liezhagei
6. Medziphema	6. Dihoma	6. Kigwema	6. Menguzou
7. Nagarjan	7. Gareiphema	7. Mima	7. Mezoma
8. Piphema	8. Keruma	8. Mitelephe	8. Peducha
9. Razhaphe	9. Kijümetou	9. Pfuchama	9. Secüma
10. Rüziephema	10. Kohima	10. Phesama	10. Thekrüjüna
11. Seithekema	11. Merema	11. Viswema	
12. Signal Angami	12. Nerhema		
13. Socünoma	13. Phekerükriema		
14. Sovima	14. Rükhroma		
15. Seirheima	15. Seiyhama		
16. Tenyiphe	16. Teichüma		
17. Toulazou	17. Tophema		
18. Tsiepama	18. Tsiemekhuma		
19. Tsüüma	19. Tsiesema		
20. Tsierüü			
21. Vidima			
22. Viphoma			

* See village locations on map 3-5.

APPENDIX 3-15. Summary of Results of 1997 Census of Khonoma's Population and Literacy Rate[a][b]

	RÜFFÜNO[c] BLOCK[d]					Abroad	Nagaland	TOTAL
	A	B	C	D	E			
No. of families	416	196	315	200	53	6	1176	1182
Males	822	430	731	489	118	12	2577	2589
Females	818	499	751	484	125	10	2664	2674
Total Population	1640	929	1483	973	243	22	5241	5263
Matriculate	131	129	162	69	23	2	508	510
Graduate	19	92	71	76	2	2	254	256
Post-Graduate	1	20	25	12	2	7	65	72
Total No. of Employees	106	199	144	99	17	8	561	569
Above 80 years	23	9	11	7	2	nil	52	52
Literacy rate[e] *(%)*	78.89	93.40	91.70	94.25	89.43	100	80	

[a] Source: Greenridge Club, 1997.

[b] Census undertaken between June 5 and July 20, 1997.

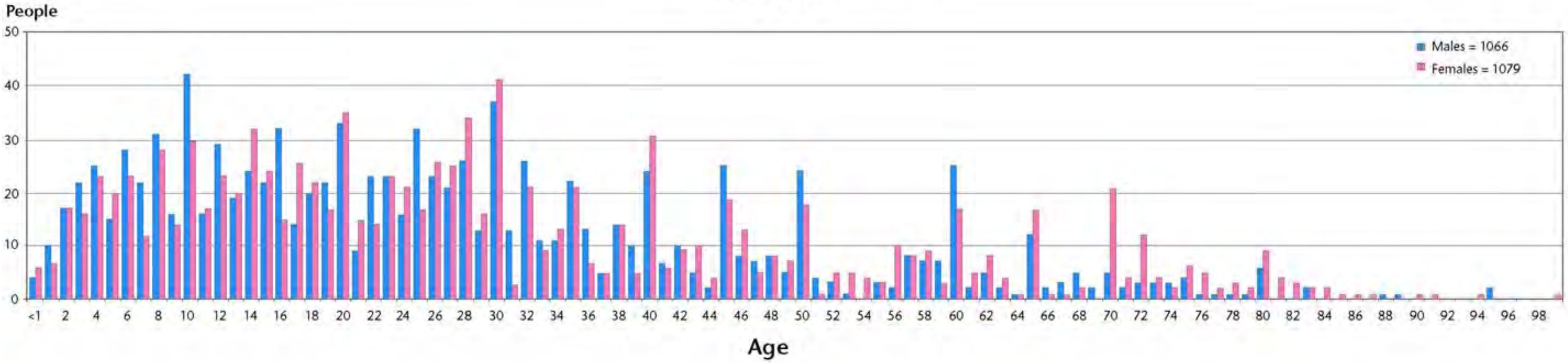
[c] Rüffüno translates literally to "army" and was begun in 1944 as a way to unite the people of Khonoma, to uphold the dignity of the village, and preserve its culture and values. It is the village's apex organization, and all descendents of Khonoma are members by virtue of their birth and regardless of where they live.

[d] A – living in Khonoma village itself
B – living in Kohima
C – living in Medzephema and surrounding villages
D – living in Kuda (Dimapur)
E – living in Secü town (Zubza)

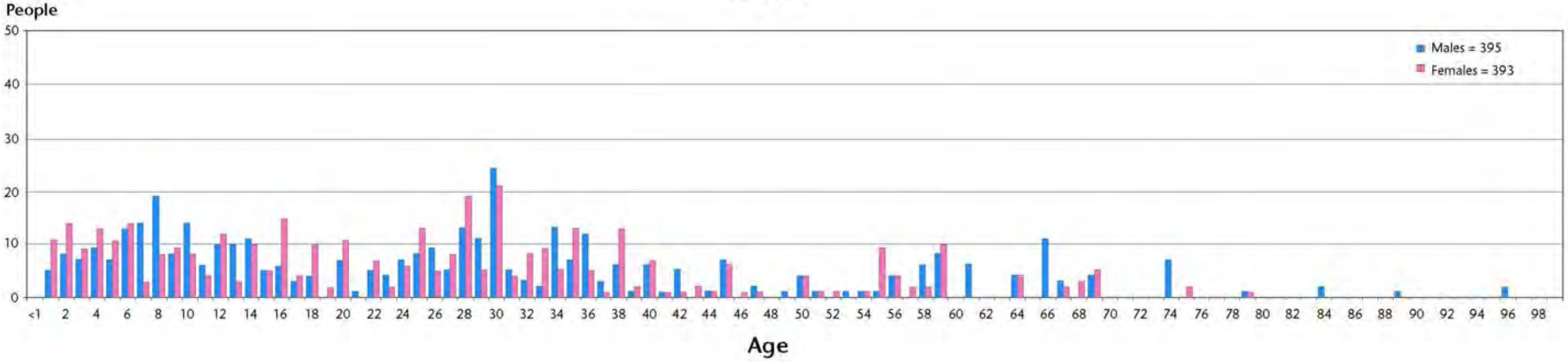
[e] The test of literacy was based on whether a person, above the age of 4, could read and write.

APPENDIX 3-16. Ages of Study Village Populations – Graphed Annually *

Age Distribution - Khonoma
Year 2002

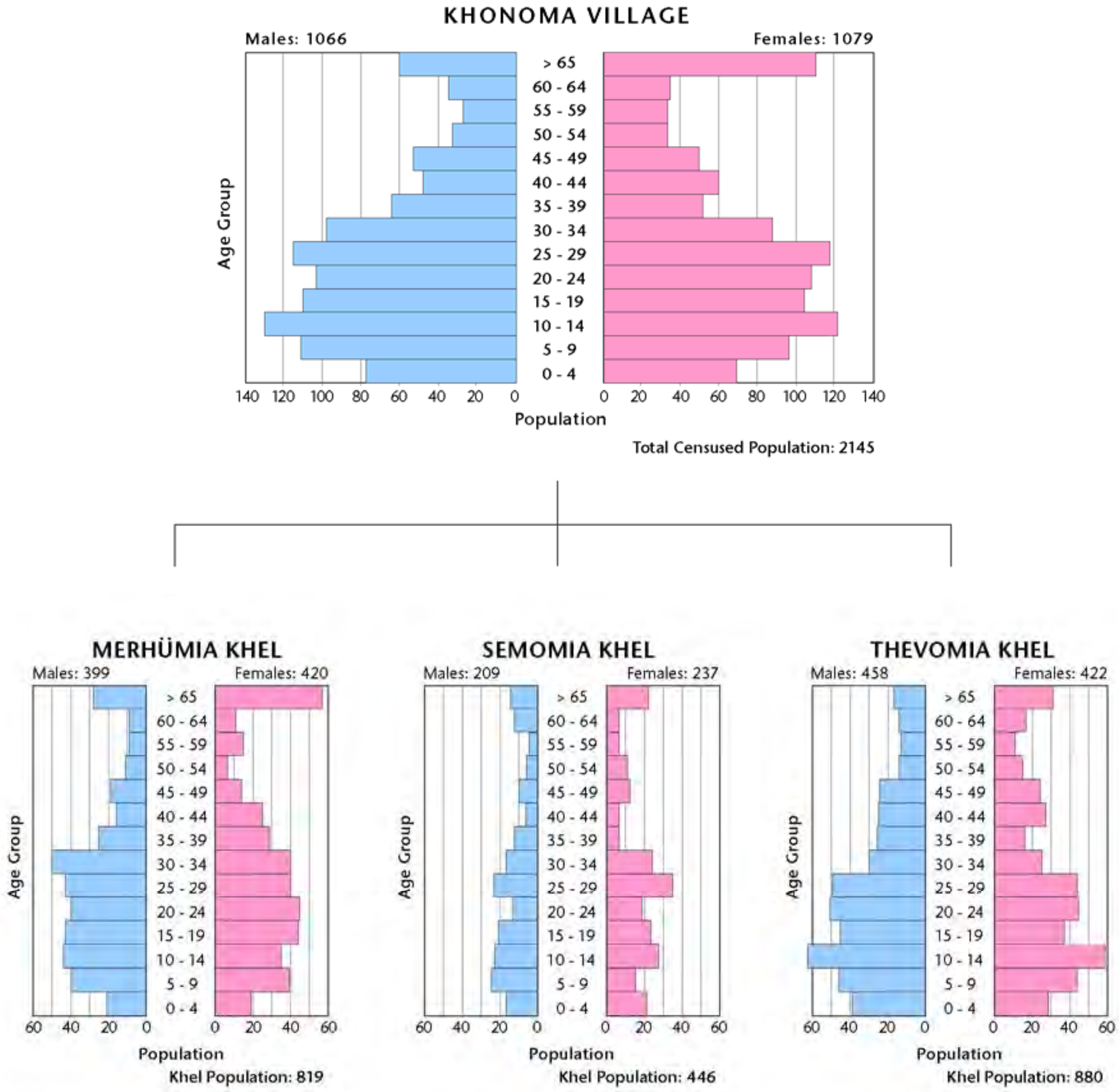


Age Distribution - Tsiesema
Year 2002



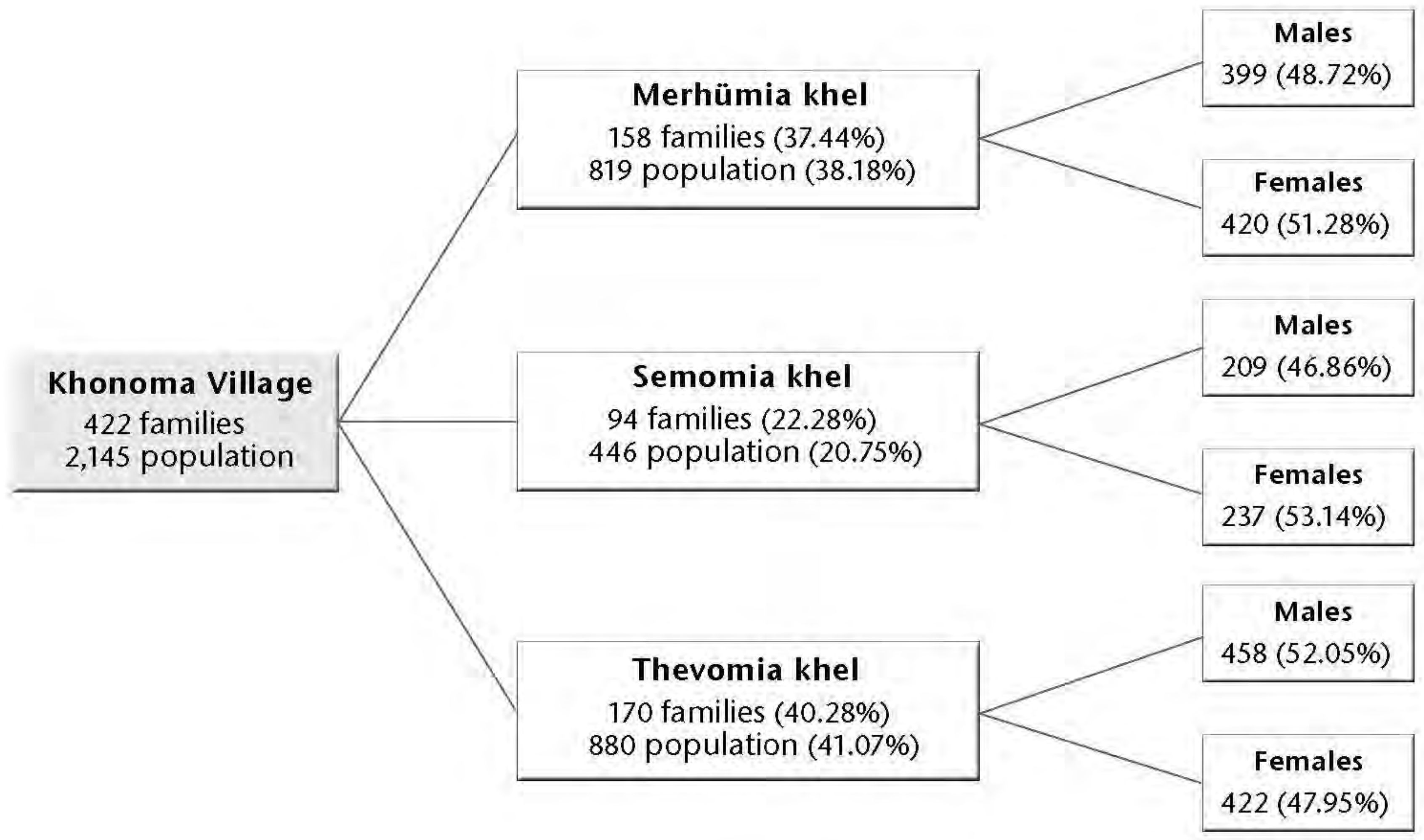
* The Khonoma graph displays stage of life heaping, most noticeably at 30, 40, 45, 50, 60, 65 and 70 years.

APPENDIX 3-17. Age Pyramid for All of Khonoma Village, and Breakdown by Khel *



* Data based on household-level survey conducted during the fieldwork.

APPENDIX 3-18. Composition of Khonoma's Population, Broken Down by Khel and Gender *



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* These numbers include only the local Angami population, and not the approximately 49 outsiders (predominantly Bihari [10], Assamese [3], and Nepalese [8]) that stay temporarily in the village.

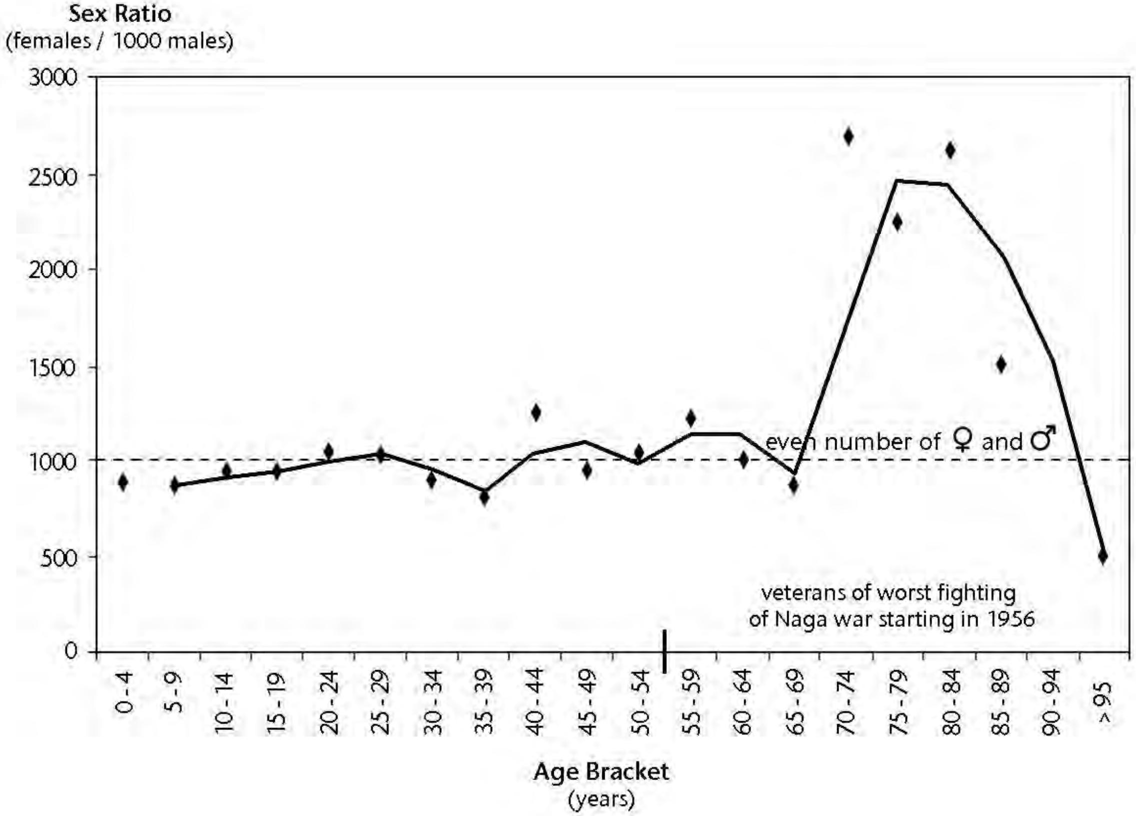
APPENDIX 3-19. Gender of Khonoma's Population across Khels and Age Brackets *

Age Brackets *(yrs.)*	**TOTAL VILLAGE**				**BREAKDOWN BY KHEL**											
	Nos.		%		*Nos.*						%					
					Merhümia khel		**Semomia khel**		**Thevomia khel**		**Merhümia khel**		**Semomia khel**		**Thevomia khel**	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
0-4	78	69	7.32%	6.39%	21	19	18	21	39	29	5.26%	4.52%	8.61%	8.86%	8.52%	6.87%
5-9	112	97	10.51%	8.99%	40	39	25	15	47	43	10.03%	9.29%	11.96%	6.33%	10.26%	10.19%
10-14	130	122	12.20%	11.31%	44	35	23	28	63	59	11.03%	8.33%	11.00%	11.81%	13.76%	13.98%
15-19	110	104	10.32%	9.64%	43	44	21	23	46	37	10.78%	10.48%	10.05%	9.70%	10.04%	8.77%
20-24	104	108	9.76%	10.01%	40	45	13	19	51	44	10.03%	10.71%	6.22%	8.02%	11.14%	10.43%
25-29	115	118	10.79%	10.94%	43	40	23	35	49	43	10.78%	9.52%	11.00%	14.77%	10.70%	10.19%
30-34	98	88	9.19%	8.16%	50	40	18	23	30	25	12.53%	9.52%	8.61%	9.70%	6.55%	5.92%
35-39	64	52	6.00%	4.82%	26	29	12	7	26	16	6.52%	6.90%	5.74%	2.95%	5.68%	3.79%
40-44	48	60	4.50%	5.56%	16	25	7	7	25	28	4.01%	5.95%	3.35%	2.95%	5.46%	6.64%
45-49	53	50	4.97%	4.63%	19	14	10	12	24	24	4.76%	3.33%	4.78%	5.06%	5.24%	5.69%
50-54	32	33	3.00%	3.06%	11	7	7	11	14	15	2.76%	1.67%	3.35%	4.64%	3.06%	3.55%
55-59	27	33	2.53%	3.06%	9	15	5	7	13	11	2.26%	3.57%	2.39%	2.95%	2.84%	2.61%
60-64	35	35	3.28%	3.24%	9	11	12	7	14	17	2.26%	2.62%	5.74%	2.95%	3.06%	4.03%
65-69	24	21	2.25%	1.95%	11	11	4	3	9	7	2.76%	2.62%	1.91%	1.27%	1.97%	1.66%
70-74	16	43	1.50%	3.99%	8	14	5	11	3	18	2.01%	3.33%	2.39%	4.64%	0.66%	4.27%
75-79	8	18	0.75%	1.67%	4	8	2	7	2	3	1.00%	1.90%	0.96%	2.95%	0.44%	0.71%
80-84	8	21	0.75%	1.95%	5	17	2	1	1	3	1.25%	4.05%	0.96%	0.42%	0.22%	0.71%
85-89	2	3	0.19%	0.28%	0	3	1	0	1	0	0.00%	0.71%	0.48%	0.00%	0.22%	0.00%
90-94	0	3	0.00%	0.28%	0	3	0	0	0	0	0.00%	0.71%	0.00%	0.00%	0.00%	0.00%
>95	2	1	0.19%	0.09%	0	1	1	0	1	0	0.00%	0.24%	0.48%	0.00%	0.22%	0.00%
	1066	1079	100%	100%	399	420	209	237	458	422	100%	100%	100%	100%	100%	100%

* See appendix 3-20 for graph of changing sex ratio as population ages, calculated from the first three columns of this table.

APPENDIX 3-20. Measuring the Increasing Ratio of Females to Males as Khonoma's Population Ages *

Age Bracket	Females	Males	Sex Ratio
0 - 4	69	78	885
5 - 9	97	112	866
10 - 14	122	130	938
15 - 19	104	110	945
20 - 24	108	104	1038
25 - 29	118	115	1026
30 - 34	88	98	898
35 - 39	52	64	813
40 - 44	60	48	1250
45 - 49	50	53	943
50 - 54	33	32	1031
55 - 59	33	27	1222
60 - 64	35	35	1000
65 - 69	21	24	875
70 -74	43	16	2688
75 - 79	18	8	2250
80 - 84	21	8	2625
85 - 89	3	2	1500
90 -94	3	0	0
> 95	1	2	500



* Data derived from a household survey undertaken as part of field research.

APPENDIX 3-21. Comparison of Sex Ratios in Khonoma Pre- and Post-War Generations [a]

	< 55 Years			**≥ 55 Years**			**Total** *(all ages)*		
	♀	♂	**Ratio** [b]	♀	♂	**Ratio** [b]	♀	♂	**Ratio** [b]
Merhümia	338	353	958	82	46	1783	420	399	1053
Semomia	202	177	1141	35	32	1094	237	209	1134
Thevomia	364	417	873	58	41	1415	422	458	921
Total *(all khels)*	904	947	955	175	119	1471	1079	1066	1012

[a] This analysis uses 55 years as the cut-off age after which it wanted to test for a decline in the proportion of males in Khonoma's population. The rationale was that male casualties of the Indo-Naga war should show up in terms of an abnormally high ratio of females to males in that generation that was most affected by the war. Since the worst fighting took place from 1956 to 1964, and most combatants were probably in the 20 to 40 year age bracket, then war casualties should become noticeable by their absence in that section of the village's population that is now 55 years of age and above. This is in addition to the increasing proportion of women that we would normally expect to see as populations age, due to women's longer life expectancy.

[b] women / 1000 men

APPENDIX 3-22. Overview of Household Size in Khonoma Village, Broken Down by Khel *

Household Size	Presentation of Actual Numbers								Calculated as %			
	Number of Households				Number of People				Households of Each Size			
	Merhümia	Semomia	Thevomia	Entire Village	Merhümia	Semomia	Thevomia	Entire Village	Merhümia	Semomia	Thevomia	Entire Village
1	17	12	16	45	17	12	16	45	10.83	12.77	9.36	10.66
2	16	10	17	43	32	20	34	86	10.19	10.64	9.94	10.19
3	16	8	22	46	48	24	66	138	10.19	8.51	12.87	10.90
4	19	14	17	50	76	56	68	200	12.10	14.89	9.94	11.85
5	17	17	15	49	85	85	75	245	10.83	18.09	8.77	11.61
6	19	12	29	60	114	72	174	360	12.10	12.77	16.96	14.22
7	18	8	22	48	126	56	154	336	11.46	8.51	12.87	11.37
8	19	4	10	33	152	32	80	264	12.10	4.26	5.85	7.82
9	8	6	13	27	72	54	117	243	5.10	6.38	7.60	6.40
10+	8	3	10	21	90	34	104	228	5.10	3.19	5.85	4.98
Total	157	94	171	422	812	445	888	2145	100	100	100	100

* Data derived from a household survey undertaken as part of field research. See figure 3-15 for graphical presentation of these data.

APPENDIX 3-23. Overview of Relative Ages of Married Couples in Khonoma Village *

	Merhümia		**Semomia**		**Thevomia**		**Entire Village**	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Husband Older								
1 yr	25	23.81	5	7.81	16	17.78	46	17.76
2 yrs	22	20.95	14	21.88	23	25.56	59	22.78
3 yrs	14	13.33	11	17.19	9	10.00	34	13.13
4 yrs	12	11.43	6	9.38	6	6.67	24	9.27
5 yrs	7	6.67	5	7.81	16	17.78	28	10.81
6 yrs	4	3.81	1	1.56	3	3.33	8	3.09
7 yrs	4	3.81	4	6.25	2	2.22	10	3.86
8 yrs	4	3.81	2	3.13	2	2.22	8	3.09
9 yrs	0	0.00	2	3.13	0	0	2	0.77
10 + yrs	10	9.52	6	9.38	10	11.11	26	10.04
Total:	**102**	**97.14**	**56**	**87.50**	**87**	**96.67**	**245**	**94.59**
Roughly Same Age	**5**	**4.76**	**0**	**0.00%**	**21**	**23.33**	**26**	**10.04**
Wife Older								
1 yr	2	1.90	5	7.81	1	1.11	8	3.09
2 yrs	0	0.00	0	0.00	1	1.11	1	0.39
3 yrs	0	0.00	0	0.00	1	1.11	1	0.39
4 yrs	0	0.00	2	3.13	0	0.00	2	0.77
5 yrs	0	0.00	1	1.56	0	0.00	1	0.39
6 yrs	0	0.00	0	0.00	0	0.00	0	0.00
7 yrs	0	0.00	0	0.00	0	0.00	0	0.00
8 yrs	0	0.00	0	0.00	0	0.00	0	0.00
9 yrs	1	0.95	0	0.00	0	0.00	1	0.39
Total:	**3**	**2.86**	**8**	**12.50**	**3**	**3.33**	**14**	**5.41**
All Categories	**105**	**100**	**64**	**100**	**90**	**100**	**259**	**100**

* Data derived from a household survey undertaken as part of field research.

See figure 3-16 for a graphical representation of this data.

APPENDIX 3-24. Age of Khonoma's Women at the Time of their First Childbirth – Broken Down by Khel *

Age of Women at 1st Childbirth *(years)*	Merhümia	Semomia	Thevomia	Entire Village
15	1	0	4	5
16	1	1	2	4
17	1	1	2	4
18	1	0	1	2
19	2	0	1	3
20	8	4	6	18
21	4	3	4	11
22	6	0	8	14
23	10	11	6	27
24	8	5	9	22
25	10	5	18	33
26	4	4	6	14
27	6	2	5	13
28	6	5	6	17
29	3	1	9	13
30	4	3	7	14
31	4	5	4	13
32	2	1	4	7
33	3	1	3	7
34	2	2	2	6
35	0	2	2	4
36	1	2	1	4
37	0	2	2	4
n =	87	60	112	259

* Data derived from a household survey undertaken as part of field research. Calculated by subtracting women's ages from those of their first-born children. See figure 3-17 for graphical presentation of these data.

APPENDIX 3-25. Khonoma Songs of Love and War

'Khrisathelie'

MAN:
In our time of innocence, when we were growing
Past puberty, sporting manly haircuts, yet oblivious still
Of right and wrong.
We would go up to the Weü forest way
And hold our loved ones names close to our breasts.
And it was then we began to ornament ourselves with the four-rowed chükrano
And the cornelian necklace, with these we ornamented ourselves.
Some of the girls wore their ornaments
And on their wrists wore the wristlet.
But my loved one went without ornaments.
Still I loved her for her natural self.
When I took a chicken to supplicate the spirits
And went to chase my enemies, I chased them far beyond
Our village gates, so eager was I to earn my ornaments,
And I signaled to our warriors from afar
Stand firmly and kill our enemies
And early let us return home.

WOMAN:
Excellent one, if you die, you cannot return.
When clear weather comes, the harvest comes too
And the time for donning ornaments by chasing your enemies.
Do not go forth on that enterprise.
When a feather falls from a chicken, another grows back to replace it.
That is a fact my beloved, and so
One generation will not die simultaneously.
May our age-group continue to be together
And hold such fellowship all will know us wherever we are
And then, may we wither together as leaves wither away.

Translated by E. Iralu

‘**Khatsühie**’

You went off to war saying you would bring
Back ornaments of war, and we daily expected your return
But news of your killing came back instead.
Today I went to the fields
But could not work till sundown.
I hope naught has happened, favorite of all.
We showed our affection in the daytime, thus we did.
Surely you have not gone from me?
Your parents fulfilled all the rituals of initiation upon you.
They performed the ritual of the tsohe.
Surely these protected you in battle
And you are not killed, but are somewhere still.
Why do you not want to be the glory of the clan?
What urges you on to go away from our age-mates
And become decayed soon, dear one?
When news of your death in battle
Came to me, so many thoughts came and my mind was restless.
Those who have their lovers still are together.
They go about happily and with untroubled minds,
I thought you too would grow up to bring joy to your parents
That you would initiate good and great things for our age mates.
And when the women of our age group
Take gifts for their loved ones
I am at a loss who to give my gift to now that you’re gone.
As a symbol of grief, I give this wristlet
And our childhood bonds are broken now, beloved.
When the prü plant sprouted green and young
We were happy and joyful in one another.
We should have drawn out much more joy from those days.
Now when you are no more, how can I relive alone
The happy days of childhood?
If only you would return, O Tsühie.

Translated by E. Iralu

APPENDIX 3-26. U Thi-u No – A Melancholy Poem Reflecting on the Impermanence of Life

Composed by Danyü Zhünyü

Our ancestor lived (communed) with the spirits. But separation came before his physical death. At the time of the close communion of man and spirit, had they made a covenant that man would not be visited by death, we would have lived a fulfilled life and all our ambitions be met.

Our ancestral lands will eventually become the property of the rich.

If we had the fruit of the tree of life, we would go into the neighboring villages to distribute it far and wide so that man might live forever with the spirits. And then we would live with happiness mirroring the happiness of the spirits. Alas, this did not come to pass.

What of the man who had struggled to feast the village twice, thrice in his lifetime? Does not he, more than any other, deserve to live forever?

In our youth and childhood, our parents and grandparents performed all the necessary rituals of initiation upon us. We were cleansed with ritual water, we were initiated into adulthood with newly cooked food. When our labors were over and the harvests brought in, we looked expectantly to good things (festivals, times of fellowship and feasting, etc.). I am filled with despair at the thought of death and disease. O, to be forever young! But I am as mortal as the next man and cannot escape this fate; what is there to do?

Loath to die, I meditate on new songs to compose but I know I cannot live eternally.

When our village folk drag in the new bridge or gate, and our young men in the prime of their youth are seen, worshipping the deity, agile on their feet, it fills me with sadness to think that death will take me from these sights.

If this sickness would leave me and I could be resurrected after I die to return to be the child of my parents, to be a young man once again. Alas, that will never be.

Last night, I dreamt of my younger days spending time with my age mates, such times of happy fellowship together.

By day and by night, I have thought of all good things, I have discussed the matter through and through, but not learnt yet from the spirits what my time of dying will be.

Therefore, my mind is burdened to be ignorant of my time of death. I wonder on which day will I die and leave my ancestral village. When I think of that day, such desolation overwhelms me. I think that I shall be so bereft that I shall call on my parents in my despair. On that day, I swear, all men surely are to be found weeping.

(Terhuja et al., unpublished, 18)

APPENDIX 3-27. Formal Organizations in Which Khonoma Villagers Now Participate

STATE	WESTERN ANGAMI (niakracha Angami)	VILLAGE (rüna)	CHURCH (kehouki)	KHEL (thino)	CLAN (thepfü)
Administrative: Naga Hoho Naga National Council (NNC) Angami Public Organization (APO) **Religious:** American Baptist Church Roman Catholic Church **Youth:** Angami Student Union (ASU) **Sports:** Angami Wrestling Association (AWA)	**Administrative:** Western Angami Public Organization (WAPO) **Youth:** Western Angami Student Union (WASU) **Sports:** Western Angami Sport Association (WASA)	**Administrative:** Gaonbura (GB) - 5 Village Council – (VC) Village Development Board (VDB) - NEPED Rüffüno Khonoma Nature Conservation & Tragopan Sanctuary (KNCTS) Age Group Organization Chatsu-Merhümia-Kotsu Organization Khonoma Staff Organization **Agricultural:** Khonoma Farmers' Association (KFA) Khonoma Tea Plantation and Agricultural Society **Education:** Village Education Committee Christian Welfare School Board **Women's:** Khonoma Women's Union Women's Health Organization **Youth:** Khonoma Youth Organization (KYO) Khonoma Student Union (KSU)	**American Baptist:** Baptist Church Khonoma (BCK) Baptist Youth Fellowship (BYF) Baptist Women's Fellowship (BWF) Child's Evangelism Ministry (CEM) Outreach Evangelistic Committee (OEC) Property Committee Cradle Roll Committee Church Executive Committee Finance Committee Education Committee Christian Welfare School **Roman Catholic:** Khonoma Catholic Union (KCU) Khonoma Catholic Youth Association (KCYA) Khonoma Catholic Women's Association (KCWA) Church Building Committee Small Christian Community (SCC) School Management Board **Pfütsana Krotho:** Association for those retaining traditional religious beliefs	**Merhümia Khel:** Merhümia Union (MU) Merhümia Youth Organization (MYO) Merhümia Age Group Organization **Thevomia Khel:** Thevomia Union (TU) Thevomia Youth Organization (TYO) Thevomia Cooperative Society (TCS) Environment Society of Nagaland (ESN) **Semomia Khel:** Semomia Union (SU) Semomia Youth Organization (SYO)	**Merhümia Khel:** Gwizan Clan Organization Gwizan Women's Union Gwizan Multipurpose Society Lievüse Clan Organization Lievüse Women's Union Meyase Clan Organization Meyase Women's Union **Thevomia Khel:** Kotsu Clan Organization Kotsu Women's Union Phetsu Clan Organization Phetsu Women's Union **Semomia Khel:** Sonyino Clan Organization Sonyino Women's Union Rülho Clan Organization Rülho Women's Union Kuthotsu Clan Organization Kuthotsu Women's Union

APPENDIX 3-28. Educational Status of that Part of Khonoma's Population that Considers its Studies to be Complete, Divided by Khel and Gender *

Educational Level Reached	Merhümia khel		Semomia khel		Thevomia khel		Entire Village
	males	females	males	females	males	females	
No Formal Education	22 (9.69%)	85 (31.95%)	38 (30.65%)	86 (56.21%)	16 (7.41%)	99 (39.76%)	346 (28.02%)
I	1 (0.44%)	2 (0.75%)	- (-)	- (-)	2 (0.93%)	1 (0.40%)	6 (0.49%)
II	4 (1.76%)	9 (3.38%)	1 (0.81%)	1 (0.65%)	8 (3.70%)	12 (4.82%)	35 (2.83%)
III	9 (3.96%)	12 (4.51%)	3 (2.42%)	4 (2.61%)	5 (2.31%)	13 (5.22%)	46 (3.72%)
IV	5 (2.20%)	10 (3.76%)	1 (0.81%)	4 (2.61%)	15 (6.94%)	12 (4.82%)	47 (3.81%)
V	20 (8.81%)	22 (8.27%)	10 (8.06%)	6 (3.92%)	19 (8.80%)	32 (12.85%)	109 (8.83%)
VI	13 (5.73%)	12 (4.51%)	6 (4.84%)	6 (3.92%)	26 (12.04%)	8 (3.21%)	71 (5.75%)
VII	7 (3.08%)	6 (2.26%)	8 (6.45%)	4 (2.61%)	9 (4.17%)	1 (0.40%)	35 (2.83%)
VIII	19 (8.37%)	19 (7.14%)	10 (8.06%)	6 (3.92%)	21 (9.72%)	14 (5.62%)	89 (7.21%)
IX	13 (5.73%)	9 (3.38%)	4 (3.23%)	8 (5.23%)	11 (5.09%)	7 (2.81%)	52 (4.21%)
X	32 (14.10%)	14 (5.26%)	13 (10.48%)	4 (2.61%)	29 (13.43%)	19 (7.63%)	111 (8.99%)
XI	1 (0.44%)	- (-)	- (-)	- (-)	1 (0.46%)	1 (0.40%)	3 (0.24%)
XII	1 (0.44%)	1 (0.38%)	- (-)	- (-)	9 (4.17%)	3 (1.20%)	14 (1.13%)
P.U.	29 (12.78%)	23 (8.65%)	7 (5.65%)	4 (2.61%)	11 (5.09%)	9 (3.61%)	83 (6.72%)
B.A.	16 (7.05%)	14 (5.26%)	7 (5.65%)	3 (1.96%)	24 (11.11%)	12 (4.82%)	76 (6.15%)
B.Sc.	2 (0.88%)	- (-)	- (-)	- (-)	- (-)	- (-)	2 (0.16%)
B.Comm.	- (-)	- (-)	4 (3.23%)	- (-)	1 (0.46%)	- (-)	5 (0.40%)
M.A.	8 (3.52%)	6 (2.26%)	2 (1.61%)	2 (1.31%)	5 (2.31%)	2 (0.80%)	25 (2.02%)
M.Sc.	3 (1.32%)	1 (0.38%)	- (-)	- (-)	1 (0.46%)	- (-)	5 (0.40%)
Ph.D.	1 (0.44%)	- (-)	- (-)	- (-)	- (-)	- (-)	1 (0.08%)
N/A	21 (9.25%)	21 (7.89%)	10 (8.06%)	15 (9.80%)	3 (1.39%)	4 (1.61%)	74 (5.99%)
	227 (100%)	266 (100%)	124 (100%)	153 (100%)	216 (100%)	249 (100%)	1235 (100%)

* Data derived from a household survey undertaken as part of field research.

These data of course include only those people considered to still be residents of Khonoma. They therefore do not count the many sons and daughters that have moved away from Khonoma to start their own families and pursue more attractive livelihood options. This latter group tends to be by far better educated than those that remain behind in the village.

APPENDIX 3-29. Overview of Education in Khonoma as Influenced by Age – Broken Down by Khel *

(based only on that part of population that considers its studies to be complete)

level[b] completed	Merhümia						Semomia						Thevomia						Entire Village
	<20	20 - 39	40 - 59	60 - 79	80 +	Total	<20	20 - 39	40 - 59	60 - 79	80 +	Total	<20	20 - 39	40 - 59	60 - 79	80 +	Total	
none	2	10	31	39	25	**107**	6	35	36	44	3	**124**	5	16	40	49	5	**115**	**346**
I	-	2	1	-	-	**3**	-	-	-	-	-	-	-	2	1	-	-	**3**	**6**
II	-	6	6	-	1	**13**	-	-	2	-	-	**2**	2	7	6	5	-	**20**	**35**
III	-	8	8	5	-	**21**	-	3	2	2	-	**7**	3	13	1	1	-	**18**	**46**
IV	-	8	5	2	-	**15**	1	3	1	-	-	**5**	3	13	9	2	-	**27**	**47**
V	2	22	13	5	-	**42**	1	10	2	3	-	**16**	3	32	14	2	-	**51**	**109**
VI	2	12	7	4	-	**25**	-	9	3	-	-	**12**	3	16	13	2	-	**34**	**71**
VII	-	9	2	2	-	**13**	1	8	2	-	1	**12**	2	7	-	1	-	**10**	**35**
VIII	3	26	7	2	-	**38**	2	11	3	-	-	**16**	3	22	7	2	1	**35**	**89**
IX	2	14	4	1	1	**22**	1	10	1	-	-	**12**	-	8	8	2	-	**18**	**52**
X	1	31	13	1	-	**46**	-	11	6	-	-	**17**	-	29	17	2	-	**48**	**111**
XI	-	1	-	-	-	**1**	-	-	-	-	-	-	1	-	1	-	-	**2**	**3**
XII	-	2	-	-	-	**2**	-	-	-	-	-	-	-	9	3	-	-	**12**	**14**
PU	2	44	4	2	-	**52**	-	10	-	1	-	**11**	-	14	5	1	-	**20**	**83**
B.A.	-	24	6	-	-	**30**	-	9	1	-	-	**10**	-	16	16	4	-	**36**	**76**
B.Sc.	-	2	-	-	-	**2**	-	-	-	-	-	-	-	-	-	-	-	-	**2**
B.Com.	-	-	-	-	-	-	1	2	1	-	-	**4**	-	1	-	-	-	**1**	**5**
M.A.	-	12	2	-	-	**14**	-	3	1	-	-	**4**	-	5	2	-	-	**7**	**25**
M.Sc.	-	4	-	-	-	**4**	-	-	-	-	-	-	-	1	-	-	-	**1**	**5**
Ph.D.	-	-	1	-	-	**1**	-	-	-	-	-	-	-	-	-	-	-	-	**1**
all levels	*14*	*237*	*110*	*63*	*27*	**451**	*13*	*124*	*61*	*50*	*4*	**252**	*25*	*211*	*143*	*73*	*6*	**458**	**1161**

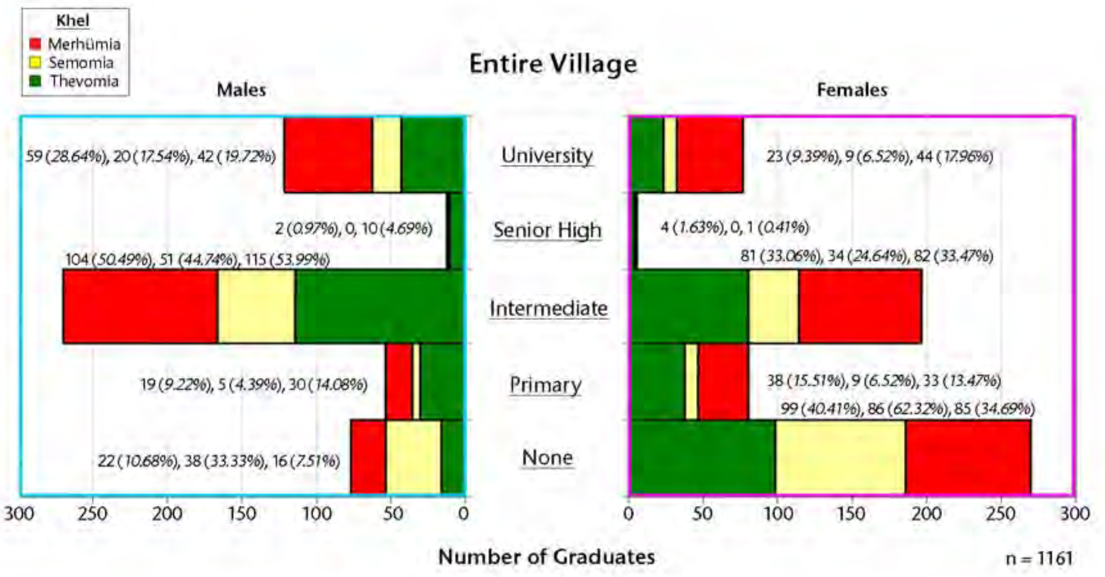
level[b] completed	Merhümia						Semomia						Thevomia						Entire Village
	<20	20 - 39	40 - 59	60 - 79	80 +	Total	<20	20 - 39	40 - 59	60 - 79	80 +	Total	<20	20 - 39	40 - 59	60 - 79	80 +	Total	
none	14.29%	4.22%	28.18%	61.90%	92.59%	**23.73%**	46.15%	28.23%	59.02%	88.00%	75.00%	**49.21%**	20.00%	7.58%	27.97%	67.12%	83.33%	**25.11%**	**29.80%**
I	-	0.84%	0.91%	-	-	**0.67%**	-	-	-	-	-	-	-	0.95%	0.70%	-	-	**0.66%**	**0.52%**
II	-	2.53%	5.45%	-	3.70%	**2.88%**	-	-	3.28%	-	-	**0.79%**	8.00%	3.32%	4.20%	6.85%	-	**4.37%**	**3.01%**
III	-	3.38%	7.27%	7.94%	-	**4.66%**	-	2.42%	3.28%	4.00%	-	**2.78%**	12.00%	6.16%	0.70%	1.37%	-	**3.93%**	**3.96%**
IV	-	3.38%	4.55%	3.17%	-	**3.33%**	7.69%	2.42%	1.64%	-	-	**1.98%**	12.00%	6.16%	6.29%	2.74%	-	**5.90%**	**4.05%**
V	14.29%	9.28%	11.82%	7.94%	-	**9.31%**	7.69%	8.06%	3.28%	6.00%	-	**6.35%**	12.00%	15.17%	9.79%	2.74%	-	**11.14%**	**9.39%**
VI	14.29%	5.06%	6.36%	6.35%	-	**5.54%**	-	7.26%	4.92%	-	-	**4.76%**	12.00%	7.58%	9.09%	2.74%	-	**7.42%**	**6.12%**
VII	-	3.80%	1.82%	3.17%	-	**2.88%**	7.69%	6.45%	3.28%	-	25.00%	**4.76%**	8.00%	3.32%	-	1.37%	-	**2.18%**	**3.01%**
VIII	21.43%	10.97%	6.36%	3.17%	-	**8.43%**	15.38%	8.87%	4.92%	-	-	**6.35%**	12.00%	10.43%	4.90%	2.74%	16.67%	**7.64%**	**7.67%**
IX	14.29%	5.91%	3.64%	1.59%	3.70%	**4.88%**	7.69%	8.06%	1.64%	-	-	**4.76%**	-	3.79%	5.59%	2.74%	-	**3.93%**	**4.48%**
X	7.14%	13.08%	11.82%	1.59%	-	**10.20%**	-	8.87%	9.84%	-	-	**6.75%**	-	13.74%	11.89%	2.74%	-	**10.48%**	**9.56%**
XI	-	0.42%	-	-	-	**0.22%**	-	-	-	-	-	-	4.00%	-	0.70%	-	-	**0.44%**	**0.26%**
XII	-	0.84%	-	-	-	**0.44%**	-	-	-	-	-	-	-	4.27%	2.10%	-	-	**2.62%**	**1.21%**
PU	14.29%	18.57%	3.64%	3.17%	-	**11.53%**	-	8.06%	-	2.00%	-	**4.37%**	-	6.64%	3.50%	1.37%	-	**4.37%**	**7.15%**
B.A.	-	10.13%	5.45%	-	-	**6.65%**	-	7.26%	1.64%	-	-	**3.97%**	-	7.58%	11.19%	5.48%	-	**7.86%**	**6.55%**
B.Sc.	-	0.84%	-	-	-	**0.44%**	-	-	-	-	-	-	-	-	-	-	-	-	**0.17%**
B.Com.	-	-	-	-	-	-	7.69%	1.61%	1.64%	-	-	**1.59%**	-	0.47%	-	-	-	**0.22%**	**0.43%**
M.A.	-	5.06%	1.82%	-	-	**3.10%**	-	2.42%	1.64%	-	-	**1.59%**	-	2.37%	1.40%	-	-	**1.53%**	**2.15%**
M.Sc.	-	1.69%	-	-	-	**0.89%**	-	-	-	-	-	-	-	0.47%	-	-	-	**0.22%**	**0.43%**
Ph.D.	-	-	0.91%	-	-	**0.22%**	-	-	-	-	-	-	-	-	-	-	-	-	**0.09%**
all levels	*100%*	*100%*	*100%*	*100%*	*100%*	***100%***	*100%*	*100%*	*100%*	*100%*	*100%*	***100%***	*100%*	*100%*	*100%*	*100%*	*100%*	**100%**	**100%**

* Data derived from a household survey undertaken as part of field research.

P.U. – pre-university; B.A. – Bachelor of Arts; B.Sc. – Bachelor of Science; B.Comm. – Bachelor of Commerce; M.A. – Master of Arts; M.Sc. – Master of Science; Ph.D. – doctorate; N/A – data not available

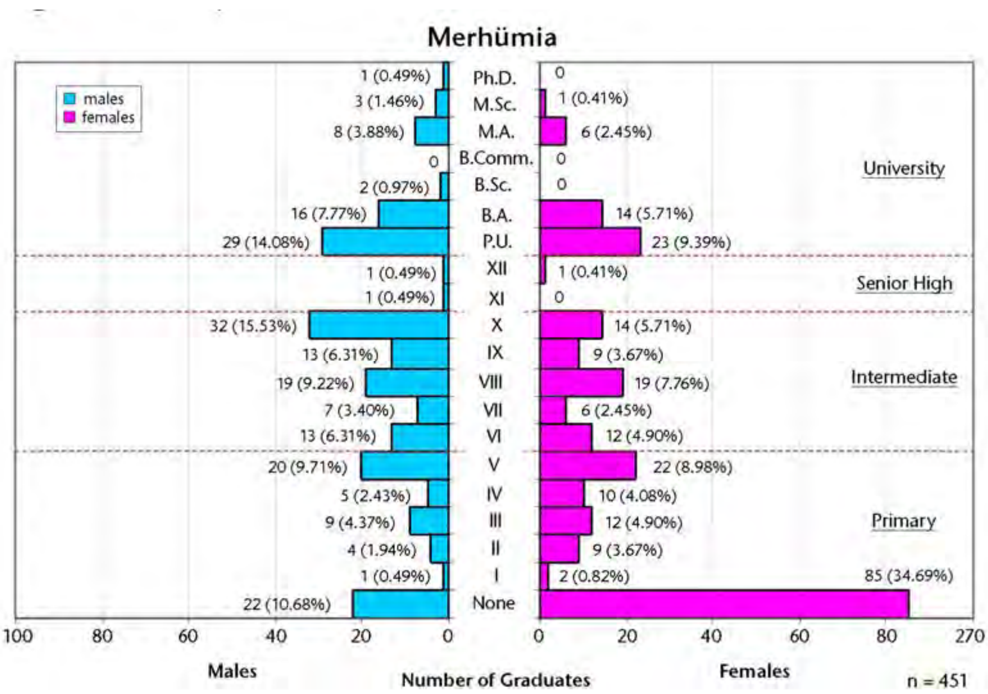
See table 3-8 to see an aggregation of these data to the village level.

APPENDIX 3-30. Comparison of Academic Achievement between the Sexes in Khonoma*
(based only on that part of population that considers its studies to be complete)



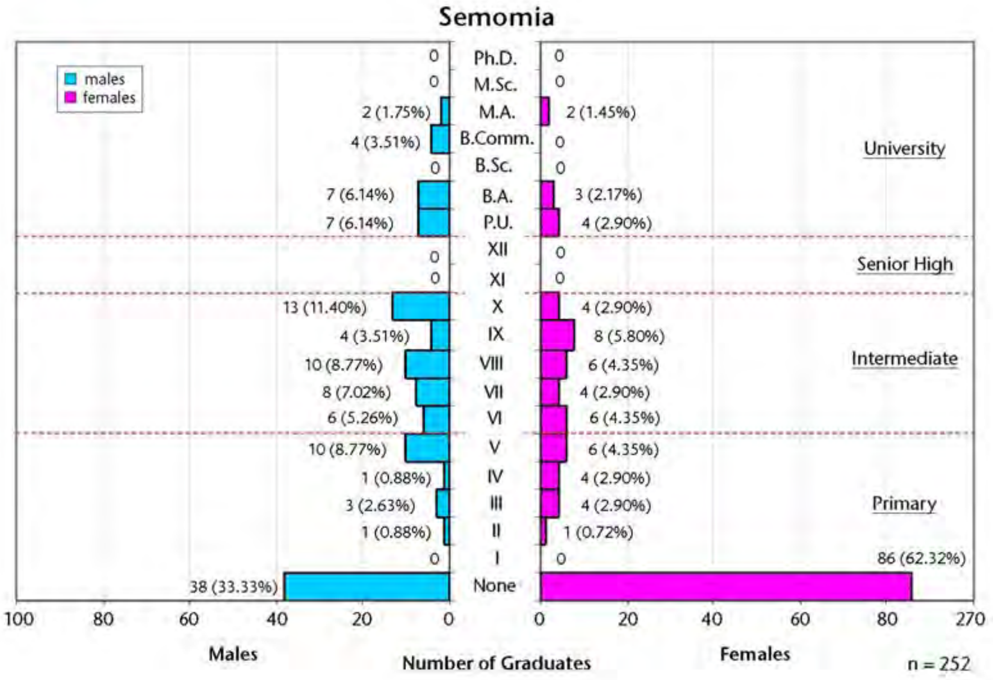
* Data derived from a household survey undertaken as part of field research.
None – no formal education; Primary = I-IV; Intermediate = V-X; Senior High = XI-XII; University = pre-university - doctorate

APPENDIX 3-31. Gender Analysis of Education Levels in Merhümia Khel, Khonoma*
(based only on that part of population that considers its studies to be complete)



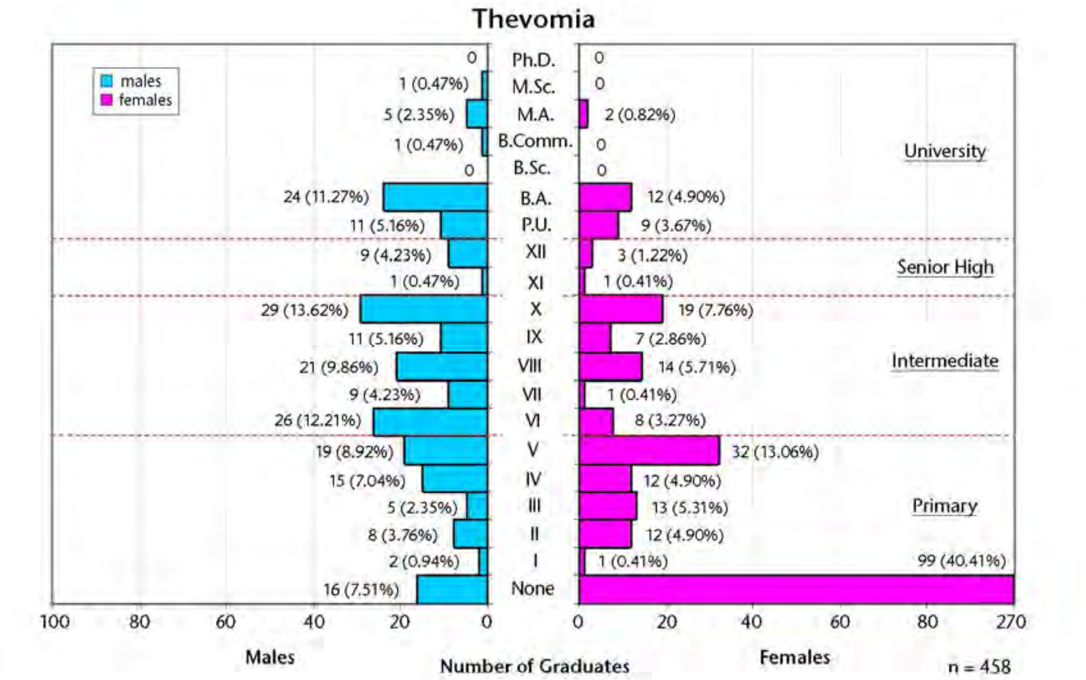
* Data derived from a household survey undertaken as part of field research.
P.U. – pre-university; B.A. – Bachelor of Arts; B.Sc. – Bachelor of Science; B.Comm. – Bachelor of Commerce; M.A. – Master of Arts; M.Sc. – Master of Science; Ph.D. – doctorate; N/A – data not available
See appendix 3-28 for presentation of these data in table format.

APPENDIX 3-32. Gender Analysis of Education Levels in Semomia Khel, Khonoma*
(based only on that part of population that considers its studies to be complete)



* Data derived from a household survey undertaken as part of field research.
P.U. – pre-university; B.A. – Bachelor of Arts; B.Sc. – Bachelor of Science; B.Comm. – Bachelor of Commerce; M.A. – Master of Arts; M.Sc. – Master of Science; Ph.D. – doctorate; N/A – data not available
See appendix 3-28 for presentation of these data in table format.

APPENDIX 3-33. Gender Analysis of Education Levels in Thevomia Khel, Khonoma *
(based only on that part of population that considers its studies to be complete)



* Data derived from a household survey undertaken as part of field research.
P.U. – pre-university; B.A. – Bachelor of Arts; B.Sc. – Bachelor of Science; B.Comm. – Bachelor of Commerce; M.A. – Master of Arts; M.Sc. – Master of Science; Ph.D. – doctorate; N/A – data not available
See appendix 3-28 for presentation of these data in table format.

APPENDIX 3-34. Summary of Khonoma Students

Class	Teaching Staff			Students														
				M-khel			T-khel			S-khel			Other			Total		
	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F
M-khel Primary School - Class A-IV																		
A				4	6	10	1	1	2	0	1	1	0	0	0	5	8	13
B				2	1	3	0	0	0	2	0	2	0	0	0	4	1	5
I				6	1	7	0	0	0	1	0	1	0	0	0	7	1	8
II				3	2	5	0	0	0	1	0	1	0	0	0	4	2	6
III				5	6	11	0	0	0	0	0	0	0	0	0	5	6	11
IV				2	3	5	0	3	3	0	0	0	0	0	0	2	6	8
TOTAL				**22**	**19**	**41**	**1**	**4**	**5**	**4**	**1**	**5**	**0**	**0**	**0**	**27**	**24**	**51**
Teachers	5	2	7															
T-khel Primary School - Class A-IV																		
A				1	0	1	11	12	23	0	0	0	0	0	0	12	12	24
B				0	0	0	3	7	10	0	0	0	0	0	0	3	7	10
I				0	0	0	6	2	8	0	0	0	0	0	0	6	2	8
II				0	0	0	1	3	4	0	0	0	0	0	0	1	3	4
III				0	0	0	2	3	5	0	0	0	0	0	0	2	3	5
IV																		
TOTAL				**1**	**0**	**1**	**23**	**27**	**50**	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**27**	**51**
Teachers	4	1	5															
S-khel Primary School - Class A-IV																		
A				0	0	0	1	0	1	2	4	6	0	0	0	3	4	7
B				0	0	0	0	0	0	1	1	2	1	1	2	2	2	4
I				0	0	0	0	0	0	1	2	3	0	1	1	1	3	4
II				0	0	0	0	0	0	1	1	2	0	1	1	1	2	3
III				0	0	0	1	0	1	0	2	2	0	0	0	1	2	3

Class	Teaching Staff			Students														
				M-khel			T-khel			S-khel			Other			Total		
	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F
IV				0	0	0	0	0	0	4	0	4	0	0	0	4	0	4
TOTAL				**0**	**0**	**0**	**2**	**0**	**2**	**9**	**10**	**19**	**1**	**3**	**4**	**12**	**13**	**25**
Teachers	4	2	6															
Government Middle School - Class V-VIII																		
V				1	2	3	5	2	7	1	1	2	1	0	1	8	5	13
VI				3	3	6	1	1	2	0	1	1	0	0	0	5	4	9
VII				0	1	1	0	3	3	0	1	1	1	0	1	1	5	6
VIII				2	0	2	1	2	3	1	0	1	0	1	1	4	3	7
TOTAL				**6**	**6**	**12**	**7**	**8**	**15**	**2**	**3**	**5**	**2**	**1**	**3**	**18**	**17**	**35**
Teachers	7	1	8															
St. John Bosco School - Class A-10																		
A				2	2	4	6	4	10	1	3	4	0	1	1	9	10	19
B				2	2	4	6	6	12	3	2	5	2	0	2	13	10	23
I				6	2	8	7	3	10	4	0	4	0	0	0	17	5	22
II				2	4	6	8	5	13	3	3	6	3	0	3	16	12	28
III				2	3	5	9	4	13	6	2	8	2	1	3	19	10	29
IV				9	0	9	1	7	8	2	4	6	5	0	5	17	11	28
V				2	6	8	5	6	11	1	2	3	4	0	4	12	14	26
VI																13	11	24
VII				4	2	6	5	7	12	0	3	3	3	4	7	12	16	28
VIII				1	1	2	3	0	3	4	2	6	6	4	10	14	7	21
IX				4	1	5	7	1	8	0	3	3	3	1	4	14	6	20
X				1	2	3	0	2	2	2	0	2	6	2	8	9	6	15
TOTAL				**35**	**25**	**60**	**57**	**45**	**102**	**26**	**24**	**50**	**35**	**13**	**47**	**165**	**118**	**285**
Teachers	9	6	15															

Class	Teaching Staff			Students														
				M-khel			T-khel			S-khel			Other			Total		
	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F
Christian Welfare School - Class A-10																		
A				3	3	6	0	1	1	0	1	1	1	0	1	4	5	9
B				5	2	7	1	1	2	0	0	0	0	0	0	6	3	9
Teachers	0	2	2															
I				1	5	6	1	0	1	1	1	2	0	1	1	3	7	10
II				6	1	7	0	0	0	2	0	2	0	1	1	8	2	10
III				1	3	4	1	0	1	2	2	4	0	2	2	4	7	11
IV				4	4	8	1	0	1	0	1	1	0	0	0	5	5	10
V				6	3	9	2	0	2	3	3	6	0	0	0	11	6	17
VI				5	3	8	1	1	2	1	5	6	0	1	1	7	10	17
VII				2	4	6	0	2	2	0	0	0	2	0	2	4	6	10
VIII				7	6	13	3	0	3	5	2	7	6	2	8	21	10	31
IX				2	1	3	2	0	2	1	1	2	2	0	2	7	2	9
X				6	3	9	3	0	3	2	3	5	1	0	1	12	6	18
TOTAL				**48**	**38**	**86**	**15**	**5**	**20**	**17**	**19**	**36**	**12**	**7**	**19**	**92**	**69**	**161**
Teachers	9	5	14															
SUM TOTAL				**112**	**88**	**200**	**105**	**89**	**194**	**58**	**57**	**115**	**50**	**24**	**73**	**338**	**268**	**608**
Teachers - TOTAL	**38**	**19**	**57**															

APPENDIX 3-35. Stories of the Supernatural

Ghost stories are exceedingly common in Khonoma and elsewhere in the Naga Hills. Although not seen by myself, the spirits of several recently-deceased villagers were reported to be wandering about Khonoma during the period of fieldwork. The Nagas believe that it is only those who have weak spirits themselves that see such wandering ghosts; those with strong spirits are said to never meet them (Meru, Z., 2001).

One of the spirits that was allegedly seen often was of an elderly lady from Thevomia khel that had passed away in her home in early 2002. Her neighbors recall that she had been fond of collecting lievino (*Gynura* sp.) as a wild vegetable. About a week after her death, on Jan. 23rd, her husband and sons joined many others in the village (including myself) in watching the village wrestling meet held on the grounds of the Christian Welfare School (CWS). On returning home that evening, the widower and his sons noticed that the house door was ajar and a few lievino plants were strewn on the ground nearby. Inside, they found a bunch of lievino placed on a stool in the kitchen. Intrigued, they consulted their neighbors on whether they had seen anybody entering their house in their absence. Finally, someone admitted to witnessing a visit by his deceased wife. Apparently, so people said, she continued to visit the house and leave wild vegetables for some time after that. The story grows even stranger. This same woman was reportedly also fond of her drink during her lifetime, and thus a frequent customer at some of the local bootleggers that sold home brew. It is said that she began showing up at her old drinking spots, drinking herself into a jolly mood, and then howling with laughter!

Spirits' fondness for spirits of the liquid variety may be a common theme in paranormal sightings. (Or it may simply be that their sightings at drinking establishments may have more to do with the sobriety of witnesses who claim to have seen them!) An Angami colleague with a PhD in literature told me matter-of-factly about the spirit of a woman who had recently died in Kohima showing up at her usual drinking establishment. The proprietor was momentarily taken aback to see her sitting there. She had herself attended this woman's funeral. Quickly recovering her wits, she poured a drink while gently advising her old customer that she had already died and had better not come back again (Iralu, E., 2001).

Another spirit reported to be in circulation during the fieldwork was that of quite a young man who had died recently. Before the arrival of Christianity, it was customary to shoot guns at the graves of recently deceased to drive away the evil spirits. A surviving brother, I was told, was in deep mourning over the loss of his sibling and every evening at dusk, I would hear the roar of gunfire echoing across the valley as this man dutifully protected his brother's spirit. Some time later, I heard that this young man's spirit began showing up at people's doors in Khonoma and asking for a drink of water. (Maybe this spirit did not know where the drinking establishments were?)

Meyase explains that according to some Angami beliefs, "*the soul of the dead man possesses all the normal human sensibilities such as hunger, thirst and human normal emotions such as joy, sorrow, and the feeling of loyalty and kinship*" (1985, 91). This is why food and drinks are offered to the souls of deceased ancestors during every festival.

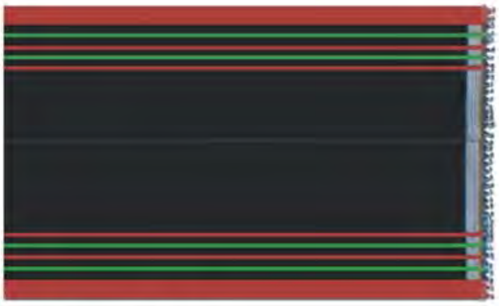
Lest we scoff too quickly at "native superstitions", Hutton related his own experiences with a haunted Inspection Bungalow in Baimho village. When constructing the bungalow, the villagers had warned him that it was a "bad place" and that they made sacrifices there to the spirit of a man who had drowned in the nearby Tizu River. But since the site was suitable in every other respect, Hutton ignored their warnings. Hutton takes up the story:

> "A few months after the bungalow was finished, I went and stayed in it for some local business, but I am not sure whether it was my first visit after its completion or not. Anyhow I occupied the west bedroom and my night was spoilt by a horrifying nightmare in the course of which I saw a creature like a human child with a monstrous big head creeping across the floor; the principal feature of the dream was the quite unreasonable fear which I experienced and which caused me to perspire so freely (the weather was quite cool) that my pyjamas and sheets had to be dried in the sun next day. I thought it was a bad, a very bad dream and put it down to having eaten the roe of some fish they had brought me from the river, and thought no more about it." (undated letter, probably to C.G. Seligmann)

But when comparing experiences with J.P. Mills some time later, they discovered that while staying at the Baimho bungalow, he also had experienced virtually the exact same nightmare. The two British officers agreed not to tell anyone, but searched for excuses to send other colleagues to Baimho to test if they would have the same experience. Apparently at least some of them did.

APPENDIX 3-36. Patterns of Shawls, Skirts and Kilts Worn in Khonoma

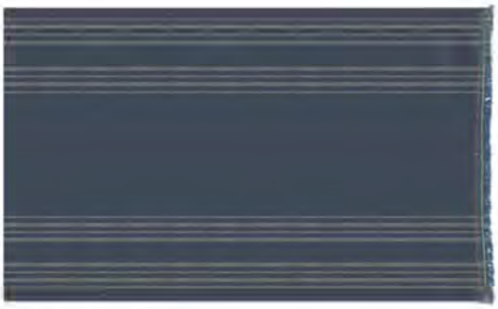
MALE



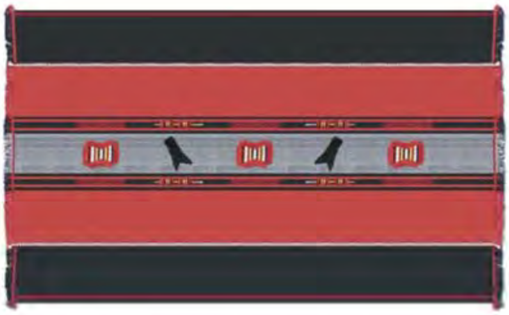
Name: lohekhwe (red)
Comments: common Angami shawl; Khonoma has a slightly modified version of this shawl that has an extra line of green thread running its length

Name: lohekhwe (yellow)
Comments: women's shawl, used by both young and old.

Name: vimho
Comments: traditional pattern of Khonoma shawl, worn by older men



Name: latakhwe
Comments: older pattern of men's shawl



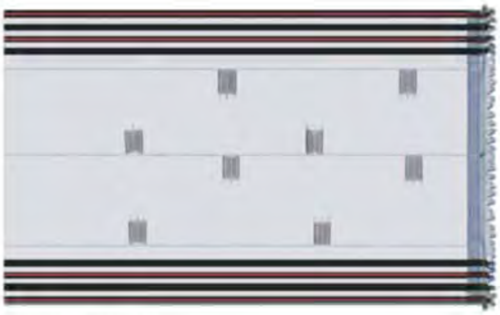
Name: kriekhwe
Comments: designed to commemorate the centenary of the Baptist Church in Khonoma

Name: niti
Comments: style of men's kilt, without rows of shells

FEMALE

Name: mehakhwe
Comments: used mostly by younger girls

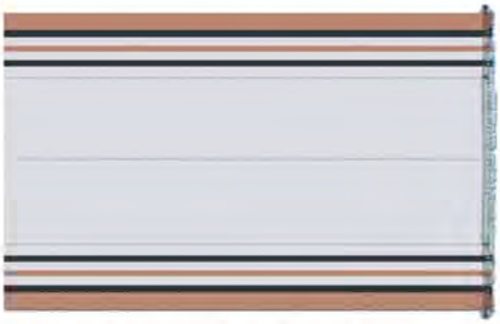
Name: another version of mehakhwe
Comments: used mostly by younger girls



Name: thotsenokhwe
Comments: Angami pattern

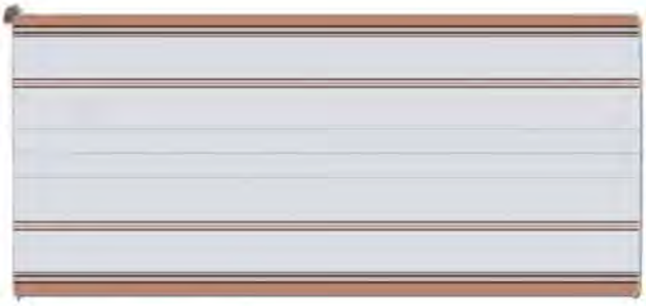
Name: another version of thotsenokhwe
Comments: Angami pattern

Name: mhuchükhwe
Comments: shawl pattern specific to Khonoma

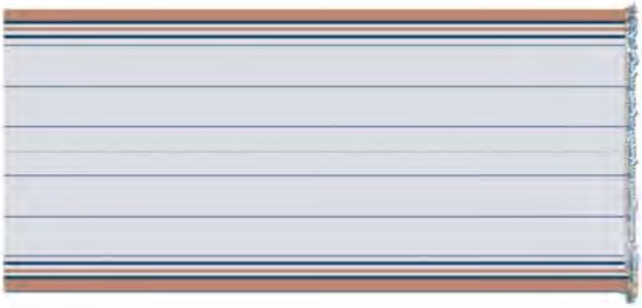


Name: another version of mhuchükhwe
Comments: shawl pattern specific to Khonoma

FEMALE



Name: kerhienyi
Comments: worn as mekhela (skirt) by young Angami girls



Name: another version of kerhienyi
Comments: worn as mekhela (skirt) by young Angami girls

Name: henyiekhwe (pink)
Comments: shawl pattern specific to Khonoma

Name: kriechiecha
Comments: mekhala (skirt), designed to commemorate centenary of Khonoma's Baptist Church

UNISEX

Name: hecakhwe
Comments: shawl pattern specific to Khonoma

Name: khwerü (loviekhwe)
Comments: an old design, this one woven from the *Girardinia heterophylla* (lovie) fibre

Name: henyiekhwe (orange)
Comments: shawl pattern specific to Khonoma

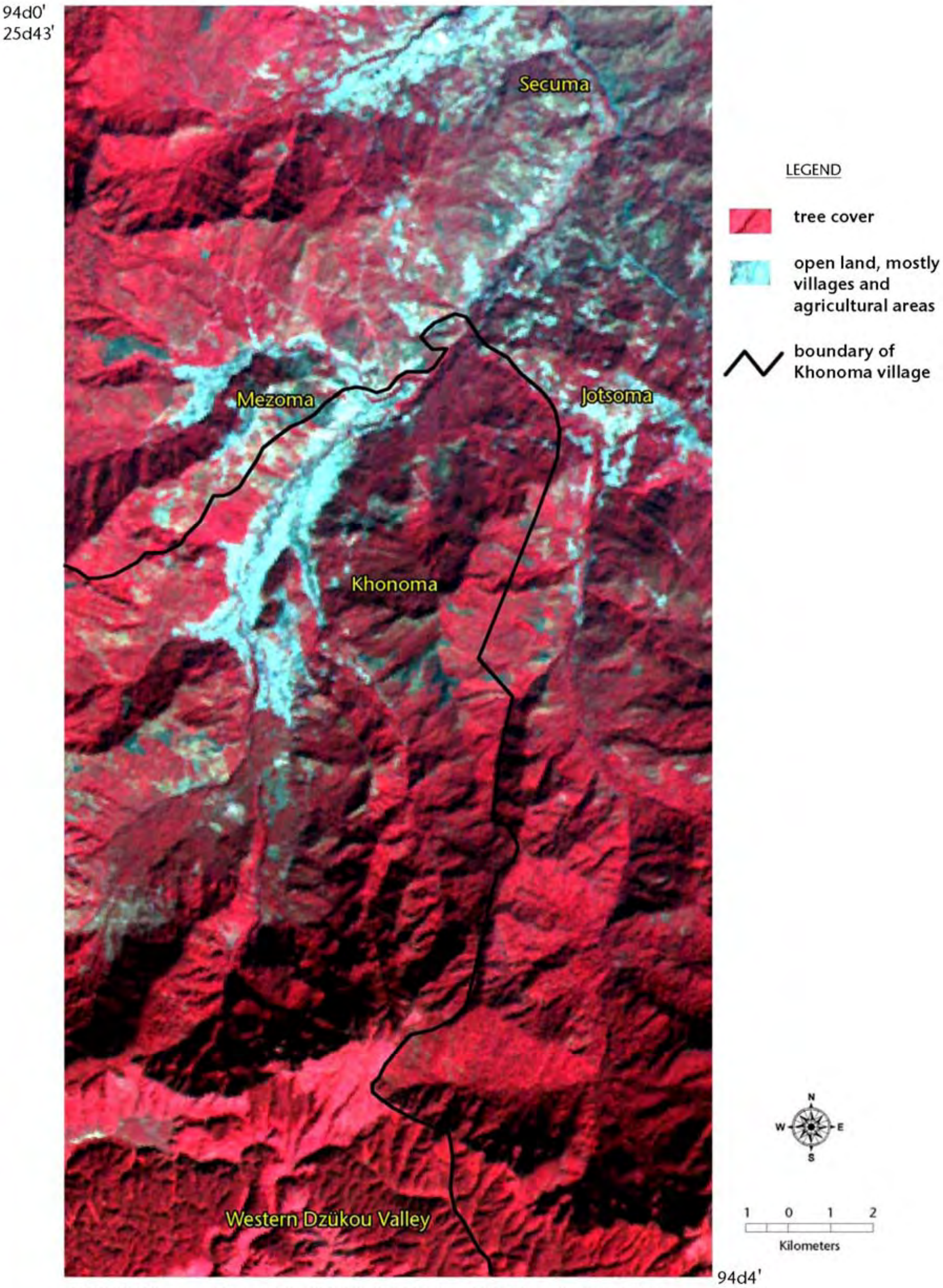
Name: khwerü
Comments: a newer version of above

CHAPTER 4

The Land and its Ownership

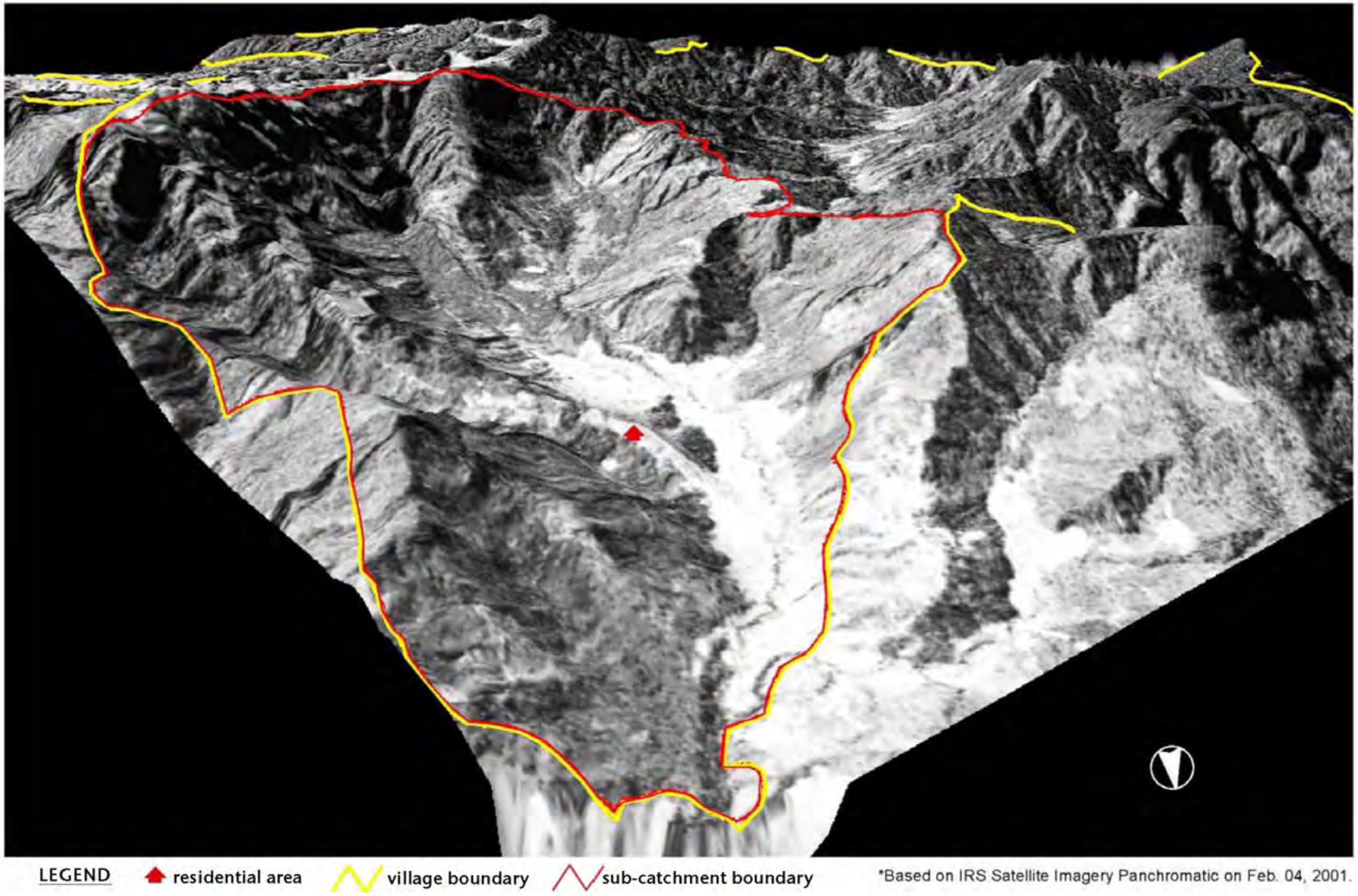
APPENDICES

APPENDIX 4-1. Satellite Image of Khonoma Village and Surrounding Basin*



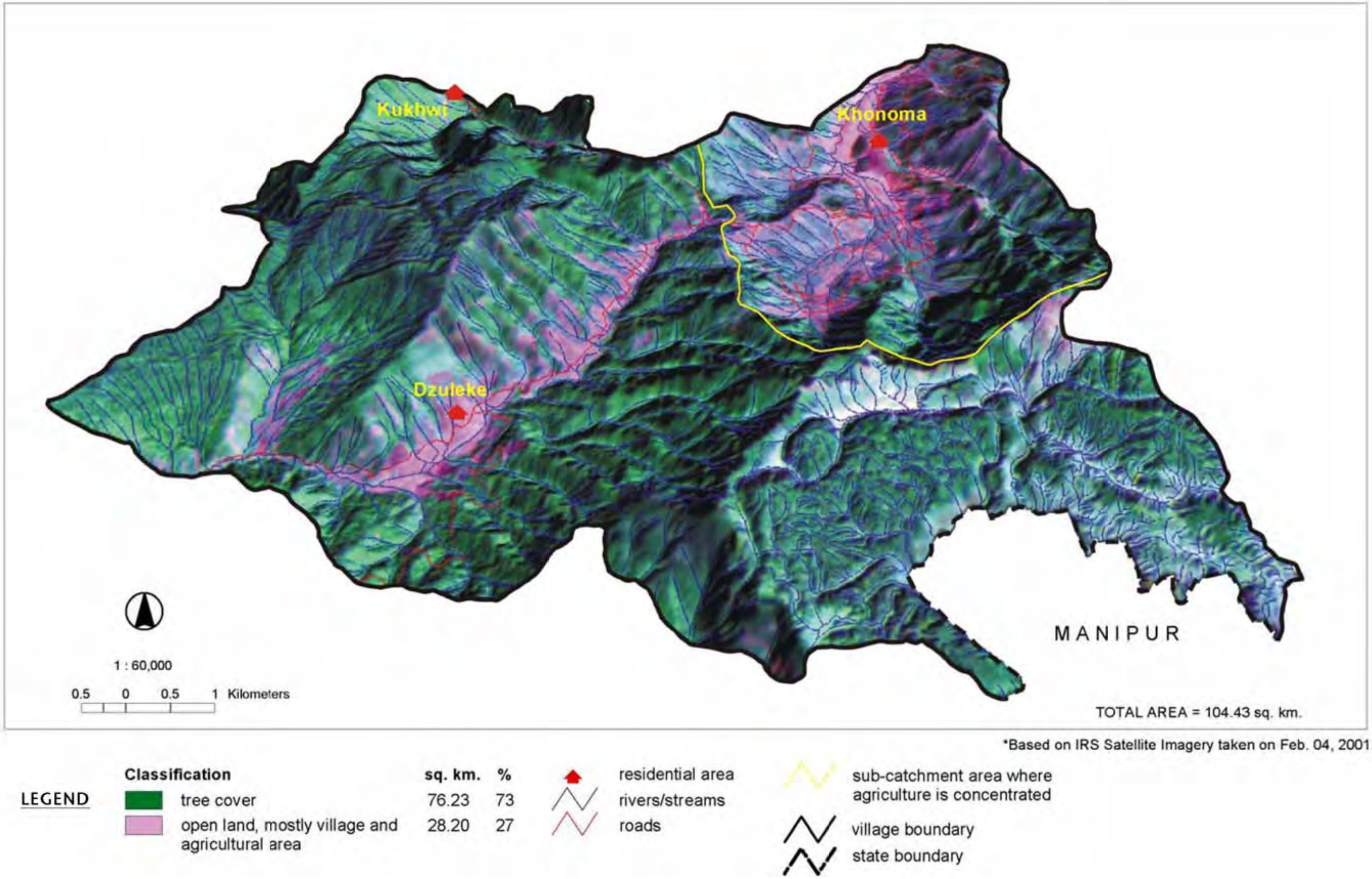
* IRS IC LISS III, image taken on Feb. 18, 1998, Path 133, Row 53-54. (toposheet no. 83K/2)

APPENDIX 4-2. Digital Elevation Model Showing Another View of Khonoma’s Territory



*Based on IRS Satellite Imagery Panchromatic on Feb. 04, 2001.

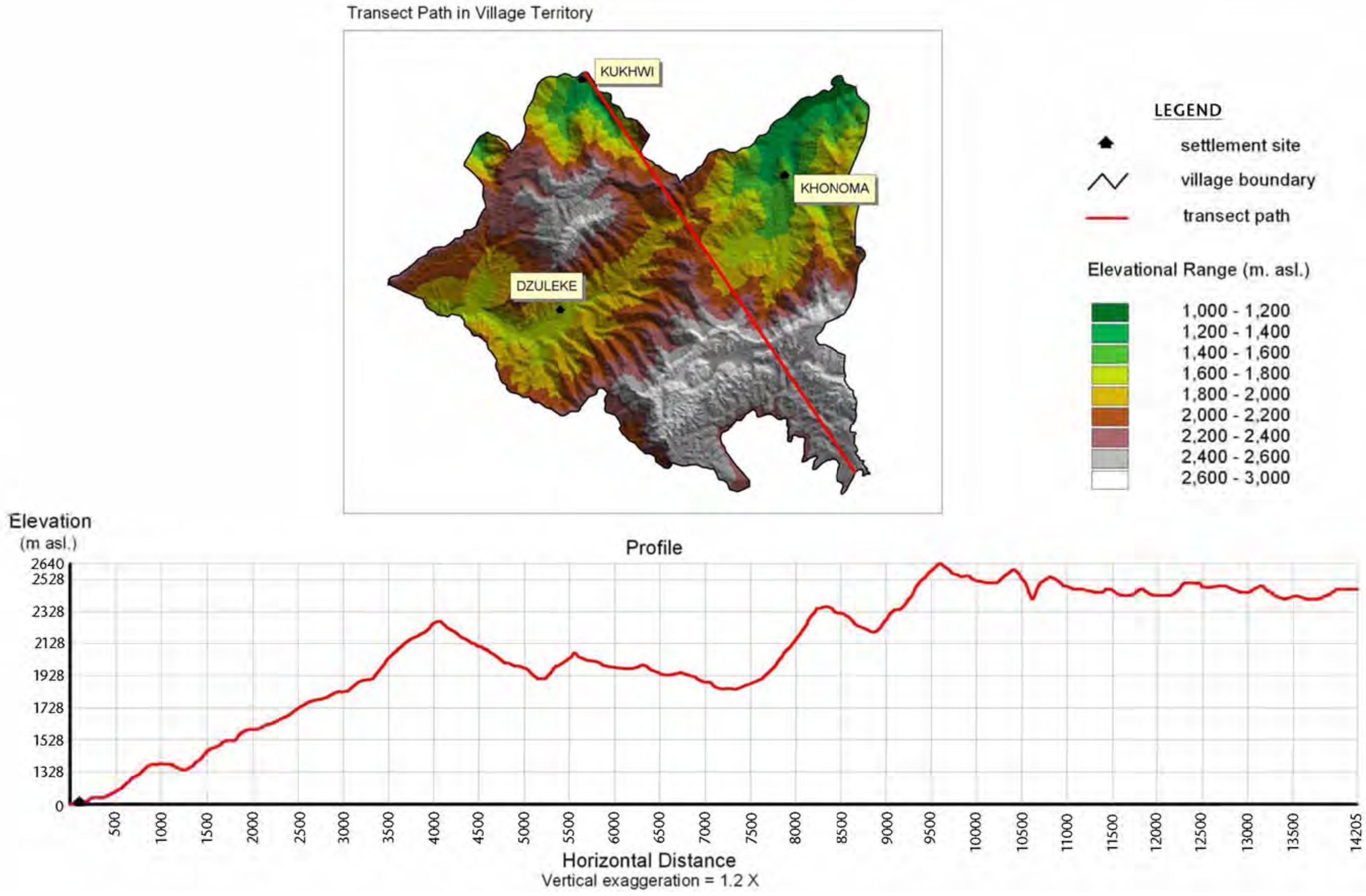
APPENDIX 4-3. Digital Elevation Model of Khonoma Village, Draped with Color Satellite Image*



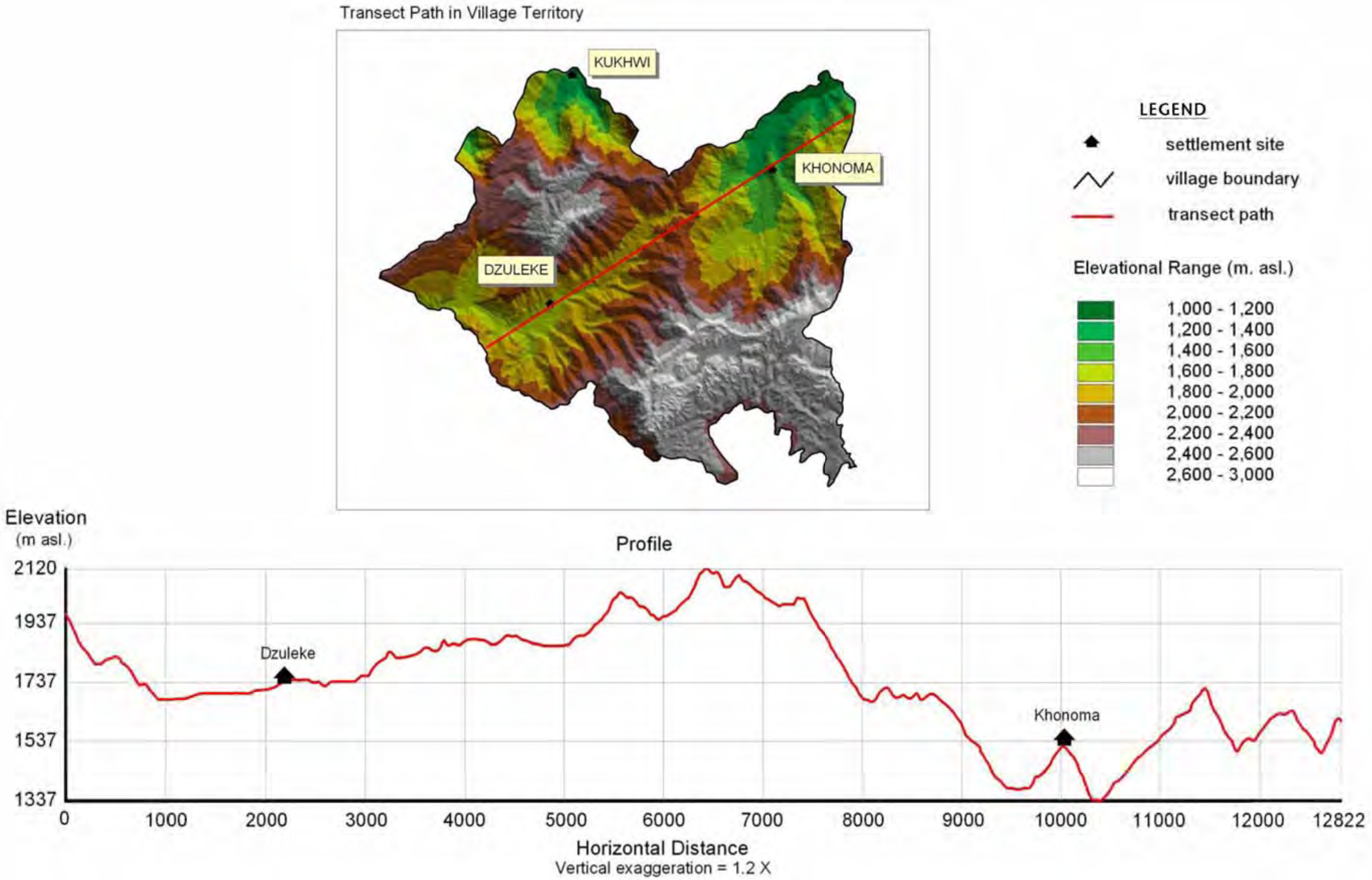
	Classification	sq. km.	%
🟩	tree cover	76.23	73
🟪	open land, mostly village and agricultural area	28.20	27

*Based on IRS Satellite Imagery taken on Feb. 04, 2001.

APPENDIX 4-4. Topographic Profile of Diagonal Transect through Khonoma, Showing Ascent from Tropical to Sub-alpine Altitudes

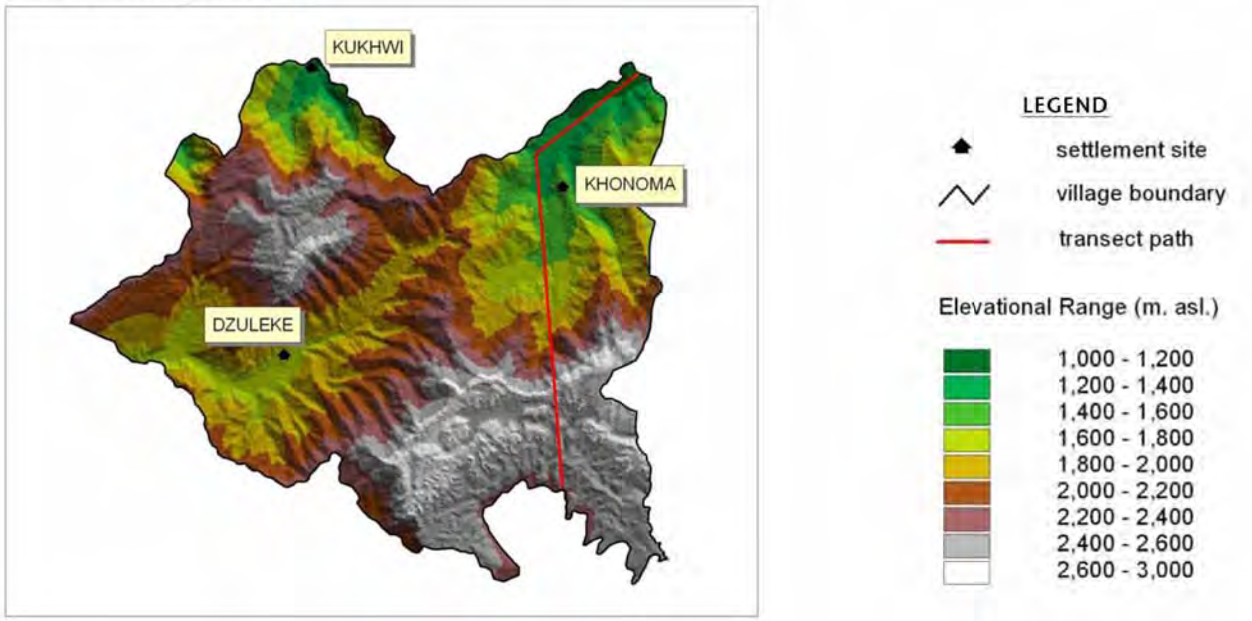


APPENDIX 4-5. Series of Topographic Profiles of Transects through Khonoma Village – No. 1

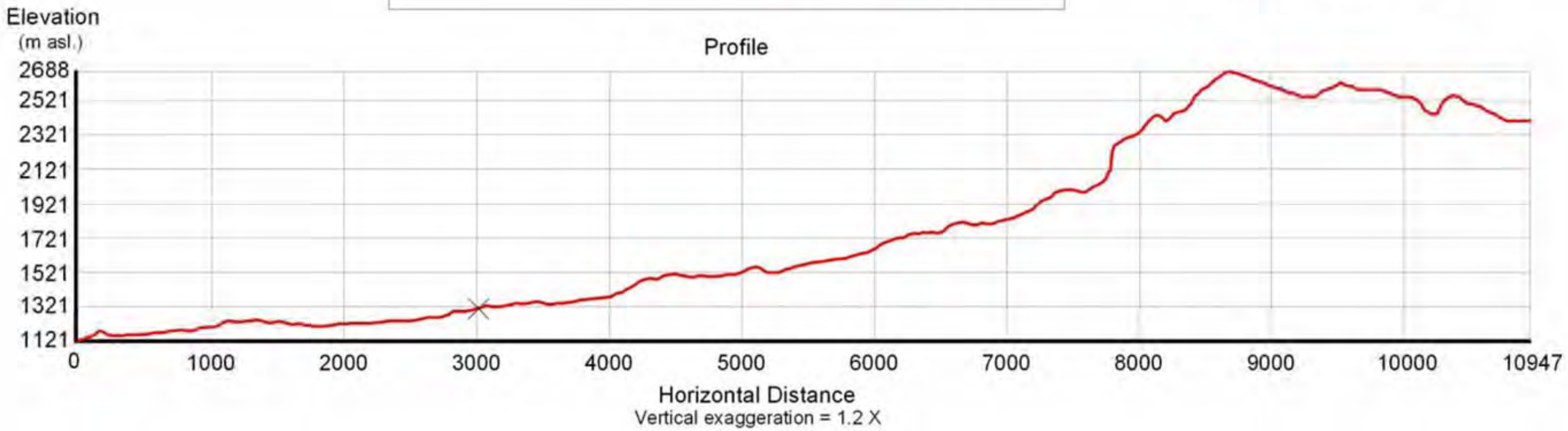


APPENDIX 4-6. Series of Topographic Profiles of Transects through Khonoma Village – No. 2

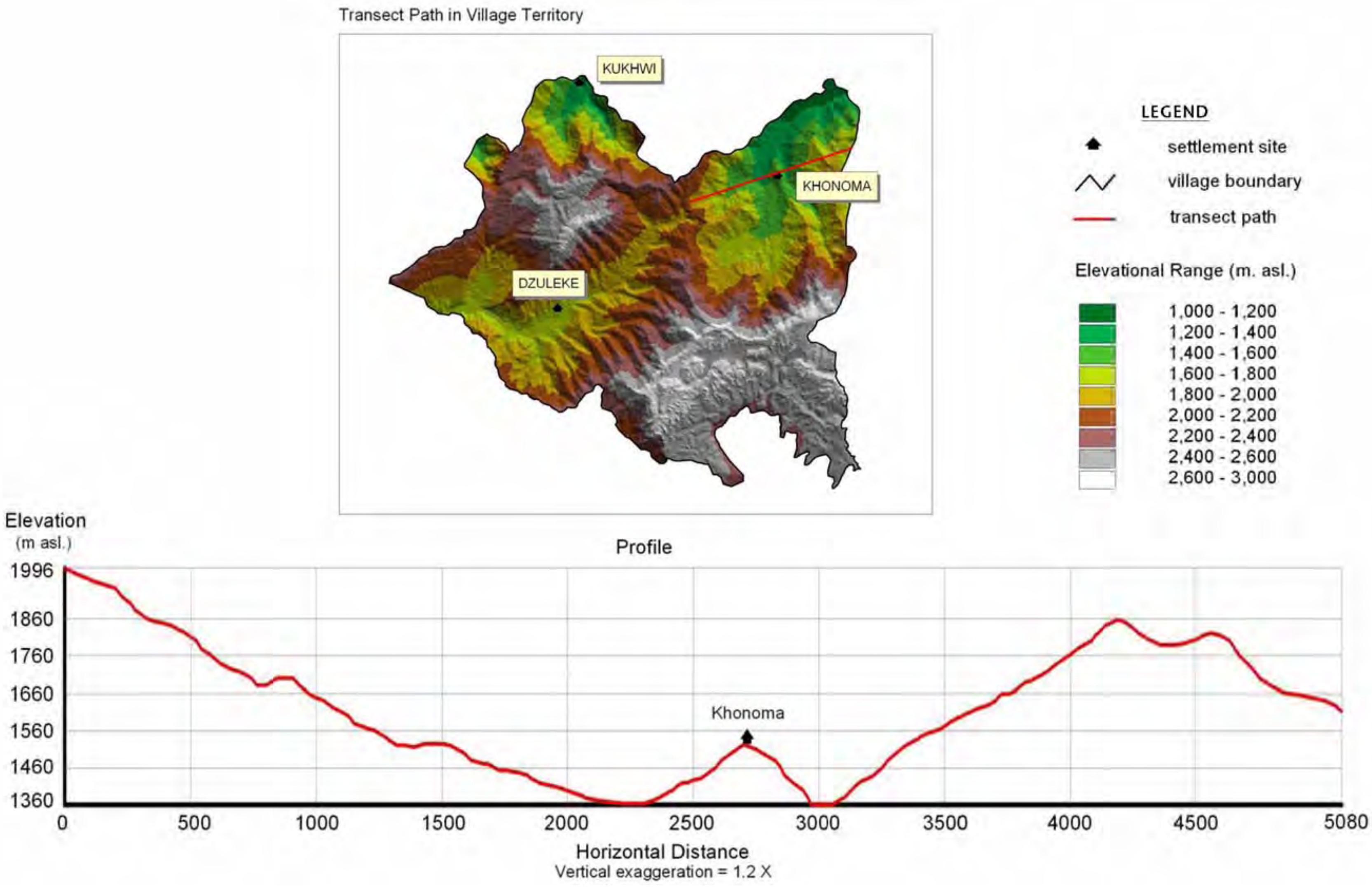
Transect Path in Village Territory



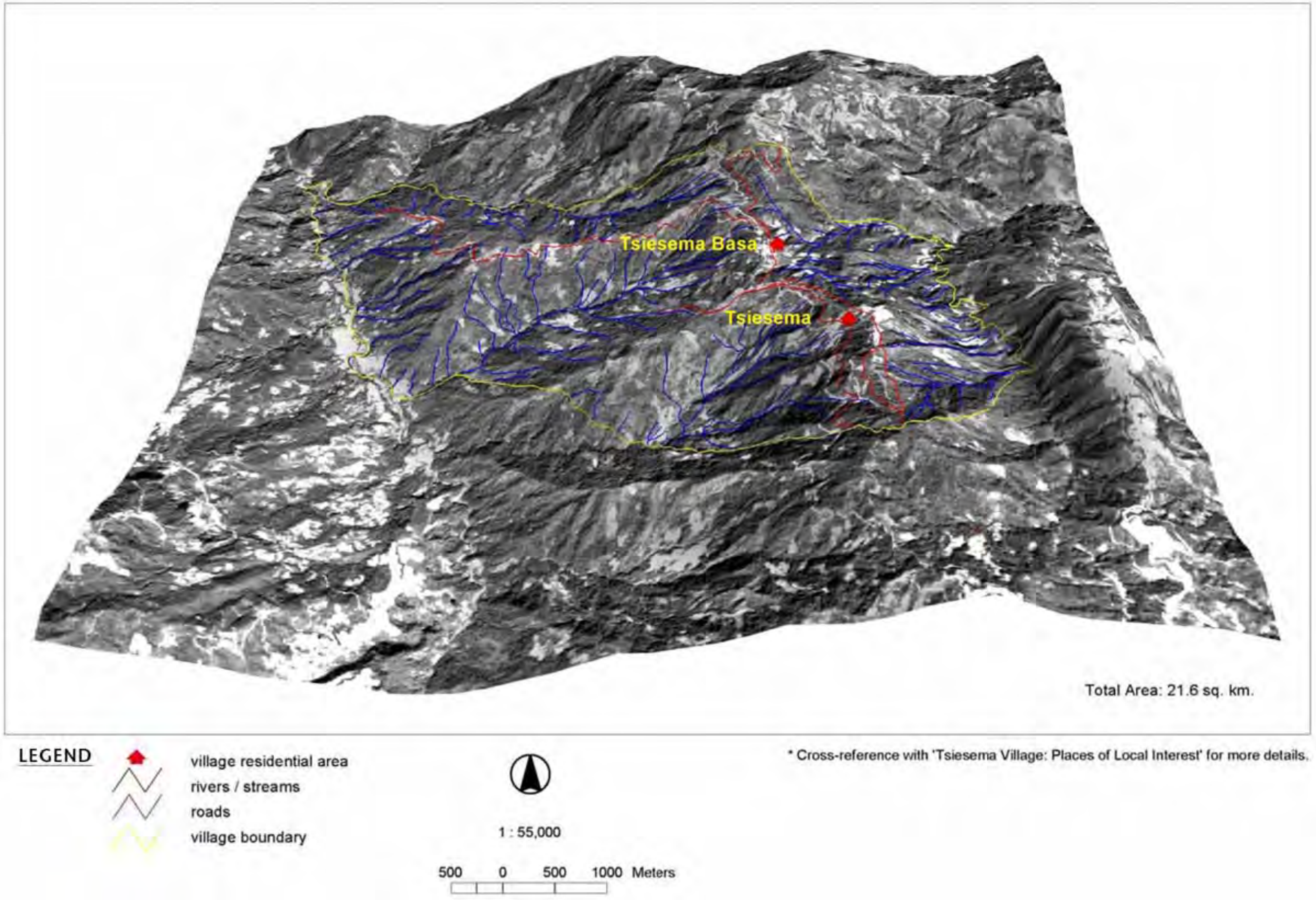
Profile



APPENDIX 4-7. Series of Topographic Profiles of Transects through Khonoma Village – No. 3

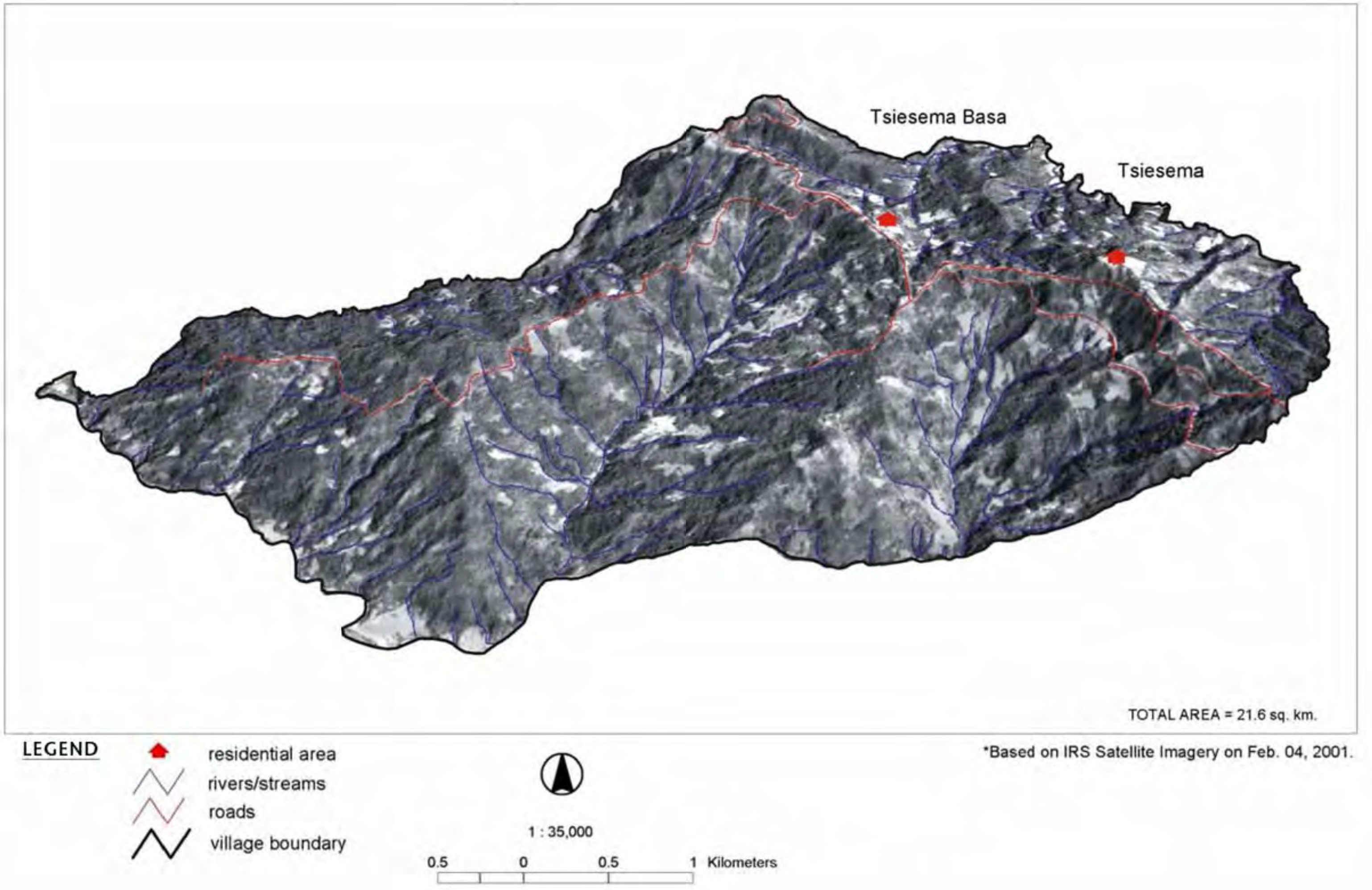


APPENDIX 4-8. A Bird's Eye View of Tsiesema from Space *
(IRS Panchromatic Sattelite Imagery taken on Feb. 04, 2001, draped over a digital elevation model)



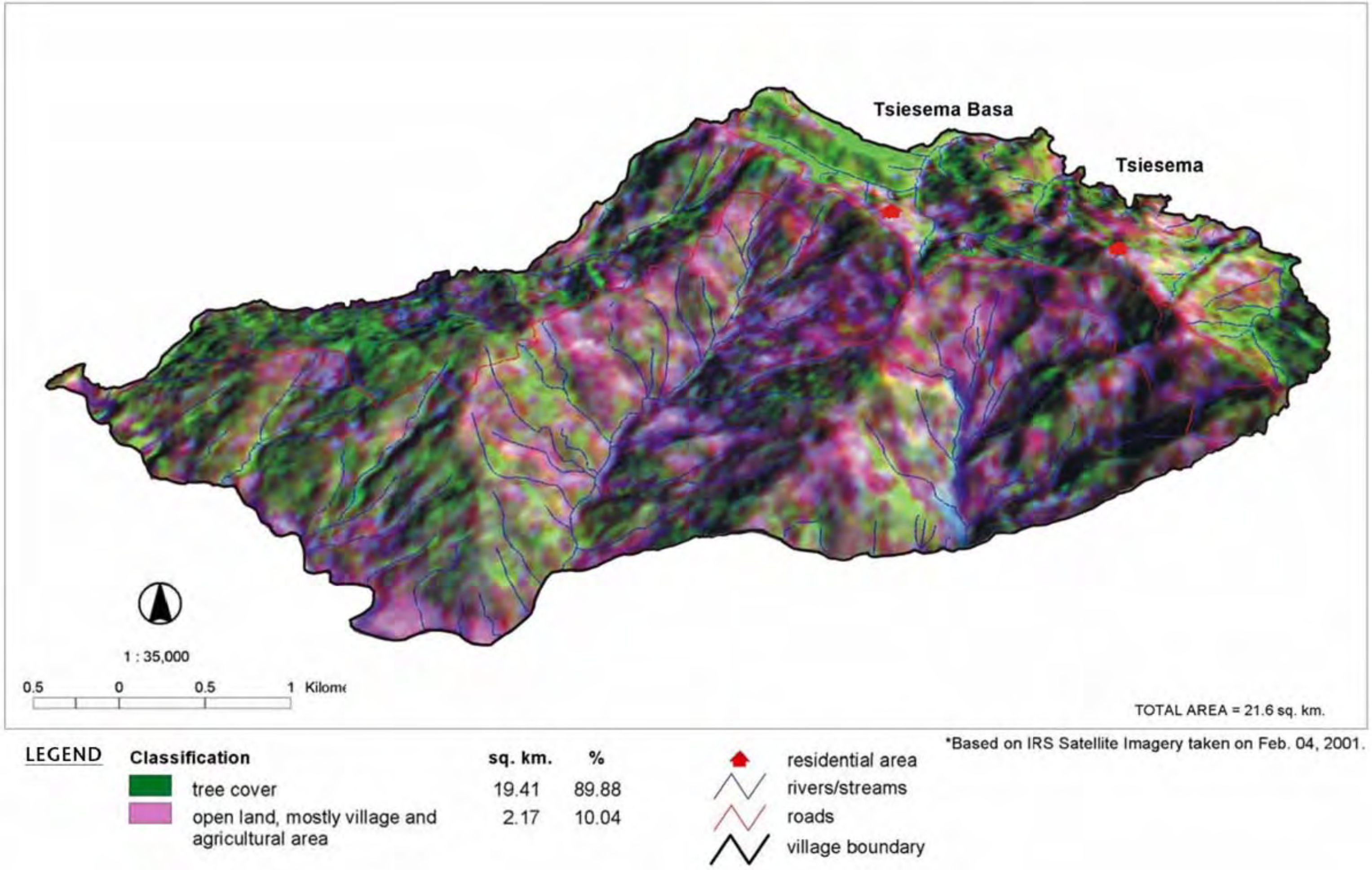
* Cross-reference with 'Tsiesema Village: Places of Local Interest' for more details.

APPENDIX 4-9. Digital Elevation Model of Tsiesema Village (Comparative Study Site), Draped with a Panchromatic Satellite Image*



*Based on IRS Satellite Imagery on Feb. 04, 2001.

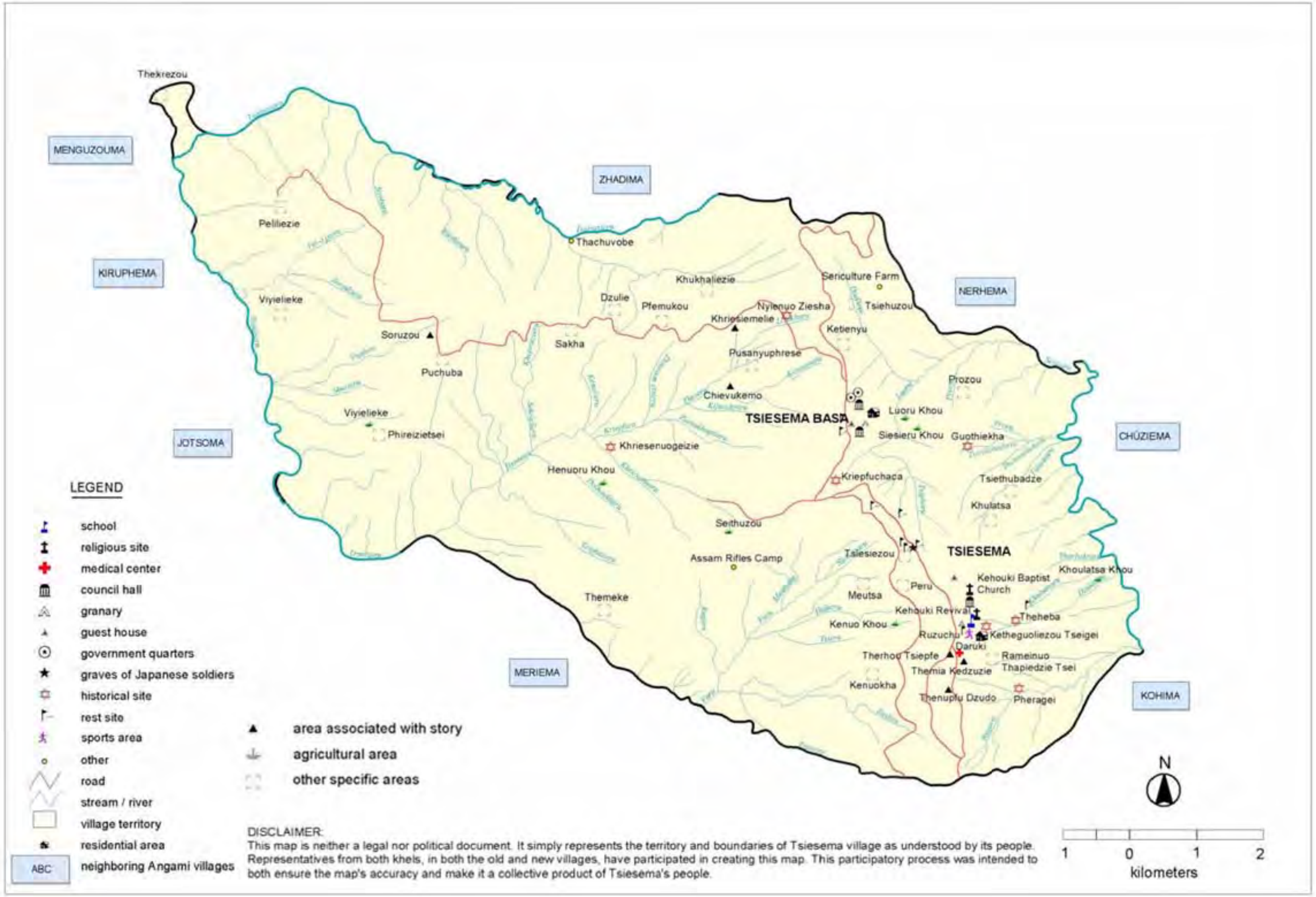
APPENDIX 4-10. Digital Elevation Model of Tsiesema Village, Draped with Color Satellite Image*



Classification	sq. km.	%
🟩 tree cover	19.41	89.88
🟪 open land, mostly village and agricultural area	2.17	10.04

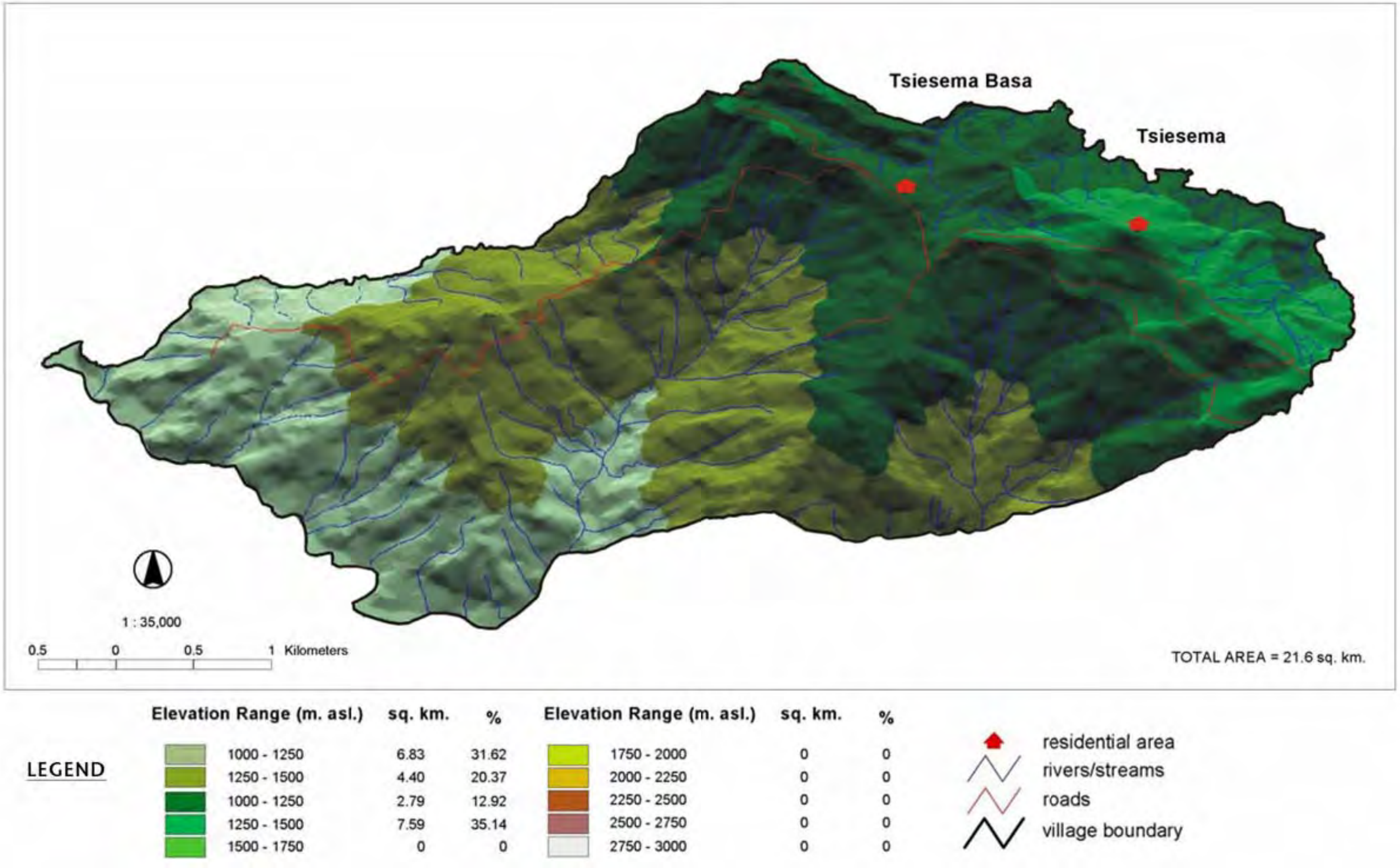
*Based on IRS Satellite Imagery taken on Feb. 04, 2001.

APPENDIX 4-11. Places of Local Interest in Tsiesema – Identified by Villagers through Participatory Mapping Process



DISCLAIMER:
This map is neither a legal nor political document. It simply represents the territory and boundaries of Tsiesema village as understood by its people. Representatives from both khels, in both the old and new villages, have participated in creating this map. This participatory process was intended to both ensure the map's accuracy and make it a collective product of Tsiesema's people.

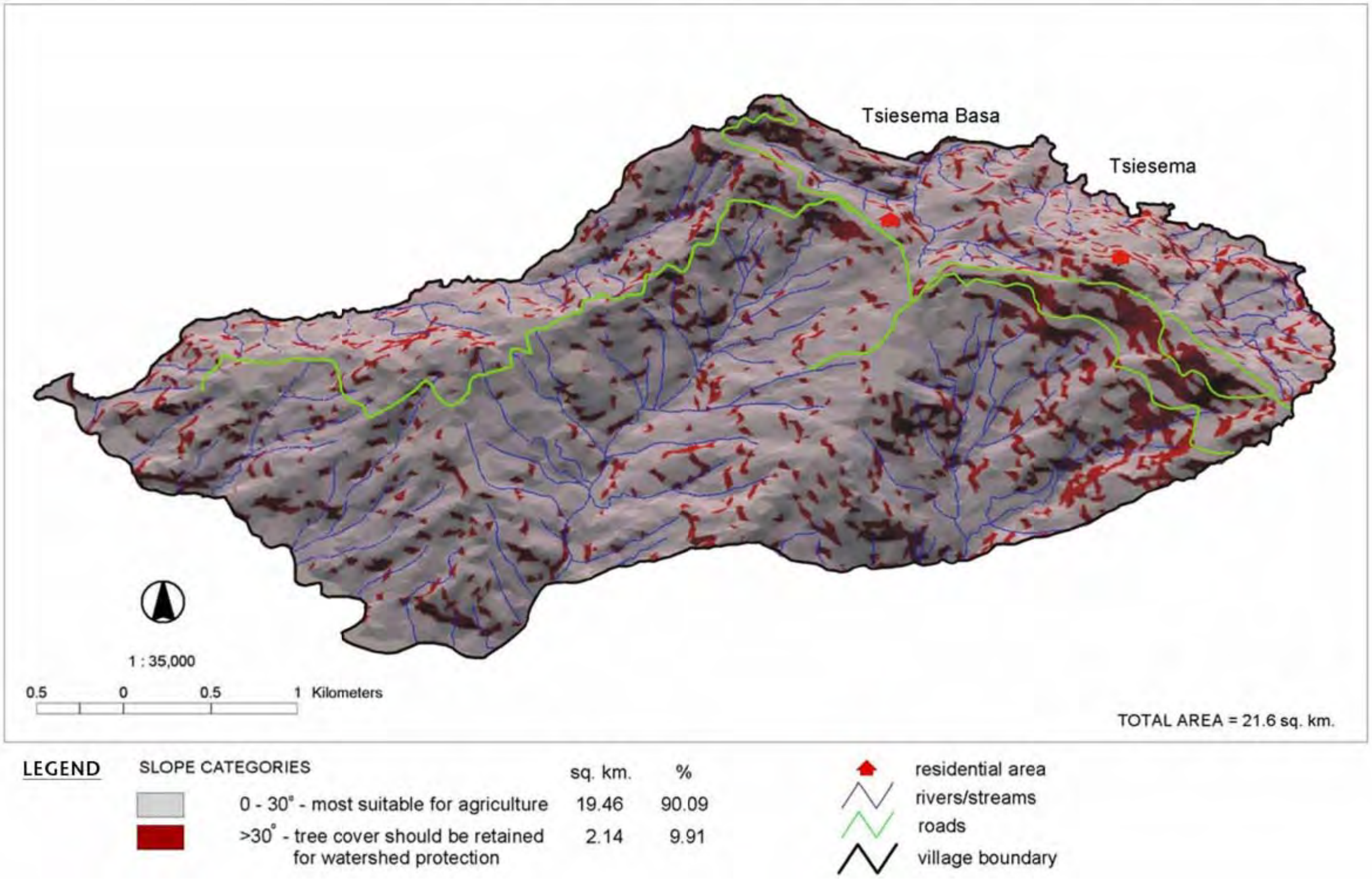
APPENDIX 4-12. Breakdown of Altitudinal Bands in Tsiesema Village



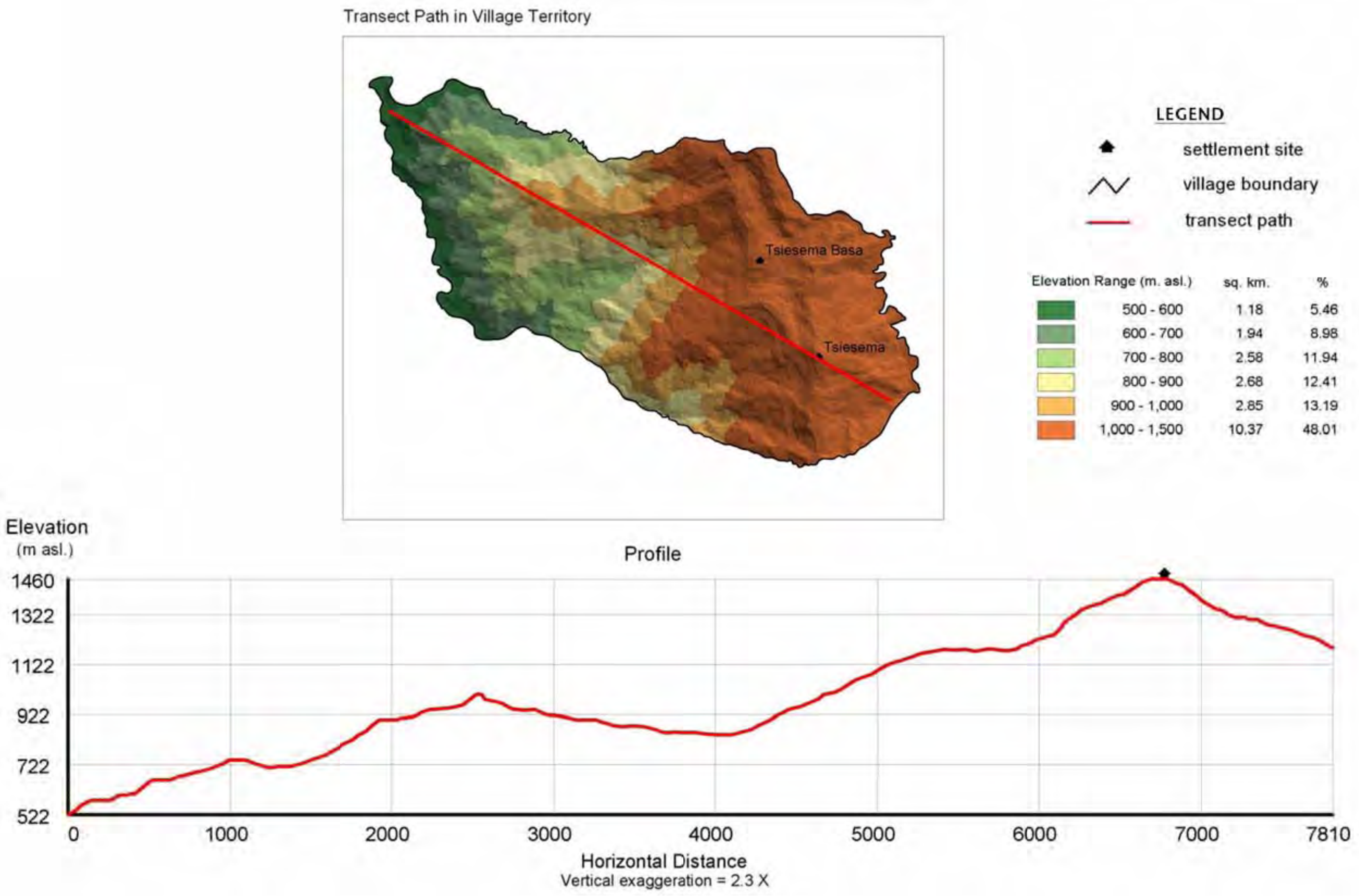
LEGEND

	Elevation Range (m. asl.)	sq. km.	%		Elevation Range (m. asl.)	sq. km.	%
🟩	1000 - 1250	6.83	31.62	🟨	1750 - 2000	0	0
🟩	1250 - 1500	4.40	20.37	🟨	2000 - 2250	0	0
🟩	1000 - 1250	2.79	12.92	🟧	2250 - 2500	0	0
🟩	1250 - 1500	7.59	35.14	🟫	2500 - 2750	0	0
🟩	1500 - 1750	0	0	⬜	2750 - 3000	0	0

APPENDIX 4-13. Slope Classification of Tsiesema Village



APPENDIX 4-14. Topographic Profile of Diagonal Transect through Tsiesema Village



APPENDIX 4-15. Soil Properties of Ten Jhum Field in Khonoma Monitored during Fieldwork [‡]

Field No.	Sampling Depth *(cm)*	pH	O.M. *(%)*	CEC *(me/100gms)*	N *(%)*	P *(ppm)*	K *(ppm)*	Ca *(ppm)*	Mg *(ppm)*	sand *(%)*	silt *(%)*	clay *(%)*
1	0-15	6.37	7.72	28.83	0.336	4.5	158.76	400	65	44.28	33.76	21.96
	15-30	4.63	3.39	19.38	0.241	2	98.28	225	43.75	35.68	38.56	27.76
2	0-15	4.68	6.02	26.44	0.356	9.5	146.16	175	30	30.68	41.96	27.36
	15-30	4.54	2.56	14.35	0.16	5.5	120.96	200	37.5	27.68	39.16	53.16
3	0-15	4.74	5.01	11.46	0.324	9.5	173.88	400	42.5	30.08	42.54	27.38
	15-30	4.52	3.43	18.13	0.198	7.5	173.4	150	18.75	27.48	44.98	27.54
4	0-15	4	5.61	24.55	0.309	5.5	115.92	125	21.25	32.28	38.3	29.42
	15-30	4.24	3.26	20.32	0.305	3	90.72	100	13.75	33.68	34.96	31.36
5	0-15	4.44	5.79	19.44	0.229	5.5	161.28	450	77.5	32.48	38.96	28.56
	15-30	4.6	3.19	16.99	0.202	2	118.44	275	48.75	26.6	41.2	32.2
6	0-15	4.94	7.77	26.06	0.429	15	246.96	1975	165	40	36.8	23.2
	15-30	5.09	3.66	18.88	0.2	2	178.92	700	87.5	28.4	40.4	31.2
7	0-15	4.23	6.19	27.45	0.356	15	133.56	125	15	49.4	25.8	24.8
	15-30	4.47	3.43	18.76	0.215	12	103.32	75	7.5	32.4	36.6	31
8	0-15	4.42	5.59	17.63	0.342	5.05	204.12	550	82.5	30.6	42.1	27.3
	15-30	4.57	2.69	21.15	0.176	2.5	143.64	275	55	30.4	38.2	31.4
9	0-15	4.25	5.95	22.66	0.349	3	128.52	200	35	28	40.4	31.6
	15-30	4.36	3.33	20.14	0.194	1	90.72	100	12.5	25.4	37.6	37
10	0-15	5.025	3.087	12.761	0.1702	11.65	84.168	657.5	100	30.872	40.8	27.954
	15-30	5.616	1.942	12.695	0.1083	4.8	77.616	832.5	141.5	34.662	36.804	28.734
Avg.	**0-15**	**4.7095**	**5.8737**	**21.7281**	**0.32002**	**8.42**	**155.3328**	**505.75**	**63.375**	**34.8672**	**38.142**	**26.9534**
	15-30	**4.6636**	**3.0882**	**18.0795**	**0.19993**	**4.23**	**119.6016**	**293.25**	**46.65**	**30.2382**	**38.8464**	**33.1354**

[‡] Analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University on May 18, 2001.

pH - acidity; OM - Organic Matter; CEC - Exchangeable Cation Exchange Capacity; N - Total Nitrogen; P - Extractable Phosphorous; K - Exchangeable Potassium; Ca - Exchangeable Calcium; Mg - Exchangeable Magnesium

Methods used for soil analyses:

pH: soil to water ratio 1:1
OM: Walkley and Black 1934
N: Kjhedahl Method
P: Brays Method No. 2
K: Flame Photometry
CEC: Distillation
Ca: Titration Method - EDTA
Mg: Titration Method - EDTA
Texture: 5% Calgon Solution

Samples taken from monitored jhum fields after one year of cropping.

APPENDIX 4-16. Soil Properties of Ten Wet Rice Terraces in Khonoma Monitored during Fieldwork ‡

Field No.	Sampling Depth (cm)	pH	O.M. (%)	CEC (me/100gms)	N (%)	P (ppm)	K (ppm)	Ca (ppm)	Mg (ppm)	sand (%)	silt (%)	clay (%)
1	0-15	4.51	2.66	14.98	0.159	5	52.92	450	62.5	34	38	27.26
	15-30	5.34	1.67	12.84	0.102	3	78.12	875	160	30.2	42.54	27.26
2	0-15	4.87	3.54	13.47	0.19	15	68.04	625	95	26.6	44.12	29.28
	15-30	5.77	2.12	14.47	0.095	8	85.68	1100	180	34.4	38.38	27.22
3	0-15	4.93	3.41	11.83	0.173	9.5	52.92	700	77.5	42.6	31.8	25.6
	15-30	5.83	4.54	13.85	0.127	2	60.48	1125	145	36.3	37.5	26.2
4	0-15	5.13	2.85	10.83	0.152	18	68.04	600	80	34	42.4	25.6
	15-30	5.4	1.89	14.48	0.119	5.5	75.6	800	117.5	35.2	35.4	31.4
5	0-15	5.09	2.51	14.48	0.152	11	63	500	87.5	30.6	37.2	32.2
	15-30	5.67	1.16	12.46	0.095	3	75.6	600	105	30	39	31
6	0-15	5.2	3.08	12.21	0.173	21	85.68	700	112.5	25.4	45.2	29.4
	15-30	5.63	1.96	12.39	0.123	16	85.68	900	150	32	37	31
7	0-15	4.95	3.18	10.45	0.166	8	83.16	650	82.5	39	34	27
	15-30	5.75	1.39	11.83	0.102	1.5	73.08	750	122.5	38.8	32	29.2
8	0-15	4.95	3.18	10.45	0.166	8	83.16	650	82.5	28.4	44.36	27.24
	15-30	5.75	1.39	11.83	0.102	1.5	73.08	750	122.5	36.4	36.3	27.3
9	0-15	5.25	3.28	15.69	0.19	19	103.32	700	140	22.16	44.56	28.28
	15-30	5.57	1.85	13.86	0.123	6.5	108.36	675	152.5	34.96	38.56	26.48
10	0-15	5.37	3.18	13.22	0.181	2	181.44	1000	180	25.96	46.36	27.68
	15-30	5.45	1.45	8.94	0.095	1	60.48	750	160	38.36	31.36	30.28
Avg.	0-15	5.025	3.087	12.761	0.1702	11.65	84.168	657.5	100	30.872	40.8	27.954
	15-30	5.616	1.942	12.695	0.1083	4.8	77.616	832.5	141.5	34.662	36.804	28.734

‡ Analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University on May 18, 2001.

pH - acidity; OM - Organic Matter; CEC - Exchangeable Cation Exchange Capacity; N - Total Nitrogen; P - Extractable Phosphorous; K - Exchangeable Potassium; Ca - Exchangeable Calcium; Mg - Exchangeable Magnesium

Methods used for soil analyses:

pH: soil to water ratio 1:1
OM: Walkley and Black 1934
N: Kjhedahl Method
P: Brays Method No. 2
K: Flame Photometry
CEC: Distillation
Ca: Titration Method - EDTA
Mg: Titration Method - EDTA
Texture: 5% Calgon Solution

Samples taken from monitored jhum fields after one year of cropping.

APPENDIX 4-17. Soil Properties of Ten Jhum Field in Tsiesema Monitored during Fieldwork ‡

Field No.	Sampling Depth (cm)	pH	O.M. (%)	CEC (me/100gms)	N (%)	P (ppm)	K (ppm)	Ca (ppm)	Mg (ppm)	sand (%)	silt (%)	clay (%)
1	0-15	4.47	4.56	21.28	0.256	6.5	95.76	1400	62.5	24.56	38.96	36.48
	15-30	4.36	2.99	20.14	0.187	3	68.44	150	42.5	25.16	36.56	38.28
2	0-15	4.5	5.36	11.33	0.279	3.5	173.88	425	115	26.56	38.96	34.48
	15-30	4.53	3.72	20.77	0.225	1.5	138.6	250	78.75	18.96	38.36	42.64
3	0-15	5.14	2.86	14.86	0.206	2.5	80.64	400	185	22.56	38.96	38.48
	15-30	5.22	2.73	18.25	0.202	3	171.36	1100	170	2.45	65.7	31.85
4	0-15	4.12	4.26	16.11	0.244	2	73.08	150	37.5	27.16	41.36	31.48
	15-30	4.11	3.56	14.98	0.202	1.5	57.96	125	26.25	20.016	42.584	37.4
5	0-15	4.84	4.06	18.13	0.229	4.5	148.68	325	135	20.016	42.584	37.4
	15-30	4.82	2.75	18.63	0.195	2	80.64	225	103.75	21.216	38.984	39.8
6	0-15	4.91	4.35	21.35	0.225	3	168.84	500	205	18.816	41.584	39.6
	15-30	6.29	1.06	14.03	0.126	4.5	47.88	1150	363.75	26.816	38.384	34.8
7	0-15	5.16	3.39	14.98	0.191	6	113.4	300	112.5	18.616	36.384	45
	15-30	4.96	3.36	14.35	0.225	2	68.04	175	65	18.616	33.984	47.4
8	0-15	5.27	4.26	7.8	0.218	4.5	153.72	1100	322.5	33.216	28.184	38.6
	15-30	5.15	3.37	25.81	0.191	2.5	118.44	550	215	33.616	26.984	39.4
9	0-15	4.75	3.33	18.81	0.244	2.5	93.24	600	192.5	20.016	36.784	43.2
	15-30	4.62	2.23	15.66	0.206	3	68.04	450	162.5	23.216	34.984	41.8
10	0-15	4.41	3.79	11.96	0.233	2.5	113.4	150	52.5	18.616	39.584	41.8
	15-30	4.35	2.73	15.11	0.191	7.5	70.56	100	40	22.416	36.784	40.8
Avg.	0-15	4.757	4.022	15.661	0.2325	3.75	121.464	535	142	23.0136	38.3344	38.652
	15-30	4.841	2.85	17.773	0.195	3.05	88.996	427.5	126.75	21.2482	39.3308	39.417

‡ Analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University on May 18, 2001.

pH - acidity; OM - Organic Matter; CEC - Exchangeable Cation Exchange Capacity; N - Total Nitrogen; P - Extractable Phosphorous; K - Exchangeable Potassium; Ca - Exchangeable Calcium; Mg - Exchangeable Magnesium

Methods used for soil analyses:

pH: soil to water ratio 1:1
OM: Walkley and Black 1934
N: Kjhedahl Method
P: Brays Method No. 2
K: Flame Photometry
CEC: Distillation
Ca: Titration Method - EDTA
Mg: Titration Method - EDTA
Texture: 5% Calgon Solution

Samples taken from monitored jhum fields after one year of cropping.

APPENDIX 4-18. Soil Properties of Ten Wet Rice Terraces in Tsiesema Monitored during Fieldwork [‡]

Field No.	Sampling Depth (cm)	pH	O.M. (%)	CEC (me/100gms)	N (%)	P (ppm)	K (ppm)	Ca (ppm)	Mg (ppm)	sand (%)	silt (%)	clay (%)
1	0-15	5.4	2.57	15.36	0.157	7.5	90.72	750.00	210	26.616	36.584	36.8
	15-30	5.32	2.52	15.98	0.137	8	78.12	65	185	20.616	38.384	41
2	0-15	5.4	2.53	14.98	0.179	4.5	50.4	75.00	307	20.616	41.584	38.2
	15-30	5.38	2.53	22.28	0.191	5.5	50.4	715	303.75	20.816	42.384	36.8
3	0-15	5.24	2.16	20.65	0.157	9	47.88	600.00	281.25	7.216	48.984	43.8
	15-30	5.73	1.65	19.06	0.137	24	40.32	750	255	5.616	48.184	46.2
4	0-15	5.18	2.03	23.8	0.127	6	45.36	500.00	225	12.616	44.784	42.6
	15-30	5.48	1.3	20.65	0.118	5	42.84	600	300	14.216	39.784	46
5	0-15	5.37	2.59	17.5	0.176	11	110.88	700.00	217.5	21.48	49.06	29.46
	15-30	5.93	1.99	27.12	0.164	20.5	118.44	1050	356.25	25.28	60	14.72
6	0-15	5.61	1.79	16.24	0.157	7.5	50.4	1,150.00	315	22.68	44.16	33.16
	15-30	5.96	1.67	14.73	0.153	16	50.4	850	307.5	0	0	0
7	0-15	5.63	2.49	19.39	0.187	2.5	57.96	1,075.00	300	3.68	56.76	39.56
	15-30	6.2	2.3	14.98	0.164	5.5	50.4	1375	412.5	18.68	43.36	37.96
8	0-15	5.98	6.36	16.24	0.221	5.5	126	2,850.00	600	19.68	43.36	36.96
	15-30	6.87	2.39	16.62	0.168	9.5	128.52	3200	1046.25	27.68	47.98	24.34
9	0-15	5.04	2.43	12.84	0.183	12	146.16	1,350.00	540	8.032	29.168	62.8
	15-30	5.23	2.39	15.11	0.172	15	136.08	1325	495	2.232	30.568	62.2
10	0-15	5.15	2.9	14.6	0.164	6	70.56	1,000.00	1080	9.832	30.168	60
	15-30	6.24	3.56	21.78	0.179	8	143.64	3800	650	39.28	34.96	25.76
Avg.	0-15	5.4	2.785	17.16	0.1708	7.15	79.632	1005	407.575	15.2448	42.4612	42.334
	15-30	5.834	2.23	18.831	0.1583	11.7	83.916	1373	431.125	19.379556	42.844889	37.22

[‡] Analyses conducted at the Dept. of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University on May 18, 2001.

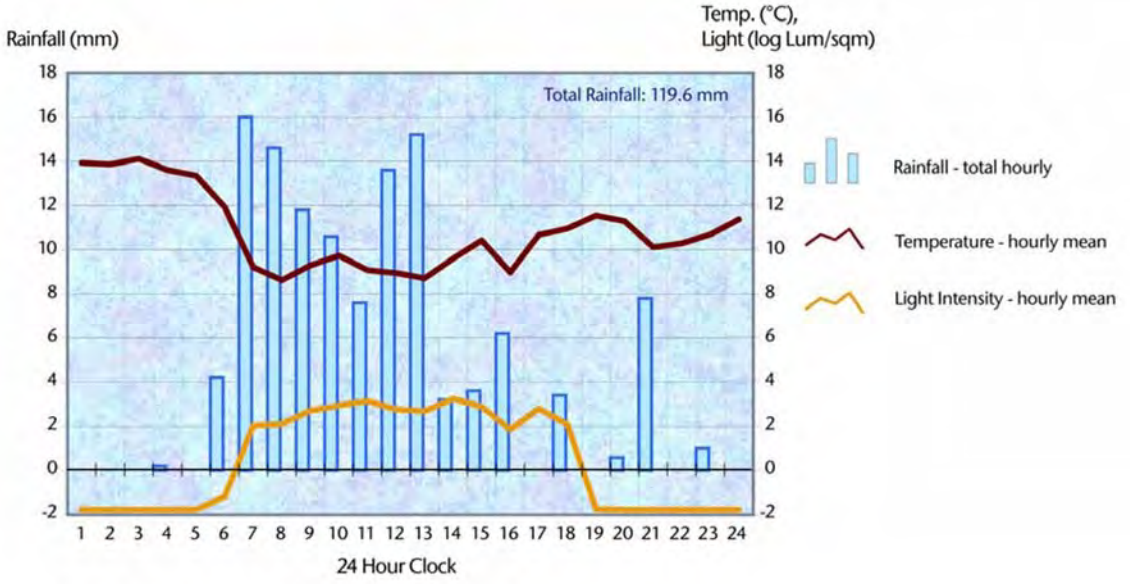
pH - acidity; OM - Organic Matter; CEC - Exchangeable Cation Exchange Capacity; N - Total Nitrogen; P - Extractable Phosphorous; K - Exchangeable Potassium; Ca - Exchangeable Calcium; Mg - Exchangeable Magnesium

Methods used for soil analyses:

pH: soil to water ratio 1:1
OM: Walkley and Black 1934
N: Kjhedahl Method
P: Brays Method No. 2
K: Flame Photometry
CEC: Distillation
Ca: Titration Method - EDTA
Mg: Titration Method - EDTA
Texture: 5% Calgon Solution

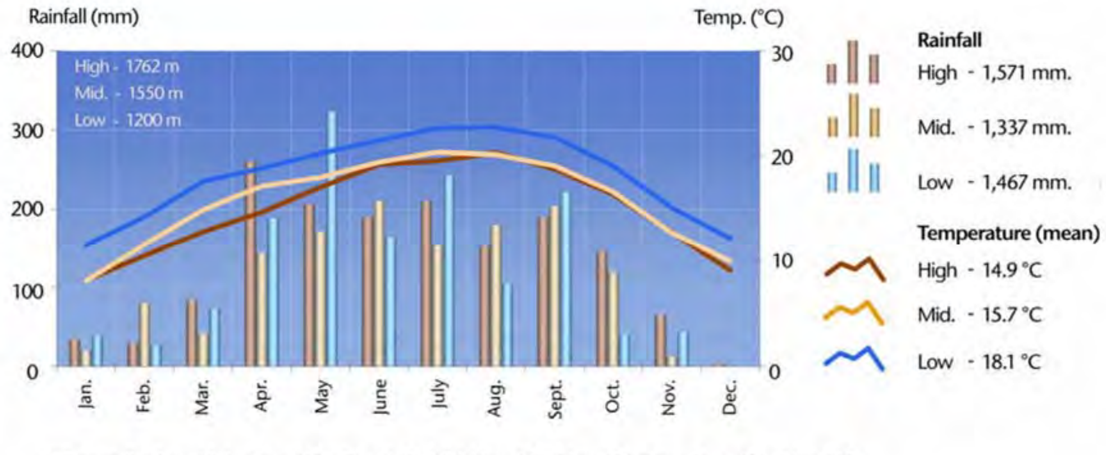
Samples taken from monitored jhum fields after one year of cropping.

APPENDIX 4-19. Example of Unusually Heavy Pre-Monsoon Rainfall in Khonoma on Feb. 26th, 2001*



* See plate 2-84 in photograph gallery.

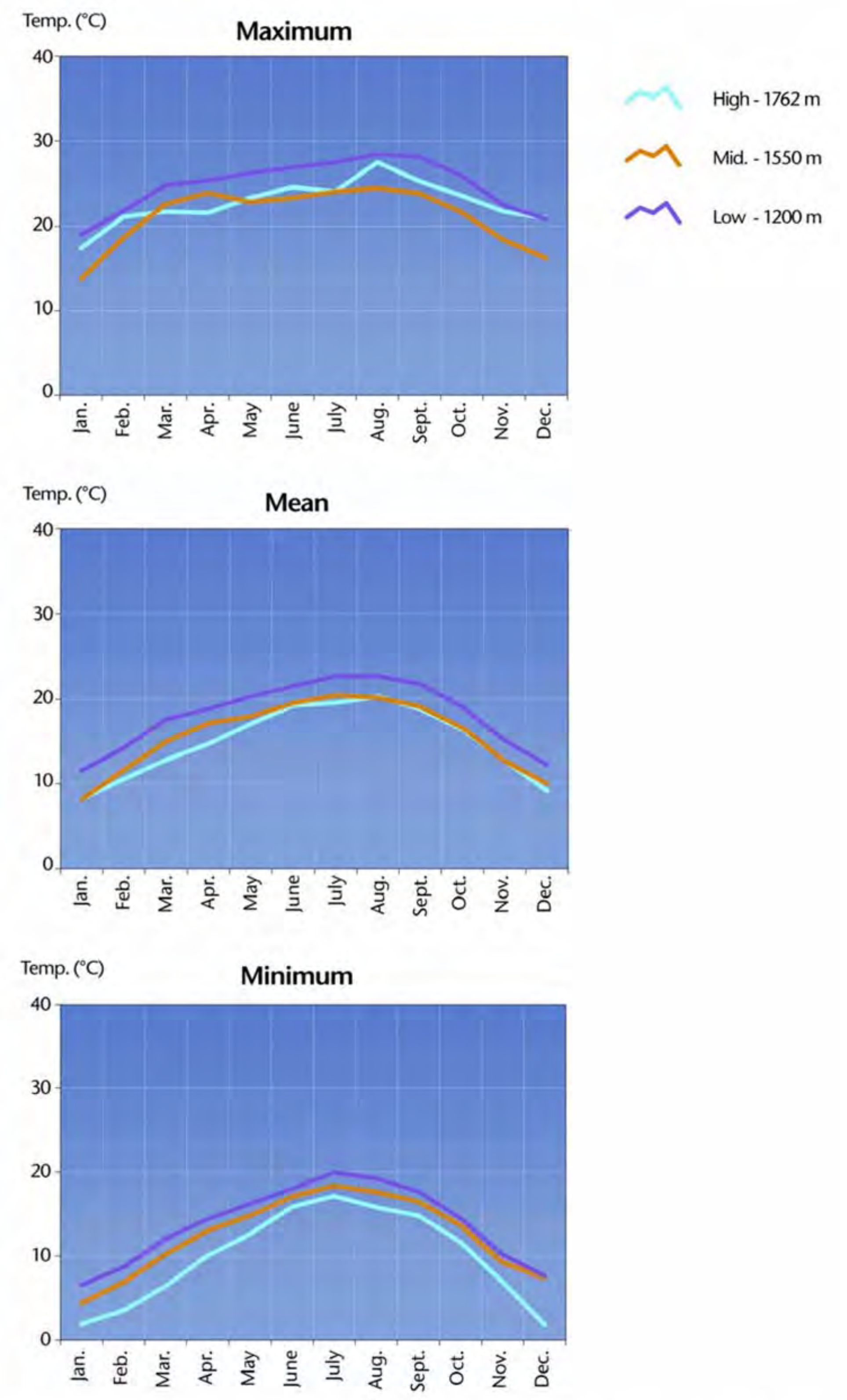
APPENDIX 4-20. Comparison of Rainfall and Temperature Data at Varying Altitudes in Khonoma



* Data collection - High: Sept., '01 - Dec., '02; Mid: Nov., '00 - Nov., '02; Low: Sept., '01 - Nov., '02

See map 4-7 for locations of the respective weather stations.

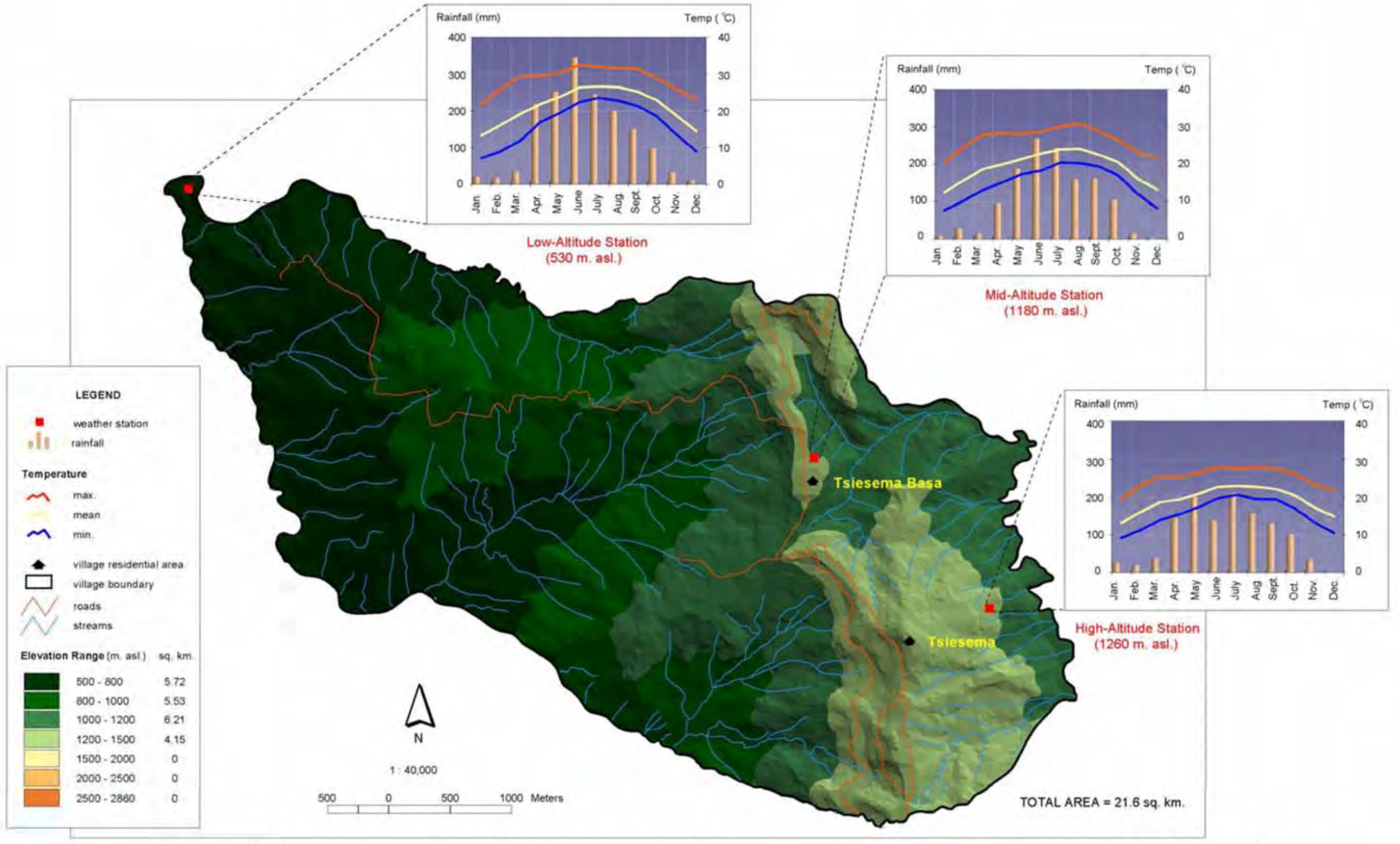
APPENDIX 4-21. Comparison of Temperature Data at High, Mid and Low Altitude Weather Stations in Khonoma *



* Data collection - High: Sept., '01 - Dec., '02; Mid: Nov., '00 - Nov., '02; Low: Sept., '01 - Nov., '02

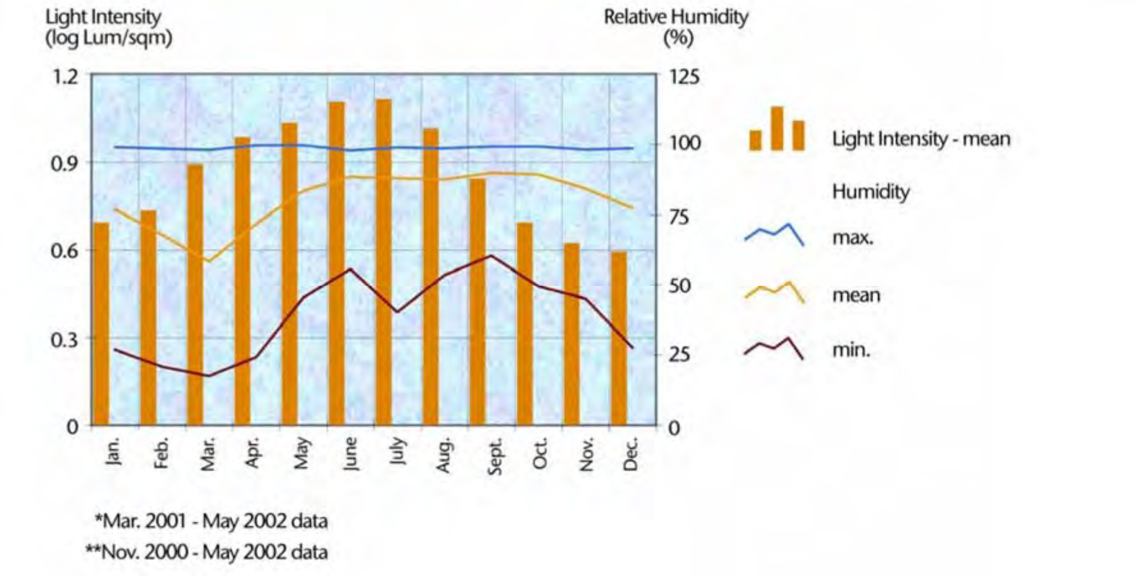
See map 4-7 for locations of the respective weather stations.

APPENDIX 4-22. Overview of Climatic Data across Tsiesema's Landscape*



* See appendix 4-25 for additional graphs comparing the maximum, mean and minimum temperatures across the three weather stations.

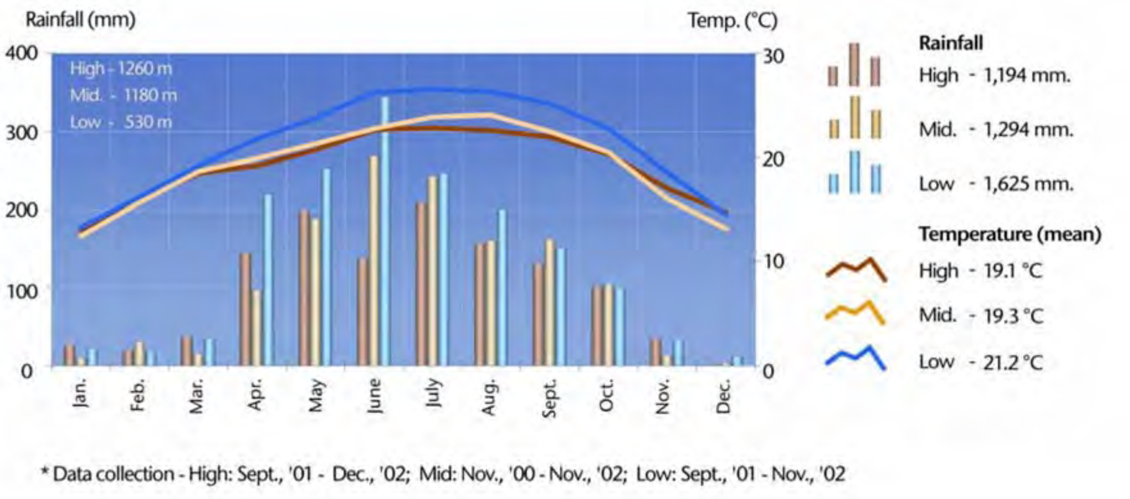
APPENDIX 4-23. Light Intensity* and Relative Humidity** at Tsiesema's Mid-Altitude Weather Station (1,180 m. asl.)



*Mar. 2001 - May 2002 data
**Nov. 2000 - May 2002 data

See appendix 4-22 for locations of the mid-altitude weather station.

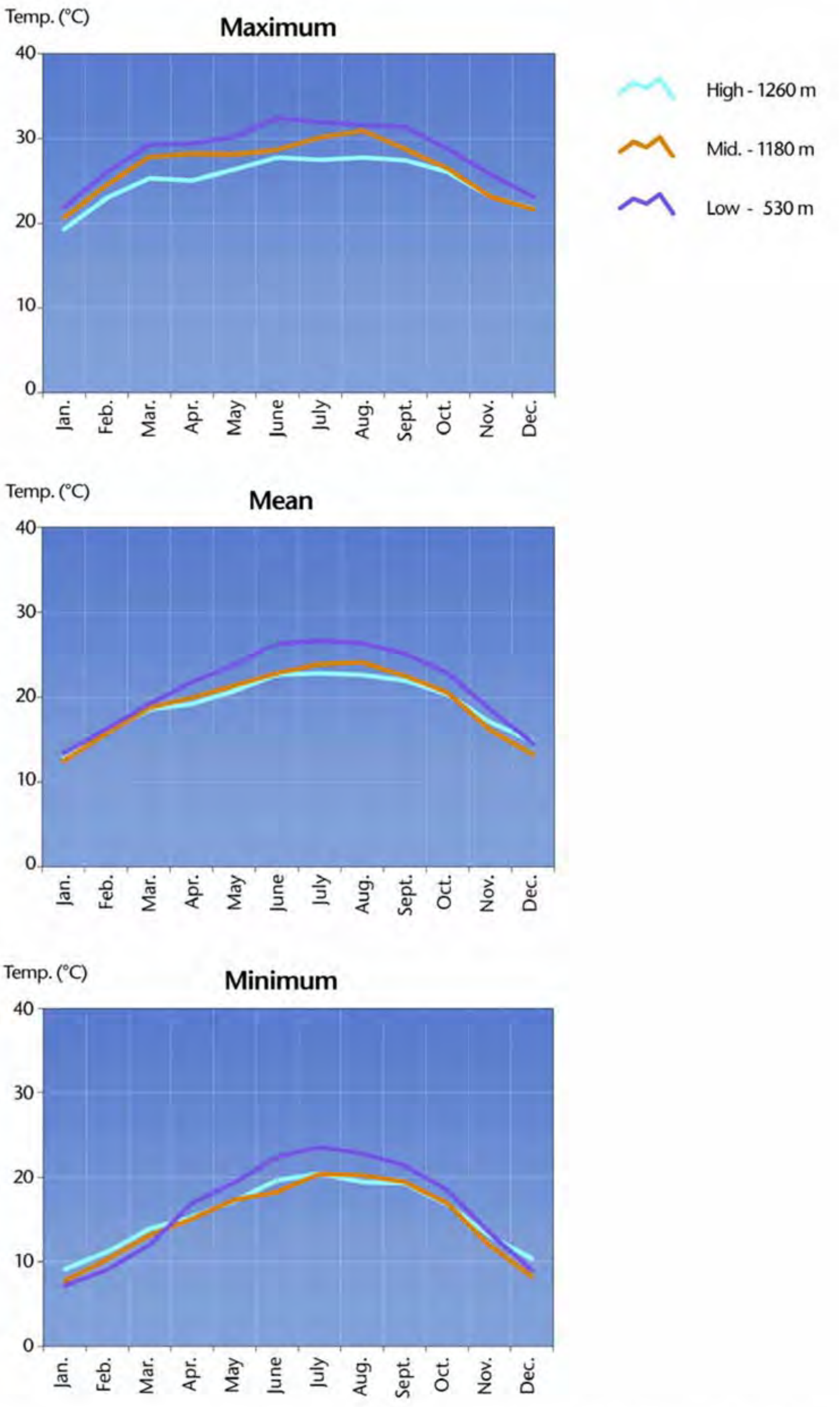
APPENDIX 4-24. Comparison of Rainfall and Temperature Data at Varying Altitudes in Tsiesema*



* Data collection - High: Sept., '01 - Dec., '02; Mid: Nov., '00 - Nov., '02; Low: Sept., '01 - Nov., '02

See appendix 4-22 for locations of the respective weather stations.

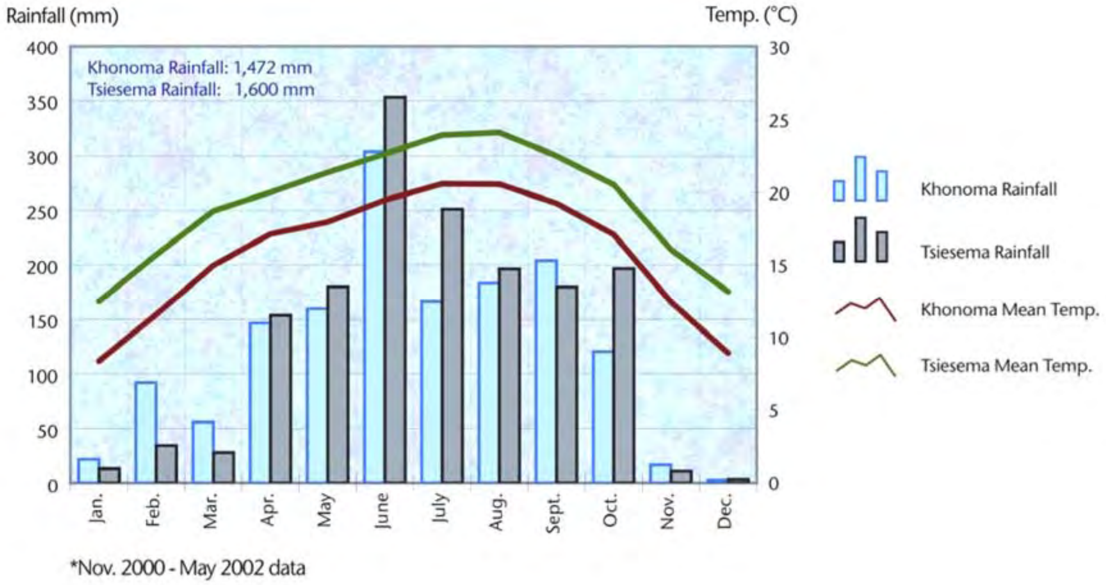
APPENDIX 4-25. Comparison of Temperature Data at High, Mid and Low Altitude Weather Stations in Tsiesema *



* Data collection - High: Sept., '01 - Dec., '02; Mid: Nov., '00 - Nov., '02; Low: Sept., '01 - Nov., '02

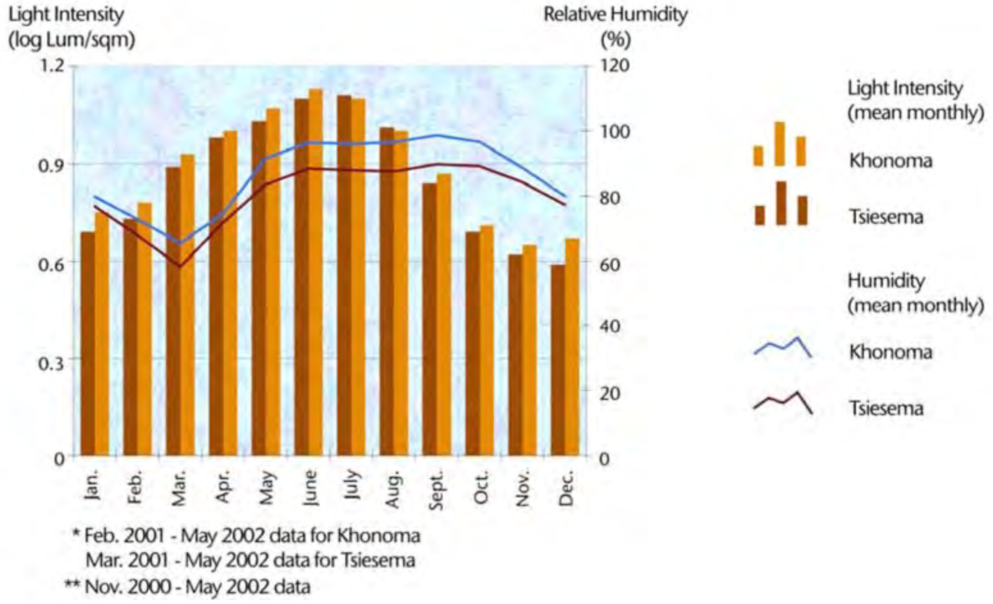
See appendix 4-22 for locations of the respective weather stations.

APPENDIX 4-26. Rainfall and Temperature Data at Khonoma and Tsiesema Mid-Altitude Weather Stations * (1,550 and 1,180 m. asl. respectively)



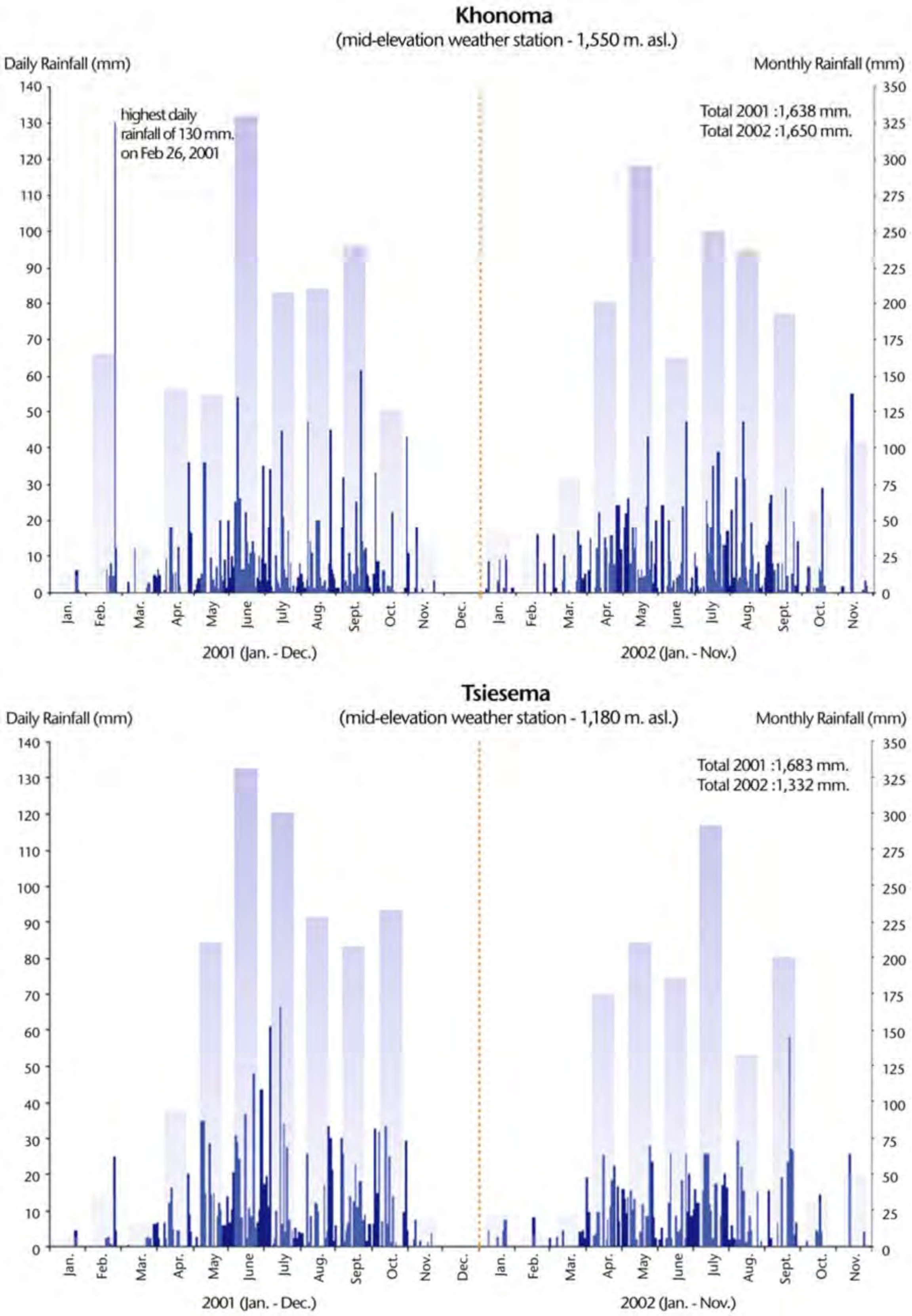
See map 4-7 (Khonoma) and appendix 4-22 (Tsiesema) for locations of the mid-altitude weather stations at each village.

APPENDIX 4-27. Khonoma and Tsiesema Light Intensity* and Relative Humidity** at their Respective Mid-Altitude Weather Stations



See map 4-7 (Khonoma) and appendix 4-22 (Tsiesema) for locations of the mid-altitude weather stations at each village.

APPENDIX 4-28. Comparison of Rainfall between Khonoma and Tsiesema during 2001-2002 *



* See map 4-7 (Khonoma) and appendix 4-22 (Tsiesema) for locations of the mid-altitude weather stations at each village.

APPENDIX 4-29. List of Animals and Birds of Nagaland [‡]

BIRDS: [†]

No.	English Name	Taxonomic Name	Local Name (Angami)
1.	Barbet, Blue-throated	*Megalaima asiatica* (Latham)	
2.	Barbet, Great Hill	*Megalaima virens* (Boddaert)	
3.	Bulbul, White-cheeked	*Pycnonotus leucogenys* (Gray)	
4.	Chat	Passeriformes	
5.	Chloropsis, Goldfronted	*Chloropsis aurifrons* (Temminck)	
6.	Coucal, Lesser	*Centropus toulou* (P.L.S. Muller)	
7.	Crow, Common/House	*Corvus splendens* Vieillot	shüzha
8.	Cuckoo	Cuculidae	hutu
9.	Drongo, Racket-tailed	*Dicrurus paradiseus (*Linnaeus)	
10.	Dove, Rufous Turtle	*Streptopelia orientalis* (Latham)	
11.	Dove, Spotted	*Streptopelia chinensis* (Scopoli)	
12.	Drongo, Bronze	*Dicrurusaeneus* Vieillot	
13.	Drongo, Crow-billed	*Dicrurus annectans* (Hodgson)	
14.	Drongo, Hair Crested / Ash	*Dicrurus hottentottus* (Linnaeus)	
15.	Finch	Fringillidae	
16.	Flower Pecker	*Dicaeum* sp.	
17.	Flycatcher, Fantailed	*Myioparus plumbeus* Hartlaub	
18.	Flychatcher, Paradise	*Terpsiphone paradisi* (Linnaeus)	
19.	Fowl, Red Jungle	*Gallus gallus* (Linnaeus)	
20.	Hawk-Eagle, Hodgson's / Feathertoed	*Spizaetus nipalensis* (Hodgson)	
21.	Hoopoe	*Upupa epops* Linnaeus	buoürhü
22.	Hornbill, Great Pied	*Buceros bicornis* Linnaeus	thovü
23.	Hornbill, Indian Pied	*Anthracoceros malabaricus* (Gmelin)	
24.	Hornbill, Rofous-necked	*Aceros nepalensis* (Hodgson)	
25.	Hornbill, Wreathed	*Rhyticeros undulates* (Shaw)	
26.	Kite, Pariah/Black	*Milvus migrans* (Boddaert)	keya
27.	Magpie, Common Green	*Cissa chinensis* (Boddaert)	
28.	Malkoha, Large Green-billed	*Rhopodytes tristis* (Lesson)	
29.	Martin	Delichon or Chelidon	
30.	Mesia, Silver-eared	*Leiothrix argentauris* (Hodgson)	
31.	Minivet	*Pericrocotus* spp.	
32.	Myna, Hill	*Gracula religiosa* Linnaeus	tsathou
33.	Owl	Strigidae	boukhruo
34.	Parrot / Parakeets	*Psittacula* sp.	kekie
35.	Partridge, Common Hill	*Arborophila torqueola* (Valenciennes)	peü
36.	Pheasant	Phasianidae	terhei
37.	Pigeon, Common Green	*Treron phoenicoptera* (Latham)	kevü
38.	Pigeon, Green Imperial	*Ducula aenea* (Linnaeus)	
39.	Pigeon, Imperial	Carpophada	
40.	Pigeon, Purple Wood	*Columba punicea* Blyth	

No.	English Name	Taxonomic Name	Local Name (Angami)
41.	Pipit, Olive-backed	*Anthus hodgsoni* Richmond	
42.	Pipit, Water	*Anthus spinoletta* (Linnaeus)	
43.	Quail, Common / Grey	*Coturnix coturnix* (Linnaeus)	vüpfhi
44.	Quail, Jungle Bush	*Perdicula asiatica* (Latham)	
45.	Quail, Little Bustard	*Turnix sylvatica* (Desfontaines)	
46.	Sunbird	*Nectarinia* sp.	
47.	Sunbird, Firetailed	*Aethopyga ignicauda* Hodgson	
48.	Swallow, Wiretailed	*Hirundo smithii* Leach	kitie
49.	Swift		
50.	Tailorbird, Common	*Orthotomus sutorius* (Pennant)	nyievünuo
51.	Thrush	Turdidae	
52.	Thrush, Pied Ground	*Zoothera wardii* Blyth	
53.	Tit	Paridae	
54.	Tit, Grey	*Parus major* Linnaeus	
55	Tragopan, Greybellied	*Tragopan blythii* (Jerdon)	ngou
56.	Wagtail, White	*Motacilla alba* Linnaeus	
57.	Warbler, Brown Hill	*Suya crinigera* Hodgson	
58.	Woodpecker	Picidae	seidu
59.	Wren-Warbler	*Prinia* sp.	

[†] Latin names follow Ali, 1996.

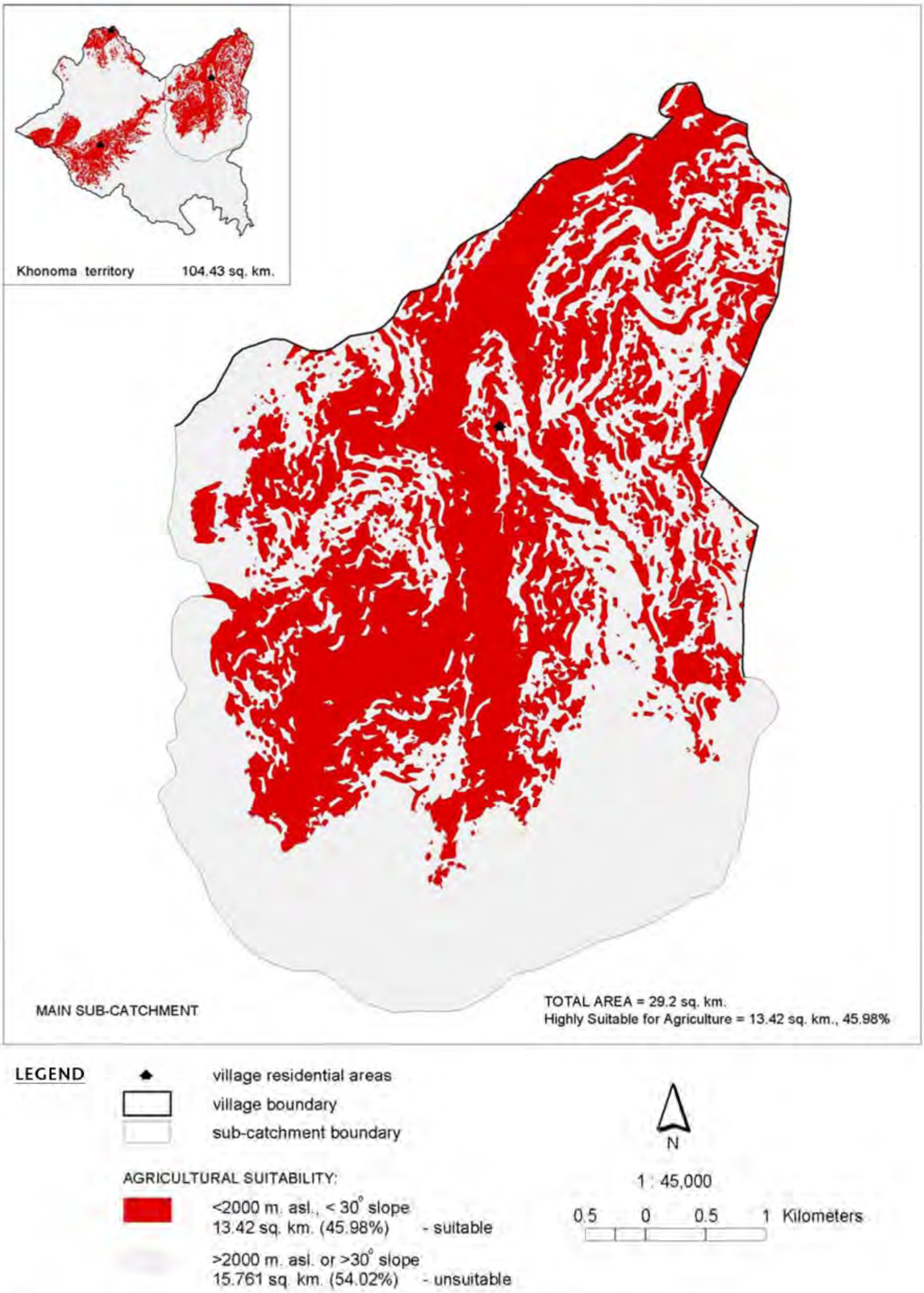
[†] For a more detailed enumeration of birds specific to Nagaland, see Whiso et al., 2002.

ANIMALS:

No.	English Name	Taxonomic Name	Local Name (Angami)
1.	Bear, Sloth	*Melursus ursinus* Shaw	thega
2.	Boar, Wild	*Sus scrofa* Linnaeus	menyi
3.	Cat, Asiatic Golden	*Felis temmincki* (Vigors & Horsfield)	
4.	Cat, Civet	Viverra	
5.	Cat, Jungle	*Felis chaus* Schreber	tenya
6.	Cat, Leopard	*Felis bengalensis* Kerr	
7.	Deer, Barking	*Muntiacus muntjak* Zimmermann	chüzhie
8.	Deer, Sambar	*Cervus unicolor* Kerr	tekhra
9.	Elephant, Asiatic	*Elephas maximus* Linnaeus	tso
10.	Jackal, Golden / Asiatic	*Canis aureus* Linnaeus	meseru
11.	Leopard / Panther	*Panthera pardus* Linnaeus	khurhü
12.	Loris, Slow	*Nyeticebus coucang*	
13.	Macaque, Assamese	*Macaca assamensis* M'Clelland	tepfi
14.	Porcupine, Crested	*Hystrix indica* Kerr	tshiekru
15.	Python	*Python molurus* Linné	
16.	Squirrel, Flying	subfamily Petauristinae, family Sciuridae	kejo
17.	Tiger	*Panthera tigris* Linnaeus	tekhu

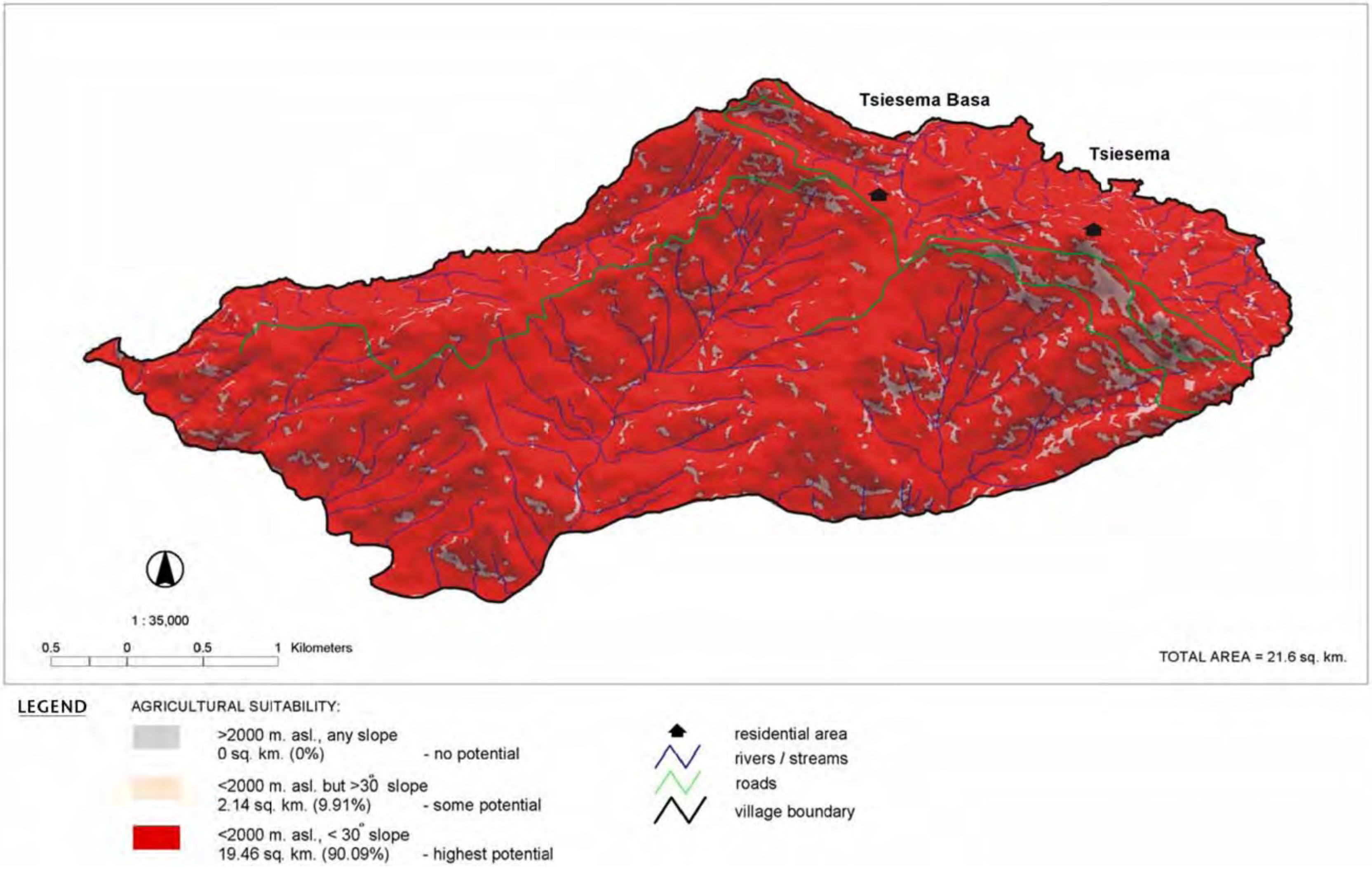
[‡] Lists provided by Wildlife Division of Department of Forestry, Nagaland, and are in no way comprehensive.

APPENDIX 4-30. Zooming in on Main Sub-catchment Area that Khonoma Cultivates, to Classify Land with Highest Potential for Agricultural Use * (using altitude and slope as parameters)



* See map 5-2 for a digital elevation model of this same sub-catchment area.

APPENDIX 4-31. Identifying Land that Should have Highest Agricultural Potential in Tsiesema Village – Based on Altitude and Slope Criteria



APPENDIX 4-32. Brief Case Studies of Land Transfers in Khonoma *

1. EXCEPTIONS WHERE HEREDITARY LAND WAS NOT PASSED ON THROUGH NORMAL CHANNELS:

Although ancestral lands are normally passed from father to sons, there can be exceptions where this does not happen:

Case Study 1.1:

Mr. Siu Ratsa, of Semomia khel, pledged that his jhum field at Thedzülieziekie would be jointly inherited by the eldest sons of each of his four daughters: 1) Mrs. Puheno, 2) Mrs. Ulieü, 3) Mrs. Sano and 4) Mrs. Zalhuniü.

Accordingly, the plot is now jointly owned by –

- Mr. Salhou Yalie – son of Puheno,
- Mr. Nitsilie Mern – son of Ulieü,
- Mr. Viyietsu Viyie, son of Sanuo, and
- Dr. Medovikho Chücha, son of Zalhuniü.

This was a valid transfer because Mr. Siu Ratsa did not have any other kin who could inherit this property.

Case Study 1.2:

According to Khonoma's customary law, ancestral land is normally not passed on to daughters. But this can be over-ridden with the agreement of the brothers or other male kin who would ordinarily inherit that land, granting the daughter/s full freedom to manage or dispose of the land according to their wishes.

Three sisters - Mrs. Zalhukhoü, Mrs. Pekruno, and Mrs. Bino of Semomia khel - received a plot of jhum land at Chayagei. Even though this was ancestral land, their brothers allowed them to use it according to their own discretion. Later on, the women sold this same plot to Mr. Vizolie Chücha, son of Thezavilie Chücha.

The above transfer of land was consistent with customary law since the women's brothers had allowed them to dispose of the plot at their own discretion.

2. TRANSFER OF PURCHASED LAND TO DAUGHTERS:

A son has no right to object to whatever decision his parents make about the transfer of purchased (and thus transferable) land.

Case Study 2.1:

Mrs. Nichürhiü received a transferable paddy field at Kelizie from her father, Mr. Khrehie Terhüja. Later on, she transferred this same paddy field to her daughter, Mrs. Vigwelieno. These transfers were valid because the plot was bought and thus transferable.

Case Study 2.2:

Mrs. Khobuü received a paddy field at Chadaphi from her father. This plot had been purchased by her grandfather, Mr. Lovi. This transfer was permissible because the plot she received was transferable land. According to Khonoma's customary law, if a transfer is accepted as legitimate at the time it happens, then it will always be recognized henceforth.

3. CONVERSION FROM PRIVATE TO PUBLIC LAND:

Age groups (thetshü) in Khonoma often play a role in the conversion of private property into public domain:

Case Study 3.1:

Khwümezi's age group of Semomia khel bought a paddy field at Nyieziekie and donated it to all of Semomia khel as common land.

Case Study 3.2:

Tsoselie sold a plot of land at Terhuotsiese to Nivir's age group – which then used it to construct a rest house and playground to be used as common property by all of Merhümia khel.

Case Study 3.3:

Vilarhito's age group bought a plot of land and constructed a pond (Merhü Zie) on it as a common property for all of Merhümia khel.

Case Study 3.4:

Zhasiu's / Nilhupia's age group, of Thevomia khel, bought a paddy field from Miapho-u Savino and constructed a rest house on it as a public property for all of Thevomia khel.

4. CONFISCATION OF PRIVATE LAND IN DEFAULT OF REPAYMENT OF PUBLIC DEBT:

Case Study 4.1:

When Mr. Menovilhu Vakha, of Semomia khel, defaulted in repayment of a debt owed to Semomia khel, they confiscated his land. This property is the present site of Clayagei Government Primary School.

* Collected with the assistance of Ateu Chücha (Chücha, 2001).

APPENDIX 4-33. Village-Level Regulations Enacted by Khonoma [1]

CIVIL REGULATIONS:

Social Vices:

- Selling locally-manufactured brew is permitted, but not imported alcoholic drinks.
- Gambling over card games is strictly prohibited.
- Selling betelnut, tobacco or their products in any form is banned.

Crimes Against Others:

- In the case of theft, seven times the value of the amount stolen must be repaid to the injured party by the offender.
- If one's actions, either by intent or accident, result in the death of another, then the offender will be expelled from the village and not permitted to return for seven years.
- In the event of less grievous injuries or crimes committed against others, the guilty party is banished from the village for five days. This both 1) discourages revenge, and 2) is believed to help the wounds heal more quickly.
- Use of poisoning, love charms or other conjures is prohibited – and punishable by expulsion from the village.

Aliens:

- Outsiders who come to reside in Khonoma do not have the full range of rights as enjoyed by other villagers – and will be subject to a tax at a rate decided by village authorities. If 'adopted' by a citizen of Khonoma, then s/he will assume the full rights and responsibilities of other villagers.

RESOURCE MANAGEMENT [2]:

Livestock:

- Rearing pigs in the village is permitted, but they must be kept properly penned and not permitted to wander.
- Chickens can be reared in Khonoma – but can not be brought into the village from outside (for fear of introducing poultry diseases).
- Keeping dogs in the village is prohibited. (This regulation was enacted at a time when rabies was a problem.)
- To encourage their members to switch to growing profitable vegetables, often as winter crops, some khels are designating specific areas of their land to be excluded from all wandering cattle and mithun.
- If cattle or mithun enter a restricted area and damage crops, a fine will be levied against the herder responsible for looking after the offending livestock (not the livestock owner). The amount of the fine will be commensurate with the cost of the damage done.
- If cattle or mithun are discovered in the act of damaging crops, the field owner is at liberty to kill the intruding animals – with the meat divided evenly between the field owner and the livestock owner.
- Cattle and mithun are permitted access to 1st-year jhum fields after the Tiekede festival in the closing days of November, and the owners are not liable for damage done to any crops that remain in the fields.
- For 2nd-year jhum fields, this rule is applied after the Tsünyi festival in August.

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[1] The village council does not maintain a systematic registry of all the ordinances that it passed over the years. This list is not comprehensive, but simply a compilation of those regulations encountered during the fieldwork.

[2] The regulations governing resource use vary according to the category of ownership. The general guidelines are that: resources on village land can be harvested for personal use, but not for commercial purposes; those wishing to use clan-owned land or harvest resources from such land must first seek the permission of clan elders; and private land can be managed by the owner according to his wishes, with few restrictions imposed by the village.

Tree Harvest:

- Logging for commercial purposes is strictly prohibited on all village land; has been banned by Merhümia and Thevomia khels on their respective khel lands (but continues on Semomia khel land); and is at the owners' discretion on private lands.
- Trees can be cut for firewood (for either private use or sale) on communal land within limits imposed by elders or office bearers. On private lands, firewood harvest is at the owners' discretion.
- Cutting trees for making charcoal is governed by the same regulations as applied to firewood (see directly above).
- Alder is to be excluded for use in making charcoal.

Non-Timber Forest Products:

- Similar rules apply to the harvest of most non-timber forest products from village land – fruits and vegetables, medicinal plants and flowers. Their harvest is permitted only for individual needs, but prohibited for commercial purposes.
- Bamboo can be cut on village land for personal use, but not for commercial purposes. Permission from elders of the relevant clan is needed to cut bamboo on clan land, but that growing on private land can be cut at the owners' discretion.
- Thatch grass can be harvested from village land for personal use, but not for sale. Thatch growing on clan land is restricted to members of the owning clan, while swards on private land are limited to the land owner.
- Broomgrass can be harvested from village land for own use, but not for commercial ends. That growing on private land can be harvested by the owner with no restrictions on its use.
- Harvest of cane (rattan) on village land is open to all members of the village.
- Export of topsoil from the village for sale as potting soil is prohibited.
- Quarrying stones is prohibited on village land, requires the permission of elders on clan land, and is at the owners' discretion on private land.
- Wild honey can be collected on communal land with permission from elders, and at the owners' discretion on private land.

Hunting and Fishing:

- There is a blanket ban on hunting all types of birds and wild animals within the village's territory, except in those cases where the village council decides to temporarily lift the ban to permit a limited hunting season (often at times when wildlife damage crops).
- Burning of the jungle (usually for flushing wildlife) is strictly prohibited on all types of common land.
- Fishing by local techniques is permitted in Khonoma's rivers and streams – but use of chemicals to stun or kill fish is strictly prohibited.
- Use of fisheries ponds on clan land is restricted to members of the owning clan. Those dug on private lands are limited to private access.
- Fish and snails in wet rice terraces, whether naturally-occurring or introduced, are private resources. It is thus not permitted to catch fish or snails in wet rice terraces belonging to someone else.

Land Claims:

- Trees or other perennial crops can be planted on common lands – but can not be used to justify private claims to the land. He can claim ownership only over what he has planted.
- A son can claim ownership of trees planted on clan land by his father but after cutting the trees the first time, any coppice regrowth reverts to clan ownership and can be cut by any member of the clan.
- The elders of each khel decide every year which area will be opened for jhumming. Anyone not owning land in the particular area chosen can instead request to cultivate khel-owned land.
- Anyone wishing to cultivate common lands must first seek permission from the elders and then pay a symbolic rental fee as acknowledgement that the land is not his.
- If one builds a sitting place or some other type of monument on land that does not belong to him, then one may attach a name to it – but can not use it as justification for claiming the land.
- Although less common now, land disputes may be settled by taking an oath that your claim is authentic and inviting the severest punishment to yourself and family members from the spirit world in the event that you are being untruthful. Otherwise, cases that can not be settled within the village are now taken to the dubashi court in Zubza.

APPENDIX 4-34. Village-Level Regulations Enacted by Dzulake

CIVIL REGULATIONS:

Aliens:

- Non-Nagas residing in Dzulake area or working as labor in the area must pay a tax of Rs 100/annum. Persons found in violation of this rule will be subject to any action deemed necessary by the village. †

RESOURCE MANAGEMENT:

Livestock:

- If an elephant enters someone's agricultural field, its owner will be fined Rs 5000. The fine must be paid within 10 days of the incident, or the village may decide to take any course of action against the animal. (This resolution was passed at a time when there were many elephants in the Dzulake valley, being used for logging.) ‡
- If a buffalo enters someone's agricultural field, its owner will be fined Rs 2000. The fine must be paid within 10 days of the incident, or the village may decide to take any course of action against the animal. ‡

Tree Harvest:

- Residents of Dzulake have the right to harvest at least one truckload of firewood every year for their own use. Those actually staying in Dzulake can cut their firewood in more accessible locations close to the village. But those who own land in Dzulake, but no longer live there, are restricted to cutting firewood in designated areas more distant from the village. Cutting firewood for sale is prohibited. Villagers from Khonoma can not come to cut firewood on Dzulake's land unless they actually go and live there.

Non-Timber Forest Products:

- Dzulake residents are permitted to collect wild vegetables for sale only one day in a year. When groups visit from Khonoma representing, for example, the Baptists, the Catholics or those retaining their traditional religious beliefs, they may collect as many wild vegetables as they wish. But this privilege is not extended to Khonoma villagers when they visit Dzulake as individuals. If outsiders (from neither Dzulake nor Khonoma) come for a picnic, then after seeking the permission of the gaonburas, they are allowed to gather whatever wild vegetables they can eat whilst on the premises, but are prohibited from taking any away when they leave.
- The above regulation also applies to wild fruit, principally apples.
- Villagers can quarry any amount of stone for their own use, but are prohibited from selling it. Wages for stone masonry are set at a standard rate of Rs 150/day – compared to Rs 300/day in Khonoma.

Hunting and Fishing:

- Hunting is now completely banned in all of Dzulake's territory.
- Fishing is allowed only by those from Dzulake and Khonoma. Others found violating this rule (caught in the act or reported by a witness) will be fined from Rs 10,000 – 50,000. †
- There are certain restrictions in fishing techniques. Anyone caught using bleaching powder to kill fish will be fined Rs 15,000 or more; stretching a net across the stream is prohibited and violators will be fined Rs 500 or more; and anyone found using a hammer to hit rocks under which fish are hiding will be fined Rs 500 or above. †

Land Claims:

- Only wet rice terraces, permanent gardens and more recently, perennial cash crop plantations (tea, passion fruit) can be claimed as private land. The remainder of Dzulake's territory is community land.
- Many of Dzulake's wet rice terraces are left uncultivated now because their owners have moved away from the villages. But their ownership of the land remains intact and anyone wanting to cultivate it must first seek their permission.
- When opening a jhum on community land, every household can open as large an area as it has labor to manage.
- Planting trees on community land is permitted, and the farmer's tenure over those trees will be recognized. But they can not be used as a justification for trying to claim the land.

[†] Resolutions passed at a meeting of the Dzulake village council on Jan. 6th, 1991.

[‡] Resolutions passed at a meeting of the Dzulake village council on June 20th, 1993.

APPENDIX 4-35. Village-Level Regulations Enacted by Tsiesema [3]

CIVIL REGULATIONS:

Social Vices:

- Selling alcoholic drinks is prohibited in the village. Infractions are punishable by fines up to Rs 500 to both the seller and customer, and destruction of the spirits.
- Those selling or using drugs will be expelled from the village.
- In the absence of permission from the village council, any type of lottery or games involving gambling is not permitted. Violators are subject to fines of Rs 500 each by the village council.
- During intervillage sports competitions, visitors are not permitted to fraternize with the local village girls.
- Unmarried girls who fall pregnant must leave the village.

Village Hygiene:

- Discarding garbage within the village's residential area is not permitted.
- During winter, washing clothes at the village well is not permitted.

Crimes Against Others:

- In the event of causing the death of another (often through hunting accidents), the guilty party is expelled from the village for a period of seven years. It is customary that after this period, relatives of the deceased will then seek him out and invite him to rejoin the village.
- Anyone caught stealing will be penalized at seven times the value of the property stolen.
- It is permissible to harvest up to five pieces of fruit from someone else's kitchen garden, but above this will be subject to fines.

Aliens:

- If an outside man marries into the village and settles there, then he must adopt his wife's surname and clan affiliations. Providing that he respects the rules of the clan, then he can participate fully in clan and village life – including use of communal resources. If he leaves the village or violates its rules, then he forfeits all such privileges.
- Anyone adopted by a Tsiesema family enjoys full and equal rights accorded to other children born into that family. But these privileges are contingent on the adopted son or daughter continuing to reside in the village and abide by the adopting parents' wishes. Failing to do so may nullify the adoption and associated privileges.
- Outsiders wishing to reside in Tsiesema for an extended period must both receive permission from the village council, and identify a local patron (parent) who will be responsible for their conduct. This applies to both Nagas and non-Nagas. Non-Nagas must further pay an annual fee of Rs 50 to the village student body as a way of acknowledging that they are not Nagas. Those failing to satisfy these rules are not permitted to remain in the village.

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[3] In the absence of a formal penal system, there are numerous leverages that the village uses to enforce its regulations. A violator may find himself banned from using community resources, and that his neighbors are no longer willing to join communal work groups to work in his fields. He may also be forbidden to cut his hair in the village.

RESOURCE MANAGEMENT [4]:

Livestock:

- Pigs may be reared in the village but must be kept in confinement.
- Chickens and ducks can be kept in the village, but must be propagated from local stock. It is prohibited to import poultry into the village from outside (for fear of introducing diseases).
- It is prohibited to rear dogs in the village. If a dog kept in the village against regulations bites someone, then the offender will be responsible for any injuries and medical costs.
- Goats are barred from being kept in the village residential area. They can be reared on communal lands, but must be looked after by a herder.
- It is not permitted to rear king bees in Tsiesema. Anyone breaking this regulation will be held responsible for any negative consequences.
- Cows are allowed to free-range on both private and communal land, but must be supervised by a herder throughout the year.
- In case crops are damaged by cattle, then the cattle owner must visit the spot and negotiate compensation with the land owner. If they are unable to reach an agreement, only then will the village council be asked to settle the case.
- Those cultivating permanent gardens are responsible for fencing them against free-ranging cattle. Otherwise, they have no grounds for claiming compensation for damage to their crops.
- The village council has set a standard rate of Rs 200/day for hiring buffalo to plough wet rice terraces. Anyone found not complying with this rate will be barred from rearing buffalo in Tsiesema.
- Any meat sold in Tsiesema must be at village rates, not Kohima prices.

Tree Harvest:

- Cutting trees on village land for timber or firewood is prohibited – except in cases decided by the village council and supported by the majority of villagers. However, the village council does permit farmers to cut enough small diameter poles to build their fieldhuts.
- A buffer of 100 m both above and below the agri-link road is to be preserved under forest cover and cutting any trees or bamboo there is strictly prohibited, punishable by a Rs 5000 fine.
- It is prohibited to cut fence posts from trees on village land.
- If, with the permission of elders, someone plants oak trees on clan land, then he will retain exclusive rights to those trees. But if planted on village land, then he can claim only the right of first harvest and the future regrowth can then be cut by anyone.

Non-Timber Forest Products:

- Non-timber forest products such as wild fruits and vegetables, medicinal plants, and flowers can be harvested for personal use but not to sell. Care should be taken that harvest does not unnecessarily damage the future productivity of the resource. Only the needed portion should be removed, leaving the remainder of the plant intact. Wild fruit trees should never be cut or damaged.

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[4] At a general meeting of the village council on Feb. 3rd, 2002, it was resolved to create a special committee to work with the village council in managing Tsiesema's land and forest resources.

Land tenure has similar implications to resource regulations as in Khonoma. Village members can avail communal resources for personal use, but not for sale. The village council and the recently established committee oversee resource use on village-owned land. Clan elders play this role on clan-owned land, and private land is managed at the discretion of its owner. All land disputes are settled by the village gaonburas (headmen of a khel or village appointed by the government) and clan members.

- It is permitted to harvest wild honey, but again, care should be taken to protect the future productivity of the site. The tree containing the hive should not be cut, nor the bees killed.
- Wild orchids can be collected to adorn one's own house compound, but not for sale in the market.
- Only domesticated flowers can be harvested for commercial purposes.
- Bamboo growing on private land can not be cut without the land owner's permission.
- Thatch grass growing on communal land can be collected by Tsiesema residents, but not outsiders. Thatch grass growing on private land is the sole property of the land owner and can only be harvested with his permission. Those caught cutting thatch on someone else's land without his consent will have to surrender the thatch and may be fined.
- Quarrying stones on private land is permitted and at the owner's discretion. Quarrying can also be done on clan land, provided that the majority of clan members agree.

Hunting and Fishing:

- Outsiders are forbidden to hunt or fish in Tsiesema's territory. Individuals or groups found in violation of this rule are subject to seizure of their equipment and fines of up to Rs 5000.
- The hunting season in Tsiesema is closed from March to September. The Welfare Society of Tsiesema is empowered to oversee regulations related to hunting.
- Burning the forest is a serious offence and offenders will be both punished by Tsiesema and jailed by government order.
- Fishing in Tsiesema's streams and rivers is allowed, but no chemicals can be used to stun or kill the fish.
- The snails found in wet rice terraces are considered a private resource, so collecting snails in someone else's field is not permitted.
- It is similarly not allowed to fish in the wet rice terraces of others.
- Anyone found on other's private land collecting the edible larva (kelu) that burrow through some tree species, is subject to fines imposed by the land owner – depending on the estimated damage to his trees.

Agricultural Lands:

- Community land can be used for agricultural activities – including developing it into irrigated terraces or cash crop plantations – only with the permission of the village council and any conditions it may impose.
- Community land can be opened for jhumming as long as there is a majority consensus within the village. Everyone has the right to harvest firewood from the jhum fields that they open.
- Burning of the jhum fields is done on a pre-agreed date. Everyone should therefore be informed before the fields are burnt, and assemble to ensure that the fire does not escape. In the event that someone burns before the fixed date, then he may be punished by having to clean the jhum fields of others.
- Every household is permitted to develop not more than one wet rice field on Tsiesema's village-owned land. There are no fees for the first three years of production, but starting on the fourth year, a land tax of one large tin of paddy (16 kg) for every three sacks harvested is levied by the village council. This right is reserved for original Tsiesema families and not outsiders.
- Villagers are free to develop wet rice terraces on their private land. But use of irrigation water is governed by the principle of 'first come – first serve'. It is prohibited to dig a canal above an existing irrigation system and divert water away from that water-user's fields. But it is permitted to dig new canals downstream from existing users.

APPENDIX 4-36. Khwünomia Geizo (Khonoma Song)

From distant lands that we know not of
Came a race of men, numberless as the spirits
Wielding sticks that fire, sticks shaped like toys.
It is reported, they are proceeding on us, and in their wake
Conquered are the neighboring villages.
Their wrath, legend-like, we have heard,
And they have set eyes upon our land, so return early.
Lo, the village placed upon that expanse of land
Is the land we hold most dear after our love for the spirits.

Young men of our land, do not give our land to others.
Our village is excellent among her neighbors.
Her population increases, brew and rice abound.
Our people are fattened by our feasts of merit.
We think on several things and each of us
Fill our spaces with laughter.
Plagues do not come near us
But take other roads into unknown regions.
Our enemy shall be defeated by us
Let your luck hold and may you chase our foes back
Early and return to our land.

Composed by Yani-ü Rürhie
Translated by E. Iralu

CHAPTER 5

The Wider Livelihood System

APPENDICES

APPENDIX 5-1. Months of Lunar Calendar

Gregorian Calendar	Angami Calendar
January - February	Doshü
February - March	Kezei
March - April	Kera
April - May	Ketshie
May - June	Cacü
June - July	Cadi
July - August	Mvüsa
August - September	Tsierie
September - October	Rüyo
October - November	Thenyie
(November – December)	Ziephie
November - December	Rüde
December - January	Kenuo

APPENDIX 5-2. Ecological Indicators – Khonoma*

Marking the Rhythm of the Agricultural Year ...

- The weather begins to turn warmer after the Sekrenyi Festival in February.
- The arrival of the pipihi bird in Mar.-May signals the end of winter and that the weather will turn wet and hot.
- When one hears the call of the hetu bird (usually April-May), it is already too late to get married that season. Further courtship or marriage should be deferred until the next season.
- When tego (*Bauhinia variegata* L.) blooms, it is a sign that it is time to plant the wet rice nurseries.
- Also, when the hetu bird sings, it is similarly a sign that it is time to plant the paddy nurseries.

Weather Indicators ...

- Rainfall will usually coincide with the blooming of the wild cherry (*Prunus avium* (L.) L.) in early-mid-November.
- The appearance of lines of ants, often carrying their eggs to relocate their nest sites, foreshadows approaching rain.
- When the ketsiedsithu insects ('cows of the stone') retreat under their stones, then rainfall is imminent.
- If a rüva (leech) is placed on the fire and explodes, then it will not rain. But if a leech is turned inside out, then rain will follow.
- Zochü (earthworms) blocking the entrance of their tunnels with their dung signal approaching rain.
- When mekhrü (termites) are seen flying from their nests, the rains will soon stop.
- During the dry season (winter), when cattle herd together and make loud noises, and then enter the thick jungle, then it is a sign that there will be rain.
- When hunting dogs pause to chew grass along the pathway, it means that rain is approaching.
- The call of the khrüpfüte bird signals approaching rain.
- The flowering of riegie, garibu (*Porana racemosa* Roxb.) or nimhvü (*Anisochilus carnosus* (L.f.) Bth.) is followed by rain.
- As long as garibu (*Porana racemosa* Roxb.) continues to flower, the rain will continue to fall.
- When the ground surrounding springs becomes damp, the rains are coming.
- Cloudy conditions around Japfü peak indicate approaching rain.
- If there are constant rains almost every day during the months of April and May, it results in less rainfall and shortage of water during the time of transplanting in late June – early July.
- During those years when the rain seems to be coming from the North towards the South, water will be in abundance.
- When rainbows are seen, it means that sunshine will soon return on that day.
- The clucking manner of chickens in the village foretell a sunny day.
- The chirp of the thekhrürano bird signals that the weather will be good. This is believed to be a magical bird that although never seen, its chirping is heard at night. It is thought to be tall and stands with one foot on earth and the other in the heavens.
- Migration of the teyha hornbill towards the village is a positive omen, and provides reassurance that the crops will not be destroyed by hailstorms that year.
- The low bending of the giant bamboo (vüni - *Dendrocalamus giganteus* Wall. ex Munro), so that its tips are near the ground, signals approaching drought.

- When the rock bee (tsiekhakhwi) is seen migrating down the valley (south) away from the village, it foretells heavy rains and winds that year that may damage the crops. But adversely, if the bees migrate further upward into the valley (north), then harsh weather will not be a problem that year.
- When bees and wasps build their hives low, hidden or sheltered, fierce winds and rains are expected that year. But when they build high in the trees or other unsheltered locations, the weather will be calmer.
- When the small kerüra birds build their nests low along the river banks, rainfall will not be heavy that year. But nest construction higher from the water level signals that heavy rains can be expected.

Agricultural Indicators ...

- When 'nodules' are found on the roots of rice plants during transplanting, this indicates an impending famine.
- When bamboos flower, then a famine will follow the coming year. Flowering bamboos thus signal that villages should prepare alternative food resources.
- When rice flowers heavily such that the panicles rub against each other, then the harvest will be good that year.
- In areas sheltered from the wind, there will be more empty rice hulls.
- Wild apple (*Docynia indica* (Wall.) Decne.) bears fruit only every second year; in those years when wild apple bears fruit, there will also be a bountiful harvest of jhum cereals, such as rice, millet and Job's tears.
- Plenty of snow on the surrounding mountain tops indicates that the coming cropping season will be ideal for planting millet.
- The growth of the prübie weed indicates soil easily tilled. But colonization by the mithutie weed suggests soil difficult to cultivate.
- The presence of penie (*Artemisia indica* Willd.) or rünu (*Elsholtzia blanda* (Benth. in Wall.) Benth.) are indicators of superior soil, whereas kukhie (*Osbeckia* sp.) or thegasiro (*Neillia thyasiflora* D. Don) suggest poorer soils.
- After the windy season begins (Feb.-Mar.), then one should not collect wood, bamboo, thatch or any raw materials for construction. Otherwise they will be destroyed by insects.
- Or similarly, after new leaves begin to emerge on the trees (Apr.-May), one should not cut or collect materials for construction, or make baskets, furniture or other handicrafts.
- If one follows the sun rays that penetrate the forest canopy, wherever vapor is seen rising from the ground will be a promising site to search for edible mushrooms.
- To identify if mushrooms are edible, one should look for the presence of insects. If there are no insects on the mushrooms, it is probably an indication that they are poisonous. But if insects are present, then it is probably safe to eat.
- On the day that a wet rice terrace is puddled, that evening will be the best time to hunt for frogs there.
- Perilla (*Perilla ocymoides* L.) planted along the perimeter of jhum fields will help repel rats from damaging the crops.
- If *Artemisia* is cut and placed as a mulch over a garlic bed, the garlic will grow much better.
- *Ficus* trees should be cut when opening a jhum. Otherwise many birds will be attracted by their fruit and then damage the crops.

Related to Conservation ...

- Civit cats should not be killed – since they play an important ecological role in eating the seeds and fruits of trees and dispersing them, assisting in forest regeneration.
- If jungle cats are heavily hunted, then rats will become more of a problem.
- If deer and other wild animals become too few, hunters will be plagued by flies that would ordinarily be attracted to wildlife, and it becomes difficult to sleep in the forest.

Omens of the Future ...

- The appearance of an unusually short rainbow (temvü) in the middle of the sky is feared to bring death from outside the village, from the direction where it was seen.
- The frequent call of a chüzhie (barking deer) nearby the village signals an impending death in the village. The side from which the barks are heard indicates which khel will be visited by death.
- When picked up, the nuluo will roll up tightly into a ball to protect itself. But if it unrolls in your hand and tries to crawl away, then it is an omen that your parents will die early.
- The cry of foxes or domesticated dogs mean that calamities or accidents may occur in the near future.
- The call of the koshotsiedu bird indicates impending death of a villager outside the village, and the repatriation of his body back to the village for burial.
- The small tseüno bird has two distinctive types of calls. One call signals bad luck and when heard, some people will turn around and return home. (Others will ignore it, rationalizing that it is not 'their' bird.) The second more musical call is interpreted as good luck and that the listener will be successful in his/her work.
- When going to the field, if one hears the cracking call of the tseüino bird, it means that the listener will experience problems or difficulties along the way. But if the chirping of the tseüino bird is heard from the left-hand side, then it signals good news – since the shield (pezhü) is usually worn on the left side.
- While making a journey, if a civit cat, squirrel or snake run across one's path, then it is believed to be a sign that one's mission will fail.
- When the diegie bird is heard singing (sounding like a crowd of voices), then problems or danger may be encountered.
- While walking along a pathway, if one hears the call of the ziegei bird from the direction of the lower side, then it means that the day's work will be successful. But if the call is heard from the upper side of the pathway, then this forecasts bad luck – possibly an injury from a fall, slip of the dao, etc. In the aftermath of such ill fortune, the victim will often recall hearing the call of this bird from the upper side of the pathway.
- When walking to the field, if the phrievü bird is spotted circling overhead, then good news may be expected.
- It was taboo to kill deer that ventured into the village, for fear of adversely influencing the village's fortunes.
- If a warrior plans to join an expedition for warfare or headhunting, he should not sleep with his wife the previous night. Neither should he taste wine or food from other households. Before he departs, he tests his luck by plucking two leaves and dropping them simultaneously. If one leaf lands facing upward and one downward, his luck will be favorable. But if the leaves both lie facing the same direction, his luck will be uncertain.

Appeasing the Spirits ...

- When rainbows appear, the places where they touch the landscape (e.g., rocks, springs, big trees, etc.) show the abode of spirits.
- If you kill a python and then perform the proper puja, then its power (believed to reside in its head) will be yours.
- Every man should sacrifice a chicken during the Sekrenyi festival every year to sanctify his life. For young boys participating for the first time, they should kill a full-grown cock. Then their names will henceforth be included amongst the men.
- Transplanting wet rice should be initiated by a village elder on a particular day, called tekhusekhrü.
- After transplanting wet rice is completed (mid-July-Aug.), a village elder should sacrifice a chicken and impale it upside-down on a sharp stick to appease the spirits guarding the crops. This offering is called terhase.

* Collected with the assistance of Nijasielie Terhüja, Khonoma.

APPENDIX 5-3. Ecological Indicators - Tsiesema

Marking the Rhythm of the Agricultural Year ...

- When the kuku bird (hutu - cuckoo) starts singing, then the rainy season is approaching and it is time to prepare umbrellas, shelters, etc. for use in the fields.
- When the kuku (cuckoo) bird is heard singing in March, this signifies that it is the proper time to sow paddy in the higher-altitude fields near the village.
- When the khotsonuopfu bird starts singing, it indicates the optimal time for sowing paddy in the warmer jhum fields that are at lower altitudes and further from the village.
- When niedzo flowers, it marks the proper time for sowing sticky rice in the jhum fields, and also time for planting the wet rice nurseries.
- When huto (*Trevesia* sp.) and teguo (*Bauhinia variegata* L.) bloom, it is the proper time to sow paddy in the jhum fields.
- The second flowering of kijünounyie (*Curcuma* sp.) marks the optimum time for planting the jhum field. By the time of its third flowering, the season for planting jhum is considered over.
- When there blooms for the second time, it marks the proper time for planting soybean.
- When the shüguo bird stops singing, then it is too late for planting in the jhum field.
- Nyierhie, pfesei, npe and mecho (*Schima wallichii* (DC.) Korth.) are all indicator plants, whose flowering signals that it is time to transplant rice seedlings from the nurseries into the wet rice terraces.
- While working in the wet rice terraces, when the dzogei insect (cicada) is heard two times (usually 3:30-4:00 p.m.), this signals that it is time to begin the return trek back to the village. While working in more distant fields, when the cicada sings three times, this means that it is time to stop work for the day and begin the return trip back to the village.

Weather Indicators ...

- When rüpu (termites) bring new soil up to the surface of their nests, it is followed by rains.
- When termites fly out from the ground, it is a sign of impending good weather.
- When red ants march in a line, it signals good weather – but black ants doing the same thing point to approaching wet weather.
- When bees construct their hives in lower branches of trees, it signals that heavy winds and destruction should be expected that year.
- When zochü (earthworms) crawl on the soil surface, it indicates impending heavy rainfall.
- When the boukhrou (owl) calls its own name – '*boukhrou, boukhrou*', then the weather will remain cold. But if it sings '*tororo, tororo*', then the days will turn warmer.
- When the migratory mithutsi bird arrives, it will be followed by continuous rainfall for two to three days.
- When the pfili bird builds its nest lower along the river, then less rain will be expected that year. But higher nest locations hint that rainfall will be heavy.
- Dogs eating grass forewarn of impending drought.
- When rietsü blooms, it is always followed by heavy rains.
- The low bending of the tip of a bamboo is taken as a sign that more rain will fall that year.
- Heavy winds suggest that it will also be a year of heavy rainfall.
- If thunder starts from the east and continuously in the east, then there will be more rainfall in the east.
- When the ashes around a fire grow damp, it signals that rainfall is approaching.
- When the sky 'becomes lower' (i.e., low cloud cover), then rainfall is imminent.

- When the moon is in a perpendicular position, the weather will be hot that month – but if the moon is in a more horizontal position, then rainy weather should be expected.

Agricultural Indicators ...

- If the tip of the bamboo falls, then it is a sign of famine.
- When bamboo flowers, it is believed that famine will follow.
- Mornings with plenty of dew indicate healthy conditions for growing vegetables and rice, and that there should be fewer weeds in the jhum fields.
- When more snowfall is visible on Japfü peak, this is a positive sign for a healthy crop that year.
- When soil accidentally flies up into the mouth of a farmer hoeing his jhum field, this is interpreted to signify the new rice that he will soon be eating.

Omens of the Future ...

- When a fox is heard barking near the village, it signals that someone in the village will die.
- When encountered, if the tephrievü bird sings, it forewarns of the possibility of impending injury or fighting.
- When the neitsa bird enters the village, it forewarns that a house will catch fire and burn.
- While walking to the field or elsewhere, if one encounters several dzogei birds singing in unison, then it is a sign of good luck. But if only a single bird sings, then that is not good. The same belief is held about the tseünuo bird.
- The call of the tiechanuo bird is a good omen for the village.
- When the spirit called kegu shouts '*kegu, kegu, kegu*' and then falls silent (during Mar.-Apr.), then it signals that the rice crops will be healthy that year and yield a bountiful harvest. But when kegu adds an additional '*khrie*' to his call (i.e., *kegu, kegu, kegu, khrie*'), it warns that hailstones will damage the jhum and wet rice crops that year.
- When hunters succeed in killing the migratory khotsonuopfu bird, this signals that the remainder of the hunt will be successful and that more and larger game will be caught.
- While going hunting, if a snake (teinyhü) crosses the pathway, then no game will be killed that day.

APPENDIX 5-4. Dreams and their Meanings - Khonoma

- If one dreams about receiving good news, then it will surely come.
- Dreams of catching fish mean that money will soon be received.
- If one dreams of a cow, it will rain – but dreams of fire foretell that the coming day will be sunny.
- Dreaming of names associated with positive virtues such as “Viu” (good) or “Gongu-ü” (lucky) is a sign of good things to come. But if one dreams of names with less positive connotations, such as “Khrieni” (lost love), then the future will be more cloudy.
- If one climbs a tree in one’s dreams, then it is good – but falling out of the tree would signal bad tidings.
- Dreaming of somebody getting married is considered a bad omen.
- A dream that sees tribal members wearing traditional dress and walking in a single line may mean that there will soon be a death in the community. Similarly, dreaming of somebody wearing full traditional dress and singing is bad.
- If one dreams of losing a tooth, then it forewarns that a death may soon occur in the family.
- Some dreams are associated with travel. Dreams of traveling – perhaps by bus to another village or even flying somewhere, are auspicious. But if one dreams that the trip must be cancelled because a ticket is unavailable, then it signals approaching misfortune.
- If someone planning to go hunting dreams of killing a mithun, this foretells that the hunt will be successful.
- In earlier days when headhunting and warfare prevailed across the Naga Hills, Khonoma’s warriors paid careful attention to their dreams before going into battle. If their dreams saw them bloodied in war, then this warned that they would suffer casualties.

APPENDIX 5-5. Dreams and their Meanings - Tsiesema

- When considering whether to open a particular site as the following year's jhum field, if one dreams about catching snails or sighting a large body of water, then that area will produce a bumper paddy harvest. A dream about a stag also indicates a high paddy yield. If a tiger is seen in his dreams, then the field will be very weedy. But if a deer is dreamt of, then the harvest will be poor.
- While searching for a good site to open one's jhum field that year, if one dreams that his clothes are missing and he is naked, then the site under consideration will not yield good results.
- If fire is seen in a dream, then the following day will be dry with good weather. But if one dreams of death or a latrine, then rain will come the following day.
- If one dreams of birds or squirrels, then it foretells a possible fight or quarrel with someone.
- If we dream of a pig, then it means that much time will be lost in unproductive and unnecessary ways.
- If trees are seen falling in a dream, then it may indicate the approaching death of a villager.
- If we dream about fish, then the next day we will receive money.
- If we dream that our front two teeth fall out, this means that we may lose a maternal aunt or uncle to death. But if it is a wisdom tooth that is seen falling out in the dream, then there is a chance that a parent may die.
- If after setting a bamboo trap (kesia) in the forest, one dreams that he is collecting fruit like papaya, guava, banana ... then the next morning he will have animals in his trap.
- Dreams of pig meat, particularly the fat, signal the onset of a cough and/or fever.
- If a hunter dreams that he is getting married, then the next day he will be successful in his hunt.
- If we dream about chilli, then we will become sick.

APPENDIX 5-6. Angami Soil Descriptors

ANGAMI DESCRIPTOR		ENGLISH TRANSLATION	COLOR	WHERE FOUND	SUITABLE CROPS
KHONOMA	TSIESEMA				
chübo	*zochübuo*	earth worm castings	black	jhum fields	all types of crops
dzüba	*dzüba*	deep soil, immersed in water	black	wet rice terraces	rice
hochanyie	*huotsanuo*	sandy	light brown / dark grey	riversides, in fields irrigated from rivers	none / all types of crops (all types of crops but less production)
kiju nyieri	*nuorie*	red soil	red	sloped areas (below the top soil) / village residential area	ginger, soybean (No vegetables, but some trees can grow, e.g., local oak, pine.)
kijü jüpie	*dzüthonuo*	original, thick soil	light brown	warmer areas of village community land; will erode in heavy rains	All types of crops. Deep soil that is considered the highest potential for agriculture.
kijü keti (*melo*)	*dzütei*	dark / black soil, fertile	black	both in jhums and wet rice terraces, old forest	All types of crops grow well, particularly vegetables.
jüso nyie	*rüyhanuo*	soil in wet rice terraces after it has dried out	light grey	terraced fields that have been allowed to dry and become hard	red rice – Thevürü (less tasty than Nyoba)
kijü meyha / kijü meha	*dzüyhanuo*	thick soil, not very sticky	yellow - light brown	widely distributed (village residential area)	ginger, soybean (One of the preferred types of soil, producing less vegetative growth but very good fruiting.)
misenyie	*mimo*	burnt soil	red	in jhum fields where soil has been piled over debris and burnt	potato; rice grows best in such soil
niaya nyie	*niaya*	(area of direct sunlight)	any color	Higher areas with heavy sun exposure, both in jhums and wet rice terraces.	all types of crops
kijü nierha	*nuoyha*	wet mud / clay found in area where soil is prone to sinking / sliding	red-yellow	landslide areas	ginger, soybean
ketsa nyierhu	*ketsanuo*	soil formed by decay of forest plants	black	jhums; not found in Tsiesema.	all types of crops

ANGAMI DESCRIPTOR		ENGLISH TRANSLATION	COLOR	WHERE FOUND	SUITABLE CROPS
KHONOMA	TSIESEMA				
kijü phiedzü	*thelhow*	infertile soil (dry land or place where growth of trees is very slow)	reddish (both red and yellow)	both jhum fields & wet rice terraces (Naturally infertile areas that can be found anywhere on the landscape. Requires much longer fallow period to recover. Additional soil tillage required before planting.)	Can plant any type of crop, but production will be less. Best used for millet. (maize, soybeans, beans, rice, taro)
pheidzü nyie	*nuomhie*	fine soil; crops do not grow well	grey	jhum fields	millet
phiedzü	*phriedzü*	soil found in wet rice terraces that is able to hold water; contains water throughout the year	black (any color)	wet rice terraces that contain water throughout the year.	sticky rice; red rice – Nyoba variety (small and tasty)
rayha	*phiechü*	(infertile, only suitable for growing trees)	yellow -red	Naturally infertile and compact soil found in grassland areas. Usually covers a rocky layer underneath. Requires a long fallow period before it can support a crop.	None. Only grasses can grow there.
rüganyie	*rüganuo*	grey, sticky and wet	dark blue-grey	loose soil on unstable slopes, subject to frequent landslides; below the top soil	None. Alder colonizes these areas in colder areas.
?	*rüpu nuo*	small mountain; termite mound	(red and) black	young jhum fallows	Rice and all kinds of vegetables. Wild mushroom grow.
rüpu nyie	*rüpu pura*	termite mound, red in color	red	young jhum fallows	Wild mushroom – but no crops.
kijü therie	*theli*	soil rendered infertile by continuous cultivation	light black	widely distributed; maybe not found in Tsiesema, because less continuous cultivation – unlike Khonoma	Fertility is low, so crops do not perform well. Soybean can be planted but will not fruit well. Better to plant trees. (Ginger growth up to 7 years (???) – Tsiesema)
thethi	*thethi*	(immature, infertile)	any color	immature fallows	No crops grow well, but all types of trees can grow.

ANGAMI DESCRIPTOR		ENGLISH TRANSLATION	COLOR	WHERE FOUND	SUITABLE CROPS
KHONOMA	TSIESEMA				
kijü theze	*theze*	soil / area less exposed to direct sunlight	red or black (black on top, but increasing yellow tinge as move deeper)	places where sunlight hardly penetrates (sloping areas between mountain ridges, that recieve little direct sunshine and are continually moist)	cabbage, mustard leaf, garlic (cucumber, mustard leaf)
kijü tsiechie	*dzüsie / tsiethokhrie*	soil with small / soft stones (mixed with small stones) / equal mixture of soil with stones	any color (black)	along streams, or places where the soil is shallow (both in jhum and wet rice terraces); (community land)	soybeans, chilli, pumpkin, cucumber, rice (All types of crops can grow, but tomato and chilli perform particularly well.) / (All crops will produce well.)
	dzüsie dzübu	black soil mixed with black stone	black	can be found anywhere	suitable for tomato, taro, and chilli

APPENDIX 5-7. Implements Used in the Livelihoods of Angami Villagers

How farmers manage their resources depends not only on biophysical factors and knowledge systems – but also on the tools at their disposal. It was with this thought that a component was added to the fieldwork to record some of the tools and instruments of the Angami study villages. If ever true, obviously much has changed since the time when Butler declared "*The only implements of husbandry they* [Angami] *used are the dao ... and a light hoe ...*" (1875, cited in Elwin, 1969, 586).

But like language, dress, rituals or any other expressions of culture, it is common for villages of Angami and neighboring tribes in border areas to borrow tool designs from each other. The lines thus quickly become blurred as to what is local and specific – and what has been imported from outside. Such borrowing has doubtless been going on for a long time, and probably motivated early Naga expeditions down from the mountains to trade with more technically-advanced lowland populations. Oral evidence suggests that Khonoma owed much of its military supremacy to early acquisition of guns from Manipur Rajas. This was a byproduct of Khonoma's reputation as a trading village, whose people traveled as far as Bombay, Calcutta and Rangoon. These wandering traders were exposed to new ideas and technologies, some of which they brought home with them. Khonoma's propensity for trading, I have argued, was inextricably related to its shortage of agricultural land and the need to draw on external resources. But most fundamental to this study, the system of careful pollarding of alders would likely only have become possible after the introduction of iron tools.

Like all technologies, tools have thus evolved, with some abandoned in favor of more efficient substitutes. How the Angami till the soil is a good case in point. Within this collection can be found the shoulder-blade of a cow lashed with cane onto a wooden handle – an early prototype of the hoe used in an era before iron was widely available in the Naga Hills. It was probably most effective in the soft soils of flooded rice terraces. As steel became more widely available (often stolen from train tracks in the lowlands), later versions were hammered out by blacksmiths in the village. But now even blacksmithing has become a vanishing art as steel tools became easily available from local markets at affordable prices. But the march of progress did not stop there. Although steep rocky terrain has continued to limit Khonoma to hand-cultivating its rice terraces, Tsiesema has gone on to experiment with animal draught power and now hand-tractors. The shift from man to machine has profound implications to freeing up agricultural labor and how farmers manage their land. Although village women still work remarkably hard, the advent of rice mills, piped water and trucks to carry firewood from the jhum fields has eliminated some of their most onerous tasks.

We can expect the pace of change to accelerate now that peace has gained a tentative foothold in Nagaland and it is joining the global community. Already, village artisans that had once made spears, forged tools, or woven baskets and shawls for local everyday use are now supplying outside markets. One wonders if the fantastic array of woven baskets and trays shown in the following pages will soon be replaced by plastic substitutes. Such are the effects of globalization and "development".

CLASSIFICATION SYSTEM

1. Cutting Tools
    - 1.1 Knives, Axes & Accessories
    - 1.2 Saws
    - 1.3 Wood Chisels
2. Soil Tillage
    - 2.1 Hand Tillage
        - 2.1.1 Wet Rice Terraces
        - 2.1.2 Jhum Fields
    - 2.2 Animal-Powered Tillage (Wet Rice Terraces)
    - 2.3 Mechanized Tillage (Wet Rice Terraces)
3. Weeding
    - 3.1 Wet Rice Terraces
    - 3.2 Jhum Fields
4. Pest Control
5. Harvest
6. Carrying Baskets / Containers
7. Storage Baskets / Container
    - 7.1 Dry Goods
    - 7.2 Crops
        - 7.2.1 Woven Trays
        - 7.2.2 Tins
        - 7.2.3 Baskets
        - 7.2.4 Sacks
        - 7.2.5 Larger Containers
8. Post-Harvest Processing
    - 8.1 Threshing
    - 8.2 Winnowing
    - 8.3 Drying
    - 8.4 Milling
    - 8.5 Making Local Brew
        - 8.5.1 Sieves
        - 8.5.2 Vats
        - 8.5.3 Storage
        - 8.5.4 Transport to the Field & Forest
        - 8.5.5 Drinking
9. Livestock Husbandry
    - 9.1 Apiculture
    - 9.2 Poultry
    - 9.3 Swine
    - 9.4 Cattle and Mithun
10. Other Skilled Trades
    - 10.1 Weaving
    - 10.2 Basketry
    - 10.3 Blacksmithing
    - 10.4 Spear-Making
    - 10.5 Stone Masonry
11. Hunting, Trapping and Fishing
    - 11.1 Hunting
    - 11.2 Trapping
    - 11.3 Fishing
12. Kitchen Implements
    - 12.1 Lighting
    - 12.2 Fire Management
    - 12.3 Drying Containers

   12.4 Dishes & Utensils
   12.5 Pots, Bowls & Jugs
   12.6 Miscellaneous

13. Furniture
   13.1 Stools & Chairs
   13.2 Beds
   13.3 Ladders

14. Protection Against the Elements
   14.1 Hats
   14.2 Rain Capes

15. Weapons of War
   15.1 Spears
   15.2 Shields

16. Traditional Dress
   16.1 Necklaces
      16.1.1 Female
      16.1.2 Male
      16.1.3 Unisex
   16.2 Ear Ornaments
      16.2.1 Female
      16.2.2 Male
   16.3 Bracelets & Armbands
      16.3.1 Female
      16.3.2 Male
   16.4 Leg Ornaments (male)
   16.5 Head Gear (male)
   16.6 Kilts, Sashes & Other Cloth Apparel (male)
   16.7 Other Body Ornaments (male)

17. Ceremonial Tools
   17.1 Spears
   17.2 Shields
   17.3 Miscellaneous

18. Musical Instruments

ILLUSTRATIONS

1. CUTTING TOOLS

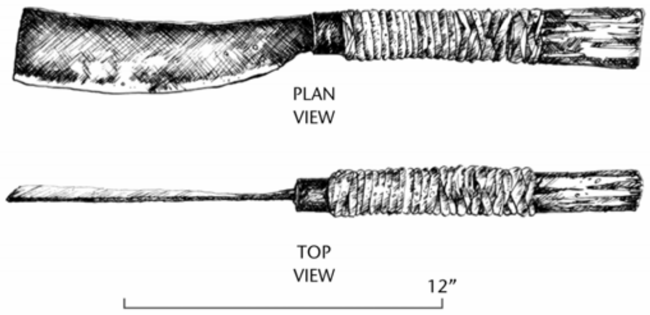
Nagas feel almost undressed without a zhie (bush knife). It is their most important tool, used in a myriad of ways every day - in this case, clearing away the underbrush while opening a jhum fallow for cultivation.

1. CUTTING TOOLS

1.1 Knives, Axes & Accessories

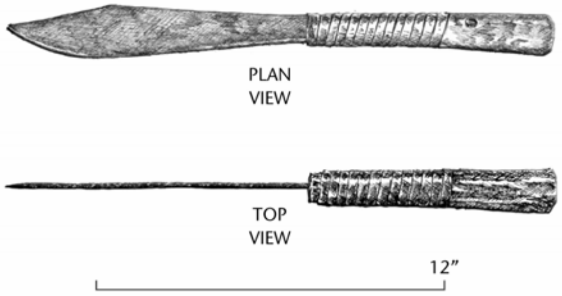
K - zhie
T - zie
code: 1.1.1

- general cutting tool used for meat, firewood and bamboo; for slashing weeds; or shaving rattan for making baskets



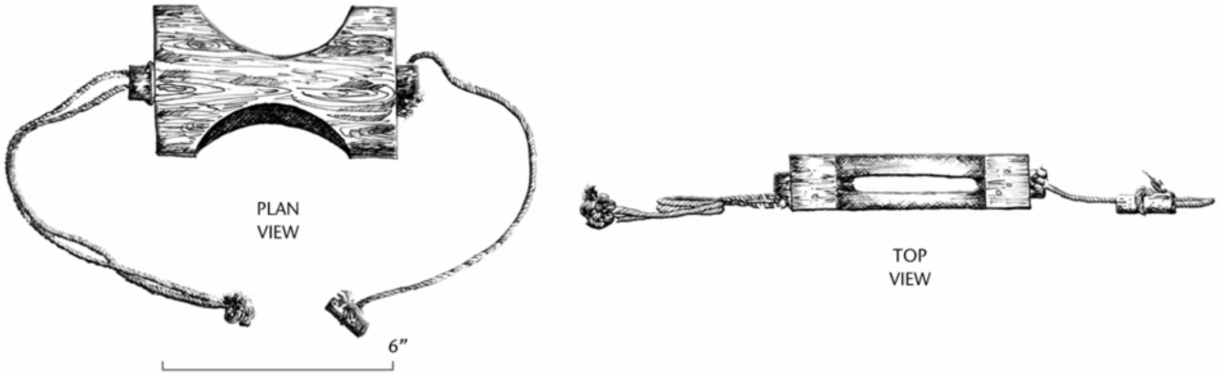
K - jieteno
T - ziethe
code: 1.1.2

- small type of knife used for lighter cutting such as small trees, broom grass, banana leaves; also used in hunting



K - zhieku
T - ziesa
code: 1.1.3

- scabbard for carrying <u>zhie</u> (code 1.1.1) at the back



1. CUTTING TOOLS
1.1 Knives, Axes & Accessories

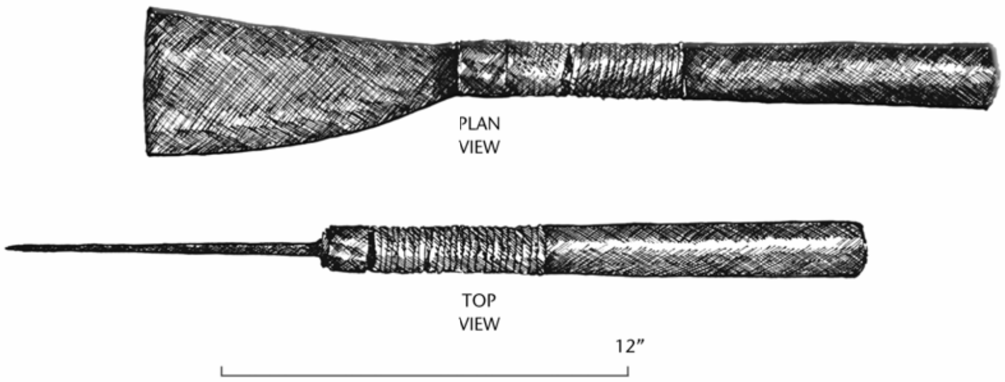
A demonstration of how a zhie and cagwi are used in tandem for clearing the underbrush in jhum fallows.

1. CUTTING TOOLS

1.1 Knives, Axes & Accessories

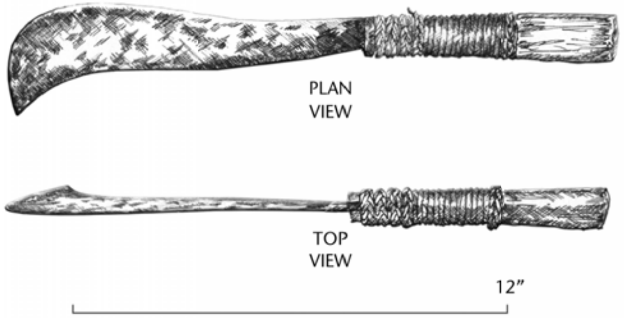
K - jiecha
T - ziedo
code: 1.1.4

- with short blade



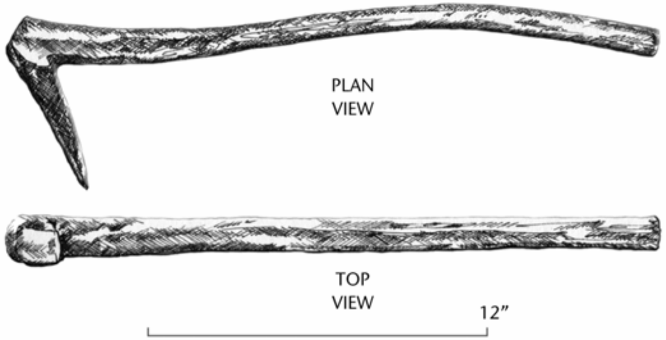
K - zhügwü
T - ziewi
code: 1.1.5

- cutting small trees and slashing undergrowth when opening jhums, usually used together with cagwi (code 1.1.6); also used to shave cane when making baskets



K - cagwi
T - tsawi
code: 1.1.6

- when opening jhum, used for pushing thorny shrubs to the side, so that they can then easily be slashed with a zhie (code 1.1.1) or zhügwü (code 1.1.5)



1. CUTTING TOOLS

1.1 Knives, Axes & Accessories

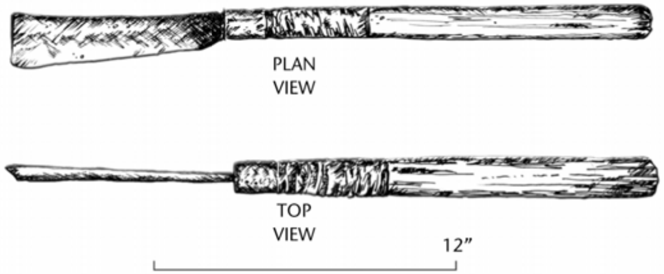
Firewood is split with a merü before being loaded into baskets and carried back to the village.

1. CUTTING TOOLS

1.1 Knives, Axes & Accessories

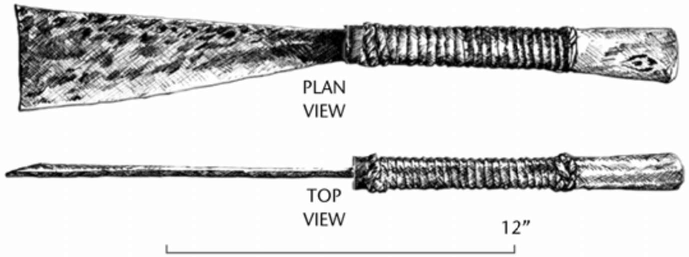
K - zhiecha
T - zie
code: 1.1.7

- cutting down or pollarding trees, or cutting meat with bones



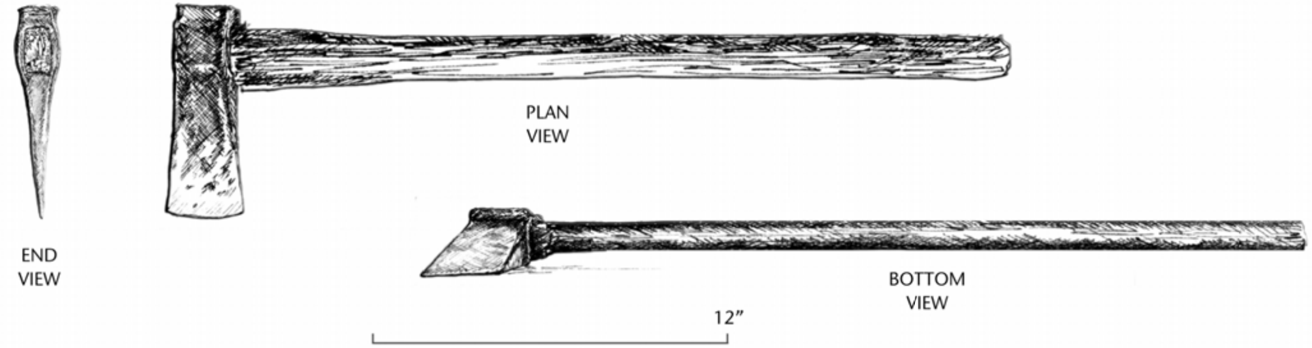
K - zhiecha
T - ziedi
code: 1.1.8

- heavier style of dao used for cutting large trees, pollarding, or cutting meat with heavy bones



K - merü
T - seidurü
code: 1.1.9

- felling trees, splitting wood



1. CUTTING TOOLS

1.2 Saws

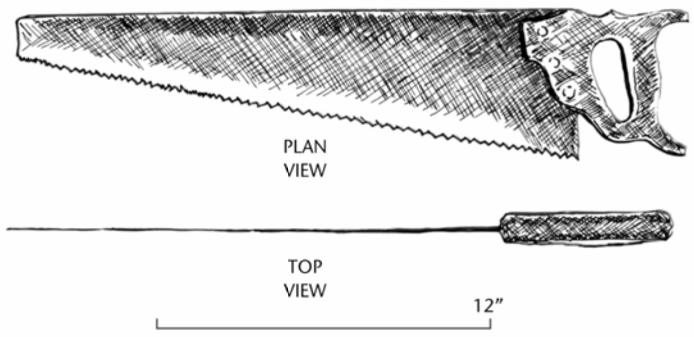
Using a sigei to cut logs into firewood lengths.

1. CUTTING TOOLS

1.2 Saws

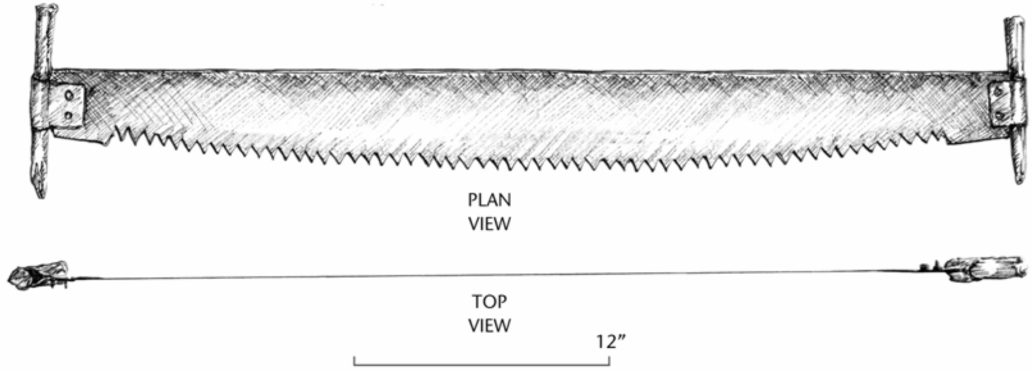
K - sigei
T - seigizie
code: 1.2.1

- cutting planks and timber



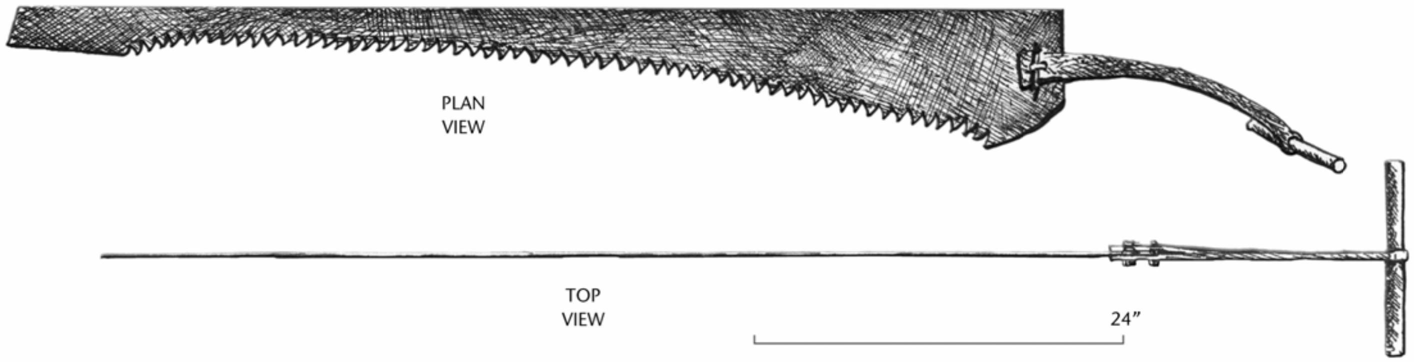
K - sigei
T - seigeizie
code: 1.2.2

- sawing logs into boards



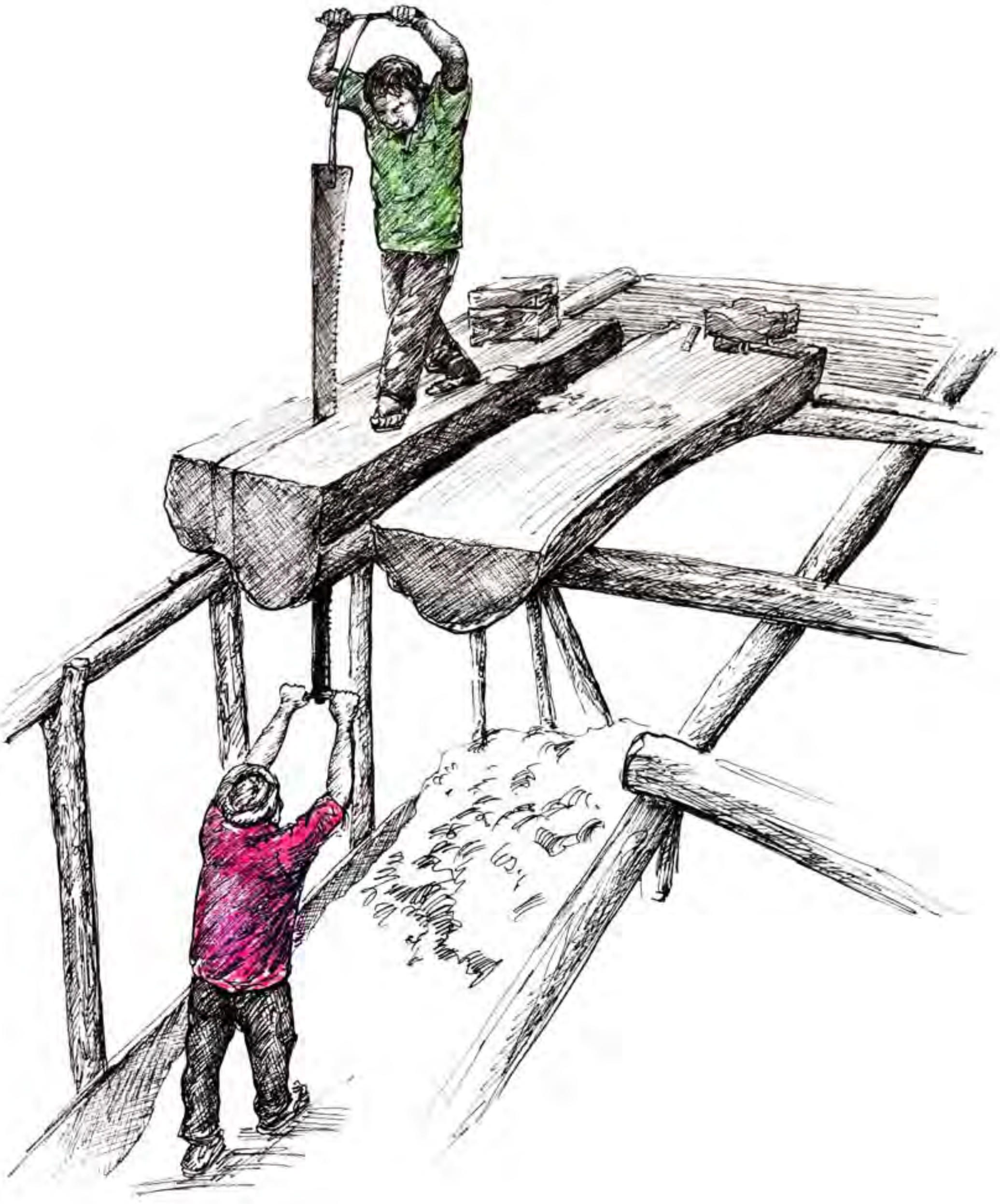
K - sigei
T - seigeizie
code: 1.2.3

- sawing logs into boards



1. CUTTING TOOLS

1.2 Saws

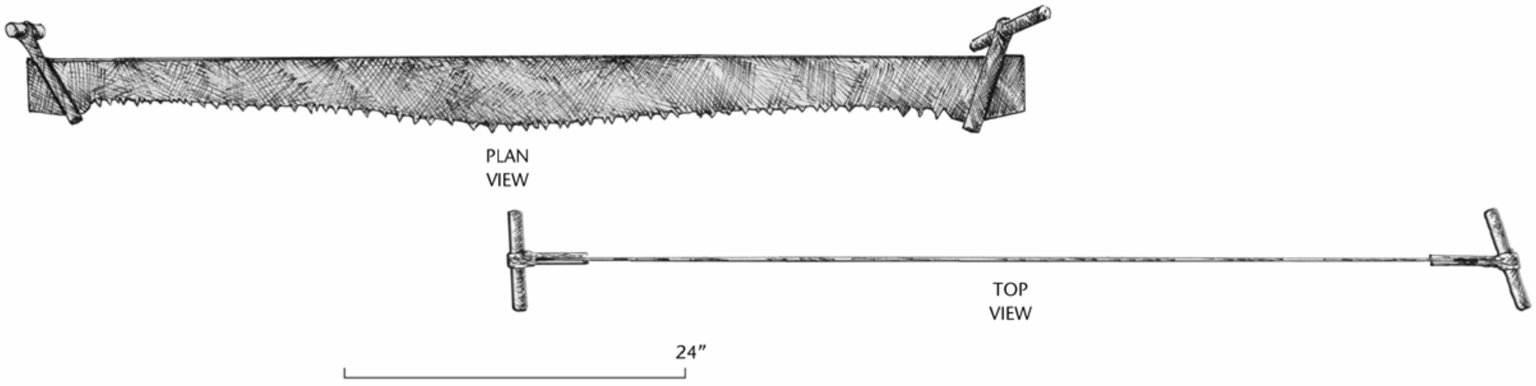


Two men use a sigei (cross-cut saw) to cut a log into planks. Most timber milled at the village level uses this method.

1. CUTTING TOOLS
1.2 Saws

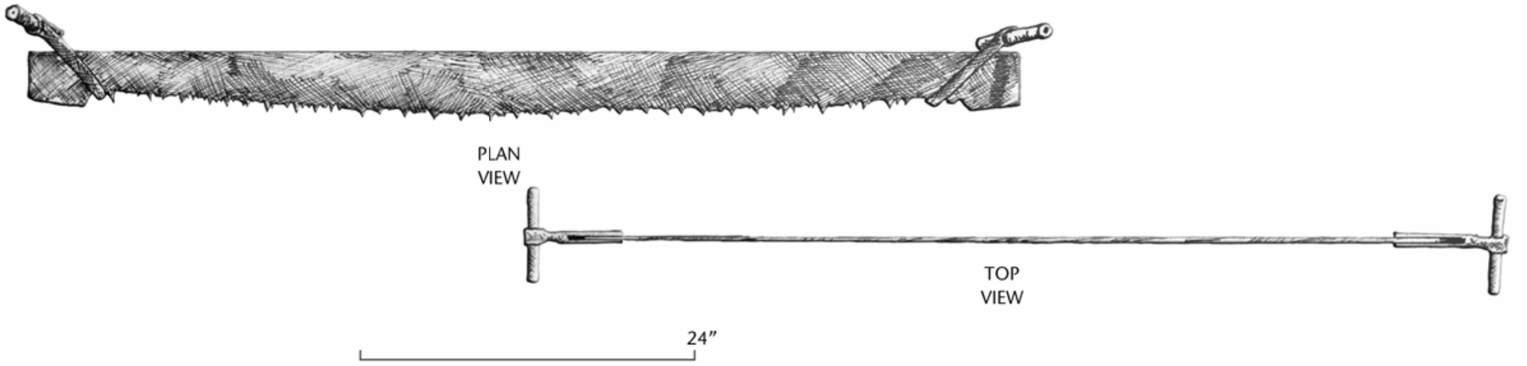
K - sigei
T - seigeizie
code: 1.2.4

- for felling large trees or sawing logs into boards



K - sigei
T - seigeizie
code: 1.2.5

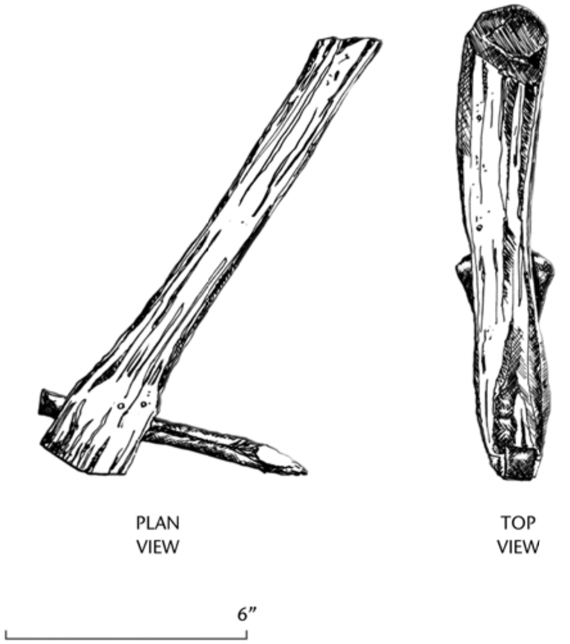
- sawing logs into boards



1. CUTTING TOOLS
1.3 Wood Chisels

K - kethi
T - kechie
code: 1.3.1

- planing timber to be used in construction



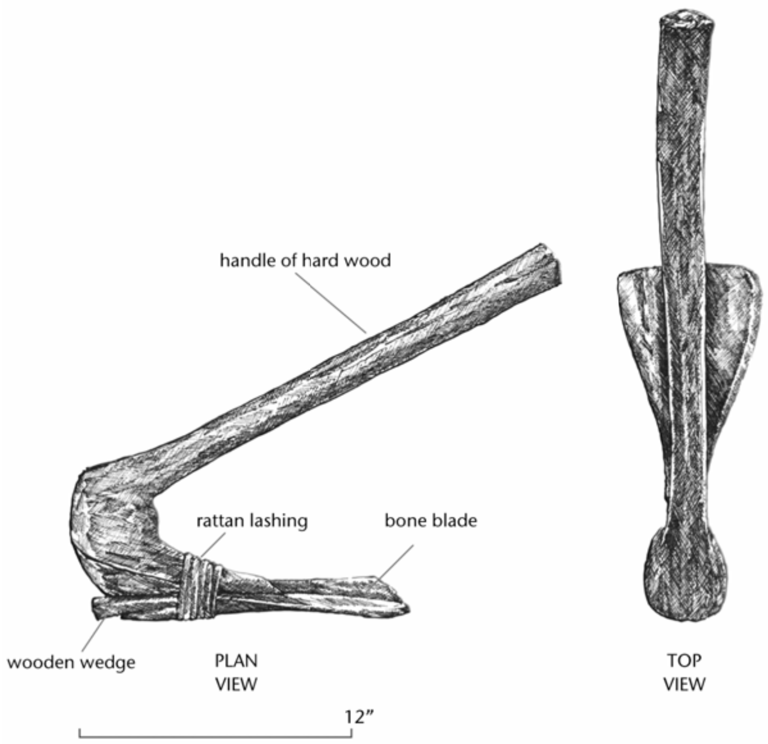
1. CUTTING TOOLS
2.1 Hand Tillage

A large-bladed hoe known as a kuruzhü is used for the first tillage of the rice terraces, turning over the stubble of the previous year's crop. This usually begins in December.

2. SOIL TILLAGE
2.1 Hand Tillage
2.1.1 Wet Rice Terraces

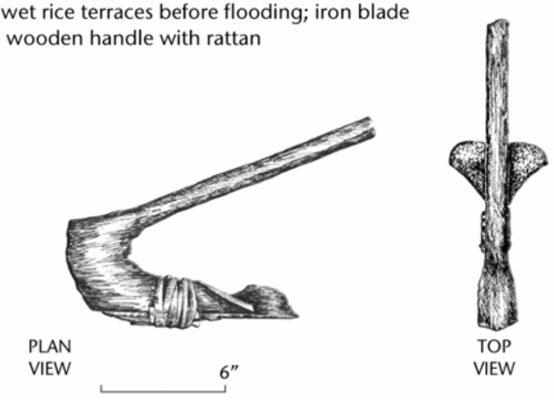
K - chürujü
T - chürudzü / tenyijü
code: 2.1.1.1

- early style of hoe with blade fashioned from the shoulder blade of a cow; formerly used for puddling wet rice terraces at a time when iron was less available in the Naga Hills. Probably the forerunner of the iron hoe. (This specimen was found in a village museum in Touphema.)



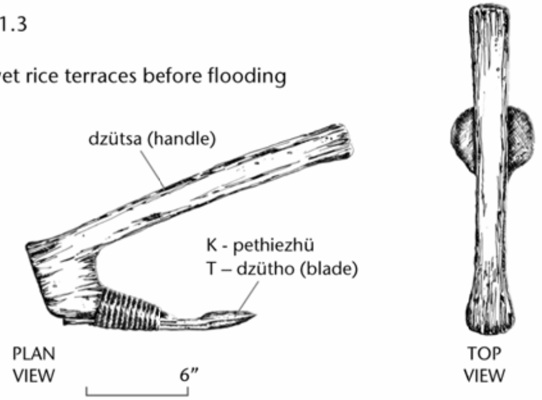
K - pethiezhü
T - dzütho / mhokra dzütho
code: 2.1.1.2

- used in wet rice terraces before flooding; iron blade lashed to wooden handle with rattan



K - kedzü
T - kedzü
code: 2.1.1.3

- used in wet rice terraces before flooding



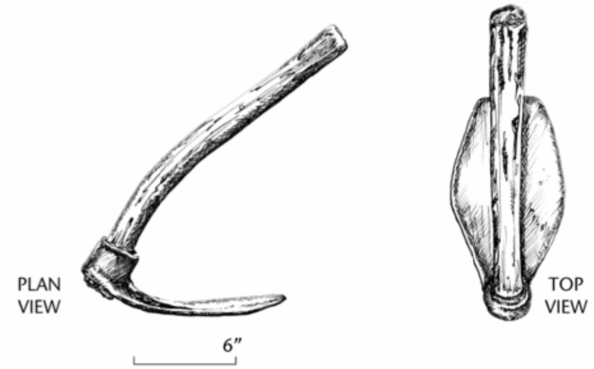
1. CUTTING TOOLS
2.1 Hand Tillage

Weeds are trimmed from the bunds of rice terraces using a kathijü.

2. SOIL TILLAGE
2.1 Hand Tillage
2.1.1 Wet Rice Terraces

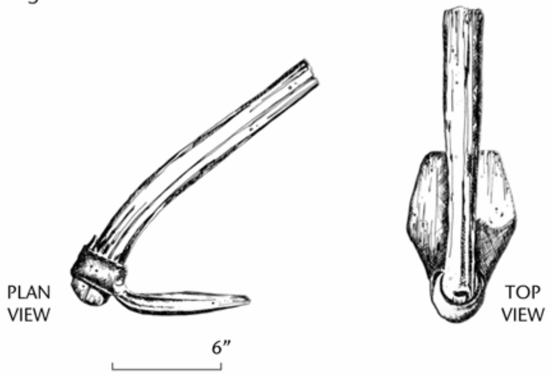
K - kurüzhü
T - kurdzü
code: 2.1.1.4

- used in wet rice terraces, both before flooding and during puddling



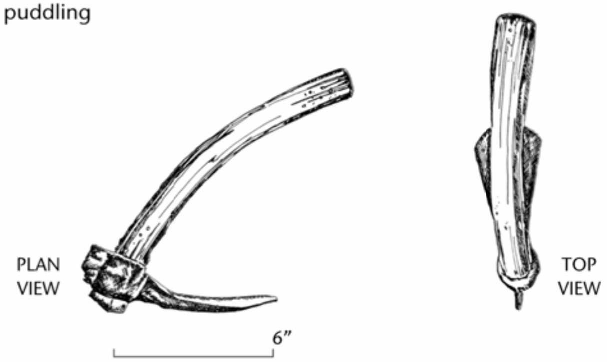
K - kurüzhü
T - kurüdzü / kurdzü
code: 2.1.1.5

- used in wet rice terraces, both before flooding and during puddling



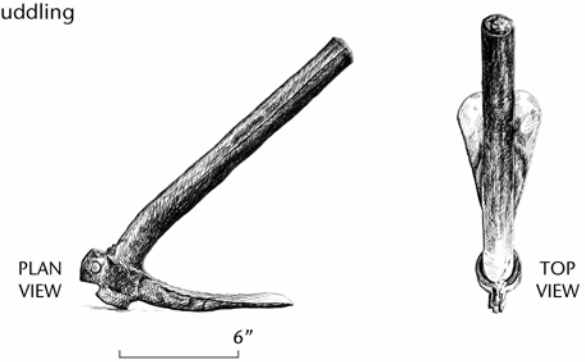
K - khuhizhü / kathizhü / kathijü
T - kathidzü
code: 2.1.1.6

- used in wet rice terraces, both before flooding and during puddling



K - kathizhü
T - kathidzü
code: 2.1.1.7

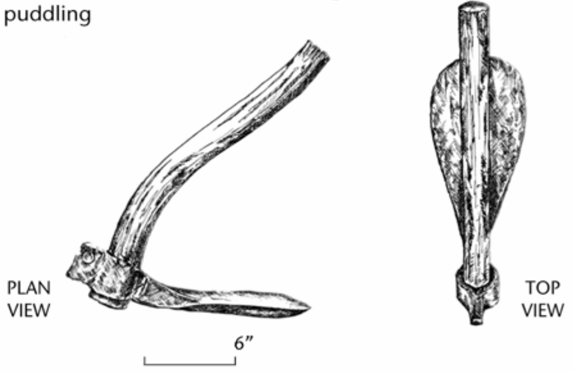
- used in wet rice terraces, both before flooding and during puddling



2. SOIL TILLAGE
2.1 Hand Tillage
2.1.1 Wet Rice Terrace

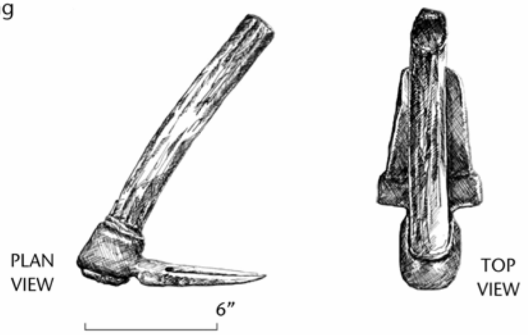
K - kathizhü
T – kathidzü
code: 2.1.1.8

- used in wet rice terraces, both before flooding and during puddling



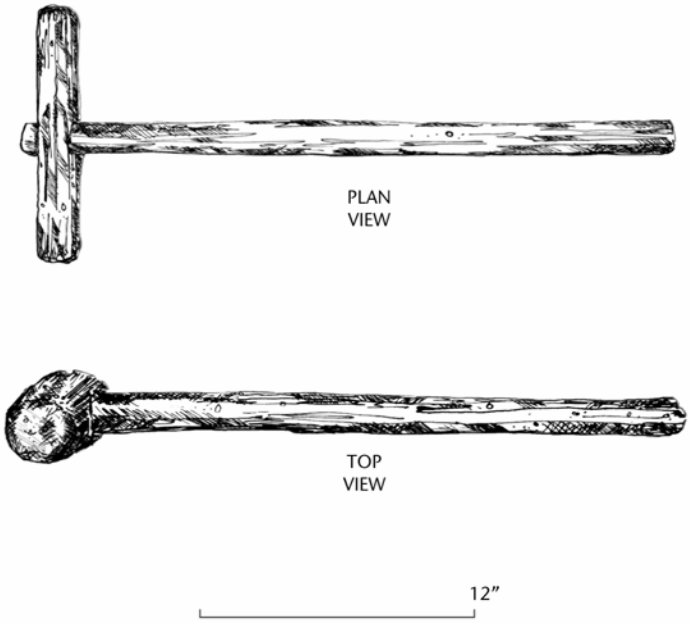
K - kathizhü/ kathiju
T - kathidzu
code: 2.1.1.9

- used in wet rice terraces, both before flooding and during puddling



K - nyiekro miedu
T - midu
code: 2.1.1.10

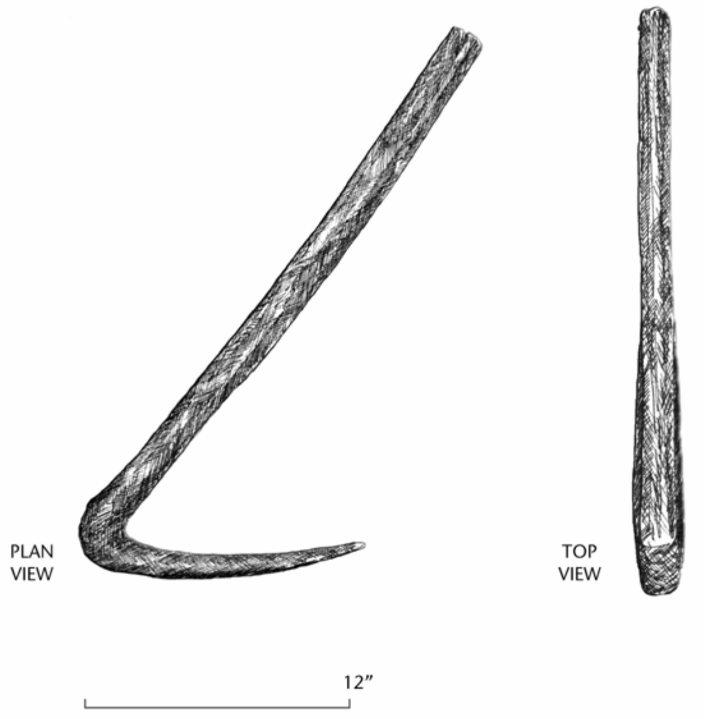
- breaking up soil lumps in wet rice terraces, after the first tillage; can also be used in jhum fields when planting potatoes and a finer tilth is required



2. SOIL TILLAGE
2.1 Hand Tillage
2.1.2 Jhum Fields

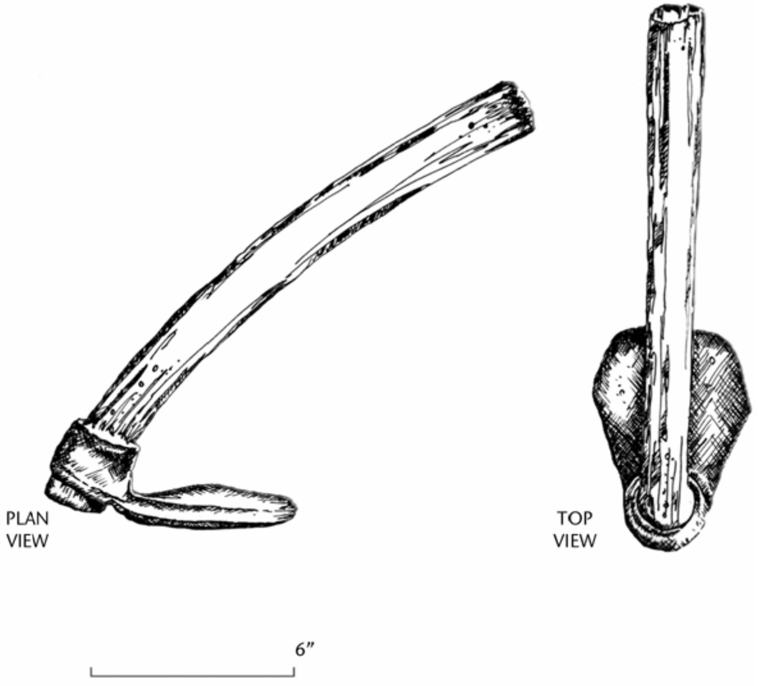
K - lirijü
T - tsawi
code: 2.1.2.1

- another wooden tool used for breaking up soil clumps and leveling in jhum fields



K - liephiezhü
T - kurdzü
code: 2.1.2.2

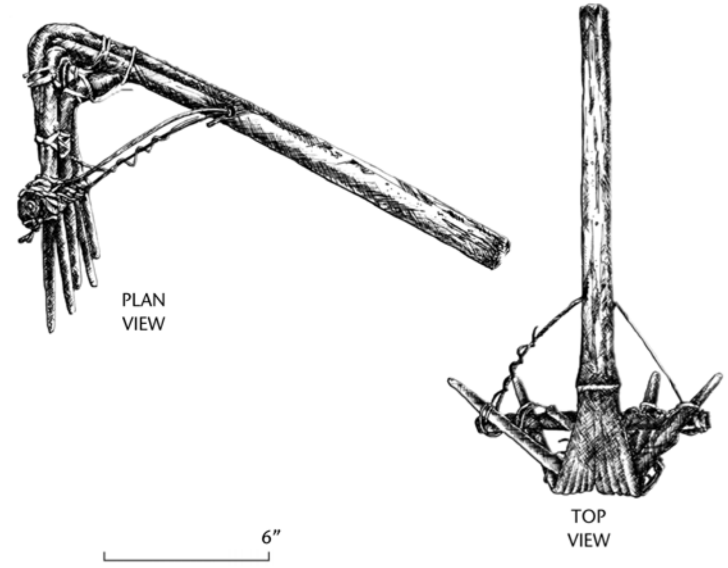
- used in jhum fields, both in field preparation and later for weeding



2. SOIL TILLAGE
2.1 Hand Tillage
2.1.2 Jhum Fields

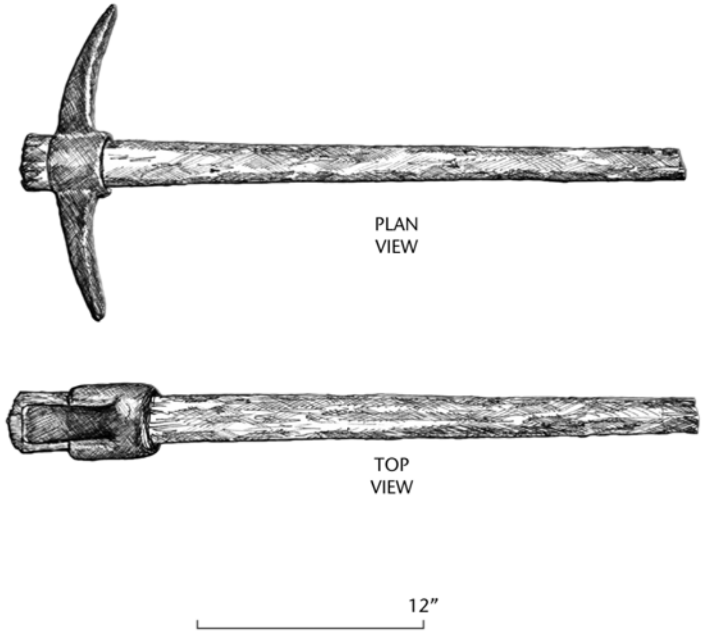
K - phiero
T - charuo
code: 2.1.2.3

- bamboo rake used while opening jhum field, to pull together slash in preparation for burning; can also be used to weed paddy nursery (similar to code 3.1.1); formed from a section of bamboo, with one end split and turned down to form the teeth, which are kept in position by a crosspiece lashed with rattan



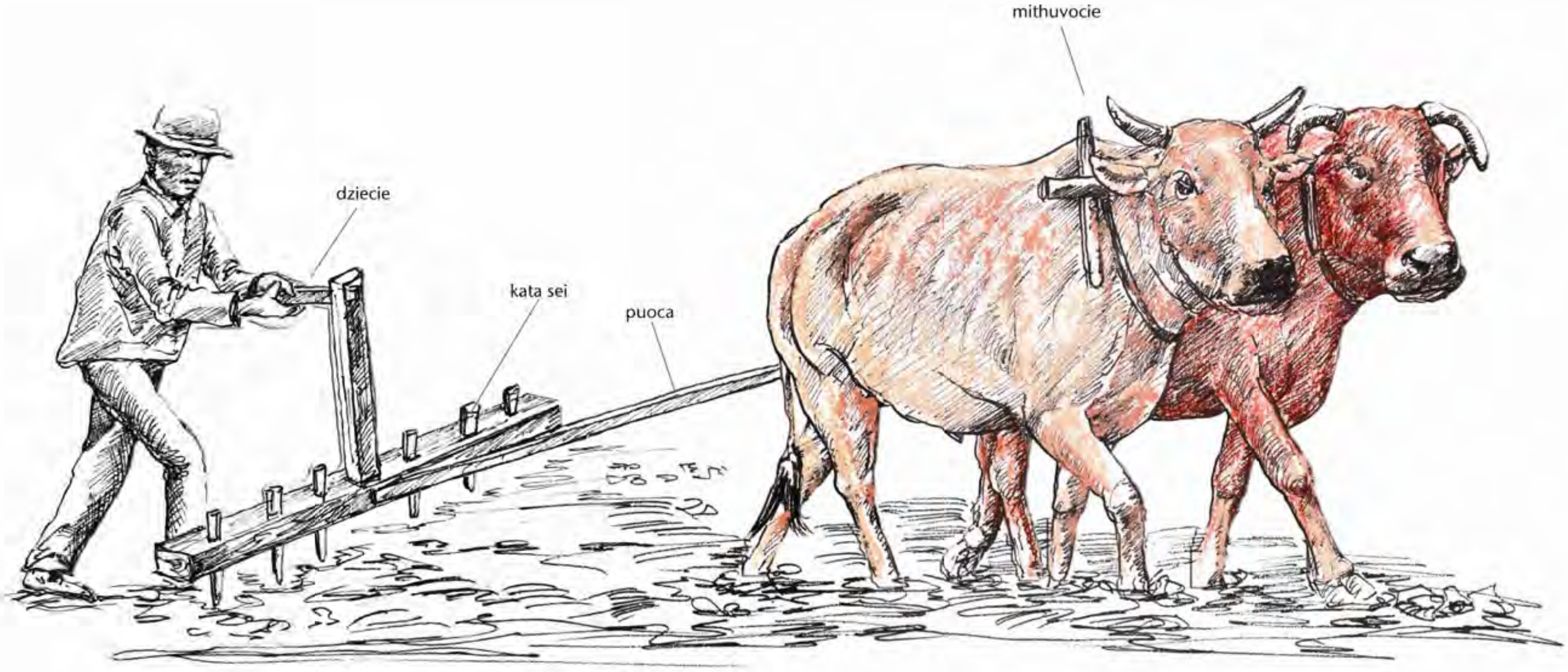
K - kathi
T - kathi / thire
code: 2.1.2.4

- pick axe used for digging through hard soil or rocks; more often used in construction than for agriculture



2. SOIL TILLAGE

2.2 Animal-Powered Tillage (wet rice terraces)

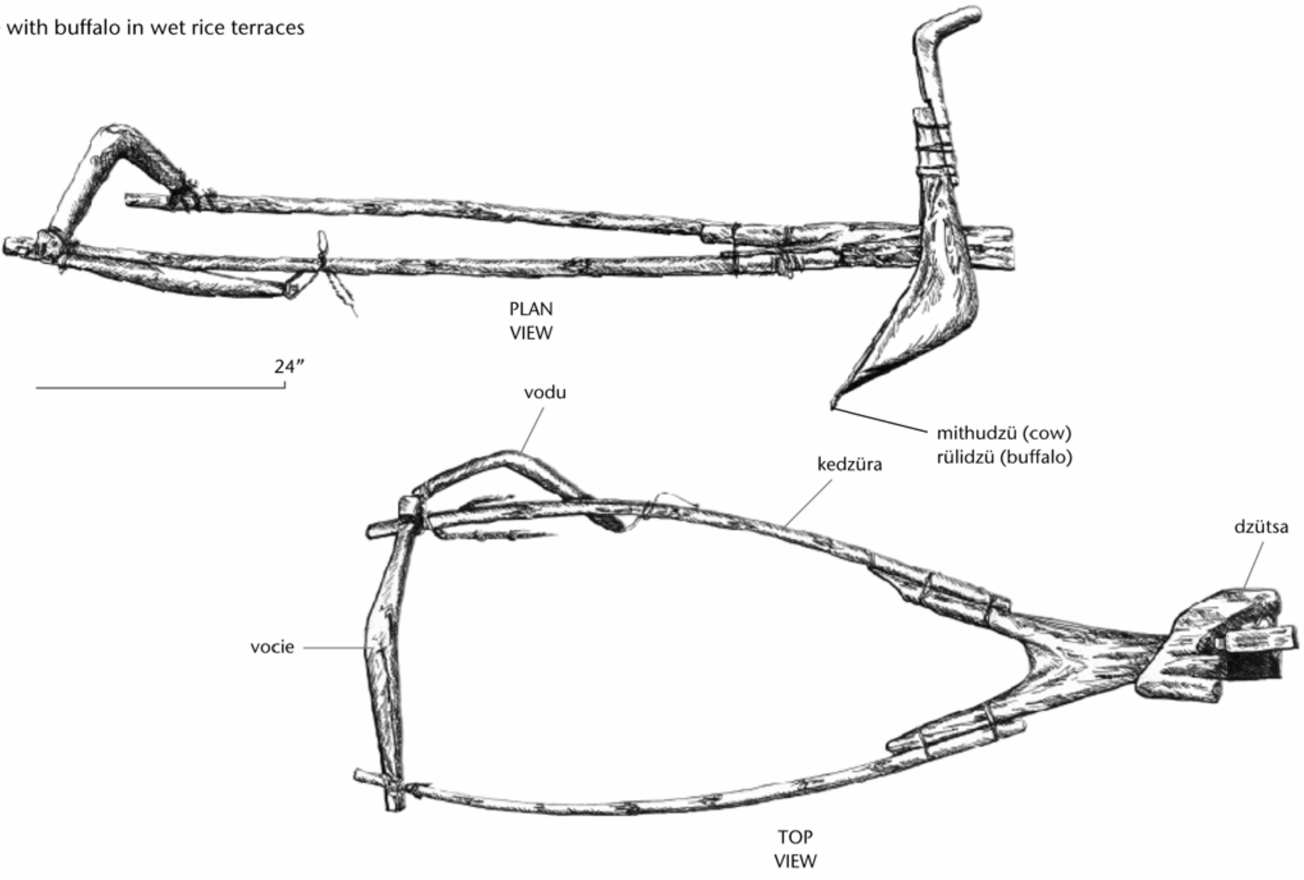


Oxen fitted with a <u>mithuvocie</u> and pulling a <u>kata sei</u> to level the soil in wet rice terraces.

2. SOIL TILLAGE
2.2 Animal-Powered Tillage (wet rice terraces)

K -
T - rülidzü / ruliju
code: 2.2.1

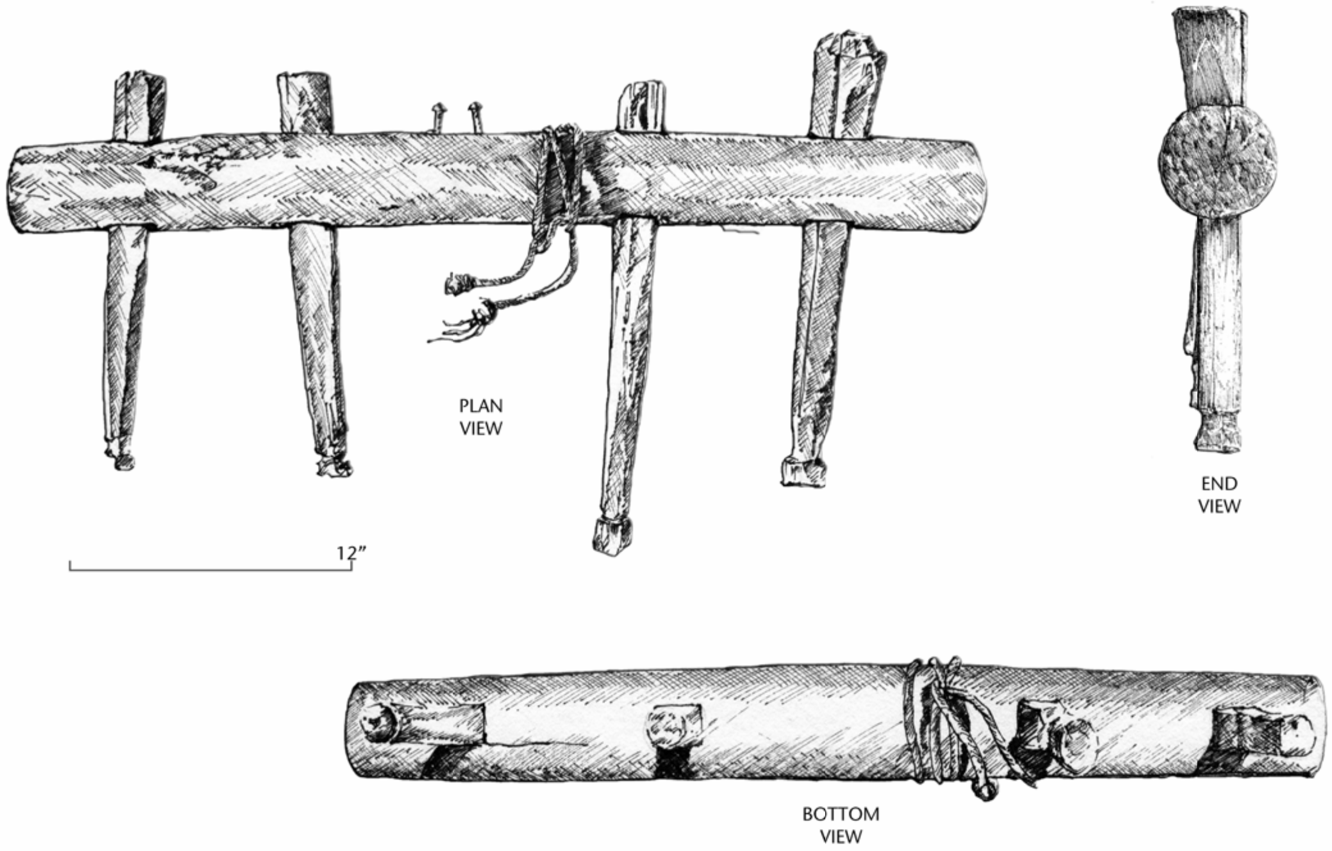
- harness and plough, for use with buffalo in wet rice terraces



2. SOIL TILLAGE
2.2 Animal-Powered Tillage (wet rice terraces)

K -
T - mithuvocie
code: 2.2.2

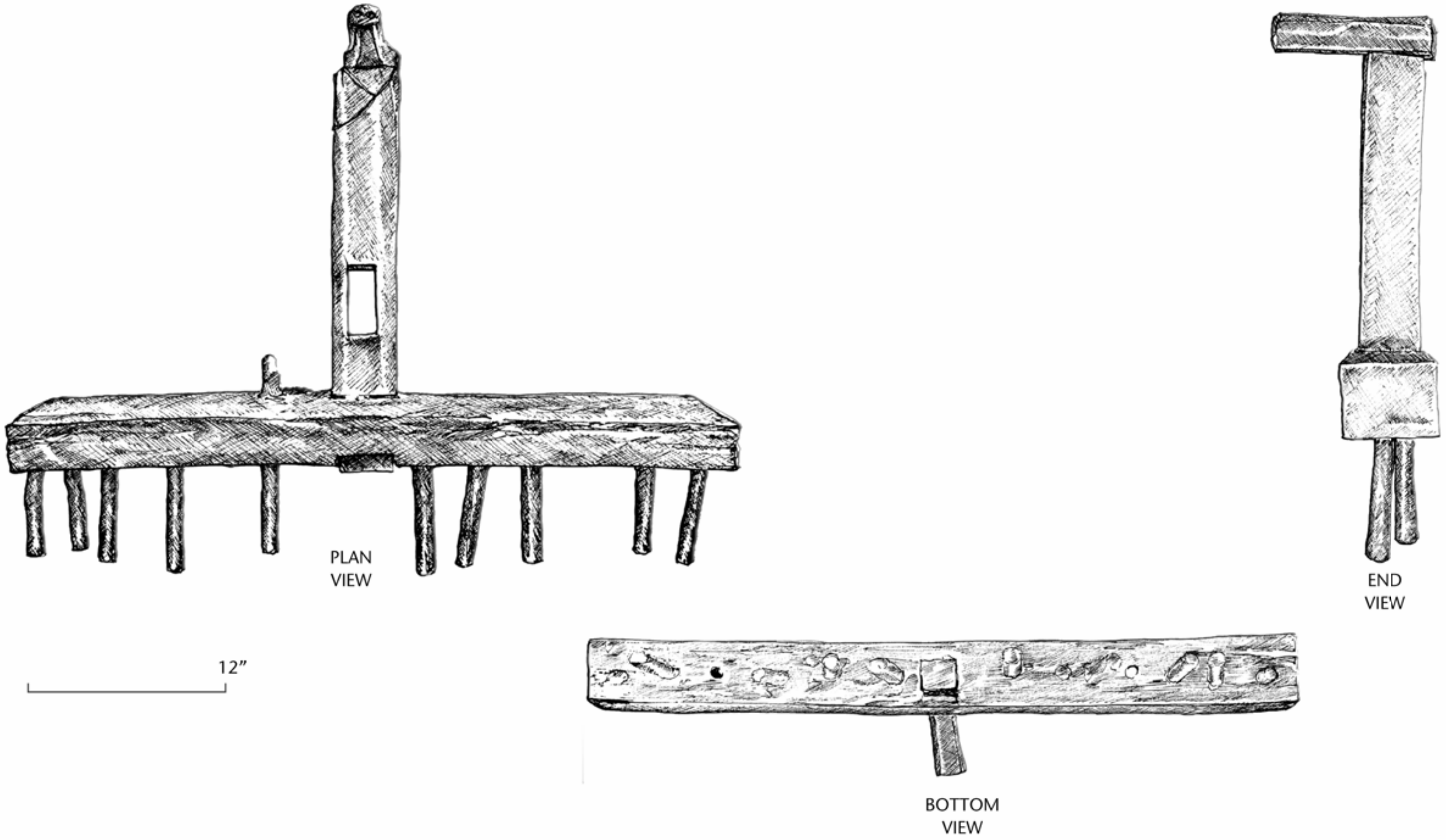
- yoke for fitting over necks of two cattle/oxen when doing draught work such as ploughing, puddling, leveling, etc.



2. SOIL TILLAGE
2.2 Animal-Powered Tillage (wet rice terraces)

K -
T - kata sei
code: 2.2.3

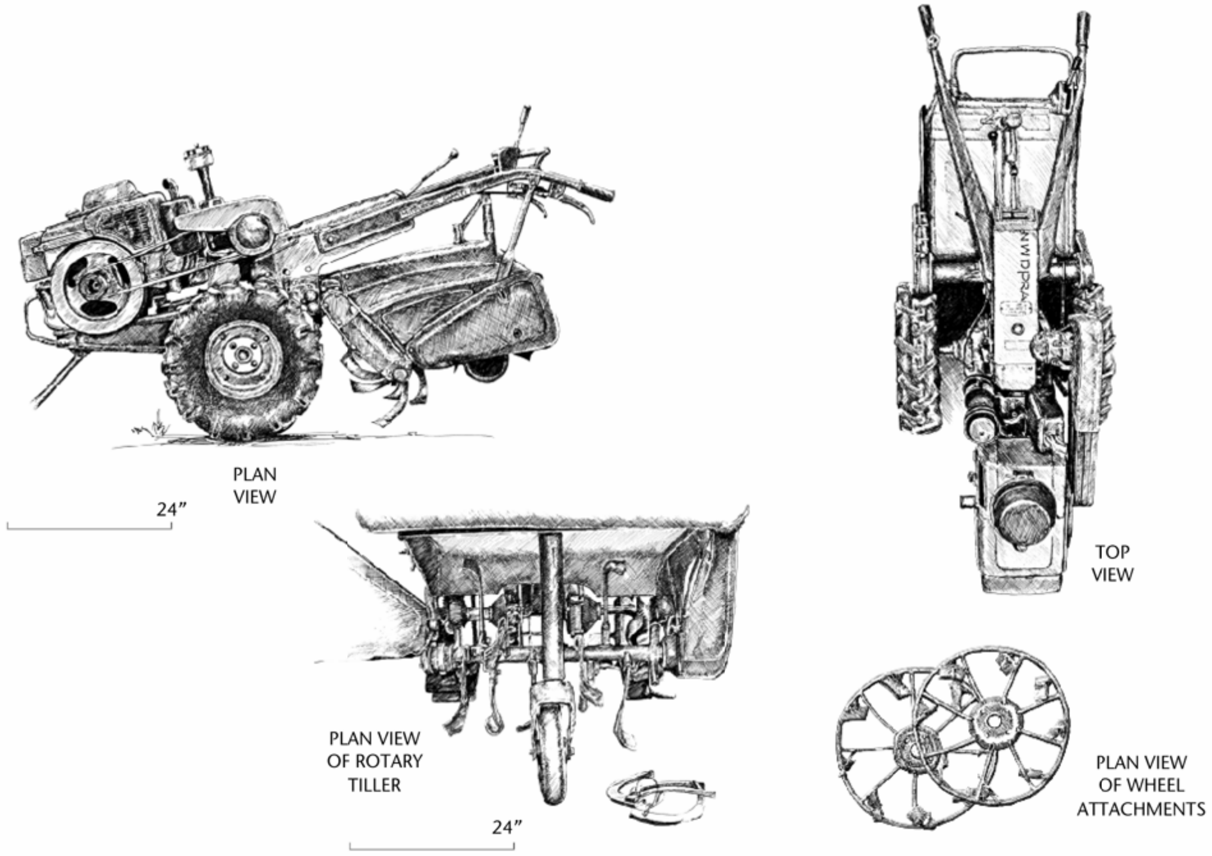
- used for leveling wet rice terraces, after ploughing and flooding



2. SOIL TILLAGE
2.3 Mechanized Tillage (wet rice terraces)

K - lietigari
T - liciebagei
code: 2.3.1

- used for tillage in wet rice terraces; still rare in the Naga Hills but some have been distributed by government programs

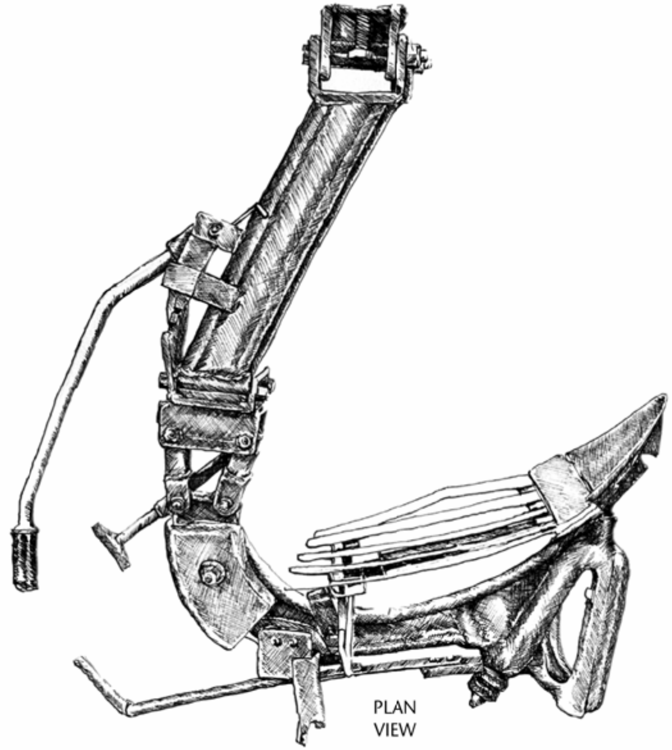


2. SOIL TILLAGE

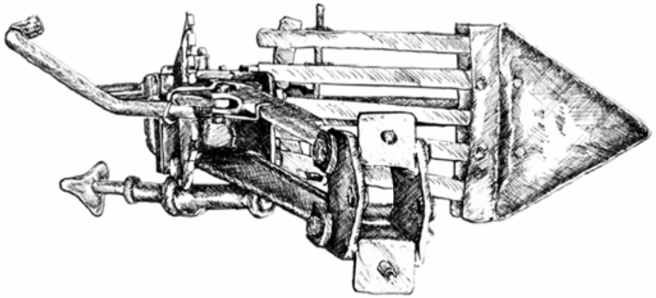
2.2 Animal-Powered Tillage (wet rice terraces)

K - lietizhü / lietiju
T - lieciegaridzü
code: 2.3.2

- mounted on small tractor (code 2.3.1) for ploughing wet rice terraces



PLAN VIEW



TOP VIEW

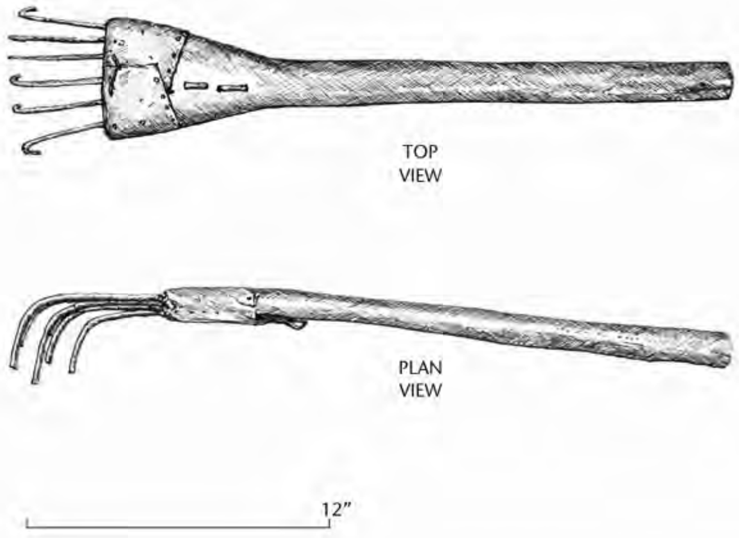
3. WEEDING

3.1 Wet Rice Terraces)

The phiero is used to dislodge weeds and thin out seedlings in rice nurseries to the desired density.

K - phiero
T - charuo
code: 3.1.1

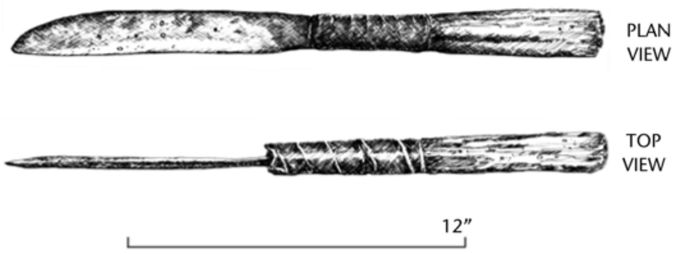
- small rake used for weeding rice nursery



3. WEEDING
3.1 Wet Rice Terraces

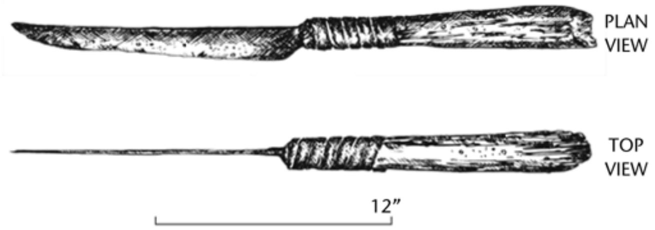
K - podazhie
T - ziethe / ziecha
code: 3.1.2

- long knife used for cleaning weeds from bund walls of wet rice terraces



K - podajie / podazhie
T - ziecha
code: 3.1.3

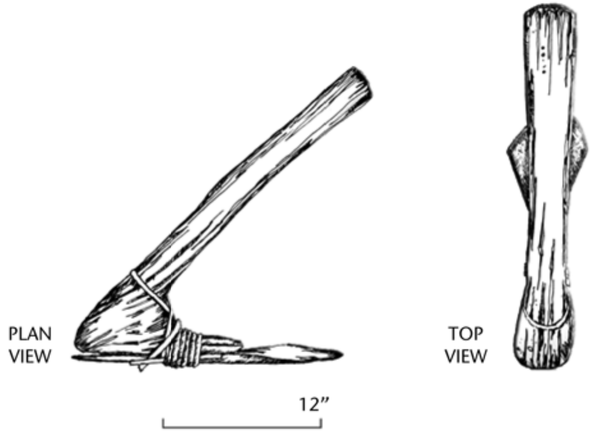
- cleaning weeds from bund walls of wet rice terraces



3. WEEDING
3.2 Jhum Fields

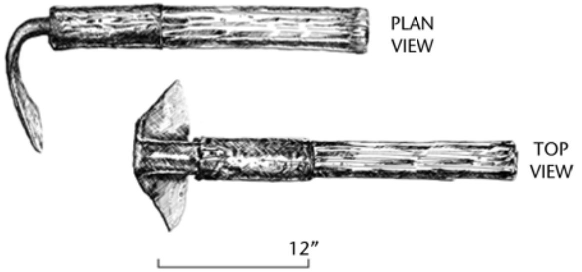
K - pethiezhü
T - kechie
code: 3.2.1

- weeding / intertillage of dryland crops



K - nhaphie zhü
T - dithodzünuo
code: 3.2.2

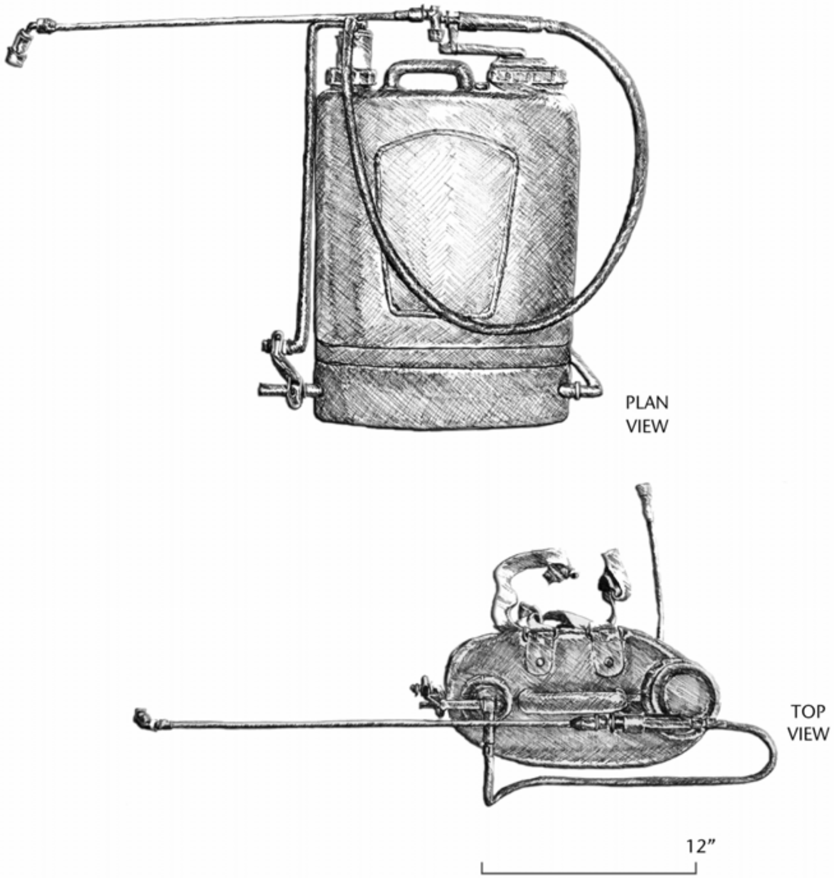
- weeding and light soil tillage in Job’s tears and other jhum crops



3. WEEDING
3.2 Jhum Fields

K -
T - dzukepfupu
code: 3.2.3

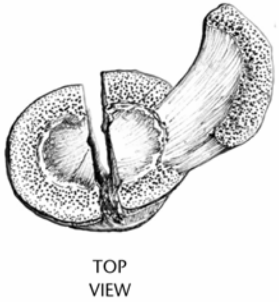
- application of chemical weedicides; not yet common



4. PEST CONTROL

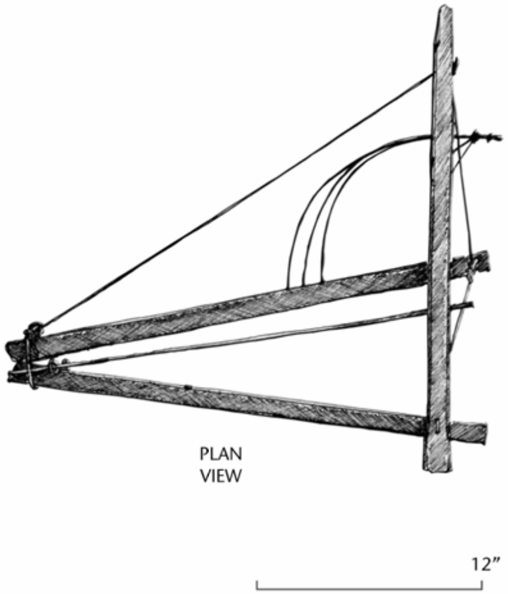
K - tsatsa
T - kebo
code: 4.1

- bamboo noise-maker used for scaring birds from fields



K - dzübe
T - kesia
code: 4.2

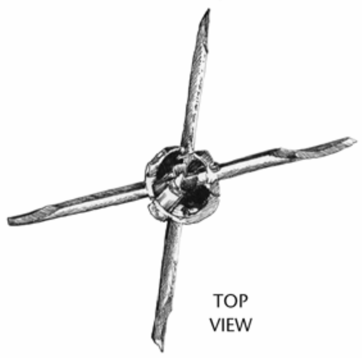
- spring trap used for rats and birds

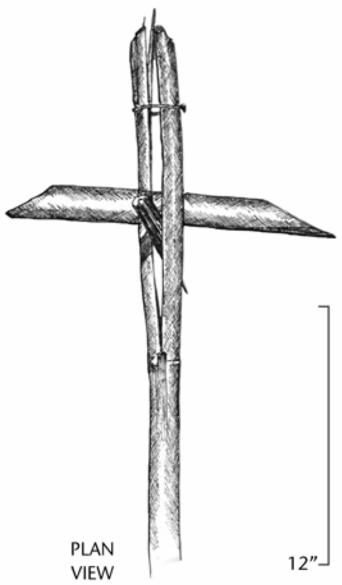


4. PEST CONTROL

K - kethie
T - khuteicha
code: 4.3

- sign of private ownership, usually erected in wet rice terraces to prohibit others from catching fish or snails



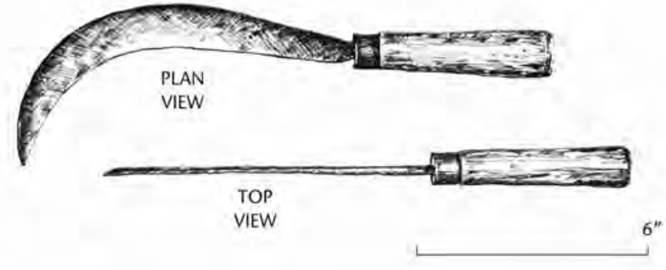


5. HARVEST TOOLS

By October, Khonoma's (mostly) women sharpen their zhiekhwino (sickles), take their khodis (baskets), and descend into the valley to harvest the wet rice crop.

K - zhiekhwino
T - ziefinuo
code: 5.1

- sickle used for harvesting paddy or collecting thatch



K - sithizhie
T - ziecha
code: 5.2

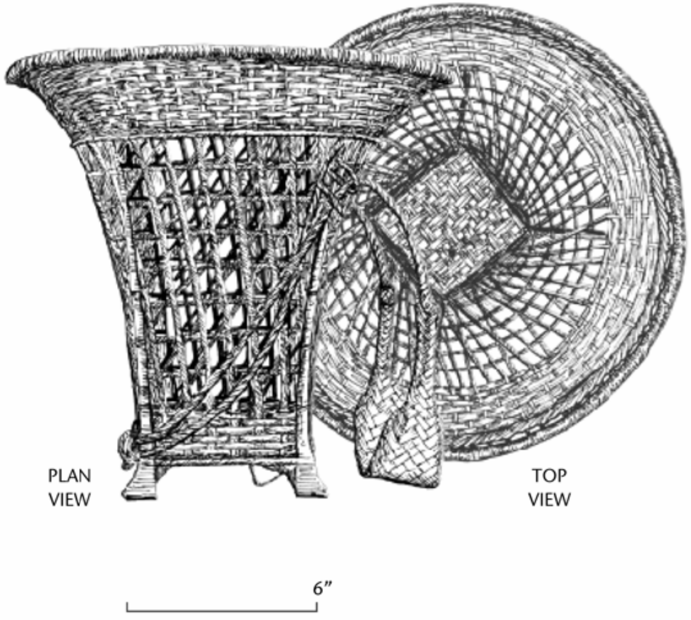
- special extra-sharp knife for harvesting Job's tears

6. CARRYING BASKETS / CONTAINERS

Angami women traveling back and forth from their fields are seldom without a basket.

K - mekho / khorü
T - khosie
code: 6.1

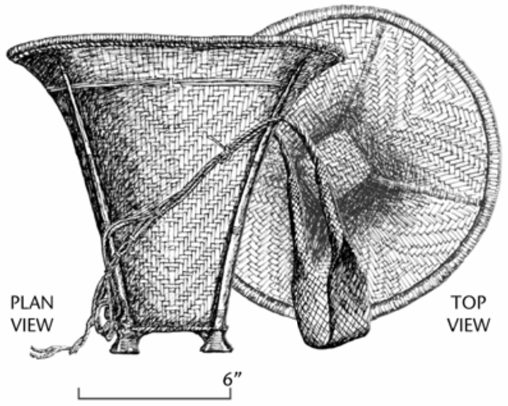
- a general purpose basket, mostly used by women for carrying firewood, vegetables, water, meat, etc.



6. CARRYING BASKETS / CONTAINERS

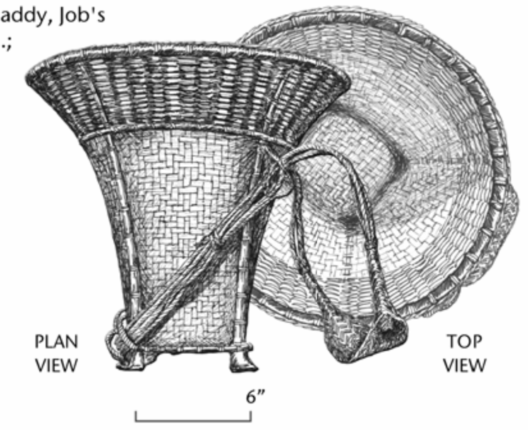
K - dichie
T - khodi
code: 6.2

- carrying paddy, Job's tears, millet



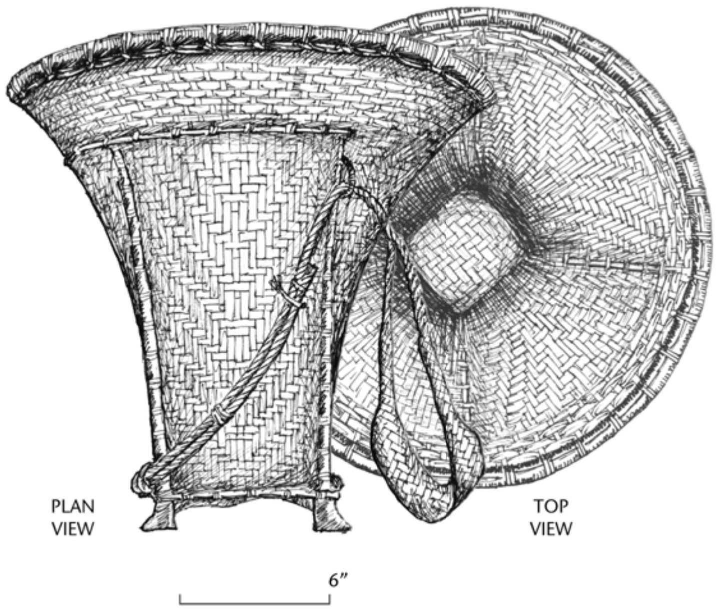
K - khodi kecu (small khodi)
T - chükho
code: 6.3

- for general carrying, usually paddy, Job's tears, vegetables, pumpkin, etc.; smaller version of standard <u>khodi</u>, used by children



K -
T - tsiese khodi (Tsiesema style of khodi)
code: 6.4

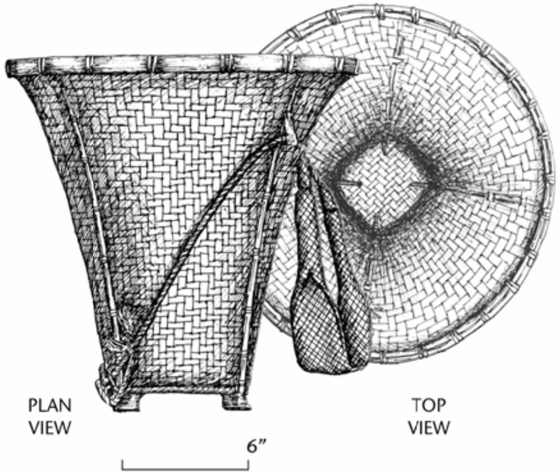
- carrying rice, Job's tears and millet; interchangeable with a <u>dichie</u>



6. CARRYING BASKETS / CONTAINERS

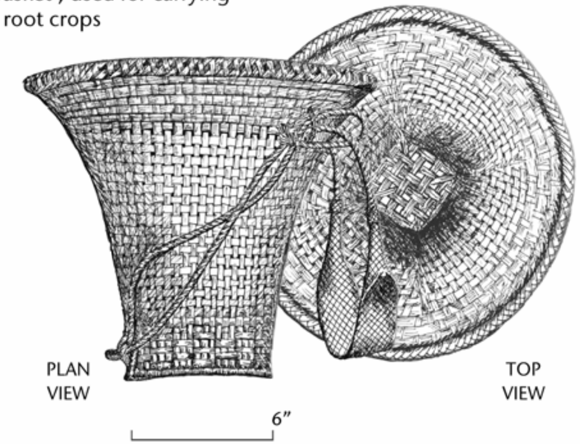
K -
T - tsiese chükho
code: 6.5

- carrying millet



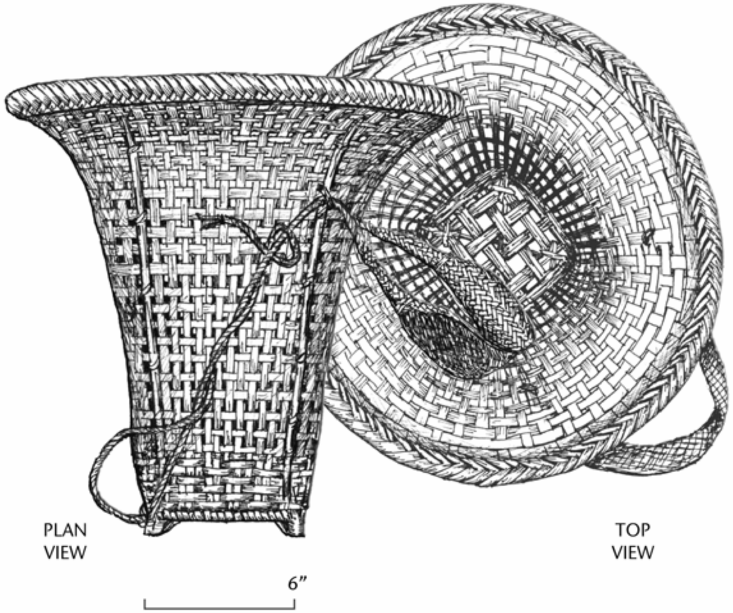
K -
T - tsiese khorü
code: 6.6

- means 'Tsiesema basket'; used for carrying heavy loads of fruit, root crops and vegetables



K -
T - tsiese khorü
code: 6.7

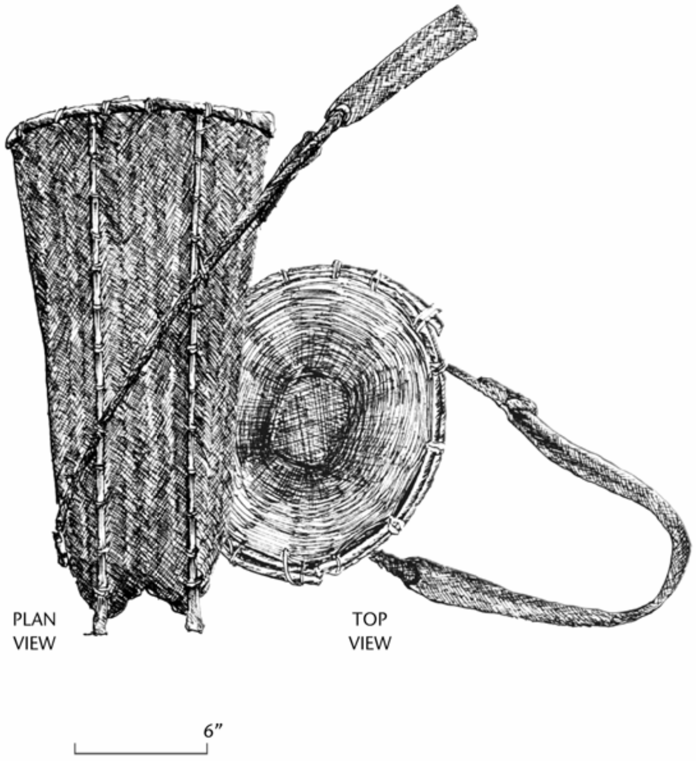
- used for carrying heavy loads of fruit, root crops and vegetables



6. CARRYING BASKETS / CONTAINERS

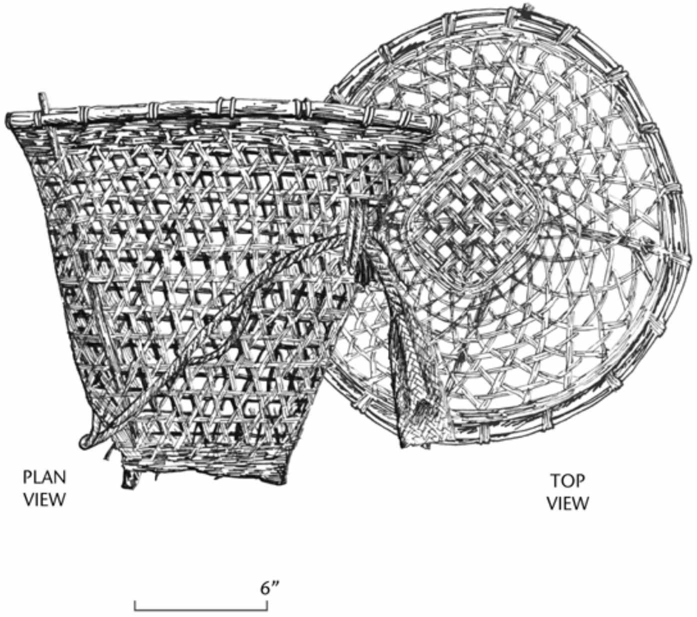
K - khodi
T - biekho
code: 6.8

- northern Angami style of <u>khodi</u>, used for carrying paddy, maize and any other crops; less common in research villages



K -
T - khorha
code: 6.9

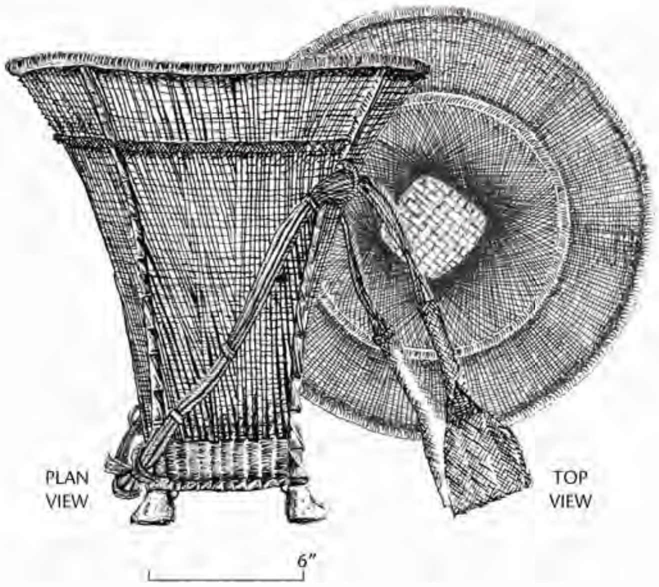
- for carrying firewood, vegetables and other heavy loads



6. CARRYING BASKETS / CONTAINERS

K - mekho / khophi
T - khophi
code: 6.10

- every daughter in Khonoma families will have this basket; used only by girls, for carrying wine and rice beer during festivals such as <u>Sekrenyi,</u> when age groups go to the field together; this style unique to Khonoma



Although rare in chauvenistic Khonoma, Naga men elsewhere are more likely to assist their women with carrying firewood and other menial chores. (Illustration from Tsiesema village.)

6. CARRYING BASKETS / CONTAINERS

K -
T - kenhu
code: 6.11

- use of shawl to carry paddy back from the field, only by men (women use a kodi); not seen in Khonoma, where women do most of the carrying

PLAN VIEW

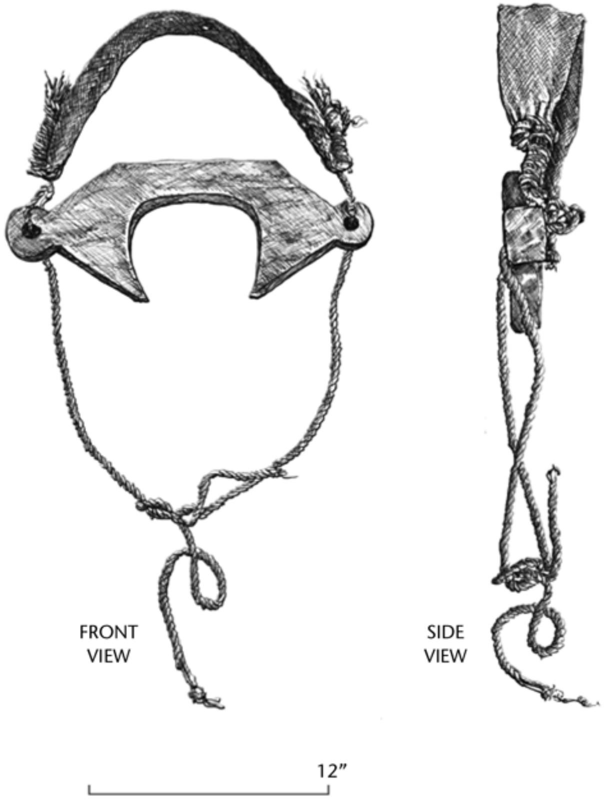
TOP VIEW

Demonstration of how an ordinary shawl is adapted for carrying newly-harvested paddy from the field back to the village. (Illustration from Tsiesema village.)

6. CARRYING BASKETS / CONTAINERS

K -
T - vobephu
code: 6.12

- wooden yoke used for support while carrying either baskets or sacks of rice, Job's tears, millet, maize or any other heavy load; by taking the weight on the shoulders, the head can then relax



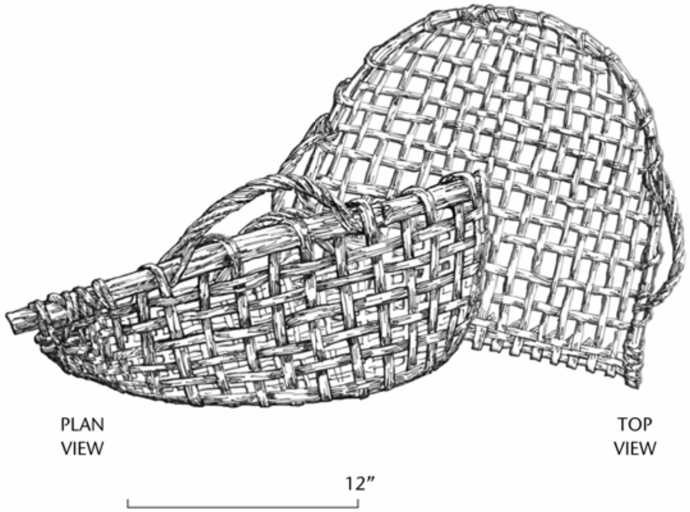
K - khope
T - khope
code: 6.13

- carrying basket that men use for food, tools or other small items when they go to the field or forest

6. CARRYING BASKETS / CONTAINERS

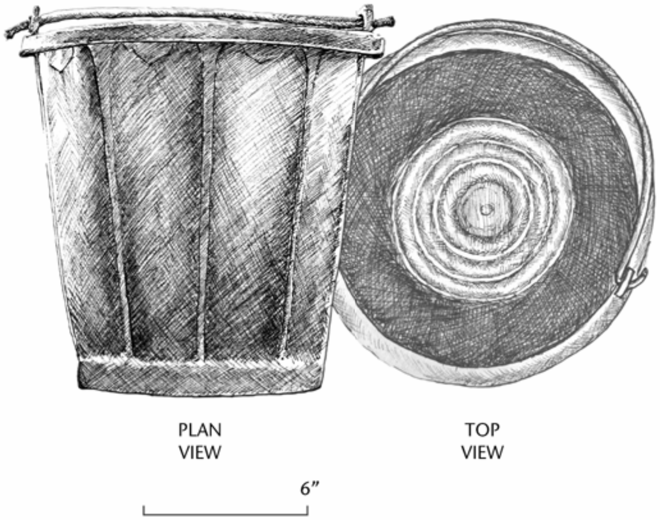
K - nyipierha
T - nuopfürha
code: 6.14

- carrying stones and soil in construction projects such as repairing roads, field bunds or irrigation channels; newly harvested potatoes are placed on this, the soil shaken off, and then put in a <u>khorü</u> (code 6.1); can also be used to carry rubbish to be thrown out



K -
T - balati
code: 6.15

- a more modern introduction, plastic buckets are now also used for carrying, measuring and storing crops

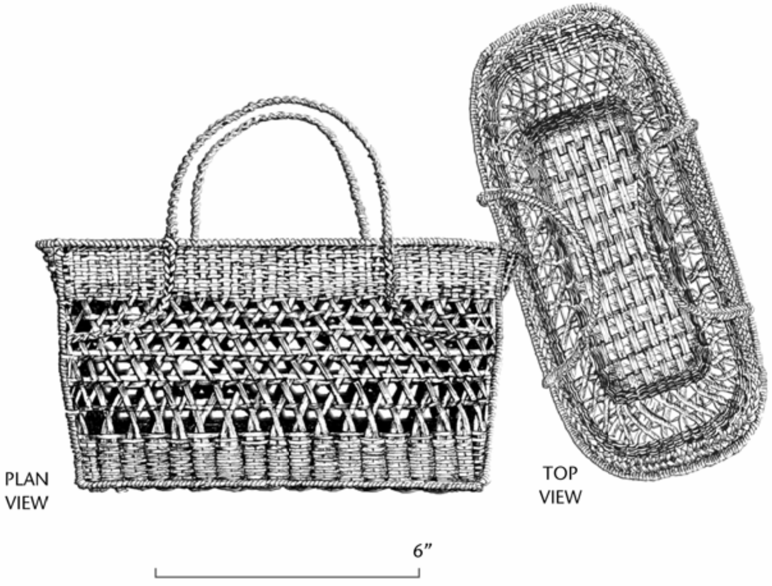


7. STORAGE CONTAINERS

7.1 Dry Goods

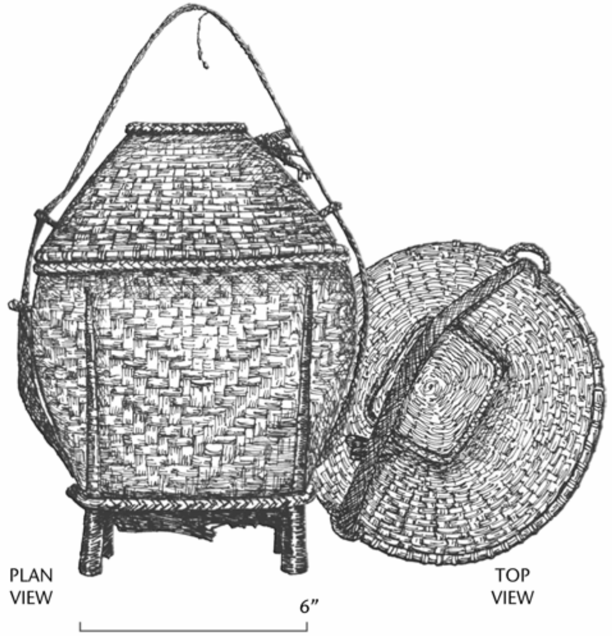
K - merha
T - therülikhou
code: 7.1.1

- storing knitting materials, decorating with dried flowers, going to market, etc.



K - khathu (bugie)
T - buge
code: 7.1.2

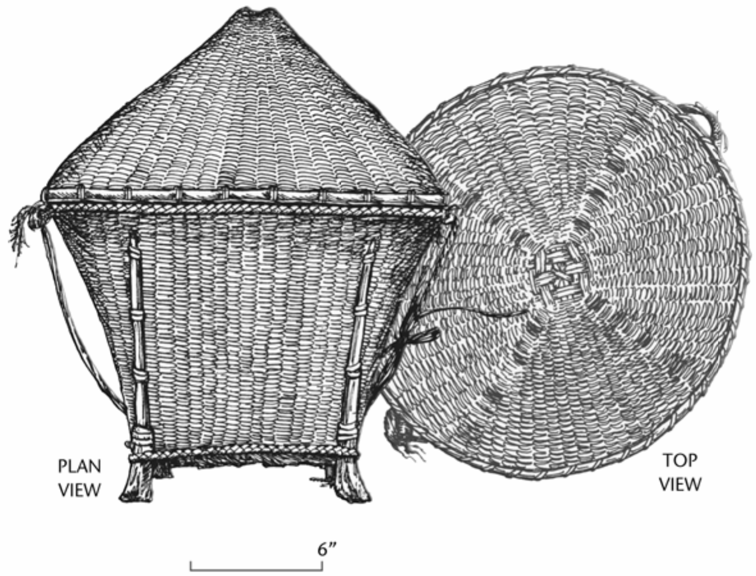
- general storage purposes, such as for necklaces, earrings and other precious items



7. STORAGE CONTAINERS
7.1 Dry Goods

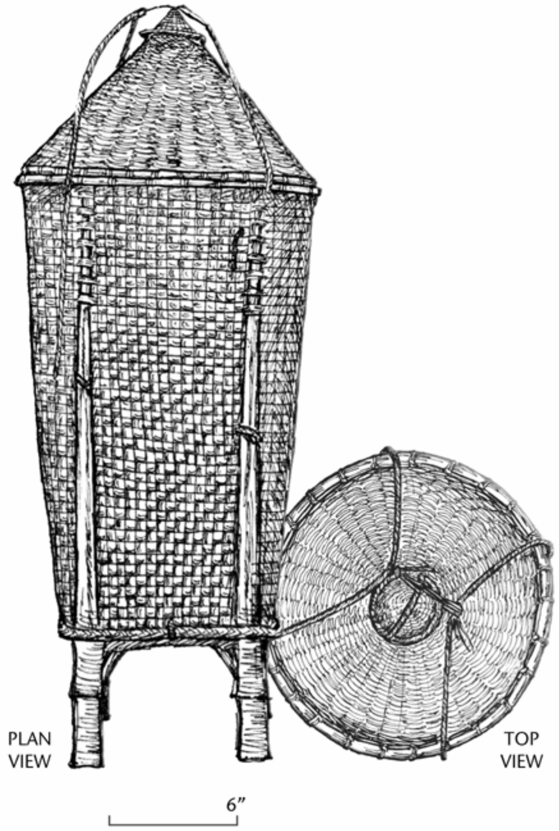
K - khathu
T - biekho
code: 7.1.3

- storing precious possessions, such as clothing, necklaces, ivory arm bands, bangles, and other items of traditional dress



K - khathu
T - biekho
code: 7.1.4

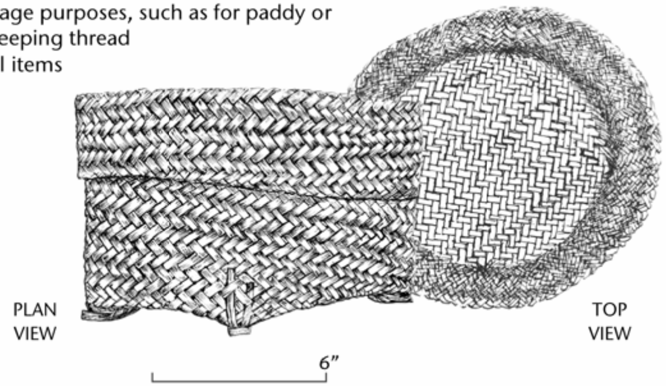
- general storage purposes, such as for necklaces, earrings and other precious things



7. STORAGE CONTAINERS
7.2 Crops
7.2.1 Woven Trays

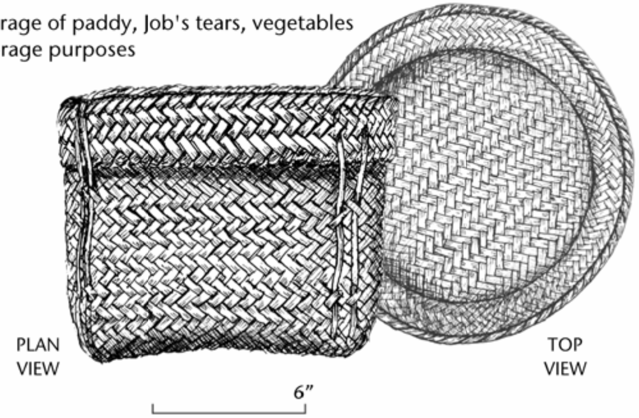
K - rhapa / merha
T - rhapa / merha
code: 7.2.1.1

- general storage purposes, such as for paddy or vegetables, keeping thread or other small items



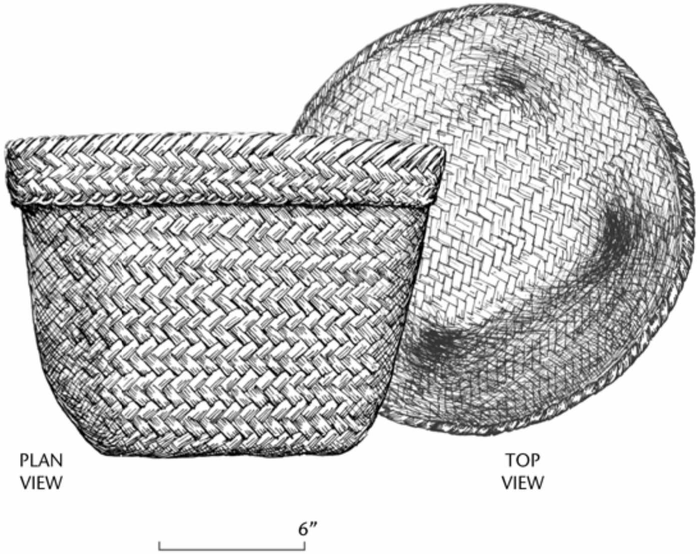
K - rhapa
T - merha
code: 7.2.1.2

- temporary storage of paddy, Job's tears, vegetables and general storage purposes



K - merha
T - merha
code: 7.2.1.3

- storing small amounts of food crops on the short term; can be of varying sizes



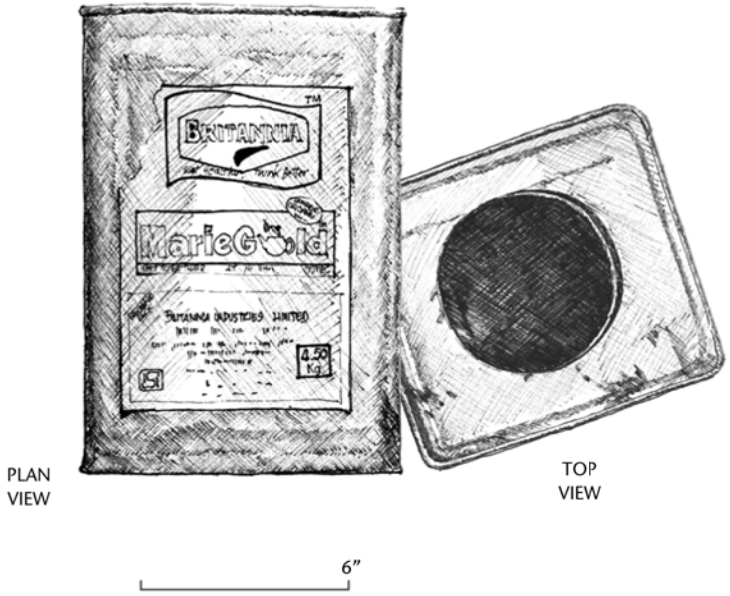
7. STORAGE CONTAINERS

7.2 Crops

7.2.2 Tins

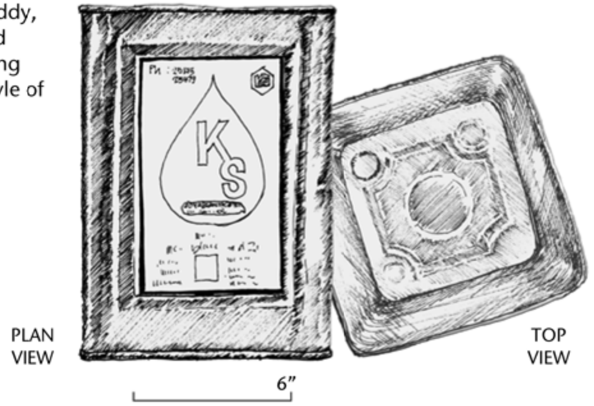
K - tinyü kecü-u
T -
code: 7.2.2.1

- measuring paddy, rice, potatoes, etc.; also for storage; slightly smaller style of tin



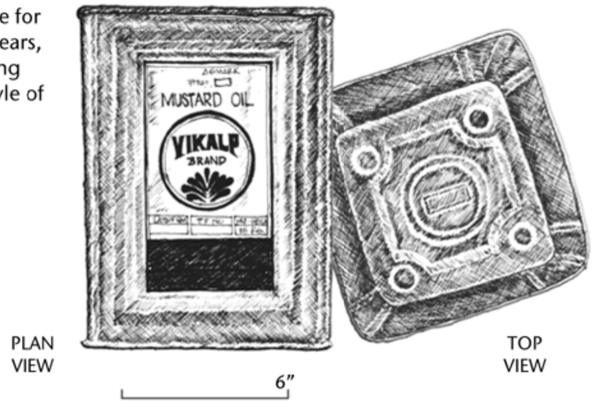
K - tinyü kezha-u
T - cienyü / thuthseli kezha-u
code: 7.2.2.2

- unit of measure for paddy, potatoes, Job's tears and chilli; also used for storing rice in kitchen; larger style of tin



K - tinyü
T - cienyü / thuthseli kezha-u
code: 7.2.2.3

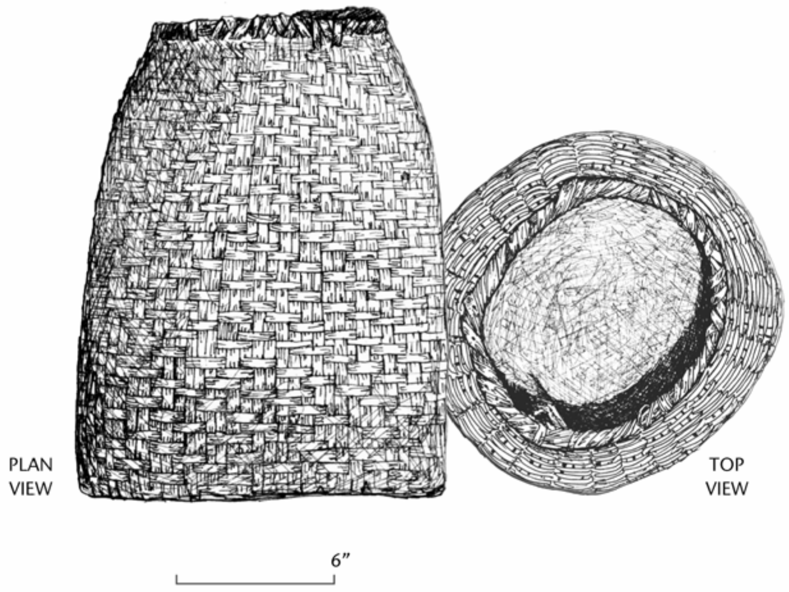
- used as unit of measure for paddy, potatoes, Job's tears, chilli; also used for storing rice in kitchen; larger style of tin



7. STORAGE CONTAINERS
7.2 Crops
7.2.3 Baskets

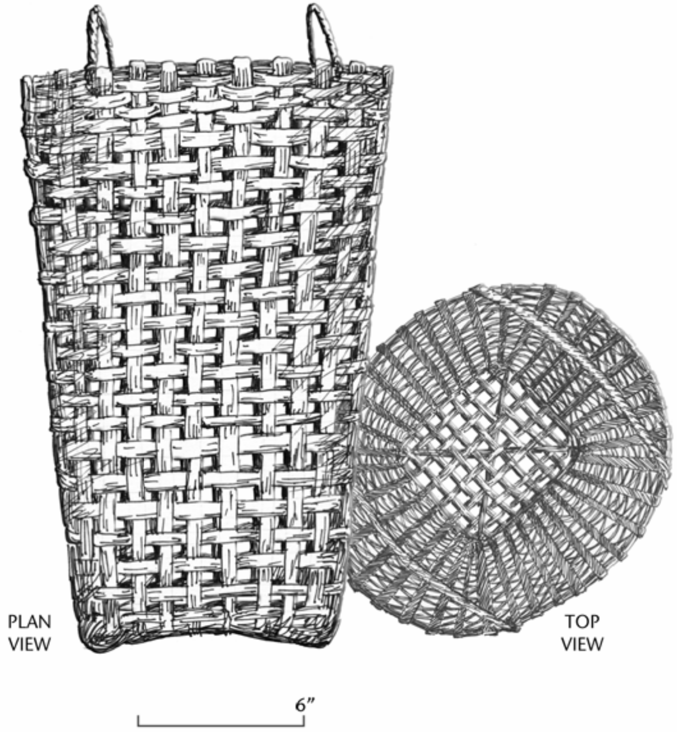
K - keprüchü
T - tsiachünuo
code: 7.2.3.1

- storing paddy, Job's tears or millet, for either eating or planting



K - chüsiya
T - chüsiya
code: 7.2.3.2

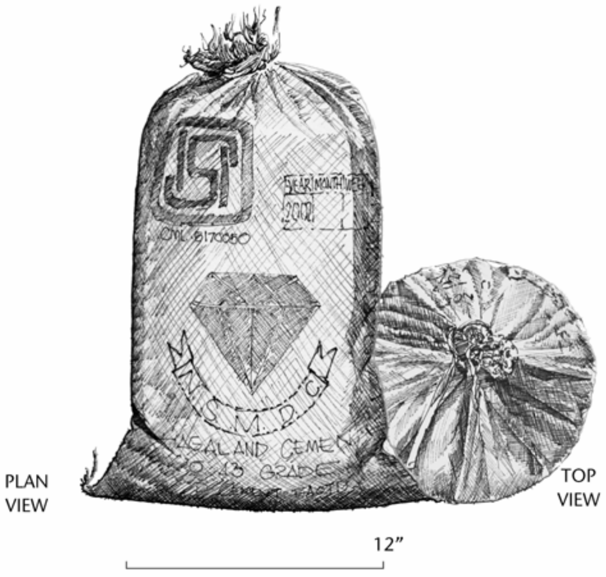
- storing chilli after drying



7. STORAGE CONTAINERS
7.2 Crops
7.2.4 Sacks

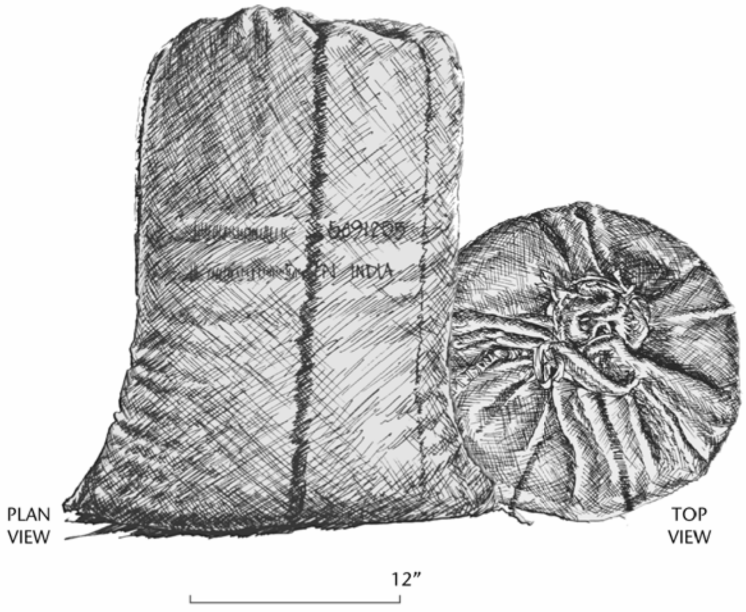
K - ciment nhu
T - gakhropfe ketsü / ciment nhu
code: 7.2.4.1

- cement sack, usually used for carrying wild apple, tomato, guava or papaya to the Kohima market



K - thula
T - gakhropfe tie kepha (tied shut)
code: 7.2.4.2

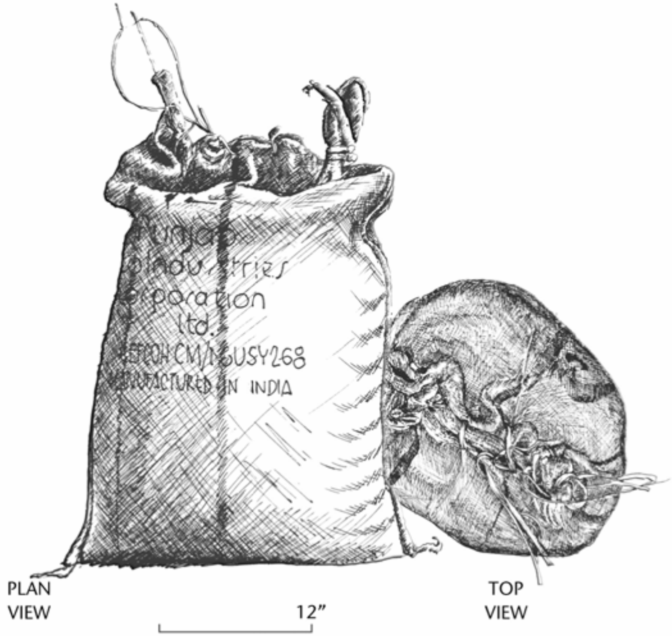
- carrying or storing paddy, potatoes, etc.



7. STORAGE CONTAINERS
7.2 Crops
7.2.4 Sacks

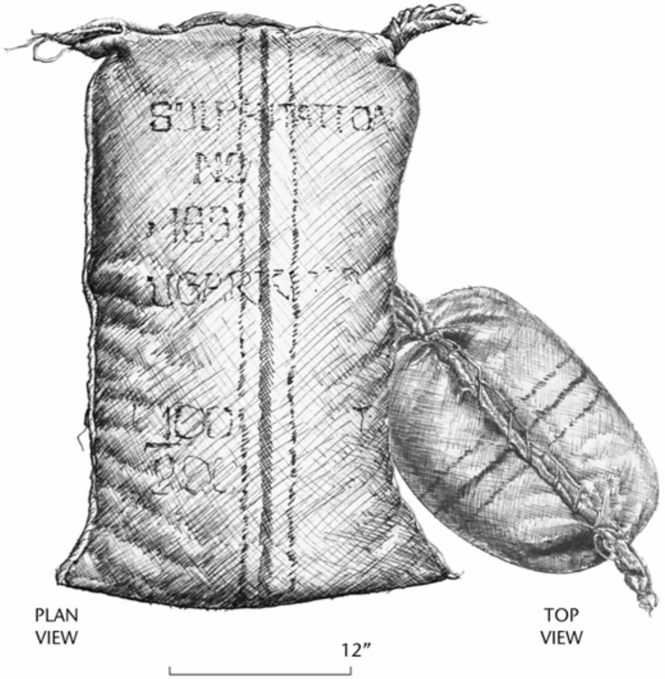
K - thula
T - gakhropfe puotie keterhü
code: 7.2.4.3

- carrying or storing paddy, potatoes, charcoal, etc.



K -
T - gakhropfe (stitched shut)
code: 7.2.4.4

- large sack, usually used for storing paddy



7. STORAGE CONTAINERS
7.2 Crops
7.2.5 Larger Containers

The keprüchü (foreground) are the large bamboo baskets used for rice storage and could traditionally be found in every Angami home. Like everywhere else in Asia, bamboo is an immensely important construction material for the Nagas with a wide variety of uses - for baskets, mats, walling, fencing, cages, mugs, ladles and other kitchen utensils, piping water between paddy terraces, etc. The keprüchü had the disadvantage that it took the strength of several men to move them and the entire rice harvest could be lost if the house caught fire.

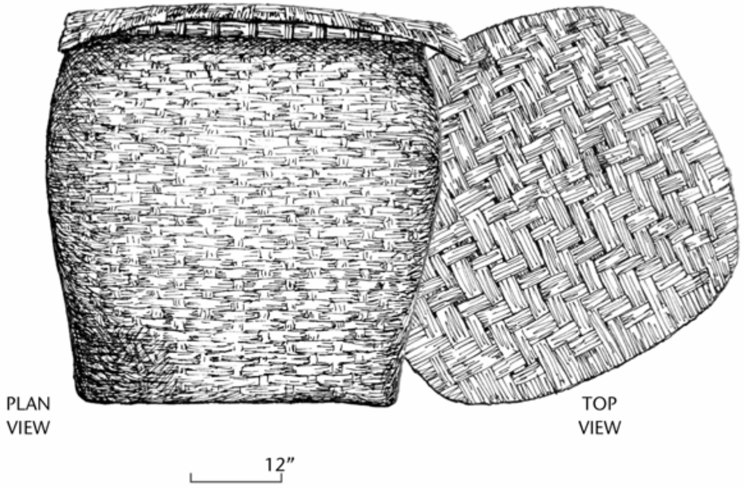
7. STORAGE CONTAINERS

7.2 Crops

7.2.5 Larger Containers

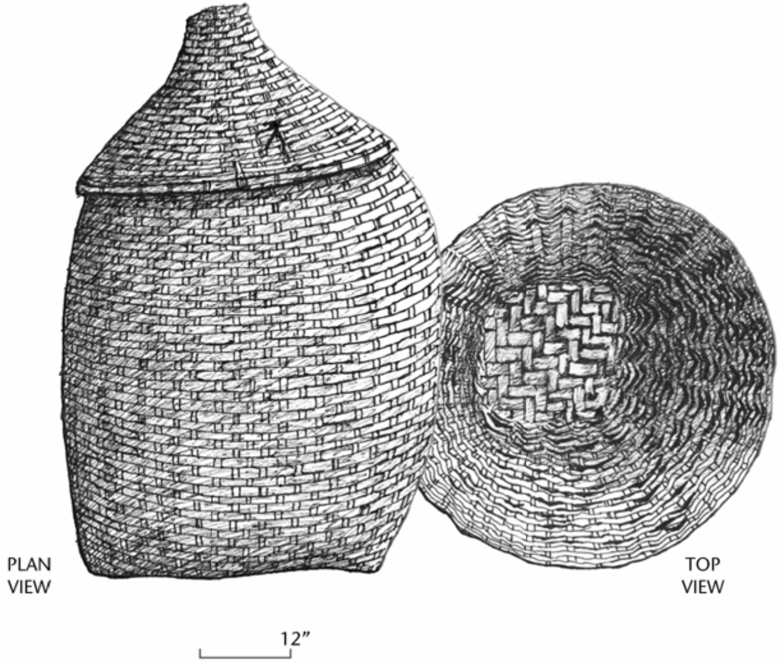
K - keprüchü
T - chü / chünuo
code: 7.2.5.1

- large storage basket for paddy, Job's tears and millet, made from cane and split bamboo; unit of measurement



K - keprüchü
T - chü / chünuo
code: 7.2.5.2

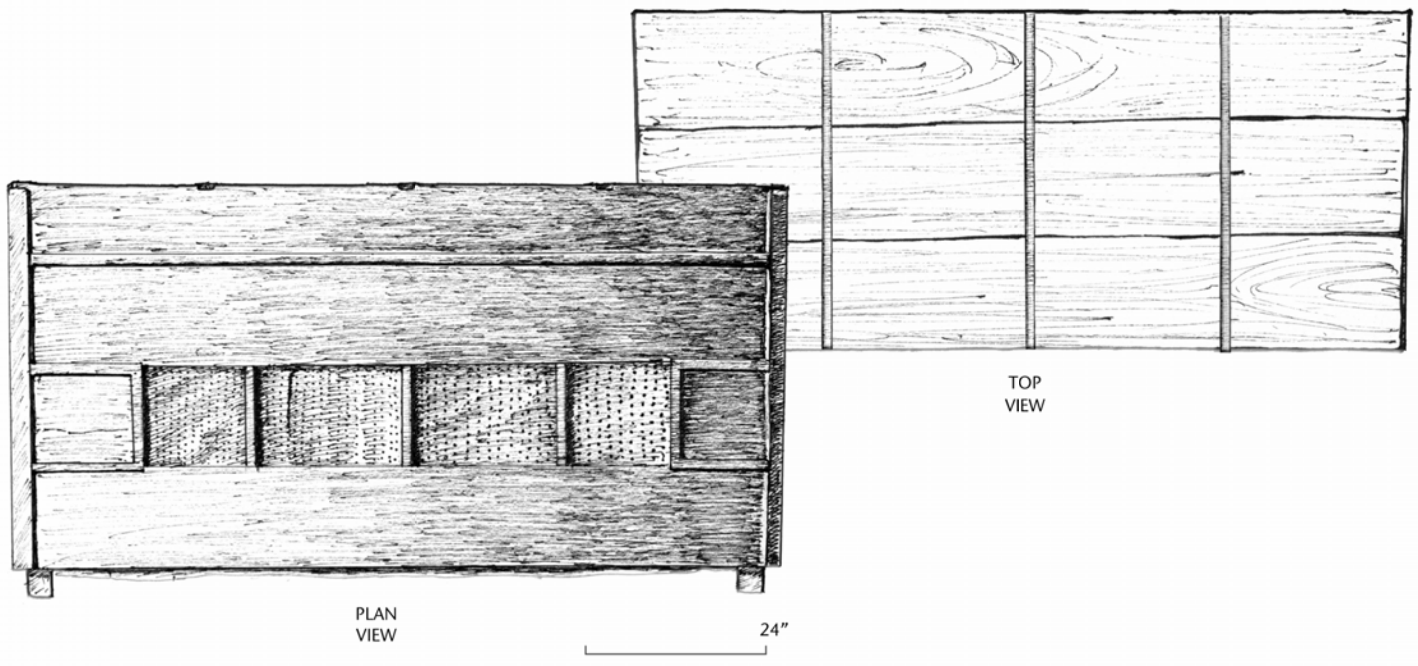
- another style of large storage basket for paddy, Job's tears and millet; unit of measurement



7. STORAGE CONTAINERS
7.2 Crops
7.2.5 Larger Containers

K - melachü / sichü
T - telhabu
code: 7.2.5.3

- wooden box for storage of rice after harvest



8. POST-HARVEST PROCESSING

8.1 Threshing

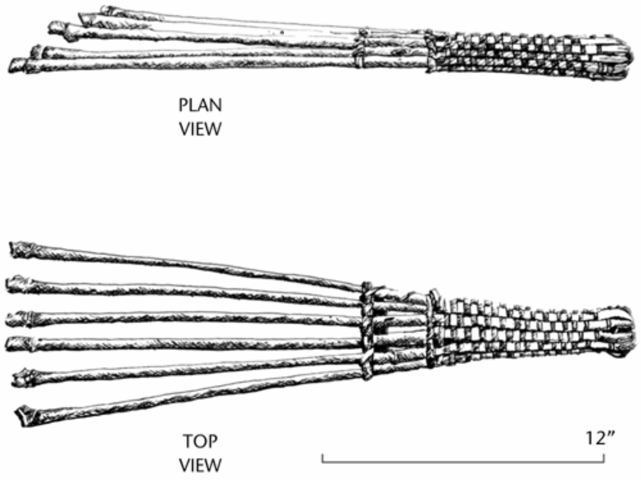
As the khodis (baskets) are filled, they are carried to a central point and dumped onto a tsopie (woven bamboo mat) - where the rice is threshed by foot in a circular, dance-like motion.

8. POST-HARVEST PROCESSING

8.1 Threshing

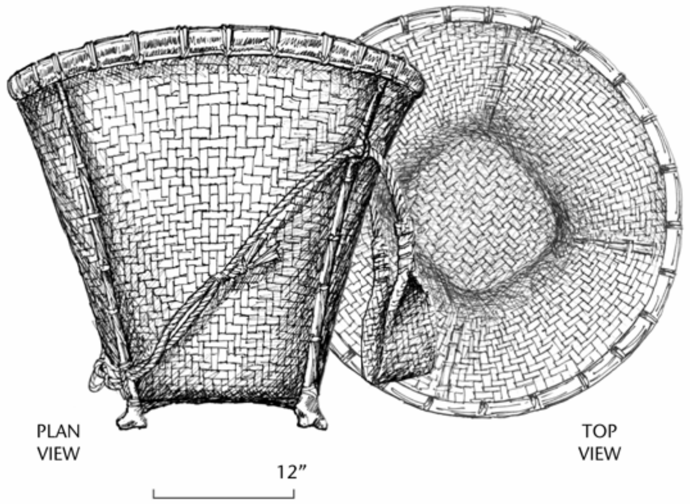
K - lieda
T - dzü / kudasei
code: 8.1.1

- six-pronged implement made from kevae bamboo, used in threshing rice, Job's tears, rice bean and soybean; each prong knobbed with a section of the node



K - telhakevükho
T -
code: 8.1.2

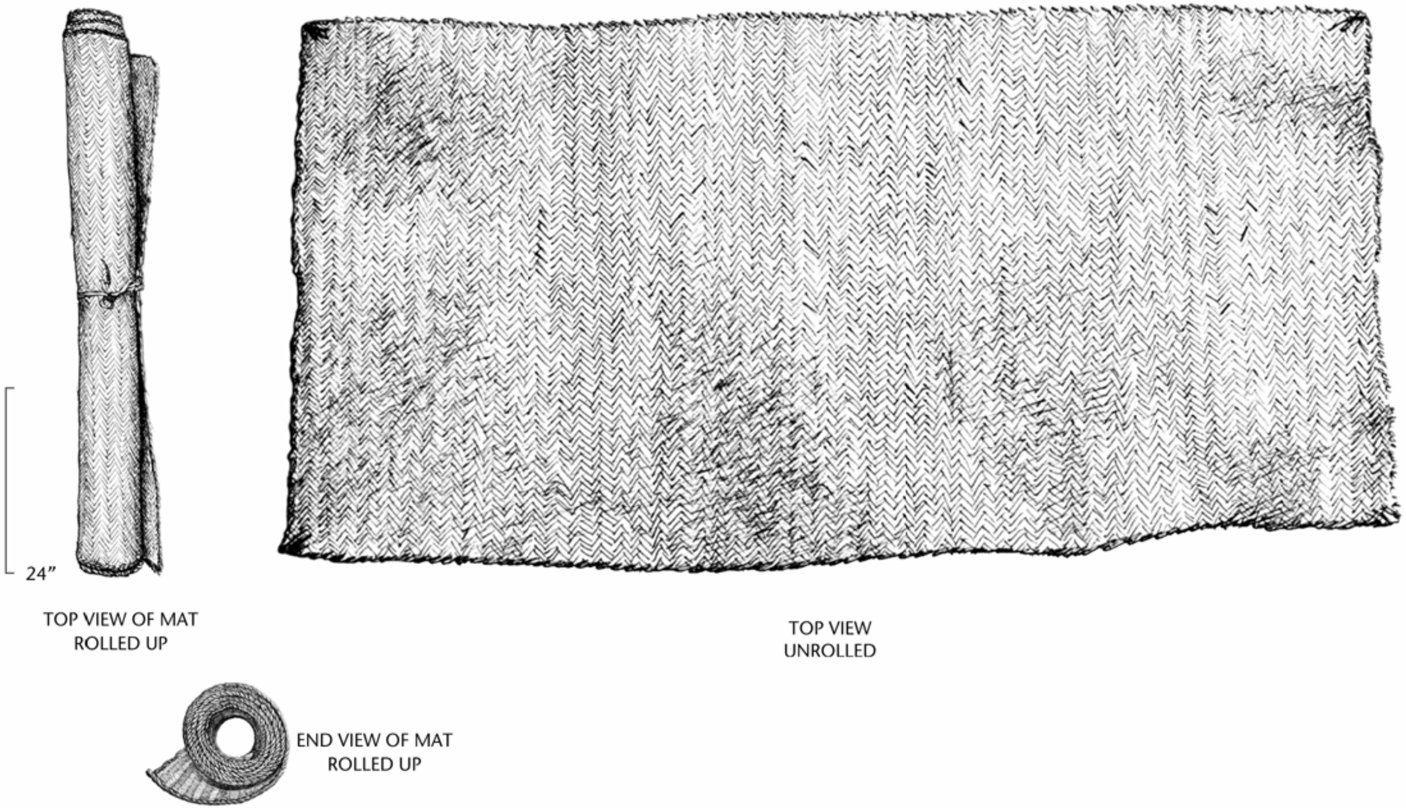
- harvested rice plants are shaken in this large basket to dislodge the seeds; a new technique that began in Khonoma only 4-5 years ago, as an alternative to the traditional practice of using feet to thresh rice on a mat



8. POST-HARVEST PROCESSING
8.1 Threshing

K - tsopie
T - zoprie
code: 8.1.3

- mat woven in a twilled pattern from split bamboo; used for threshing paddy, millet or Job's tears and later for spreading out these crops to dry in the sun

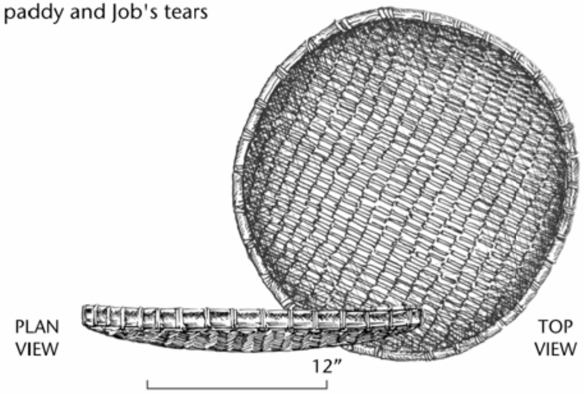


8. POST-HARVEST PROCESSING

8.2 Winnowing

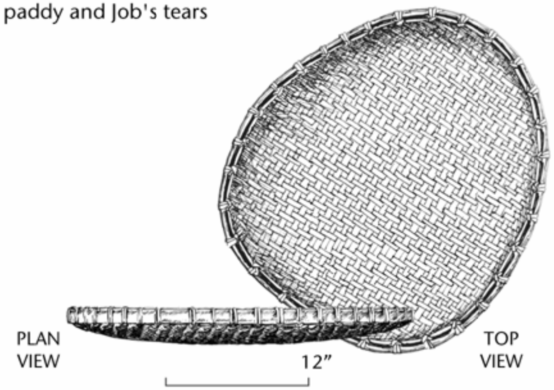
K - jarü
T - zarü kemetou
code: 8.2.1

- winnowing paddy and Job's tears



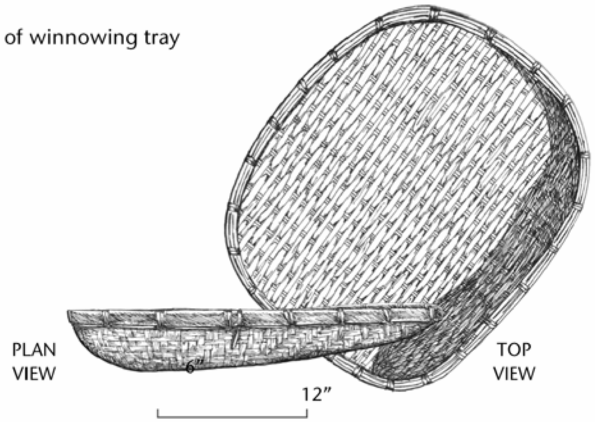
K - jarü
T - zarü
code: 8.2.2

- winnowing paddy and Job's tears



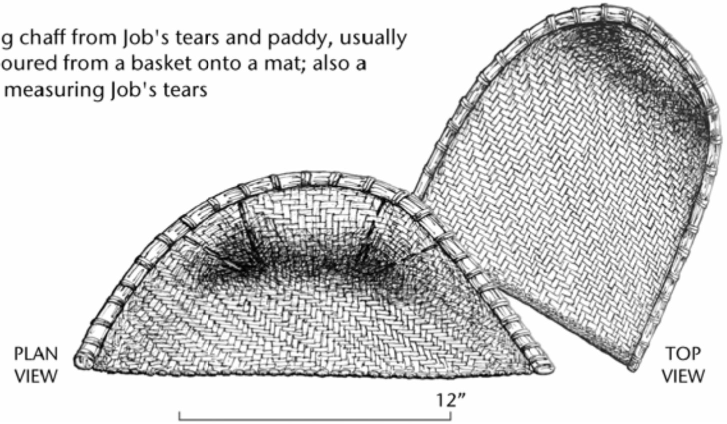
K - jarü
T - zarü
code: 8.2.3

- square style of winnowing tray



K - lieherü
T - lieharü
code: 8.2.4

- fanning chaff from Job's tears and paddy, usually when poured from a basket onto a mat; also a unit for measuring Job's tears



8. POST-HARVEST PROCESSING

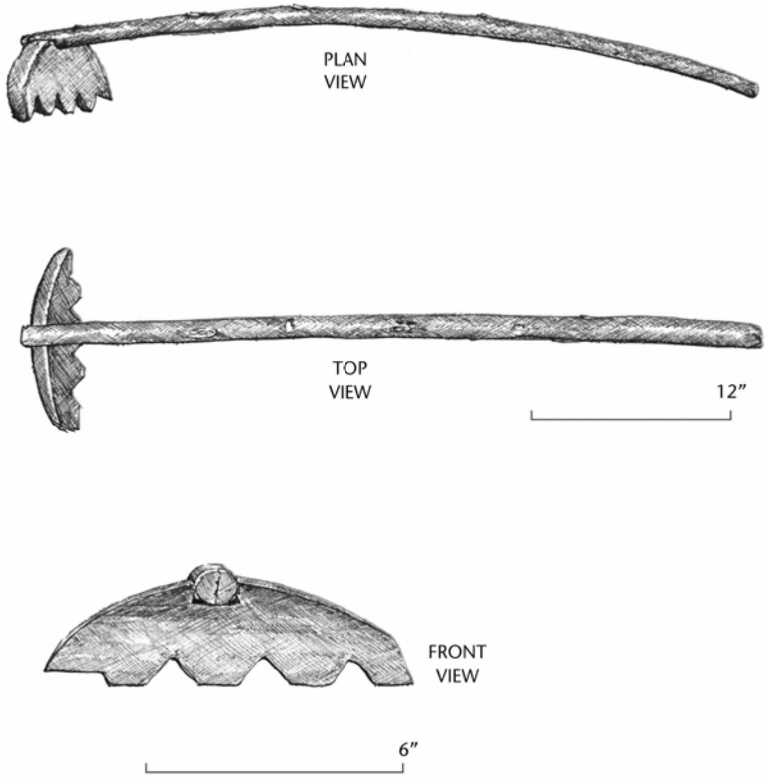
8.3 Drying

Taking advantage of a sunny day to dry out the rice. The rice is dumped onto a tsopie (bamboo mat), and a lhavahu (wooden rake) then used to spread it out evenly and turn it over as it dries.

8. POST-HARVEST PROCESSING
8.3 Drying

K - lhavahu
T -
code: 8.3.1

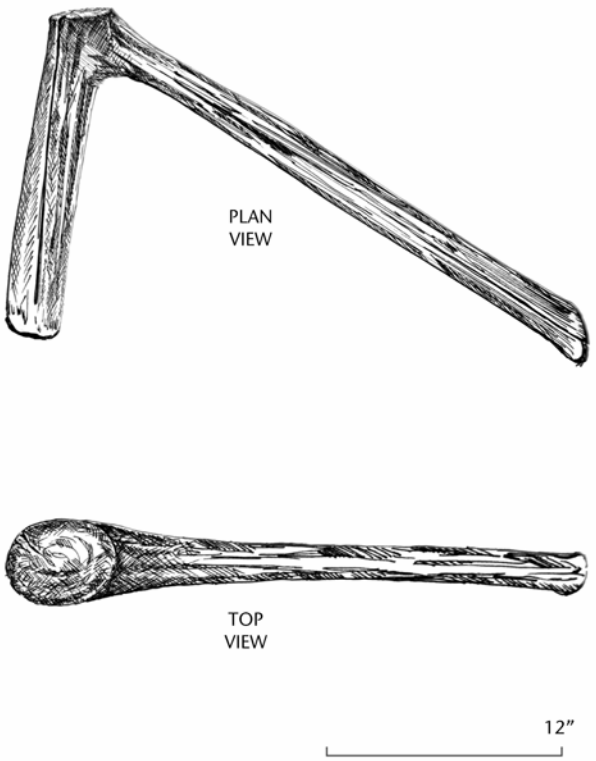
- wooden rake used for spreading out rice, Job's tears, millet, perilla, etc. on mats (code 8.1.3) to dry in the sun



8. POST-HARVEST PROCESSING
8.4 Milling

K - miedu
T - midu
code: 8.4.1

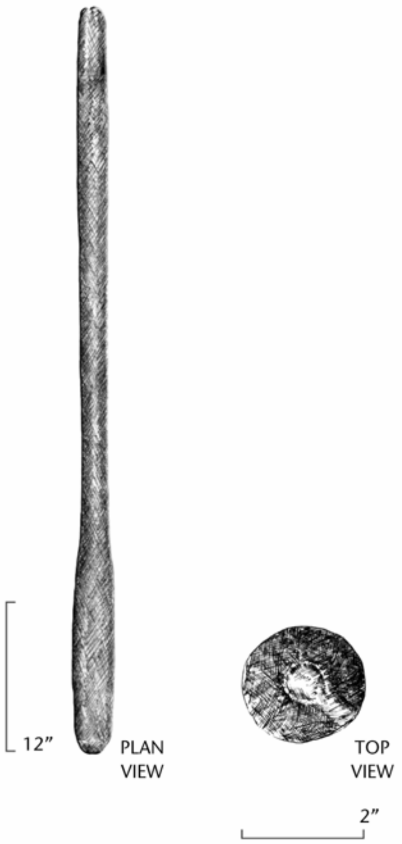
- pestle for pounding rice or Job's tears in making bread or beer



8. POST-HARVEST PROCESSING
8.4 Milling

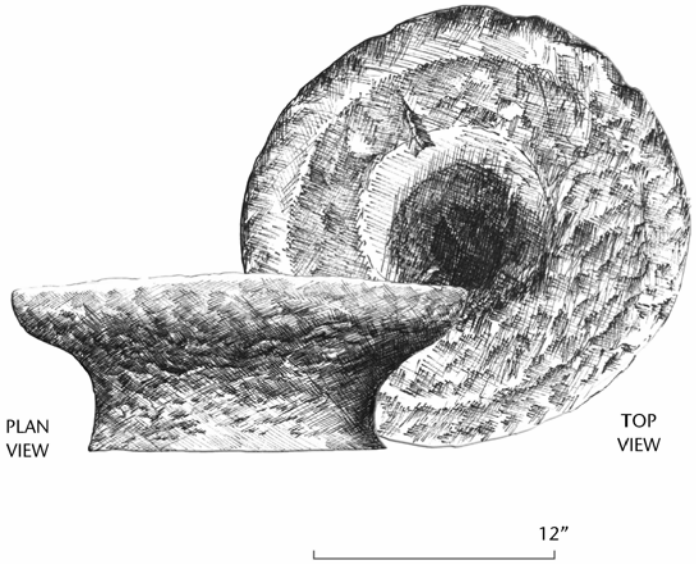
K - kemie
T -
code: 8.4.2

- wooden pestle used for dehusking paddy, Job's tears, or millet; can be made from any dense wood



K - ketsie pikhie
T -
code: 8.4.3

- stone mortar for pounding paddy, Job's tears, millet, chilli, ginger, tea leaf, etc.; made in Khonoma

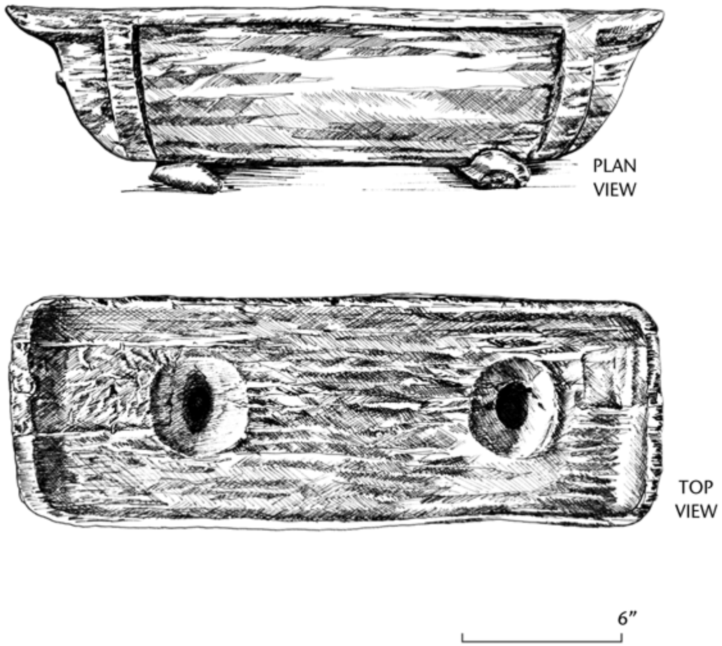


8. POST-HARVEST PROCESSING

8.4 Millings

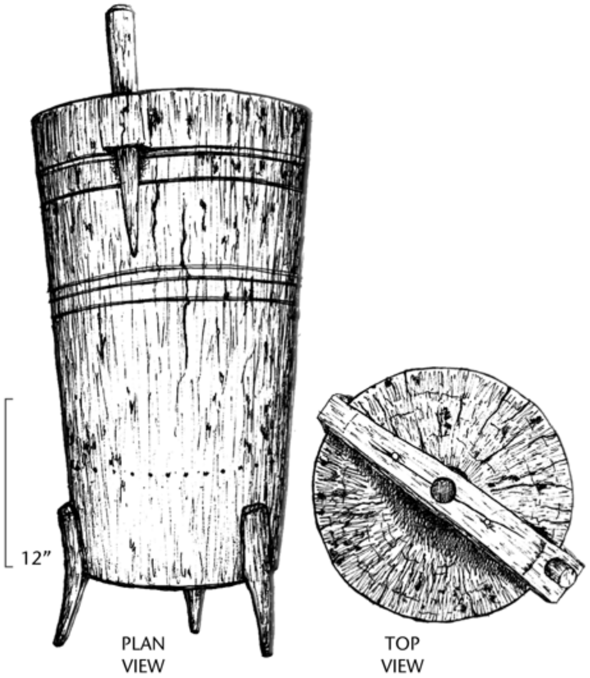
K - pikhie
T - ciekhe
code: 8.4.4

- wooden 2-holed mortar used together with miedu for pounding rice or Job's tears; made from a single tree



K - kotsie pikhie
T -
code: 8.4.5

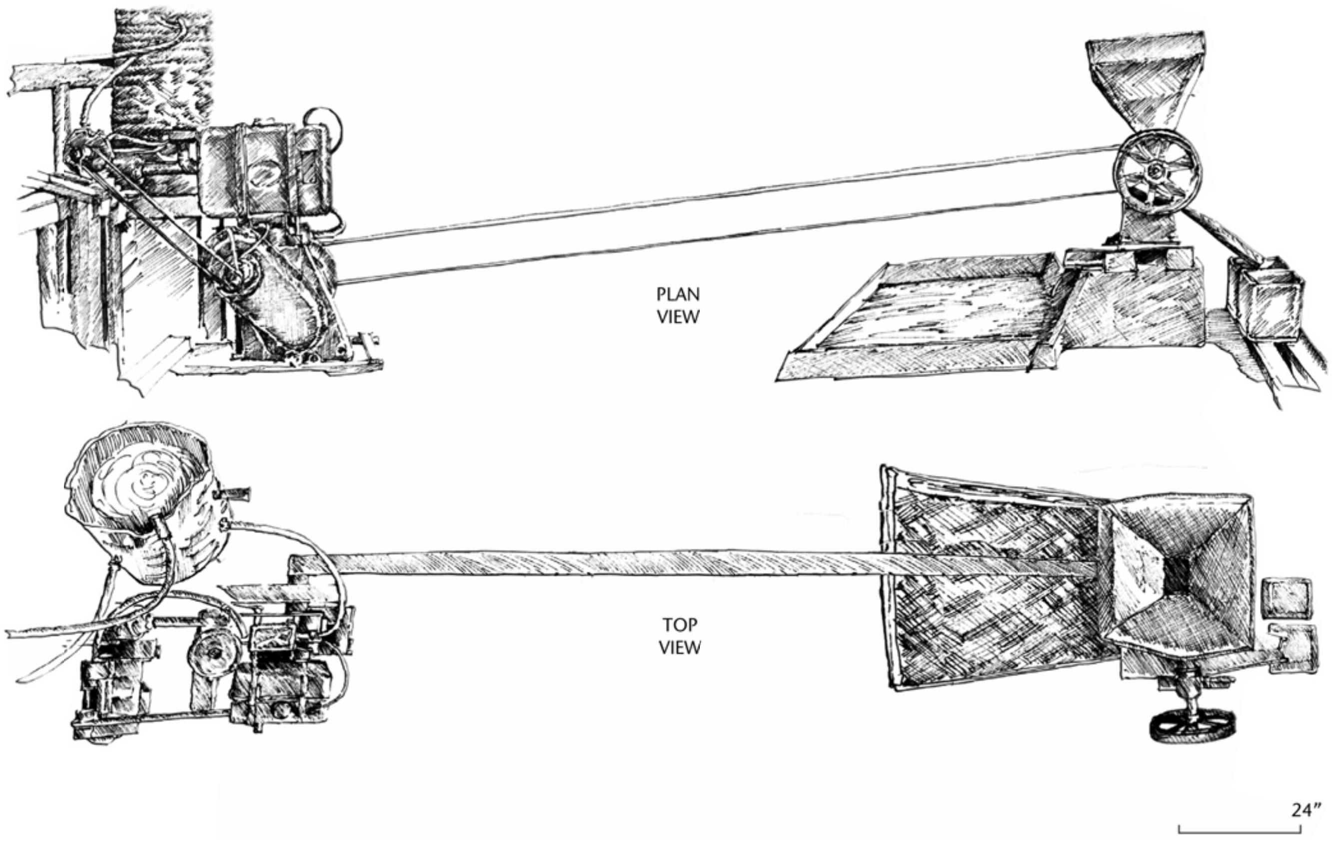
- for milling rice, design probably borrowed from the Kukis



8. POST-HARVEST PROCESSING
8.4 Milling

K - pithuki
T - tsiethu
code: 8.4.6

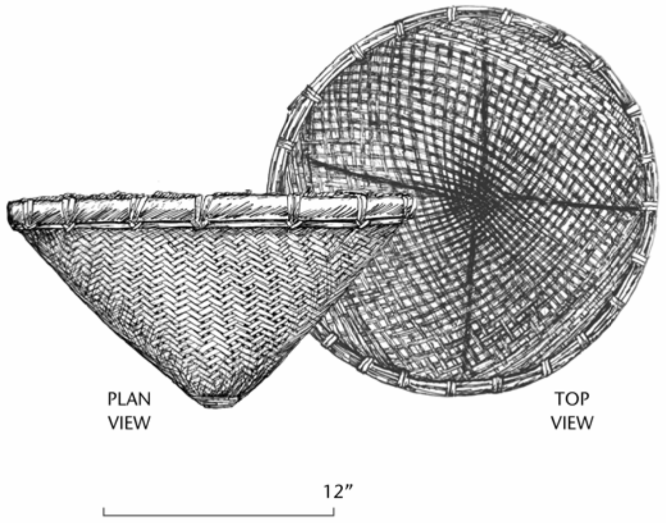
- engine-powered rice mill



8. POST-HARVEST PROCESSING
8.5 Making Local Brew
8.5.1 Sieves

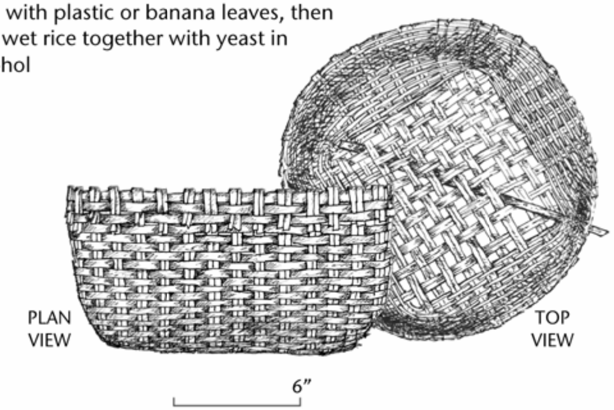
K - dzucharha
T - zucharha
code: 8.5.1.1

- bamboo sieve for draining water from rice or Job's tears in preparation for pounding



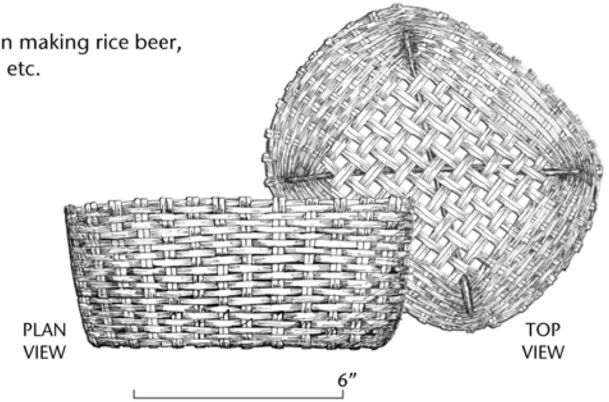
K - khiecharha
T - sügo
code: 8.5.1.2

- after lining with plastic or banana leaves, then used to mix wet rice together with yeast in making alcohol



K - thuzorha
T -
code: 8.5.1.3

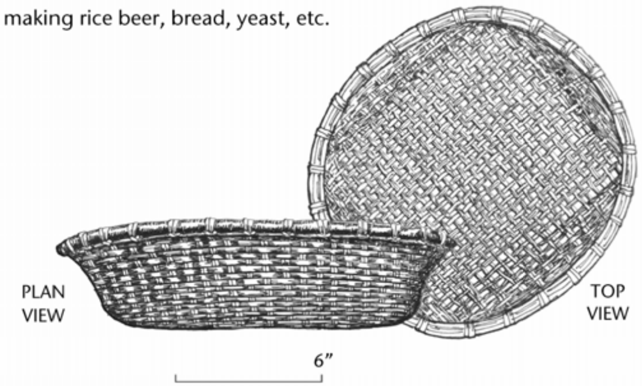
- sieve used in making rice beer, bread, yeast, etc.



8. POST-HARVEST PROCESSING
8.5 Making Local Brew
8.5.1 Sieves

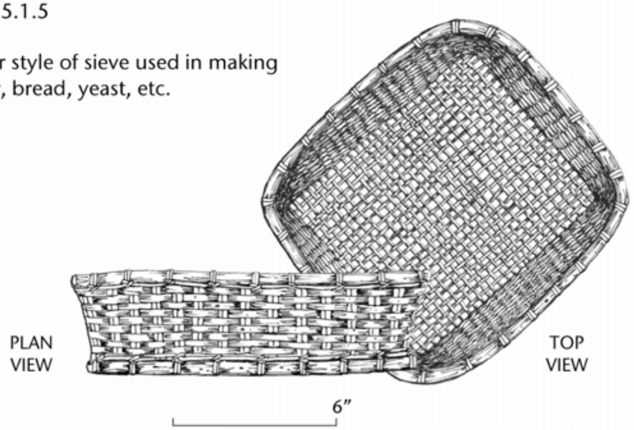
K - thuzorha
T - lithuo
code: 8.5.1.4

- sieve for making rice beer, bread, yeast, etc.



K - thuzorha
T - thuzuo
code: 8.5.1.5

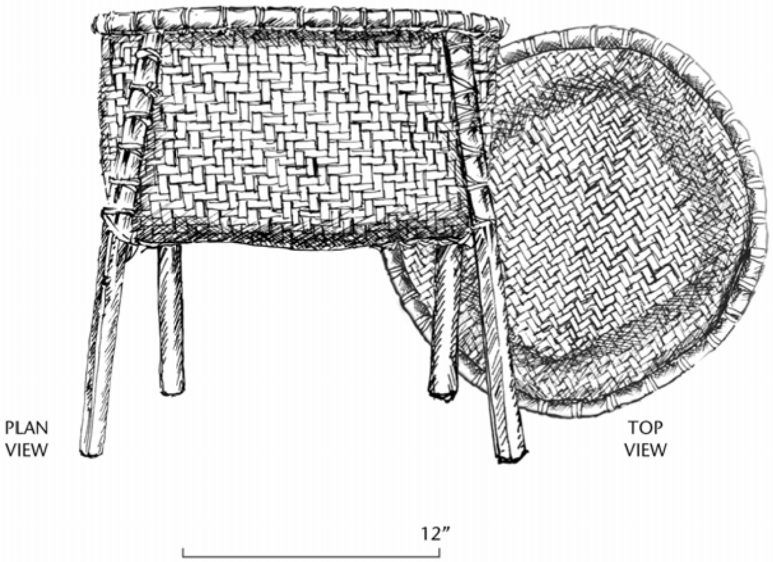
- another style of sieve used in making rice beer, bread, yeast, etc.



8. POST-HARVEST PROCESSING
8.5 Making Local Brew
8.5.2 Vats

K - thuserha
T - thuthserha
code: 8.5.2.1

- used for mixing boiling water with pounded rice or Job's tears, and then yeast, in the process of making beer



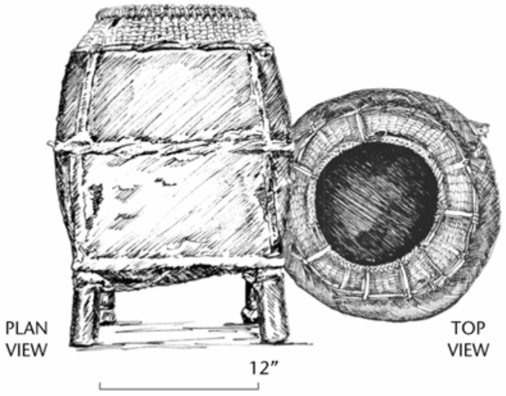
8. POST-HARVEST PROCESSING

8.5 Making Local Brew

8.5.2 Vats

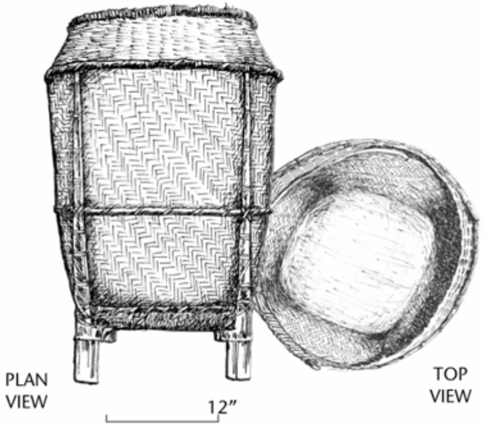
K - liti
T - tsiachunuo
code: 8.5.2.2

- large basket closely woven in twill pattern, used for mixing beer (<u>zutho</u>) while it ferments; used in times of rituals



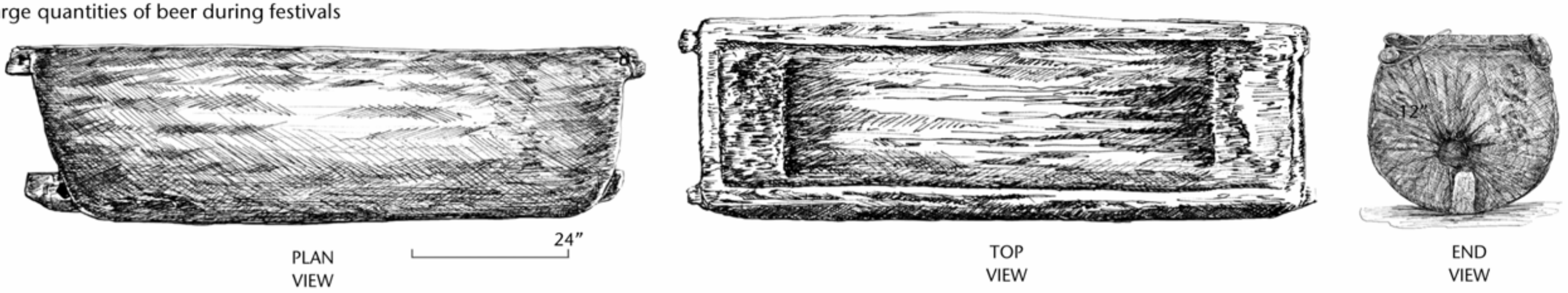
K - liti
T - prulitei
code: 8.5.2.3

- another style of basket used for mixing beer



K - kuzo
T - ciekhe / kuzuo
code: 8.5.2.4

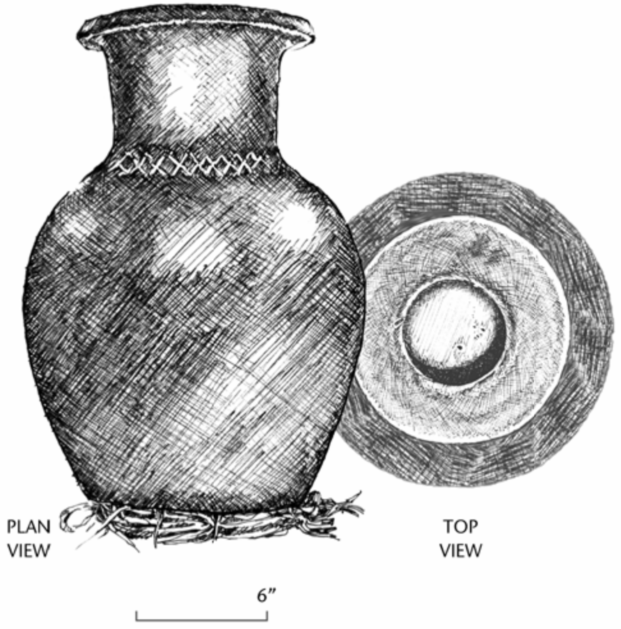
- wooden vat, made from a hollowed-out log, used in brewing large quantities of beer during festivals



8. POST-HARVEST PROCESSING
8.5 Making Local Brew
8.5.3 Storage

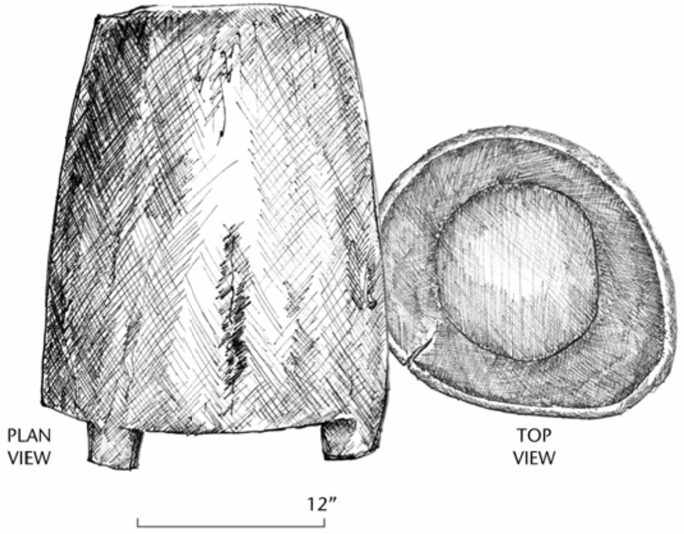
K - licü
T - liki
code: 8.5.3.1

- earthen jar used for storing rice beer or water



K - dapa
T - litei
code: 8.5.3.2

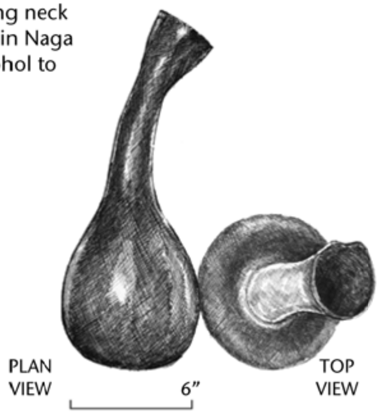
- storage container for beer (zutho), made from a hollowed-out tree, used anytime



8. POST-HARVEST PROCESSING
8.5 Making Local Brew
8.5.4 Transport to the Field and Forest

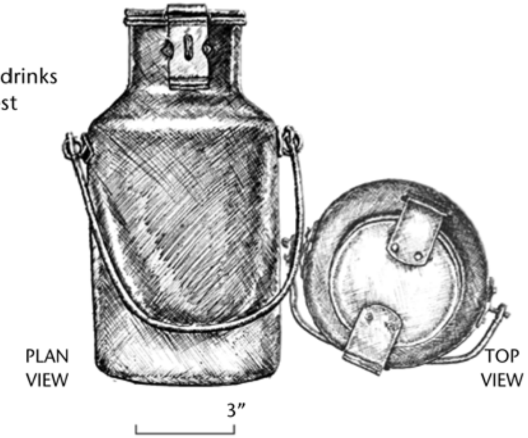
K - mekhwü
T - vahie
code: 8.5.4.1

- large gourd flask with long neck commonly used for water in Naga houses or for carrying alcohol to the field



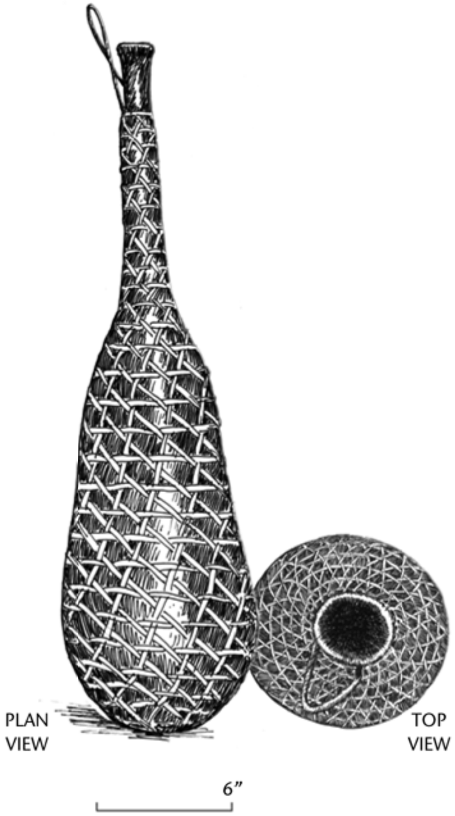
K - hicha
T - rukasü
code: 8.5.4.2

- carrying alcoholic drinks to the field and forest



K - mekhwü
T - sürha
code: 8.5.4.3

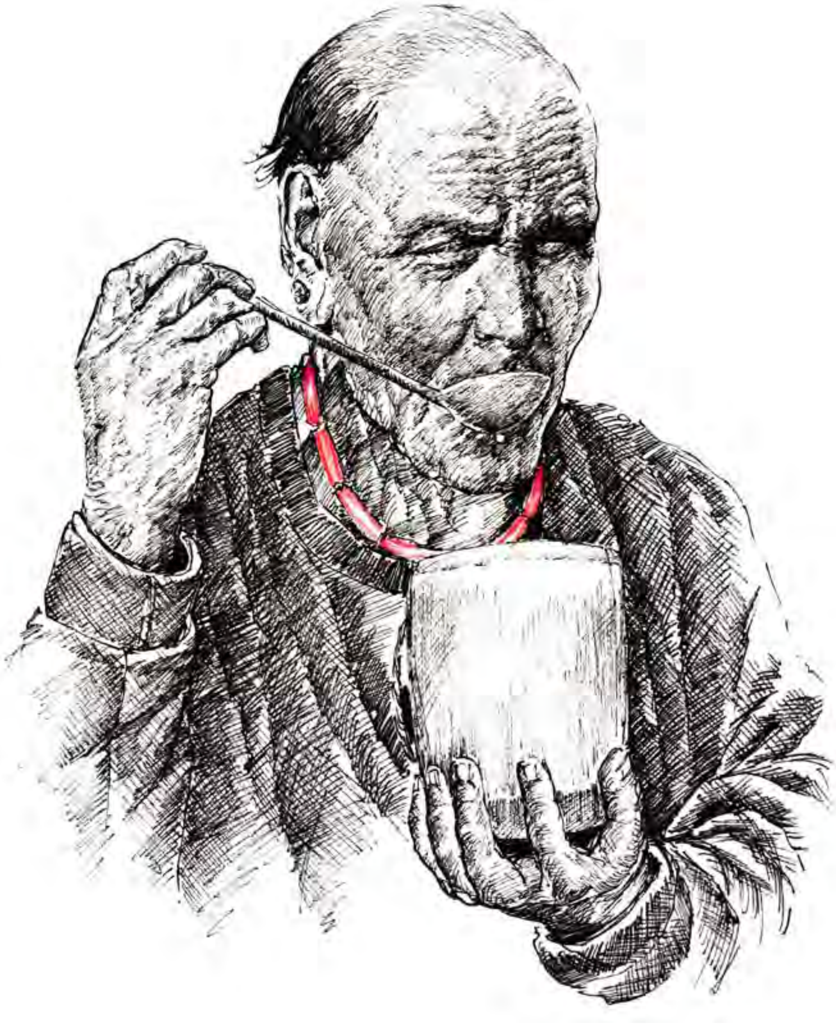
- gourd flask used for carrying alcohol to the field



8. POST-HARVEST PROCESSING

8.5 Making Local Brew

8.5.5 Drinking

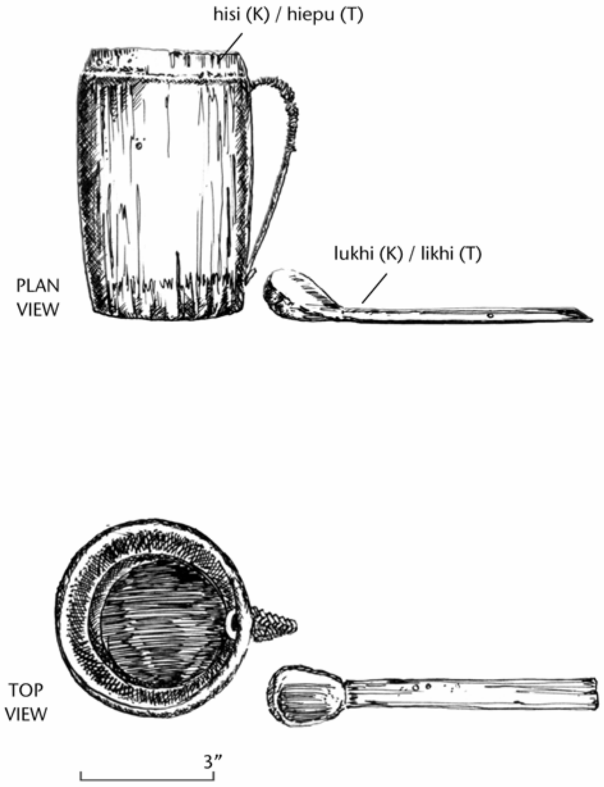


Khonoma's sole remaining zievo (priest of traditional Angami religion) uses a lukhi (bamboo spoon) to ladle zu (rice beer) from his hisi (bamboo mug). Rice beer was an important part of the Angami diet, but tends to be cast as a social evil since the arrival of Christianity.

8. POST-HARVEST PROCESSING
8.5 Making Local Brew
8.5.5 Drinking

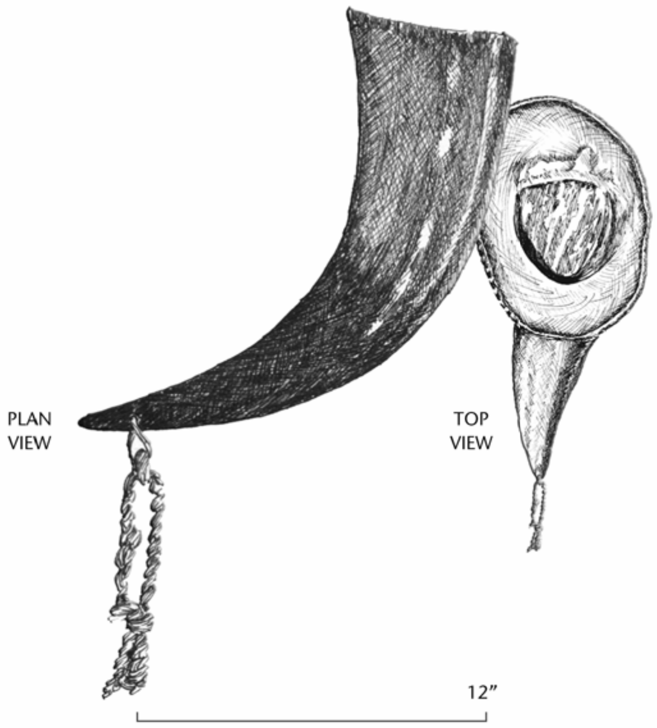
K - hisi & lukhi
T - hiepu & likhi
code: 8.5.5.1

- bamboo mug and spoon used for drinking beer



K - hiekie
T - hiekia
code: 8.5.5.2

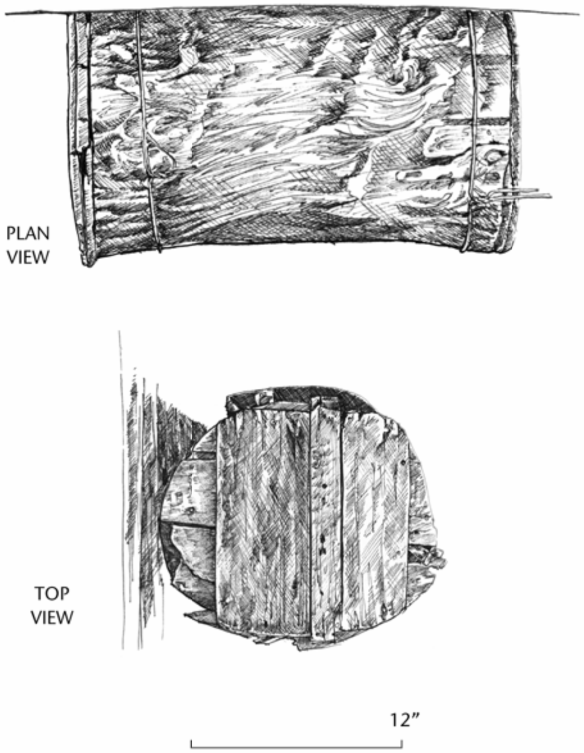
- drinking vessel made from a mithun horn, used for wine or rice beer; also often held as part of ceremonial dress



9. LIVESTOCK HUSBANDRY
9.1 Apiculture

K - mekhwübu
T - kevünuobu
code: 9.1.1

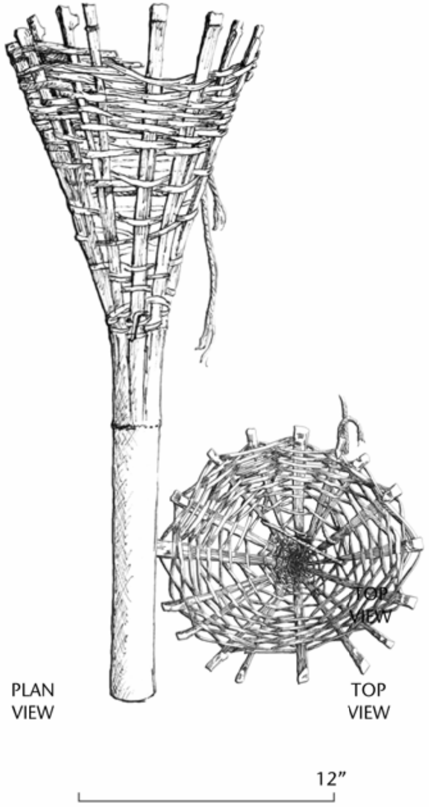
- hive for rearing <u>kevüno</u> bees for honey production



9. LIVESTOCK HUSBANDRY
9.2 Poultry

K - thevükru
T - thevükru
code: 9.2.1

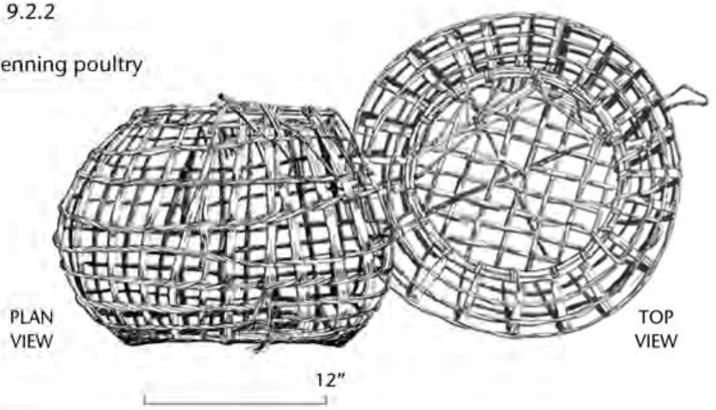
- nesting site for chickens



9. LIVESTOCK HUSBANDRY
9.2 Poultry

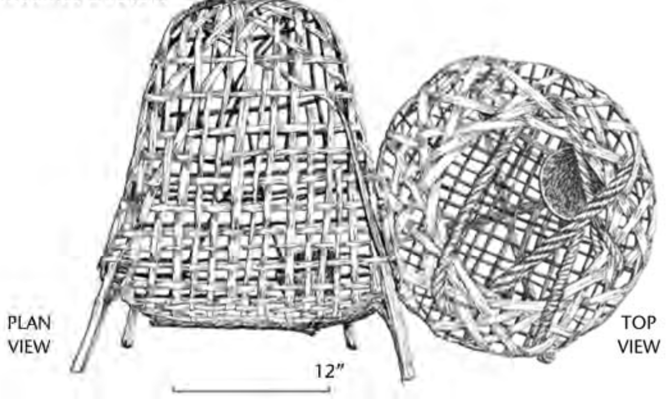
K - vütsüya
T - thevüruo
code: 9.2.2

- for penning poultry



K - vütsüya
T - thevüruo
code: 9.2.3

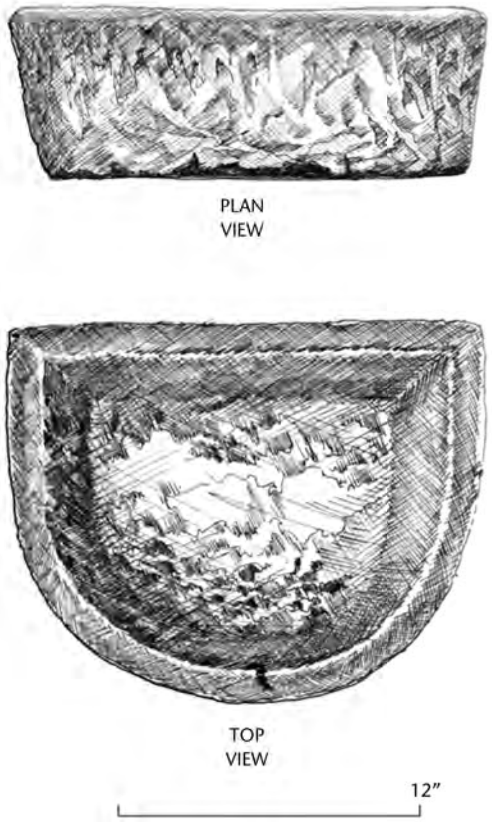
- another style of basket for penning
ducks or sometimes chickens



9. LIVESTOCK HUSBANDRY
9.3 Swine

K - thevokhu
T - thevokhu
code: 9.3.1

- stone pig trough

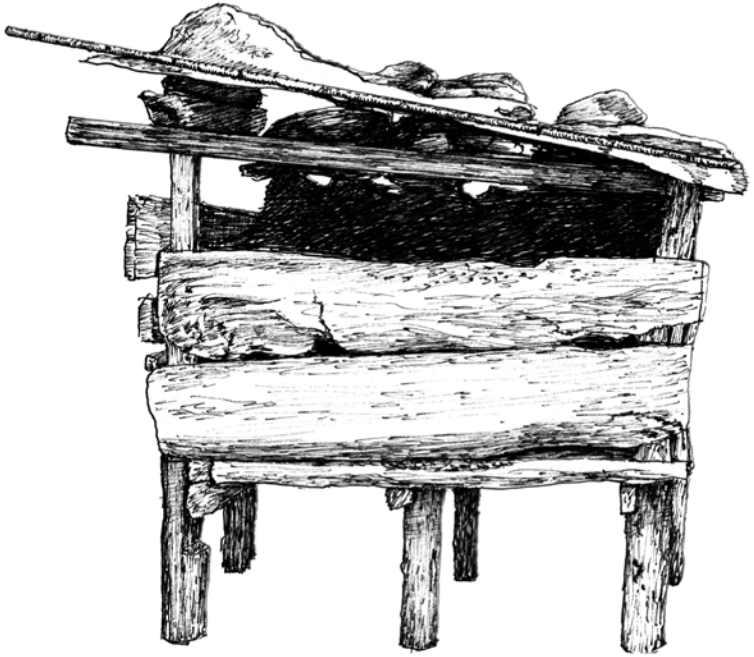


9. LIVESTOCK HUSBANDRY

9.3 Swine

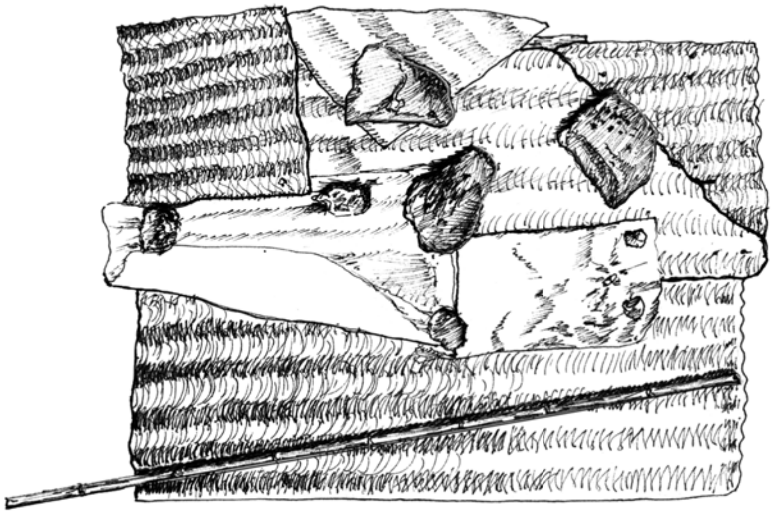
K - thevoki
T - thevoki
code: 9.3.2

- pig pen



PLAN
VIEW

24”



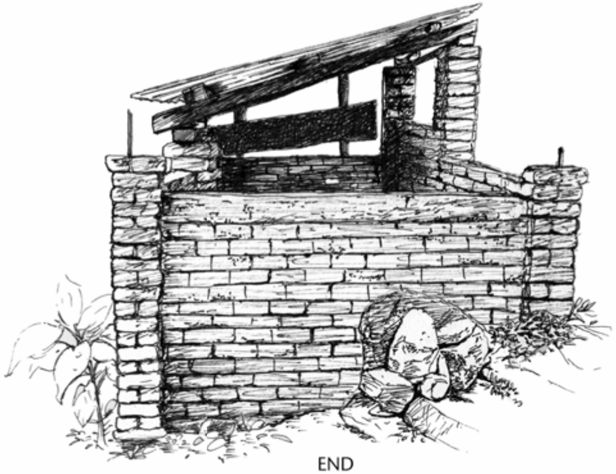
TOP
VIEW

9. LIVESTOCK HUSBANDRY

9.3 Swine

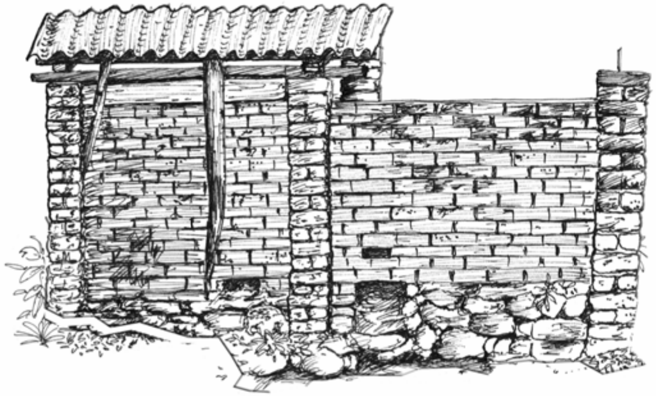
K - thevoki
T - thevoki
code: 9.3.3

- more elaborate pig pen

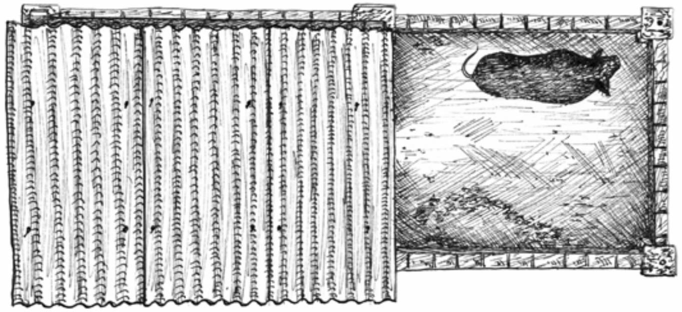


END
VIEW

36”



PLAN
VIEW



TOP
VIEW

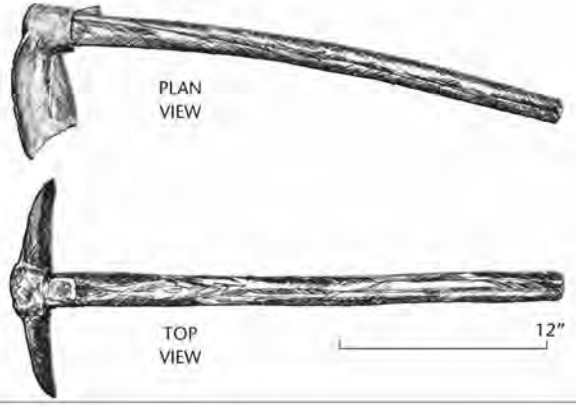
60”

9. LIVESTOCK HUSBANDRY

9.4 Cattle and Mithun

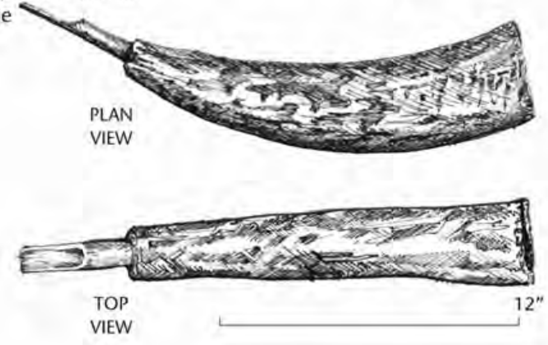
K - kuruju
T - kurdzü
code: 9.4.1

- used for scraping up dung when livestock had previously been kept in the house



K - ketsu
T -
code: 9.4.2

- horn, fashioned from a buffalo horn, usually used for summoning mithun from the forest, or sometimes for signalling the village



Blowing a ketsu to summon mithun from the surrounding forest. In past times when warfare and headhunting were common, it was also used by the villagers to signal one another over long distances.

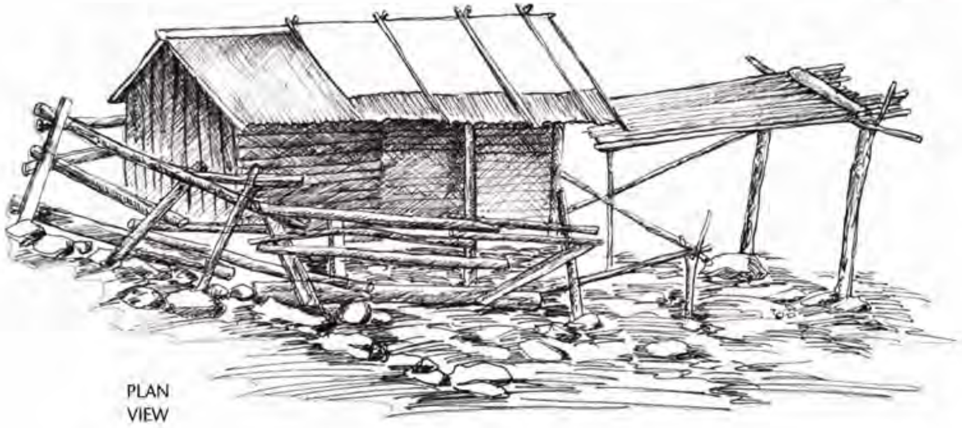
9. LIVESTOCK HUSBANDRY

9.4 Cattle and Mithun

K - gwiki
T -
code: 9.4.3

- shed used by those charged with looking after the mithun (gwukhwemia); provides a focal point for summoning the mithun, feeding them salt, and checking their condition

FRONT VIEW



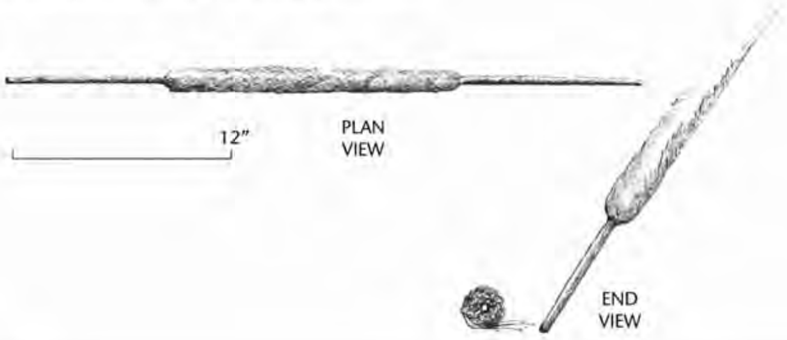
PLAN VIEW

10. OTHER SKILLED TRADES

10.1 Weaving

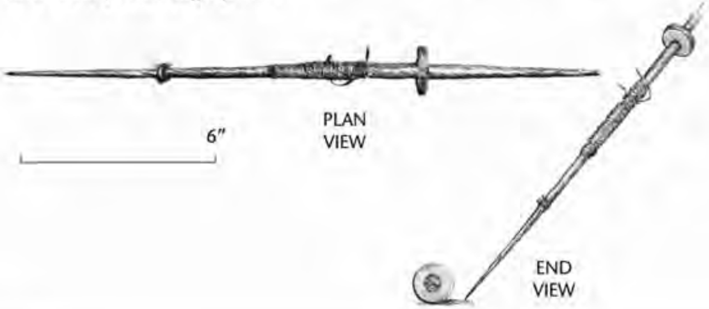
K - zhürüsi
T – dzürü
code: 10.1.1

- similar to a spool, used for gathering spun cotton



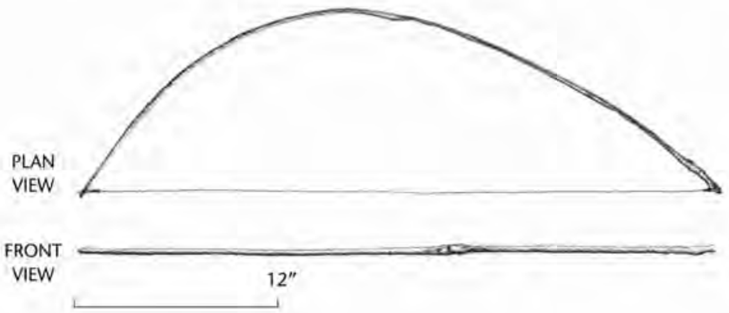
K - themvu
T - themvü
code: 10.1.2

- Spindle for spinning cotton, the spindle being spun with the right hand against the thigh and cotton held in the left. Usually made from a long spike of hard wood, often sago palm.



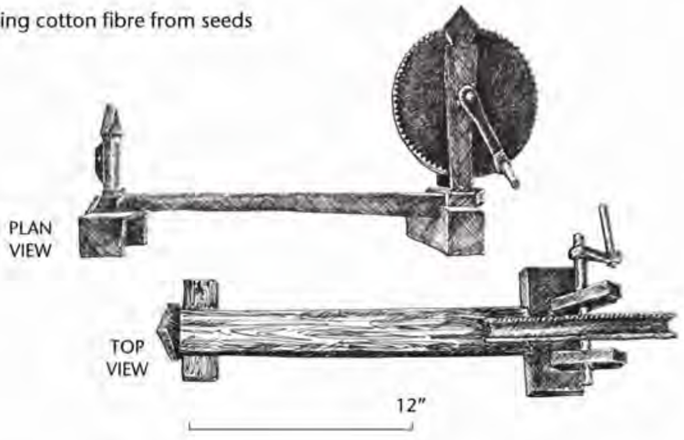
K - thepi
T - chaprie
code: 10.1.3

- for spreading out cotton in preparation for spinning



K - sanyiesi
T - chanuosei
code: 10.1.4

- separating cotton fibre from seeds



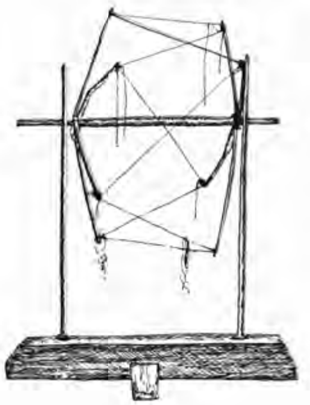
10. OTHER SKILLED TRADES

10.1 Weaving

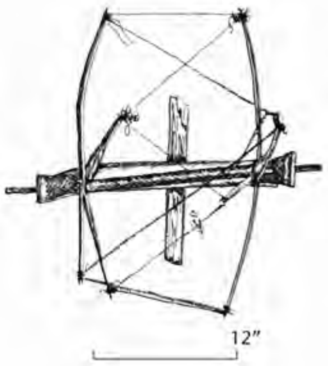
K - dulo
T – logibu
code: 10.1.5

- light frame used in spinning fibre, such as wool, silk and cotton

PLAN VIEW



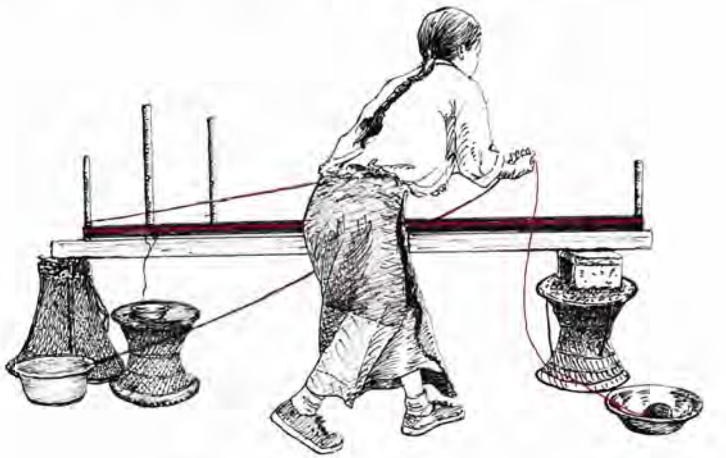
TOP VIEW



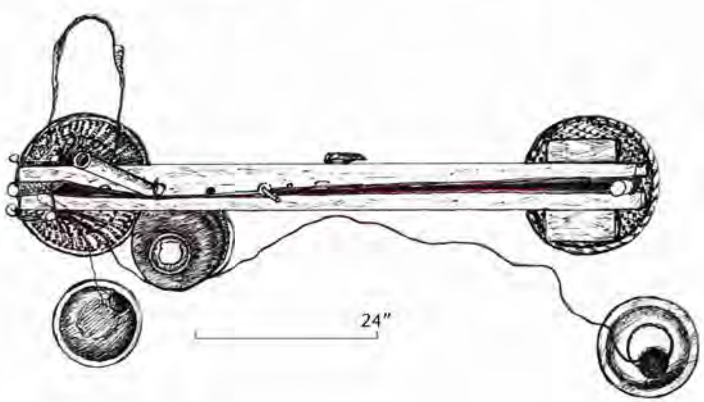
K - zhürieba
T – dzürieba
code: 10.1.6

- for organizing thread in preparation for weaving

PLAN VIEW



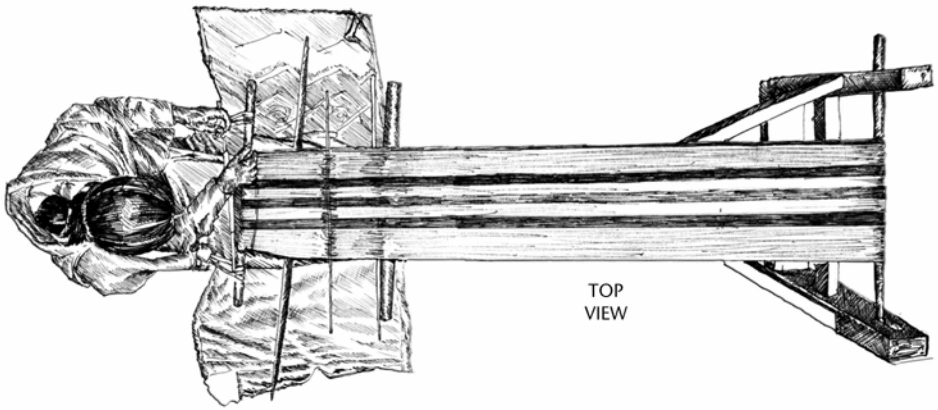
TOP VIEW

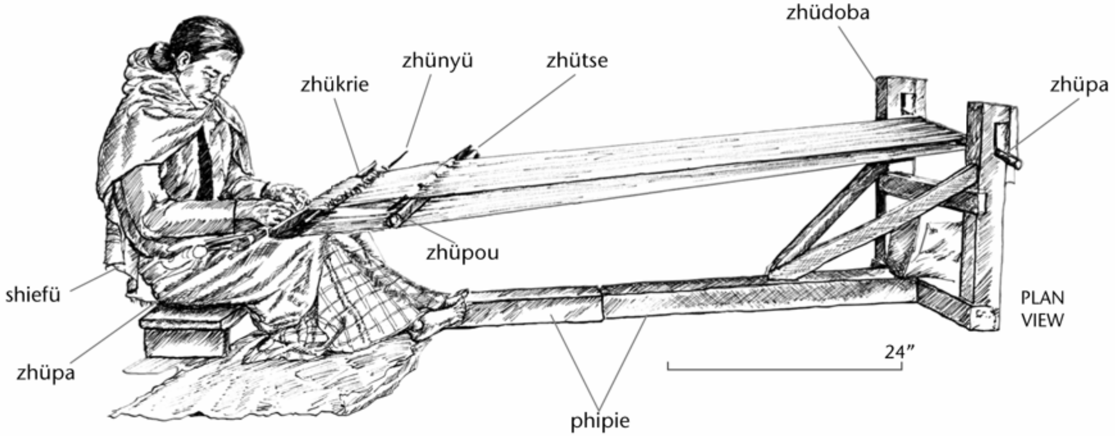


10. OTHER SKILLED TRADES
10.1 Weaving

K - thezhüdo
T - terhei
code: 10.1.7

- back strap type of tension loom, used to weave cloth 45-75 cm wide and 1.2-1.5 m long, extending up to 7.5 m in exceptional cases





10. OTHER SKILLED TRADES

10.2 Basketry

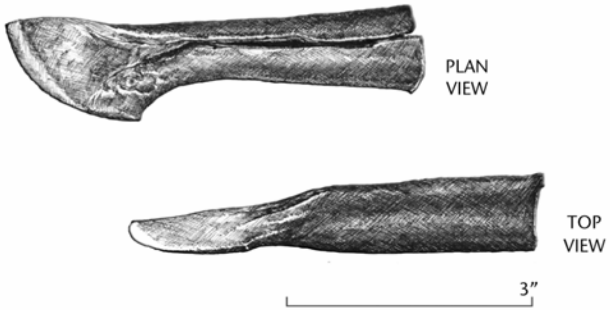
Naga men often use spare moments to weave baskets. A pan of water is kept nearby to moisten the bamboo strips so that they will be supple and more easily woven into the desired shape.

10. OTHER SKILLED TRADES

10.2 Basketry

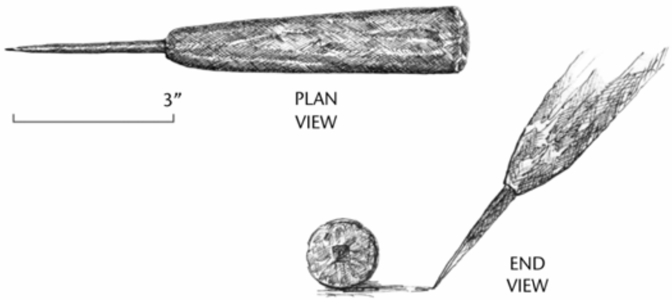
K - kelezhie
T - rhiethozie
code: 10.2.1

- small knife used for trimming rattan



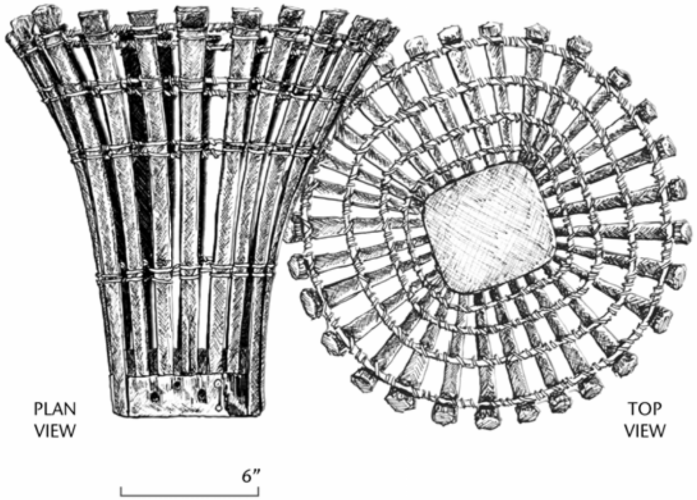
K - ketusi
T - ruphasei
code: 10.2.2

- for pushing rattan strips tightly together



K - mekhoya
T - khophira
code: 10.2.3

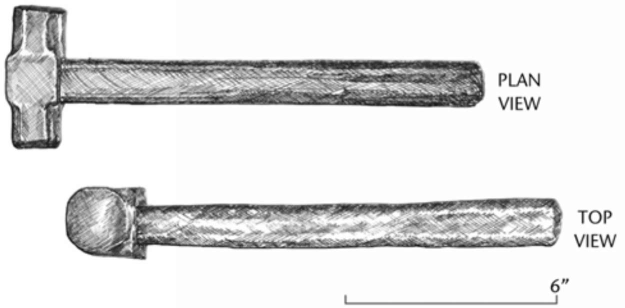
- frame for making baskets



10. OTHER SKILLED TRADES
10.3 Blacksmithing

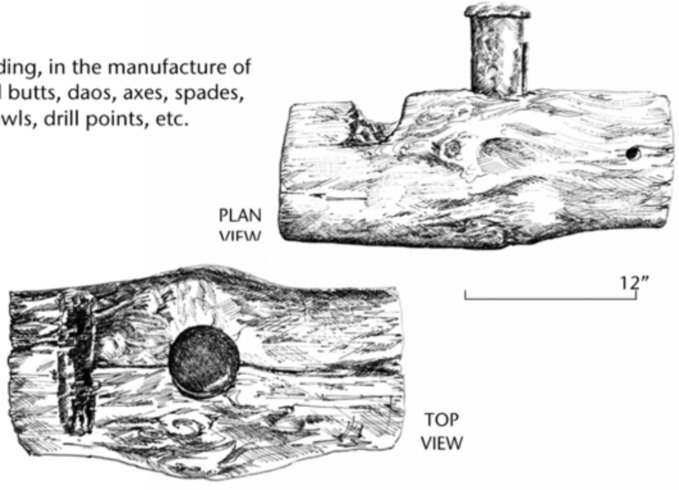
K - sivüno
T - metevünuo
code: 10.3.1

- hammer used in blacksmithing



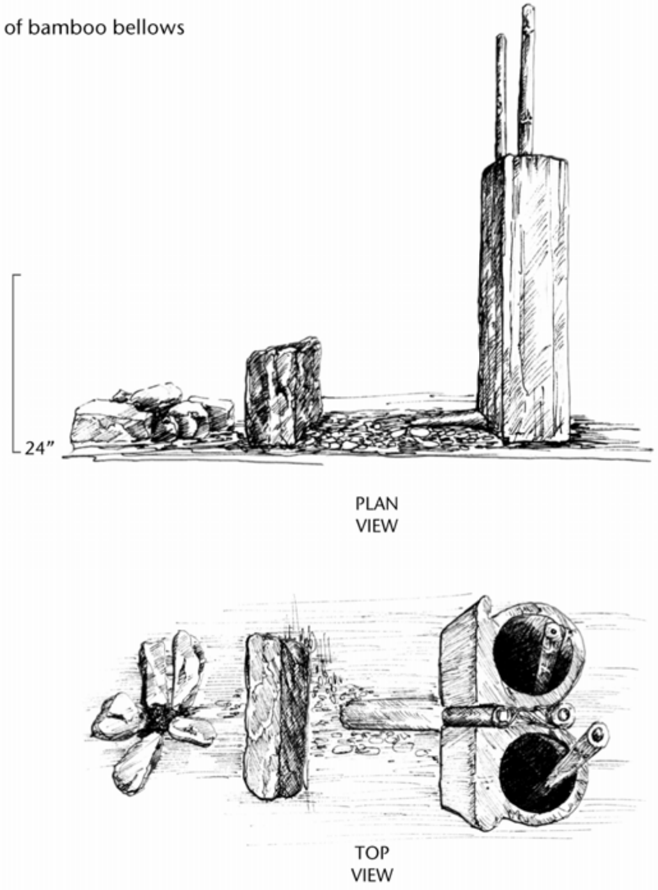
K - chükra
T -
code: 10.3.2

- anvil for pounding, in the manufacture of spear heads and butts, daos, axes, spades, knives, sickles, awls, drill points, etc.



K - kuru
T - ru
code: 10.3.3

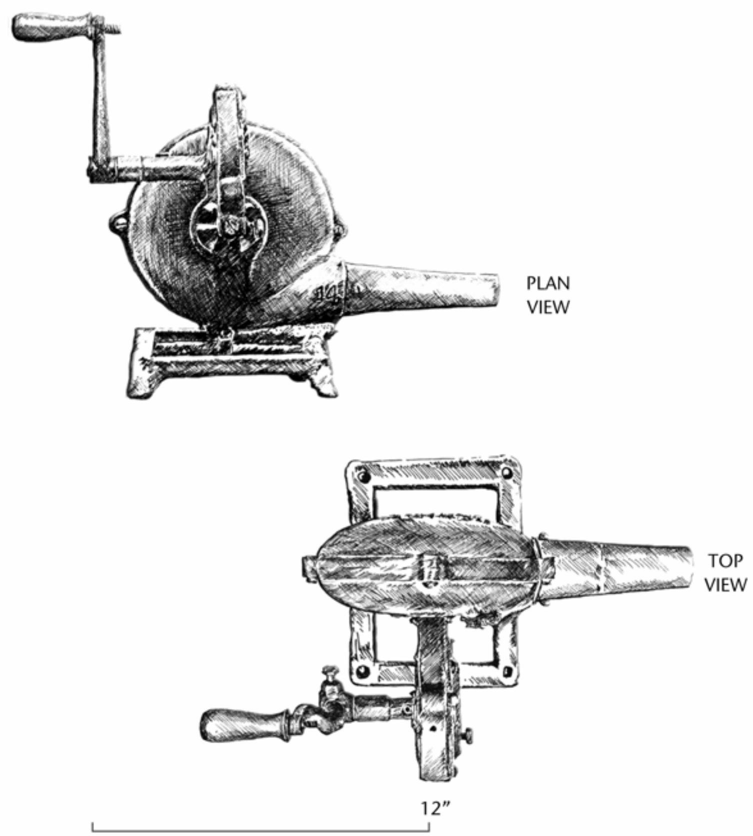
- old style of bamboo bellows



10. OTHER SKILLED TRADES
10.3 Blacksmithing

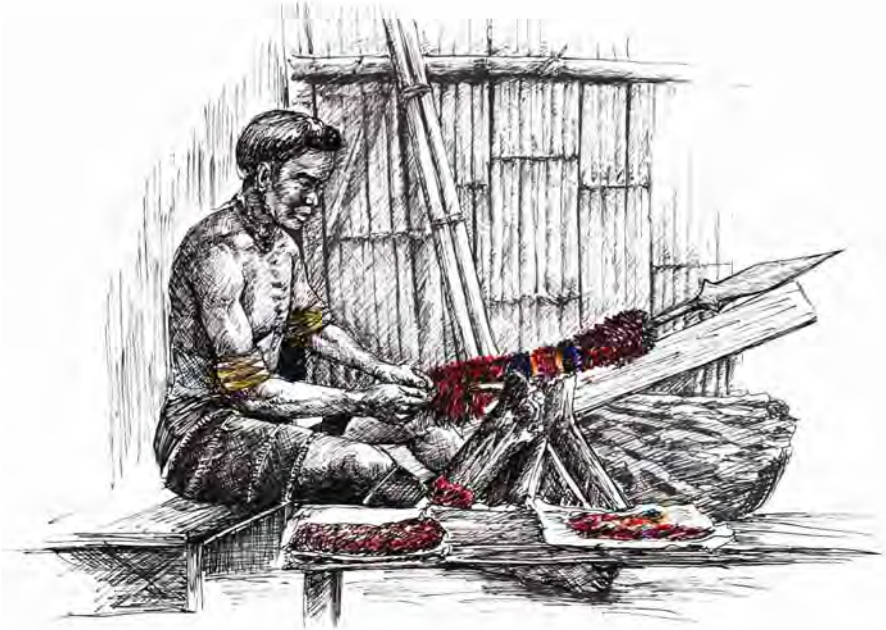
K - kuru
T - miheru
code: 10.3.4

- more modern type of bellows used for blowing the fire



10. OTHER SKILLED TRADES

10.4 Spear-Making



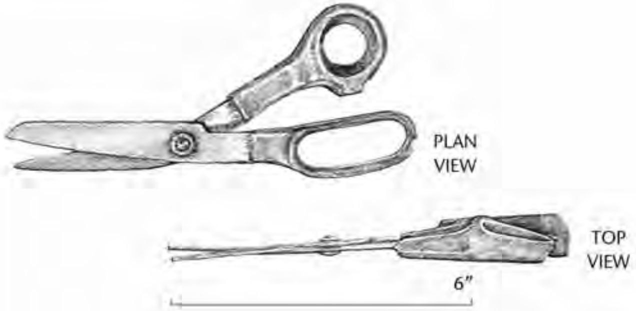
With headhunting and warfare now things of the past, there is a new peacetime demand for rüngu duda (spears) as souvenirs, gifts and decorations. These skills are rapidly being lost as old artisans pass away and few of the younger generation are interested in continuing them.

K - thudi
T -
code: 10.4.1

- for combing out goat hairs used to decorate spear shafts

K - tsüpezhie
T - tsübe
code: 10.4.2

- scissors used for trimming goat hair attached to spear handle



10. OTHER SKILLED TRADES

10.5 Stone Masonry

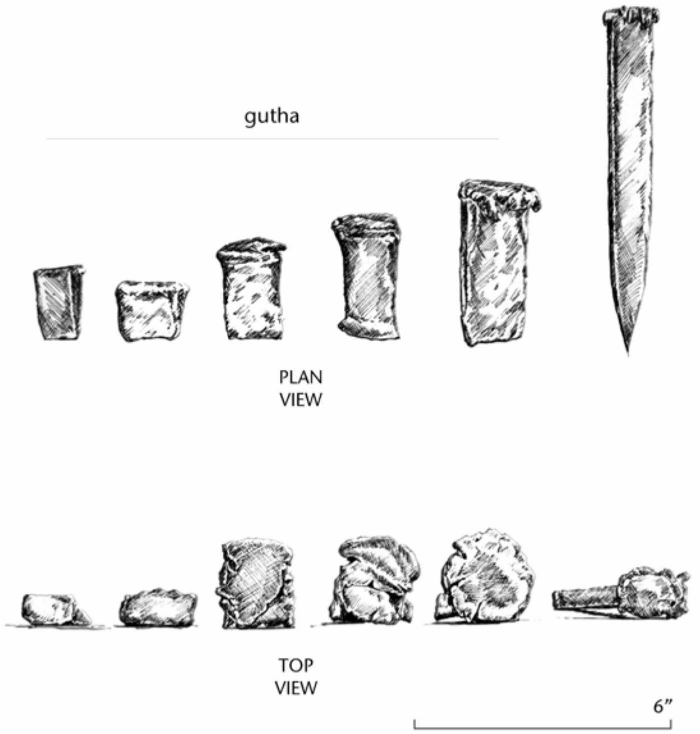
Large sandstone boulders along the rivers are cut into blocks for sale. Stone masonry has become an important side income in Khonoma. This illustration shows the method of first using a sivüno (hammer) and chüni (chisel) along the intended line of cut. He will then change to a gutha (a different style of chisel) and with powerful swings of a larger style of sivüno (maul), the rock will break cleanly. The jüli (whisk) behind him is used to brush away the dust as he works.

10. OTHER SKILLED TRADES

10.5 Stone Masonry

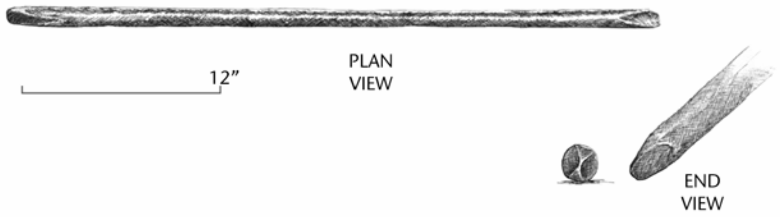
K - chüni + gutha
T - zhüthie
code: 10.5.1

- chisels for stone-cutting



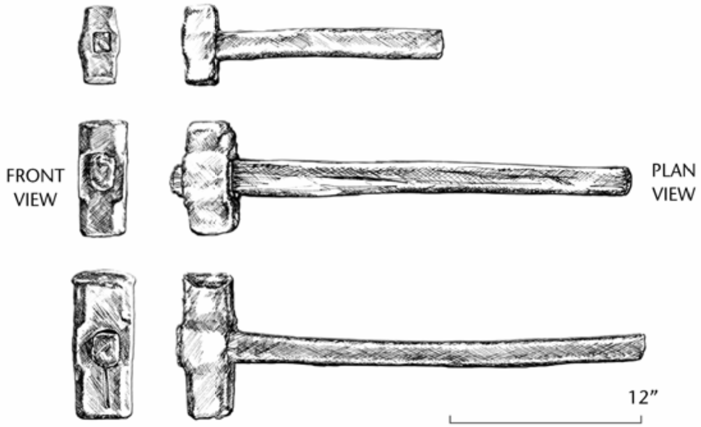
K - thezhümie
T - zomie
code: 10.5.2

- steel bar used for making holes in the ground for constructing buildings, or prying large rocks in quarrying operations



K - sivüno
T - metevünuo
code: 10.5.3

- hammers for stone-cutting



11. HUNTING,TRAPPING & FISHING

11.1 Hunting

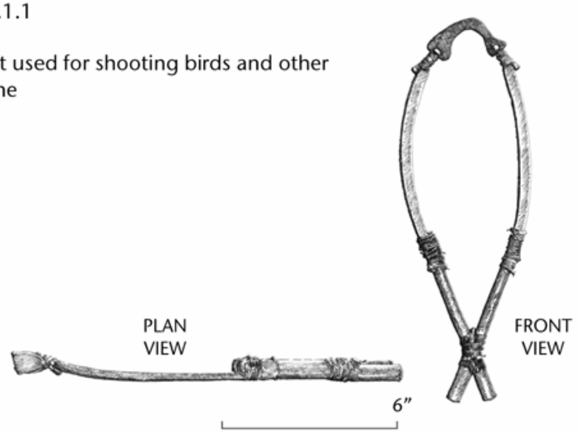
The inflow of tenyimisi (guns) into Nagaland during WW II tilted the balance in favor of the hunter and left wildlife populations severely depleted.

11. HUNTING,TRAPPING & FISHING

11.1 Hunting

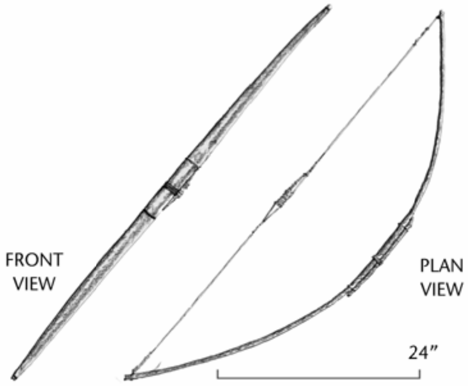
K - pathuli
T - theü
code: 11.1.1

- slingshot used for shooting birds and other small game



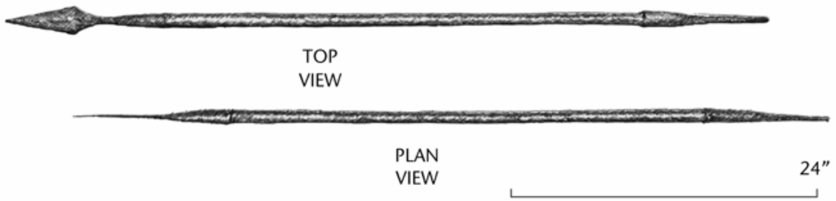
K - the-ü / thiü
T - theku / seitheü
code: 11.1.2

- pellet bow used in hunting birds and small animals; made from bamboo and a double string, and stones are fired from a pouch between the strings



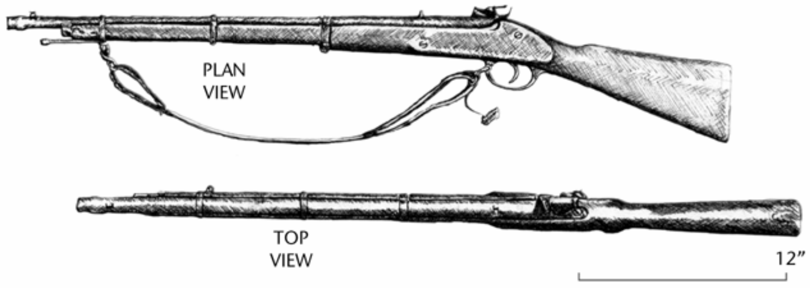
K - chuho rüngu
T - nguzu
code: 11.1.3

- spear used for hunting deer (before arrival of guns), killing cattle and fighting



K - tenyimisi
T - zhükha
code: 11.1.4

- WW II muzzle loader used for hunting and fighting, shooting at times of death and during <u>Sekrenyi</u> festival

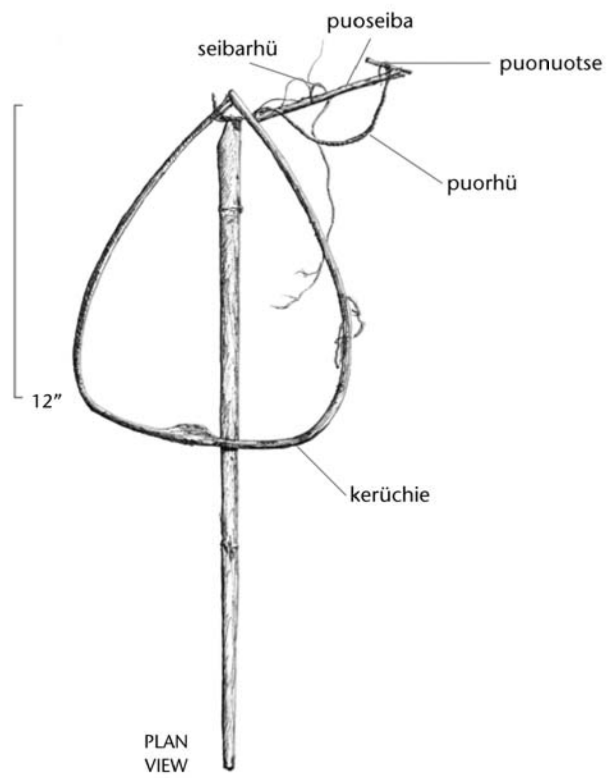


11. HUNTING,TRAPPING & FISHING

11.2 Trapping

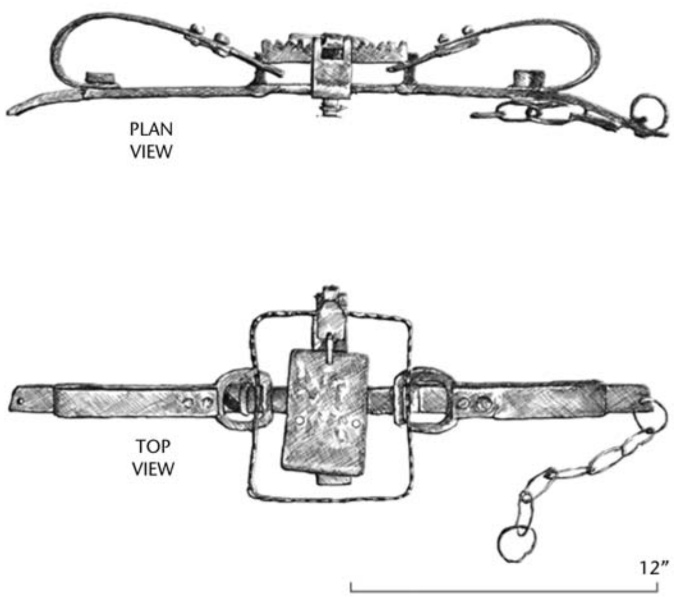
K -
T - kerü
code: 11.2.1

- snare placed on post, to catch feet of small birds that light on the trigger; usually positioned in perimeter of agricultural fields



K - keba
T -
code: 11.2.2

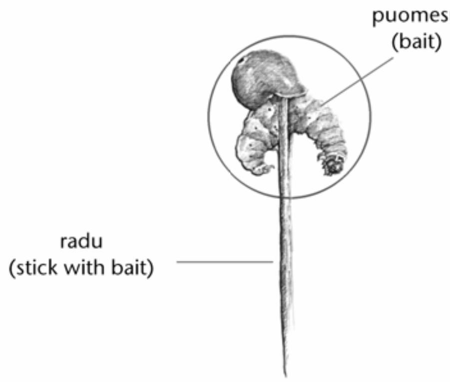
- steel spring trap used for wild cat, bear and other wildlife

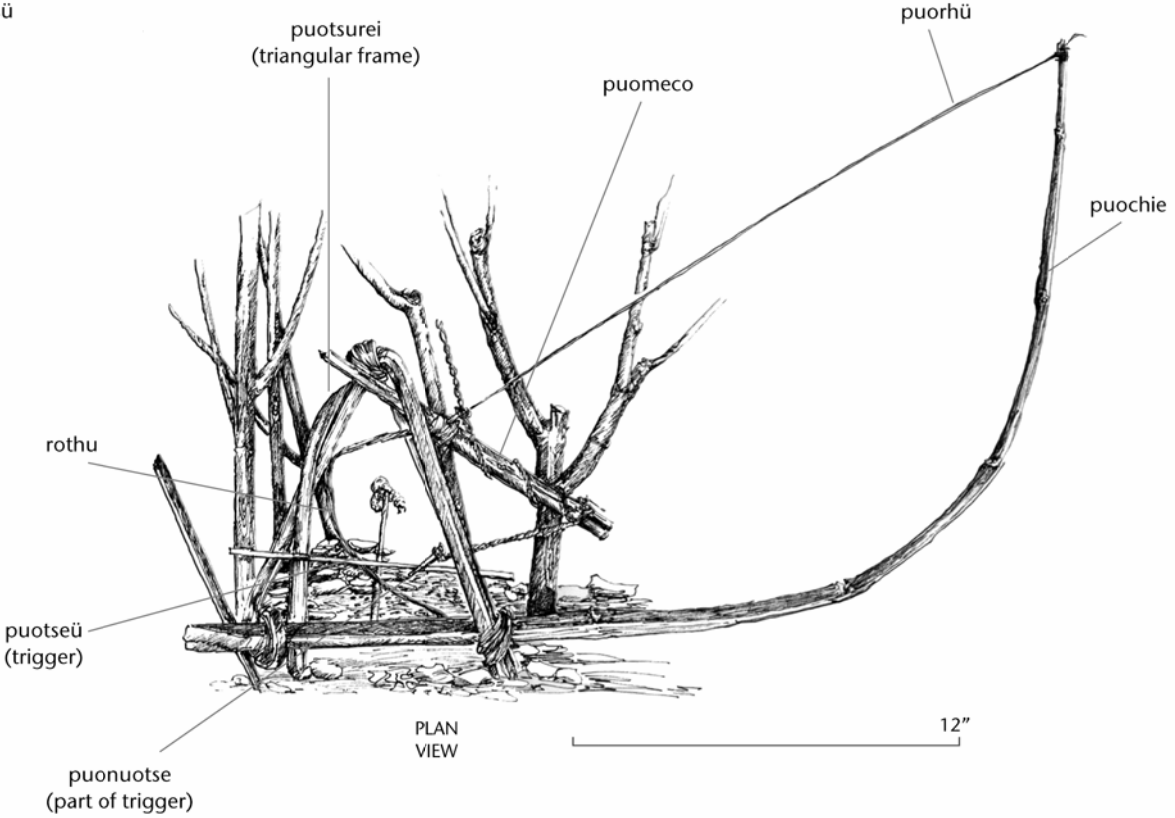


11. HUNTING,TRAPPING & FISHING
11.2 Trapping

K -
T - kesia
code: 11.2.3

- snare placed on ground, usually near agricultural fields, to catch birds and other small wildlife





11. HUNTING,TRAPPING & FISHING
11.3 Fishing

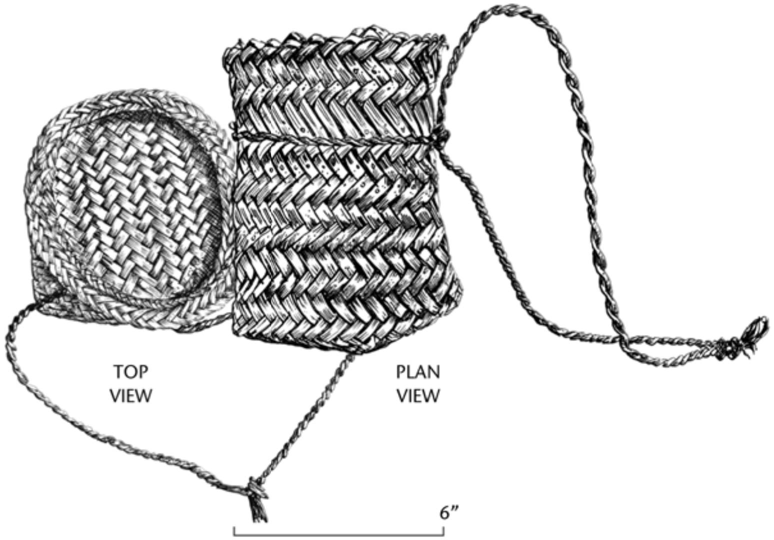
Using a yietho to search for edible insects and larvae in a wet rice terrace.

11. HUNTING, TRAPPING & FISHING

11.3 Fishing

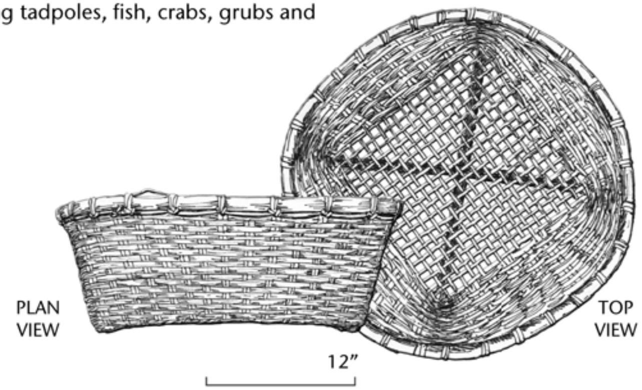
K - khocü
T - khotsü
code: 11.3.1

- worn while working in the wet rice terraces or while fishing to collect fish, snails, crabs, grubs and insects; may also be used to carry seed while planting jhum fields



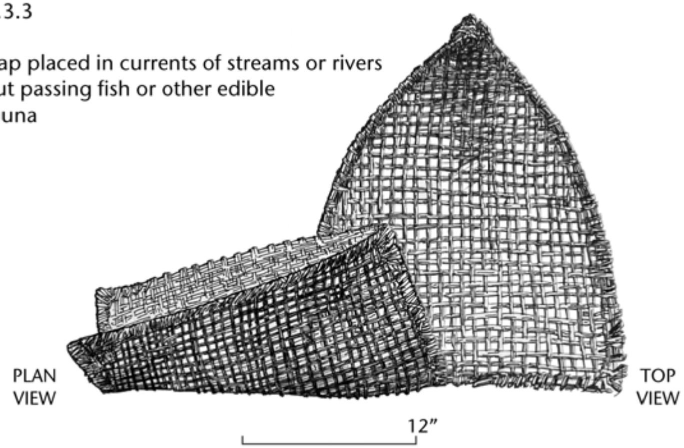
K - yietho
T -
code: 11.3.2

- rattan tray used in wet rice terraces for collecting tadpoles, fish, crabs, grubs and insects



K - khopierü
T -
code: 11.3.3

- rattan trap placed in currents of streams or rivers to filter out passing fish or other edible aquatic fauna

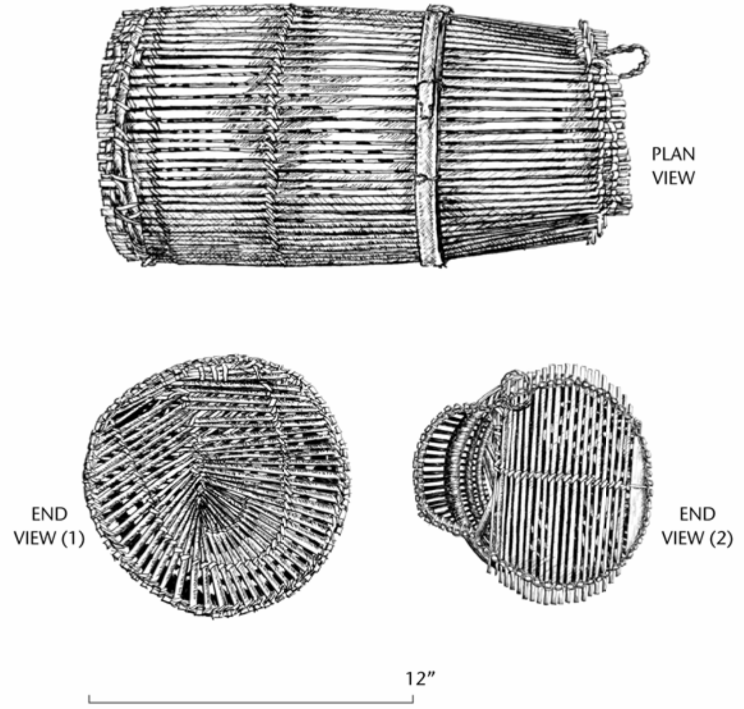


11. HUNTING,TRAPPING & FISHING

11.3 Fishing

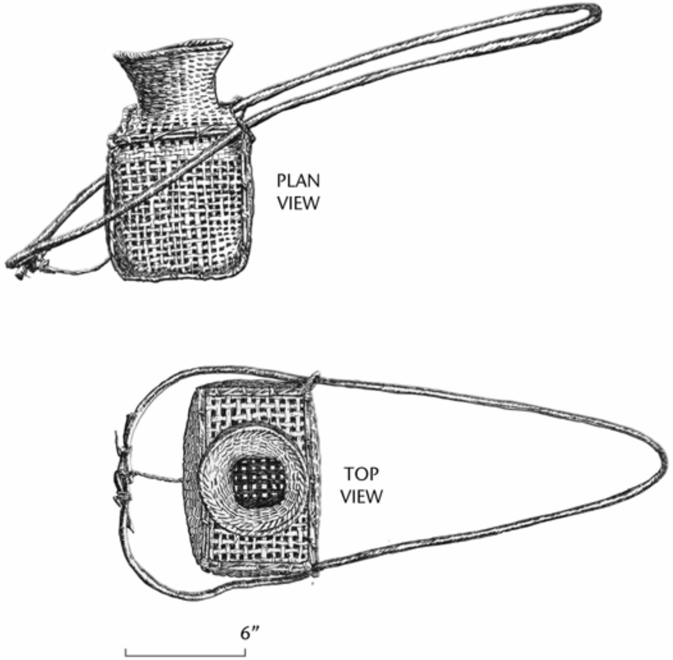
K - lose
T - khoure / khouhuo
code: 11.3.4

- used in rivers for trapping trout and other fish



K - khocü
T - khotsü
code: 11.3.5

- collecting frogs from the river



12. KITCHEN IMPLEMENTS

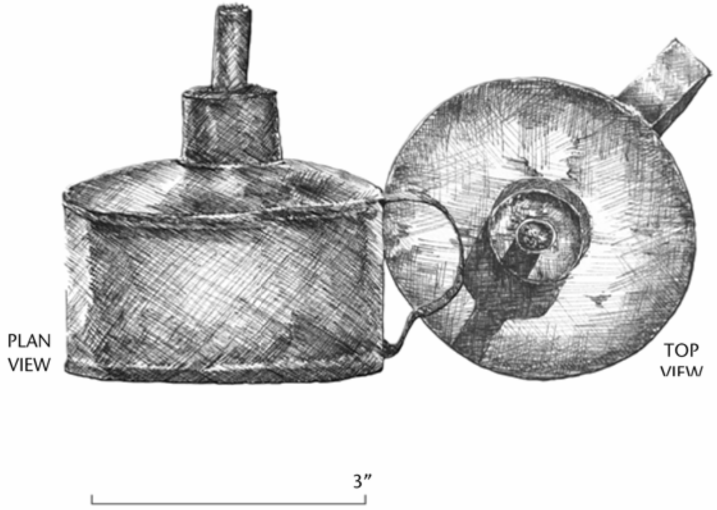
Social life in Naga villages centers around the fireplace during the cool winter months. Naga kitchens always have a fascinating mixture of tools, cooking ingredients, and often have the moldy legs of livestock slaughtered several years previously still hanging from the rafters. Cats are commonly kept in Naga kitchens to keep rats under control.

12. KITCHEN IMPLEMENTS

12.1 Lighting

K - saki
T - saki
code: 12.1.1

- kerosene lamp



K - saki
T - bottle saki
code: 12.1.2

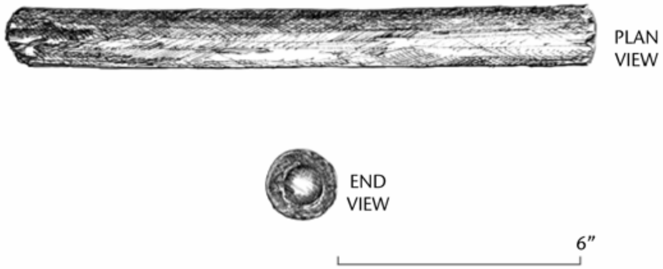
- whisky bottle fashioned into a kerosene lamp

12. KITCHEN IMPLEMENTS

12.2 Fire Management

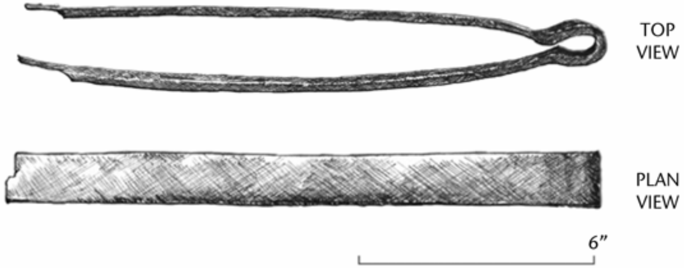
K - mimhepu
T -
code: 12.2.1

- bamboo tube used for blowing on fire



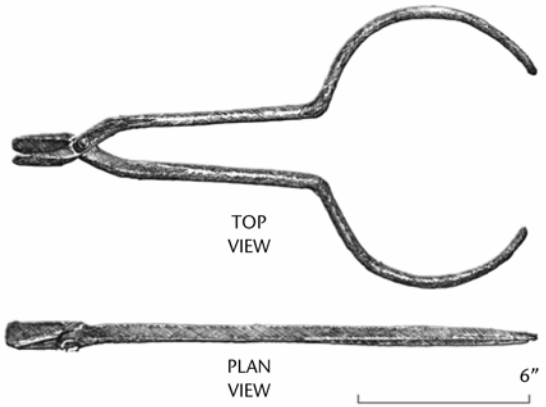
K - mibe
T - mibe
code: 12.2.2

- forceps for picking up hot embers and arranging the fire



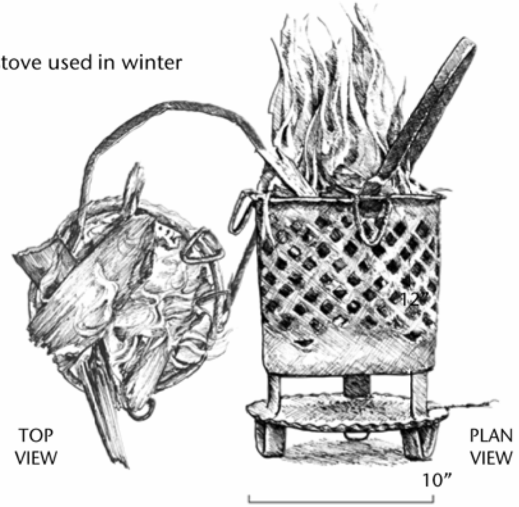
K - bahuli (Hindi)
T - lipie
code: 12.2.3

- tongs for picking up hot pots; not a traditional tool



K - thejumibu
T - mibu
code: 12.2.4

- small mobile stove used in winter

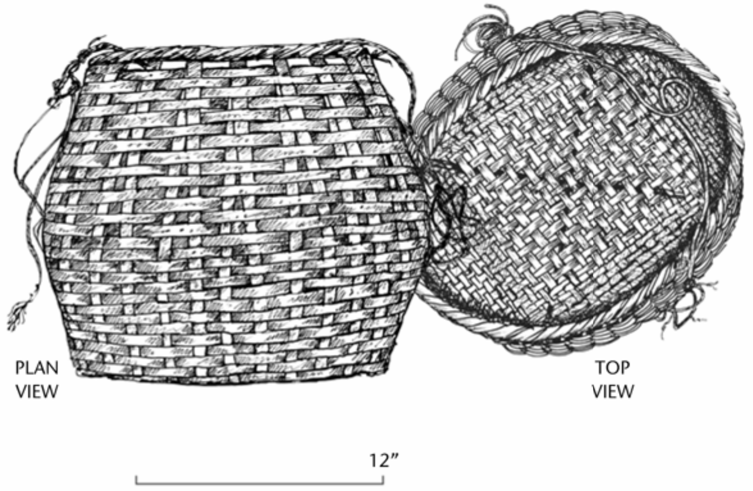


12. KITCHEN IMPLEMENTS

12.3 Drying Containers

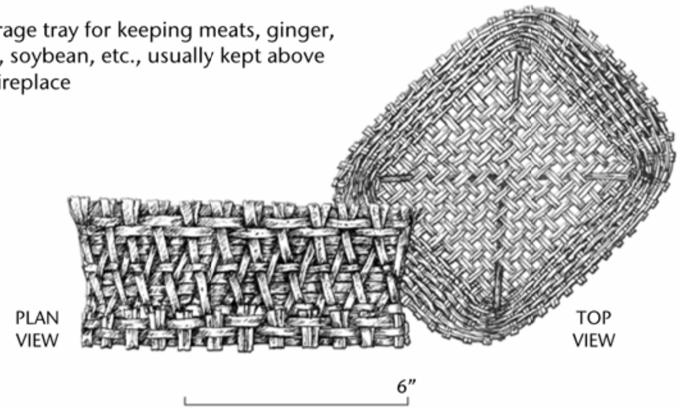
K - chügo
T - chügurha
code: 12.3.1

- drying Job's tears, millet, chilli, meat, etc. above the fire



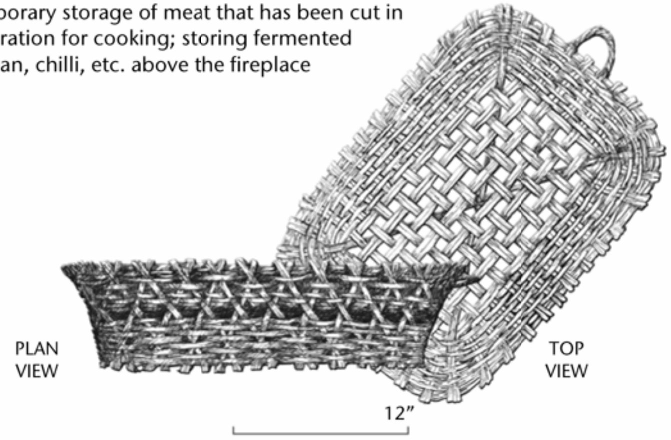
K - chükhrerha
T - sügo / tsiekhora
code: 12.3.2

- storage tray for keeping meats, ginger, chilli, soybean, etc., usually kept above the fireplace



K - chükhrierha
T - sügo
code: 12.3.3

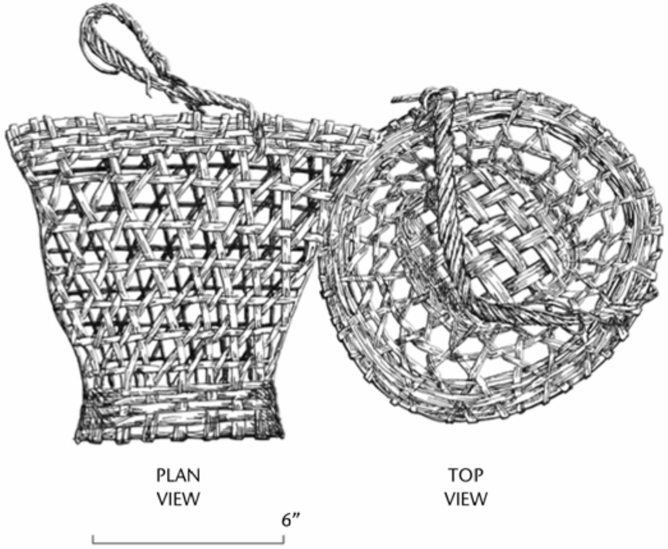
- temporary storage of meat that has been cut in preparation for cooking; storing fermented soybean, chilli, etc. above the fireplace



12. KITCHEN IMPLEMENTS
12.3 Drying Containers

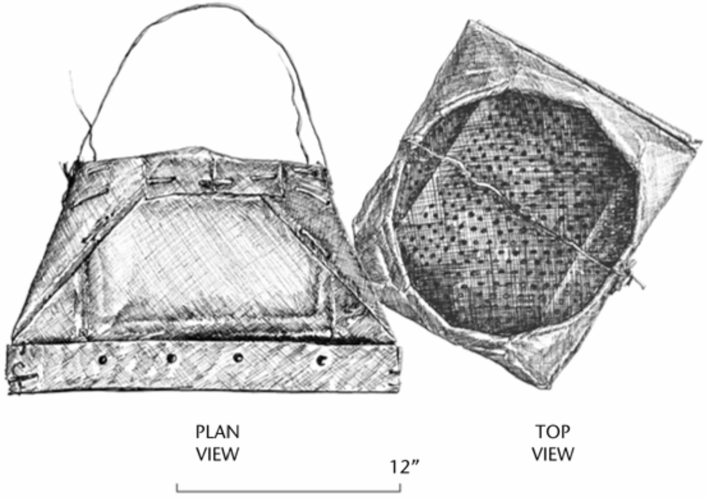
K - tekhre
T - khope
code: 12.3.4

- usually hangs near fireplace in kitchen, to dry soybeans, meat, dried fish, chilli, etc.



K - chügo
T - sügo
code: 12.3.5

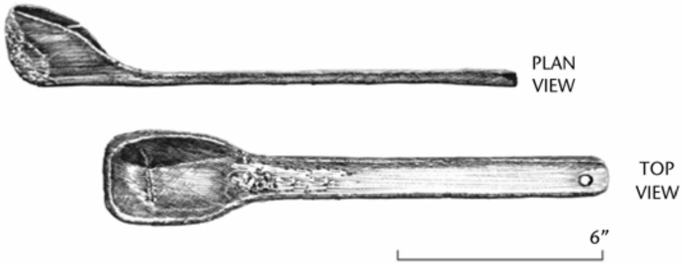
- hung over the fire to dry cereals, meats, soybean, chilli, etc.



12. KITCHEN IMPLEMENTS
12.4 Dishes & Utensils

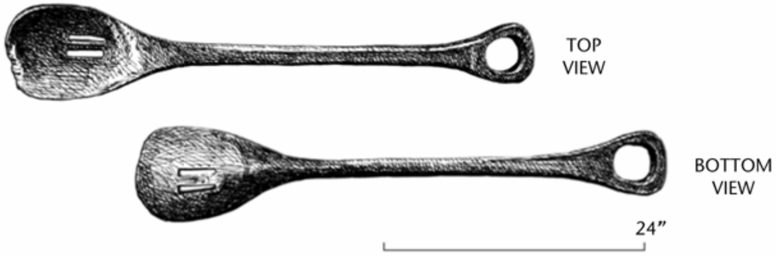
K - galivuku
T - vüku
code: 12.4.1

- spoon / ladle made from bamboo and used for curry or soup



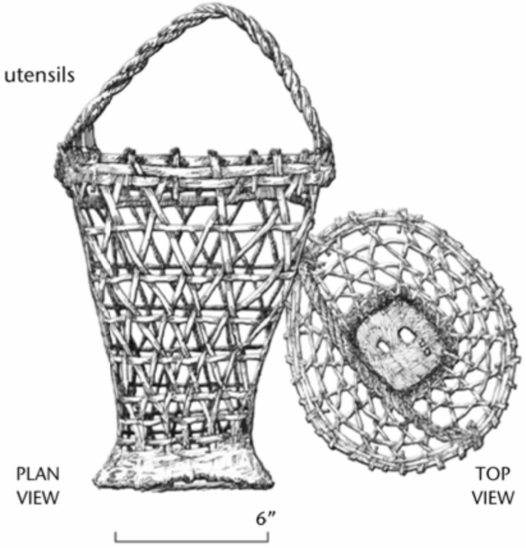
K - vüku
T - kecie
code: 12.4.2

- large wooden spoon used during times of festivals for mixing curries or retrieving pieces of meat from the cooking pot



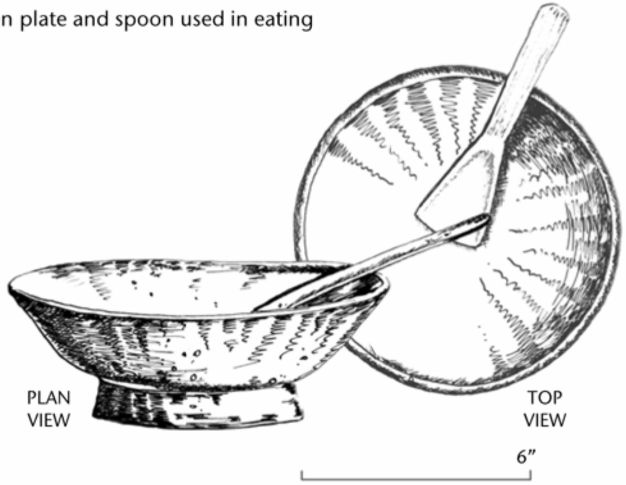
K - keciekuya
T - keciekho
code: 12.4.3

- for holding kitchen utensils



K - khuda & kecie
T - khuda & kecie
code: 12.4.4

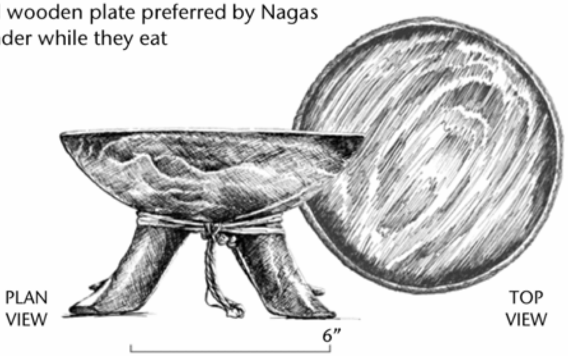
- wooden plate and spoon used in eating



12. KITCHEN IMPLEMENTS
12.4 Dishes & Utensils

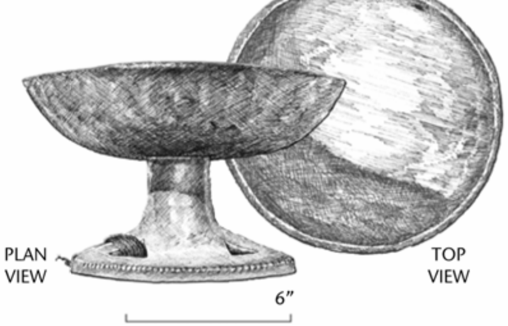
K - khuphi
T - khuphi
code: 12.4.5

- easily-gripped wooden plate preferred by Nagas that like to wander while they eat



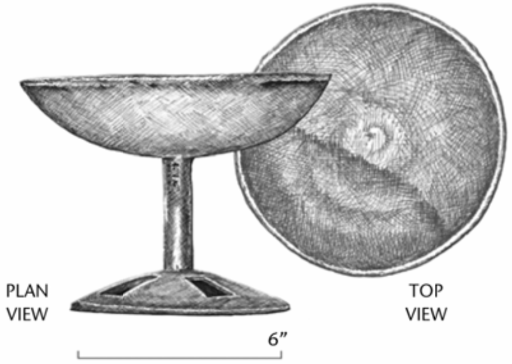
K - tenyükhu
T - khura
code: 12.4.6

- another style of wooden plate used at meal times



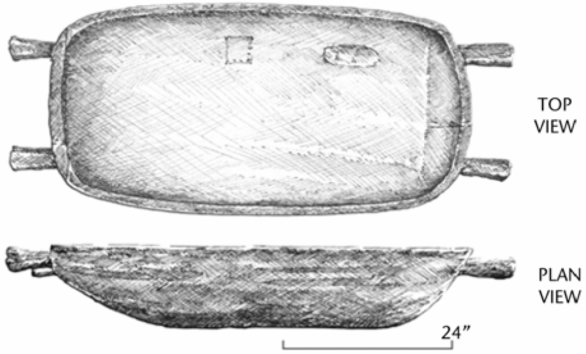
K - khuphi
T - khura
code: 12.4.7

- metal plate used for eating meals, traditionally made from wood (as in code 12.4.6)



K - sikhu
T - seikhu
code: 12.4.8

- large wooden platter used for placing cooked meat during feasts

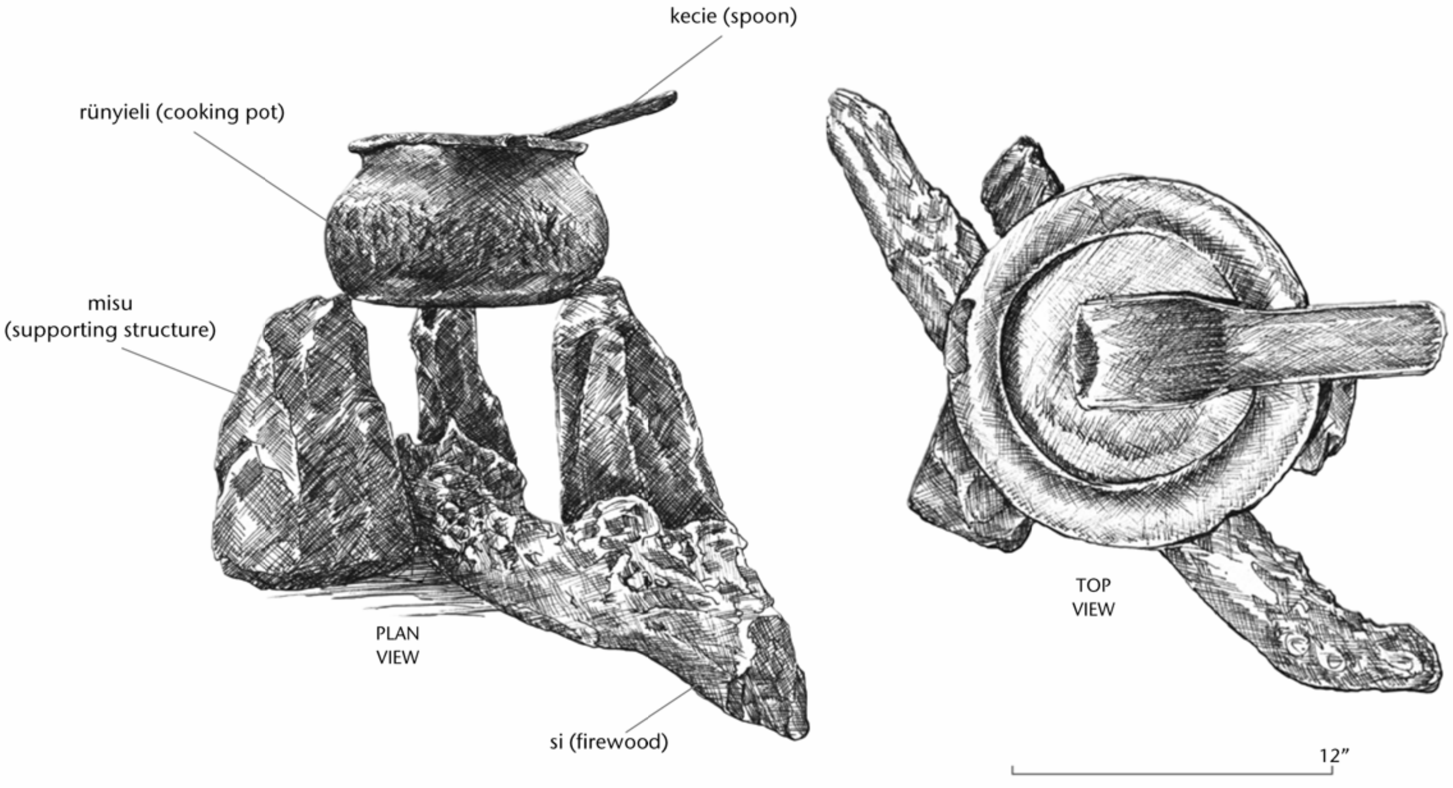


12. KITCHEN IMPLEMENTS

12.5 Pots, Bowls & Jugs

K - rünyieli
T -
code: 12.5.1

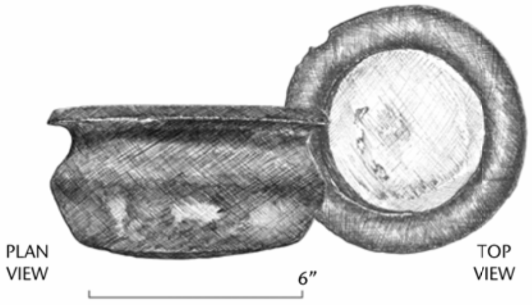
- earthen pot over fire



12. KITCHEN IMPLEMENTS
12.5 Pots, Bowls & Jugs

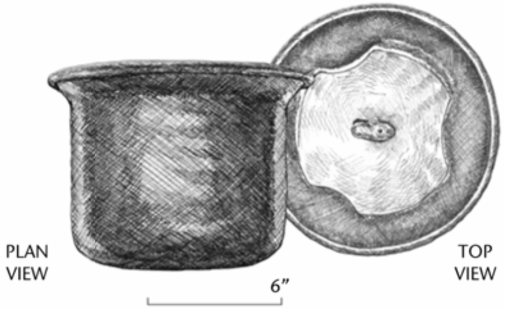
K - rünyieli
T -
code: 12.5.2

- clay cooking pot; manufactured in Khuzama, in southern Angami area



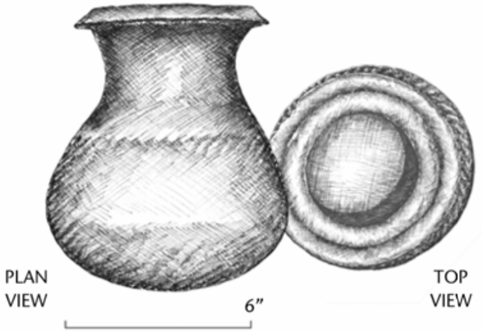
K - rünyieli
T -
code: 12.5.3

- another more modern design of clay cooking pot; manufactured in Khuzama



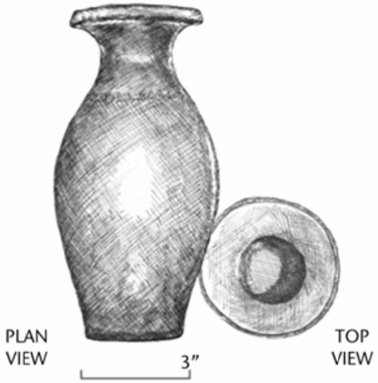
K - rünyieli
T - rünuoli
code: 12.5.4

- clay pot used for boiling water; manufactured in Khuzama



K - hicha
T -
code: 12.5.5

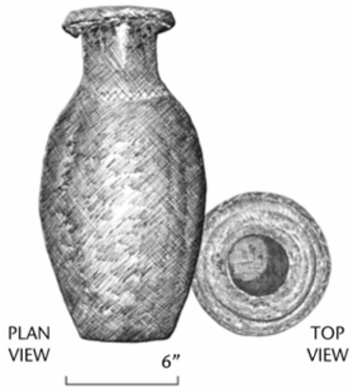
- for carrying rice beer or water to the field



12. KITCHEN IMPLEMENTS
12.5 Pots, Bowls & Jugs

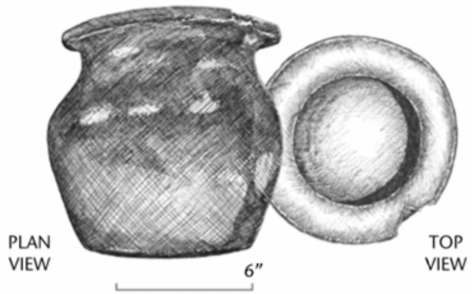
K - likhwü
T -
code: 12.5.6

- carrying rice beer or water;
probably made in Khuzama



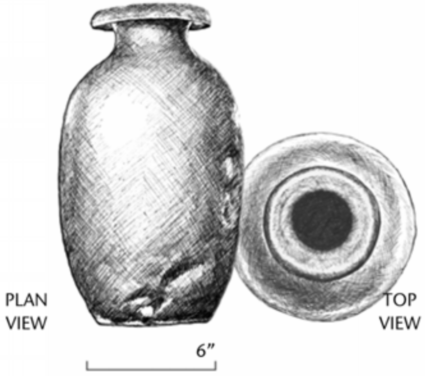
K - licü
T -
code: 12.5.7

- clay jar used for storing water or making rice beer;
also made in Khuzama



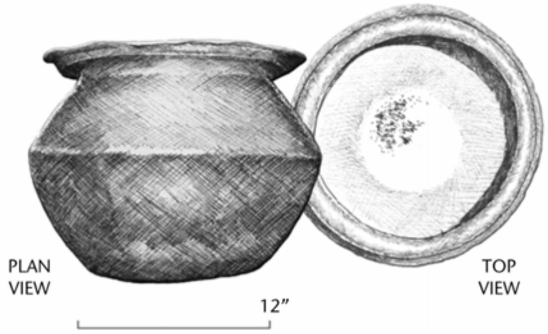
K - likwu
T - lipfu
code: 12.5.8

- a more modern aluminum version,
used for carrying water from a well
or water tank to house



K - dzübu
T - libu
code: 12.5.9

- aluminum container for water storage in Angami kitchens

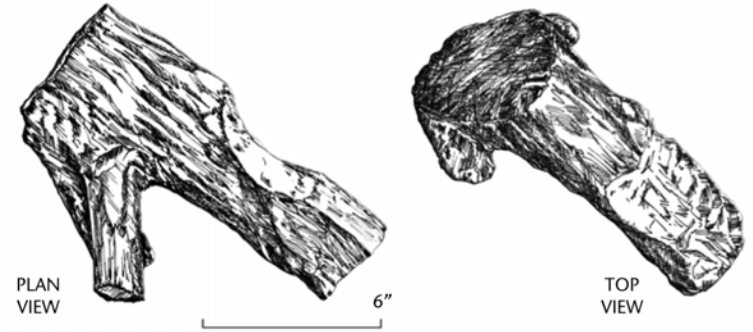


12. KITCHEN IMPLEMENTS

12.6 Miscellaneous

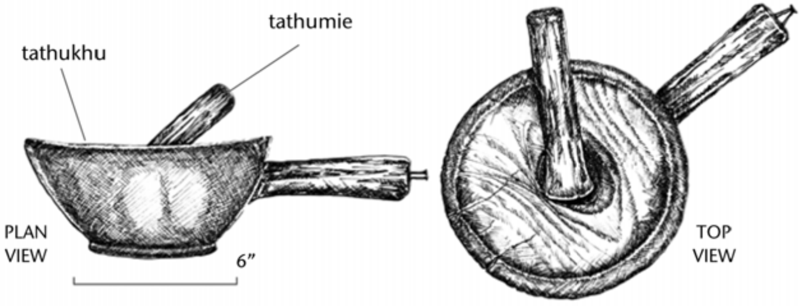
K - chukra
T - dzütsie / chükra
code: 12.6.1

- block for cutting meat, pounding ginger, or cutting chilli in preparation for cooking



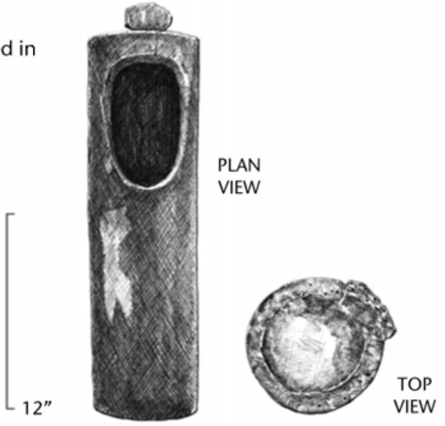
K - tathukhu & tathumie
T - tathukhu & tathumie
code: 12.6.2

- small mortar and pestle, used mostly in making pickles



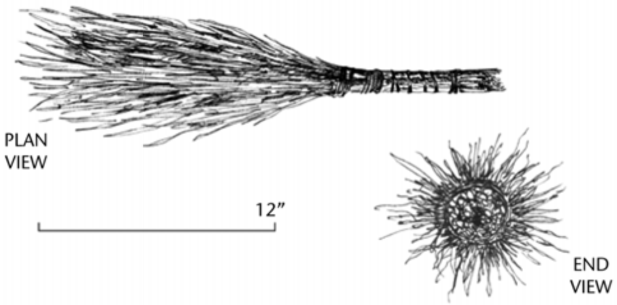
K - metsiebu
T -
code: 12.6.3

- bamboo container used in kitchen for storing salt



K - jüli
T -
code: 12.6.4

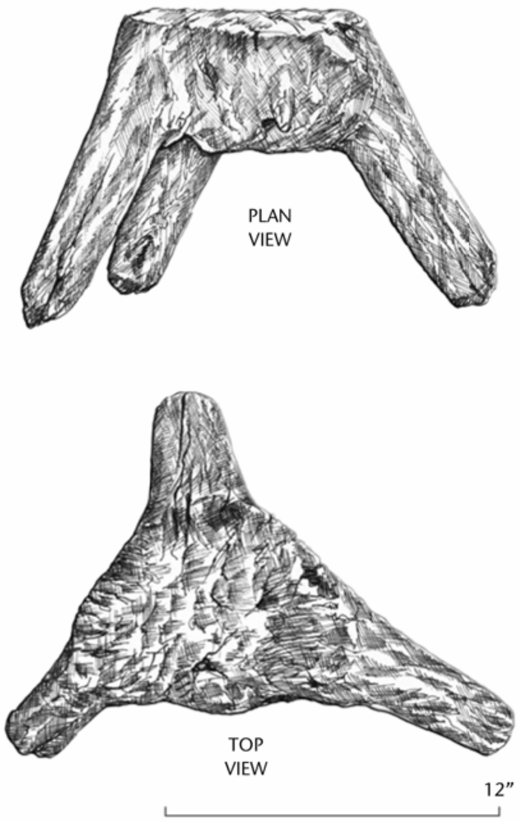
- a whisk, usually made from *Chimonobambusa callosa* bamboo gathered from Dzükou valley; used for general cleaning around the house, and for brushing away dust while cutting stones



13. FURNITURE
13.1 Stools & Chairs

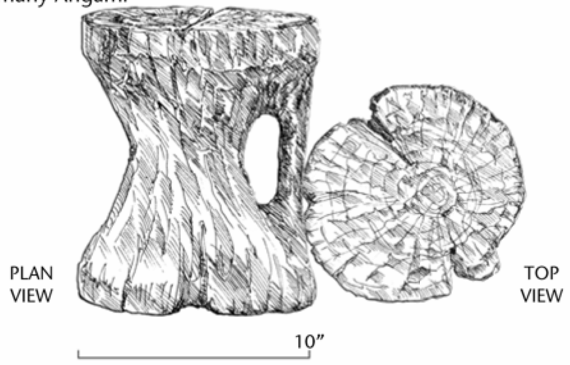
K - siphietuno
T - barhu
code: 13.1.1

- 3-legged stool fashioned from tree trunk



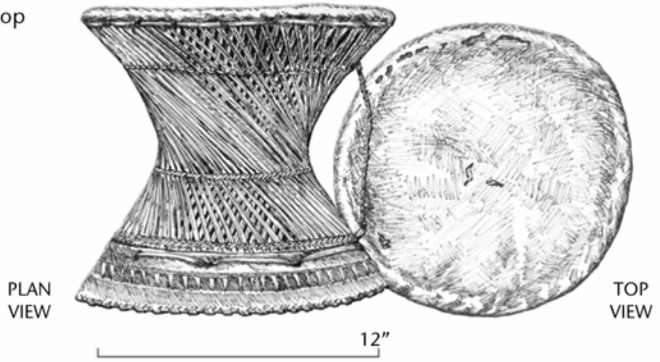
K - baseno
T - batou / batsu
code: 13.1.2

- traditional seat found in many Angami homes, carved from a log



K - theba
T -
code: 13.1.3

- seat featured in many Naga kitchens, this one with a more modern style of cane structure and a leather top

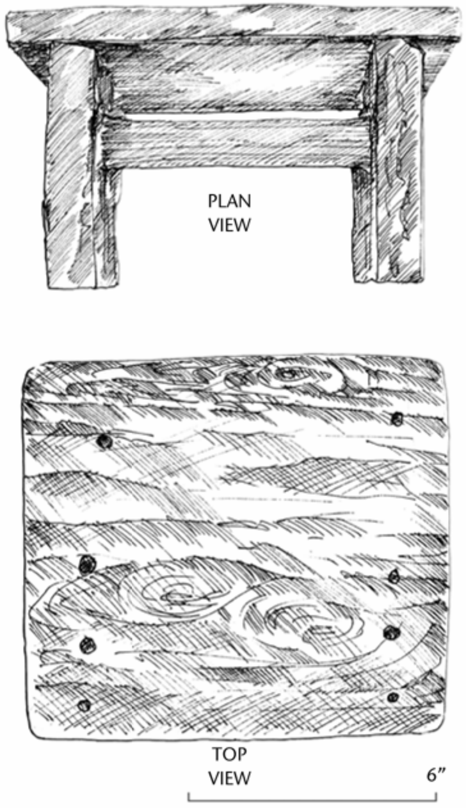


13. FURNITURE

13.1 Stools & Chairss

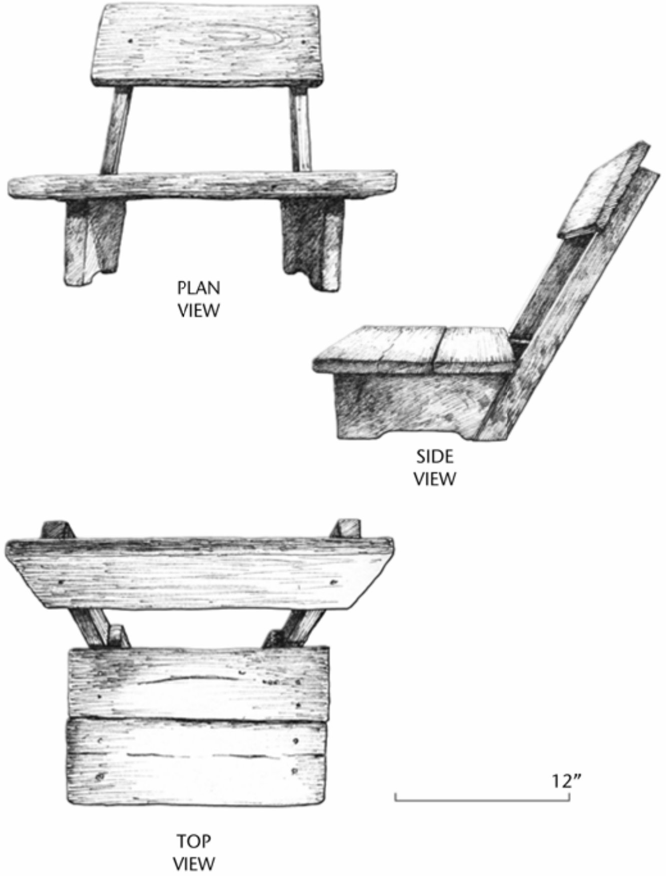
K -
T -
code: 13.1.4

- stool, or alternatively used as a small table



K - siba / badu
T - bara
code: 13.1.5

- akin to a legless chair, found in some
Angami kitchens

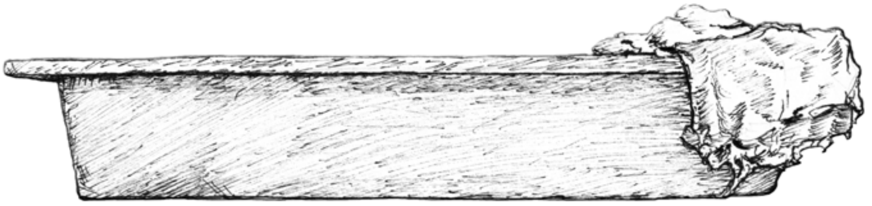


13. FURNITURE

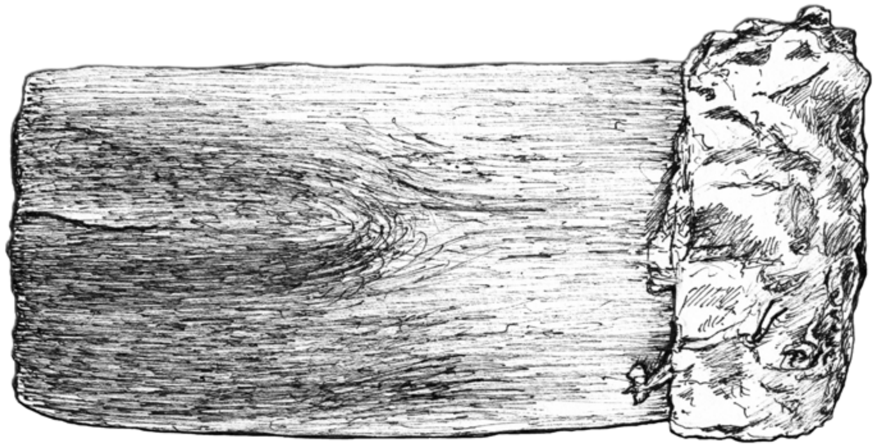
13.2 Beds

K - thyü / yaku
T - yaku
code: 13.2.1

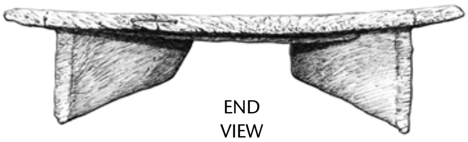
- bed or cot



PLAN
VIEW



TOP
VIEW



END
VIEW

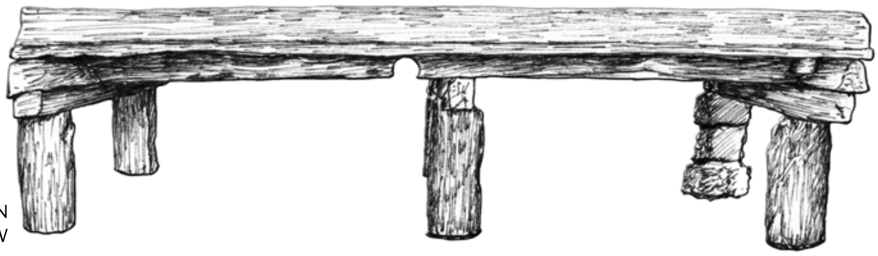
24”

13. FURNITURE

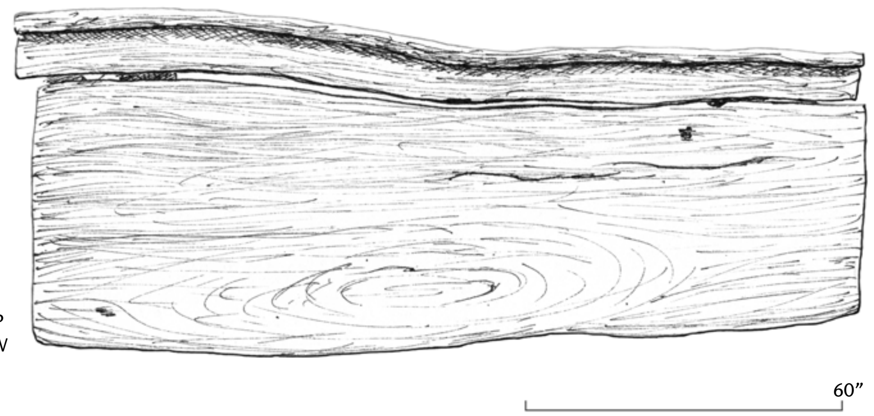
13.2 Beds

K - kichüjü
T - kichünuozhü
code: 13.2.2

- communal bed used by boys in morung



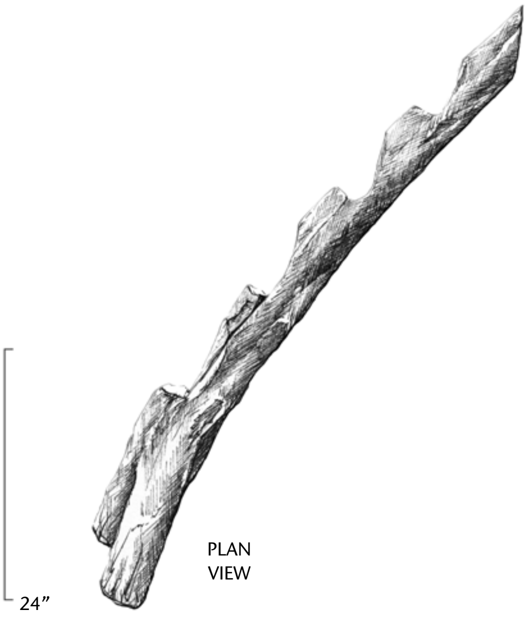
PLAN
VIEW



TOP
VIEW

K - khieya
T - khrieya
code: 13.3.1

- ladder typically used in constructing houses, climbing up on house roof or climbing trees



PLAN
VIEW

FRONT
VIEW

14. PROTECTION AGAINST THE ELEMENTS

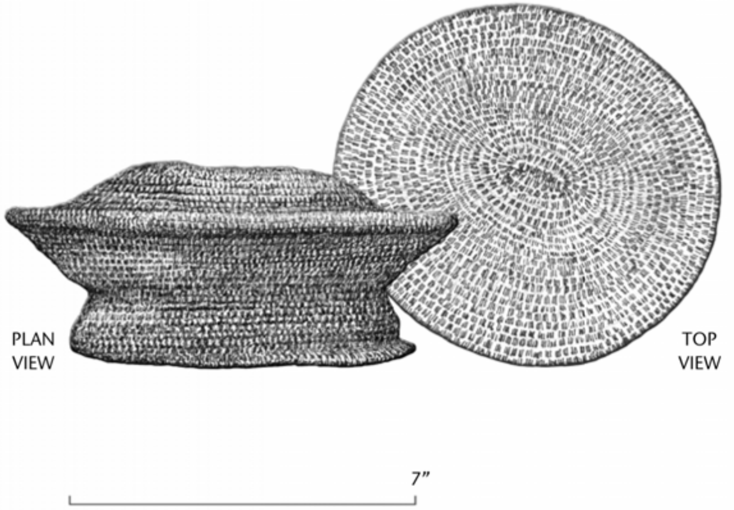
Dressed with a <u>kenho</u> (cape) and <u>khrugie</u> (hat) for a day of working in the field during the rainy season.

14. PROTECTION AGAINST THE ELEMENTS

14.1 Hats

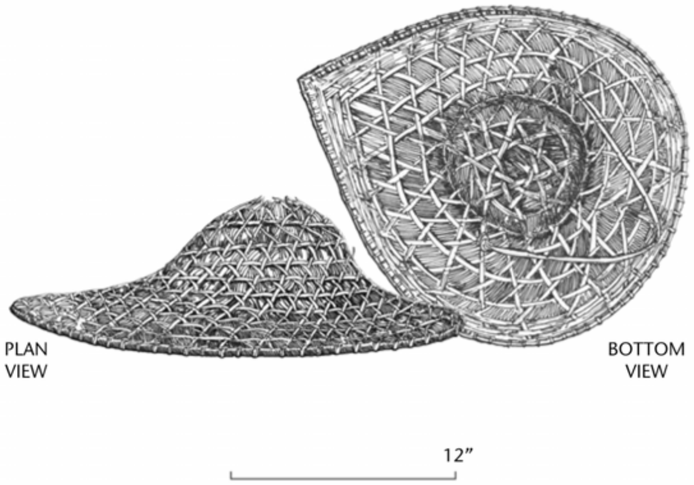
K - tsüre
T - tsüze
code: 14.1.1

- traditional Naga style hat made from cane



K - khrugie
T - tsüre
code: 14.1.2

- large rain hat, made from leaves and frame of <u>keprü</u> bamboo

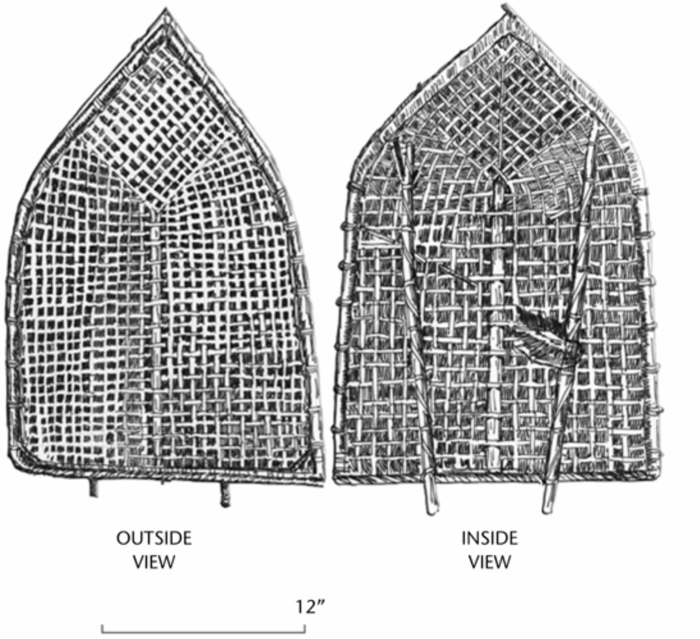


14. PROTECTION AGAINST THE ELEMENTS

14.2 Rain Capes

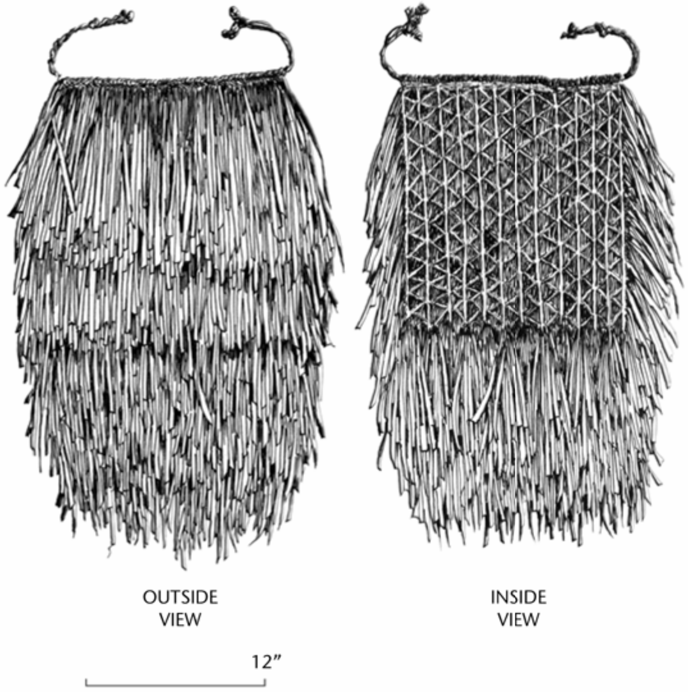
K - khrutho
T - khruda
code: 14.2.1

- rain cape made from keprü bamboo, used mainly while working in the wet rice terraces



K - kenho
T - kesunyho
code: 14.2.2

- rain cape made from pandanus leaf (nhakhwünho), the ends of which hang down loose (similar to a thatched roof), to keep off the water; usually worn while working in the wet rice terraces

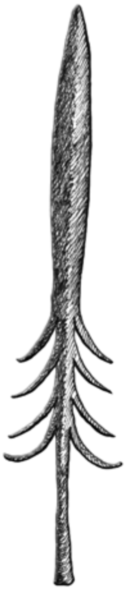


15. WEAPONS OF WAR
15.1 Spears

Headhunting was deeply rooted in agriculture and the soil.

K - rüngu
T - thema rüngu
code: 15.1.2

K - thokhwi rüngu
T - hupfihungu
code: 15.1.3

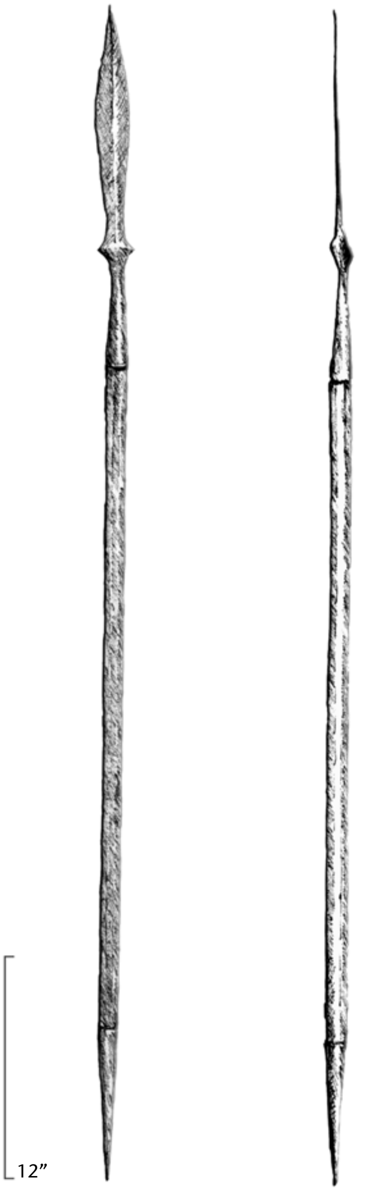


K - thokhwi rungul
T - hupfihungu
code: 15.1.4

- barbs are purely ornamental. Among the Chakhesang, the number of barbs vary according to the martial achievements of the owner.

K - rüngu
T -
code: 15.1.1

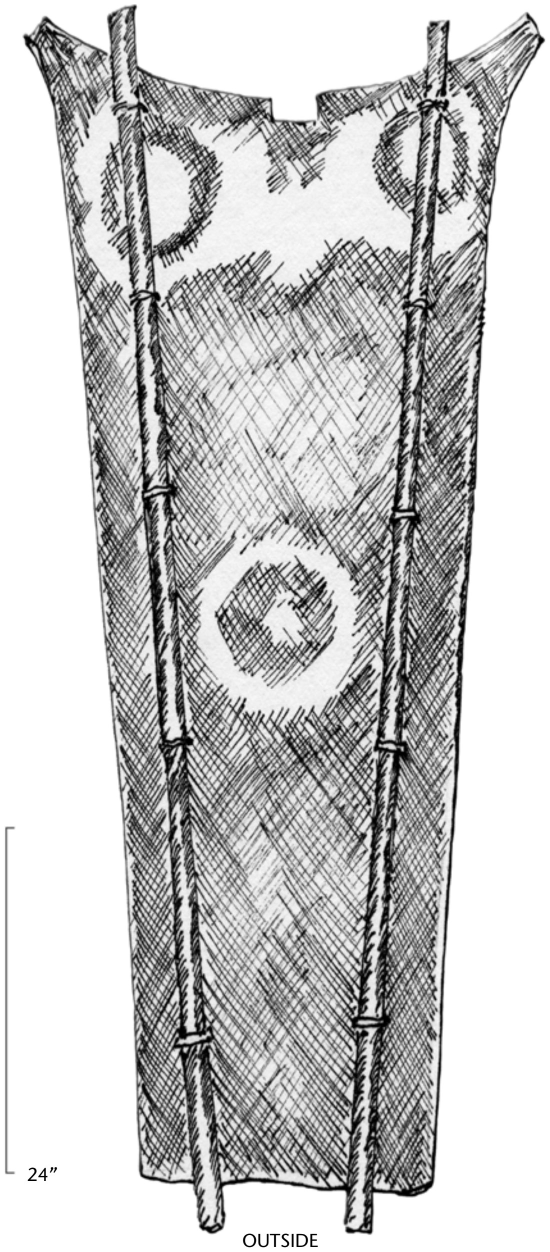
- Shaft about 4 to 5.5 feet in length, made from the heart of a tree that is particularly light and tough; spear head has a projecting check before the sharpened edge of the blade, to prevent its slipping through and cutting the user's hand. Spear-head narrows above this check and swells out gradually into a broad leaf-shaped blade. Tipped at the butt with an iron spike for sticking into the ground. Two spears were carried on the warpath - one to be thrown and the other retained.



15. WEAPONS OF WAR
15.2 Shields

K - peju
T - pezhü
code: 15.2.1

- Made from long strip of elephant hide (or alternatively, rhinoceros or buffalo), from 5-7 feet high. Top is about 2.5 feet broad, and narrows to 18 inches at the bottom. Suspended by a rope going over the right shoulder, and manipulated by the left hand with the aid of a small horizontal cane handle set low on the inside of the shield. Rather heavy and reduces mobility of a fighter.



OUTSIDE
VIEW

INSIDE
VIEW

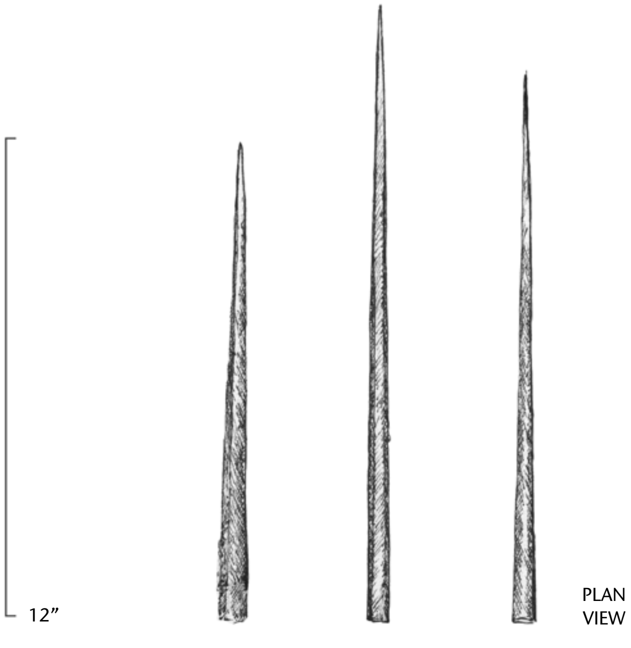
15. WEAPONS OF WAR
15.3 Others

K -
T -
code: 15.3.1

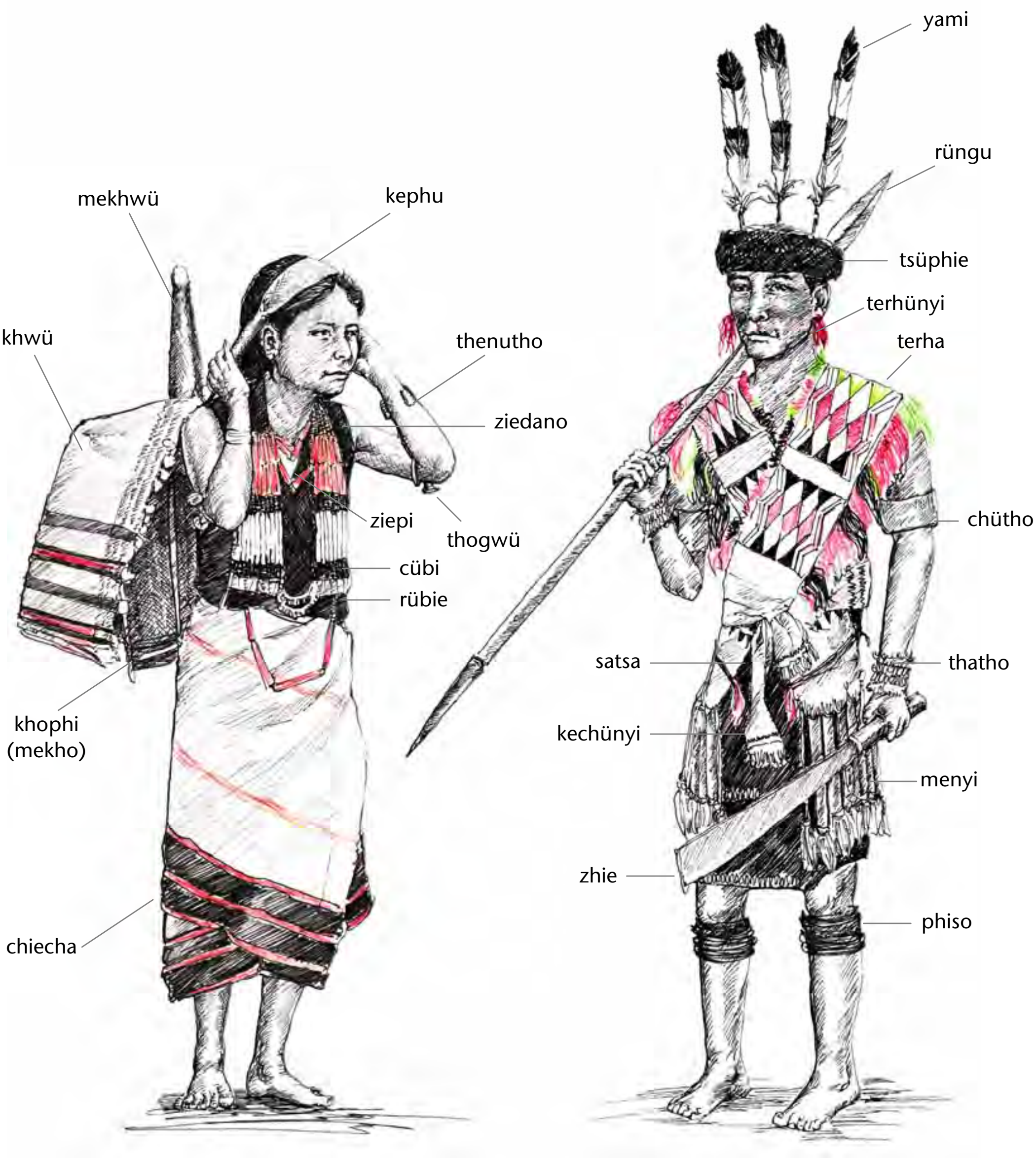
- Ceremonial tail and hip baskets used for carrying panjis (spikes of sharpened bamboo - see code 15.3.2 below), decorated with human and goats' hair. The tail is regarded as the decoration of the warrior who has been the last to retreat before superior numbers.

K -
T -
code: 15.3.2

- spikes of sharpened bamboo hardened in the fire, and stuck in the ground to impede the progress of one's enemies



16. TRADITIONAL DRESS *



Angami couple in traditional dress.

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* For further details, see Butler, 1875; Hutton, 1969, 22-33; Ghosh, 1995, 86-88.

16. TRADITIONAL DRESS

16.1 Necklaces

16.1.1 Female Necklaces

K - ziedano
T - tsüzie
code: 16.1.1.1

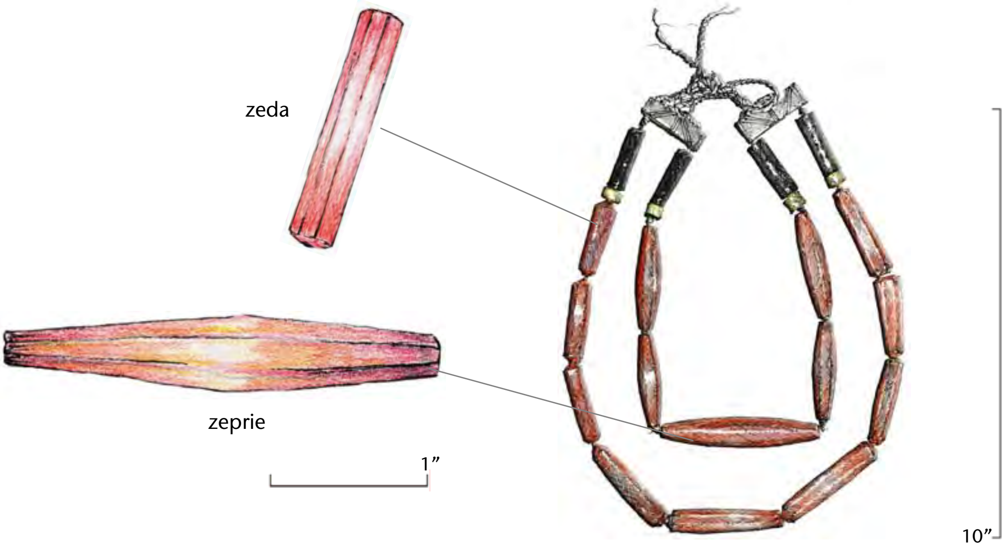
- made from cornelian, worn casually by women

K - ziepi
T -
code: 16.1.1.2

- worn casually by women and on special occasions by men; made from cornelian

K - ziepi
T -
code: 16.1.1.3

- double-stranded necklace worn casually by women and on special occasions by men; made from cornelian, with bone spacers

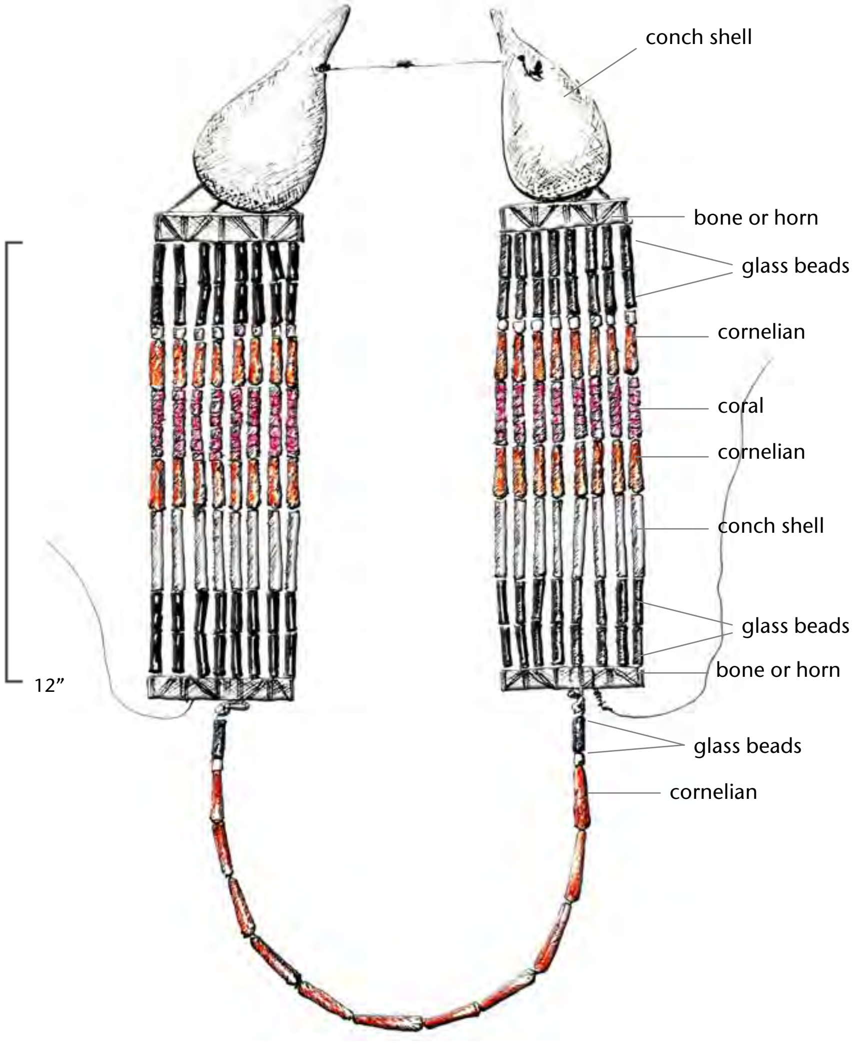


Two styles of cornelian beads (actual size).

16. TRADITIONAL DRESS
16.1 Necklaces
16.1.1 Female Necklaces

K - cübi
T - tsüdzie
code: 16.1.1.4

- most important necklace worn as part of women's traditional dress



16. TRADITIONAL DRESS
16.1 Necklaces
16.1.2 Male Necklaces

K - chükrü
T - chükrütsü
code: 16.1.2.1

- worn casually by men; a likeness is made from the fruit of *Solanum khasianum* during Sekrenyi festival

K - loziecü
T -
code: 16.1.2.2

- fashioned out of wool or cotton balls, worn as part of men's traditional dress

K - tiliku
T - teiliku
code: 16.1.2.3

- worn as part of men's traditional dress; made from *Sternocera aeguisignata* (emerald beetles)

16. TRADITIONAL DRESS

16.1 Necklaces

16.1.3 Unisex Necklaces

K - cülino
T - prütsü
code: 16.1.3.1

- worn casually by either sex, imported from Manipur

K - cülino
T - tatsü
code: 16.1.3.2

- worn casually by either sex, imported from Manipur

K - cüzhie
T - tsütho
code: 16.1.3.3

- worn casually by either sex

K - temie
T - ketsü
code: 16.1.3.4

- worn casually by either sex

16. TRADITIONAL DRESS
16.1 Necklaces
16.1.3 Unisex Necklaces

K - cügu
T - tsüra
code: 16.1.3.5

- worn casually by either sex

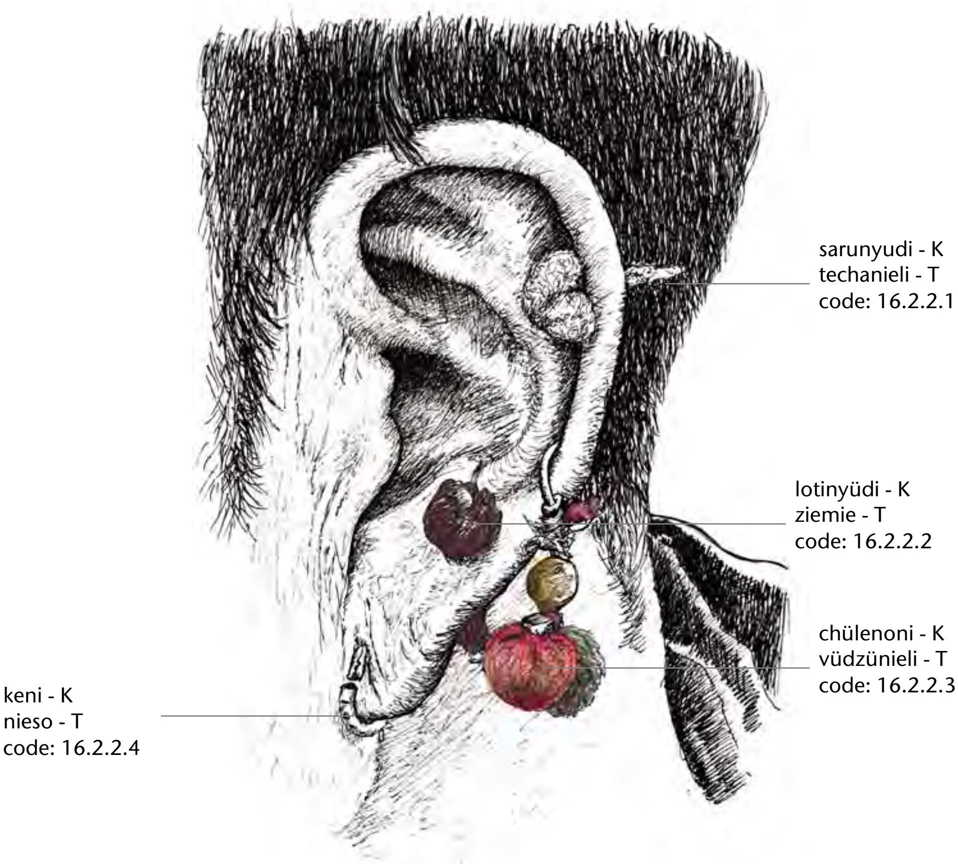
K - kwitsü
T - tsütho
code: 16.1.3.6

- worn casually by either sex

K - sani
T - thanie
code: 16.2.1.1

- worn by women as part of traditional dress on occasion of ceremonies; two long scarlet tassels of dyed goats’ hair are worn hanging down from the ears in front; a thread fastening them together runs round the back of the head over the hair

16. TRADITIONAL DRESS
16.2 Ear Ornaments
16.2.2 Male Ear Ornaments

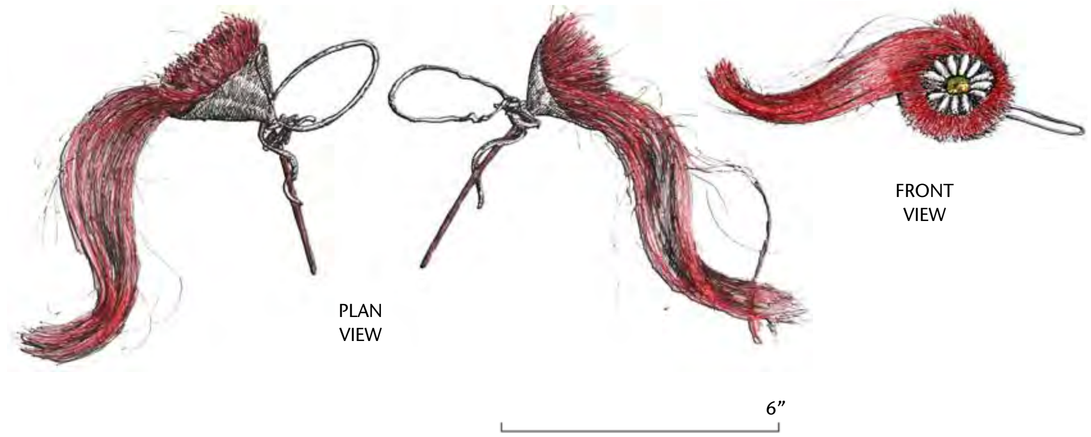


Arrangement of ear ornaments worn casually by Angami males (actual size).

16. TRADITIONAL DRESS
16.2 Ear Ornaments
16.2.2 Male Ear Ornaments

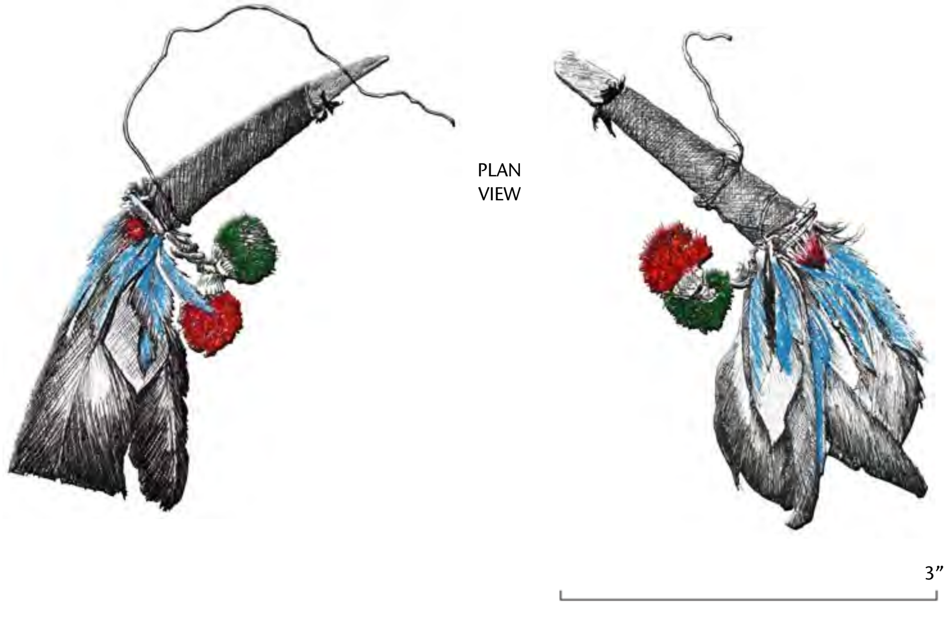
K - terhüni / terhünyi
T - thanie
code: 16.2.2.5

- rosette ear ornaments worn by men as part of traditional dress; about 3.5 cm in diameter, the centre formed by a ring of shiny seeds of Job's tears, and on the outside of this again an encircling fringe of scarlet hair cut short and stiff, except in the front, where it falls in a long streamer; the rosette is made on a sort of wooden cup, the stem of which is inserted into the lobe of the ear



K - zieni
T - zienie
code: 16.2.2.6

- fanlike feather ornaments worn by men in their ears as part of traditional dress during festivals and other important times; usually made from feathers of the blue jay

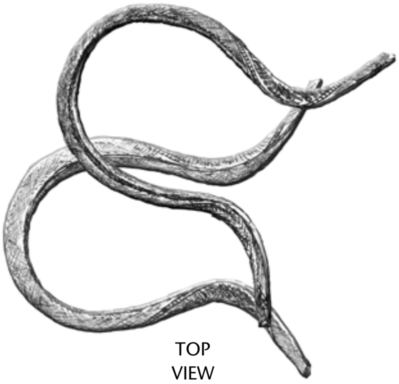


16. TRADITIONAL DRESS
16.3 Bracelets & Armbands
16.3.1 Female Bracelets & Armbands

K - thogwü
T - thuobvü
code: 16.3.1.1

- brass wristlets with ends palmated and turned outward away from one another; worn by women as part of traditional dress

PLAN
VIEW



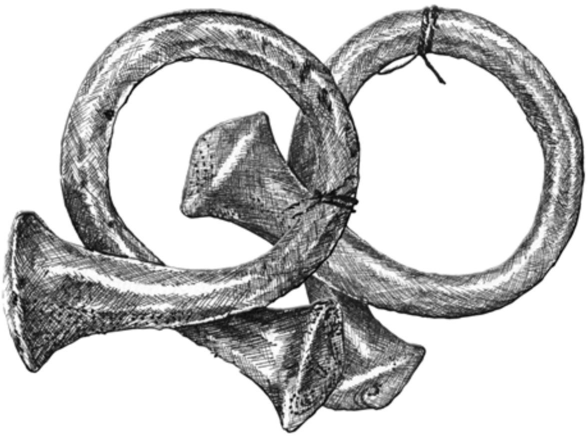
TOP
VIEW

3”

K - thogwü
T -
code: 16.3.1.2

- heavy brass armlets with solid bugle-shaped ends and twisted around into a circle; worn by women above the elbow as part of traditional dress; bears some punched ornamentation

PLAN
VIEW



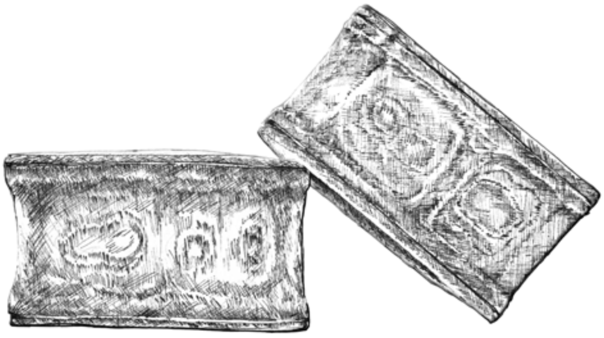
TOP
VIEW

4”

16. TRADITIONAL DRESS
16.3 Bracelets & Armbands
16.3.2 Male Bracelets & Armbands

K - chütho
T - chüthuo
code: 16.3.2.1

- ivory armlets made from a 6-10 cm wide section of elephant's tusk; worn by more prosperous men as part of their traditional dress; usually bought from Assam. Sometimes young Angami warriors that do not own authentic ivory armlets instead wear wooden replicas, usually carved from *Gmelina arborea* wood.



PLAN
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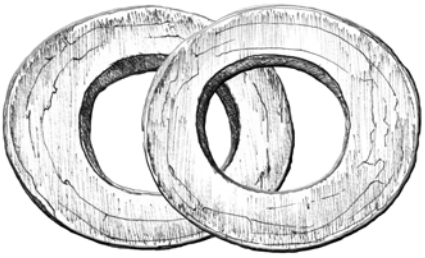
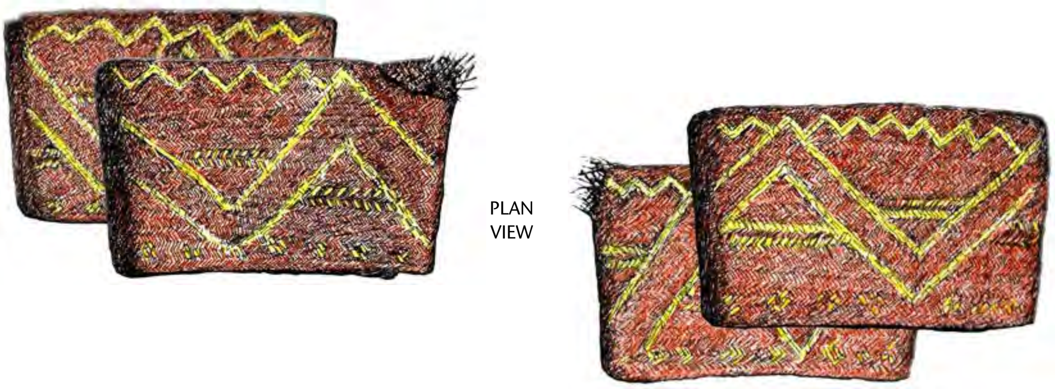


TOP
VIEW

K - bipa
T - zunuopa
code: 16.3.2.2

- armlets of plaited red and yellow cane, sometimes embellished with cowries and hair; worn by men above the elbow as part of traditional dress



PLAN
VIEW

16. TRADITIONAL DRESS
16.3 Bracelets & Armbands
16.3.2 Male Bracelets & Armbands

K - thatho
T -
code: 16.3.2.3

- armlets of cane embroidered in Job's tears and fringed with either goats' hair or long human hair; worn on the forearms in dance and war by warriors of distinction

16. TRADITIONAL DRESS

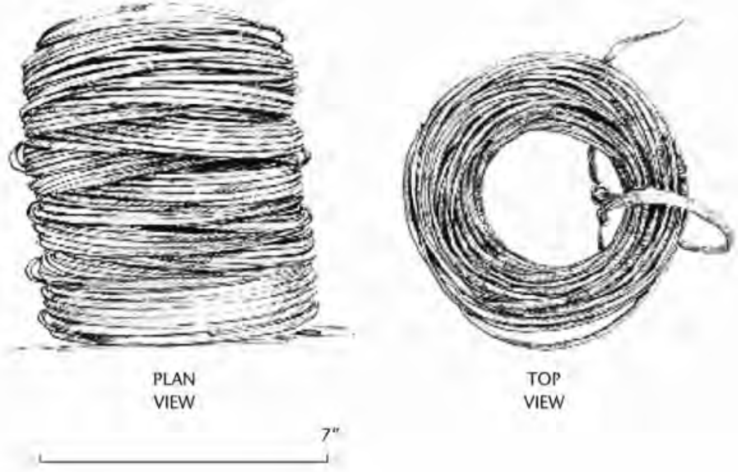
Ceremonial dress of Angami males, worn during Kelipie day of Thekranyi festival.

16. TRADITIONAL DRESS

16.4 Leg Ornaments (male)

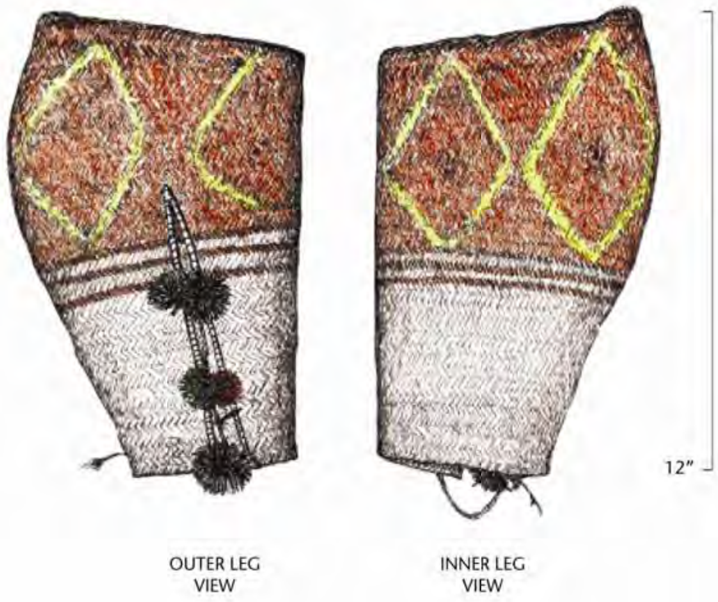
K - phiso
T - phiso
code: 16.4.1

- knee bands made from very finely cut rings of cane, dyed black (traditionally with dye from *Strobilanthes flaccidifolius* Nees [syn. *Strobilanthes cusia* Kuntze]); mostly for decorative purposes but some claim that they aid hill climbing



K - phipa
T - phipa
code: 16.4.2

- leggings made of very fine red and yellow cane-work, extending from below the knee to above the ankle; worn by men during times of traditional dress; in the case of Viswema and the Chakhesang, these leggings were woven on the leg and remained there until they rotted off. This pair designed with slit so they can be removed at leisure.



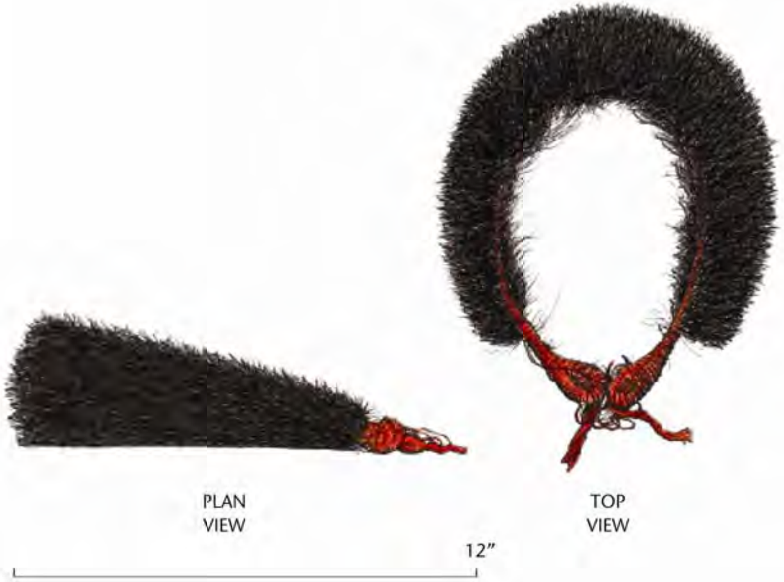
16. TRADITIONAL DRESS
16.5 Head Gear (male)

K - yami
T -
code: 16.5.1

- the tail feather of a hornbill, white with a single broad bar of black at the top; is worn by all the Naga tribes as a symbol of valor; the right to wear hornbill feathers was reserved for warriors who had taken a head

K - tsüphie
T - tsüphrie
code: 16.5.2

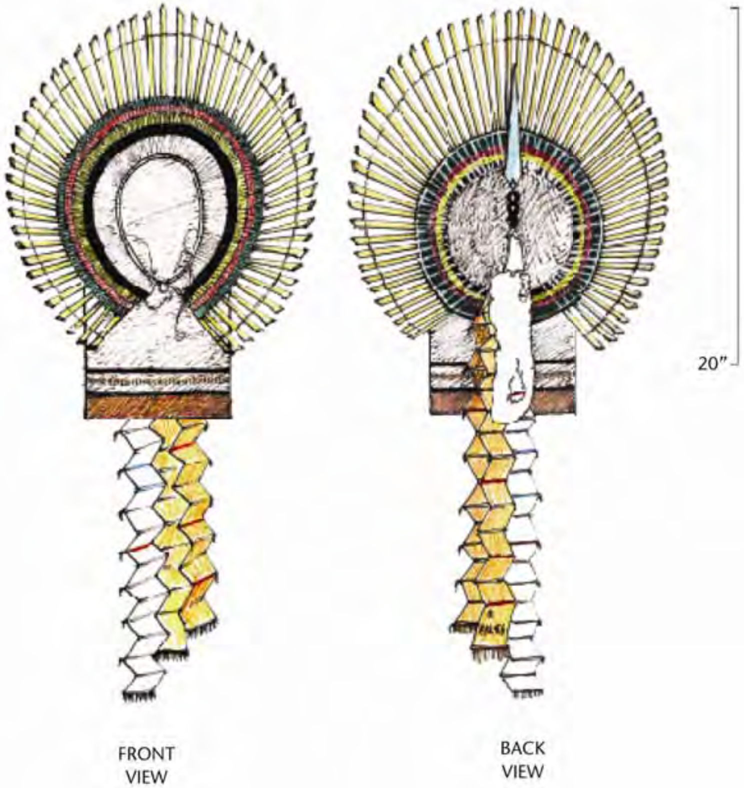
- bearskin fringe worn by males as part of traditional attire; back is bound in ropes of white cotton



16. TRADITIONAL DRESS
16.5 Head Gear (male)

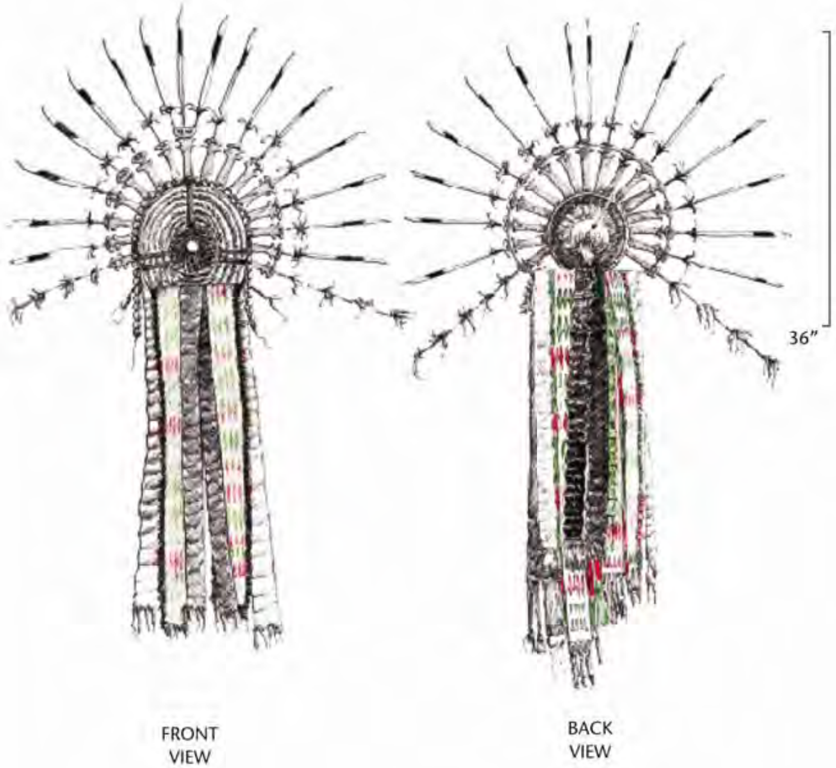
K - tirhütsula
T - tsüla
code: 16.5.3

- worn by men as part of traditional dress



K - tsüla
T - tsüla
code: 16.5.4

- Men's head dress is a coronet of hornbill feathers, circular in shape, the feathers positioned in a convex frame; worn during Kelipie day of Thekranyi festival. Khonoma is the only Angami village that wears the tsüla with the hornbill feathers positioned to be seen on the edge (as shown here) - and not on the flat, like other villages.

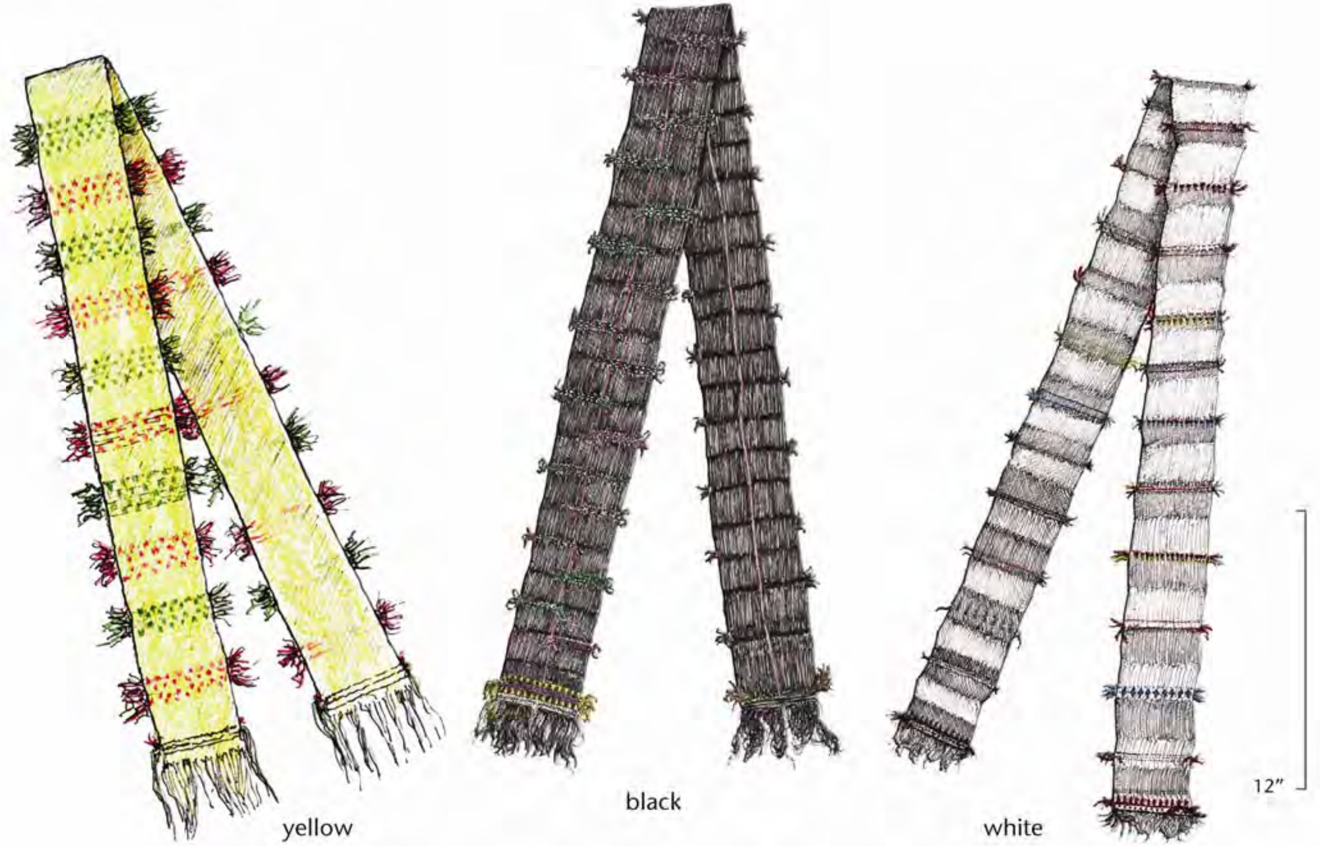


16. TRADITIONAL DRESS

16.5 Head Gear (male)

K - satsa
T - nipfü
code: 16.5.5

- hangs from the back of tsüla head gear (see 16.5.4)



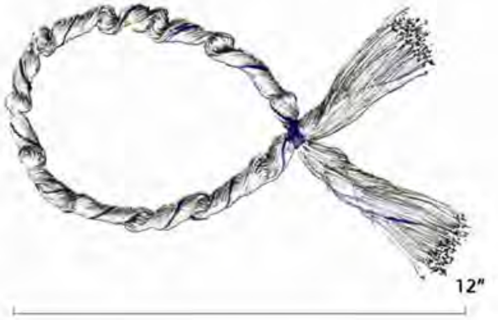
16. TRADITIONAL DRESS

16.5 Head Gear (male)

Traditional Angami male style of wearing their hair long at the top and back of the head, and tying it up in a knot at the back.

K - lophie
T - lophrietsü
code: 16.5.6

- piece of twisted cotton the thickness of a rope; made for a man by his sweetheart as a love token, and worn either as a necklace or to tie his hair



K - lophie
T - chatho
code: 16.5.7

- bestowed to a man by his lover; as part of traditional dress, used by men to tie up the lock of hair grown long at back of the head

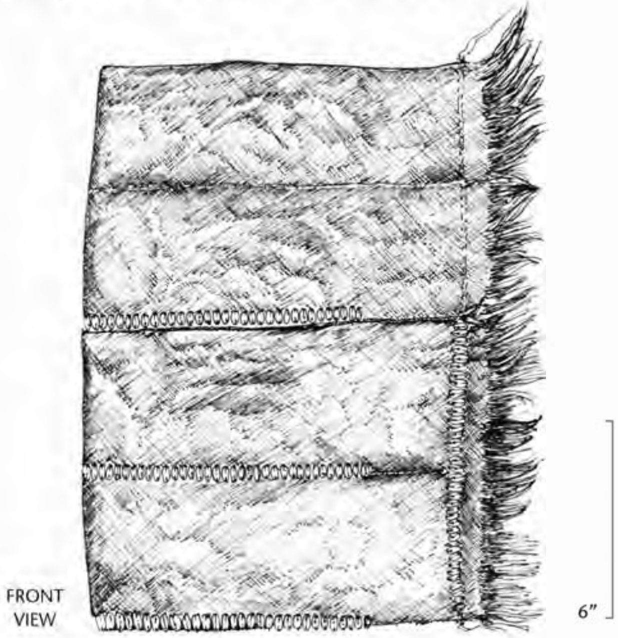
16. TRADITIONAL DRESS

16.6 Kilts, Sashes & Other Cloth Apparel (male)

K - kechuni / kechünyi
T - kesüni
code: 16.6.1

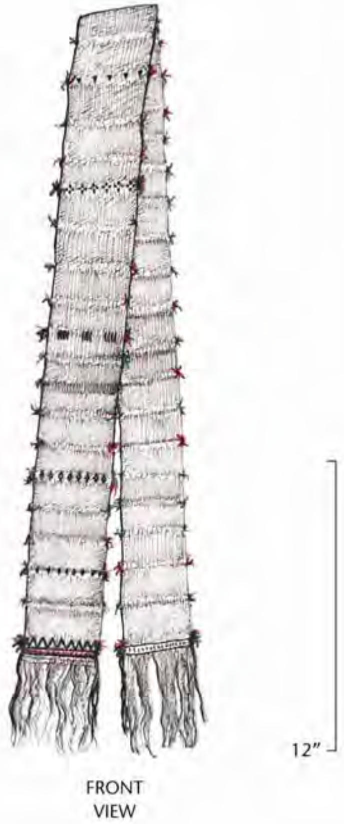
- Angami men's kilt of dark blue or black cotton cloth, varying from 3.5 - 4.5 feet in length; to about 18 inches in width, embroidered with 3 rows of small white cowrie shells, worn until about the 1970s, when trousers became more popular; a 4th row of cowries on the kilt indicated the sexual exploits of the wearer - by sleeping with another man's wife, two sisters, or a mother and daughter (see Hutton, 1969, p. 25 for other interpretations).

This kilt passes around the hips and overlaps in front, the edge of the upper flap is ornamented with a narrow fringe, whilst the under-flap having a string attached to its lower corner is pulled up tightly between the legs, and the string is then either allowed to hang loosely a few inches above the waist belt or is tucked in at the side.



K - satsa
T - nipfu
code: 16.6.2

- tied as a belt around a man's kilt (16.6.1), as part of traditional dress

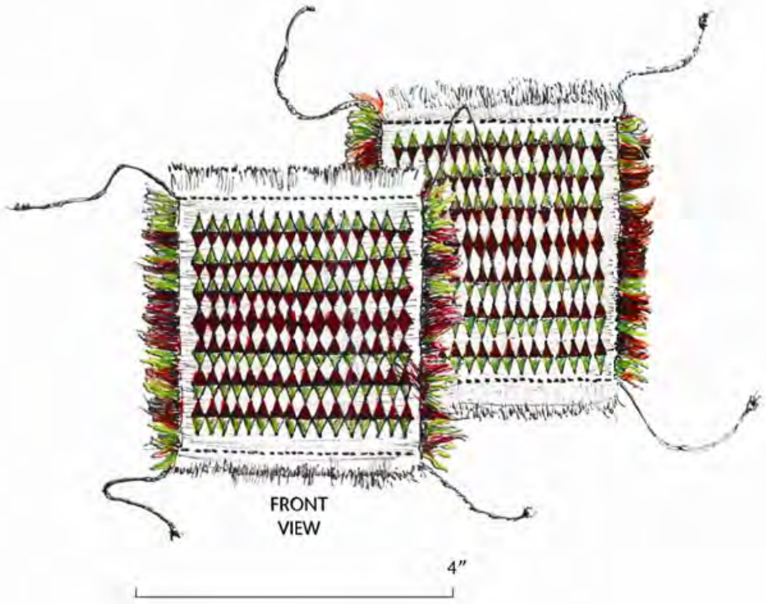


16. TRADITIONAL DRESS

16.6 Kilts, Sashes & Other Cloth Apparel (male)

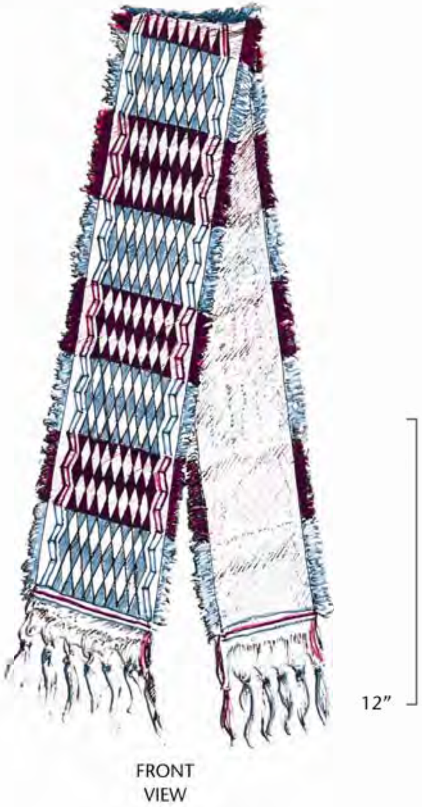
K - birepa
T - dziesupa
code: 16.6.3

- cloth bangels worn on men's wrists during times of traditional dress; similar lozenge patterns as the <u>terha</u> (code 16.6.4)



K - terha
T – terha
code: 16.6.4

- sash embroidered in lozenge patterns; worn by men, diagonally across the chest, as part of ceremonial dress



16. TRADITIONAL DRESS

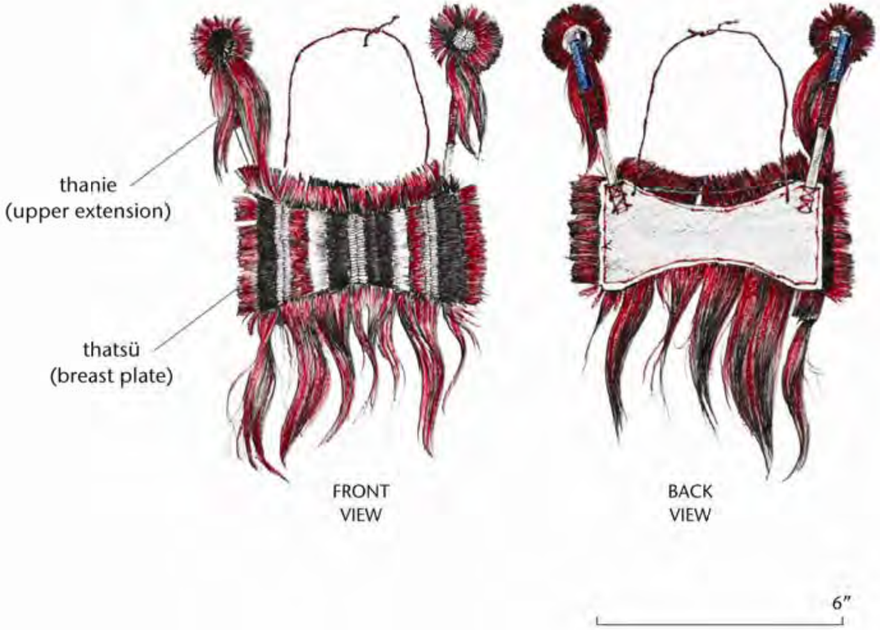
16.7 Other Body Ornaments (male)

K - menyi
T - chaphrie
code: 16.7.1

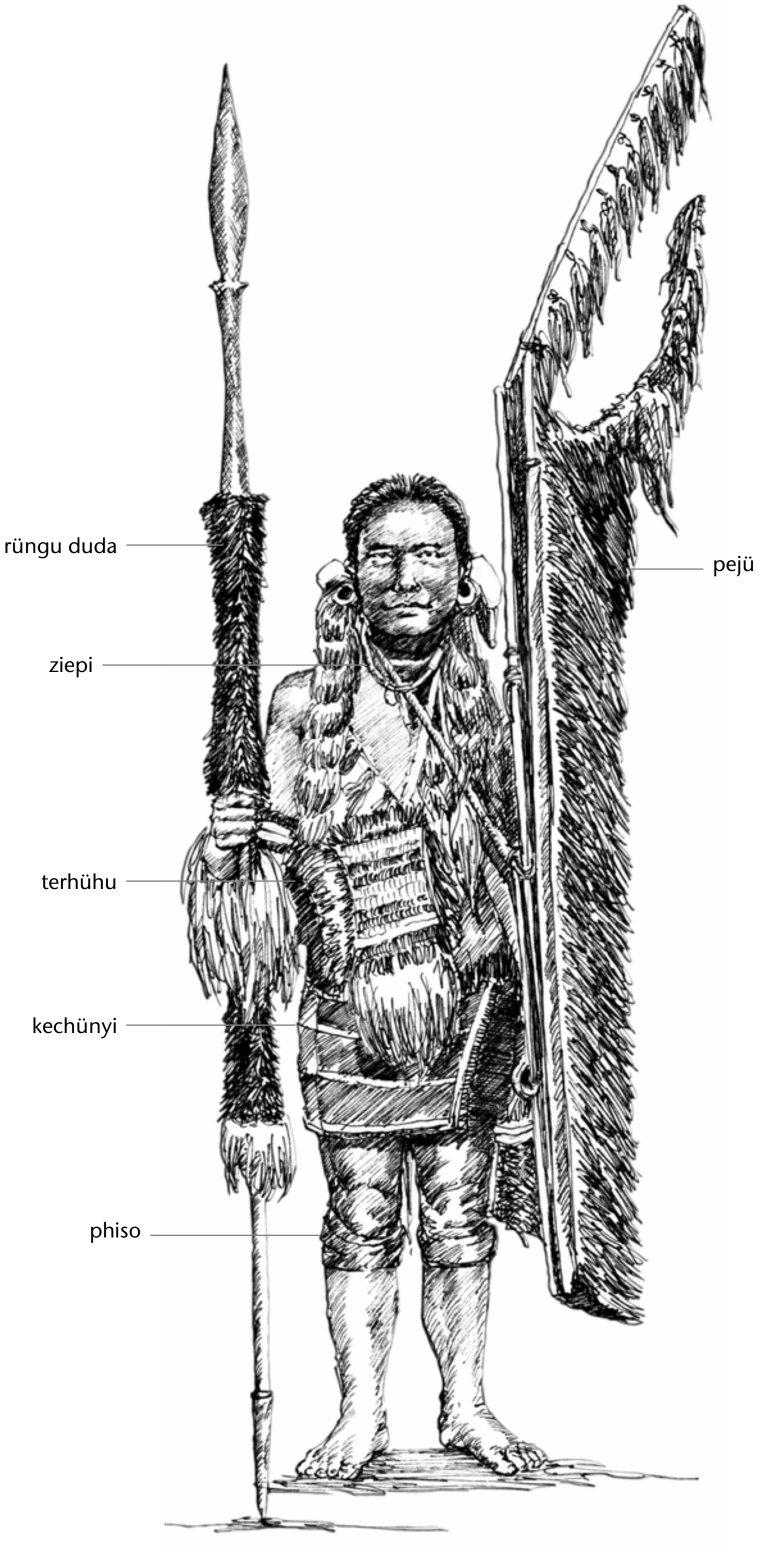
- cotton apron worn as a sporran by men, wrapped around the waist, with the colored ends left hanging in front; part of traditional dress of younger men to signify their prowness in love

K - terhühu
T -
code: 16.7.2

- breastpiece made from an oblong piece of wood, about 6 inches in length and about 4 inches in breadth, decorated with goat hairs or sometimes human hair of slain victims, and Job's tears; and having a broad fringe of scarlet hair all around it; adorned with horns with rosette tips similar to those worn in the ears (see 16.2.2.5), suspended from the neck by a cord; worn in dance and in war by men who had taken heads



17. CEREMONIAL TOOLS



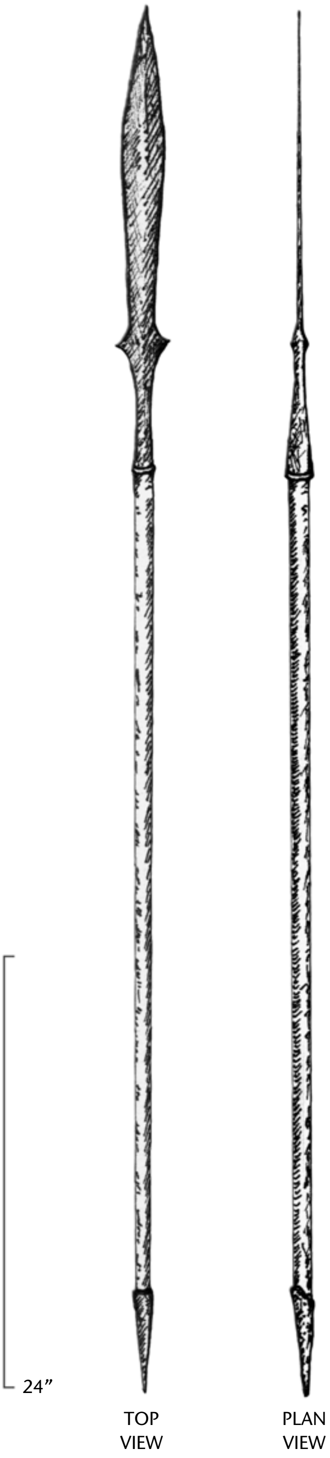
Angami male dressed for ceremonial occasion.

17. CEREMONIAL TOOLS

17.1 Spears

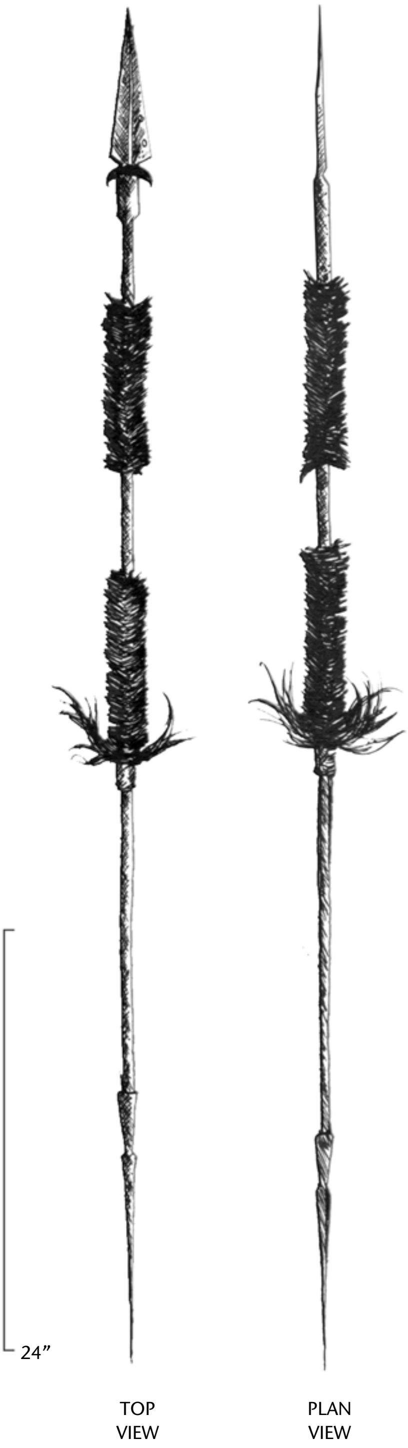
K - thema rüngu
T - thema rüngu
code: 17.1.1

- matrimonial engagement spear, presented to the father of the intended bride



K - rüngu duda
T - rüngu ngudu
code: 17.1.2

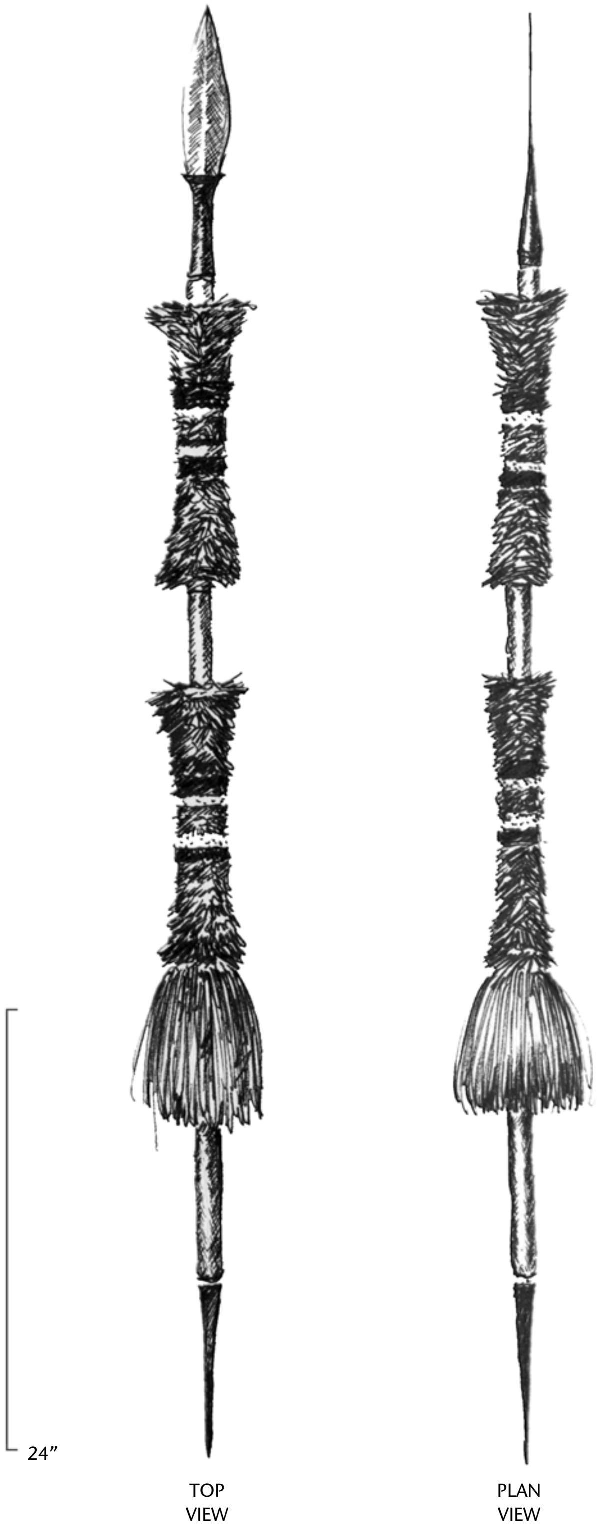
- Veterans formerly decorated their spears with tresses of human hair, trophies from successful raids in the past. This spear head has an extra ornamental barb. Now used during festivals as part of traditional dress.



17. CEREMONIAL TOOLS
17.1 Spears

K - rüngu duda
T - rüngu ngudu
code: 17.1.3

- Now used during festivals as part of traditional dress. Shaft decorated with goat's hair dyed scarlet, with black and yellow stripes, the central part being kept bare for the grip of the hand.

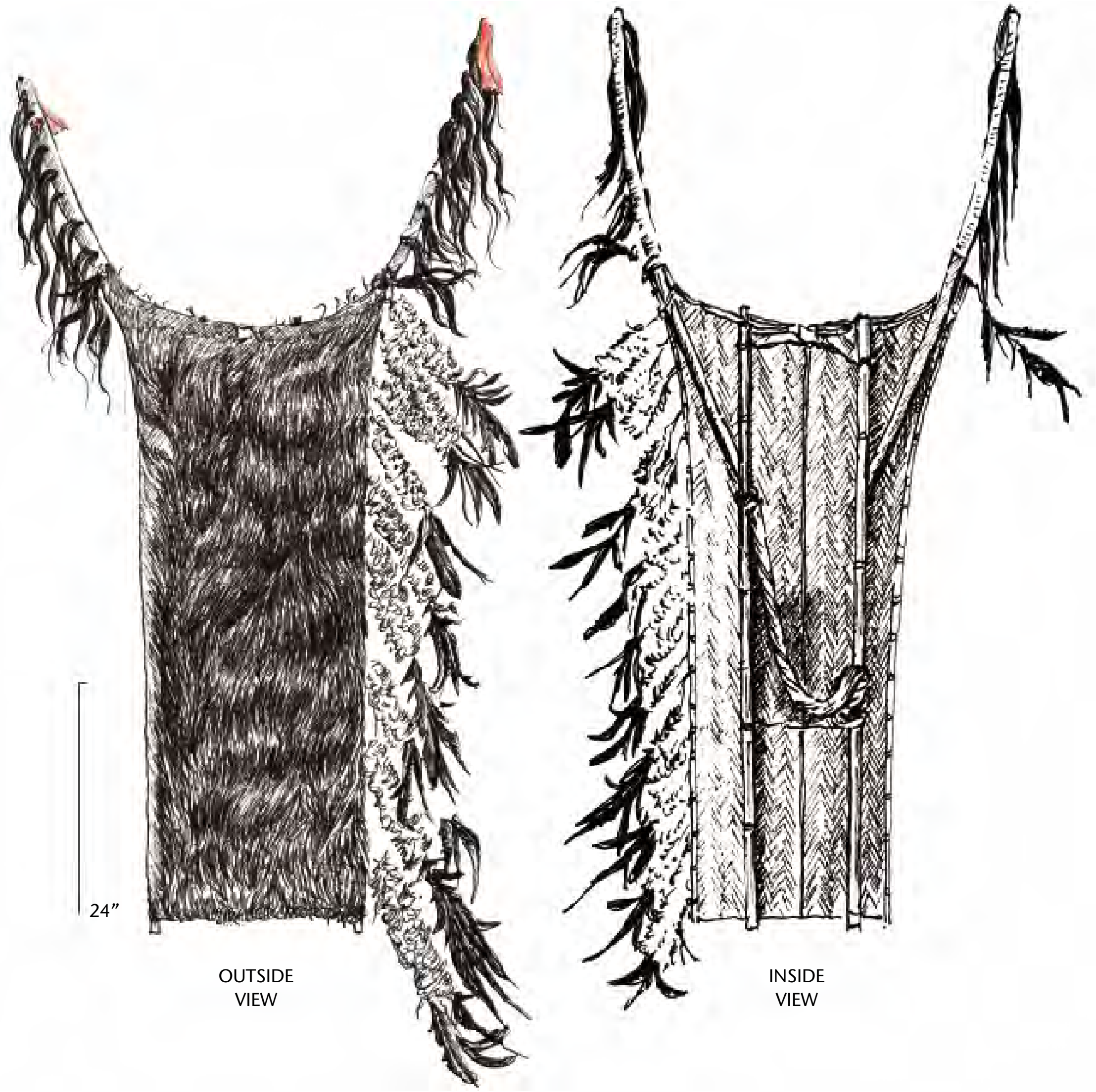


17. CEREMONIAL TOOLS

17.2 Shields

K - pejü
T - pezhü
code: 17.2.1

- Bear skin shield used for ceremonial purposes such as during Thekranyi festival; not used in war. Ceremonial shields are lighter - made of bamboo matting and covered with bear (below), leopard (code 17.2.2) or tiger skin (code 17.2.3). Two long cane horns rise from the upper corners, formerly ornamented with tresses of human hair. One side is decorated with a string of feather tassles.



OUTSIDE VIEW

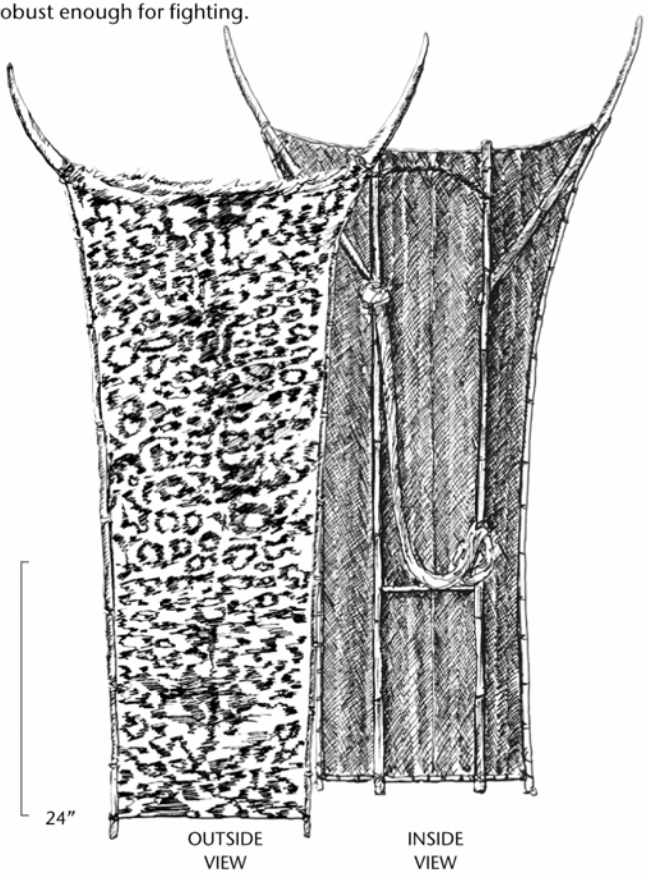
INSIDE VIEW

17. CEREMONIAL TOOLS

17.2 Shields

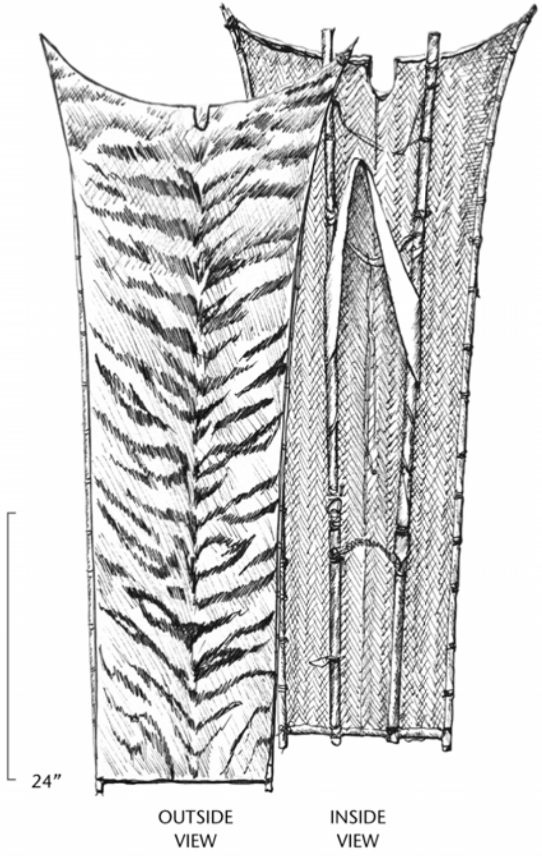
K - pejü
T - pezhü
code: 17.2.2

- Ceremonial shield, of cane covered with leopard skin; wooden horns. Light to carry but not robust enough for fighting.



K - pejü
T - pezhü
code: 17.2.3

- tiger skin shield used for ceremonial purposes

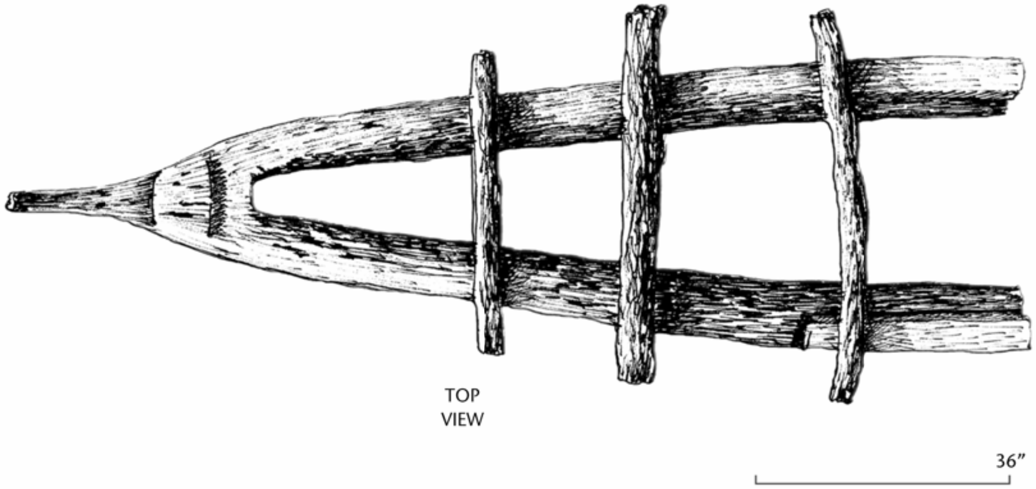


17. CEREMONIAL TOOLS
17.3 Miscellaneous

K - lieki
T - likrie
code: 17.3.1

- wooden sled used for pulling during times of erecting village gates, monoliths, grave stones, bridges, etc.

PLAN
VIEW



TOP
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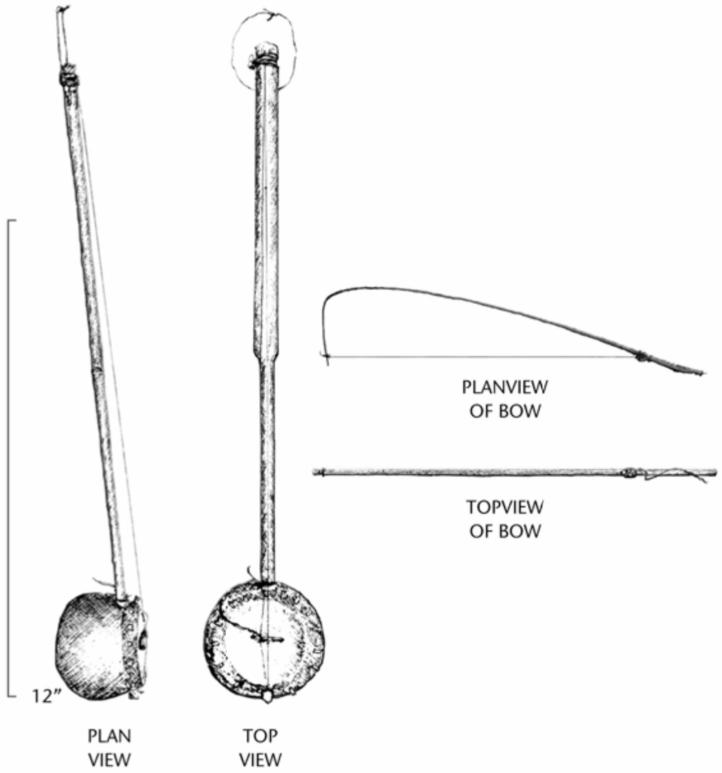
18. MUSICAL INSTRUMENTS

A singer plucks his tatibu (Naga guitar) while intoning an Angami traditional song.

18. MUSICAL INSTRUMENTS

K - nyarübu
T - nyarbu
code: 18.1

- single-stringed musical instrument using a gourd as a sound box and played with a bow, akin to a violin; the string is made from strong fibre from *Terminalia myriocarpa* (<u>mecha</u>)



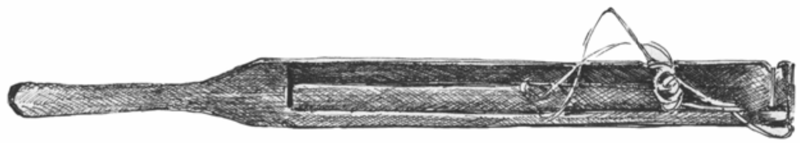
K - tatibu
T - tati
code: 18.2

- single-stringed musical instrument; the string is plucked by the fingers, similar to a guitar; it is made from a dried gourd shell cut in half and covered with cow's bladder; this is attached to a wooden or bamboo handle and then fitted with a cotton thread, waxed to make it smooth and firm

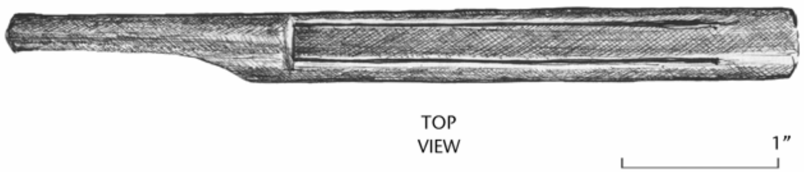
18. MUSICAL INSTRUMENTS

K -
T -
code: 18.3

- Jew's harp made out of a piece of thin, flat bamboo about 1 inch wide and 4 or 5 inches long, with the centre cut away so as to leave a prong attached to the frame at one end. The instrument is made to vibrate between the lips of the open mouth, which acts as a sounding board.



BOTTOM
VIEW



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APPENDIX 5-8. Local Units of Measurement

Like most isolated communities not under a central authority, Naga villages developed their own systems of weights and measures. Warfare and headhunting undoubtedly heightened isolation, and thus thwarted the emergence of a standardized system in the Naga Hills.

But like everything else, this too began to change with the arrival of the British – and their Imperial set of measures – in the 19th century. But Naga villagers still lacked the practical means to measure a foot, pound or gallon, so it is doubtful if this system expanded much beyond officialdom. But more importantly, as the Naga Hills opened up to outside commerce, the flow of products into the mountains provided an assortment of containers of uniform sizes and suitable for storing crops. Systems of measurement thus gained a degree of universality as villagers began integrating condensed milk cans, biscuit tins and jute sacks into their lexicons of measurements. Nor did it take them long to quantify how these new standardized units related to their local units.

Although metric is now adopted as the official system in Nagaland and throughout India, when we began interviewing farmers about the productivity of their fields, we quickly learnt that the old local systems remain in common use in the villages. Confronted with these foreign terms, we had no choice but to come to grips with local units of measurement – and try to convert them to metric equivalents. Only then could we speak in a common language. Although the newer units of cans, cups, tins and sacks were common between the two study villages, the older system of using hand-woven trays and baskets was unique to each and had to be recorded separately. Sometimes they were not easily quantified as, for example, the number of hours in a working day in Tsiesema – where the third whir of the cicadas in late afternoon signals that it is time to stop work in the fields and begin the return journey back to the village.

This appendix presents, separately for each village, conversion tables between local and metric units, and then illustrations of the various containers that define each local unit.

CLASSIFICATION SYSTEM

1. Cups & Cans
2. Woven Trays
3. Tins
4. Baskets
5. Sacks
6. Larger Storage Containers
7. Miscellaneous

Conversion Table between Local Units of Measure and International Units [1]

Khonoma Village

CEREALS

RICE [2] (*telha*) –

Cups & Cans:
4 *rhadono* = 1 kg. of rice
2 *rhadono* (level) = 1 *chükihi* [3] = 0.5 kg. of rice
2 *chükihi* = 1 *shrerühi* [4] = 1 kg. of rice

Woven Trays:
4 *jarha* ≅ 1 *tsa*
2 *tsa* = 1 *bie*
9 *jarha* = 1 *tinyü kezha-u* [5] (old large *tin* [6])
1 *merha* [7] of rice = 7.5 kg.
2 *merha* of rice = 1 *tinyü kezha-u* = 15 kg.

Tins:
1 *tinyü kecü-u* [8] of paddy (heaped) = 12 kg.
1 *tinyü kecü-u* (heaped) of rice = 14 kg.
1 *tinyü kezha-u* (heaped) of paddy = 13.5 kg.
1 *tinyü kezha-u* (heaped) of rice = 15 kg.
2 *tinyü kezha-u* of paddy = 1 *khodi* [9] = 27 kg.
2 *tinyü kezha-u* of rice = 1 *khodi* = 30 kg.
6 *tinyü kecü-u* of rice = 1 *thula* [10] (stitched shut) = 84 kg.

Baskets [11]**:**
1 *khodi kecü* of paddy = little more than 1 *tinyü kezha-u* ≅ 16-17 kg.
1 *khodi* of rice (level) = 2 *tinyü kezha-u* = 30 kgs.
1 *khodi* = 1 *dichie* [12] in size

Sacks:
1 *thula* of paddy (with knot tied short) = 5 *tinyü kecü-u* = 60 kg.
1 *thula* of paddy (if stitched shut) = 6 *tinyü kecü-u* = 72 kg.

Larger Storage Containers:
1 small *keprüchü* [13] of paddy, millet or Job's tears ≅ 8 *thula* (with knot tied short) ≅ 40 *tinyü kecü-u*
1 medium *keprüchü* of paddy, millet or Job's tears ≅ 14-15 *thula* (with knot tied short) ≅ 75 *tinyü kecü-u*
1 large *keprüchü* of paddy, millet or Job's tears ≅ 18-20 *thula* (with knot tied short) ≅ 100 *tinyü kecü-u*
1 *melachü* [14] of paddy, millet or Job's tears ≅ 100-300 *tinyü kezha-u*

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[1] For a sketch of each unit of measure, refer to the illustrations that follow.

[2] paddy = with husks (lighter by volume)
rice = without husks
This distinction obviously becomes critical when converting between weight and volume measures.

[3] 25 paise cup, used as a kitchen measure for cooking or selling

[4] 1 rupee cup, used as a kitchen measure for cooking or selling

[5] older and larger type of *tin*

[6] If *tinyü* (*tins*) are heaped, then they generally contain an extra 1 kg.

[7] a type of woven tray of variable sizes – often 0.5-1 *tinyü*

[8] newer and smaller version of *tin*

[9] type of basket

[10] large jute sack

MILLET (*sü*) – 1 *mekho* = 2 *tins* ≅ 7-8 kg. unthreshed ⇒ 4 kg. after threshing
MAIZE (*zarosi*) – - by the cob 1 *piepo*[15] = 50 cobs (with husks)
JOB'S TEARS (*kesi*) – 1 *lieherü*[16] = 1 *tinyü kezha-u* = 7 kg. unthreshed 1 *piepo* = 2 *tinyü kezha-u* = 14 kg. unthreshed ⇒ 5 kg. after threshing
PULSES
SOYBEANS (*südza*) – 1 *chükihi* = 0.5 kg. 1 *shrerühi* = 1 kg. 1 *tinyü kecü-u* = 12 kg. 1 *piepo* = 2 *tinyü kecü-u* = 24 kg.
RICE BEANS (*kerhü*) – 1 *chükihi* = 0.5 kg. 1 *shrerühi* = 1 kg. 1 *piepo* = 2 *tinyü kecü-u* = 24 kg.
BULBS, ROOTS & TUBERS
SWEET POTATO (*phiemu*) - 1 *piepo* = 20 kg.
POTATO (*kelu*) – 1 *tinyü kezha-u* = 13 kg. 1 *piepo* = 2 *tins* = 26 kg.
TARO (*dzuno*): 1 *piepo* = 15 kg.
YAM (*tsüpie*) - 1 *piepo* = 15 kg.
CASSAVA (*seiphimu*) **-** 1 *piepo* = 12 kg.
GARLIC (*khuovie*) – - by bundle 1 *mekho khorü* ≅ 15-16 bundles
CUCURBITS
CUCUMBER (*tsüto*) – 1 *piepo* ≅ 15-20 pieces
PUMPKIN (*rümo*) - 1 *piepo* ≅ 6-7 pieces

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[11] Baskets differ somewhat in size, causing some variation in weights.

[12] another style of basket, the same size as a *khodi*

[13] large woven basket for crop storage

[14] wooden storage box

[15] refers to a full load that a man or woman can carry, in a basket, sack or shawl

[16] winnowing tray

CHAYOTE (*kulukushü / squash*) –
- by piece (in village)
- by kg. (in Dimapur)

SUGAR

SUGARCANE (*nukrücha*)
- by piece

HERBS, SPICES & CONDIMENTS

CHILLI (*chüsi*) –
1 *piepo* = 12 kg.

GREENS & VEGETABLES

CABBAGE (*kobi*) –
1 *mekho khorü* ≅ 9-10 kg.

TREE TOMATO (*seibinyieno*) –
- by piece
1 *mekho khorü* = 15 kg.

OILSEEDS

PERILLA (*kenie*) –
1 *chükihi* = 0.5 kg.
1 *shrerühi* = 1 kg.
1 *mekho khorü* = 2 *tins* = 20 kg.

FRUITS, NUTS & BERRIES

PASSION FRUIT (*bell*) –
- by piece (in village)
- by kg.

WILD APPLE (*kipho*) –
- by *ciment nhu* (small cement sack)

FIREWOOD

1 *sikhwü* (stack) = 6’ length of pile (l) x 6’ height of pile (h) x 3’ firewood length (w)

DISTANCE, HEIGHT & AREA

DISTANCE:
1 *kwü puo* = length between extended thumb and forefinger (handspan)
1 *thupuo* = 1 forearm length = 2 *kwü puo*
1 *buphropuo* = 0.5 armspan
1 *phichado* = 1 stride

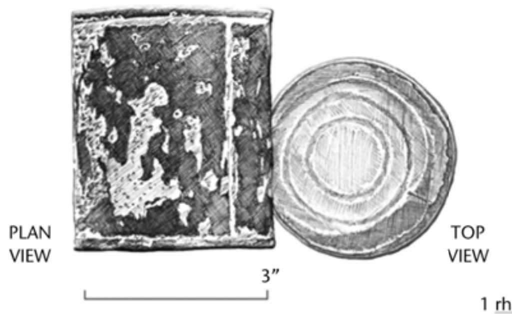
LAND AREA:
size of jhum field = number of *lieherü* of Job’s tears planted
size of wet rice terrace = number of *tinyü kezha-u* of rice seed planted

ILLUSTRATIONS

UNITS OF MEASUREMENT (MU)*
MU 1 Khonoma System
MU 1.1 Cups and Cans

K - rhadono
T - rhadonuo
code: MU 1.1.1

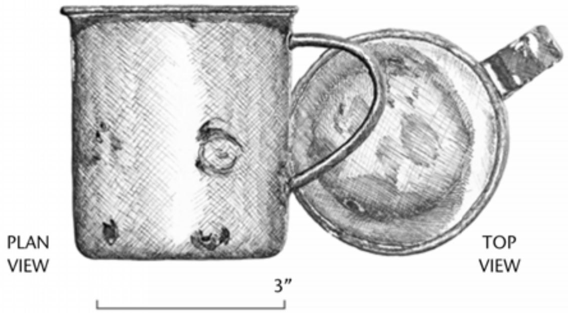
- measuring portions of rice, Job's tears, millet, perilla, etc. for cooking



1 rhadono of rice ≅0.25 kg.

K - chükihi
T - sükihie
code: MU 1.1.2

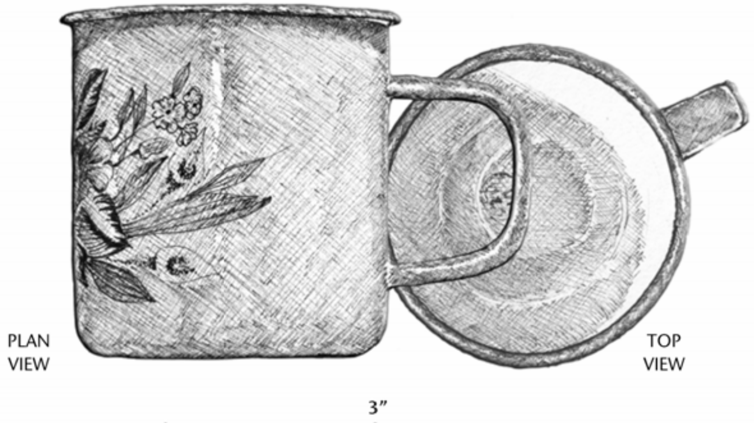
- for measuring, usually rice, for cooking or selling; also for drinking tea or alcohol



1 chükihi of rice ≅0.5 kg.

K - shrerühi
T - hiedo
code: MU 1.1.3

- for measuring, usually rice, for selling or cooking; also for drinking water or rice beer



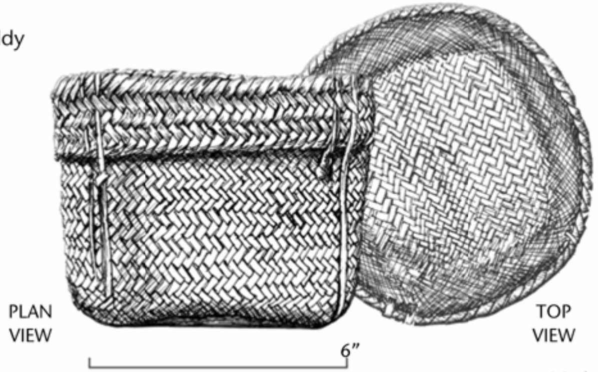
1 shrerühi of rice ≅1 kg.

* See table for conversion rates.

MU 1. Khonoma System
MU 1.2 Woven Trays

K - jarha
T - merha
code: MU 1.2.1

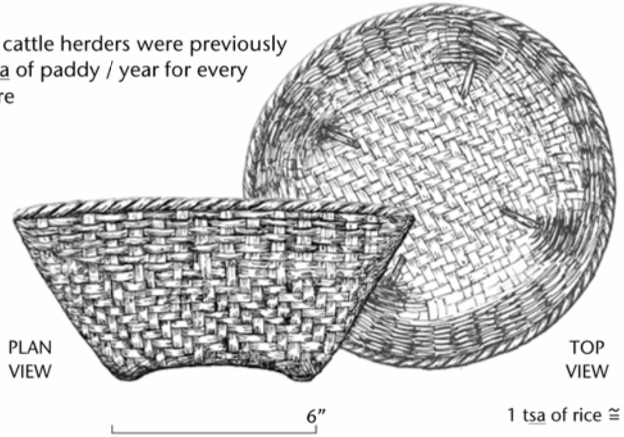
- measuring paddy



1 jarha of rice ≅1.6 kg.

K - tsa
T - merha
code: MU 1.2.2

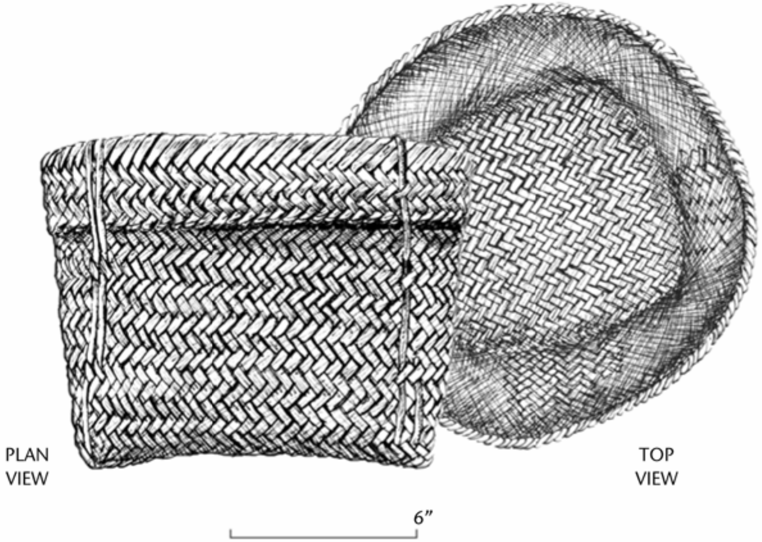
- measuring paddy; cattle herders were previously paid at a rate of 3 tsa of paddy / year for every head under their care



1 tsa of rice ≅ 6.2 kg.

K - bie
T - merha
code: MU 1.2.3

- measuring paddy

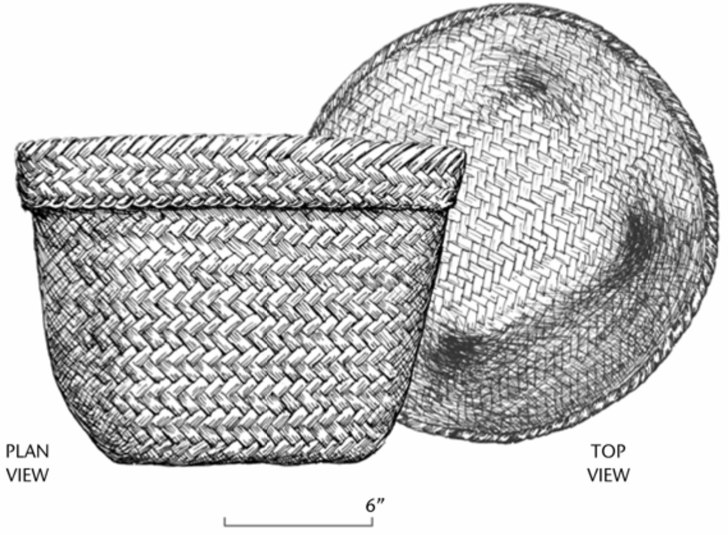


1 bie of rice ≅12.4 kg.

MU 1. Khonoma System
MU 1.2 Woven Trays

K - merha
T - merha
code: MU 1.2.4 (7.2.1.3)

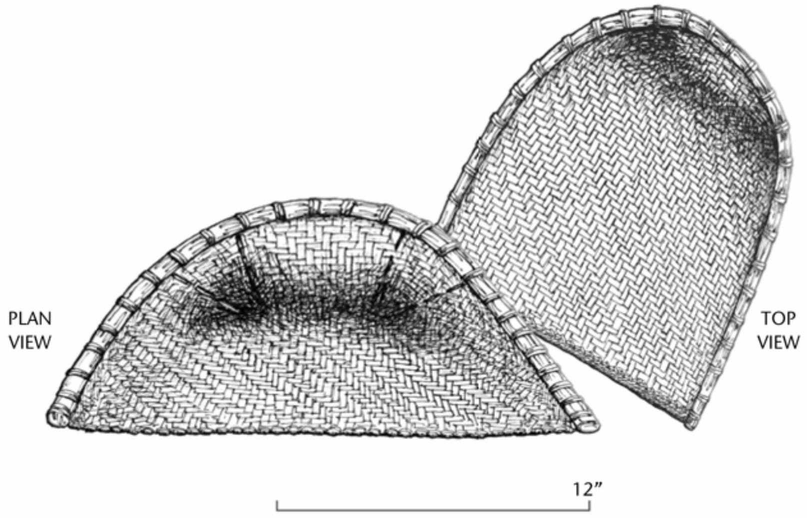
- storing small amounts of food crops on the short term



1 merha (average sized) of rice ≅ 7.5 kg.

K - lieherü
T - lieharü
code: MU 1.2.5 (8.2.4)

- fanning chaff from Job's tears and paddy, usually when poured from a basket onto a mat; also a unit for measuring Job's tears

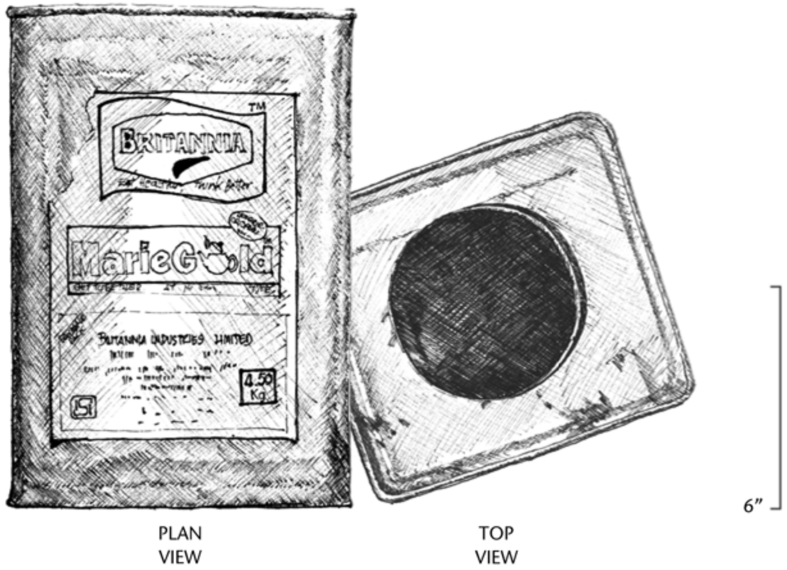


1 lieherü of Job's tears (unthreshed) ≅ 7 kg.

MU 1. Khonoma System
MU 1.3 Tins

K - tinyü kecü-u
T -
code: MU 1.3.1 (7.2.2.1)

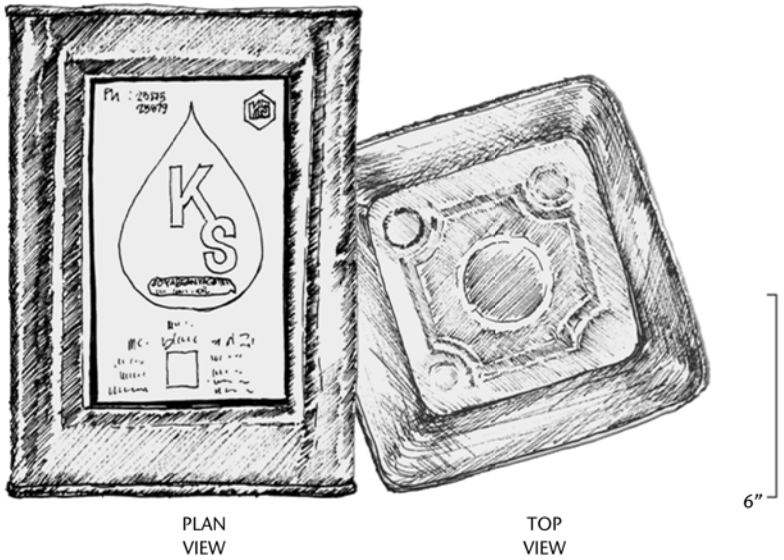
- newer and slightly smaller style of tin used for measuring paddy, rice, potatoes, etc.; also for storage



1 tinyü kecü-u of rice (heaped) ≅ 14 kg.

K - tinyü kezha-u
T - cienyü / thuthseli kezha-u
code: MU 1.3.2 (7.2.2.2)

- older and slightly larger style of tin used as a unit of measure for paddy, potatoes, Job's tears and chilli; also used for storing rice in kitchen; the gwükhwemia are paid for looking after others' mithun at a rate of 2 of these tins / head / year

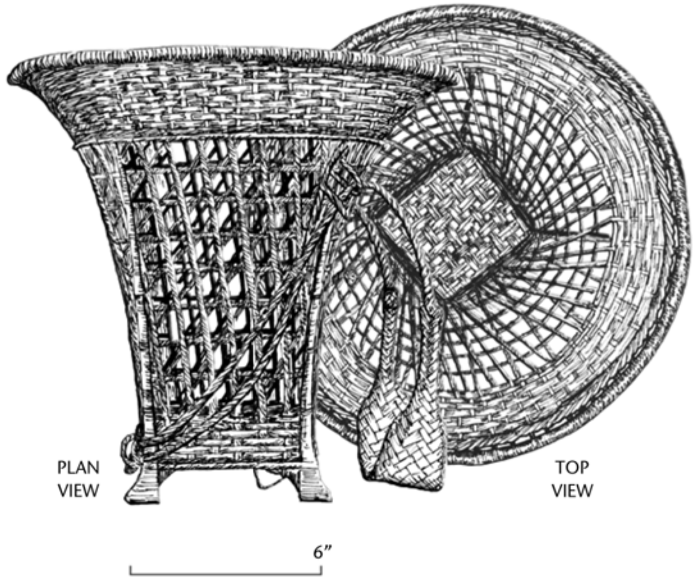


1 tinyü kezha-u of rice (heaped) ≅ 15 kg.

MU 1. Khonoma System
MU 1.4 Baskets

K - mekho / khorü
T - khosie
code: MU 1.4.1 (6.1)

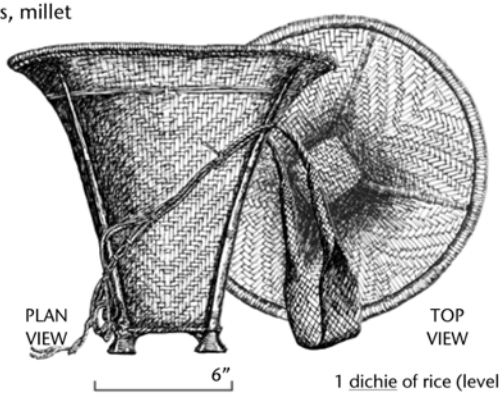
- a general purpose basket, mostly used by women for carrying firewood, vegetables, water, meat, etc.



1 mekho of millet (unthreshed) ≅ 7-8 kg.

K - dichie
T - khodi
code: MU 1.4.2 (6.2)

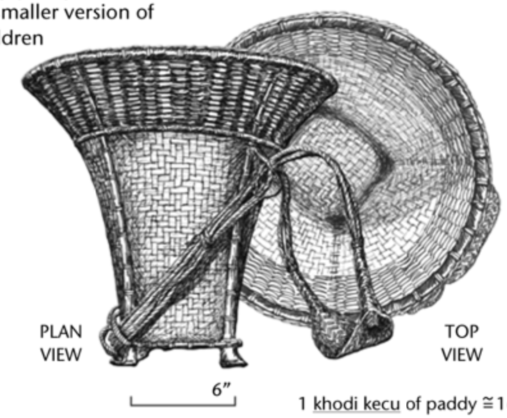
- carrying paddy, Job's tears, millet



1 dichie of rice (level) ≅ 30 kg.

K - khodi kecu
T - chükho
code: MU 1.4.3 (6.3)

- for general carrying, usually paddy, Job's tears, vegetables, pumpkin, etc.; smaller version of standard khodi, used by children



1 khodi kecu of paddy ≅16-17 kg.

MU 1. Khonoma System
MU 1.5 Sacks

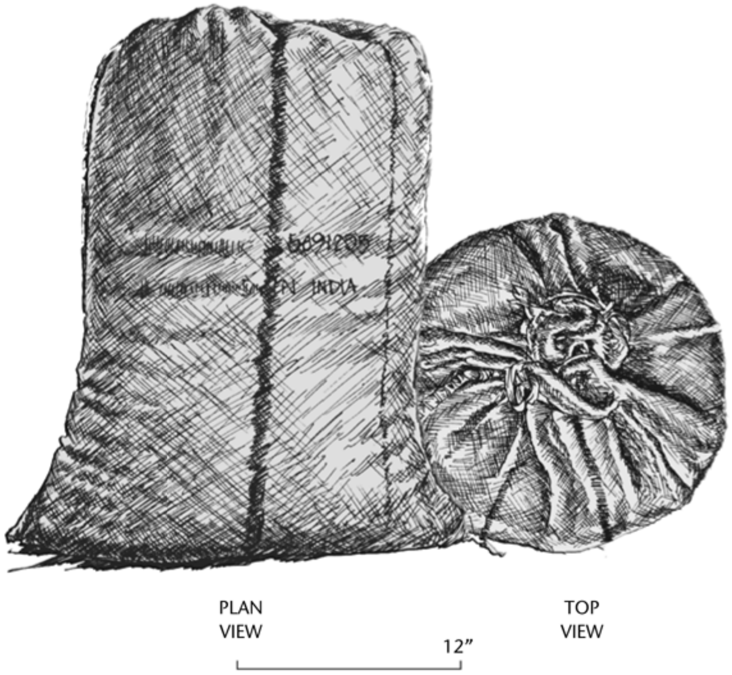
K - ciment nhu
T - gakhropfe ketsü / ciment nhu
code: MU 1.5.1 (7.2.4.1)

- cement sack, usually used for carrying wild apples to the Kohima market

1 ciment nhu of wild apples ≅ 14-15 kg.

K - thula
T - gakhropfe tie kepha
code: MU 1.5.2 (7.2.4.2)

- carrying or storing paddy, potatoes, etc. (tied shut)

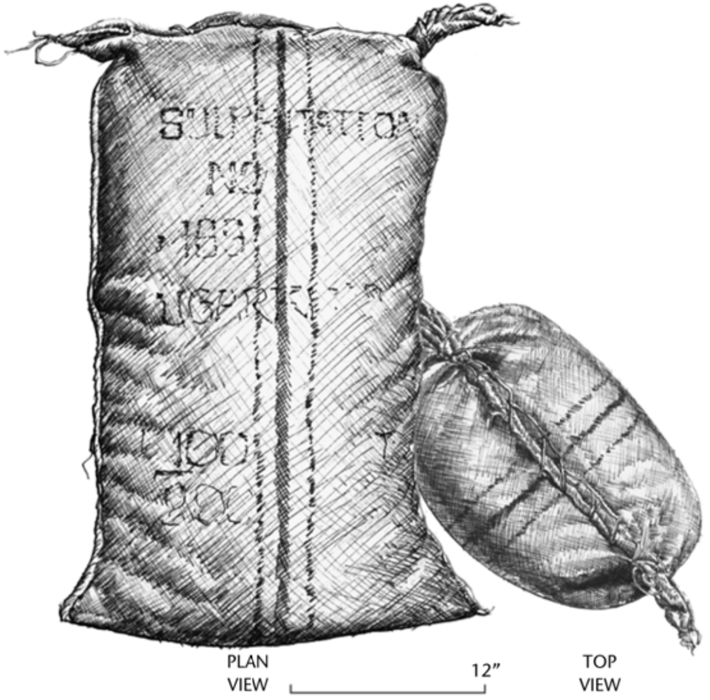


1 thula of paddy (tied shut) ≅ 60 kg.

MU 1. Khonoma System
MU 1.5 Sacks

K - thula
T – gakhropfẹ puotie keterhü
code: MU 1.5.3 (7.2.4.4)

- a large sack, usually used for storing paddy (stiched shut)

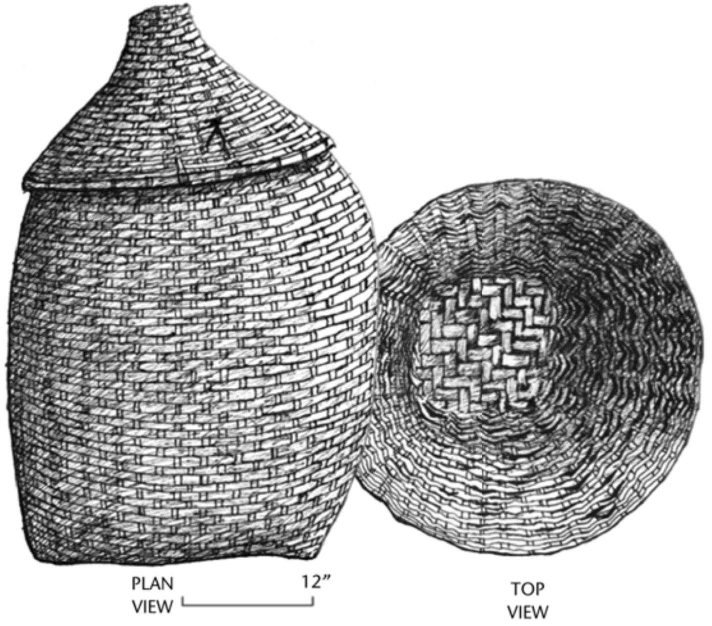


1 thula of paddy (stitched shut) ≅72 kg.

MU 1. Khonoma System
MU 1.6 Larger Storage Containers

K - kepruchü
T - chü / chünuo
code: MU 1.6.1 (7.2.5.2)

- another style of large storage basket for paddy, Job's tears and millet; unit of measurement

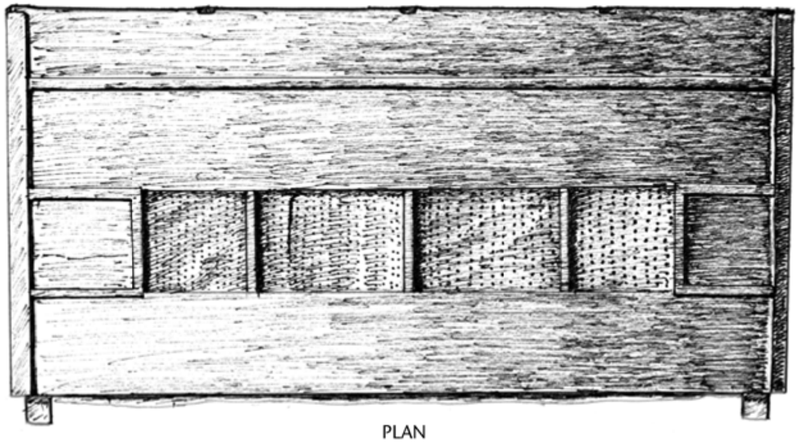


1 kepruchu of paddy ≅480-1200 kg. (depending on size)

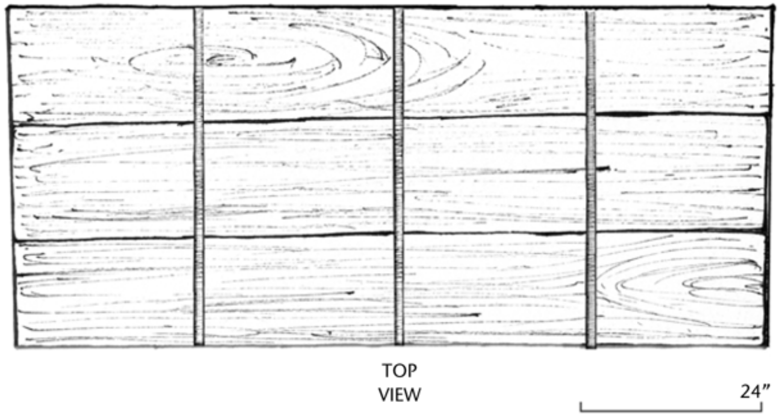
MU 1. Khonoma System
MU 1.6 Larger Storage Containers

K - melachü / sichü
T - telhabu
code: MU 1.6.2 (7.2.5.3)

- wooden box for storage of rice after harvest



PLAN
VIEW



TOP
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1 melachü of paddy ≅ 1250-3750 kg. (depending on size)

Conversion Table between Local Units of Measure and International Units

Tsiesema Village

CEREALS

RICE (*lhako*) –

Cups & Cans:
1 *sierkhu*[17] of paddy (heaped) = 0.75 kg.
1 *sierkhu* of rice (heaped) = 1 kg.

Woven Trays:
1 *rhadonuo* of rice = 0.5 kg.
1 *zharha* [18] of paddy = 2 kg.
1 *thetsa* [19] of paddy = 2 *zharha* = 4 kg.
1 *thekho* of paddy [20] = 2 *thetsa* = 8 kg.
1 *rhadzü* [21] of paddy = 2 *thekho* = 16 kg.

Tins:
1 *cienyü* [22] of paddy = 16 kg. ⇒ 7-8 kg. of rice (after milling)

Baskets & Shawl-loads:
1 *tsiachünuo* of paddy = 2 *tins*
1 *tsiese khodi* [23] of paddy = 2 *cienyü* ⇒ 32 kg.
1 *kenhu* [24] of threshed paddy = 32 kg.

Sacks:
1 *gakhropfe* [25] of paddy (*tie kepha* - tied shut) = 5 *cienyü* = 80 kg.
1 *gakhropfe* of paddy (*puotie keterhü* - stitched shut) = 6 *cienyü* = 96 kg.

Large Storage Containers:
1 *chü ketsü* (small-sized storage basket) of paddy = 10 *gakhropfe* (tied shut) = 50 *cienyü* = 800 kg.
1 *chüdo* (medium-sized storage basket) of paddy = 12 *gakhropfe* (tied shut) = 60 *cienyü* = 960 kg.
1 *chüdi* [26] (largest-sized storage basket) of paddy = 15 *gakhropfe* (tied shut) = 75 *cienyü* = 1200 kg.

Less Exact Measurements:
1 *piepua* [27] = refers to any full load, either a basket, sack, or shawl-load, carried by either man or woman

---

[17] Nestle Everyday Pure Ghee can - 1120 ml, used for measuring rice for cooking.

[18] labor wages for children and aged during earlier times

[19] labor wages for average laborer

[20] wages paid to herder for looking after 1 cow for 1 year

[21] labor wages for highest contributors

[22] older and larger type of *tin*

[23] Tsiesema style of old basket

[24] shawl-load

[25] 100 kg. sugar sack

[26] The rice storage baskets (*chükho, chüdi* and *chüdo*) are commonly known as *chünuo*. The names are derived from millet – *chütinuo*.

[27] An abbreviated name for *piepua* is *pie*.

MILLET (*chütinuo*) –
1 *thetsapuo* [28] = 3 kg., after threshing ⇒ 2 kg. of milled millet
1 *tsiese chükho* [29] = 14 kg., after threshing ⇒ 9.4 kg. of milled millet
1 *chüdo* (unthreshed) = 40 *chükho* ⇒ 560 kg. of threshed millet
1 *khodi* (unthreshed) = 7-8 kg. ⇒ 4 kg. of threshed millet

MAIZE (*süko*) –
- by the cob (*chüpuo*)
1 *khe puo* [30] = 14 cobs sticky maize – or 10 cobs of non-sticky maize
1 *khorü pie* [31] = 7 *khethenie* (plural of *khe puo*)

JOB'S TEARS (*kesi*) –
1 *rhapuo* [32] = 4 kg., with husks ⇒ 1.6 kg. after milling
1 *khodi* = 1.75 *rhapuo* = 7 kg. with husks ⇒ 2.8 kg. after milling

PULSES

SOYBEANS (*südza*) –
1 *thetsa* = 4 kg., after threshing
1 *khodi* = 6.5 *thetsa* = 26 kg., after threshing

RICE BEAN (*kerhü*) -
1 *khodi* ≅ 16-17 kg. (after threshing)

BULBS, ROOTS & TUBERS

SWEET POTATO (*dzümu*) -
1 *tsiese khorü* [33] = 20 kg.

POTATO (alu)*
1 *tsiese khorü* ≅ 20 kg.
* Since potato is a recent introduction to Tsiesema (about 1970), there were no traditional units of measurement and it is measured mainly by kg.

TARO (*dzünuo*):
1 *khropuo* [34] ≅ 4-5 kg.
1 *tsiese khorü* ≅ 15-16 kg.
1 *khorha* = 22 kg.

YAM (*rüphrie*) -
1 tsiese khorü = 20 kg.

CASSAVA (*sidzümu*) **-**
1 *phapuo* [35] ≅ 1 kg.
1 *tsiese khorü* ≅ 20 kg.

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[28] a double handful, formerly used as a rough measurement
[29] means 'Tsiesema style of millet basket'
[30] bundle of corn cobs (unhusked), usually hung nearby the fireplace
[31] a particular type of carrying basket used in Tsiesema
[32] general term for basket, may be any size, used as a container for rice
[33] Tsiesema-style *khorü*
[34] bundle of leaves
[35] bundle of tubers

CUCURBITS
CUCUMBER (*tsütuo*) – - by piece (*sipuo*) 1 *tsiese khorü* = 25 kg. 1 *khorha* = 30 kg.
PUMPKIN (*rümo* / *mungunuo*) - - by piece (*rümo sipuo*)
HERBS, SPICES & CONDIMENTS
CHILLI (*chüsi*) (small chilli) – 1 *thetsapuo* = 3 kg. (fresh) ⇒ 1 kg. (dry weight) 1 *merha* (average sized) = 5 kg. (fresh weight) 1 *thutseli* [36], filled level = 8-9 kg. (fresh weight) ⇒ 2.5 kg. (dry weight)
CHILLI (*raza*) (large chilli) – - by piece (*sipuo*) 1 *thetsapuo* = 1 kg. (fresh weight) ⇒ 0.5 kg. (dry weight) 1 *merha* (average sized) = 3 kg. (fresh weight) ⇒ 1.5 kg. (dry weight) 1 *thutseli* ≅ 3-4 kg. (fresh weight) ⇒ 1.5-2 kg. (dry weight)
GREENS & VEGETABLES
TOMATO (*bengenuo*) – 1 *gakhropfe ketsü* [37] ≅ 14-15 kg. 1 *tsiese khorü* ≅ 20+ kg.
FRUITS, NUTS & BERRIES
GUAVA (*meduram*) – - by piece (*sipuo*) 1 *gakhropfe ketsü* ≅ 14-15 kg. 1 *balati* [38] = 20 kg. 1 *tsiese khorü* = 22 kg.
ORANGES (*sühuo*) - - by piece (*sipuo*) 1 tsiese khorü = 16 kg.
PAPAYA (*kopita*) – - by piece (*sipuo*) 1 gakhropfe ketsü ≅ 14-15 kg.
BANANA (*thayie*) – - by piece (*sipuo*) - by bunch *(khrobuo*) 1 *tsiese khorü* (heaped) ≅ 11-12 bunches ≅ 14-16 kg.
POMELLO (*huolo*) - - by piece 1 *tsiese khorü* ≅ 10-12 pieces = 9 kg.
MANGO (*merosi*) – 1 *tsiese khorü* ≅ > 20 kg.

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[36] large *tin*, used currently

[37] small cement bag

[38] plastic bucket

SUGAR

SUGARCANE (*meke* / *ke*) –
- by piece (*kebo*)

FIREWOOD

1 *seitha* (*seipfe*) = 1 *chiepuo* width (w) x man's height (h) x 1 *sei repuo* (l)

DISTANCE, HEIGHT & AREA

DISTANCE:

1 *pfüpuo* = 1 handspan
1 *thupuo* = 1 forearm = 2 *pfükenie* (plural of *pfüpuo*)
1 *chierha* = 0.5 armspan
1 *chiepuo* = 1 armspan = 4 *thudia* (plural of *thupuo*)
1 *chiepuo di chierha* = 1.5 armspans
1 *phitsapuo* = 1 stride
1 *sei repuo* = 1 *da-u* [39] length
Longer distances were measured as (parts of) walking days.

HEIGHT:

height of a man – measured in *thupuo*

LAND AREA:

1 *lietsapuo* = area of standard-sized jhum field
1 *phechüpuo* = area of standard-sized house compound
size of jhum field = number of *cienyü* of rice seed planted
size of wet rice terrace = number of *thesula* [40] of rice seedlings planted

Land area was traditionally measured as length by breadth, using units of distance (above), but the 'acre' later became the standard unit after arrival of British administration.

INDIAN NUMERICAL SYSTEM:
1 *lakh* = 100,000
1 *crore* = 100 *lakh* (10,000,000)
10 *lakh* = 1,000,000
10 *crore* = 1,000,000,000

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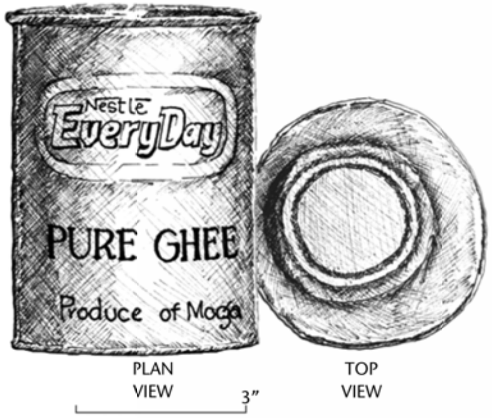
[39] field knife
[40] bundles

ILLUSTRATIONS
UNITS OF MEASUREMENT (MU) *
MU 2. Tsiesema System

MU 2.1 Cups and Cans

K - rhadono
T - sierkhu
code: MU 2.1.1

- condensed milk can used for measuring rice, perilla, Job's tears, millet, etc. when cooking; a Naga usually eats one of these full of rice for a meal, a Nepali only half

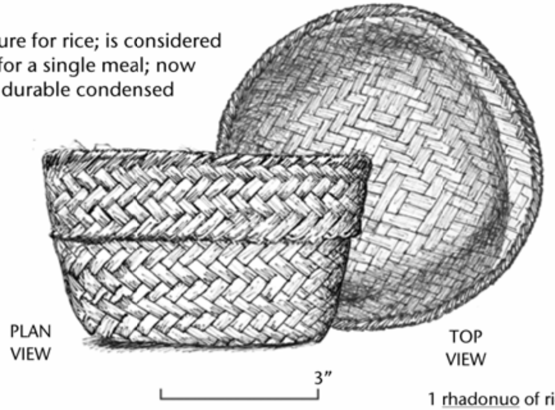


1 sierkhu of rice (heaped) ≅ 1 kg.

MU 2.2 Woven Trays

K -
T - rhadonuo
code: MU 2.2.1

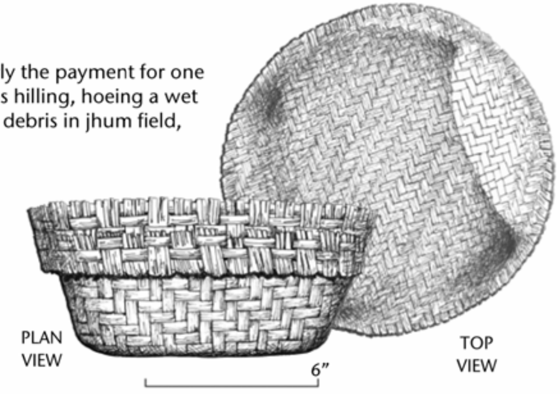
- used in kitchen as measure for rice; is considered sufficient for one person for a single meal; now widely replaced by more durable condensed milk cans (see MU 2.1.1)



1 rhadonuo of rice ≅ 0.5 kg.

K -
T - zharha
code: MU 2.2.2

- full of paddy, was formerly the payment for one day of lighter work, such as hilling, hoeing a wet field, cleaning up unburnt debris in jhum field, leveling soil, etc.



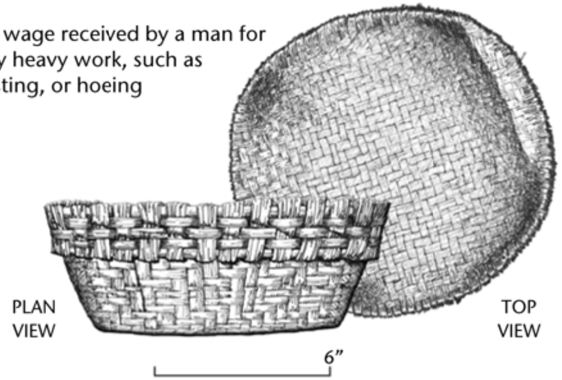
1 zarha of paddy ≅ 2 kg.

* See table for conversion rates.

MU 2. Tsiesema System
MU 2.2 Woven Trays

K -
T - thetsa
code: MU 2.2.3

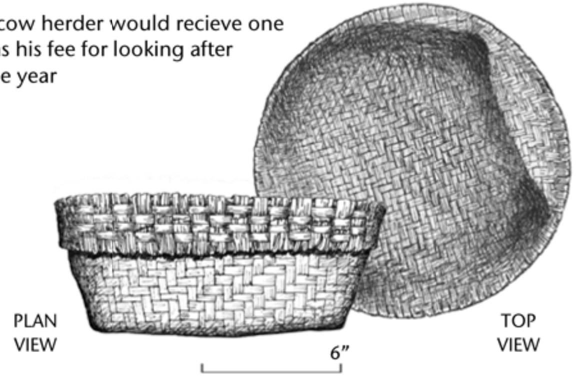
- full of paddy, was wage received by a man for one day of relatively heavy work, such as puddling, broadcasting, or hoeing jhum fields



1 thetsa of paddy ≅4 kg.

K -
T - thekho
code: MU 2.2.4

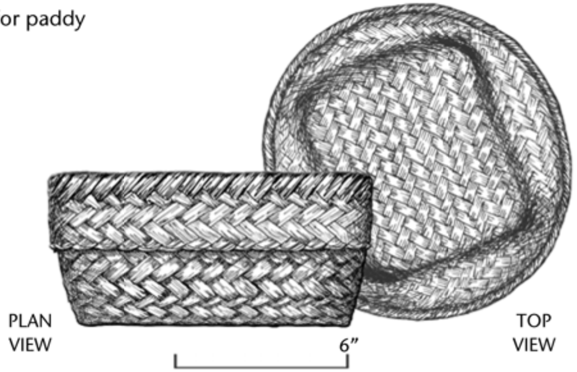
- in the past, a cow herder would recieve one thekho of rice as his fee for looking after one cow for one year



1 thekho of paddy ≅ 8 kg.

K -
T – rhadzü
code: MU 2.2.5

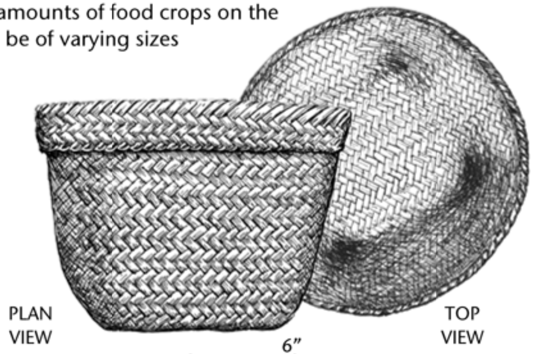
- measuring unit for paddy



1 rhadzü of paddy ≅ 16 kg.

K - merha
T - merha
code: MU 2.2.6 (7.2.1.3)

- storing small amounts of food crops on the short term; can be of varying sizes

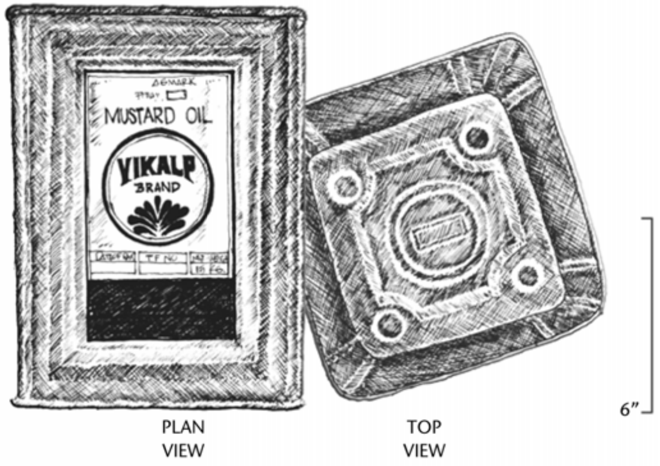


1 merha (average-sized) of chilli ≅ 5 kg. (fresh weight)

MU 2. Tsiesema System
MU 2.3 Tins

K - tinyü
T - cienyü / thuthseli kezha-u
code: MU 2.3.1 (7.2.2.3)

- older and slightly larger style of tin used for temporary storage of paddy, Job's tears, vegetables and general storage purposes; also used as a unit of measure

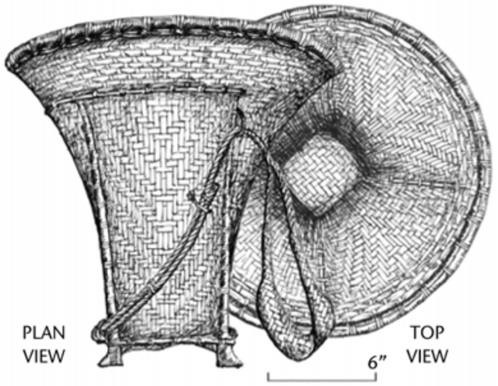


1 cienyü (larger style) of paddy ≅16 kg.

MU 2. Tsiesema System
MU 2.4 Baskets

K -
T - tsiese khodi (Tsiesema style of khodi)
code: MU 2.4.1(6.4)

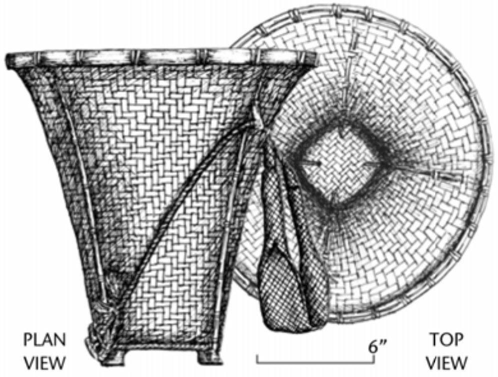
- carrying rice, Job's tears and millet; interchangeable with a dichie



1 tsiese khodi of paddy ≅ 32 kg.

K -
T - tsiese chükho
code: MU 2.4.2 (6.5)

- carrying millet

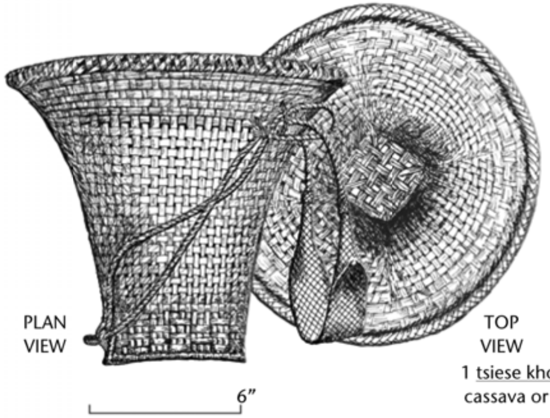


1 tsiese chükho of millet (unthreshed) ≅14 kg.

MU 2. Tsiesema System
MU 2.4 Baskets

K -
T - tsiese khorü
code: MU 2.4.3 (6.6)

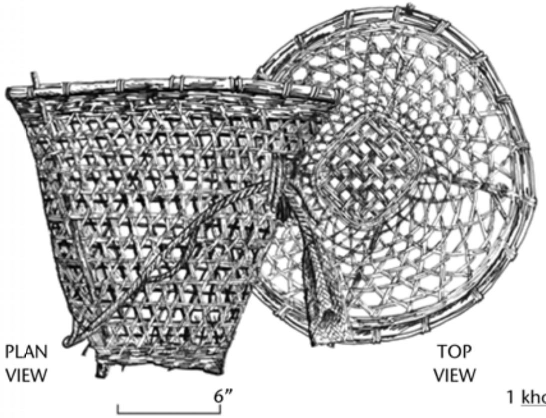
- means 'Tsiesema basket'; used for carrying heavy loads of fruit, root crops and vegetables



1 tsiese khorü of potato, sweet potato, cassava or yam ≅ 20 kg.

K -
T - khorha
code: MU 2.4.4 (6.9)

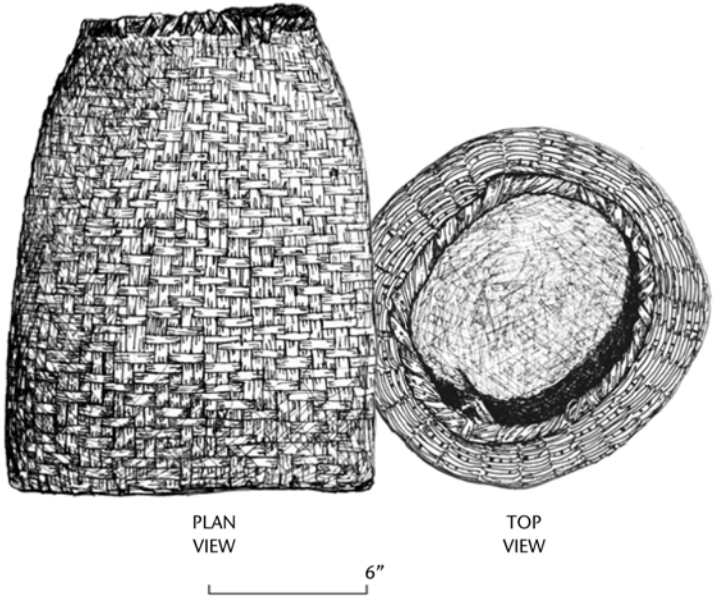
- for carrying firewood, vegetables and other heavy loads



1 khorha of taro ≅ 22 kg.

K - keprüchü
T - tsiachünuo
code: MU 2.4.5 (7.2.3.1)

- storing paddy, Job's tears or millet, for either eating or planting

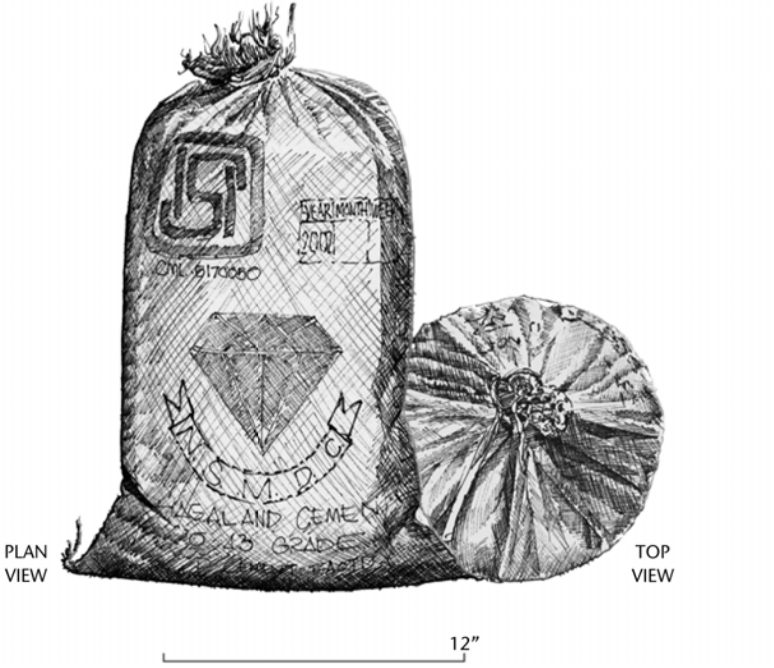


1 tsiachünuo of paddy ≅ 32 kg.

MU 2. Tsiesema System
MU 2.5 Sacks

K - ciment nhu
T - gakhropfe ketsü / ciment nhu
code: MU 2.5.1 (7.2.4.1)

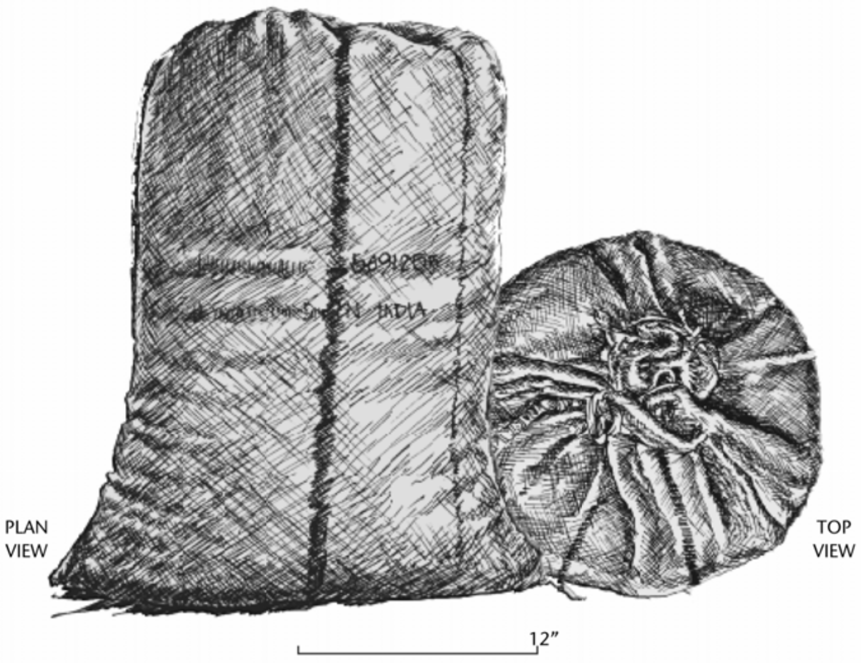
- cement sack, usually used for carrying tomato, guava or papaya to the Kohima market



1 gakhropfe ketsü of tomato, guava, or papaya ≅14-15 kg.

K - thula
T - gakhropfe tie kepha
code: MU 2.5.2 (7.2.4.2)

- carrying or storing paddy, potatoes, etc. (tied shut)

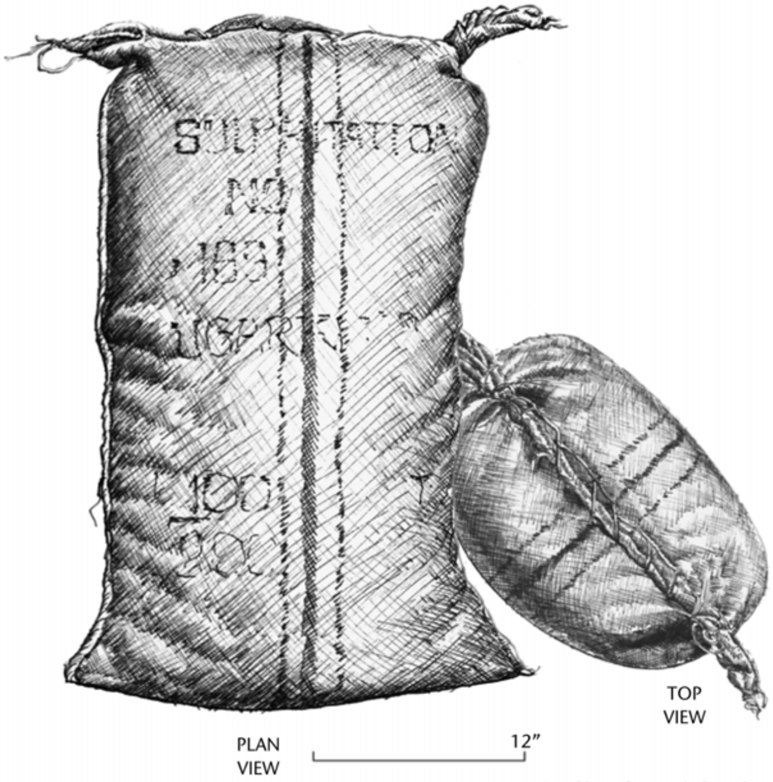


1gakhropfe tie kepha of paddy ≅ 80 kg.

MU 2. Tsiesema System
MU 2.5 Sacks

K - thula
T - gakhropfe puotie keterhü
code: MU 2.5.3 (7.2.4.4)

- large sack, usually used for storing paddy (stitched shut)

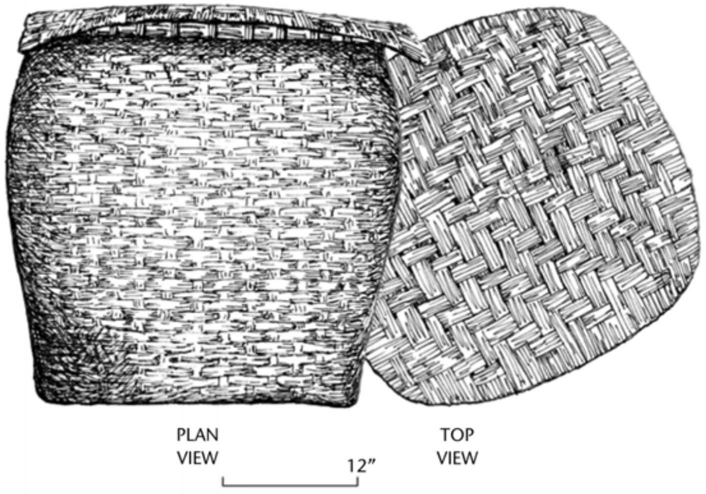


1 gakhropfe puotie keterhü of paddy ≅ 96 kg.

MU 2. Tsiesema System
MU 2.6 Larger Storage Containers

K - kepruchü
T - chü / chünuo
code: MU 2.6.1(7.2.5.1)

- large storage basket for paddy, Job's tears and millet, made from cane and split bamboo; unit of measurement

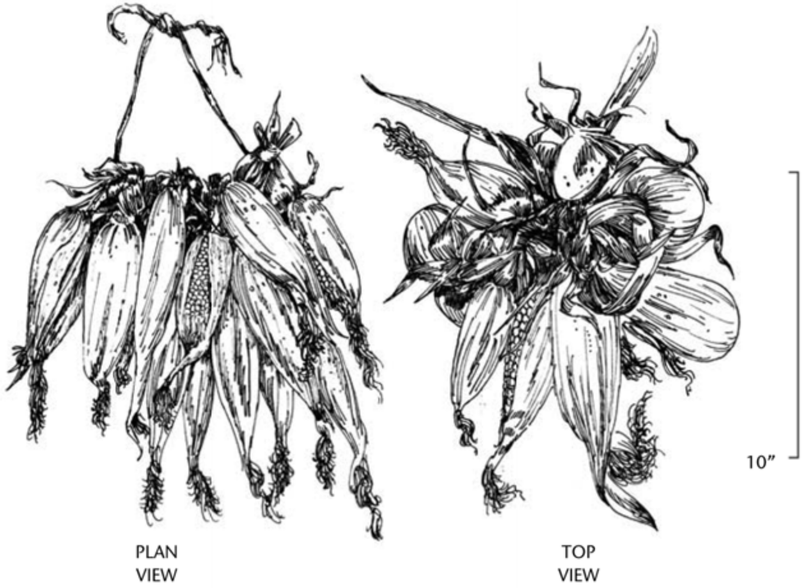


1 chü of paddy ≅800-1200 kg.
(depending on size)

MU 2. Tsiesema System
MU 2.7 Miscellaneous

K - khropo
T - süko khe puo
code: MU 2.7.1

- method for hanging maize from kitchen, near the fireplace

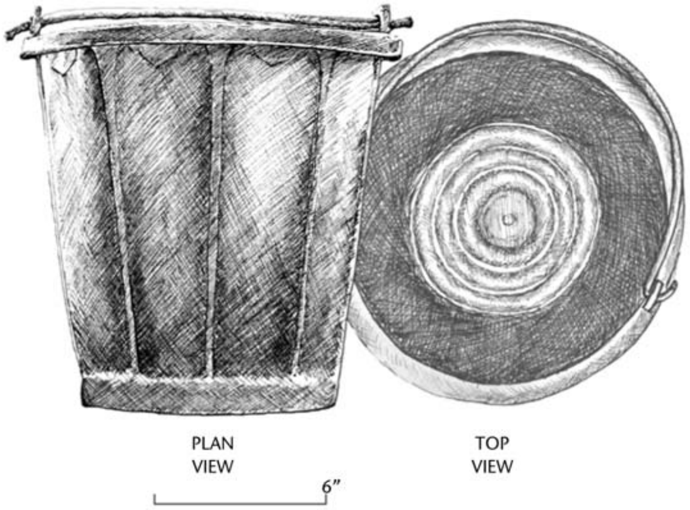


1 khe puo of maize ≅10-14 cobs (depending on whether glutinous or nonglutinous)

MU 2. Tsiesema System
MU 2.7 Miscellaneous

K -
T - balati
code: MU 2.7.2 (6.15)

- a more modern introduction, plastic buckets are now also used for carrying, measuring and storing crops



1 balati of guava ≅ 20 kg.

K -
T - kenhu
code: MU 2.7.3 (6.11)

- use of shawl to carry paddy back from the field, only by men (women use a kodi); not seen in Khonoma, where women do most of the carrying

1 kenhu of threshed paddy ≅ 32 kg.

APPENDIX 5-9. Crop Shrinkage Due to Processing *

Crop	Processing Losses		
	Threshing	Drying	Milling
CEREALS			
paddy	2/3 vol.	20% wt.	50% wt.
millet	50% wt.		35-40% wt.
Job's tears	†		60% wt.
HERBS, SPICES & CONDIMENTS			
chilli - small	-	70% wt.	-
chilli – Raja	-	50% wt.	-

* wt. = loss by weight
vol. = loss by volume

† Weight loss of Job's tears during threshing is unknown, since the weight is not originally measured.

‡ Maize is not milled, but often eaten directly from cob.

The entire soybean plant is usually uprooted, and of course not measured before threshing. Soybeans are not milled.

APPENDIX 5-10. Master List of Domesticated Plants in the Study Villages * ▫
(Based on Data from the Fields of Ten Farmers Monitored in Each Village)

Botanical Name	Common English Name	Life Form[§]	Khonoma					Tsiesema					Use Codes[‡]
			Local Name	JC[†]	RT[†]	PG[†]	KG[†]	Local Name	JC[†]	RT[†]	PG[†]	KG[†]	
ACANTHACEAE - Acanthus Family (1)													
Adhatoda vasica Nees	malbar nut	S	teise				X	tsiesenyü				X	M
ACTINIDIACEAE - Chinese Gooseberry Family (1)													
Actinidia chinensis Planch.	kiwi vine	V	kiwi vine				X						F
AMARANTHACEAE - Amaranth Family (1)													
Celosia argentea L.	Amaranth	H	nidza					niedza	X			X	FL
ANACARDIACEAE - Sumac Family (4)													
Mangifera indica L.	mango	T	merosi			X	X	merosi		X	X	X	F
Rhus sp.		T	sikhwü / sikwü				X						M, W
R. semialata Murray	nut-gall tree, Chinese gall	T	tsomhu				X	zomhou					WF
Spondias axillaris Roxb.	hog-plum	T	khula				X						WF
APIACEAE - Carrot Family (2)													
Coriandrum sativum L.	corriander	H	dunia	X	X	X		dhunia / dunia			X	X	S
Daucus carota subsp. *sativus* (L.) Schübl. & Mart.	carrot	H	carrot	X	X	X		carrot					R
ARACEAE - Arum Family (3)													
Alocasia macrorrhizos (L.) G. Don	elephant's-ear	H	dzüno	X	X			dzümo / thupele	X		X	X	R
Colocasia sp.	taro	H						dzüti			X	X	
C. esculenta (L.) Schott	taro	H	dzüno / dzuno	X	X	X	X	dzunuo / dzünuo	X		X	X	R

Botanical Name	Common English Name	Life Form§	Khonoma					Tsiesema					Use Codes‡
			Local Name	JC†	RT†	PG†	KG†	Local Name	JC†	RT†	PG†	KG†	
ASTERACEAE - Sunflower Family (2)													
Gynura sp.	velvet plants	H	lievino	X		X	X	lizienuo / liejieno			X	X	WV
Helichrysum bracteatum (Vent.) Andrews	straw flowers	H	leshü niepu	X				niepu					FL
BERBERIDACEAE - Barberry Family (1)													
Mahonia nepalensis DC.	barberry	S	nthoü				X	thuopu / ntho					M
BETULACEAE - Birch Family (1)													
Alnus nepalensis D. Don	Himalayan alder	T	rüpo / rüpu / rupou / rüpuo				X	rüpro			X	X	W
BORAGINACEAE - Borage Family (1)													
Cordia myxa L.	Assyrian plum, sebesten, Spear rod tree, Egyptian plum	T	chiemu					chiemu / chemu			X	X	WV
BRASSICACEAE - Mustard or Crucifer Family (5)													
Brassica campestris L.	mustard leaf	H	gakrie / gakre	X	X	X	X	gakrie / gakre	X		X	X	V
B. oleracea L. var. *capitata* L.	head cabbage	H	kobi	X		X	X	kobi	X		X	X	V
B. oleracea var. *caulorapa* DC.								kobi				X	
B. rapa L. subsp. *rapa*	turnip	H	turnip	X				turnip					R
Raphanus sativus L.	radish	H	mola	X		X		mula			X		R
BROMELIACEAE - Bromeliad Family (1)													
Ananas comosus (L.) Merr.	pineapple	H						anaras			X		F
CARICACEAE - Papaya Family (1)													
Carica papaya L.	papaya	T				X		kopita			X	X	F

Botanical Name	Common English Name	Life Form[§]	Khonoma					Tsiesema					Use Codes[‡]
			Local Name	JC[†]	RT[†]	PG[†]	KG[†]	Local Name	JC[†]	RT[†]	PG[†]	KG[†]	
COMBRETACEAE - Indian Almond Family (1)													
Terminalia myriocarpa Heurck & Mull. - Arg.	hollock	T	bicha	X			X	mecha			X		W
CONVOLVULACEAE - Morning-glory Family (1)													
Ipomoea batatas (L.) LmK.	sweet potato	V	phiemu	X		X		dzümu	X		X	X	R
CUCURBITACEAE - Cucumber or Cucurbit Family (7)													
Cucumis sativus L.	cucumber	V	tsüto	X	X	X		tsütuo	X		X	X	C
Cucurbita pepo L.	pumpkin	V	rümo	X	X	X		se rümo / mungunuo	X		X	X	C
Lagenaria siceraria (Molina) Standl.	bottle gourd	V	mekhwü	X				mesü	X				C
L. vulgaris Ser.	gourd	V						meshü	X		X	X	
Luffa cylindrica (L.) M. Roem.	sponge gourd	V	pfüchü					pfüshü	X		X	X	C
Momordica charantia L.	balsam pear, leprosy pear, leprosy gourd, bitter gourd, bitter cucumber	V	kerila / kerela	X				keriela	X		X	X	C
Sechium edule (Jacq.) Swartz	chayote squash, chow-chow, alligator pear, vegetable pear	V	kulukushü / squash	X	X	X	X	eskush			X	X	C
DIOSCOREACEAE - Yam Family (1)													
Dioscorea sp.	yam	V	tsüpie	X				rüphrie / rüphie	X		X	X	R
ELAEAGNACEAE - Oleaster Family (1)													
Elaeagnus conferta Roxb.		T	peshü			X	X	peshü			X	X	F

Botanical Name	Common English Name	Life Form[§]	Khonoma					Tsiesema					Use Codes[‡]
			Local Name	JC[†]	RT[†]	PG[†]	KG[†]	Local Name	JC[†]	RT[†]	PG[†]	KG[†]	
EUPHORBIACEAE - Spurge Family (6)													
Antidesma sp.			neirhünyü				X						WV
Bischofia javanica Blume	bishop wood	T						meliesi			X		W
Emblica officinalis Gaertn.	wild gooseberry	T	khulhu					chiehu / ciehusi / ciehuhuse / chehu	X		X	X	WF
Hevea brasiliensis (Willd. ex A. Juss.) Mull. - Arg.	para rubber	T	ketsa					ketsa / priegei				X	Q
Manihot esculenta Crantz	tapioca / cassava	H						sidzümu	X		X		R
Ricinus communis L.	castor oil plant	S	luluca					luca / lutsa				X	M
FABACEAE - Bean Family (16)													
Albizia stipulata (DC.) Boivin	Black Siris	T	mego				X	mego / mago					W
A. lebbeck (L.) Benth.	East Indian walnut, black siris	T						ze			X		W
Arachis hypogaea L.	groundnut	H	badam	X				budam					F
Bauhinia variegata L.	mountain ebony	T	tego					teguo				X	WV
Cajanus cajan (L.) Millsp.	pigeon pea	S	dali	X		X		dali			X		P
Dolichos lablab L.	hycianth bean	V	cüba	X		X	X	rütsü / tsüdu	X		X	X	P
Erythrina indica Lam.	Indian coral tree	T	heto					hutuopu / hutuo			X		W
Glycine max (L.) Merr.	soybean	H	südza	X	X			südza / shüdza	X		X		P
Mucuna pruriens (L.) DC.	velvet bean	V	cüprie	X	X			rütsü					P
Parkia roxburghii G. Don	tree bean, yongchak	T	teiquebi / thepfibi			X	X	thepfibi / thepfica			X	X	P
Phaseolus vulgaris L.	french / kidney bean	V	kecüprei	X	X	X		rütsü	X		X	X	P
Pisum sativum L.	peas	V	motor	X	X	X		motor			X		P
Psophocarpus tetragonolobus (L.) DC.	winged beans	V	suru					kediatsü				X	P

Botanical Name	Common English Name	Life Form[§]	Khonoma					Tsiesema					Use Codes[‡]
			Local Name	JC[†]	RT[†]	PG[†]	KG[†]	Local Name	JC[†]	RT[†]	PG[†]	KG[†]	
Vicia faba L.	broad bean	V	tsüprie / miakrümia tsüprie			X							P
Vigna umbellata (Thunb.) Ohwi & H. Ohashi	rice bean	V	kerhü	X	X	X		kerhü	X				P
V. unguiculata (L.) Walp.	cow pea	V	boti					boti	X		X	X	P
FAGACEAE - Beech Family (2)													
Quercus pachyphylla Kurz	red oak	T	pedu					pedusei / pedusi			X		W
Q. serrata Thunb.	white oak	T	phie / phrie				X	phrie / phre			X	X	W
GINKGOACEAE - Maidenhair Tree Family (1)													
Ginkgo biloba L.	maidenhair	T	maiden hair				X						M
JUGLANDACEAE - Walnut Family (1)													
Juglans regia L.	walnut	T	khwüsi					pfüsi / pfhü / mewe			X		F
LAMIACEAE - Mint Family (5)													
Anisochilus carnosus (L.f.) Bth.	thick-leaved lavender	H	nimhvü	X				nienyhü	X				S
Mentha spicata L.	spearmint	H	tephinitso				X	bedinuo				X	S
Ocimum basilicum L.	sweet basil	H	nitso	X				nietso / nhietso	X			X	
Perilla ocymoides L.	perella, beefsteak plant	H	kenie	X				kenie / kenia	X			X	S
Pogostemon sp.		H	khamhvü / khamyhü				X	tepfürünu					WV

Botanical Name	Common English Name	Life Form[§]	Khonoma					Tsiesema					Use Codes[‡]
			Local Name	JC[†]	RT[†]	PG[†]	KG[†]	Local Name	JC[†]	RT[†]	PG[†]	KG[†]	
LAURACEAE - Laurel Family (3)													
Cinnamomum pauciflorum Nees	tejpat	T						tespata				X	S
C. zeylanicum Blume	tezput, cinnamon	T	chüri					seichü				X	S
Litsea citrata Blume	tropical verbena, May Chang	T	tsi / chi / cie					chi				X	W
LILIACEAE - Lily Family (5)													
Allium cepa L.	onion	H	piezü	X		X		piezü	X				R
A. cepa L. var. *perutile*	ever-ready onion	H	chümeria / chümerienyü	X	X	X		chümerie					R
A. fistulosum Linn		H	samara	X									
A. porrum L.	leek; purret; poro; pearl onion	H	solie / solia	X	X	X		süla / shüla			X	X	R
A. sativum L.	garlic	H	khuovie / samara	X	X	X		khuvie	X		X		R
LOGANIACEAE - Butterfly-bush Family (1)													
Buddleja paniculata Wall.	butterfly bush	T	teisü / teizu / teizü / teishü / teidzü / temepfü				X	teizhü				X	W
MALVACEAE - Mallow Family (3)													
Hibiscus sabdariffa L.	Rozelle plant / Monarch Rosemallow	S	gakhie					gakhro / gakhro memerie (red)	X		X	X	V
H. syriacus L.		S	sohenothe				X						
Kydia calycina Roxb.	Roxburgh's Kydia, pula	T	kerunyie / thezumhiku / kerunyu / keruny					kerunyü / kerünyü			X		M
MELASTOMATACEAE - Melastome Family (1)													
Osbeckia sp.		S	khukhe / kukhie				X	kukhe					M

Botanical Name	Common English Name	Life Form[§]	Khonoma					Tsiesema					Use Codes[‡]
			Local Name	JC[†]	RT[†]	PG[†]	KG[†]	Local Name	JC[†]	RT[†]	PG[†]	KG[†]	
MELIACEAE - Mahogany Family (2)													
Cedrela serrata Royle	hill toona	T	zuna					zuna				X	W
Melia azederach L.	lilac, ghora neem	T	khusia / khusie				X	khousie / khusia			X		W
MORACEAE - Mulberry Family (7)													
Artocarpus heterophyllus LmK.	jack fruit	T						kothal / thatshu			X		F
Ficus sp.	fig	T	chede (exotic)				X						F
Ficus sp.	fig	T						liho				X	
Ficus sp.	fig	T						bugu				X	W
F. auriculata Lour.	roxburg fig, giant Indian fig, elephant ear fig	T	chedi / chiede				X	chiede / chede				X	WF
F. elastica Roxb.	rubber tree	T	neikhupi / niakhupri					prigi / pregei / priegi / leiteitsasei			X	X	Q
Morus nigra L.	mulberry	S	khagunwthe				X	khravü				X	WV
MUSACEAE - Banana Family (4)													
Musa sp.	banana	H	khwekreno			X	X	pfengu				X	F
Musa sp.	banana	H						chüpfe				X	F
M. paradisiaca L.	banana	H	tekhwesi / tekwhesi / thayie	X		X	X	thayie		X	X	X	F
M. rosacea Jacq.	Flowering Rose Banana, Ornamental banana, Flowering banana	T	tekhwüno / tsiekwenyü / tiekwenyu / tekhwe				X	tepferhü, pfetho ('the real' leaf)				X	F
MYRSINACEAE - Myrsine Family (1)													
Ardisia crenata Sims		S	soda / sodai				X	Christmas niepu					

Botanical Name	Common English Name	Life Form[§]	Khonoma					Tsiesema					Use Codes[‡]
			Local Name	JC[†]	RT[†]	PG[†]	KG[†]	Local Name	JC[†]	RT[†]	PG[†]	KG[†]	
MYRTACEAE - Myrtle Family (1)													
Psidium guajava L.	guava	T	moduram			X	X	moduram		X	X	X	F
PASSIFLORACEAE - Passion-flower Family (1)													
Passiflora edulis Sims	passion fruit	V	bell	X		X	X	bell	X		X	X	F
PINACEAE - Pine Family (1)													
Pinus khasya Royle ex Hook. f.	Khasia Pine, Benguet Pine	T	tehu				X	tehou			X		W
PLANTAGINACEAE - Plantain Family (1)													
Plantago major L.		H	gapa					gapa				X	WV
POACEAE - Grass Family (11)													
Arundinaria sp.	bamboo	G	jüpfü / jhepfü				X	jüpfü / jülei					H
Bambusa sp.	bamboo	G	kipha				X						H
Coix lacryma-jobi L.	Job's tears	G	kesi	X	X			kesi / kesie	X		X	X	G
Dendrocalamus hamiltonii Nees & Arn. ex Munro	Magar bamboo, kako bamboo, tufted bamboo	G	kevü				X	kevü				X	H
Oryza sativa L.	rice	G	telha	X	X			telha	X	X			G
Phyllostachys mannii Gamble	bamboo	G	jhülithe				X						H
Saccharum officinarum L.	sugarcane	G	nukrücha			X	X	meke / ke	X		X	X	SU
Setaria italica (L.) P. Beauv.	foxtail millet	G	sü	X				chütinuo					G
Sinarundinaria nagalandiana H.B. Naithani	bamboo	G	kerie					kerie			X		H
Triticum aestivum L.	bread wheat	G	zohu		X								G
Zea mays L.	sweet corn / maize	G	zarosi / zarusi	X	X	X		süko / shüko	X	X	X	X	G

Botanical Name	Common English Name	Life Form[§]	Khonoma					Tsiesema					Use Codes[‡]
			Local Name	JC[†]	RT[†]	PG[†]	KG[†]	Local Name	JC[†]	RT[†]	PG[†]	KG[†]	
POLYGONACEAE - Buckwheat Family (3)													
Fagopyrum cymosum (Trevir.) Meisn.	perennial buckwheat	H	gari / garai / gare				X	gari / garei				X	WV
Polygonum chinense L.	Chinese knotweed, smartweed, red bush	H	gare , ketsa gare				X	gare				X	WV
P. plebeium R. Br.	small knotweed	H	gagi /gagei / gagie				X	gazie					WV
PROTEACEAE - Protea Family (1)													
Grevillea robusta A. Cunn. ex R. Br.	silver oak	T	seivuro				X	seivüro					W
RHAMNACEAE - Buckthorn Family (2)													
Hovenia dulcis Thunb.	Indian coral tree / Japanese Raisin Tree	T	kipia / kipie / kiapie				X	shisiasi / ciepie				X	W
Zizyphus incurva Roxb.			khroge				X	khrogei					WF
ROSACEAE - Rose Family (5)													
Docynia indica (Wall.) Decne.	Indian crab apple	T	kipho				X	ciepho					F
Prunus avium (L.) L.	cherry	T	pezie / kevi	X			X	pezie / kezie			X	X	F
P. domestica L.	plum	T	plum			X	X	plum			X	X	F
P. persica (L.) Batsch	peach	T	zarsi / zorüsi			X	X	ciehumekrü / chehumakrhü		X	X	X	F
Pyrus communis L.	pear	T	naspati					naspati				X	F
RUBIACEAE - Madder Family (1)													
Coffea arabica L.	coffee	T					X	cofee				X	B
RUTACEAE - Rue Family (6)													
Citrus aurantium cv. *chinotto*	orange (sour)	T						sühuo kekhro-u / sehu kekro-u			X	X	F

Botanical Name	Common English Name	Life Form§	Khonoma					Tsiesema					Use Codes‡
			Local Name	JC†	RT†	PG†	KG†	Local Name	JC†	RT†	PG†	KG†	
C. limon (L.) Osb.	lemon	T	shüpfü kekro-u			X	X	nhashüho			X	X	F
C. maxima (Burm. ex Rumph.) Merr.	pomello / shaddock	T	chüho			X	X	huolo / hulo		X	X	X	F
C. reticulata Blanco	mandarin	T				X		shüpfü / sehu kemu-u			X		F
C. sinensis (L.) Osbeck	sweet orange	T						sehu		X	X	X	
Zanthoxylum acanthopodium DC.	Sumatran Andaliman, mechinga, lemon pepper	T	ganyanyü / ganya				X	mechinga / ganya / ganyanyü / gangasi				X	S
SAPINDACEAE - Soapberry Family (2)													
Litchi chinensis Sonn. ssp. *chinensis*	litchi	T						lechu			X		F
Sapindus rarak DC.	soap nut tree	T	khulhucü / khulucü	X				khurchisi / khurüciesi / khurciesi					M
SAXIFRAGACEAE - Saxifrage Family (1)													
Bergenia stracheyi (Hook. f. & Thomson) Engl.		H	tsiekha / tsiekha daru				X						M
SOLANACEAE - Potato Family (12)													
Capsicum sp.	king chilli	H	raja chüsi						X	X			
C. frutescens L.	chilli	H	chüsi	X	X	X	X	chüsi	X		X	X	S
Cyphomandra betacea (Cav.) Sendtn.	tree tomato	T	seikhwüdi	X		X	X	seibenganuo / sibienyienuo	X		X	X	V
Datura meteloides Dunal	angel's trumpet	S	mekriteise / mekrietise / mekritise				X	lalhopu / lalho					M
Lycopersicon esculentum Mill.	tomato	H	bienyieno	X		X	X	bengenuo / bienyienuo	X	X	X	X	V

Botanical Name	Common English Name	Life Form§	Khonoma					Tsiesema					Use Codes‡
			Local Name	JC†	RT†	PG†	KG†	Local Name	JC†	RT†	PG†	KG†	
Physalis minima L.	pygmy groundcherry	H	kedicahu / kedichahu / thuti					betelenuo / betelnuo			X	X	F
Solanum sp.		H	kepfü / kepfü kezha-u / kipfü	X	X	X	X				X	X	V
S. barbisetum Nees	bitter brinjal	H	kikhwü	X				chipfü / ciepfü	X				V
S. kurzii Prain		H	kipfü ketsü-u / kikhwu kecu-u / kikhwü kecü-u					ciepfu ketsü / ciepfu ketsü-u / kepfü ketsü	X		X	X	M
S. melongena L.	brinjal	H	khwüdi	X	X		X	pfüdi	X		X		V
S. spirale Roxb.		H	zierüprü / zarüpre / zierprü				X	zierprü / zierüprü				X	V
S. tuberosum L.	potato	H	kelu	X	X	X		alu	X		X	X	R
TAXODIACEAE - Bald Cypress Family (1)													
Cryptomeria japonica (Thunb. ex L. f.) D. Don	Japanese cedar	T	tehu				X	tehu				X	W
THEACEAE - Tea Family (2)													
Camellia sinensis (L.) O.K. var. *assamica* (Mast.) Kita	tea	T	sichanyü	X			X						B
Schima wallichii Choisy	neddle tree	T	mashie / mechie				X	mecho / macho			X	X	W
URTICACEAE - Nettle Family (1)													
Elatostema cyrtandrifolium (Zoll. & Moritzi) Miq.			gajie					gajie / gajo				X	WV
VERBENACEAE - Verbena Family (3)													
Callicarpa indica	beautyberry / beautybush	T						sotsü			X		W
Clerodendrum colebrookianum Walp.			gatherü				X	gathera / gathere / gatherie				X	WV

Botanical Name	Common English Name	Life Form[§]	Khonoma					Tsiesema					Use Codes[‡]
			Local Name	JC[†]	RT[†]	PG[†]	KG[†]	Local Name	JC[†]	RT[†]	PG[†]	KG[†]	
Gmelina arborea Roxb. ex Sm.	gumbhar / gomari	T	thogwü / thoguü				X	thobvü / thovü			X		W
VITACEAE - Grape Family (1)													
Vitis vinifera L.	grape	V	khube				X	khube				X	F
ZINGIBERACEAE - Ginger Family (6)													
Alpinia sp.		H	sokrüno				X	sokrünyü				X	H
Amomum subulatum Roxb.	large cardamom	H	eliachi	X			X	elechie					S
Costus speciosus (J. König) Sm.	wild ginger, Malay ginger, crepe ginger	H	khwünothi / khwnothi				X	kevicharü					M
Curcuma aromatica Salisb.		H	khukhwü / haldi				X						M
C. longa L.	turmeric	H	kotsievü	X				ciesi / ciecie / chietei					S
Zingiber officinale Rosc.	common ginger, cooking ginger	H	kevü	X	X	X	X	kevü	X		X	X	S
UNIDENTIFIED (2)													
unidentified (wild fruit)		T						seiti / seitei / seiteisi			X		WF
unidentified (firewood)		T						thenyie				X	W

[*] n = 10 farmers / village

[□] study villages = Khonoma Village, Tsiesema Village, both of Kohima District

[§] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), F (fern), and M (mushroom)

[†] Field Types: JC (jhum cultivation), RT (rice terraces), PG (permanent gardens), KG (kitchen gardens)

[‡] Use Codes: V (vegetable), F (edible fruit), D (beverage), O (oil), S (spice), M (medicine), T (timber), C (housing), H (handicrafts), (fiber), P (pig fodder), I (shellac insect host)

APPENDIX 5-11. Cultivars Planted by Ten Collaborating Farmers in Khonoma

***Oryza sativa* L. – Rice (telha)**

LOCAL NAME	COLOR		FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
	husk	*grain*								
NON-GLUTINOUS										
Ketsarü	white	white	WRT, J	traditional	tolerant of cold forestal areas	large-grained, tall plant	K1, K8	medium	colder areas	7,9
Kezi	brown-red	white	J	Socünoma Village	'early', referring to harvest	small-grained, short plant	K1, K8	short	warmer areas	9
Khenu	black & white	white		Secüma Village		large-grained, tall plant	K5, K8	medium	warmer areas	6,9
Abor	red	red	WRT	Arunachal Pradesh	seeds obtained during 1911-1912 Abor war	medium-grained, tall plant	K1, K3, K8, A6	medium	colder areas	2,4,7,8
Rosolha	red	red		outside		large-grained with roundish shape, plant of medium height	K1, K8, A2	medium	adaptable to either cold or warm areas	1,6,7,8,10
Thevürü Kecü-u	yellow	red		traditional	small variety of *Thevürü*	small-grained, short plant height	K1, K8, A2	short	colder areas	4,6,9,10
Thevürü Kezha-u	yellow	red		traditional	big variety of *Thevürü*	large-grained, tall plant	K1, A2	medium	adaptable to either cold or warm areas	1,3,6,7,8,
Tsorienyü	red	red		traditional		large-grained, tall plant	K1, K8	long	warmer areas	3,6,9,10
Mekrielha	black & white	white		Manipur	'Manipur rice', referring to origin	small-grained, plant of medium height	K1, K8	medium	warmer areas	10
Ngoca	white	white		traditional	refers to white color	medium-grained, tall plant	K1, K8	short	warmer areas	4,7
Nyoba	yellow	white		traditional	plant's short stature	large-grained, short plant	K1, K8	long	warmer areas	6,10
Tekhwerü	yellow	white		traditional	cold tolerance	large-grained, tall plant	K1, K2, A6	long	colder areas	3,4,5,7,8,10
Thevürü Pfürüko Vürü Kezha-u	yellow	white		traditional	variety brought by *Pfürüko*	large-grained, tall plant	K1, K8, A2	medium	warmer areas	5

GLUTINOUS										
Chünyinonya	yellow	white	WRT, J	traditional	variety brought by *Chünyino*	medium-grained, tall plant	K1, K2, K8	medium	adaptable to either colder or warmer areas	6,7,10
Dzükunya	red	white	WRT	traditional	cold tolerance	large-grained, tall plant	K1, K5, K8	medium	colder areas	2,3,4,6,8,9,10
Kemenya Nyapie	white	white		traditional	'sticky white' rice	large-grained, tall plant	K8	long	warmer areas	9
Kenonya	yellow	white		Zeliang area	'Zeliang area sticky' rice	large-grained, tall plant	K1, K5, K8	long	warmer areas	3,5
Krumiavi Nya	yellow	white		outside	name of person who introduced it	medium-grained, tall plant	K1, K5, K8	medium	warmer areas	7
Nyabu	yellow	white		southern area	'sticky short' rice	large-grained, tall plant similar to *Tsorienyü*	K1, K5, K8	long	warmer areas	6,10
Rhieninya	white	white		traditional	variety brought by *Rhieninya*	large-grained, tall plant	K5, K8	long	warmer areas	1

† J = jhum field; WRT = wet rice terrace

* Refer to '*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

Zea mays L. - Maize (zarosi)

LOCAL NAME	COLOR (*grain*)	FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
NON-GLUTINOUS									
Zarüsi Kerie-u	white	WRT, J	traditional	refers to early harvest	mid-sized cobs, short plant	K1, A2	short	adaptable to either colder or warmer areas	3,7,8
Zarüsi Keno-u	red		traditional	'maize late', referring to harvest	large cobs, tall plant	K1	medium	adaptable to either colder or warmer areas	7
Zarüsi Sitho			traditional	'non-sticky maize'	large cobs, tall plant	K1	short	colder areas	1,2,5,6,10
Kelhule- ü Zarüsi	white & red	J	Sema area	woman who introduced it	tall plant with long cobs	K1	long	colder areas	3,8
Zarüsi Menyakemo-u	white & black		traditional	'non-sticky maize'	large cobs, tall plant	K1	medium	colder areas	4

GLUTINOUS									
Khrüse Zarüsi	red	J	traditional	can harvest within 3 months	short plant with mid-sized cobs	K1, A2	short	warmer areas	9
Zarüsi Kemenya-u	white		traditional	'sticky maize'	short plant with small cobs	K1	long	adaptable to either colder or warmer areas	4
Zarüsi Sinya	black & white		outside	'sticky maize'	mid-sized cobs	K1	medium	adaptable to either colder or warmer areas	1,2,9,10
Se Zarüsi			Sema area	reference to origin in Sema area	short plant with mid-sized cobs	K1	long	warmer areas	6

[†] J = jhum field; WRT = wet rice terrace
* Refer to 'Farmer Criteria in Selecting Crop Cultivars' in appendix 5-13.

Glycine max (L.) Merr. - Soybean (südza)

LOCAL NAME	COLOR (*bean*)	FIELD TYPE[†]	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
Kelhule-ü Süza	yellow	WRT, J	Sema area	name of person who introduced it	large pods, medium-sized plants	K1, K5, A2	short	colder areas	1,2,3,4,6,7,8, 9, 10

[†] J = jhum field; WRT = wet rice terrace
* Refer to '*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

Coix lacryma-jobi L. - Job's Tears (kesi)

LOCAL NAME	COLOR (*grain*)	FIELD TYPE[†]	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
NON-GLUTINOUS									
Kesi Burü	white	J	traditional	'Job's tears, round and big' referring to seeds	mid-sized panicle, tall plant, seeds easy to grind	K1	medium	colder areas	1
Kesi	white		traditional		large panicles, tall plant	E2	short	colder areas	7
Mezomia Kesitsie	white & red		Mezoma Village	village of origin	mid-sized panicle, tall plant	E2	medium	colder areas	3
GLUTINOUS									
Kesi Sinya / Kesi Kemenya	black	WRT, J	traditional	reference to sticky	short plant with small panicles	K1, K5, K8	long	adaptable to either colder or warmer areas	2,3,5,6,7,8,9, 10

[†] J = jhum field; WRT = wet rice terrace
* Refer to '*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

***Setaria italica* (L.) P. Beauv. - Millet (sütieno)**

LOCAL NAME	COLOR (*grain*)	FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
GLUTINOUS									
Luümia Sü	black	J	Zeliang area	'Zeliang millet'	tall plant with large panicles	K1	medium	adaptable to either colder or warmer areas	1
Zhüpie	red		traditional	refers to early harvest	tall plant with large panicles	K1, K5, A2	short	colder areas	1,3,5,7,8,10
Sühe / Süse	yellow		traditional		tall plant with large panicles	K1, K5, A2	short - medium	colder areas	1,2,3,4,5,7,8,10

† J = jhum field; WRT = wet rice terrace
* Refer to '*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

***Solanum tuberosum* L. - Potato (kelu)**

LOCAL NAME	COLOR (*tuber*)	FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
Kelu Keca-u	white	WRT, J	Simla	'white potato'	large tubers	K1, E1	medium	colder areas	1,2,3,4,5,6,7,8, 10
Kelu Kemeri	red		traditional	'red potato'	smaller tubers	K1	medium	colder areas	2,3,4,7,8,9,10
Zapuphizo Kelu	red		England	'Phizo's potato'	large tubers	K1	medium	colder areas	5,8

† J = jhum field; WRT = wet rice terrace
* Refer to '*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

APPENDIX 5-12. Cultivars Planted by Ten Collaborating Farmers in Tsiesema

***Oryza sativa* L. - Rice (telha)**

LOCAL NAME	COLOR		FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
	husk	*grain*								
NON-GLUTINOUS										
Rengma Lha	yellow	white	WRT, J	Rengma area	seed was brought by a Rengma lady	tall sturdy plant, that produces high yields	K1, K4, A1, A2`	short - medium	adaptable – but performs best in warmer areas, demands sufficient water	2,5,7,8,9
Khokhrienuo	maroon& yellow	white	J	traditional		short, strong plant	K8, S1	medium	hotter areas with good soil moisture; fields cleared from bamboo fallow	1,7
Khourü	yellow	white		traditional	named after its founder	short-stemmed, planted late but quick-maturing	A2	short	colder areas	7
Lakarü	brown	white		traditional		tall-stemmed, vulnerable to lodging	A1	long	colder areas	1
Lhatei- ü (Mezarü)	black	red		Zeliang area	black husk (named after Mezarüü Village where it is thought to have originated)	tall plant, reddish-colored stem, vulnerable to lodging, long panicle	K1, A1, A3, A10, S1	long	colder areas	2,4,5,6,9,10
Mepfhürü	yellow	red		traditional	original seeds believed to have been taken from a gourd	tallest variety grown in jhum fields, subject to lodging, long panicle	K1, K4, K5, K6, A1, A4	medium- long	warmer areas with thick soils	1,2,4,6,7,8,9
Neikuolieke	yellow	white		traditional	named after its founder	short, thick-stemmed	A5	medium	colder areas	6

LOCAL NAME	COLOR		FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
	husk	*grain*								
Rüyha-ü	maroon	white		traditional	Ruha-o, who introduced it to this area		K4, K5, S1	long	warmer areas with thick soil	4,6
Thethirü	yellow	white		Zeliang area	ability to grow in less fertile fields	short plant, resistant to lodging, small panicles	K1, A2, A9, S1	short-medium	warmer areas with thick soil	1,2,3,6,10
Kekhrielha	yellow	white	WRT	Kiruphema Village	*'love paddy'* – thought to be gifted by God to show his love	short plant with strong stem that resists lodging, prolific tillering	K1, K4, A1, A2, A4, A5, S1	long	warmer areas with sufficient water	2,4,6,7,8
Lhadzüno Kekra-u	red	white		short white rice		short plant with high yields	A2	short	warmer areas	1
Lhadzünuo	yellow	red		introduced from outside, possibly Assam plains	seed selected by farmer named Lhadzünuo	short-stemmed variety that resists lodging and tillers well, good yields	K4, A1, A2, A5, A6, A8	short	adaptable to warmer or colder areas	1,2,3,4,5,7,8,9,10
Mekrülha	yellow	white	WRT	Manipur	reference to Mekrüma area as its origin	tall variety that lodges easily, little tillering	K1, K4, A7, S1	long	warmer areas	2,7,9,10
Nagaland Special	red	white		Dimapur area	preferred variety among those supplied by Government	tall variety, with small stem diameter	K1	long	warmer areas	10
Thevürü	yellow	red		Zeliang area	story that describes the seed being retrieved from crop of a slaughtered chicken	tall plant with small stem diameter, long panicle, good tillering	A1, A2, S1	short	colder areas	1,5,6,10
Tsamorü	brown	red		Chüzie Village		strong-stemmed	K7	long	warmer areas	1
Zeliang Lha	brown	red		Zeliang area	its origin in Zeliang area	tall plant with strong stem, long panicle	K4, S1	long	warmer areas	7,8,10

LOCAL NAME	COLOR		FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
	husk	*grain*								
Zoehülha	red	white		Jotsoma Village	named after village thought to be its original source	strong-stemmed, good tillering	K4	long	hottest areas	6
GLUTINOUS										
Menuolie Nga	yellow	white	WRT	Chakhesang area	after Menuolie, who introduced it	thick-stemmed variety, with few tillers, large panicles	K8, A5, E1	long	warmer areas with sufficient water	1,2,4,6,7,8,9, 10
Kemenga	yellow	white				short-stemmed, with strong tillering	E1	medium	warmer areas	3

† J = jhum field; WRT = wet rice terrace

* Refer to "*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

Zea mays L. - Maize (süko)

LOCAL NAME	COLOR (*grain*)	FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
NON-GLUTINOUS									
Kotho	multi-colored	J	traditional	the '*first maize*', referring to its early harvest	tall plant, sometimes vulnerable to lodging, produces 1-2 large cobs	K9, A2, E2	short	black soils in colder areas	1,2,3,4,5,6,7, 9,10
GLUTINOUS									
Konya	multi-colored	J	traditional	sticky or '*second maize*'	short-medium plant height, very leafy, produces many cobs	K1, E1	long	warmer areas	1,2,3,4,5,6,7, 8,9,10

† J = jhum field; WRT = wet rice terrace

* Refer to "*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

***Glycine max* (L.) Merr. - Soybean (<u>südza</u>)**

LOCAL NAME	COLOR (*bean*)	FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
Südza	yellow	J	traditional		short, heavily-branched variety	K4	long	black soils, in warmer areas	1,2,4,6,9

† J = jhum field; WRT = wet rice terrace
* Refer to "*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

***Coix lacryma-jobi* L. - Job's Tears (<u>kesi</u>)**

LOCAL NAME	COLOR (*grain*)	FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
NON-GLUTINOUS									
Kesi Kemephruo	white	J	traditional	*'non-sticky Job's tears'*	tall plant, with long panicle	K4	long	colder areas	9
Kesi Mephruo	white	J	traditional		tall-stemmed, with long panicles	K9	medium	black soils in warmer areas	4
GLUTINOUS									
Kesi Kemenya	white	J	traditional		short-stemmed, with long panicle	K8, K9	long	black soils, adaptable to both colder or warmer areas	1,2,4,6

† J = jhum field; WRT = wet rice terrace
* Refer to "*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

***Setaria italica* (L.) P. Beauv. - Millet (<u>chütinuo</u>)**

LOCAL NAME	COLOR (*grain*)	FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
NON-GLUTINOUS									
Chüphruo	white	J	traditional	non-sticky millet	medium-sized plant, with long panicle	K4	short	colder areas	4
Chüteinuo	white	J	traditional		non-tillering variety, with long stem	K4, K8	short	colder areas	6

GLUTINOUS									
Chünya	yellow	J	traditional	sticky millet	short plant, with large panicle	K4	short	colder areas	4

† J = jhum field; WRT = wet rice terrace
* Refer to "*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

Solanum tuberosum L. - Potato (alu)

LOCAL NAME	COLOR (*tuber*)	FIELD TYPE†	SOURCE	ORIGIN OF NAME	DISTINGUISHING CHARACTERISTICS	WHY PLANTED?*	TIME TO MATURITY	BEST CONDITIONS	GROWN BY (*Farmer No.*)
Mephrosi *Alu* (Hindi)	white	J	other areas of India		white tubers	K4	short	sandy soils	2,4

† J = jhum field; WRT = wet rice terrace
* Refer to "*Farmer Criteria in Selecting Crop Cultivars*' in appendix 5-13.

APPENDIX 5-13. Farmer Criteria in Selecting Crop Cultivars

CODE		SUB-CODE		%
A	*AGRONOMIC*			
		A1	high yielding	
		A2	matures quickly, so can be harvested early	
		A3	allows later harvest	
		A4	strong tillering	
		A5	resistant to lodging	
		A6	cold-tolerant	
		A7	less water-demanding	
		A8	less vulnerable to pest damage (birds)	
		A9	adaptable to variable field conditions	
		A10	tolerant of poor growth conditions where other varieties fail	
K	*KITCHEN QUALITIES*			
		K1	preferred taste	
		K2	aromatic	
		K3	soft	
		K4	general cooking / eating qualities	
		K5	multipurpose, in that it can be used in different food preparations	
		K6	medicinal / health-building properties	
		K7	fills the stomach for longer period	
		K8	suitable for making alcoholic drinks	
		K9	can be used as substitute for rice in times of shortage	
S	*STORABILITY*			
		S1	can store for long periods of time without spoilage	
E	*ECONOMIC*			
		E1	attractive market price	
		E2	can be fed to livestock	

APPENDIX 5-14. Uses of Major Agricultural Crops in Study Villages

CROP	MAJOR USES
Oryza sativa (rice) –	
- non-sticky white	steamed, brewed for beer, distilled into alcohol
- non-sticky brown	steamed, sometimes in making (khie) alcohol
- non-sticky black and white	brewed for beer, snacks, tea
- non-sticky red	steamed, brewed for beer, distilled into alcohol
- sticky white	steamed, fried rice, baking bread, brewed for beer, distilled into alcohol, snacks, tea
- sticky red	steamed, brewed for beer, snacks, tea
Coix lacryma-jobi (Job's tears)	distilled into alcohol, snacks, tea, fed to poultry and pigs
Setaria italica (millet)	distilled into alcohol, making bread, snacks, fed to livestock
Zea mays (maize)	usually roasted and eaten from cob as a snack, fed to poultry
Perella ocimoedes (perilla)	making curry, pickles, used in a snack preparation
Solanum tuberosum (potato)	ingredient in fried or boiled curries, pickled, potato chips
***Vigna* sp.** (Naga dal)	ingredient in curry, pickles, snacks, fed to livestock
Glycine max (soybeans)	ingredient in traditional porridge called 'galho', fermented, roasted and salted as a snack to eat along with rice beer or tea, roasted grains are pulverized to a fine powder and mixed with sugar and boiling water to make an energy drink, fed to livestock
Capsicum frutescens (chilli)	ingredient in fried or boiled curries, used in salads, pickled
Allium sativum (garlic)	ingredient in curry, spice in cooking and chutney preparation, several medicinal uses
Colocasia esculenta (taro)	all parts of plant – leaf, stem, corms and sucker – are used in cooking, snacks, stems fed to pigs
Lycopersicon esculentum (tomato)	ingredient in curry, pickled, fed to livestock
Brassica oleracea* var. *capitata (cabbage)	ingredient in fried or boiled curries, salad, grown for sale
Sechium edule (chayote squash)	ingredient in fried or boiled curries, shoots eaten as a vegetable, fed to pigs during times of abundance

APPENDIX 5-15. Main Types of Land Use in Study Villages

LAND USE TYPE	*ANGAMI TERM*	
	KHONOMA	TSIESEMA
AGRICULTURAL		
wet rice terraces	*tekhulie*	*tekhu*
swidden fields	*nhalie kijü ku kekrie* – a) *rasa*; b) *therie*	*nhalie*
permanent gardens	*tize*	*tezie*
kitchen gardens	*kihiekimhuze*	*kitho kihie zie*
land with monoliths	*kesiamero* (*tsiese*)	*kesiameruo*
residential area	*ukebieshü*	*ukebachü*
rivers	*kerü*	*kerü*
fruit orchards (in kitchen garden)	*nhasize*	*nhasi zie*
fruit orchards (in field)	*nhasilie*	*nhasilie*
grazing area	*rarha*	*phiechü*
forest	*ketsa / utsa*	*ketsa*
fish ponds	*khuozie*	*rüzie / khuozie*
private fish pond celebrated with feast of merit	*kerheizie*	*kerheiziehie*
village perimeter	*rüna cahu*	*tsahie*
FORESTS		
forest areas reserved for firewood	*thinorapie* (communal ownership)	*seikha*
forests preserved, mainly for timber	*sikha* (private)	*utsa*
fallow jhum land, under secondary forest regrowth	*thekrolie*	*thekrolie*
thick virgin forest	*ketsa keti, ketsa kesou, ketsa tsapo*	*tsapo*
private forest	*sikha*	*useikha*
logged-over forest	*thethitsa*	*thethilie*
WATER BODIES		
large river	*rüdi*	*rüdi*
smaller rivers	*rücü*	*rütsü*
streams	*rücü rüno*	*rütsü rünuo*
seasonal streams	*rüsorü*	*rüsorü*
spring	*dzuluo*	*dzuluo*
swampy area	*godzie*	*guodzü*
pond	*rüzie*	*rüzie*
portion of river permanently diverted for fishing	*theprü kerü*	*khuothi*
portion of river temporarily dammed for fishing	*kerü khuozie*	*khuozhü*
waterfalls in river	*dzüvo*	*kevuo*
deep pools in river	*dzübe / dzüthu*	*dzübe*

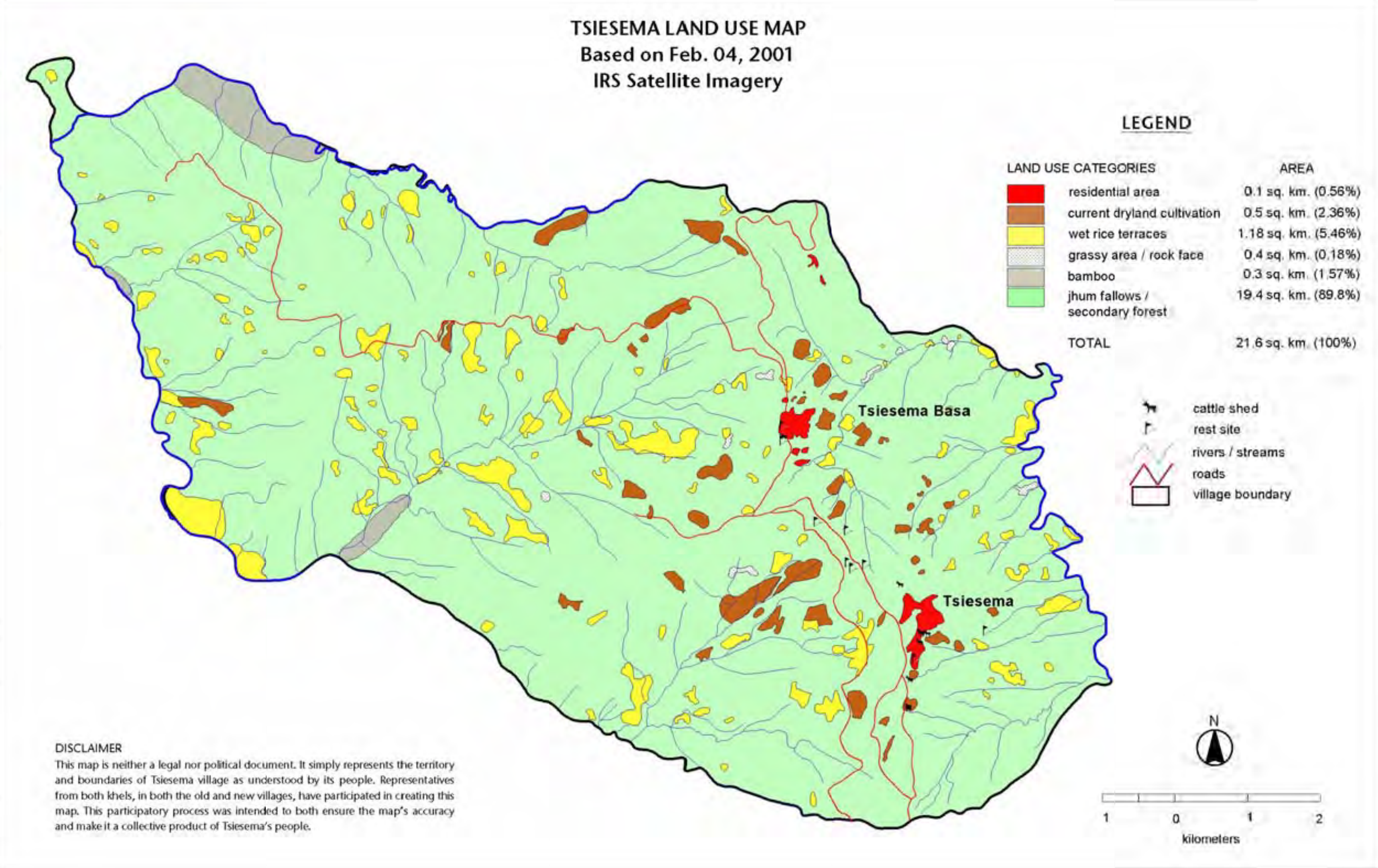
APPENDIX 5-16. Angami Terminology for Describing the Topography of the Landscape

LAND FORMS	*ANGAMI TERM*	
	KHONOMA	TSIESEMA
mountain	*kijüthou*	*kijüthou*
mountain peak	*kijüthoudzü / puotsüle*	*puotsüle*
mountain range	*kijüthouria*	*puotsei*
mountain slope	*puotsi*	*zudo*
mountain ridge	*rükha*	*tsiekrie*
steeper embankment at river valley	*puohekha*	*puohekha*
mountain range between river tributaries	*judo*	*zudo*
plains	*kijü thezha*	*theza*
less steep mountain slopes	*petsia*	*lazo*
cliff that cannot be ascended	*rükhase*	*tsiekhie / tsieyo*
cliff that can be climbed	*tsiekha*	*tsiekrie*
small dip between slopes	*kijü rügou*	*puo rüku*
base between two mountain slopes	*kijü ca*	*kijü rükou*
hillock	*kijüthou kecü / kijü cu*	*seithu*
gorge	*kijüthou ca*	*puo rükou*
lowland area surrounding the base of a mountain	*kijüthou pheisie*	*kijü vahi*
plateau	*razha*	*razha*
spur	*puothigei*	*puotsüthou*

APPENDIX 5-17. Main Types of Human Constructions

CONSTRUCTION	*ANGAMI TERM*	
	KHONOMA	**TSIESEMA**
fort	*kuda*	*kuda / dahu*
village gate	*kharu*	*kharu*
village council hall	*mechüki*	*mechüki*
church	*kehouki*	*kehouki*
graves	*mekhru*	*mekhru*
above-ground burial vault	*rusa*	*peliwa*
hospital	*daruki / kechüki*	*kechüki*
khel office	*thinoki*	*chienuoki*
school	*leshüki*	*leshüki*
playground	*rüzhüchü*	*rüzhüchü*
gathering place	*thehu* (males only)	*thehuba* (males & females)
rest house	*rüliki*	*rüliki* (jhum field)/ *razhüki* (town)
age group house	*thesüki*	*thechüki*
morung	*kichüzhüki* (bed constructed from planks)	*kichüki*
morung	*chüdiki* (bed hewn from large tree pulled from forest)	-
monolith	*tsiesi*	*tsiese*
stone sitting place constructed as memorial	*baze*	*badze*
stone sitting place commemorating a feast	*khwehu*	-
shop	*duka*	*lhithoki*
blacksmith shop	*rükriki*	*rükriki*
standard residence	*ki*	*ki*
water tank	*dzükhu*	*dzükhu / dzübou*
bridge	*pe*	*pe*
granary	*chüpheki*	*telhaki*
mithun house	*gwiki*	
cattle shed	*mithuki*	*mithuki*
pig pen	*thevoki*	*thevoki / thevobou*

APPENDIX 5-18. Land Use Map for Tsiesema Village



LAND USE CATEGORIES		AREA
🟥	residential area	0.1 sq. km. (0.56%)
🟫	current dryland cultivation	0.5 sq. km. (2.36%)
🟨	wet rice terraces	1.18 sq. km. (5.46%)
▨	grassy area / rock face	0.4 sq. km. (0.18%)
⬜	bamboo	0.3 sq. km. (1.57%)
🟩	jhum fallows / secondary forest	19.4 sq. km. (89.8%)
	TOTAL	21.6 sq. km. (100%)

DISCLAIMER

This map is neither a legal nor political document. It simply represents the territory and boundaries of Tsiesema village as understood by its people. Representatives from both khels, in both the old and new villages, have participated in creating this map. This participatory process was intended to both ensure the map's accuracy and make it a collective product of Tsiesema's people.

APPENDIX 5-19. Steps in Wet Rice Cultivation (tekhulie) – Khonoma

ACTIVITIES			TIME FRAME	TOOL/S USED		
No.	***ANGAMI TERM***	**ENGLISH DESCRIPTION**		***ANGAMI NAME***	**ENGLISH DESCRIPTION**	**CODE/S**[†]
1	*thiguda*	cutting down the rice straw	Dec.-Jan.	*jie (da-u)*	Naga axe	1.1.1
2	*rie*	burning down the straw	Dec.-Jan.	*mi*	fire	
3	*thesulihi*	hoeing the nursery field	Dec.-Jan.	*khuhijü kejü*	spade	2.1.1.6
4	*niekrovü*	breaking up soil lumps	Dec.-Jan.	*niekromiedu*	mallet	2.1.1.10
5	*thesuli kephie*	second hoeing	Dec.-Jan.	*kejü*	spade	2.1.1.3
6	*niekrovü*	breaking up soil lumps	Dec.-Jan.	*niekromiedu*	mallet	2.1.1.10
7	*thesula*	broadcasting seeds into nursery bed	Feb.-Mar.	*ubi*	hand	
8	*thesuli nhapie, thesurü*	weeding / thinning nursery		*phiero*	rake	3.1.1
9	*tekhuhi*	turning over soil by spade	Mar.-Apr.	*khuhi jü*	spade	2.1.1.6
10	*niekrodu*	breaking up soil lumps	Apr.	*niekromiedu*	mallet	2.1.1.10
11	*mego rhie*	pollarding *Albizia* trees and integrating leaves into soil		*jie (da-u)*	Naga axe	1.1.1
12	*tekhunyie*	1st puddling	May	*khunyie jü*	spade	2.1.1.6
13	*sepuhi*	2nd puddling	May	*kejü*	spade	2.1.1.3
14	*khupone*	strengthening terrace bunds by applying additional mud	June	*kejü*	spade	2.1.1.3
15	*rhe*	leveling soil in preparation for transplanting	June	*kejü*	spade	2.1.1.3
16	*thesuphe*	uprooting rice seedlings from nursery	June	*ubi*	hand	
17	*tekhuse*	transplanting rice seedlings into terraces	June	*ubi*	hand	
18	*lierha*	releasing water from field and weeding	July	*ubi*	hand	
19	*khuporhe mu nhaphieda*	cleaning weeds from bund walls and around field perimeter	July	*khupokerhe jü, jie (da-u)*	spade, Naga axe	1.1.1
20	*sekekhe*	turning over weed piles to assist drying	Aug.	*ubi*	hand	
21	*thiphivü*	pruning dead outer leaves from rice	Sept.	*ubi*	hand	

ACTIVITIES			TIME FRAME	TOOL/S USED		
No.	***ANGAMI TERM***	**ENGLISH DESCRIPTION**		***ANGAMI NAME***	**ENGLISH DESCRIPTION**	**CODE/S**[†]
22		erecting scarecrows and other devices to discourage birds				
23	*liekhro*	bunching rice plants	Sept.	*ubi*	hand	
24	*liere*	harvesting	Oct.	*jiekhwino mu mekho*	sickle, basket	5.1, 6.2
25	*lienyü*	threshing	Oct.	*tsopie, lieda*	mat, flailing tool	8.1.3, 8.1.1
26	*liehe*	winnowing	Oct.	*liherü, mekho, khodi, tsopie*	winnowing tray, baskets, mat	8.2.1, 6.2, 8.1.3
27	*medo*	measuring	Oct.	*tin*	tin	7.2.2.1
28	*pfü*	carrying harvest back to village	Oct.	*mekho, khodi, mu thula*	basket, sack	6.2, 7.2.4.2

[†] Illustrations of the tools are available in appendix 5-7.

APPENDIX 5-20. Steps in Wet Rice Cultivation (<u>tekhu mhathoko</u>) – Tsiesema

ACTIVITIES			TIME FRAME	TOOL/S USED		
No.	***ANGAMI TERM***	**ENGLISH DESCRIPTION**		***ANGAMI NAME***	**ENGLISH DESCRIPTION**	**CODE/S[†]**
1	*thesulieda*	slashing the grass in area planned for rice nursery	Dec. – Jan.	*da-u (zie)*	Naga axe	1.1.1
2	*rüguda*	slashing the straw residue of previous rice crop	Dec. – Jan.	*da-u (zie)*	Naga axe	1.1.1
3	*tekhuhie*	hoeing the field	Dec. – Jan.	*kedzü*	spade	2.1.1.3
4	*thesuliethe*	burning the nursery field	Feb. – Mar.	*mi*	fire	
5	*thesulie rütsü*	collecting any unburnt slash	Mar.	*charuo, da-u (zie)*	bamboo rake, Naga axe	2.1.2.3, 1.1.1
6	*tekhurei*	second hoeing, breaking into smaller pieces	Apr.	*kedzü, midu*	spade, mallet	2.1.1.3, 2.1.1.10
7	*thesula*	broadcasting the rice into nursery	Apr.	*charuo, kedzü*	bamboo rake, spade	2.1.2.3, 2.1.1.3
8	*dzüyiechü*	cleaning irrigation canals	May	*da-u (zie), kedzü, zomie*	Naga axe, spade, crowbar	1.1.1, 2.1.1.3, 10.5.2
9	*tekhunuo*	1st puddling	May - June	*kedzü*	spade, foot	2.1.1.3
10	*thesupie*	uprooting rice seedlings from nursery	June - July	*udzie*	by hand	
11	*khupone*	2nd puddling	June - July	*kedzü*	spade	2.1.1.3
12	*tekhuse*	transplanting	June - July	*udzie*	by hand	
13	*dzüphakese*	regulating water level	July	*kedzü*	spade	2.1.1.3
14	*tekhurhe*	cleaning the bunds of weed growth	Aug.	*ziecha, kedzü*	long Naga axe, spade	3.1.3, 2.1.1.3
15	*nhaphieda*	slashing weeds around field perimeter	Aug.	*da-u (zie)*	Naga axe	1.1.1
16	*tekhu mesa*	pruning away dead outer leaves	Sept.	*udzie*	by hand	
17	*nhaphieda*	slashing the perimeter	Oct.	*da-u (zie)*	Naga axe	1.1.1

ACTIVITIES			TIME FRAME	TOOL/S USED		
No.	***ANGAMI TERM***	**ENGLISH DESCRIPTION**		***ANGAMI NAME***	**ENGLISH DESCRIPTION**	**CODE/S†**
18	*tekhukhro*	bunching standing rice to prevent lodging	Oct.	*udzie, sei*	by hand, sticks	
19	*tekhure*	rice harvest	Oct. – Nov.	*ziefinuo, khodi*	sickle, basket	5.1, 6.4
20	*lienyü*	threshing	Oct. – Nov.	*uphi, sei*	by foot	
21	*telhapfü*	carrying rice back to village	Nov.	*gakhropfe, khodi, chünuo*	sacks, baskets, large storage basket	7.2.4.2, 6.4, 7.2.5.1
22	*pruchüla*	repairs to field hut	Nov. – Jan.	*da-u (zie)*	Naga axe, bamboo	1.1.1

† Illustrations of the tools are available in appendix 5-7.

APPENDIX 5-21. Crops Grown in Wet Rice Terraces of Khonoma and Tsiesmea Study Villages
(Based on Data from Ten Fields Monitored in Each Village)

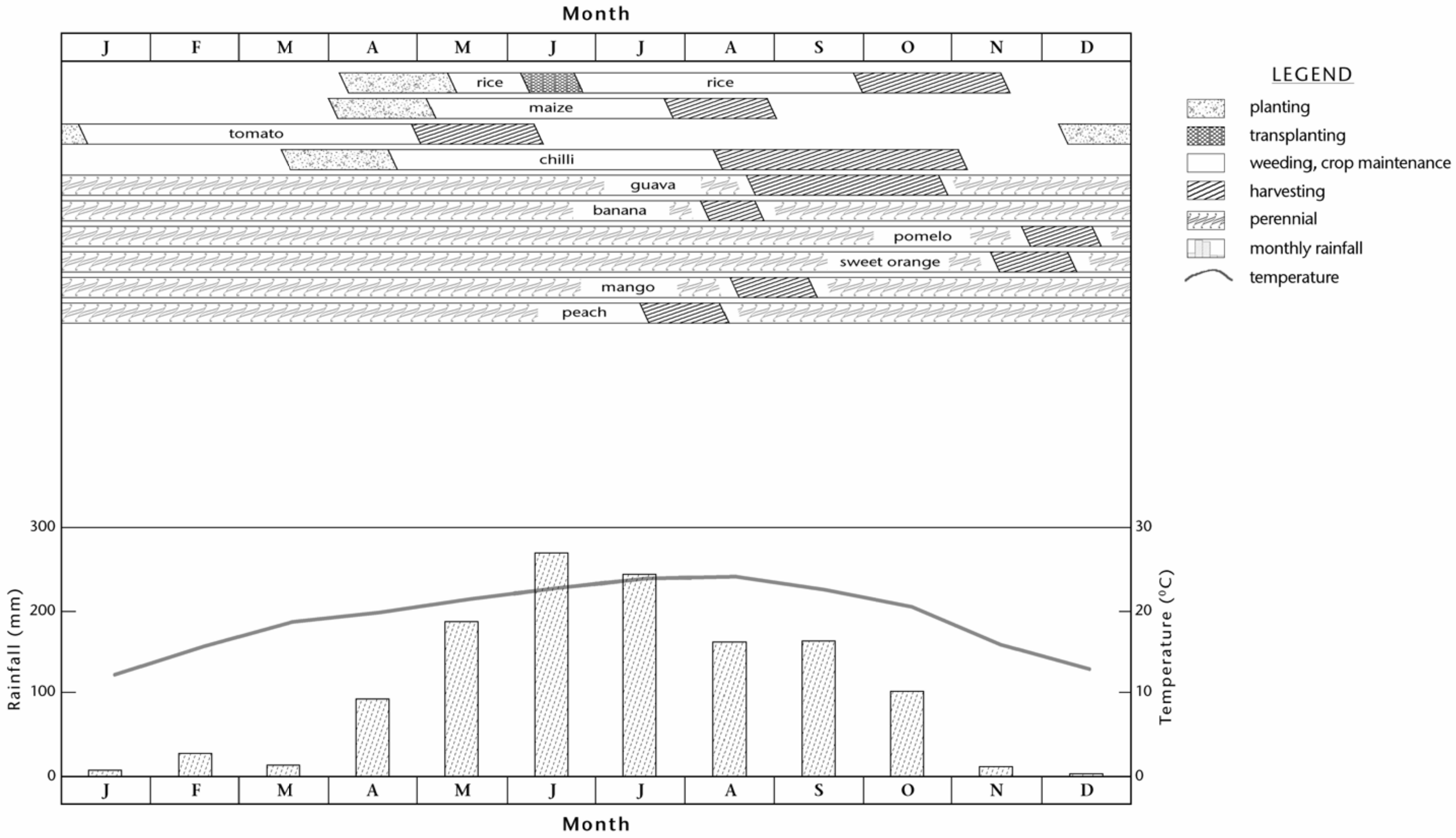
Botanical Name	Local Names		Common English Name	Life Form[†]	Season Planted	Season Harvested	Prices *(Rs)*	Fields Present	
	Khonoma	Tsiesema						Khonoma	Tsiesema
ANACARDIACEAE - Sumac Family (1)									
Mangifera indica L.	merosi	merosi	mango	T	perennial	July-Aug.	30/kg, 200/basket		10
APIACEAE - Carrot Family (2)									
Coriandrum sativum L.	dhunia / donia		coriander	H	Apr.-June	Aug.-Sept.	2.50/bundle	6,8	
Daucus carota L.	carrot		carrot	H	Apr.	Aug.	30/kg	10	
ARACEAE - Arum Family (2)									
Alocasia macrorrhizos (L.) G. Don	dzüno / thupele	dzümo / thupele / thupelie	elephant's-ear	H		July-Aug.	5-10/bundle	10	
Colocasia esculenta (L.) Schott	dzüno / dzuno	dzunuo / dzünuo	taro	H	Mar.-Apr.	July-Aug.	5/bundle or 10/kg	10	
BRASSICACEAE - Mustard or Crucifer Family (1)									
Brassica campestris L.	gakrie / gakre	gakhri / gakrie / gakre	mustard leaf	H	Mar./Aug.	Nov./Mar.	5-10/bundle	7,10	
CUCURBITACEAE - Cucumber or Cucurbit Family (3)									
Cucumis sativus L.	tsüto / tsütuo	tsütuo / mungunuo	cucumber	V	Mar.	July-Nov.	2-5/piece	5,7,10	
Cucurbita pepo L.	rümo / rümo ketsü	rümo / se rümo / mungunuo	pumpkin	V	Mar.	Aug.-Nov.	5-10/fruit	2,7,8	
Sechium edule (Jacq.) Sw.	squash		chayote squash	V	Feb.	Nov.	2/kg	7	
FABACEAE - Bean Family (5)									
Glycine max (L.) Merr.	shüdza / süza	südza / shüdza	soybean	H	Apr.	Sept.	20/ kg	10	
Mucuna pruriens (L.) DC.	cüprie / cüpri / chüpri	rütsü	velvet bean	V	Apr.	July	8/kg, 5/bundle	10	
Phaseolus vulgaris L.	kecüprei / kechüprie	rütsü	kidney bean	V	Apr.	July	8-10/kg	1,5	

Botanical Name	Local Names		Common English Name	Life Form[†]	Season Planted	Season Harvested	Prices *(Rs)*	Fields Present	
	Khonoma	Tsiesema						Khonoma	Tsiesema
Pisum sativum L.	motor		peas	V	Apr. / Sept.	May-Nov.	8-10/kg	7,10	
Vigna umbellata (Thunb.) Ohwi & H. Ohashi	kerhü	kerhü	rice bean	V	Apr.-May	Oct.	20/kg	1,10	
LILIACEAE - Lily Family (3)									
Allium sp.	solia / shüla / solie			H	wild	May-Oct.	5-10/bundle	1,3,10	
A. cepa L. var. *perutile*	chümerie	chümerie	ever-ready onion	H	Aug.-Oct.	Jan.-Apr.	10/bundle	6,7,8,9,10	
A. sativum L.	khuovie / samara	khuvie	garlic	H	Sept.-Oct.	Dec.-Apr.	10/bundle	6,7,8,9,10	
MUSACEAE - Banana Family (1)									
Musa paradisiaca L.	tekwhesi / thayie		banana	T	perennial	July-Aug.	120/bunch, 150/basket		1,6
MYRTACEAE - Myrtle Family (1)									
Psidium guajava L.	moduram	moduram	guava	T	perennial	Aug.-Dec.	8-10/kg, 1/fruit, 100-160/basket		2,4,6,7,8,10
POACEAE - Grass Family (4)									
Coix lacryma-jobi L.	kesie / kesi	kesi / kesie	Job's tears	G	Apr.-May	Oct.-Nov.	25-50/tin	1,6	
Oryza sativa L.	telha	telha	rice	G	Feb.-May	Sept.-Nov.	5-10/kg, 60-90/tin	1,2,3,4,5,6,7,8,9,10	1,2,3,4,5,6,7,8,9,10
Triticum aestivum L.	zohu		wheat	G	Feb.	May	12/kg	6	
Zea mays L.	zarosi / zarusi	süko / shüko	sweet corn / maize	G	Mar.-Apr.	July-Sept.	1/cob - 10/7 cobs – 2/cob, 10/kg, 80/basket	1,3,7,8,9,10	7,8
ROSACEAE - Rose Family (1)									
Prunus persica (L.) Batsch	zarsi / zorüsi	ciehumekrü / chehumakrhü	peach	T	perennial	July	20/kg		1

Botanical Name	Local Names		Common English Name	Life Form[†]	Season Planted	Season Harvested	Prices *(Rs)*	Fields Present	
	Khonoma	Tsiesema						Khonoma	Tsiesema
RUTACEAE - Rue Family (2)									
Citrus maxima (Burm. ex Rumph.) Merr.	pomelo / hulo	huolo / hulo	shaddock	T	perennial	Nov.-Dec.	4-7/fruit		7,10
C. sinensis (L.) Osbeck	sehu	sehu	sweet orange	T	perennial	Nov.-Dec.	20/kg, 1/fruit, 400/basket		6,10
SOLANACEAE - Potato Family (6)									
Capsicum sp.	raja chüsi	raza	king chilli	H	May	Nov.	20/kg		8
C. frutescens L.	chüsi	chüsi / chisi / chüshi	chilli	H	Apr.-May	Aug.-Oct.	15-20/kg	2,3,7	
Lycopersicon esculentum Mill.	bienyienuo	bounganuo / begenuo	tomato	H	Jan.	Apr.-June	20-25/kg		5,7
Solanum sp.	kepfü / kepfü kezha-u / kipfü			H	Mar-June	Oct.-Nov.	10/kg	6	
S. melongena L.	pfüdi	pfüdisi / pfüdi	brinjal	H	Feb.-Mar.	Aug.	5/kg	10	
S. tuberosum L.	kelu	alu	potato	H	Jan.-May	May-Aug.	8-10/kg, 100/tin	1,6,7,9,10	
ZINGIBERACEAE - Ginger Family (1)									
Zingiber officinale Roscoe	kevü	kevü	ginger	H	May	Oct.-Nov.	7.50-10/kg	1,7,10	

[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

APPENDIX 5-22. Cropping Calendar for Tsiesema's Wet Rice Terraces



* Data derived from farmer-kept diaries on their inputs and outputs for fields monitored over 2000 and 2001 cropping years.

APPENDIX 5-23. Diary Entry of W.G. Archer, Describing a Visit to Khonoma in 1946

"31st December, 1946.

This morning I set out for Khonoma, the first Angami village I shall see and the most redoubtable of all the Angami group. It was here that a British force was repulsed in 1879, and although the village ultimately accepted British rule, it was never defeated in battle. Khonoma was selected by Dr. Hutton as the type Angami village and it was here that Haimendorf spent hours photographing stone circles, discussing feasts of merit, and drinking mugs of white, milky rice beer. I left under a clear keen sky and after motoring 6 miles along the Indo-Burma road, away up a valley with lowering hills on either side. The track is paved with stones and even at the height of the rains, must be fairly passable. It was up the river at the foot that a British force went one night when the Japs were threatening Kohima. They reached Khonoma the next morning to find the rest house deserted and the Japs working in a pool. The Japs noticed them and at once rushed into thick jungle. None of them was killed but none was seen again.

Although the track begins three miles below Khonoma, rice fields belonging to the village commence almost at once and we were soon moving along a ridge with a vast tract of fields below. As we climbed higher, more and more fields came into view, in some cases rising in successive terraces almost to the top of the hill. In their great broad sweeps, these huge expanses of cultivation were not unlike glaciers. In many fields the ridges are made of stones and where the slope is steep, a field is sometimes only a few feet wide. I have never seen such perfect agricultural engineering.

Dotted through the fields are little thatched huts where in bad weather, men and women keep their clothes and food and eat their meals. Close to one of them a group of men and women were at work, busily digging the clods. Since the plough is unknown, the soil is broken up and hemmed with a spade and women as well as men labour at the digging. Since it was the end of December, all the paddy had been cut and the straw was standing in little stooks. Only the ears are cut during the reaping, the straw being left to stand and a bunch of stalks being loosely tied together at the top. These are all got in later. In a number of fields, bamboo stakes armed at the top with little slats pointing four ways were mounting lonely guard. I was told that all these fields had yielded bumper crops and the stakes were erected to distract attention and avoid inauspicious praise. Hutton also refers to their erection at times of house building and adds that they are intended to keep off evil spirits ('Angami Nagas', 53).

As we neared Khonoma, monoliths grew more and more plentiful and in some of the fields there are whole colonies of stones standing on end and looking down the valley. Many of these are four to six feet high and are erected as memorials to the feasts of merit. None of the stones is carved.

About half a mile from the village, we came to a field rest-house. This is known as 'mechuki' and is a solidly built hall with a sumptuous roof. It is open on all sides and has a lofty view down the valley. It belongs to the Semoma clan and during the 'tsungi' [Tsünyi] or path-clearing festival, the boys and girls of the clan clear the tracks during the day and adjourn at sunset to the hall. There they stay until nine o'clock, cooking their food and singing. After the meal they all go home to their houses. At other times the singing shed is a casual shelter.

Just below the hall, there is an ascending series of mud platforms. The three lowest each contains a single globed cone, moulded out of earth while the uppermost has a pair of cones identical in design. The cones are made each year on the first day of the path-clearing festival, but without any ritual or ceremonies. There also do not seem to be any songs or incantations connected with them. As they markedly resemble breasts, there is little doubt that they are fertility symbols but the Nagas who were with me did not ascribe any special function to them. Pawsey tells me this is the only village where he has seen anything like them.

From the hall, the path drops down to a stream and the fields were thick with scarecrows, almost all of them in the form of men. On the way up the spur, I was shown 3 stones half hidden in a bamboo clearing. These mark the shrine of Kipuche whom a priest worships on genna days on behalf of two clans, the Semoma and Thevoma of Khonoma. The other clan, Merhema, has similar stones elsewhere. The priest offers a fowl and says '*May the crops flourish. May no sores affect the body.*'

Just above the stones, the path comes out at a great roofed block-house which marks the village entrance. There is a large carved gate nearby and the village is reached through lanes of tall stone walls. Since the village covers the top and sides of a spur, it is virtually a series of banked up terraces. Every slope is set with stone and walls go up and down between the houses. Strung out through the three khels, is a series of lofty look out posts and at six of the entrances massive gates carved to a single standard model are installed. The village not only is but looks a fortress.

Inside the village, all the smaller boys and girls were playing with tops. The stone is carefully cut into two cones and is spun in exactly the same way as tops the world over. With their cropped and shaved hair, these younger boys are by no means prepossessing, and it is only the young men with their black kilts, white cowries, ivory armlets and red necklaces who make a dashing sight. In contrast to the men, almost all the women are dull and drab.

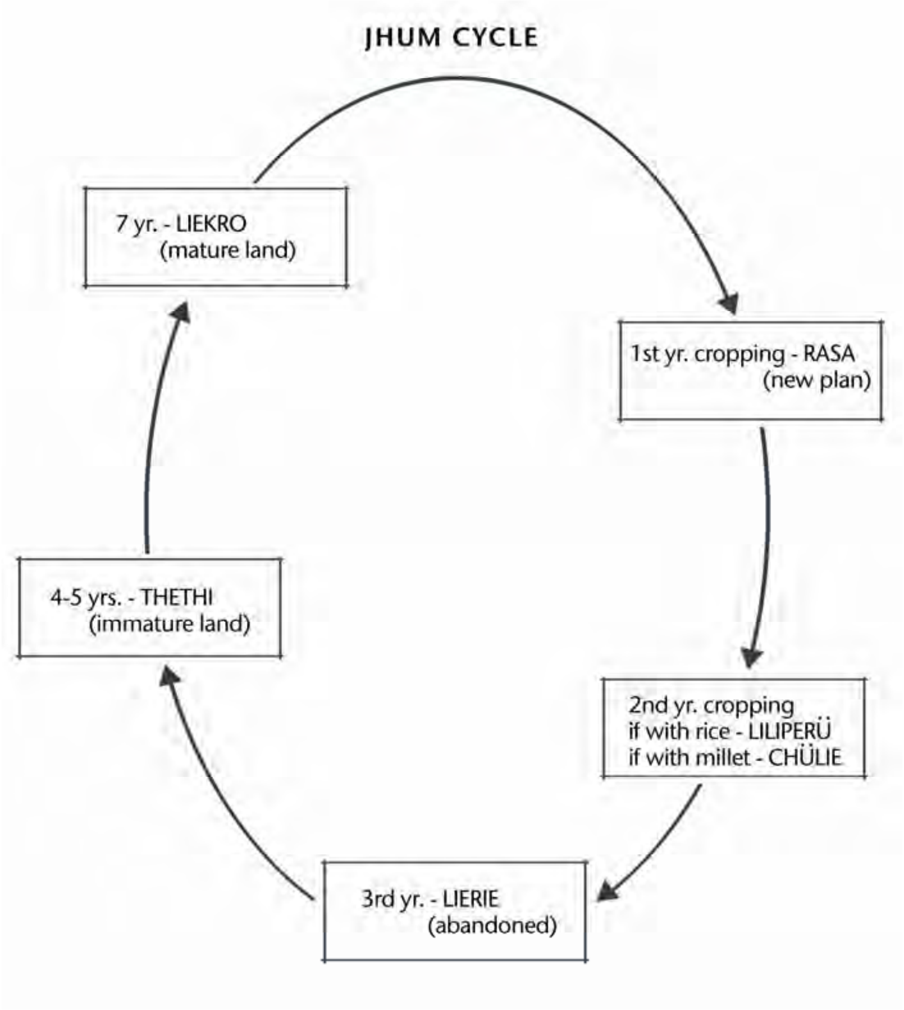
After toiling up the spur, I was glad to stop at a gaonbura's house. This is used as a 'theka ki' at the Sekrengi [Sekrenyi] festival and inside it, the middle partition was festooned with gigantic reproductions in pith of various necklaces. In the middle panel, red chains were hung round an enlarged version of the half conch shell which adorns the nape of the neck and on either side, there were pith chains in black and white. I was told that boys and girls had made them at the festival and had ceremonially garlanded the house. In the same room I noticed a little shelf of split bamboos dangling from the roof and loaded with shrivelled leaves. I was told that these had been placed there by girls of the khel. During the Thekrangi [Thekranyi] festival, the girls go to the fields, gather plantain leaves and come dancing with them to the house. The same house is also used as a morung and a great sleeping platform runs down one side. I was told that there are no separated young men's houses in Khonoma, but a number of private houses are shared by young men with the owners.

A most impressive feature of the village is the great stone circle which marks the grave of the first director of the village ceremonies, the Kemova. This is illustrated in the 'Naked Nagas' and is the scene of some of the great ritual dances. Only few houses have such circles, but in almost every courtyard is a stone grave containing the family dead. Apart from the great carved gates, there is no other form of carving in the village. None of the houses have 'horns' and nothing is carved on the frontal planks.

After lunch I sat on a high fort taking in the enormous view and talking to Unelhu about the coming changes. He is attached to the public works side of the Deputy Commissioner Office and is himself a resident of Khonoma. He was full of pride in the village and dismay for the future. '*Even if the British go*' he said '*Russia will come in. From congress we can expect nothing. But Khonoma will fight*'."

(Archer, 1946)

APPENDIX 5-24. Tsiesema's Conceptualization of the Stages of its Swidden Cycle



APPENDIX 5-25. Crops Grown in Jhum Fields of Khonoma and Tsiesmea Study Villages ‡
(Based on Data from Ten Fields Monitored in Each Village)

Botanical Name	Local Names		Common English Name	Life Form†	Season Planted	Season Harvested	Prices *(Rs)*	Fields Present	
	Khonoma	Tsiesema						Khonoma	Tsiesema
AMARANTHACEAE - Amaranth Family (1)									
Celosia argentea L.	niza / niedza / nidza	niedza	amaranth	H	Apr.	Oct.	20/bundle		6
APIACEAE - Carrot Family (2)									
Coriandrum sativum L.	dhunia / donia		coriander	H	Feb.-Mar. / July	May-Nov.	5-10/bundle	4,6,8	
Daucus carota L.	carrot		carrot	H	Mar.	June-Aug.	20-30/kg	5,10	
ARACEAE - Arum Family (2)									
Alocasia macrorrhizos (L.) G. Don	dzüno	dzümo / thupele / thupelie	elephant's-ear	H	Mar.-May	July-Nov.	10/kg, 10/bundle	6,10	1,2,4,5,7
Colocasia esculenta (L.) Schott	dzüno / dzuno	dzunuo / dzünuo	taro	H	Mar.-May	July-Mar.	6-10/kg, 1/piece, 100/basket, 10-50 /bundle for leaves	1,3,6,8,9,10	1,2,3,4,5,6,7,8, 9,10
ASTERACEAE - Sunflower Family (2)									
Gynura sp.	liejieno / lievino	lizienuo	velvet plants	H	perennial	Feb.-May	5/bundle	10	
Helichrysum bracteatum (Vent.) Andrews	leshü niepu	niepu	straw flowers	H	May	June-July	30/kg	4	
BRASSICACEAE - Mustard or Crucifer Family (4)									
Brassica campestris L.	gakrie / gakre	gakhri / gakrie / gakre	mustard leaf	H	Mar.-Apr.	Apr.-Dec.	5-10/bundle or 5/kg	1,2,4,5,6,7, 8,9,10	4
B. oleracea var. *capitata* L.	kobi	kobi	cabbage	H	Feb.-May, Sept.	Feb.-Nov.	5-10/kg or 10/piece	1,3,4,5,6,7, 9,10	4
B. rapa L. subsp. *rapa*	turnip	turnip	turnip	H	Mar.	July	10/kg	5	

Botanical Name	Local Names		Common English Name	Life Form†	Season Planted	Season Harvested	Prices *(Rs)*	Fields Present	
	Khonoma	Tsiesema						Khonoma	Tsiesema
Raphanus sativus L.	mula / mola		radish	H	Mar./July	May-Nov.	5-10/kg or 5/bundle	2,4,5,6,8,10	
COMBRETACEAE - Indian Almond Family (1)									
Terminalia myriocarpa Van Heurck & Müll. Arg.	bicha / mecha		hollock	T	Apr.	all seasons		10	
CONVOLVULACEAE - Morning-glory Family (1)									
Ipomoea batatas (L.) Lam.	phiemü / dzümu	dzümou	sweet potato	V	Mar.-July	Mar. / Nov.-Dec.	8-10/kg	1,2,4,7,8,10	4,7
CUCURBITACEAE - Cucumber or Cucurbit Family (7)									
Cucumis sativus L.	tsüto / tsütuo	tsütuo	cucumber	V	Feb.-Apr.	June-Nov.	10/kg, 20/7 pieces, 3-5/piece	1,2,3,4,5,6,7,9,10	1,2,3,4,5,6,7,9,10
Cucurbita pepo L.	rümo / rümo ketsü	rümo / se rümo	pumpkin	V	Feb.-May	Aug.-Jan.	5-10/fruit , 5-10/kg	1,2,3,4,5,6,7,8,9,10	1,2,3,4,5,6,7,8,9,10
Lagenaria siceraria (Molina) Standl.	mekhwü	mesü	bottle gourd	V	Mar.-Apr.	Aug.	10/fruit	10	5,7
L. vulgaris Ser.	meshü	meshü	gourd	V	Mar	Sept.	10/piece		4
Luffa cylindrica M. Roem.	pfüshü	pfüsü / füsü	sponge gourd	V	Apr.	Sept.-Oct.	2/piece		5,6,7
Momordica charantia L.	kerela / kerila	kerela / keriela	bitter gourd	V	Mar.-May	Oct.-Nov.	10/kg	3,6	6,7
Sechium edule (Jacq.) Sw.	squash		chayote	V	Dec.-Feb.	Apr.-May / Sept.-Jan.	1/piece, 3/kg, 10/bundle	3,6,10	
DIOSCOREACEAE - Yam Family (1)									
Dioscorea sp.	tsüpie	rüphie / rüphrie	yam	V	Mar.-May	Dec.-Feb.	5-15/kg	1,3	2,7
EUPHORBIACEAE - Spurge Family (2)									
Emblica officinalis Caertn.	chehu	chiehu / ciehusi / ciehuhuse / tsiehusi	Indian Gooseberry	T	perennial	July	5/kg		7
Manihot esculenta Crantz	sidzümu	sidzümu / sidzümou	cassava / tapioca	S	Mar.-May	Nov.	75/basket		4,7

Botanical Name	Local Names		Common English Name	Life Form†	Season Planted	Season Harvested	Prices *(Rs)*	Fields Present	
	Khonoma	Tsiesema						Khonoma	Tsiesema
FABACEAE - Bean Family (9)									
Arachis hypogaea L.	badam / bodam	budam	groundnut	H	Apr.-July	Oct.-Nov.	8-20/kg	1,3,4,9	
Cajanus cajan (L.) Millsp.	dali		pigeon pea	S	Apr	Apr.-May	8/kg	10	
Dolichos lablab L.	cüba	rütsü / tsüdu	hycianth bean	V	Apr.	Nov.	10/kg	10	1,5,6,10
Glycine max (L.) Merr.	shüdza / süza	südza / shüdza	soybean	H	Mar.-Apr.	July-Dec.	20/ kg	1,2,3,4,5,6, 7,8,9,10	6
Mucuna pruriens (L.) DC.	cüprie / cüpri / chüpri	rütsü	velvet bean	V	Mar.-Apr.	Apr.-July	8-10/kg	1,5,6,7,8,9, 10	
Phaseolus vulgaris L.	kecüprei / kechüprie	rütsü	kidney bean	V	Jan.-May	May-Aug.	8-10/kg	2,3,4,5,6,7, 8,9,10	4,7,9
Pisum sativum L.	motor		peas	V	Feb.-Mar.	May-Nov.	8-20/kg	1,2,3,4,5,8, 9,10	
Vigna umbellata (Thunb.) Ohwi & H. Ohashi	kerhü	kerhü	rice bean	V	Apr.-May	Oct.-Nov.	10-20/kg	10	1,6,7,9
V. unguiculata (L.) Walp.	boti	boti / botei	cow pea	V	Mar.-Apr.	Sept.-Dec.	5-10/kg or 10-20/bundle		1,5,6,7
LAMIACEAE - Mint Family (3)									
Anisochilus carnosus (L.f.) Bth.	nimhvü / ninhyü	nyünyhü / nyienyhü	thick-leaved lavender	H	Mar.-May	July-Nov.	10/bundle, 30/kg	3,5,6	2,3,5,6,7,10
Ocimum basilicum L.	nitso	nietso / nhietso / nyietso	sweet basil	H	Mar.-May	June-Oct.	5-10/bundle	3,5,6	2,3,5,6,7
Perilla ocymoides L.	kenie	kenyü / kenie / kenia	perella, beefsteak plant	H	Feb.-Apr.	Oct.-Dec.	10-30/kg	1,2,3,4,5,6, 7,8,9,10	1,6,7,9
LILIACEAE - Lily Family (5)									
Allium cepa L.	piez / pieze	pieazü	onion	H	Feb.-Mar.	June-July	10-12/kg 3/bundle of onion leaf	5,6,9,10	4
A. cepa L. var. *perutile*	chümeria / chümerienyü	chümerie	ever-ready onion	H	Mar	Mar.-Apr. / Nov.	5-10/bundle	10	

Botanical Name	Local Names		Common English Name	Life Form†	Season Planted	Season Harvested	Prices *(Rs)*	Fields Present	
	Khonoma	Tsiesema						Khonoma	Tsiesema
A. fistulosum Linn	samara			H	Mar.	June	10/bundle	6	
A. porrum L.	solia / shüla / solie		leek	H	Apr.-May	May-June	5/bundle	10	
A. sativum L.	khuovie / samara	khuvie	garlic	H	Dec.-Apr.. / Aug.-Sept.	June-Oct.	10-30/kg, 10-50/bundle	1,2,3,4,5,6, 9,10	1,2,4,9
MALVACEAE - Mallow Family (1)									
Hibiscus sabdariffa L.	gakhie	gakhro / gakhro memerie (red)	Rozelle plant / Monarch Rosemallow	S	Apr.-May	Dec.	50/basket		1,5,6,7
MUSACEAE - Banana Family (1)									
Musa paradisiaca L.	tekwhesi / thayie		banana	T	perennial	Feb.	60/bunch	10	
PASSIFLORACEAE - Passion-flower Family (1)									
Passiflora edulis Sims	bell	bel	passion fruit	V	May-Aug.	June-Aug.	10/kg or .50-1/piece	10	4
POACEAE - Grass Family (5)									
Coix lacryma-jobi L.	kesie / kesi	kesi / kesie	Job's tears	G	Mar.-May	Oct.-Dec.	2-20/kg , 25/basket, 60-75/tin	1,3,5,6,7,8, 9,10	1,2,4,6,9
Oryza sativa L.	telha	telha	rice	G	Mar.-May	June / Sept.-Oct.	10/kg, 70/tin, 105/basket, 15/bundle for seedlings	1,8,10	1,2,3,4,5,6,7,8, 9,10
Saccharum officinarum L.	nukhrücha / ke	meke / ke	sugarcane	G	perennial	Apr.-May	15/piece		4
Setaria italica (L.) P. Beauv.	sü	chütinuo	foxtail millet	G	Feb.-Mar.	July-Aug.	20/basket	1,2,3,4,5,6, 7,8,9,10	

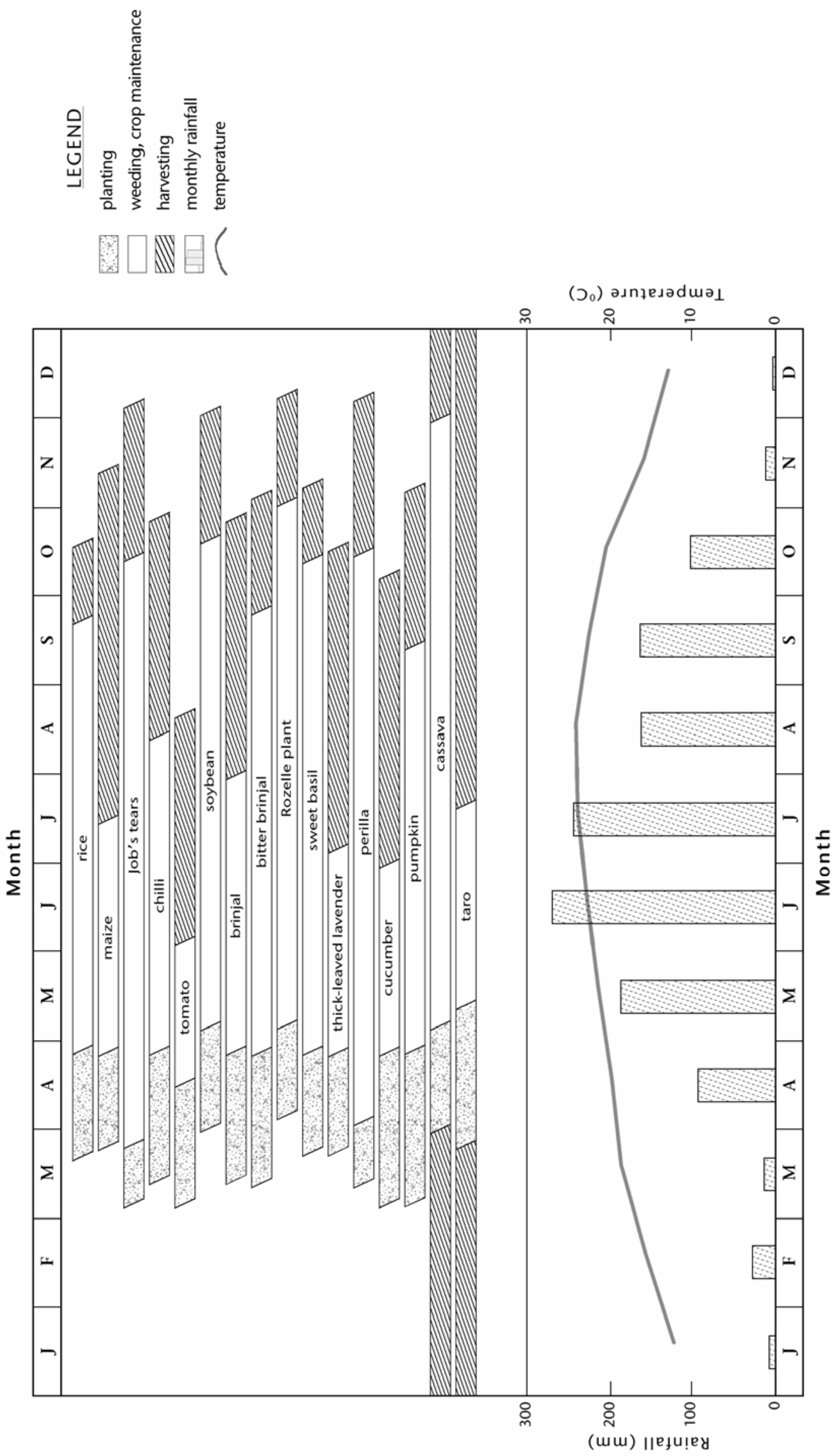
Botanical Name	Local Names		Common English Name	Life Form†	Season Planted	Season Harvested	Prices *(Rs)*	Fields Present	
	Khonoma	Tsiesema						Khonoma	Tsiesema
Zea mays L.	zarosi / zarusi	süko / shüko	sweet corn / maize	G	Feb.-May	July-Nov.	.50-2/cob, 10/kg, 70-200/basket	1,2,3,4,5,6,7,8,9,10	1,2,3,4,5,6,7,8,9,10
ROSACEAE - Rose Family (1)									
Prunus avium (L.) L.	pezie		cherry	T	Apr.	Feb-Apr		10	
SAPINDACEAE - Soapberry Family (1)									
Sapindus rarak DC.	khulhucü / khulucü	khurchisi / khurüciesi / khurciesi	hog-plum, Naga neem	T	Apr.			10	
SOLANACEAE - Potato Family (9)									
Capsicum sp.	raja chüsi	raza	king chilli	H	Mar.-Apr.	July-Sept.	10-30/kg		1,4,5,6,7,9
C. frutescens L.	chüsi	chüsi / chisi / chüshi	chilli	H	Mar.-June	Apr.-Nov.	10-30/kg or 10/bundle	1,3,4,5,6,7,9,10	1,2,3,4,5,6,7,8,9,10
Cyphomandra betacea (Cav.) Sendtn.	sibienyienuo / khwidi	sibounganuo	tree tomato	S	Apr.-May / Sept.	July-Dec.	1/fruit or 10-15/kg	1,6,10	4
Lycopersicon esculentum Mill.	bienyienuo	bounganuo / begenuo	tomato	H	Mar.-May	June-Oct.	10-20/kg	6,9,10	1,4,5,6,7,8,9
Solanum sp.	kepfü / kepfü kezha-u / kipfü			H	Mar-June	Sept.	10/kg	10	
S. barbisetum Nees	kikhwü	chipfü / chiepfü / ciepfü / tsiapfü	bitter brinjal	H	Mar.-Apr.	June-Nov.	5-15/kg	10	2,3,4,6,7,9,10
S. kurzii Prain	kepfü ketsü	chüpfü ketsü-u		H	Apr.	July	10/kg		1,5
S. melongena L.	pfüdi	pfüdisi / pfüdi	brinjal	H	Feb.-Apr.	Aug.-Nov.	10-12/kg	4,5,6,10	1,2,3,7,9,10
S. tuberosum L.	kelu	alu	potato	H	Jan.-May	Mar.- Nov.	7-10/kg, 100/tin	1,2,3,4,5,6,7,8,9,10	4
THEACEAE - Tea Family (1)									
Camellia sinensis (L.) O.K. var. *assamica* (Mast.) Kita	sichanyü		tea	T	May-June			10	

Botanical Name	Local Names		Common English Name	Life Form[†]	Season Planted	Season Harvested	Prices *(Rs)*	Fields Present	
	Khonoma	Tsiesema						Khonoma	Tsiesema
ZINGIBERACEAE - Ginger Family (3)									
Amomum subulatum Roxb.	eliachi	elechie	large cardamom	H	Apr.			10	
Curcuma longa L.	kotsievü	ciesi / ciecie / chietei	turmeric	H	May			10	
Zingiber officinale Roscoe	kevü	kevü	ginger	H	Feb.-July	June-Dec.	8-30/kg or 120-280/basket	5,10	2,4,7

[‡] This list does not include numerous wild plants, such as *Plantago major* L., *Fagopyrum cymosum* (Trevir.) Meisn., and *Houttuynia cordata* Thunb., that are not planted by farmers, but rather occur naturally in jhum fields and are also harvested as vegetables.

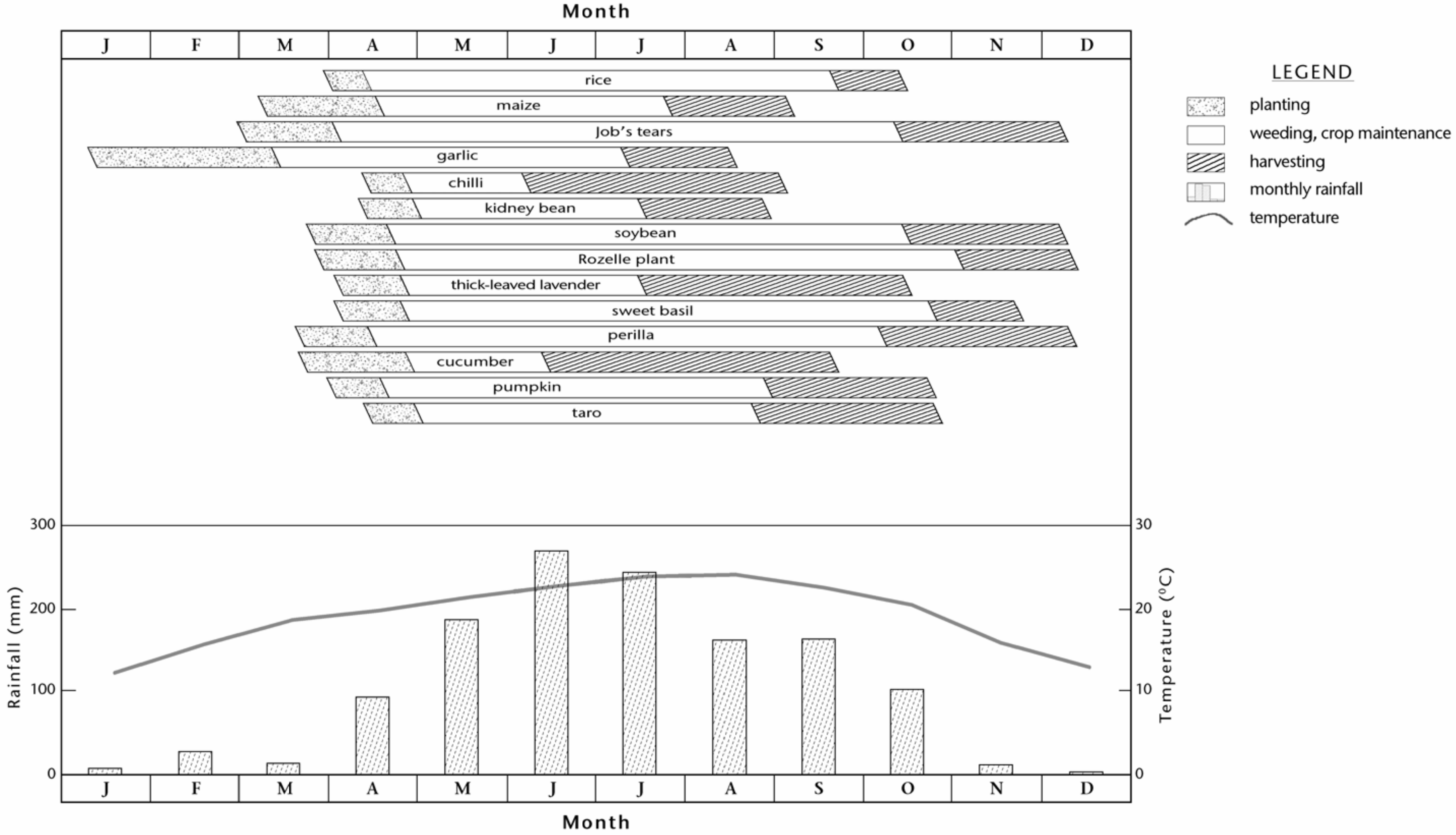
[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

APPENDIX 5-26. Cropping Calendar for Tsiesema's Jhums – 1st Year *



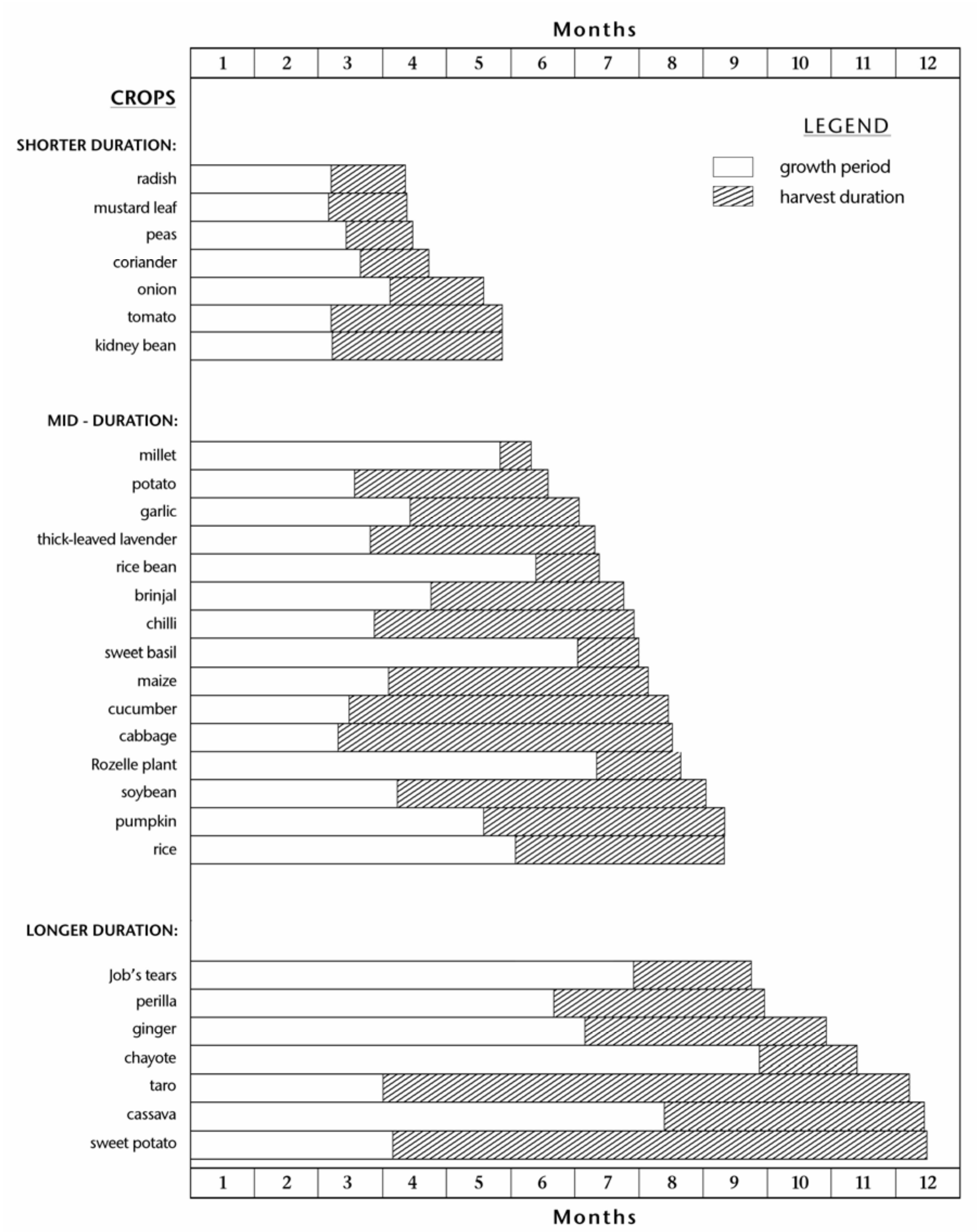
* Data derived from farmer-kept diaries on their inputs and outputs for fields monitored over 2000 and 2001 cropping years.

APPENDIX 5-27. Cropping Calendar for Tsiesema's Jhums – 2nd Year *



* Data derived from farmer-kept diaries on their inputs and outputs for fields monitored over 2000 and 2001 cropping years.

APPENDIX 5-28. Gestation Period of Some of the Crops Most Commonly Grown in the Study Villages*



* Harvest durations are extended because they include 1) data from both research villages; and 2) numerous varieties, ranging from fast- to slower-maturing.

APPENDIX 5-29. Major Fallow Plants

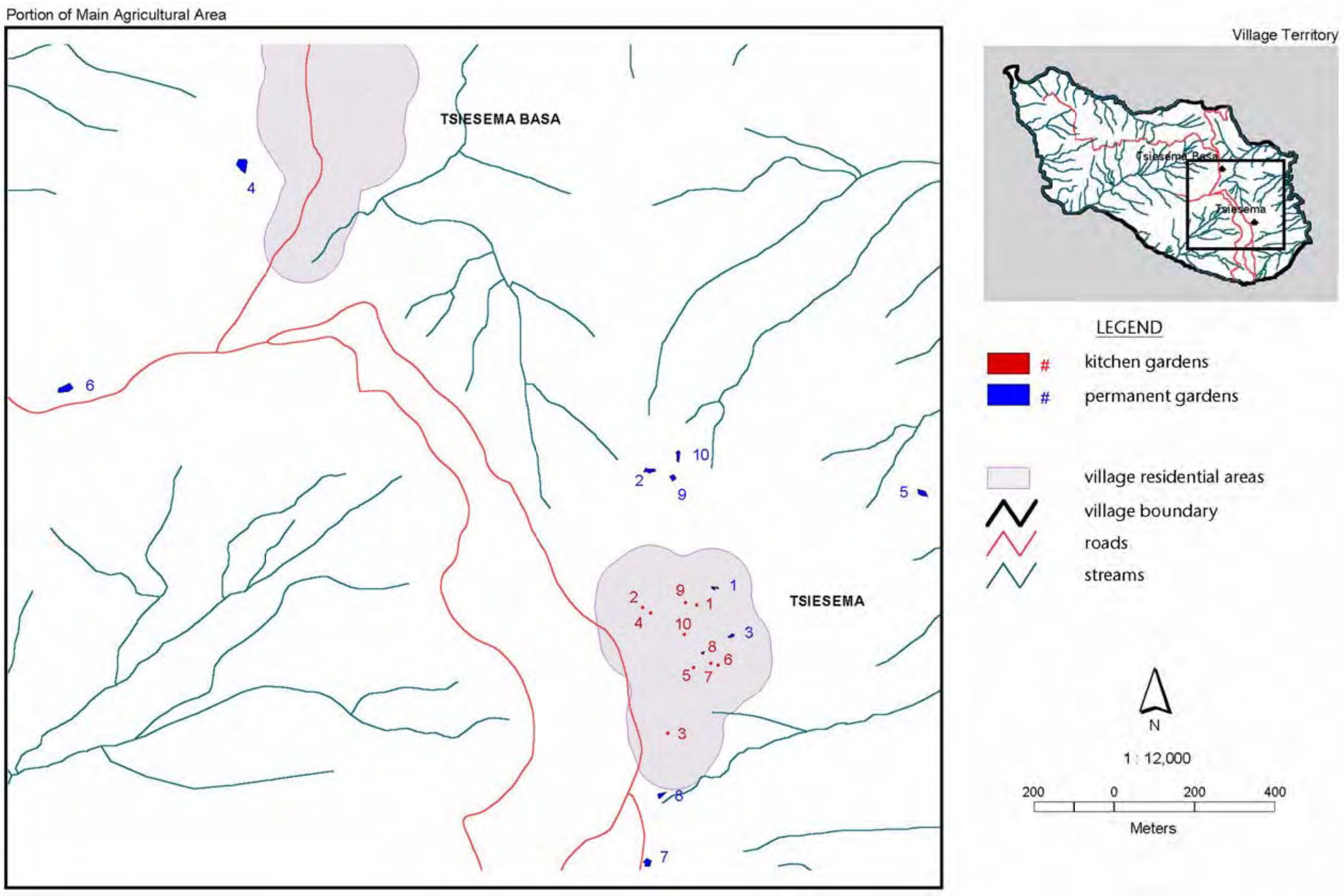
Botanical Name	Common English Name	Local Names		Life Form[†]	Habitat
		Khonoma	Tsiesema		
AMARANTHACEAE - Amaranth Family (1)					
Achyranthes aspera L.		zuyha	zorha (rha pfhü)	H	cliff, damp exposed areas
APIACEAE - Carrot Family (1)					
Centella asiatica (L.) Urb.	Indian Pennywort	gara	gara	H	clayey soils in open spaces
ASTERACEAE - Sunflower Family (10)					
Ageratum conyzoides L.		tephrienha / tephinha	nhana	H	abundant along roadsides, open fields
Artemisia indica Willd.	bitter wormwood, mugwort	penia nienu / penia / penie /niapnu / niapfü	ciena / ciena nanu / ciena-napfu	S	abundant in exposed areas with moist soils, such as forest margins, open forests, near roadsides & other degraded areas
Bidens pilosa L.		tsünyütsethu	temvütsüthu	H	shady moist areas, open fields
Chromolaena odorata (L.) R.M. King & H. Rob.			tsotsa / tsoca / japannha / tsonha	S	warmer areas
Crassocephalum crepidioides (Benth.) S. Moore	redflower ragleaf, thickhead	vilhunha / keko	mithudzü / methudzü	H	cultivated areas at mid-altitudes up to 1600 m asl
Eupatorium adenophorum Spreng.		tsunha	tsonha	S	open exposed areas
Laggera pterodonta (DC.) Sch. Bip. ex Oliv.		pierü	pierü	H	rock cliff, dry exposed areas
Mikania cordata (Burm. f.) B.L. Rob.			rosa	V	
Sonchus sp.		gadzu / gadzü	pierükeza-u / pierü kezha-u	H	rock cliffs, crevices, open areas
S. wightianus subsp. *wallichianus* (DC.) Boulos		gadzü / vilhunha	pierü / pierüpu	H	rock cliffs, crevices, open areas
CONVOLVULACEAE - Morning-glory Family (1)					
Porana racemosa Roxb.		garibu / gareibu	reitsü / reicü	V	moist areas, roadsides, forest edges, landslide areas
CUCURBITACEAE - Cucumber or Cucurbit Family (2)					
Hodgsonia macrocarpa (Blume) Cogn.			penhuro	V	climbs large trees in forest

Botanical Name	Common English Name	Local Names		Life Form†	Habitat
		Khonoma	Tsiesema		
Trichosanthes palmata Roxb.		gauri / gaü-ri / gaüri /thezuchütuo	thezuchütuo	V	riversides, roadsides, marshy areas
LAMIACEAE - Mint Family (4)					
Elsholtzia blanda (Benth. in Wall.) Benth.		rünü / runü / rünu	tepfürünu	S	degraded forest, wasteland
Gomphostemma sp.		mehya	teizhu	T	
Plectranthus sp.		tsünyütsethu			
P. amboinicus (Lour.) Spreng.		shuzhabitse	terhürünu / terhourünu	H	
MALVACEAE - Mallow Family (2)					
Sida rhombifolia L. ssp. *rhombifolia*		niki		S	road sides and other open spaces
Urena lobata L.		kushu / kushü / kuchü		S	moist roadsides
POACEAE - Grass Family (2)					
Arundinella sp.	bamboo	tsoga / tsoganyü	zoga	G	roadsides, grasslands
Digitaria sp.			phirei	G	
ROSACEAE - Rose Family (3)					
Neillia thyrsiflora D. Don		thegasero			
Rubus sp.		pfüpo		S	
R. ellipticus Sm. (orange) (raspberry)	yellow Himalyan raspberry	mvüyha	rom / ruomvu / ruomvü	S	abundant in scrub forests
RUBIACEAE - Madder Family (1)					
Borrerra alata (Aubl.) DC.		rünu /runü / mhilamelo	mhilamhiluo / nhilamhiluo	H	
SCROPHULAREACEAE - Figwort Family (1)					
Lindernia sp.		chüza betse		H	forest floor, moist soil
SMILACACEAE - Catbrier Family (1)					
Smilax zeylanica L.		khwüpro / khwüpo		T	

Botanical Name	Common English Name	Local Names		Life Form[†]	Habitat
		Khonoma	Tsiesema		
SOLANACEAE - Potato Family (1)					
Solanum khasianum C.B. Clarke		chükrü / shukru / shükru	chükrü / khuziechükrü	H	near roadsides, degraded forest, wastelands
URTICACEAE - Nettle Family (4)					
Boehmeria sp.		tekhupfemhu / tekhuphemü		H	forest floor in moist area
B. clidemioides Miq.		temieu kecu / temieü ketsü			
B. hamiltoniana Wedd.		temieu kezhau / temieü		S	
Girardinia heterophylla (Vahl) Decne. - green		lovie / lhovie / phelovie	zozie	S	roadsides, degraded forests, grasslands, gardens, & other moist areas
UNIDENTIFIED (14)					
Trinanfetta rhombordea Jaeg. (sp?)		gwi meri		S	
			huphienuo		
			keduo		
			kheza		
		kuchünieki			
			lirieprü		
			pichü		
			rapfü / rhapfü		
			rettsü		
		rünu mavi		S	
		sefülicü			
		tefünotse			
			thilamhiluo		
			zochüniakie		

[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

APPENDIX 5-30. Locations of Kitchen Gardens and Permanent Gardens Cultivated by Collaborating Farmers in Tsiesema



APPENDIX 5-31. List of Plants Found in Kitchen Gardens of the Collaborating Farmers in Khonoma and Tsiesema Villages
(Based on Data from Ten Fields Monitored in Each Village)

Botanical Name	Local Name	Life Form[†]	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
ACANTHACEAE - Acanthus Family (1)									
Adhatoda vasica Nees	teise / tsiesenyü	S	medicinal	all seasons	leaves	decoction		5	2,7
ACTINIDIACEAE - Chinese Gooseberry Family (1)									
Actinidia chinensis Planch.	kiwi vine	V	fruit	YTH	fruit	fresh		5	nil
AMARANTHACEAE - Amaranth Family (1)									
Celosia argentea L.	neidza	H	vegetable	all seasons	leaves	boil	10/bundle	nil	2
ANACARDIACEAE - Sumac Family (4)									
Mangifera indica L.	merosi	T	fruit juice	July-Aug	fruit fruit	fresh ferment	10/250 gm 40/bottle	5,7	2,3
Rhus sp.	sikhwü / sikwü	T	firewood medicinal	all seasons all seasons	bole & branches bark & leaves	liquid extract used for itching	800/stack 100/kg	7, 10	nil
R. semialata Murray	tsomhu	T	vegetable fruit medicine	all seasons Nov	leaves fruit fruit	boil fresh / dry liquid extract mixed with honey or sugar	10/bundle 100/kg 100/kg	5	nil
Spondias axillaris Roxb.	khula	T	fruit timber	YTH all seasons	fruit bole	fresh	150/stack	1,7,8	nil
APIACEAE - Carrot Family (1)									
Coriandrum sativum L.	dunia / dhunia	H	spice medicinal	all seasons	leaves leaves	fresh boil / fresh	5/bundle 5/bundle	nil	1,3,6,9
ARACEAE - Arum Family (3)									
Alocasia macrorrhizos (L.) G. Don	dzümo	H	vegetable	all seasons	leaves tuber	boil	10/bundle 10/kg	nil	2,3,8

Botanical Name	Local Name	Life Form[†]	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
Colocasia sp.	dzüti	H	vegetable	all seasons	leaves	boil	10/bundle	nil	10
					tuber		10/kg		
Colocasia esculenta (L.) Schott	dzünuo	H	vegetable	Apr-Nov	stems & leaves	boil	10/bundle	1,5,10	6,9,10
					tuber	boil	10/kg		
ASTERACEAE - Sunflower Family (1)									
Gynura sp.	liejieno	H	fruit					2,4,5,6,7,8	1,2,3,4,6,7,8,10
			vegetable	all seasons	young shoots	boil	10/bundle		
BERBERIDACEAE - Barberry Family (1)									
Mahonia nepalensis DC.	nthoü	S	medicinal	all seasons	soft inner stem	decoction	250/kg	5	nil
			dye		bark		200/kg		
			juice	Mar-Apr	fruit	ferment	40/bottle		
BETULACEAE - Birch Family (1)									
Alnus nepalensis D. Don	rüpo / rüpu / rupou / rüpuo	T	timber	all seasons	bole			1,5	9
			firewood		bole		200/sfty		
			medicine		leaves & bark	boil liquid	800/stack		
			dye		bark	extracts			
BORAGINACEAE - Borage Family (1)									
Cordia myxa L.	chemu	T	adhesive	May-June	fruit	squeeze & dry		nil	3,4,10
			firewood	all seasons	bole		600/stack		
BRASSICACEAE - Mustard or Crucifer Family (3)									
Brassica campestris L.	gakrie / gakre	H	vegetable	all seasons	stem, leaves & inflorescence	boil / fry	10/bundle	2	6
B. oleracea var. *capitata* L.	kobi	H	vegetable	all seasons	leaves	boil / fry	10/kg	2	6
B. oleracea var. *caulorapa* DC.	kobi	H	vegetable		stem			nil	6
CARICACEAE - Papaya Family (1)									
Carica papaya L.	kopita	T	fruit	Feb-July	fruit	fresh	10-20/fruit	nil	9

Botanical Name	Local Name	Life Form†	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
COMBRETACEAE – Indian Almand Family (1)									
Terminalia myriocarpa Van Heurck & Müll. Arg.	bicha	T	timber firewood	all seasons	bole		200/sfty	1,2	nil
CONVOLVULACEAE - Morning-glory Family (1)									
Ipomoea batatas (L.) LmK.	phiemu / dzümu	V	vegetable	all seasons	tuber	boil / roast	10/kg	nil	3
CUCURBITACEAE - Cucumber or Cucurbit Family (6)									
Cucumis sativus L.	tsütuo	V	vegetable	Aug-Nov	fruit	fresh	10/bundle	nil	6,8
Cucurbita pepo L.	rümo	V	vegetable	May-Nov July-Nov	leaves fruit	boil / fry boil / fry	10/bundle 10/kg 10-20/fruit	nil	7,9,10
Lagenaria vulgaris Ser.	meshü	V	vegetable	Aug-Sept	fruit	boil / fry	10/3 pieces	nil	7
Luffa cylindrica (L.) M. Roem.	pfüshü	V	vegetable scrubbing pad	Aug-Sept Oct-Jan	fruit fruit	boil / fry remove cover & seeds	10/3 pieces 10/3 pieces	nil	6,7
Momordica charantia L.	kerela	V	vegetable	Sept-Nov	fruit	boil / fry	10/bundle	nil	7,10
Sechium edule (Jacq.) Swartz	squash	V	vegetable vegetable	Feb-Dec June-Dec	leaves & shoots fruit	boil / fry boil / fry	10/bundle 5-10/kg	4,5,6	1,2,3,4,6,8,9,10
DIOSCOREACEAE - Yam Family (1)									
Dioscorea sp.	rüphie	V	vegetable	Nov-Jan	tuber	boil / roast	10/kg	nil	2,6,8
ELAEOCARPACEAE - Elaeocarpus Family (1)									
Elaeagnus conferta Roxb.	peshü	T	fruit juice	Mar-Apr	fruit fruit	fresh fresh	20/kg	1,4,5,7,8,9	2
EUPHORBIACEAE - Spurge Family (4)									
Antidesma sp.	neirhünyü		vegetable	Apr-May	young shoots	boil	10/bundle	5	nil
Emblica officinalis Caertn.	chehu	T	fruit	YTH	fruit	fresh		nil	8
Hevea brasiliensis (Willd. ex A. Juss.) Müll. Arg.	ketsa	T	adhesive	all seasons	latex from bole	dried	160/250 gm	nil	1,8,9

Botanical Name	Local Name	Life Form†	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
Ricinus communis L.	lutsa	S	feed silkworms	all seasons	leaves	fresh		nil	2
FABACEAE - Bean Family (7)									
Albizia stipulata (DC.) Boivin	mago	T	timber firewood	all seasons	bole bole		150/sfty 800/stack	3	nil
Bauhinia variegata L.	teguo	T	vegetable firewood	Apr-May all seasons	inflorescence bole	boil / fry	10/bundle 700/stack	nil	7,9
Dolichos lablab L.	rütsü / tsüdu	V	vegetable	Apr-Dec	pod	boil / fry	10/bundle	2,3,10	1,6,7,8,9
Parkia roxburghii G. Don	thepfibi	T	vegetable	YTH	pod	boil / chutney		2,5,7	1,7,10
Phaseolus vulgaris L.	rütsü	V	vegetable	May-July	pod	boil / fry	10/bundle	nil	2,3,6,7,8,9,10
Psophocarpus tetragonolobus (L.) DC.	wing beans	V	vegetable	Sept-Dec	pod	fresh	10/bundle	nil	2,7,8
Vigna unguiculata (L.) Walp.	boti	V	vegetable	Nov-Dec	pod	boil / fry	10/bundle	nil	6
FAGACEAE - Beech Family (1)									
Quercus serrata Thunb.	oak / phre	T	timber firewood	all seasons all seasons	bole bole		150/sfty 1000/stack	3	6,8
GINKGOACEAE - Maidenhair Tree Family (1)									
Ginkgo biloba L.	maidenhair	T	medicinal fruit detergent	YTH	seed kernel seed	roast / cook		5	nil
LAMIACEAE - Mint Family (4)									
Mentha spicata L.	tepfinitso / bedinuo	H	spice	all seasons	leaves	boil / fry	5/bundle	2,5,10	5,7
Ocimum basilicum L.	nhietso	H	spice	May-Dec	leaves & inflorescence	dried / fresh	10/bundle	nil	7,8
Perilla ocymoides L.	kenia	H	vegetable	Nov-Dec	seed	boil / fry / fresh	20/kg	nil	6
Pogostemon sp.	khamyhü		vegetable	Mar-June	young shoot	boil	10/bundle	7	nil
LAURACEAE - Laurel Family (3)									
Cinnamomum pauciflorum Nees	tespata	T	spice	YTH	leaves	dried / fresh		nil	6

Botanical Name	Local Name	Life Form[†]	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
C. zeylanicum Blume	sichü / daljini	T	spice	all seasons	leaves	fresh	5/bundle	nil	1
Litsea citrata Blume	tsi / chi	T	timber firewood	all seasons	bole bole		180/sfty 700/stack	nil	3
LILIACEAE - Lily Family (1)									
Allium porrum L.	shüla	H	vegetable	all seasons	leaves	boil / fry	10/bundle	nil	3,6,7
LOGANIACEAE - Butterfly-bush Family (1)									
Buddleja paniculata Wall.	teizü / teidzü / temepfü / teishü	T	firewood timber vegetable	all seasons	bole & branches leaves	boil	600/stack 150/sfty 10/bundle	4,5,7,8	2,4
MALVACEAE - Mallow Family (2)									
Hibiscus sabdariffa L.	gakhro	S	vegetable	June-Dec		fresh / dried	10/bundle	nil	7
H. syriacus L.	sohenothe	S	vegetable	Mar-Apr	young shoot	boil	10/bundle	5	nil
MELASTOMATACEAE - Melastome Family (1)									
Osbeckia sp.	khukhe	S	medicinal	all seasons	root	decoction	50/kg	5	nil
MELIACEAE - Mahogany Family (2)									
Cedrela serrata Royle	zuna	T	timber	all seasons	bole		180/sfty	nil	2
Melia azederach L.	khuosia		timber	all seasons	bole		150/stack	1	nil
MORACEAE - Mulberry Family (6)									
Ficus sp.	bugu	T	firewood	all seasons	bole			nil	2
Ficus sp.	chede (exotic)	T	fruit	YTH	fruit	fresh	500/stack	5	nil
Ficus sp.	liho	T	firewood	all seasons	bole & branches		600/stack	nil	1
F. auriculata Lour.	chede	T	fruit	Aug-Sept	fruit	fresh	20/kg	5	7
F. elastica Roxb.	prigi / merie	T	bird trap firewood fencing	all seasons	latex bole bole	latex dried cut to 12 ft	350/kg 700/stack 12/piece	nil	1,2,4,6,8,9
Morus nigra L. -	khagunwthe / khravü	T	vegetable fruit	Mar. Apr-June	leaves fruit	boil fresh	10/bundle 30/kg	1	2,3,4

Botanical Name	Local Name	Life Form†	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
MUSACEAE - Banana Family (4)									
Musa sp.	chüpfe	T	vegetable	all seasons	stem	boil	10/bundle	nil	6
Musa sp.	khwekreno / pfengu	T	vegetable packaging	all seasons	soft inner stem leaves	boil fresh	10/stem 10/bundle	1,5,7	6,8
M. paradisiaca L.	tekhwesi / tekwhesi / thayie	T	fruit	all seasons	fruit	fresh	2/fruit	4,5,7	6
M. rosacea Jacq.	tiekwenyü / pfetho	T	packaging rope vegetable vegetable	all seasons YTH	leaves stem inflorescence	fresh boil boil	5-10/bundle	1,5,7	2,6,8,10
MYRSINACEAE - Myrsine Family (1)									
Ardisia crenata Sims	soda	S	medicinal		fruit			5	nil
MYRTACEAE - Myrtle Family (1)									
Psidium guajava L.	moduram	T	fruit	Aug-Jan	fruit	fresh	15/kg	2,5,6,7,9	1,2,4,5,6,7,8
PASSIFLORACEAE - Passion-flower Family (1)									
Passiflora edulis Sims	bell	V	juice vegetable medicinal fruit	all seasons	fruit young shoot young shoot & fruit fruit	ferment boil decoction fresh	40/bottle 10/bundle 10/bundle 1/ 2 fruit or 10/12-13 fruits	1,3,4,5,6,7,8	2,3,4,5,6,8
PINACEAE - Pine Family (1)									
Pinus khasya Royle ex Hook. f.	tehu	T	timber firewood	all seasons	bole bole		150/sfty 800/stack	1,5	nil
PLANTAGINACEAE - Plantain Family (1)									
Plantago major L.	gapa	H	vegetable	all seasons	leaves	boil / fry	10/bundle	nil	6

Botanical Name	Local Name	Life Form[†]	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
POACEAE - Grass Family (7)									
Arundineria sp.	jhepfü	G	broom	all seasons	stems, leaves & shoots	fresh / dry	10/broom	7	nil
Bambusa sp.	kipha	G	handicrafts fencing timber	all seasons	stem stem stem		20/bundle	5	nil
Coix lacryma-jobi L.	kesie	G		Nov-Dec	seed	boil	20/kg	nil	6
Dendrocalamus hamiltonii Nees & Arn. ex Munro	kevü / keria	G	handicrafts fencing construction vegetable broom	all seasons	stem stem stem young shoot stem	fresh fresh fresh ferment fresh	10/stem 10/stem 10/stem 25/bundle 10/broom	3,5,7	9
Phyllostachys mannii Gamble	jhülithe	G	broom	all seasons	stem, leaves & shoot	fresh / dry	10/broom	5,7	nil
Saccharum officinarum L.	nukrücha / ke	G	juice	all seasons	stem	fresh	10/stem	1,2,3	1,2,5,6,8,9,10
Zea mays L.	shüko	G	cereal	July-Oct	cob	boil / fry / roast	10/bundle	nil	3,6,8
POLYGONACEAE - Buckwheat Family (3)									
Fagopyrum cymosum (Trevir.) Meisn.	gari	H	vegetable	all seasons	leaves	boil / fry	10/bundle	5	3,6
Polygonum chinense L.	gare	H	vegetable	all seasons	leaves	boil / fry	10/bundle	2,5,7,9	3,6
P. plebeium R. Br.	gagi	H	vegetable	all seasons	young shoots & leaves	boil / fry	10/bundle	2,5,9	nil
PROTEACEAE - Protea Family (1)									
Grevillea robusta A. Cunn. ex R. Br.	seivuro	T	timber	all seasons	bole		130/sfty	2	nil
RHAMNACEAE - Buckthorn Family (2)									
Hovenia dulcis Thunb.	kipia / sisie	T	firewood timber	all seasons	bole bole		700-800/stack 150/sfty	5,8	6
Zizyphus incurva Roxb.	khroge	T	fruit		fruit	fresh		5	nil

Botanical Name	Local Name	Life Form†	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
ROSACEAE - Rose Family (5)									
Docynia indica (Wall.) Decne.	ciepho	T	fruit juice firewood	Nov-Feb Nov-Feb all seasons	fruit fruit bole & branches	fresh ferment	50/sack 40/bottle 800/stack	1,5,7	nil
Prunus avium (L.) L.	kevi / pezie	T	fruit firewood	Feb-Apr all seasons	fruit bole & branches	fresh	10/kg 800/stack	1,2,5,7	2,3,6,8
P. domestica L.	plum	T	fruit juice	May-July	fruit fruit	fresh ferment	1/2 fruit, 10/kg 40/bottle	1,5,7,9	1,3,10
P. persica (L.) Batsch	zarsi / chehumakrhü	T	fruit firewood	July-Aug all seasons	fruit bole	fresh	10/kg 800/stack	1,3,5,7	2,8
Pyrus communis L.	naspati	T	fruit	YTH	fruit	fresh		nil	10
RUBIACEAE – Madder Family (1)									
Coffea arabica L.	cofee	T	non-alcoholic beverage	Jan-Apr	fruit	roasted & ground		5	5
RUTACEAE - Rue Family (5)									
Citrus aurantium cv. *chinotto*	sehu kekro-u	T	fruit	Nov-Jan	fruit	fresh	10/kg 10/8 fruits	nil	2,3
C. limon (L.) Osb.	shüpfü / shüpfü kekro-u / nhashüho	T	fruit	Nov-Mar	fruit	fresh	2-5/fruit	2,5,6,7,9	8
C. maxima (Burm. ex Rumph.) Merr.	pomello / hulo	T	fruit juice	Mar-Apr	fruit fruit	fresh ferment	5/fruit 40/bottle	2,5,6,8,9	1,4
C. sinensis (L.) Osbeck	sehu	T	fruit	YTH	fruit	fresh		nil	10
Zanthoxylum acanthopodium DC.	ganyanyü / ganya	T	vegetable spice	Apr-May YTH	leaves fruit	boil fresh / dried / chutney	10/bundle 10/bundle	5	6

Botanical Name	Local Name	Life Form†	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
SAXIFRAGACEAE - Saxifrage Family (1)									
Bergenia stracheyi (Hook. f. & Thomson) Engl.	tsiekha / tsiekha daru	H	medicinal	all seasons	leaves & stem	fresh / decoction	200/kg	5,10	nil
SOLANACEAE - Potato Family (10)									
Capsicum frutescens L.	chüsi	H	spice	May-Nov	fruit	boil / fry / roast / fresh	10/250 gm 10/6-8 fruits	4	2,3,5,6,8
Cyphomandra betacea (Cav.) Sendtn.	sibienyienuo	S	vegetable	Aug-Mar	fruit	boil / chutney	3/2 fruits 10/8-9 fruits	1,2,3,4,5,6,7,9	2,3,4,5,6,8,9,10
Datura meteloides Dunal	mekritise	S	medicinal	all seasons	leaves	boil to make paste	100/kg	5	nil
Lycopersicon esculentum Mill	bienyienuo	H	vegetable	Mar- June	fruit	boil / fry / fresh	8-10/kg	1,7	2,8
Physalis minima L.	betelenuo	H	fruit	May-June	fruit	fresh		nil	2,4,8
Solanum sp.	kepfü / kepfü kezhau / kepfü kezha-u	H	vegetable	Apr-Nov	fruit	boil / fry	10/kg	1,8	1,2,3,4,6,7,8
S. kurzii Prain	kepfü ketsü	H	vegetable	Apr-Dec	fruit	boil / fry	10/kg	nil	8,9
S. melongena L.	pfüdi	H	vegetable	June-Nov	fruit	boil / fry		2	nil
S. spirale Roxb.	zierprü / zerüprü	H	vegetable medicinal	all seasons	leaves leaves	boil boil	10/bundle 10/bundle	2,5	1,6,9
S. tuberosum L.	alu	H	vegetable	May-June	tuber	boil / fry	10/kg	nil	2
TAXODIACEAE - Bald Cypress Family (1)									
Cryptomeria japonica (Thunb. ex L. f.) D. Don	tehu	T	timber firewood	all seasons	bole bole		200-250/sfty 800-1200/stack	1,2,6,7	5,6,10
THEACEAE - Tea Family (2)									
Camellia sinensis (L.) O.K. var. *assamica* (Mast.) Kita	sichanyü		non-alcoholic beverage	YTH	young shoot			2,5	nil

Botanical Name	Local Name	Life Form[†]	Uses	Season Collected	Part/s Used	Preparation	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
Schima wallichii Choisy	macho	T	timber (posts) firewood	all seasons	bole bole	remove bark	7/ft,150/sfty, 700/stack	3,8	3,6
URTICACEAE - Nettle Family (1)									
Elatostema cyrtandrifolium (Zoll. & Moritzi) Miq.	gajie	H	vegetable					nil	6,8
VERBENACEAE - Verbena Family (2)									
Clerodendrum colebrookianum Walp.	gatherü / gathera	S	vegetable	all seasons	young shoot, leaves	boil / fry	10 / bundle	5	3
Gmelina arborea Roxb. ex Sm.	thoguü	T	timber	all seasons	bole		200/sfty	3,7	nil
VITACEAE - Grape Family (1)									
Vitis vinifera L.	khube	V	fruit	YTH	fruit	fresh / dried		5	9,10
ZINGIBERACEAE - Ginger Family (5)									
Alpinia sp.	sokrüno / sokrünyü	H	fruit vegetable packaging rope	Aug-Sept July-Aug all seasons	fruit inflorescence leaves	fresh boil / chutney dried	10/kg 10/kg 20/bundle	5	4
Amomum subulatum Roxb.	eliachi	H	spice	YTH	fruit	dried		2,9	nil
Costus speciosus (J. König) Sm.	khwünothi	H	medicinal	all seasons	stem	decoction	50/kg	5	nil
Curcuma aromatica Salisb.	khukhwü	H	medicinal	YTH	leaves			5	nil
Zingiber officinale Roscoe	kevü	H	spice medicine	all seasons	rhizomes, leaves & inflorescence rhizomes & leaves	fresh fresh	10/bundle 10/bundle	5,7	6,10
UNIDENTIFIED (1)									
unidentified	thenyie	T	firewood timber	all seasons	bole bole		150/stack	nil	4

[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

* $US 1 = 48.044 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

APPENDIX 5-32. List of Plants Found in Permanent Gardens of the Collaborating Farmers in Khonoma and Tsiesema Villages
(Based on Data from Ten Fields Monitored in Each Village)

Botanical Name	Local Name	Common English Name	Life Form[†]	Uses	Season Planted	Season Harvested	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
ANACARDIACEAE - Sumac Family (1)									
Mangifera indica L.	merosi	mango	T	fruit	perennial	July-Sept	10/4-5 fruits	4,9	4,5,6
APIACEAE - Carrot Family (2)									
Coriandrum sativum L.	dhunia	coriander	H	spice	Mar	Apr-June	5/bundle	4,8	2
Daucus carota subsp. *sativus* (L.) Schübl. & Mart.	carrot	carrot	H	vegetable		Nov-Apr	25/kg	5	nil
ARACEAE - Arum Family (3)									
Alocasia macrorrhizos (L.) G. Don	thupele / dzümo	taro	H	vegetable	June	all seasons	10/bundle	nil	3,6,7
Colocasia sp.	dzüti	taro	H	vegetable	perennial	all seasons	10/bundle	nil	3,5,6
Colocasia esculenta (L.) Schott	dzünuo	taro	H	vegetable	June	all seasons	10/bundle	2,3,7	1,2,4,6,7,9
ASTERACEAE - Sunflower Family (1)									
Gynura sp.	liejieno	velvet plants	H	vegetable	perennial	all seasons	10/bundle	2,5,6,7,10	1,2,3,5,6,8,9
BETULACEAE - Birch Family (1)									
Alnus nepalensis D. Don -	rüpuo	alder	T	firewood	perennial	all seasons	800/stack	nil	1,2,6,10
BORAGINACEAE - Borage Family (1)									
Cordia myxa L.	chemu	Assyrian plum	T	adhesive	perennial	May-June		nil	2,4,5,6,7
BRASSICACEAE - Mustard or Crucifer Family (3)									
Brassica campestris L.	gakrie / gakre	mustard leaves	H	vegetable	Mar Sept-Dec	May Nov-Feb	5-10/bundle	4,8	2
B. oleracea var. *capitata* L.	kobi	cabbage	H	vegetable	Jan-Mar June-Aug	June-July Nov-Jan	8/kg	2,3,4,6,8	1
Raphanus sativus L.	mula	radish	H	vegetable	Mar Jan	May-June Feb-Mar	5/bundle	4	1

Botanical Name	Local Name	Common English Name	Life Form†	Uses	Season Planted	Season Harvested	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
BROMELIACEAE - Bromeliad Family (1)									
Ananas comosus (L.) Merr.	anaras	pineapple	H	fruit	perennial	YTH		nil	4,6
CARICACEAE - Papaya Family (1)									
Carica papaya L.	kopita	papaya	T	fruit	perennial	all seasons	10-20/fruit	9	4,5,6
COMBRETACEAE - Indian Almond Family (1)									
Terminalia myriocarpa Van Heurck & Müll. Arg.	bicha / mecha	hollock	T	firewood	perennial	all seasons		nil	1
CONVOLVULACEAE - Morning-glory Family (1)									
Ipomoea batatas (L.) LmK.	phiemü / dzümu	sweet potato	V	vegetable	June	Nov-Dec	10/kg	2,10	7
CUCURBITACEAE - Cucumber or Cucurbit Family (6)									
Cucumis sativus L.	tsüto / tsütuo	cucumber	V	vegetable	Mar-June	June-Dec	10/bundle	3,4,5,7,9	2,5,6,7,10
Cucurbita pepo L.	rümo / rümo ketsü	pumpkin	V	vegetable	Mar-Apr	Sept-Nov	5-10/fruit 10/bundle	3,4,6,7,8,9	3,5,6,7,10
Lagenaria vulgaris Ser.	meshü	gourd	V	decoration	Mar	Nov		nil	3,6
Luffa cylindrica (L.) M. Roem.	pfüshü	sponge gourd	V	vegetable	Mar-June	Aug-Sept	10/3 pieces	nil	7,10
Momordica charantia L.	kerela	bitter gourd	V	vegetable	perennial	Sept-Nov	10/bundle	nil	5
Sechium edule (Jacq.) Swartz	squash	chayote	V	vegetable	perennial	May-Dec	5/bundle	4,6,7,8,9,10	4,5
DIOSCOREACEAE - Yam Family (1)									
Dioscorea sp.	rüphie	yam	V	vegetable	perrenial	Nov-Jan		nil	6
ELAEAGNACEAE - Oleaster Family (1)									
Elaeagnus conferta Roxb.	peshü		T	fruit	perrenial	Feb-Apr	10/kg	4,9	6
EUPHORBIACEAE - Spurge Family (3)									
Bischofia javanica Blume	meliesi	bishop wood	T	firewood	perennial	all seasons		nil	6,8,10
Emblica officinalis Caertn.	chehu	emblic	T	fruit	perennial	Feb-Apr		nil	6,7
Manihot esculenta Crantz	sidzümu	cassava / tapioca	S	vegetable	perennial	Sept-Jan		nil	2,4,6,9,10

Botanical Name	Local Name	Common English Name	Life Form†	Uses	Season Planted	Season Harvested	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
FABACEAE - Bean Family (11)									
Albizia lebbeck (L.) Benth.	ze	East Indian walnut	T	firewood	perennial	all seasons		nil	6
Cajanus cajan (L.) Millsp.	dali	pigeon pea	S	vegetable	Apr	Nov-Dec		9	6
Dolichos lablab L.	rütsü / tsüdu	hycianth bean	V	vegetable	Mar	all seasons	10/bundle	2,8	2,5,10
Erythrina indica Lam.	hutuo	Indian coral tree	T	firewood	perennial	all seasons		nil	3
Glycine max (L.) Merr.	shüdza	soybean	H	vegetable	May	Nov	10/cake	nil	10
Parkia roxburghii G. Don	thepfibi	tree bean	T	vegetable	perennial	YTH		4,9	5,6,8,9
Phaseolus vulgaris L.	rütsü	kidney bean	V	vegetable	Mar-Apr	May-July	10/bundle	3,4,5,6,7,9	1,2,3,5,6,10
Pisum sativum L.	motor	peas	V	vegetable	Jan	Mar		4	2,6
Vicia faba L.	miakrümia tsüprie	broad bean	V	vegetable		Feb-Mar		8	nil
Vigna umbellata (Thunb.) Ohwi & H. Ohashi	kerhü	rice bean	V	vegetable	Mar	July-Oct	20/kg	7,9	nil
V. unguiculata (L.) Walp.	boti	cowpea	V	vegetable	Mar	Nov-Dec		nil	10
FAGACEAE - Beech Family (2)									
Quercus pachyphylla Kurz	pedusi	red oak	T	firewood	perennial	all seasons		nil	2
Q. serrata Thunb.	phre	white oak	T	firewood	perennial	all seasons	1000/stack	nil	3,5,6,7
JUGLANDACEAE - Walnut Family (1)									
Juglans regia L.	mewe	walnut	T	firewood	perennial	all seasons		nil	2
LILIACEAE - Lily Family (4)									
Allium cepa L.	piez	onion	H	spice		June		3	nil
A. cepa L. var. *perutile*	chümeria	ever-ready onion	H	spice		Feb-Apr	10/bundle	2,3,4,5,6,7,8,9	nil
A. porrum L.	solia / shüla	leek	H	vegetable	Mar	all seasons	10/bundle	3,6,9,10	6
A. sativum L.	khuvie		H	vegetable	Mar	June-July	10/bundle	7	2,6,8,10
MALVACEAE - Mallow Family (2)									
Hibiscus sabdariffa L.	gakhro	Monarch Rosemallow	S	vegetable	Mar	June-Dec	10/bundle	nil	10
Kydia calycina Roxb.	kerunyü		T	firewood	perennial	all seasons		nil	10

Botanical Name	Local Name	Common English Name	Life Form†	Uses	Season Planted	Season Harvested	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
MELIACEAE - Mahogany Family (1)									
Melia azederach L.	khusia	ghora neem	T	firewood	perennial	all seasons	150/stack	nil	2,4
MORACEAE - Mulberry Family (2)									
Artocarpus heterophyllus Lam.	kothal	jackfruit	T	fruit	perennial	YTH		nil	6
Ficus elastica Roxb.	prigi		T	bird trap	perennial	all seasons		nil	3
MUSACEAE - Banana Family (2)									
Musa sp.	khwekreno	banana	T	vegetable	perennial	all seasons		6	nil
M. paradisiaca L.	tekwhesi / thayie	banana	T	fruit	perennial	all seasons	10/dozen	9,4	1,4,6,7
MYRTACEAE - Myrtle Family (1)									
Psidium guajava L.	moduram	guava	T	fruit	perennial	Aug-Jan	15/kg	4,5	1,3,4,5,9
PASSIFLORACEAE - Passion-flower Family (1)									
Passiflora edulis Sims	bell	passion fruit	V	fruit	perennial	all seasons	1/2 fruits 10/12-13 fruit	2,4,6,10	2,4,5,8,9,10
PINACEAE - Pine Family (1)									
Pinus khasya Royle ex Hook. f.	tehu	pine	T	firewood	perennial	all seasons	800/stack	nil	6,7
POACEAE - Grass Family (4)									
Coix lacryma-jobi L.	kesie	Job's tears	G	cereal	Mar	Nov-Dec		nil	10
Saccharum officinarum L.	nukhrücha / ke	sugarcane	G	juice	perennial	all seasons		2,5,6,7	1
Sinarundinaria nagalandiana H.B. Naithani	kerie	bamboo	G	fencing	perennial	all seasons		nil	1,6
Zea mays L.	zarüsi / shüko / shüko konya	maize / corn	G	cereal	Jan-May	July-Oct	10/bundle	2,3,4,5,6,7,8,9	2,3,5,6,7,8,9, 10
ROSACEAE - Rose Family (3)									
Prunus avium (L.) L.	pezie	cherry	T	fruit	perennial	Feb-Apr		nil	5
P. domestica L.	plum	plum	T	fruit	perennial	May-July		4,6,9	7

Botanical Name	Local Name	Common English Name	Life Form†	Uses	Season Planted	Season Harvested	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
P. persica (L.) Batsch	zarsi / chehumakrhü	peach	T	fruit	perennial	June-Aug	10/kg	4,7	4,5,6,7
RUTACEAE - Rue Family (5)									
Citrus aurantium cv. *chinotto*	sehu kekro-u		T	fruit	perennial	Nov-Jan		nil	2,4
C. limon (L.) Osb.	shüpfü / nhashüho	lemon	T	fruit	perennial	Nov-Jan		4	5,6
C. maxima (Burm. ex Rumph.) Merr.	pomello / hulo	shaddock	T	fruit	perennial	Nov-Jan	5/fruit	4	4,6
C. reticulata Blanco	shüpfü / sehu kemu-u	mandarin	T	fruit	perennial	Nov-Jan	5/fruit 20/8-9 fruits	6	2,4,5,6,8,9
C. sinensis (L.) Osbeck	sehu	sweet orange	T	fruit	perennial	YTH		nil	9
SAPINDACEAE - Soapberry Family (1)									
Litchi chinensis Sonn. ssp. *chinensis*	lechu	litchi	T	fruit	perennial	YTH		nil	6
SOLANACEAE - Potato Family (8)									
Capsicum frutescens L.	chüsi	pepper	H	spice	Jan-June	May-Nov	10/bundle 10/250 gms	3,4	2,4,5,6,7,10
Cyphomandra betacea (Cav.) Sendtn.	sibienyienuo	tree tomato	S	vegetable	perennial	Aug-Mar	3/2 fruits 10/8-9 fruits	4,6,10	4,5,7,8
Lycopersicon esculentum Mill.	bienyienuo	tomato	H	vegetable	Mar	Apr-Oct	8/kg 10/bundle	3,5,7	3,4,5,6
Physalis minima L.	betelenuo	pygmy groundcherry	H	fruit	perennial	May-June		nil	5
Solanum sp.	kepfü / kepfü kezha-u		H	vegetable	Mar-June	May-Nov	10/kg	4,5	1,2,3,5,7,8,9
S. kurzii Prain	kepfü ketsü		H	vegetable	perennial	May-Dec	10/bundle	nil	5
S. melongena L.	pfüdi	brinjal	H	vegetable	June	June-Nov	10/bundle	nil	6,7
S. tuberosum L.	alu	potato	H	vegetable	Mar	May-June	8/kg	4,5,7	2
THEACEAE - Tea Family (1)									
Schima wallichii Choisy	macho	needle wood	T	firewood	perennial	all seasons	700/stack	nil	2,10

Botanical Name	Local Name	Common English Name	Life Form[†]	Uses	Season Planted	Season Harvested	Prices *(Rs)* *	Fields Present	
								Khonoma	Tsiesema
VERBENACEAE - Verbena Family (2)									
Callicarpa indica	sotsü		T	firewood	perennial	all seasons		nil	10
Gmelina arborea Roxb. ex Sm.	thovü	gumbhar	T	firewood timber	perennial	all seasons		nil	4
ZINGIBERACEAE - Ginger Family (1)									
Zingiber officinale Roscoe	kevü	ginger	H	spice	Mar-May	all seasons	10/bundle	3,6	2,3,5,6,8,9,10
UNIDENTIFIED (1)									
unidentified	seiti / seitei / seiteisi		T	fruit	perennial	YTH		nil	1

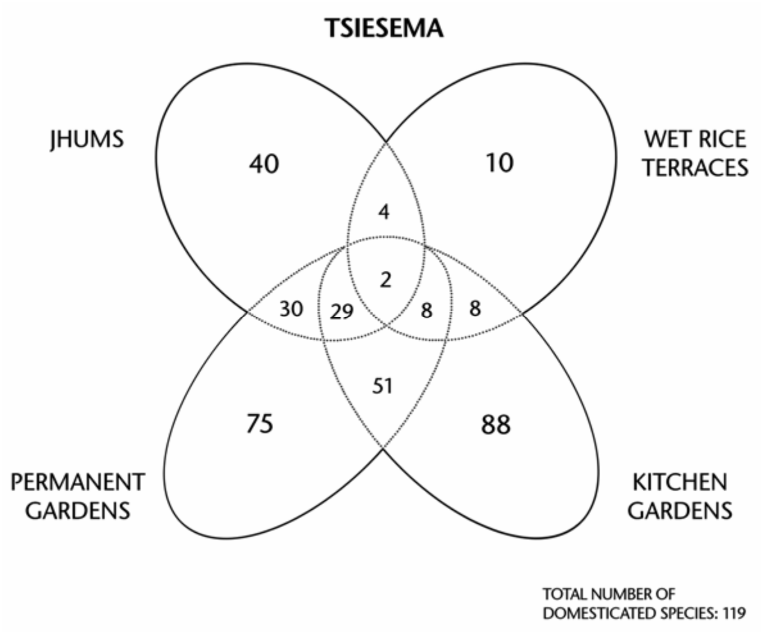
[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

*$US 1 = 48.044 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

APPENDIX 5-33. Categorization of Useful Plants Grown in the Kitchen Gardens of the Collaborating Farmers in Khonoma and Tsiesema Villages

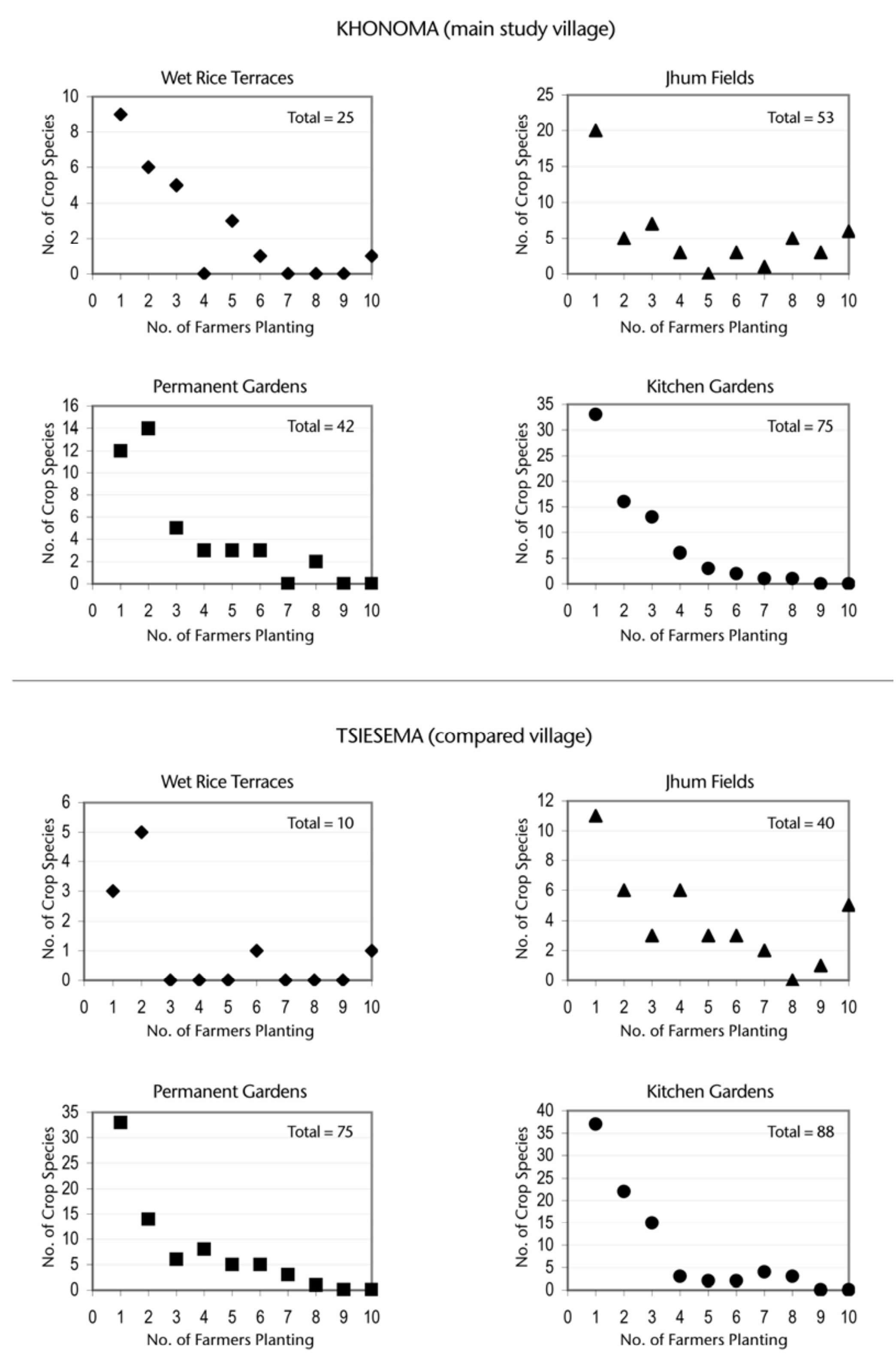
No	Use	Part Used	Number of Species Used
1	Adhesive	fruit	1
		stem	1
2	Bird trap	bark	2
3	Beverage	leaves	1
		seed	1
4	Broom	leaves	2
		shoot	2
		stem	3
5	Cereal	cob	2
6	Decoration	fruit	1
7	Fed to silkworms	leaves	1
8	Fencing	stem	3
9	Firewood	stem	23
10	Handicrafts	stem	2
11	Juice	fruit	7
		stem	1
12	Medicinal	bark	1
		fruit	3
		leaves	9
		rhizome	1
		root	1
		seed	1
		stem	3
13	Packaging	leaves	3
14	Rope	leaves	2
15	Scrubbing pad	fruit	1
16	Spices	bulb	2
		fruit	4
		inflorescence	2
		leaves	7
		rhizome	1
		seed	1
		young shoot	1
17	Timber	stem	17
18	Vegetable	bulb	1
		flower	1
		fruit	13
		inflorescence	2
		leaves	21
		pod	9
		stem	5
		tuber	10
		young shoot	6
19	Dye	bark	2

APPENDIX 5-34. Distribution of Crop Species across Four Components of Tsiesema's Farming System *



* Farmer-kept diaries provided data for wet rice terraces and jhum fields, while their kitchen gardens and permanent gardens were visited and inventoried.

APPENDIX 5-35. Frequency of Crops across Four Different Types of Fields Monitored during the Fieldwork *



* Farmer-kept diaries provided data for wet rice terraces and jhum fields, while their kitchen gardens and permanent gardens were visited and inventoried.
See appendices 5-21, 5-25, 5-31 and 5-32 for detailed species lists.

APPENDIX 5-36. Wild Vegetables

Botanical Name	Local Names		Life Form†	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
ACANTHACEAE - Acanthus Family (4)						
Andrographis laxiflora (Blume) Lindau	gatsi / gatsino		H			
Pseuderanthemum sp.	tise	metetsüse-ü / metacüse / metecüse / metecüse-ü	T	dry areas, such as along roadsides, rocky areas, & within village area		
Strobilanthes sp.	gale / galei / theluga	gathu / galelie	H	forest bed, exposed areas		leaves / tender shoots
S. atropurpurens Nees	galelepienyü	kesega	H	higher altitude, exposed areas		leaves / tender shoots
AMARANTHACEAE - Amaranth Family (2)						
Amaranthus viridis L.	kehie	tierhütiepfü	H			
Celosia argentea L.	niza / niedza / nidza	niedza	H	cultivated in kitchen garden and in house compound		
ANACARDIACEAE - Sumac Family (1)						
Rhus semialata Murray	tsomhu / tsomhonyü / tsomhumedzü	zomhoupu / zomhou	T	usually forest edge		leaves, young shoots
APIACEAE - Carrot Family (3)						
Centella asiatica (L.) Urb.	gara	gara	H	clayey soils in open spaces	throughout year	leaves, whole plant
Eryngium foetidum L.	nhadunyia / dunia (local corriander)	nhadunyia / dhunia	H	stone crevices		
Oenanthe linearis Wall. ex DC.	gakra	gakra	H	damp soils along riverbanks, in marshy open spaces & wet fields	all seasons	leaves / young branches
ARACEAE - Arum Family (2)						
Colocasia sp.	thekrüno	thekrü	H	exposed, open forest		branch ??
C. esculenta (L.) Schott	dzüno / dzuno	dzunuo / dzünuo	H	cultivated		leaves / tubers / stems

Botanical Name	Local Names		Life Form[†]	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
ARALIACEAE - Ginseng Family (4)						
Aralia foliolosa (Wall.) Seem. Ex Clarke	gasethu	seicha	T	higher altitude, forest land	Feb.-April	leaves
Brassaiopsis griffithii C.B. Clarke	rhütsinyü / rhütsinyu					
Trevesia sp.	hrütsi		T	moist areas		young tender leaves
T. palmata (DC.) Vis.	tirhünyü / teirhü / tirhü	teirhünyü	S	exposed, open forest, forest edges	all seasons	leaves
ARECACEAE - Palm Family (1)						
Calamus erectus Roxb.	tekhra / tekhrasi / tekhrameri / kipha / kepha	tekhra / therü	V	damp places		
ASTERACEAE - Sunflower Family (5)						
Artemisia indica Willd.	penia nienu / penia / penie /niapnu / niapfü	ciena / ciena nanu / ciena-napfu	S	abundant in exposed areas with moist soils, such as forest margins, open forests, near roadsides & other degraded areas		
Crassocephalum crepidioides (Benth.) S. Moore	vilhunha / keko	mithudzü / methudzü	H	cultivated areas at mid-altitudes up to 1600 m asl	Feb.-Nov.	young shoots
Gnaphalium affine D. Don	tieme	ciemega	H	open areas, such as roadsides		young shoots / flowers
Gynura sp.	lievino	lizienuo	H	usually found in backyards, terrestrial, moist areas, etc.		leaves / tender shoots
Sonchus wightianus subsp. *wallichianus* (DC.) Boulos	gadzü / vilhunha	pierü / pierüpu	H	rock cliffs, crevices, open areas		leaves
BALSAMINACEAE - Touch-me-not Family (3)						
Impatiens sp.	tsiekie / tsiekeü / tsieke	tsükanyü	H	moist areas, like riversides, cliffs, roadsides, village & forest	all seasons	leaves / young shoots
Impatiens sp.	ketsa tsukie		H			
I. tripetala Roxb.	lhuchü	tsukanyü	H	moist riversides, roadsides	all seasons	young shoots

Botanical Name	Local Names		Life Form[†]	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
BASELLACEAE - Basella Family (2)						
Basella sp.		therhie	H	cultivated in kitchen garden and in house compound		
B. alba L.	ganyüro / kerünyü	miru	V	wastelands, garbage areas, dry, rocky areas, damp ground, etc.		
BEGONIACEAE - Begonia Family (2)						
Begonia sp.	tsiequenye		H	riverbed, attached to rocks, thick forest cover		leaves
B. palmata D. Don	teise / teise ketsa	techütielenuo / techütieleno / teichü teilenyü	H	forest, usually under growth in shady area, forest floor, moist areas		leaves and young shoots
BETULACEAE - Birch Family (1)						
Betula alnoides Buch.-Ham. ex D. Don	rüproprie / rüpopie / rüpopia	pro	T	higher altitudes, in areas exposed to direct sunlight		bark
BIGNONIACEAE - Trumpet-creeper Family (1)						
Stereospermum colais (Buch.-Ham. ex Dillwyn) Mabb.	pega / piga		T	forest		
BORAGINACEAE - Borage Family (2)						
Cordia myxa L.	chiemu / chemu / chiemunyü / shiemunyü	chiemupu / chemü / chemu / chiemunyü / chiemou	T	moist, exposed areas such as forests, roadsides, etc.		young tender shoots
Trichodesma khasianum Clarke	mekhuseki	sekisekuo	S	higher altitudes, cliffs, usually in open forest	January-Febuary	leaves
BRASSICACEAE - Mustard or Crucifer Family (1)						
Rorippa sp.	segoga	seguoga	H	rock crevices, open exposed areas		young leaf
CAPRIFOLIACEAE - Honeysuckle Family (2)						
Viburnum sp.	gaphieno / gaphino		T	forest, roadsides, etc.		eat leaves as wild vegetable

Botanical Name	Local Names		Life Form†	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
V. foetidum Wall.	tsakhra / chada / riegesi	tsakhrasi / tsakrasi / thakhrasi	T			
CHENOPODIACEAE - Goosefoot Family (1)						
Chenopodium ficifolium Sm.	kehie	theshie / therhie	H	abundant in wet rice terraces		
CONVOLVULACEAE - Morning-glory Family (1)						
Porana racemosa Roxb.	garibu / gareibu	reitsü / reicü	V	moist areas, roadsides, forest edges, landslide areas		leaves / young shoots
CUCURBITACEAE - Cucumber or Cucurbit Family (1)						
Trichosanthes palmata L.	gauri / gaü-ri / gaüri /thezuchütuo	thezuchütuo	V	riversides, roadsides, marshy areas	all seasons	young shoots
DENNSTAEDTIACEAE – Ferns (4)						
Lindsaea ensifolia Sw.	thevüdokonyü		F	thick forest bed, higher altitudes		leaves
Microlepia sp.	sengega / senge	sengega	F	forest floor, ridges, etc.	all seasons	young leaves
M. speluncae (L.) T. Moore		gapfü	F			
Pteridium aquilinum (L.) Kuhn	peshü / senega		F			
DIOSCOREACEAE - Yam Family (1)						
Dioscorea sativa L.	kiphiesi	chiephodzü	V			
DRYOPTERIDACEAE - Ferns (6)						
Diplazium sp.	mugia	gapfü	F	higher altitudes, forest floor		leaves
D. esculentum (Retz.) Sw.		gasülo	F	forest floor		
D. esculentum (Retz.) Sw.	gathula	gapfü	F	paddy fields, moist forest exposed areas	all seasons	young shoots
D. esculentum (Retz.) Sw.	tsiekhrüga	sengega	F	damp forest floors at higher altitudes	all seasons	leaves
Dryopteris sp.	merie / meriega	gapfü	F	cliffs, forest floor	all seasons	leaves
unidentified fern	tsuga		F	moist, shady areas		leaves and shoots

Botanical Name	Local Names		Life Form†	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
ERICACEAE - Heath Family (1)						
Agapetes sp.	niezie / nigie / niejie		S	exposed areas, at higher altitudes, such as Dzukou valley		
EUPHORBIACEAE - Spurge Family (1)						
Euphorbia pulcherrima Willd. ex Klotzsch (poinsettia)	Christmas nyiepou	Christmas niepu	S		Dec.	young shoots
FABACEAE - Bean Family (4)						
Bauhinia variegata L.	tego / tego-pou / tegou-w	teguopu / teguo	T	roadsides, up to 1800 m asl		flowers and pods
Entada scandens (L.) Benth.	tholimeri / tholirai / tholi	tholi	V	exposed forest edges, climbing on trees		young shoots
Millettia sp.	thevübozha	kecienyü	T	directly exposed areas, moist, cliffs, etc.		leaves
Parkia roxburghii G. Don	teiquebi / thepfibi	thepfibi / thepfica	T	along streams, damp valleys, forest edges		young tender leaves
GENTIANACEAE - Gentian Family (1)						
Tripterospermum japonicum (Sieb. & Zucc.) Maxim.	kiterie / kitierie / kiteria	tefudzü	V			
GESNERIACEAE - Gesneriad Family (1)						
Rhynchotechum ellipticum (Wall. ex D. Dietr.) A. DC.	gakhwemhü		H	under forest cover		leaves / young shoots
LAMIACEAE - Mint Family (2)						
Mentha arvensis L.	pudina	bedino / bedinuo	H	cultivated		leaves
Plectranthus sp. L'Hér.	khamhvü	tepfürünu / thepfürünu	H	usually in open forest, forest edge	March-June	leaves / young shoots
LAURACEAE - Laurel Family (2)						
Cinnamomum zeylanicum Blume	riechü	seichü	T	grows wild in plains and hilly regions		dried leaf

Botanical Name	Local Names		Life Form[†]	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
Litsea citrata Blume	sienguno / singuno/ cie / ciesi / ciesei	ciesci / ciesi / ciesei / cie	T	roadside, other exposed areas	Nov.-Dec.	leaves / seeds used as condiment
LILIACEAE - Lily Family (5)						
Allium sp.	ketsa solie		H	rocks, cliffs, woods, tree trunks	March-Nov.	leaves
Allium sp.	liedi		H	usually cultivated		young leaves
A. porrum L.	solie / solia	süla	H	usually cultivated		leaves
Asparagus filicinus Buch.-Ham. ex D. Don		sieprü	H			leaves
Disporum calcaratum D. Don		chüziegare / tsohero	H	cliff, moist, forest floor		leaves
LOGANIACEAE - Butterfly-bush Family (1)						
Buddleja paniculata Wall.	teisü / teizu / teizü / teishü / teidzü / temepfü	teizhü	T			
MALVACEAE - Mallow Family (1)						
Hibiscus syriacus	sohenyü / sohe / sohenothe / zohenyü	tsakhaganyü	S	hedge plant abundantly available on dry soils, cliffs		tender leaves
MORACEAE - Mulberry Family (4)						
Ficus sp.	gwishürho / gwichüro / gwichüronyü	prigei	T		April-Nov.	young leaves
F. elastica Roxb.	neikhupi / niakhupri	prigi / pregei / priegi / leiteitsasei	T	forest edges, exposed areas		tender leaves
F. fistulosa Reinw. ex Blume	khavünyü / khavü	khravü / khravüsi / khravünyü / khrabvünyü	T	open forests, forest edges	April-May	young leaves / fruits
Morus alba L.	khragunyü / khagru	khragunyü	T	roadside, forest margins		leaves

Botanical Name	Local Names		Life Form[†]	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
MUSACEAE - Banana Family (4)						
Musa sp.	ketsa khweca / ketsa khwesia	pfenuonyü	T	cleared forests, riversides	all seasons	inner soft stem & young flowers
Musa sp.		ruochünuo	T			
M. paradisiaca L.	khwekreno		T	near river source, also cultivated		stem / fruits
M. rosacea Jacq.	tekhwüno / tsiekwenyü / tiekwenyu / tekhwe	tepferhü, pfetho ('the real' leaf)	T	usually cultivated		inner soft stem
MYRSINACEAE - Myrsine Family (4)						
Ardisia sp.	keti		T	forest edges, cliffs		leaves / tender shoots
Embelia sp.	nihrünya / nirhünye		T			
Maesa indica (Roxb.) A. DC.	kurhinyü	kurhie / kourhie				
M. montana A. DC.	kourhie / kurhei / kurhi / jadiatseünyü	kourhie	T	open areas such as roadsides or cliffs		young shoots
OLEACEAE - Olive Family (1)						
Jasminum dispermum Wall.	mejagakhwü / mejhagakhwü / mezhagakhwü		V	creeping in exposed areas, such as open forest	Nov.-March	leaves
PASSIFLORACEAE - Passion-flower Family (1)						
Passiflora adenophylla Mast.	nhabellmeri	nhabell	V	forest area, creeping on other plants		young shoots
PIPERACEAE - Pepper Family (3)						
Piper sp.		nhapan / nithupan	V			
P. brachystachyum Vahl	nhapanyu / mithupan / mithu panyü	seipan	V	parasitic climber on trees		

Botanical Name	Local Names		Life Form†	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
P. retrofractum Vahl.	khrushünyü / kushünyü		V	found attached to larger trees		
PLANTAGINACEAE - Plantain Family (1)						
Plantago major L.	gapa	gapa	H	abundant in moist areas, open spaces, often mixed with lawn grasses	all seasons	young shoots
POACEAE - Grass Family (3)						
Arundineria sp.	jüpfünothe (bamboo)		G	valleys		young shoots
Melocanna sp.	kepru (bamboo)		G			
Sinarundinaria nagalandiana H.B. Naithani	rücü / rucu / rucü / rücüria / kerie		G	higher altitude, moist, thicker forest, ridges, etc.	all seasons	young shoots
POLYGONACEAE - Buckwheat Family (6)						
Fagopyrum cymosum (Trevir.) Meisn.	gari / garai / gare	gari / garei	H	abundantly found	all seasons	leaves
Polygonum sp.	chüzie / chuzhie gare	garelie	H	riverside, exposed and open areas	all seasons	young shoots
Polygonum sp.	gare , ketsa gare	gare	H	roadsides, riversides, moist places	all seasons	leaves / tender shoots
P. chinense L.	gwigagi	garelie	H	roadsides, riversides		leaves / young shoots
P. plebeium R. Br.	gagi /gagei / gagie	gazie	H	open land, riversides	all seasons	leaves / young shoots
P. runcinatum Buch.-Ham. ex D. Don	phrügie / phrügei / prügie / prügei / prügimedzü	prüzie	H	exposed moist areas such as swampy grasslands, along riverbanks & roadsides	all seasons	young shoots
PONTEDERIACEAE - Water-Hyacinth (1)						
Monochoria vaginalis (Burm. f.) C. Presl	nyarü	dzüthekrü	H	aquatic, usually in still water		leaves
ROSACEAE - Rose Family (1)						
Rubus indicus Thunb.	mvüte / mvüti / mvütei	mvuti	S			leaves

Botanical Name	Local Names		Life Form[†]	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
RUBIACEAE - Madder Family (1)						
Luculia gratissima (Wall.) Sweet	siethо	pfenhinye	S	higher altitude, exposed		leaves
RUTACEAE - Rue Family (1)						
Zanthoxylum acanthopodium DC.	gangasi / ganyanyü / ganya / ganyasei / ganyasi	mechinga / ganya / ganyanyü / gangasi	T	open forest, riversides up to 1800 m asl	April-Nov.	young shoots & leaves
SAURURACEAE - Lizard's-tail Family (1)						
Houttuynia cordata Thunb.	gatha	gatha	H	moist and marshy areas	all seasons	root, stem & leaves
SCHIZOPHYLLACEAE – Split-Gill Fungi (1)						
Schizophyllum commune Fries	pretsie / tepfüvadi	ciecie	M			
SMILACACEAE - Catbrier Family (1)						
Smilax sp.	rürumeri / rüru	pfüpro	V	creeping on floor of degraded forests		young leaves
SOLANACEAE - Potato Family (7)						
Physalis minima L.	kedicahu / kedichahu / thuti	betelnuo / betelenuo	H	moist exposed fields, also cultivated		
Solanum sp.		keroga	H			
S. kurzii Prain	kipfü ketsü-u / kikhwu kecu-u / kikhwü kecü-u	ciepfu ketsü / ciepfu ketsü-u	H	dry soil, also cultivated		
S. macrobotryon Dunal	gratsino		H			
S. macrodon Wall. ex Nees	gake		H			
S. nigrum L.	gadzu	gadzü	H	dry sandy soil, roadside		tender leaves
S. torvum Sw.	kikhwü	tsociepfü	H			
THEACEAE - Tea Family (4)						
Adinandra sp.	nirhünyü		T	moist areas		tender leaves
Eurya sp.	shiezienye					

Botanical Name	Local Names		Life Form[†]	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
E. japonica Thunb.	sisenomeri / sise	seisenuo / seisenuopu	T	exposed warmer areas at higher altitudes	Oct.-Nov.	leaves
Schima khasiana Dyer	meshiemedzü	mezasi	T	forest areas, roadsides, etc.		young tender leaves
TRICHOLOMATACEAE – Gilled Mushrooms (9)						
Oudemansiella canarii (Jungh.) Höhn.	menyie / menye		M	parasitic growth on deadwood	Oct.-Nov.	entire plant
Pleurotus sp.	preinyii / preinyie / pinyie	cienie	M	parasitic growth on deadwood		entire plant
Pleurotus sp.	pruzie		M	parasitic growth on deadwood	Oct.-Nov.	entire plant
Pleurotus sp.	menyie	cietho	M			
unidentified mushroom	meriaprei / cie		M	parasitic growth on deadwood		
unidentified mushroom	pri		M	parasitic growth on deadwood		entire plant
unidentified mushroom	rüpuprei		M	parasitic growth on deadwood		whole plant
unidentified mushroom	teyhadzü		M	parasitic growth on deadwood		entire plant
unidentified mushroom	thevütuyha		M			
URTICACEAE - Nettle Family (8)						
Elatostema sp.	dzükou gajie		H	open forest, moist and wet areas		leaves / young shoots
E. crytandrophium Wedd. var. *platyphyllum* (check name online)	gadza / gadzie	gajolie	H	moist areas		leaves / young shoots
E. cyrtandrifolium (Zoll. & Moritzi) Miq.	gajie	gajie / gajo	H			leaves / tender branches
E. platyphyllum Wedd. var. *platyphyllum*	garei		H			
E. sessile J.R. Forst. & G. Forst.	ziewhinyü / zie whünyü	jiehunyü	H	riversides, moist and marshy areas	all seasons	young shoots
Girardinia heterophylla (Vahl) Decne. - green	lovie / lhovie / phelovie	zozie	S	roadsides, degraded forests, grasslands, gardens, & other moist areas	all seasons	young shoots
G. heterophylla (Vahl) Decne. - red	tekgwilovie / tepfizozie	tepfizozie	S	grasslands, degraded forest, roadsides & other open spaces	all seasons	young shoots

Botanical Name	Local Names		Life Form†	Habitat	Season Collected	Part Eaten
	Khonoma	Tsiesema				
Lecanthus wightii Wedd.	gaü / ga-ü		V	creeper on tall trees, riversides, etc.	all seasons	young shoots
VERBENACEAE - Verbena Family (1)						
Clerodendrum colebrookianum Walp.	gatherü	gathera / gathere / gatherie	S	forest edge, roadside	all seasons	leaves
VITACEAE - Grape Family (2)						
Vitis sp.	rieza / riezasi / riezameri	roza	V	forest, creeping on tree branches	Jan.-April	tender leaves / young shoots
Vitis aborata / *V. abovata* ???		voriephenuo	V	moist shady places		young leaves
ZINGIBERACEAE - Ginger Family (3)						
Costus speciosus (J. König) Sm.	khwünothi / khwnothi	kevicharü	H	forest floor, moist areas besides streams and rivers, lower altitudes		tuber
Curcuma sp.	kruziano / kruzieno		H			root
C. aromatica Salisb.	khwügwü / khwükwü	hupfü	H	forest bed, usually after the forest is burnt	Dec.-Feb.	flowers

† Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

APPENDIX 5-37. Wild Fruit, Nuts and Berries

Botanical Name	Common English Name	Local Names		Life Form[†]	Habitat	Season Collected
		Khonoma	Tsiesema			
ACTINIDIACEAE - Chinese Gooseberry Family (1)						
Sauravia roxburghii Wall.		pehosi / peho	tehusi / tehuo / tehuosi	T		
ANACARDIACEAE - Sumac Family (4)						
Mangifera indica L.	mango	merosi	merosi	T		
Rhus semialata Murray	Naga tenga, nut-gall tree, Chinese gall	tsomhu / tsomhonyü / tsomhumedzü	zomhoupu / zomhou	T	usually forest edge	Nov. - Jan.
Spondias axillaris Roxb.	hog-plum, Naga neem	khula	khula	T		Oct. - Jan.; Jan.-Mar. ???
S. pinnata (L. f.) Kurz	hog-plum	mezi	mezisi	T		
AQUIFOLIACEAE - Holly Family (1)						
Ilex sp.		sichu / megwü	sichü	T		
ARECACEAE - Palm Family (1)						
Calamus erectus Roxb.	viagra palm	tekhra / tekhrasi / tekhrameri / kipha / kepha	tekhra / therü	V	damp places	
BERBERIDACEAE - Barberry Family (1)						
Mahonia nepalensis DC.	barberry	nthoüsi / nthoü / ntho / nthoe	thuopu / ntho	S	near small streams, abundant in scrub forests	Mar.-Apr.
CAPPARACEAE - Caper Family (1)						
Roydsia suaveolens Roxburgh		rükhusi	rokasi			
CAPRIFOLIACEAE - Honeysuckle Family (1)						
Viburnum foetidum Wall.		tsakhra / chada / riegesi	tsakhrasi / tsakrasi / thakhrasi	T		

Botanical Name	Common English Name	Local Names		Life Form†	Habitat	Season Collected
		Khonoma	Tsiesema			
CUCURBITACEAE - Cucumber or Cucurbit Family (1)						
Solena amplexicaulis (Lam.) Gandhi in Saldanha & Nicolson	solena, melothria	temitsüto		V		
EBENACEAE - Ebony Family (1)						
Diospyros kaki L. f.	Japanese persimmon, Oriental persimmon	jiedi / zhiedi / mezhajiedi	zhiedi / ziedi	T		
ELAEAGNACEAE - Oleaster Family (1)						
Elaeagnus conferta Roxb.		pechü / peshü	pesüsi / peshü	T	cultivated	May-June
ELAEOCARPACEAE - Elaeocarpus Family (1)						
Elaeocarpus lanceaefolius Roxb.	bhadrase	chüjiechükrü / chujiechükrü / chiezhie chükrü	chüziechükrü	T	woodland, sunny edge, dappled shade up to 2400 m asl	winter
ERICACEAE - Heath Family (1)						
Vaccinium sp.		riezasi	gasesi / mezasi			
EUPHORBIACEAE - Spurge Family (3)						
Antidesma bunius (L.) Spreng.	bignai, bignay		gasisei / gasesi	T		
Baccaurea sp.		rünyi	kenyüsi			
Emblica officinalis Gaertn.	Indian Gooseberry / amla	khulhu	chiehu / ciehusi / ciehuhuse	T	open forest at mid-elevations throughout Nagaland	Jan.-Mar.
FAGACEAE - Beech Family (3)						
Castanopsis tribuloides (Sm.) A. DC.		thejüsi	thezhüsi / theziesie	T		
Quercus camellosa	oak	dzüdusi		T		Oct.-Dec.
Q. pachyphylla Kurz	red oak	pedu	pedusei / pedusi	T		Oct.-Dec.

Botanical Name	Common English Name	Local Names		Life Form†	Habitat	Season Collected
		Khonoma	Tsiesema			
JUGLANDACEAE - Walnut Family (1)						
Juglans regia L.	walnut	khwüsi	pfüsi / pfhü / mewe	T		
LAURACEAE - Laurel Family (1)						
Litsea citrata Blume	tropical verbena, exotic verbena, May Chang	sienguno / singuno/ cie / ciesi / ciesei	ciesci / ciesi / ciesei / cie	T	roadside, other exposed areas	
MENISPERMACEAE - Moonseed Family (1)						
Tinospora sinensis (Lour.) Merr.		therüsi		V		
MORACEAE - Mulberry Family (12)						
Artocarpus chaplasha Roxb.	wild jackfruit (sam)		chierie	T	partial shade	May-June
A. lakoocha Wall. ex Roxb.	monkey jack	zhieri	chieriesi	T	forest	
Ficus sp.	fig	gwishürho / gwichüro / gwichüronyü	prigei	T		
F. auriculata Lour.	roxburg fig, giant Indian fig, elephant ear fig	chedi / chiede	chiede / chede	T	common in open fields, along streams & moist valleys up to 1800 m asl	April-June
F. cunia Buch.-Ham. ex Roxb.	red fig	thotseno	thuotsenuo	T	along stream banks and ravines	
F. fistulosa Reinw. ex Blume	common yellow stem fig	khavünyü / khavü	khravü / khravüsi / khravünyü / khrabvünyü	T	open forests, forest edges	
F. hispida L. f.		temichiede	ketsa khrabvü			
F. pisocarpa Blume	fig	niakhusi	priegei	T		
F. subulata Blume		temichiede	tsawisiü ronyü / tsawisüronyü / tsawishüronyü /	T		
Morus alba L.	white mulberry	khragunyü / khagru	khragunyü	T	roadside, forest margins	leaves are also eaten as a vegetable

Botanical Name	Common English Name	Local Names		Life Form[†]	Habitat	Season Collected
		Khonoma	Tsiesema			
M. macroura Miq.	shatoot mulberry	meüsani		T		
M. nigra L.			khravüsi / khravü	T	wild damp areas	
MUSACEAE - Banana Family (1)						
Musa paradisiaca L.	banana		ruochünuo		near river source, also cultivated	
MYRICACEAE - Bayberry Family (1)						
Myrica esculenta Buch.-Ham. ex D. Don ???	box myrtle	pezie / pezia	meza			
MYRSINACEAE - Myrsine Family (1)						
Embelia sp. Burm. f.		keti	tsawisüronyü	V		
OXALIDACEAE - Wood-Sorrel Family (1)						
Oxalis repens Thunb.	sour grass, sorrel	thezushüsi / thezu-chüsi	thezu-tsütuo	S	wet open field and grassland areas	
PASSIFLORACEAE - Passion-flower Family (1)						
Passiflora adenophylla Mast.		nhabellmeri	nhabell	V	forest area, creeping on other plants	
RHAMNACEAE - Buckthorn Family (2)						
Hovenia dulcis Thunb.	Indian coral tree / Japanese Raisin Tree	kipia / kipie / kiapie	shisiasi / ciepie	T		
Zizyphus incurva Roxb.	coral tree	khrogie / khowgie / khroge	khrogei	T	moist shady places up to 2000 m asl	
RHIZOPHORACEAE - Red Mangrove Family (1)						
Carallia brachiata (Lour.) Merr.	corkwood	merüsi	merüsi	T	riverside, forest	
ROSACEAE - Rose Family (8)						
Docynia indica (Wall.) Decne.	crab / wild apple	kipho	ciepho	T	moist, forest areas	winter
Fragaria indica Andrews	mock strawberry; Indian strawberry; false strawberry	kijürom / kijurom	süzaphitse / süzhaphitse	V	crevices in stone walls, open grasslands	

Botanical Name	Common English Name	Local Names		Life Form†	Habitat	Season Collected
		Khonoma	Tsiesema			
Prunus sp.		peziakezhau		T		
P. avium (L.) L.	sweet cherry, wild cherry	pezie / kevi	peziepu / pezie / kezie	T		
Pyrus pashia Buch.-Ham. ex D. Don	pear	kitsu	kitsusi	T		
Rubus sp. (red)	raspberry (red)	sepfülicü / siepfulichu / kidzu rom	temirom	S		May-June
Rubus ellipticus Sm. (yellow)	yellow Himalyan raspberry, roseberry	mvüyha	rom / ruomvu / ruomvü	S	abundant in scrub forests	May-June
R. indicus Thunb. (black)	blackberry	mvüte / mvüti / mvütei	mvuti	S		May-June
RUTACEAE - Rue Family (3)						
Citrus sp.	wild lemon		nhashüwhou	T		
Zanthoxylum acanthopodium DC.	tomarseed, Indonesian lemon pepper, mechinga	gangasi / ganyanyü / ganya / ganyasei / ganyasi	mechinga / ganya / ganyanyü / gangasi	T	open forest, riversides up to 1800 m asl	
Z. rhetsa (Roxb.) DC.	kaitana, crocodile or satin wood		khupfü	T	lower altitude forests	
SALICACEAE - Willow Family (1)						
Salix tetradenia Hand.-Mazz.		zarosi / zarüsi		T		
SMILACACEAE - Catbrier Family (2)						
Smilax sp.		rürumeri / rüru	rüru meri / pfüpro	V	creeping on floor of degraded forests	
S. zeylanica L.		khwüpro / khwüpo		T		
SOLANACEAE - Potato Family (1)						
Physalis minima L.	pygmy groundcherry	kedicahu / kedichahu / thuti	betelenuo / betelnuo	H	moist exposed fields, also cultivated	Nov. - Jan.

Botanical Name	Common English Name	Local Names		Life Form[†]	Habitat	Season Collected
		Khonoma	Tsiesema			
THEACEAE - Tea Family (1)						
Schima khasiana Dyer	needle tree	meshiemedzü	mezasi	T	forest areas, roadsides, etc.	
URTICACEAE - Nettle Family (1)						
Debregeasia longifolia (Burm. f.) Wedd.	wild Rhea	yiedu	ganyü	T	grows wild in hilly regions	
VITACEAE - Grape Family (3)						
Leea indica (Burm. f.) Merr.	bandicoot berry	rieza	kedzahuru	T		
Vitis sp.		rieza / riezasi / riezameri	roza	V	forest, creeping on tree branches	Feb.-April
V. aborata / *V. abovata* ???			voriephenuo	V		
ZINGIBERACEAE - Ginger Family (2)						
Zingiber sp.	wild cardamom	sokrünuo	vorieto	H	forest floor, shaded areas	
unidentified		vonito				

[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

APPENDIX 5-38. Medicinal Plants

Botanical Name	Local Names		Life Form†	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
ACANTHACEAE - Acanthus Family (2)							
Adhatoda vasica Nees	teise / tsiesenyu	tsiesenyü	S	moist exposed areas, up to 1500 m asl; often cultivated as hedge plant	diarrhea, dysentry and glandular tumours, cold, cough, chronic bronchitis, asthma; leaves boiled and extract drunk to treat gastric problems	leaf, flowers, fruits, roots	fresh or dried leaves crushed, and extract taken orally
Pseuderanthemum sp.	tise	metetsüse-ü / metacüse / metecüse / metecüse-ü	T	dry areas, such as along roadsides, rocky areas, & within village area	stomach problems, gastric problems, hiccups, massaging	leaf, roots	boil leaves and roots
AMARANTHACEAE - Amaranth Family (1)							
Achyranthes aspera L.	zuyha	zorha (rha pfhü)	H	cliff, damp exposed areas		roots	
AMARYLLIDACEAE - Amaryllis Family (1)							
Curculigo capitulata (Lour.) Kuntze	segienyü	chagei	H	open spaces, undergrowth at high altitudes, forest floor, exposed cliffs	stomach disorders, gastritis	rhizomes	rhizome is cleaned, sliced and soaked overnight in water; slimy jelly that forms is scooped out and eaten
ANACARDIACEAE - Sumac Family (2)							
Rhus sp.	sikhwü / sikwü		T				
R. semialata Murray	tsomhu / tsomhonyü / tsomhumedzü	zomhoupu / zomhou	T	abundant in open fields	colic pain and dysentry; seeds boiled and extract used as soup to treat minor fever or headache; a portion of the juice extract is mixed with honey to cure diarrhea and vomiting	young shoots, roots	

Botanical Name	Local Names		Life Form†	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
APIACEAE - Carrot Family (2)							
Centella asiatica (L.) Urb.	gara	gara	H	clayey soil in open spaces	stomach-related problems	leaves, stem	leaves and stem are boiled and eaten; sometimes taken raw
Oenanthe linearis Wall. ex DC.	gakra	gakra	H	damp soils along riverbanks, in marshy open spaces & wet fields	stomach problems	leaf, young stem	boiled leaves/stem are eaten
APOCYNACEAE - Dogbane Family (1)							
Catharanthus roseus (L.) G. Don		nyiepu	H	cultivated	stammering, cancer		
ARACEAE - Arum Family (2)							
Acorus calamus L.	themeprü	zhovü	H	semi-aquatic, found in high altitude ponds	kill lice, carcinogenic properties	roots	crushed roots are applied to head
Alocasia sp.	rüzaru / rü zarü	dzüthekrü	H	inhabited areas, also cultivated	pain relief	tuber	tuber is used externally
ARALIACEAE - Ginseng Family (1)							
Panax pseudoginseng Wall.	ginsing	nhavü	H	thick forest floor	purification of blood	leaf, rhizome	cooked
ASTERACEAE - Sunflower Family (12)							
Ageratum conyzoides L.	tephrienha / tephinha	nhana	H	abundant along roadsides, open fields	assist blood clotting when cuts or wounds	leaf	crush leaf to extract juice, apply over wound along with plant residue, bandage
Artemisia indica Willd.	penia nienu / penia / penie /niapnu / niapfü	ciena / ciena nanu / ciena-napfu	S	abundant in exposed areas with moist soils, such as forest margins, open forests, near roadsides & other degraded areas	stopping blood flow, also repels leaches from feet	leaf	leaves crushed and extract applied to wound

Botanical Name	Local Names		Life Form[†]	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
Bidens pilosa L.	tsünyütsethu	temvütsüthu	H	shady moist areas, open fields	clotting blood in wounds	leaf	crush leaves and apply as ointment
Blumea sp. (cf)	thevohie	phepierü	H	sandy soil, exposed areas	skin rash	leaf	leaf crushed and warmed by fire
Chromolaena odorata (L.) R.M. King & H. Rob.		tsotsa / tsoca / japannha / tsonha	S	warmer areas	clotting blood	leaf	leaf crushed and juice applied to wound
Crassocephalum crepidioides (Benth.) S. Moore	vilhunha / keko	mithudzü / methudzü	H	cultivated areas at mid-altitudes up to 1600 m asl	clotting blood	leaf	leaves crushed, juice extraced, and applied to injured area
Echinops echinatus Roxb.	husi	kikhahu	S	degraded forest, open spaces such as forest edges, grasslands, riversides, etc.	toothache	leaf	leaves crushed
Eupatorium adenophorum Spreng.	tsunha	tsonha	S	open exposed areas	clotting blood in wounds	leaf	crush leaves and apply as ointment
Gynura sp.	lievino	lizienuo	H	usually found in backyards, terrestrial, moist areas, etc.	stomach cancer	leaf, tender branches	boil leaf and tender branches
Laggera pterodonta (DC.) Sch. Bip. ex Oliv.	pierü	pierü	H	rock cliff, dry exposed areas	body swelling, pile-related problems	leaf	leaf boiled and extract is taken / crushed leaf or boiled leaf applied externally
Sonchus sp.	gadzu / gadzü	pierükeza-u / pierü kezha-u	H	rock cliffs, crevices, open areas	blood clotting	leaf	crushed leaf
Spilanthes sp.	gatha / nhavei	ramochüsi	H	grasslands, riversides, roadsides	toothache / stammering	root, leaf, flowers	root and leaf are crushed and dried

Botanical Name	Local Names		Life Form[†]	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
BEGONIACEAE - Begonia Family (2)							
Begonia sp.	tsiekhanha		H	cliff, in between rocks, edge of rock cliffs, etc.	itchy teeth	stem	stem is eaten directly
B. palmata D. Don	teise / teise ketsa	techütielenuo / techütieleno / teichü teilenyü	H	forest, usually under growth in shady area, forest floor, moist areas	itchy teeth	leaf, entire plant	leaf is taken
BERBERIDACEAE - Barberry Family (1)							
Mahonia nepalensis DC.	nthoüsi / nthoü / ntho / nthoe	thuopu / ntho	S	near small streams, abundant in scrub forests	malaria and fever	stem	bark is removed; inner stem is crushed and the filtrates taken orally
BETULACEAE - Birch Family (1)							
Alnus nepalensis D. Don	rüpo / rüpu / rupou	rüpo / rüpro / rüpruo / rüpho / rüphosi / rüpruo	T	cultivated fields, shady ravines and landslides between 1-2000 m asl	coagulates blood flow from wounds	leaf	leaves crushed and applied locally
BIGNONIACEAE - Trumpet-creeper Family (1)							
Stereospermum colais (Buch.-Ham. ex Dillwyn) Mabb.	pega / piga		T	forest	intestinal disorder	bark, leaf	bark soaked and taken (?)
BORAGINACEAE - Borage Family (2)							
Cynoglossum furcatum Wall.	thezü-tae / thezü-mhikou / thezu-mhikou		H	moist shady areas, roadsides, stream banks	urinary problems, torn muscle	leaves (urinary), roots (torn muscle)	leaves crushed; roots crushed to make a paste
Trigonotis ovalifolia Bth.			V				

Botanical Name	Local Names		Life Form†	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
BRASSICACEAE - Mustard or Crucifer Family (1)							
Rorippa sp.	segoga	seguoga	H	rock crevices, open exposed areas	stomach tonic		
CANNABACEAE - Hemp Family (1)							
Cannabis sativa L.	ganja nyü	ganja	S	cultivated, open grassland	bowel treatment (?)	leaf	leaves crushed, and extract used, along with grains
CARYOPHYLLACEAE - Pink Family (1)							
Drymaria cordata (L.) Willd. ex Roem. & Schult.	nya-nya	pfüpfü	H	open fields from 900-2100 m asl	sinus problems	leaf	leaves crushed and warmed over fire, then inhaled through nose
CEPHALOTAXACEAE - Plum Yew Family (1)							
Cephalotaxus griffithii Hook. f.	sipehü / seipehu		T	forest, at 1500-3000 m asl	cancer treatment; leaf extract contains 'cephalotaxine' with antitumour properties)	leaf	
COMMELINACEAE - Spiderwort Family (3)							
Commelina benghalensis L.							
C. diffusa Burm. f.	meünha	me-ünha	H				
C. erecta L.	rüzienha		H	common near stream banks and other moist places	purification of blood	entire plant	plant is chopped and boiled, and extract taken
CUCURBITACEAE - Cucumber or Cucurbit Family (2)							
Cucumis sativus L.	tsüto	tsütuo	V	cultivated	edema; helps to eliminate body fluid		
Trichosanthes palmata L.	thezuchütuo /gauri / gaü-ri / gaüri	thezuchütuo	V	riversides, roadsides, marshy areas	dysentry, bloody stool	leaf, stem	

Botanical Name	Local Names		Life Form[†]	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
ERICACEAE - Heath Family (1)							
Rhododendron arboreum Sm.	nithüpü	ntho / nitho / kethuo-thuorie	T	higher altitudes with steep slopes	removal of fish bones stuck in throat	flower, leaves	dry flower, take orally
EUPHORBIACEAE - Spurge Family (4)							
Emblica officinalis Gaertn.	khulhu	chiehu / ciehusi / ciehuhuse	T	open forest at mid-elevations throughout Nagaland	deworming / diarrhea / dysentry / cough & cold	fruits and seeds	eaten raw
Euphorbia sp.	soru / sorü	soru	H	open fields, roadsides, dry land	eruption of boils	stem	extract from stems
Phyllanthus amarus Schumach. & Thonn.	tekhunha			moist soil	skin rash	leaf	
Ricinus communis L.	luluca	luca	S	open fields	broken bones, body massage, nervous disorders	leaf	crushed and made into paste
FABACEAE - Bean Family (1)							
Parkia roxburghii G. Don	teiquebi / thepfibi	thepfibi / thepfica	T	along streams, damp valleys, forest edges	for sores and skin infections, cancer	leaves, seeds	crushed leaves made into paste, as ointment
FAGACEAE - Beech Family (1)							
Quercus serrata Thunb.	phie / phrie	phrie / phre	T	forest area	bee sting	young branch	branch crushed
GENTIANACEAE - Gentian Family (1)							
Swertia sp.	tsophü				fever	leaf	
LAMIACEAE - Mint Family (5)							
Leucas flaccida var. *sebastiana* (Subba Rao & Kumari) D.A. Moulali & T. Pullaiah	saphü		H	roadsides, cliff, thick scrub forest	fever	entire plant	boil entire plant

Botanical Name	Local Names		Life Form†	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
Melissa parviflora Bth.	tepfurünyü / thepfürünyü	rünu	H	grasslands	biles and blood clotting, urinary problems, iodine content	leaf	crushed leaf
Mentha spicata L.	tephinitso	bedinuo	H	rock cliffs			
Ocimum basilicum L.	nitso	nietso	H	cultivated in fields	high blood pressure; used in making soup to treat minor fever or headache	leaves	cooked and decoction taken orally
Plectranthus amboinicus (Lour.) Spreng.	shuzhabitse	terhürünu / terhourünu	H				
LAURACEAE - Laurel Family (1)							
Litsea citrata Blume	sienguno / singuno/ cie / ciesi / ciesei	ciesci / ciesi / ciesei / cie	T	roadside, other exposed areas	dysentry, vomitting, headache, fever, diarrhea, cholera, sudden fever, constipation; application on ticks causes them to release; cures ringworm & other skin diseases	fruit, bark	fruit may be eaten raw; or ground, boiled and drunk, extract of bark is taken
LILIACEAE - Lily Family (1)							
Aloe vera (L.) Burm. f.	mirunha		H	cultivated	burns or skin diseases; stomach pain	leaf	leaf extract applied directly to burned area; fleshy leaf eaten raw for stomach problems
MALVACEAE - Mallow Family (1)							
Kydia calycina Roxb.	kerunyie / thezumhiku / kerunyu / keruny	kerunyü / kerünyü	T	forest, exposed areas	body aches, skin diseases, cuts	leaf	paste made from leaves and applied to affected area
MELASTOMATACEAE - Melastome Family (1)							
Osbeckia sp.	khukhe / kukhie	kukhe	S	cultivated	kidney problems	roots	boiled and eaten
MELIACEAE - Mahogany Family (1)							
Melia azederach L.	khusia / khusie	khousie	T	common 200 -1800 m asl	spleen enlargement, malaria	leaves	

Botanical Name	Local Names		Life Form†	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
MORACEAE - Mulberry Family (1)							
Ficus auriculata Lour.	chedi / chiede	chiede / chede	T	common in open fields, along streams & moist valleys up to 1800 m asl	coughing and dysentry in children	leaf	boiled in water and the decoction drunk
MYRSINACEAE - Myrsine Family (1)							
Ardisia crenata Sims	soda / sodai	Christmas niepu	S	degraded forests, riversides, grasslands	cancer	fruit	fruit crushed
MYRTACEAE - Myrtle Family (3)							
Callistemon sp.			T				
Pimenta sp.	kizüchi				backache or dislocated hands, skin diseases		
Psidium guajava L.	muduram / moduram	muduram / moduram	T	cultivated in home gardens, or on terrace bunds	dysentry	tender leaves	leaves eaten raw or boiled and drink decoction
OXALIDACEAE - Wood-Sorrel Family (2)							
Averrhoa carambola L.			T		jaundice		
Oxalis repens Thunb.	thezushüsi / thezu-chüsi	thezu-tsütuo	S	wet open field and grassland areas	stomach-related problems	leaf, young stem	usually taken raw orally
PAPAVERACEAE - Poppy Family (1)							
Papaver somniferum L.			H	cultivated in kitchen garden or jhum	fatigue	leaves	when people worked very hard, would pick a leaf or two to put in their curry - and then would sleep soundly all night
PASSIFLORACEAE - Passion-flower Family (1)							
Passiflora edulis Sims	bell	bell	V	cultivated, often in hedges	dysentry / gastritis / diabetes	tender leaves	leaves crushed, boiled in water, and the extract drunk

Botanical Name	Local Names		Life Form[†]	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
PLANTAGINACEAE - Plantain Family (1)							
Plantago major L.	gapa	gapa	H	abundant in moist areas, open spaces, often mixed with lawn grasses	stomach-related problems	leaves / seeds	take orally boiled leaves or raw seeds
POACEAE - Grass Family (1)							
Saccharum officinarum L.	nukrücha	meke / ke	G	cultivated	jaundice		
POLYGONACEAE - Buckwheat Family (3)							
Fagopyrum esculentum Moench	gari	garei	H	abundant in cultivated land	deworming	roots	crush root, boil and drink decoction
Polygonum capitatum Ham. ex D. Don	prügei	prüzie	H	rock crevices and walls, grasslands	wounds / injuries, removal of warts	leaf, flower	crush the plant parts to extract juice and apply locally, ointment made from decoction of leaves and flower extract
P. runcinatum Buch.-Ham. ex D. Don	phrügie / phrügei / prügie / prügei / prügimedzü	prüzie	H	exposed moist areas such as swampy grasslands, along riverbanks & roadsides	tonic (?)	leaf	cooked
PTERIDACEAE – Ferns (1)							
Adiantum capillus-veneris L.			F		chronic fever	root	
RANUNCULACEAE - Buttercup Family (5)							
Clematis sp.	ketsienha	thezucütuo	H	rock cliffs			
C. buchananiana DC.		miru / merü	V	sandy, dry places, etc.	burns	entire plant	plant is crushed
Ranunculus diffusus DC.	mithu chüsi	ramochüsi	H	moist place, exposed, open areas	dysentry	entire plant	boil and extract taken
Thalictrum elegans Wall. ex Royle			H	moist cliff, roadside, stream side			

Botanical Name	Local Names		Life Form[†]	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
T. foliolosum DC.	nhasiaki		H	common in undergrowth	malaria	roots	decoction is taken, doses depending on severity of ailment
RHAMNACEAE - Buckthorn Family (1)							
Rhamnus sp.	cierie	chierie	T	forest		leaf	
ROSACEAE - Rose Family (4)							
Fragaria indica Andrews	kijürom / kijurom	süzaphitse / süzhaphitse	V	crevices in stone walls, open grasslands	fever	entire plant	
Potentilla fulgens Wall. ex Hook.	kedzü kekhra		H	moist, open grasslands, forest floor	toothache, gastric problems	roots	roots crushed
P. mooniana Wight.	kijüchüni	süzaphitse	H	forest floor, moist open grasslands, dry sandy soil, etc.	stomach ache, tooth ache	roots	
Prunus persica (L.) Batsch	zarsi / zorüsi	ciehumekrü	T	dry areas	allergic	leaf	leaves crushed and applied to infected portion
RUBIACEAE - Madder Family (3)							
Hedyotis sp.	kitierie / kitie kitierie / khukhru	kitierie	H	open exposed spaces, degraded forest, higher altitudes	malaria, high fever	entire plant	plant is boiled and extract taken
Mussaenda sp.	sitho	mewiro					
Paederia foetida L.	riena / reina	mewiro	V	forest margins, landslide areas at 1400-1800 m asl	swelling	stem / bulbs	decoction of leaves is taken; residue used to massage swollen area
RUTACEAE - Rue Family (2)							
Citrus aurantium L.	chühuo	sühuo kemu-u	T	cultivated	cough & cold		

Botanical Name	Local Names		Life Form[†]	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
Zanthoxylum acanthopodium DC.	gangasi / ganyanyü / ganya / ganyasei / ganyasi	mechinga / ganya / ganyanyü / gangasi	T	open forest, riversides up to 1800 m asl	stomach disorders; both seeds and leaves eaten to treat stomach pain or gas	fruit, leaves	fruit eaten directly
SAPINDACEAE - Soapberry Family (1)							
Sapindus rarak DC.	khulhucü / khulucü	khurchisi / khurüciesi / khurciesi	T	mid-elevation forest	cancer, leech and insect repellent	leaf, fruit	leaf and fruit crushed and ???
SAURURACEAE - Lizard's-tail Family (1)							
Houttuynia cordata Thunb. (same as diandra ?)	gatha	gatha	H	open fields and exposed sub-soil	gastritis & other stomach-related problems, blood pressure, diabetes	tender leaves, branches	eaten raw or boiled
SAXIFRAGACEAE - Saxifrage Family (1)							
Bergenia stracheyi (Hook. f. & Thomson) Engl.	tsiekha / tsiekha daru		H	dry rocky areas	constipation, gastric problems	leaves, tubers	decoction of leaves and tubers taken orally
SOLANACEAE - Potato Family (7)							
Datura meteloides Dunal	mekriteise / mekrietise / mekritise	lalhopu / lalho	S	moist areas, such as riversides	removing the effect of alcohol, reduce swelling	leaf	leaves crushed
Nicotiana tabacum L.	khüpre / khrüprü	khoprü	H	rock crevices and dry areas	leach repellant	leaf	leaves crushed and the juice applied to feet & ankles
Solanum sp.	kepfü		H	dry areas such as rock crevices	coughing	fruit	fruit is crushed and the extract filtered, taken orally
S. khasianum C.B. Clarke	chükrü / shukru / shükru	chükrü / khuziechükrü	H	near roadsides, degraded forest, wastelands	toothache	fruit	fruit heated over fire, and inhaled through pipes

Botanical Name	Local Names		Life Form†	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
S. kurzii Prain	kipfü ketsü-u / kikhwu kecu-u / kikhwü kecü-u	ciepfu ketsü-u	H	dry soil, also cultivated	tonic (?)	leaf	boil leaf
S. spirale Roxb.	zierüprü / zarüpre / zierprü	zierprü / zierüprü	H	moist shady places	stomach ache	leaf	boiled leaves eaten
S. torvum Sw.	kikhwü	ciepfü ketsü-u / tsociepfü	H				
TROPAEOLACEAE - Nasturtium Family (1)							
Tropaeolum majus L.	kharu niepu	niepu	H	cliffs and other rocky areas	sprain	leaf	soak in water with ask, then massage sprained part with compress
ULMACEAE - Elm Family (1)							
Trema orientalis (L.) Blume	thedie	thedie	T	forest clearings, fallowed land	diarrhea	roots	extract is taken orally
URTICACEAE - Nettle Family (1)							
Pouzolzia sp.	khamhvü	khranhyü	H	riversides and other moist areas	beri-beri	leaf	leaves crushed and the ointment applied/massaged
VERBENACEAE - Verbena Family (1)							
Clerodendrum colebrookianum Walp.	gatherü	gathera / gathere / gatherie	T	forest edge, moist places	dysentry, bloody stool, stomach disorder	leaf	leaves boiled
ZINGIBERACEAE - Ginger Family (4)							
Costus speciosus (J. König) Sm.	khwünothi / khwnothi	kevicharü	H	forest floor, moist areas such as near streams and rivers, lower altitudes	heart problems, head lice	rhizome	

Botanical Name	Local Names		Life Form[†]	Habitat	Condition Treated	Part/s Used	Preparation
	Khonoma	Tsiesema					
Curcuma sp.		kijunuonie / kijünounyie	H	moist soil		roots / tuber	
C. longa Linn.	kotsievü	ciesi / ciecie / chietei	H	cultivated	as blood purifier and stomach tonic	tuber	crushed tuber, take orally
Zingiber officinale Roscoe	kevü	kevü	H	cultivated as condiment in jhums	skin allergy	tuber	cut tuber

[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

APPENDIX 5-39. Livestock Fodder

Botanical Name	Local Names		Life Form†	Habitat	Livestock Fed
	Khonoma	Tsiesema			
ACANTHACEAE - Acanthus Family (1)					
Strobilanthes sp.	gale / galei		H	forest bed	mithun / cattle
AMARANTHACEAE - Amaranth Family (3)					
Achyranthes aspera L.	zuyha	zorha (rha pfhü)	H	cliff, damp exposed areas	
Amaranthus viridis L.	kehie	tierhütiepfü	H		pigs
Celosia argentea L.	niza / niedza / nidza	niedza	H	cultivated in kitchen garden and in house compound	pigs
ANACARDIACEAE - Sumac Family (1)					
Rhus semialata Murray	tsomhu / tsomhonyü / tsomhumedzü	zomhoupu / zomhou	T	usually forest edge	bees
APIACEAE - Carrot Family (1)					
Oenanthe linearis Wall. ex DC.	gakra	gakra	H	damp soils along riverbanks, in marshy open spaces & wet fields	mithun / cattle
ARACEAE - Arum Family (2)					
Colocasia sp.	thekrüno	thekrü	H	exposed, open forest	pigs
C. esculenta (L.) Schott	dzüno / dzuno	dzunuo / dzünuo	H	cultivated	pigs
ASTERACEAE - Sunflower Family (3)					
Artemisia indica Willd.	penia nienu / penia / penie /niapnu / niapfü	ciena / ciena nanu / ciena-napfu	S	abundant in exposed areas with moist soils, such as forest margins, open forests, near roadsides & other degraded areas	mithun / cattle
Bidens pilosa L.	tsünyütsethu	temvütsüthu	H	shady moist areas, open fields	pigs
Crassocephalum crepidioides (Benth.) S. Moore	vilhunha / keko	mithudzü / methudzü	H	cultivated areas at mid-altitudes up to 1600 m asl	pigs
BETULACEAE - Birch Family (1)					
Alnus nepalensis D. Don	rüpo / rüpu / rupou	rüpo / rüpro / rüpruo / rüpho / rüphosi / rüpruo	T	cultivated fields, shady ravines and landslides between 1-2000 m asl	mithun / cattle

Botanical Name	Local Names		Life Form[†]	Habitat	Livestock Fed
	Khonoma	Tsiesema			
BORAGINACEAE - Borage Family (1)					
Cordia myxa L.	chiemu / chemu / chiemunyü / shiemunyü	chiemupu / chemü / chemu / chiemunyü / chiemou	T	moist, exposed areas such as forests, roadsides, etc.	bees
BRASSICACEAE - Mustard or Crucifer Family (1)					
Brassica sp.	gakrie	gakriepu	H	cultivated	bees
CAPRIFOLIACEAE - Honeysuckle Family (1)					
Viburnum sp.		gasuo	H		pigs
CARICACEAE - Papaya Family (1)					
Carica papaya L.		kopitapu / kopita	T	cultivated	bees
CHENOPODIACEAE - Goosefoot Family (1)					
Chenopodium ficifolium Sm.	kehie	theshie / therhie	H	abundant in wet rice terraces	pigs
CONVOLVULACEAE - Morning-glory Family (1)					
Porana racemosa Roxb.	garibu / gareibu	reitsü / reicü	V	moist areas, roadsides, forest edges, landslide areas	cattle
CUCURBITACEAE - Cucumber or Cucurbit Family (1)					
Sechium edule (Jacq.) Swartz	kulukushü / squash leaf & fruit	eskush	V	cultivated, but can quickly escape and grow wild in forest areas	pigs
CYPERACEAE - Sedge Family (1)					
Carex sp.	tsohe / henu / tsohe henü	zohe	H	shaded, exposed cliffs, roadsides	cattle
ELAEOCARPACEAE - Elaeocarpus Family (1)					
Elaeocarpus lanceifolius Roxb.	chüjiechükrü / chujiechükrü / chiezhie chükrü	chüziechükrü	T	woodland, sunny edge, dappled shade up to 2400 m asl	mithun / cattle
FABACEAE - Bean Family (2)					
Bauhinia variegata L.	tego / tego-pou / tegou-w	teguopu / teguo	T	forest margins, up to 1800 m asl	bees

Botanical Name	Local Names		Life Form[†]	Habitat	Livestock Fed
	Khonoma	Tsiesema			
Erythrina indica Lam.	heto	hutuopu / hutuo	T	forest	bees
MALVACEAE - Mallow Family (2)					
Hibiscus syriacus	sohenyü / sohe / sohenothe / zohenyü	tsakhaganyü	S	hedge plant abundantly available on dry soils, cliffs	pigs
Kydia calycina Roxb.	kerunyie / thezumhiku / kerunyu / keruny	kerunyü / kerünyü	T	forest, exposed areas	cattle
MORACEAE - Mulberry Family (2)					
Ficus fistulosa Reinw. ex Blume	khavünyü / khavü	khravü / khravüsi / khravünyü / khrabvünyü	T	open forests, forest edges	mithun / cattle / pigs
F. subulata Blume	temichiede	tsawisiü ronyü / tsawisüronyü / tsawishüronyü /	T		cattle
MUSACEAE - Banana Family (1)					
Musa sp. (wild banana stem)	tekhwüno / tiekwenyu	tiepfetsa		cleared forests, riversides	pigs
PINACEAE - Pine Family (2)					
Pinus kesiya Royle ex Gordon	tehü / tehu	tehou / tehu	T	forest area, also fields, gardens, etc.	mithun / cattle
P. patula Schltdl. & Cham.	tehü / tehu	tehou / tehu	T	forest area, also fields, gardens, etc.	mithun / cattle
PLANTAGINACEAE - Plantain Family (1)					
Plantago major L.	gapa	gapa	H	abundant in moist areas, open spaces, often mixed with lawn grasses	pigs
POACEAE - Grass Family (9)					
Arundinaria sp.	jüpfü / jhepfü	jüpfü / jülei	G		mithun / cattle
Arundinella sp.	tsoga / zoga (when young) / tsoganyü	zoga	G	roadsides, grasslands	mithun / cattle
Cyrtococcum sp.			G		cattle

Botanical Name	Local Names		Life Form[†]	Habitat	Livestock Fed
	Khonoma	Tsiesema			
Digitaria sp.		phirei	G		cattle
Eleusine indica (L.) Gaertn.	zusu / prüpre	zochü	G		cattle
Imperata cylindrica (L.) Raeusch.		phrieyaga	G	along roads, in swampy areas, etc.	cattle
Oryza sativa L.	telha	telhapu / telha	G	cultivated in both jhums and wet terraces	bees
Pennisctum sp.		süzie	G		cattle
Thysanolaena maxima (Roxb.) Kuntze	phikwe / phepfü / phipfe (broomgrass)	fipfe	G	roadsides, exposed grasslands, jhum fallows	mithun / cattle
POLYGONACEAE - Buckwheat Family (4)					
Fagopyrum cymosum (Trevir.) Meisn.	gari / garai / gare	gari / garei	H	found abundantly	mithun / cattle / pigs
Polygonum sp.	gare , ketsa gare	gare	H	roadsides, riversides, moist places	pigs
P. plebeium R. Br.	gagi /gagei / gagie	gazie	H	open land, riversides	pigs
P. runcinatum Buch.-Ham. ex D. Don	phrügie / phrügei / prügie / prügei / prügimedzü	prüzie	H	exposed moist areas such as swampy grasslands, along riverbanks & roadsides	pigs
RHAMNACEAE - Buckthorn Family (1)					
Hovenia dulcis Thunb.	kipia / kipie / kiapie	shisiasi / ciepie	T		mithun / cattle
ROSACEAE - Rose Family (2)					
Docynia indica (Wall.) Decne.	kipho	ciepho	T	moist, forest areas	mithun / cattle
Prunus avium (L.) L.	pezie / kevi	peziepu / pezie / kezie	T		mithun / cattle / bees
RUTACEAE - Rue Family (1)					
Zanthoxylum acanthopodium DC.	gangasi / ganyanyü / ganya / ganyasei / ganyasi	mechinga / ganya / ganyanyü / gangasi	T	open forest, riversides up to 1800 m asl	mithun / cattle

Botanical Name	Local Names		Life Form[†]	Habitat	Livestock Fed
	Khonoma	Tsiesema			
SALICACEAE - Willow Family (1)					
Salix sp.	sopfu sokhrie, sopfütikhrie	sopfüsokhriepu / sopfu sokhrie / sopfüciekhrie	T	forest	bees
SOLANACEAE - Potato Family (1)					
Datura meteloides Dunal	mekriteise / mekrietise / mekritise	lalhopu / lalho	S	moist areas, such as riversides	bees
THEACEAE - Tea Family (1)					
Eurya japonica Thunb.	sisenomeri / sise	seisenuo / seisenuopu	T	exposed warmer areas at higher altitudes	bees
ULMACEAE - Elm Family (1)					
Trema orientalis (L.) Blume	thedie	thedie	T	forest clearings, fallowed land	cattle
URTICACEAE - Nettle Family (5)					
Boehmeria diffusa Wedd.	kerunyu, kerünyü	ganyü	S	shaded forest floors	cattle
Debregeasia longifolia (Burm. f.) Wedd.	yiedu	ganyü	T	grows wild in hilly regions	mithun / cattle
Elatostema sessile J.R. Forst. & G. Forst.	ziewhinyü / zie whünyü	jiehunyü	H	riversides, moist and marshy areas	mithun / cattle / pigs
Girardinia heterophylla (Vahl) Decne. - green	lovie / lhovie / phelovie	zozie	S	roadsides, degraded forests, grasslands, gardens, & other moist areas	mithun / cattle
Lecanthus wightii Wedd.	gaü / ga-ü		V	creeper on tall trees, riversides, etc.	pigs
VITACEAE - Grape Family (2)					
Leea indica (Burm. f.) Merr.	rieza	kedzahuru	T		bees
Vitis sp.	rieza / riezasi / riezameri	roza	V	forest, creeping on tree branches	pigs
UNIDENTIFIED (9)					
		cukanyu			pigs
		kekhitsüpu	T		bees
		keprhie			cattle

Botanical Name	Local Names		Life Form[†]	Habitat	Livestock Fed
	Khonoma	Tsiesema			
		ketsa khabvu			cattle
		socüpu	T		bees
		teirhüpu	T		bees
	tinyhrümie				pigs
		tsünu			cattle
		zope			cattle

[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

APPENDIX 5-40. Other Economic Plants

Botanical Name	Local Names		Life Form[†]	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
ANACARDIACEAE - Sumac Family (2)							
Rhus sp.	sikwü / sikhwü		T		firewood		
R. semialata Murray	tsomhu / tsomhonyü / tsomhumedzü	zomhoupu / zomhou	T	usually forest edge	shampoo made by mixing bark extract with that of *Lavatera* sp. or *Debregiasia* sp. and *Schima wallichii*	bark	
APOCYNACEAE - Dogbane Family (1)							
Wrightia tomentosa (Roxb.) Roem. & Schult.		gasiasei	T	forest, up to 1200 m asl; planted as ornamental	carving plates, cups, etc.	wood	
AQUIFOLIACEAE - Holly Family (1)							
Ilex aquifolium L.	nicha (holly)		S	cultivated	decoration	foliage and berries	branches cut and collected
ARACEAE - Arum Family (1)							
Alocasia sp.	rüzaru / rü zarü	dzüthekrü	H	moist, wild forest	rat poison		peeled and sliced stem is used
ARECACEAE - Palm Family (3)							
Calamus erectus Roxb.	tekhra / tekhrasi / tekhrameri / kipha / kepha	tekhra / therü	V	damp places	making chairs, tables, baskets and other decorative work	stem	stem cut and peeled
C. viminalis Willd.	kipha	therü	V	moist shady areas	making chairs, tables, baskets and other decorative work	stem	stem cut and peeled
Wallichia densiflora Mart.		kevünyhonyü	T	shaded moist areas	fencing, roof	leaf	branches cut and collected
ASTERACEAE - Sunflower Family (6)							
Anaphalis sp.							
A. margaritacea (L.) Benth. ex C.B. Clarke	tieme		H	higher altitudes, open exposed areas, cliffs, etc.	decoration, used as dried flowers	flower	flower dried before displaying

Botanical Name	Local Names		Life Form[†]	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
Artemisia indica Willd.	penia nienu / penia / penie /niapnu / niapfü	ciena / ciena nanu / ciena-napfu	S	abundant in exposed areas with moist soils, such as forest margins, open forests, near roadsides & other degraded areas	capturing bees, constructing fencing, building walls; if placed over garlic, will grow better	leaf / seed / stem	leaves crushed / dried stem collected
Cosmos sulphureus Cav.			H	cultivated on terrace bunds	green manure	entire plant	plant cut & thrown into terraces
Eupatorium adenophorum Spreng.	tsunha	tsonha	S	open exposed areas	biomass cut and brought to wet rice terraces as green manure	all aerial biomass	
Tagetes patula L.			H	cultivated, often of bunds of wet rice terraces	enhancing soil fertility; also used to feed fish	entire plant	plant harvested & thrown onto terraces
Tithonia diversifolia (Hemsl.) A. Gray		niakitsu	S	roadsides, cliffs, exposed areas	decoration	flower	cut branches during flowering stage
AZOLLACEAE - Ferns (1)							
Azolla pinnata R. Br.					fertilizes wet rice terraces		
BASELLACEAE - Basella Family (1)							
Basella alba L.	ganyüro / kerünyü	miru	V	wastelands, garbage areas, dry, rocky areas, damp ground, etc.	lubricant	leaf	leaves crushed
BERBERIDACEAE - Barberry Family (1)							
Mahonia nepalensis DC.	nthoüsi / nthoü / ntho / nthoe	thuopu / ntho	S	near small streams, abundant in scrub forests	yellow dye	bark	bark crushed and juice extracted

Botanical Name	Local Names		Life Form†	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
BETULACEAE - Birch Family (1)							
Alnus nepalensis D. Don	rüpo / rüpu / rupou	rüpo / rüpro / rüpruo / rüpho / rüphosi / rüpruo	T	cultivated fields, shady ravines and landslides between 1-2000 m asl	dye	bark	bark removed and boiled
BIGNONIACEAE - Trumpet-creeper Family (1)							
Oroxylum indicum (L.) Kurz		zaprei / zaprie	T	forest area	botanical pesticide. When put flowers / leaf in rice field, all insects die away.	seed	seed decomposed. Would ferment it & disseminate it through the irrigation canel.
BOMBACACEAE - Kapok-tree Family (1)							
Bombax malabaricum DC.	tilho	chievü / seidzümu	T	open fields	rope; selectively retained in jhum fields for timber value	bark	bark peeled and inner portion used
BORAGINACEAE - Borage Family (1)							
Cordia myxa L.	chiemu / chemu / chiemunyü / shiemunyü	chiemupu / chemü / chemu / chiemunyü / chiemou	T	moist, exposed areas such as forests, roadsides, etc.	glue	fruit	squeezed and dried
CANNACEAE - Canna Family (1)							
Canna hybrida Hort.	kedinopu / kedinoni	rütie	H	wet areas such as along ditches or irrigation canals	leaves used for wrapping soybean, stabilization of irrigation canals		
COMBRETACEAE - Indian Almond Family (1)							
Terminalia myriocarpa Heurck & Mull. - Arg.	bicha	mecha	T		planted on WRT bunds to stabilize them; selectively retained in jhum fields for timber value; fibre is used to make string for tati musical instrument	bole, bark	

Botanical Name	Local Names		Life Form[†]	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
CUCURBITACEAE - Cucumber or Cucurbit Family (4)							
Hodgsonia macrocarpa (Blume) Cogn.		penhuro	V	climbs large trees in forest	rope	stem	stem used directly
Lagenaria vulgaris Ser.	meshü				fishing	leaf	crushed leaf
Trichosanthes sp.	jieru / jieri / hurü / zeirei	dzoru / joru	V	thick forest	attracting birds	fruit	fruits left as bait near bird traps
T. palmata L.	gauri / gaü-ri / gaüri /thezuchütuo	thezuchütuo	V	riversides, roadsides, marshy areas	soap	seed	seed crushed
CYPERACEAE - Sedge Family (2)							
Carex sp.	tsohe	tsakhaganyü	H	roadsides	cleaning brass and gold	leaf	
C. baccans Nees	pfü-pfü-nyü / pfü-pfü-nha / tsohie	zohe	H	exposed areas such as cliffs, roadsides, open fields, grasslands	cleaning brass, iron, etc.	leaf	scrub with leaves
EBENACEAE - Ebony Family (1)							
Diospyros kaki L. f.	jiedi / zhiedi / mezhajiedi	zhiedi / ziedi	T		wood favored for making handles for large dao		
ERICACEAE - Heath Family (2)							
Agapetes sp.	niezie / nigie / niejie		S	exposed areas, at higher altitudes, such as Dzukou valley	decoration	foliage and fruit	collect foliage during fruiting period
Vaccinium retusum (Griff.) Hook. f. ex C.B. Clarke	nijie / nieza		S	higher altitudes, open grassland	decoration / ornamental		
EUPHORBIACEAE - Spurge Family (1)							
Emblica officinalis Gaertn.	khulhu	chiehu / ciehusi / ciehuhuse	T	open forest at mid-elevations throughout Nagaland	selectively retained in jhum fields for timber value		

Botanical Name	Local Names		Life Form[†]	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
FABACEAE - Bean Family (9)							
Acacia sp.	teqwibi / khulhu						
A. megaladena Desv.	sokrie / sokhrie	sokro kromho	T	riverside, exposed, open areas	soap, fishing	stem bark	crushed bark
Albizia lebbeck (L.) Benth.		ze	T		selectively retained in jhum fields for building soil and timber value		
A. procera (Roxb.) Benth.		peu / peü	T		maintained in jhum fields for building soil and timber value		
A. stipulata (DC.) Boivin	mego	mego	T	forest, paddy fields up to 1200 m asl	maintained in jhum fields for building soil, timber - will curve if not cut in proper season	leaf / branch	leaves and branches pruned and applied to soil, timber - will curve if not cut in season
Bauhinia variegata L.	tego / tego-pou / tegou-w	teguopu / teguo	T	forest margins, up to 1800 m asl	dye	bark	bark crushed
Entada scandens (L.) Benth.)	tholimeri / tholirai / tholi	tholi	V	exposed forest edges, climbing on trees	soap, anti-dandruff and anti-lice lotion; rope	seed; vine	stem twisted
Erythrina indica Lam.	heto	hutuopu / hutuo	T	forest	wheel of trolley	timber	stem cut transversely
Millettia piscidia Wight & Arn.	m-pai	pesiero	V	cliffs, exposed or shady areas	poisoning fish	stem	leaves crushed
FAGACEAE - Beech Family (4)							
Castanopsis sp.		bedu	T		premium firewood; can be cut at ground level without maintaining stump.		
Quercus lamellosa Sm.			T		Similar to *Q. serrata*. White. Less insect damage.		
Q. pachyphylla Kurz	pedu	pedusei / pedusi	T		selectively retained in jhum fields for timber value, best & most costly firewood that can be kept up to 10 yrs. ; usually pollarded at 2-6 ft		

Botanical Name	Local Names		Life Form†	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
Q. serrata Thunb.	phie / phrie	phrie / phre	T	forest area	superior firewood but nothing else will grow underneath it; usually pollarded at 2.5-3.5 ft		
JUGLANDACEAE - Walnut Family (1)							
Juglans regia L.	khwüsi	pfüsi / pfhü / mewe	T		black dye	bark	
LAMIACEAE - Mint Family (3)							
Elsholtzia blanda (Benth. in Wall.) Benth.	rünü / runü / rünu	tepfürünu	S	degraded forest, wasteland	assisting fermintation process when brewing beer	seeds / flowers / leaf	crushed
Gomphostemma sp.	meyha	teizhu	T		firewood		
Leucosceptrum canum Sm.			T		sometimes pollarded & left in jhum fields as support for beans		
LAURACEAE - Laurel Family (3)							
Lindera caudata (Nees) Hook. f.	chienia				cleaning baskets		
Litsea sp.	chüjienyü		T		timber tree		
L. citrata Blume		tsi / tsie	T		selectively retained in jhum fields for timber value	bole	
LILIACEAE - Lily Family (2)							
Cardiocrinum sp.	ketsü		S	open and exposed areas, grasslands, etc.	decoration, dried flowers	pods	plant dried
	Dzukou dry flower		H	Dzukou Valley	decoration	flower	collected as dry flower
LOGANIACEAE - Butterfly-bush Family (1)							
Buddleja paniculata Wall.	teisü / teizu / teizü / teishü / teidzü / temepfü	teizhü	T		timber		

Botanical Name	Local Names		Life Form†	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
LORANTHACEAE - Catkin-mistletoe Family (3)							
Dendrophthoe sp.	tsatsu / thezhü	thezhü	T		used to make spear shaft	wood	
D. pentandra (L.) Miq.	ketsa	tsase					
Loranthus sp.	melia tsae / melia-tsai / ketsa	tsase	T	forest area	glue for catching birds	fruit / stem	boiled and crushed with water / stem extract mixed with other plants
MAGNOLIACEAE - Magnolia Family (1)							
Michelia champaca L.		seirei	T	thick forest	yellow dye for textiles	flower	flower crushed
MALVACEAE - Mallow Family (4)							
Abelmoschus moschatus Medic. ssp. *moschatus* var. *moschatus*	tsünyü		T		subsititute for shampoo		
Gossypium herbaceum L.	tsosa	techa / seicha (seitecha)	S	cultivated	making cloth		
Hibiscus sp.	kerünyü		H	exposed areas	soap	leaf / branch	plant crushed
Kydia calycina Roxb.	kerunyie / thezumhiku / kerunyu / keruny	kerunyü / kerünyü	T	forest, exposed areas	soap, shampoo, fibre for making rope	bark	bark crushed and used for making soap
MARANTACEAE - Prayer-Plant Family (1)							
Phrynium capitatum Willd.	tekrenyü / tekrenye	thekrenyü	S	exposed areas	packing, leaves used as plates	leaves	
MELIACEAE - Mahogany Family (2)							
Cedrela serrata Royle	zuna	zouna / zuna	T		protective frame around coffin to protect it from direct contact with soil, good for building purposes, doesn't curve, remains fresh if kept in ground; one of most revered trees		

Botanical Name	Local Names		Life Form†	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
Melia azederach L.	khusia	khousie	T	common 200 -1800 m asl, seeds spread by grazing cattle	timber can be harvested in 10-12 yrs., can be cut any season		
MORACEAE - Mulberry Family (6)							
Ficus sp.	merie / gwishürho / gwichüro / gwichüronyü / ketsa nha	prigei	T		bird trap		
Ficus sp.	prügei	prigei / prigi	T		bird trap		
Ficus sp.	tsatho, niekhupri	tsabo	T				
F. elastica Roxb.	neikhupi / niakhupri	prigi / pregei / priegi / leiteitsasei	T	forest edges, exposed areas	substitute of rubber, trapping birds		
F. pisocarpa Blume	pregei / prigei		T		BIG FICUS DOWN BY WRT		
Morus macroura Miq.	meüsani		T		good timber tree	bole	
MUSACEAE - Banana Family (2)							
Musa paradisiaca L.	tekwenyü	nhanyü	T	near river source, also cultivated	packaging, substitute for plates and cups	leaf	used fresh
M. rosacea Jacq.	tekhwüno / tsiekwenyü / tiekwenyu / tekhwe	tepferhü, pfetho ('the real' leaf)	T	usually cultivated			
MYRSINACEAE - Myrsine Family (2)							
Maesa indica (Roxb.) A. DC.	zhadiatse / kurhie	kurhie					
M. montana A. DC.	kourhie / kurhei / kurhi / jadiatseünyü	kourhie	T	open areas such as roadsides or cliffs	substitute of lotion, seed used as moisturizer	fruit	fruit crushed

Botanical Name	Local Names		Life Form[†]	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
ORCHIDACEAE - Orchid Family[‡] (33)							
Aerides crassifolium Parish & Rchb. f.		bapfu			ornamental	entire plant	
Ascocentrum miniatum (Lindl.) Schltr.					ornamental		
Coelogyne barbata Lindl. ex Griff.					ornamental		
C. corymbosa Lindl.					ornamental		
C. stricta (D. Don) Schltr.					ornamental		
Cryptochilus sanguineus Wall.	peraphipa / cipfutse				ornamental		
Cymbidium elegans Lindl.					ornamental		
C. iridioides D. Don					ornamental		
C. lancifolium Hook.					ornamental		
C. longifolium D. Don					ornamental		
C. mastersii Griff. ex Lindl.					ornamental		
C. tigrinum Parish ex Hook. f.					ornamental		
Dendrobium densiflorum Lindl. ex Wall.	kengu				ornamental		
D. eriaeflorum Griff.					ornamental		
D. falconeri Hook. f.					ornamental		
D. fimbriadum Lindl.		kenyu			ornamental		
D. fimbriadum Lindl. (var. *oculatum* Hook)					ornamental		
D. jenkinsii Wall.					ornamental		
D. longicornu Lindl.					ornamental		
D. transparens Wall.					ornamental		

Botanical Name	Local Names		Life Form[†]	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
D. wardianum Warner	theku				ornamental		
Epidendrum fulgens Brongn.					ornamental		
Eria Lindl.					ornamental		
Liparis distans C.B. Clarke					ornamental		
L. longipes Lindl.					ornamental		
Oberonia obcordata Lindl.					ornamental		
Otochilus alba Lindl.					ornamental		
Paphiopedilum hirsutissimum (Lindl. ex Hook. f.) Pfitzer					ornamental		
Phaius tankervilliae (Aiton) Blume					ornamental		
Pleione praecox (Sm.) D. Don					ornamental		
Renanthera imschootiana Rolfe					ornamental		
Thunia alba (Lindl.) Rchb. f.	tse / ketse	tse / tsenhyu		rock cliff, tree branches	glue / ornamental	stem	stem extract
Vanda coerulea Griff. ex Lindl.					ornamental		
PASSIFLORACEAE - Passion-flower Family (1)							
Passiflora edulis Sims	bell	bell	V	cultivated	juice	fruit	fruit is cut and the juice extracted
PIPERACEAE - Pepper Family (3)							
Piper sp.	thepfa pan		V				
P. brachystachyum Vahl	nhapanyu / mithupan / mithu panyü	seipan	V	parasitic climber on trees		leaves	

Botanical Name	Local Names		Life Form†	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
P. nigrum L.	khwiterinyü / khweterhie nyü	mewiro	V				
POACEAE - Grass Family (40)							
Arundinaria sp.	jüpfü / jhepfü	jüpfü / jülei	G		making brooms		
Bambusa sp.	keve		G				
Bambusa sp.	kipha		G		handicraft work		
B. balcooa Roxb.			G				
B. nutans G.C. Wall. ex Munro			G				
B. pallida Munro			G				
B. tulda Roxb. (jati bamboo)		vüshü	G		making walling		
Chimonobambusa callosa (Munro) Nakai	thepfü		G	Dzuku valley	making brooms	branches	cut branches bundled together and tied
Dendrocalamus sp.	venie		G		material for housing, cups and decorations		big bamboo, hollow with larger internodes
D. giganteus Wall. ex Munro	vuni / vüni	vünei / vünei riepu	G		rain harvest from rooves		
D. hamiltonii Nees & Arn. ex Munro	kevü	kevü	G		fencing, mura		
D. hookeri Munro			G				
D. strictus (Roxb.) Nees	vüpia		G				
Imperata cylindrica (L.) Raeusch.		phrieyaga	G	along roads, in swampy areas, etc.	thatch rooves for field huts		
Melocanna sp.	keprü		G		rope substitute, mura, etc.		large and strong
M. baccifera (Roxb.) Kurz	themopri, vüni	vünei	G				
Neohouzeana dullon	vüpri	vüprie	G		rope substitute, fencing		

Botanical Name	Local Names		Life Form†	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
Phragmites vallatoria (L.) Veldkamp (green)	tsovü	zovü	G				
P. vallatoria (L.) Veldkamp (red)	phikwe	logi	G				
Phyllostachys mannii Gamble	jüli / jhülithe	jülei	G		making brooms		
Saccharum officinarum L.	nukrücha	meke / ke	G	cultivated	juice	stem	stem is crushed and the juice extracted
Setaria sp.	tsegenyu / pfünyü		G				
Sinarundinaria nagalandiana H.B. Naithani	rücü / rucu / rucü / rücüria / kerie		G	higher altitude, moist, thicker forest, ridges	rope	stem	bamboo skin is peeled, twisted and used
Thysanolaena maxima (Roxb.) Kuntze	phikwe / phepfü / phipfe	fipfe	G	roadsides, exposed grasslands, jhum fallows	making brooms		inflorescences tied together
unidentified bamboo	dzuki		G		housing material		
unidentified bamboo	dzupfie		G	moist, open fields, cliffs	broom		
unidentified bamboo		ke-ü	G		making walling		
unidentified bamboo	kevae		G	rocky cliff	making tool for thrashing	stem	hard, small with longer internode
unidentified bamboo		khopri	G		building / furniture		
unidentified bamboo		prienie	G		building		
unidentified bamboo		prieyo	G		building / fencing		
unidentified bamboo	renere		G		weaving stick		hard, with longer internode
unidentified bamboo	rietho	rietho	G		making baskets		
unidentified bamboo	ruchu		G	forest	making thatch		
unidentified bamboo	rürü / kerie		G	moist shady areas	making baskets and other handicrafts	stem	stem cut

Botanical Name	Local Names		Life Form†	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
unidentified bamboo	tsovü		G		construction material for ceilings, fencing		small, short bamboo
unidentified bamboo	vüshie		G		rope		hard stem
unidentified bamboo	vusie		G				
unidentified reed	tekhre	tekhrie	G	high altitudes, such as Dzukou Valley	material for housing, fencing, ceilings, decorations		small, hollow with shorter internode
RANUNCULACEAE - Buttercup Family (1)							
Delphinium sp.	ketsu		H	Dzukou Valley	decoration	flower	collected as dry flower
ROSACEAE - Rose Family (3)							
Docynia indica (Wall.) Decne.	kipho	ciepho	T	moist, forest areas	juice	fruit	fruit is cut and the juice extracted
Prunus domestica L.	plum	plum	T	moist areas, cultivated	juice	fruit	fruit is cut and the juice extracted
	niezie-niezie / khavü		S	exposed areas, at higher altitudes	decoration	foliage and fruit	collect foliage during fruiting period
RUBIACEAE - Madder Family (3)							
Hedyotis sp.	kitierie / kitie kitierie / khukhru	kitierie	H	open exposed spaces, degraded forest, higher altitudes	decoration	flower	collected as dry flower
Paederia foetida L.	riena / reina	mewiro	V	forest margins, landslide areas at 1400-1800 m asl	rope	stem	stem used directly
Rubia sikkimensis Kurz	tsienhyu / tsi nyü / tsienyu / tsenyhü		V	cliffs	red dye	leaf	leaf extract
RUTACEAE - Rue Family (3)							
Citrus aurantium L.	chühuo	sühuo kemu-u	T	cultivated	mosquito repellent	fruit peeling	orange peel is dried and burnt to repel mosquitos

Botanical Name	Local Names		Life Form†	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
C. maxima (Rumph. ex Burm.) Merr.	pomello	huolo	T	cultivated	juice	fruit	fruit is cut and the juice extracted
Zanthoxylum rhetsa (Roxb.) DC.		khupfü	T	lower altitude forests	Fruit edible. Leaves also eaten by silkworm.		
SALICACEAE - Willow Family (1)							
Salix sp.	sopfu sokhrie, sopfütikhrie	sopfu sokhrie	T	forest	fertilizer. Controls landslides, produces water so mainly plant in wet rice terraces. Very important to stabilizing terracing.		
SAPINDACEAE - Soapberry Family (1)							
Sapindus rarak DC.	khulhucü / khulucü	khurchisi / khurüciesi / khurciesi	T	mid-elevation forest	leach repellant, cleaning brass or gold, soap / leach / mosquito repellant	leaf / branch / fruit	leaf / fruit / branch crushed / soak fruit in water
SCROPHULARIACEAE - Figwort Family (1)							
Scoparia dulcis L.	khekhrienha / khekhrünha	priezhü	S	exposed clear spaces	used for fermentation in making rice beer	entire plant	plant crushed
SOLANACEAE - Potato Family (2)							
Datura meteloides Dunal	mekriteise / mekrietise / mekritise	lalhopu / lalho	S	moist areas, such as riversides	cleaning basket (bamboo basket), detergent	leaf / seed	scrub directly with leaves / crushed and mixed
Solanum khasianum C.B. Clarke	chükrü / shukru / shükru	chükrü / khuziechükrü	H	near roadsides, degraded forest, wastelands	ornaments, as necklace; seeds formerly used for making soap for washing white apparel	fruits	fruits strung together
STERCULIACEAE - Cacao Family (1)							
Sterculia alata Roxb.	ketsho	kecho	T	low lying, exposed areas up to 1000 m asl	rope; preferred firewood because of oil content	bark / wood	bark peeled

Botanical Name	Local Names		Life Form[†]	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
TAXODIACEAE - Bald Cypress Family (1)							
Cryptomeria japonica (Thunb. ex L. f.) D. Don	tehu	tehu	T		timber		
THEACEAE - Tea Family (1)							
Schima wallichii Choisy	mashie / mechie	mecho	T	forest	deworm livestock, fishing	bark, leaf	crushed bark mixed with feed / leaves crushed
TROPAEOLACEAE - Nasturtium Family (1)							
Tropaeolum majus L.	kharu niepu	niepu	H	cliffs and other rocky areas	plaster	leaf	
URTICACEAE - Nettle Family (4)							
Boehmeria sp.	ukhwü		T	roadside, moist areas, open areas	lubricant	leaf	leaf crushed
B. diffusa Wedd.	kerunyu, kerünyü	ganyü	S	shaded forest floors	plastering	leaf	leaf mixed with mud and used to paste walls
Girardinia heterophylla (Vahl) Decne. - green	lovie / lhovie / phelovie	zozie	S	roadsides, degraded forests, grasslands, gardens, & other moist areas	weaving cloth	bark	bark peeled
G. heterophylla (Vahl) Decne. - red	tekwilovie	tepfizozie	S	grasslands, degraded forest, roadsides & other open spaces	weaving cloth	bark	bark peeled

Botanical Name	Local Names		Life Form†	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
VERBENACEAE - Verbena Family (1)							
Gmelina arborea Roxb. ex Sm.	thovü / thogwü	thobvü / thovü	T	scattered throughout deciduous forest	carving spoons, plates, etc.; sometimes planted on terrace bunds to stabilize them; selectively retained in jhum fields for timber value; can also withstand pollarding; good support for growing black pepper or betel vine	bole	wood is carved
ZINGIBERACEAE - Ginger Family (2)							
Alpinia sp.	sokrüno	sokrünyü	H	exposed, open forests, cliffs, lowlying, moist areas, forest floor	packing	leaf	
Zingiber sp.	sokrünuo	vorieto / sokrüno / sokrünuo	H	forest floor, shaded areas	rope	stem	stem crushed and fashioned into rope
UNIDENTIFIED (10)							
	duyha		T		preferred firewood in Kezakeno, don't burn quickly, can keep for at least 5 yrs.		
	kezu		T		preferred firewood in Kezakeno, don't burn quickly, can keep for at least 5 yrs.		
	lalie		T		B-class timber		
		meshie			Photographed in wet rice terraces in Tsiesema. Thought to produce water & assists stabilize the soil.		
		serie	T		selectively retained in jhum fields for timber value		
		tacha			making cotton		

Botanical Name	Local Names		Life Form[†]	Habitat	Use	Part/s Used	Preparation
	Khonoma	Tsiesema					
	teizii			widespread in Khonoma	wood used in making spoons, because is hard		
		thenyie	T		firewood		
	tikhra						
	tsunyie						

[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

[‡] ORCHIDACEAE identified by Dr. Sapu Changkija, School of Agriculture and Rual Development, Nagaland University, Medziphema 797112, Nagaland.

APPENDIX 5-41. Ritual Plants

Botanical Name	Common English Name	Local Names		Life Form[†]	Habitat	Ritual Use
		Khonoma	Tsiesema			
ACANTHACEAE - Acanthus Family (3)						
Adhatoda sp.						When they are about to go to war or for headhunting, they take a leaf of this plant. It's a simple leaf and bitter. They use the leaf to see if they will have success or not. They spit on the leaf, and there they will broadcast ash also.
A. vasica Nees	malbar nut	chiese / teise	tsiesenyü	S	moist exposed areas, up to 1500 m asl; often cultivated as hedge plant	To observe an omen, 5, 7 or 9 slices are cut from a branch and allowed to drop to the ground, one after another; the omen is read by observing how many slices turned upward and how many turned downward
Andrographis laxiflora (Blume) Lindau		gatse / gatsi / gatsei / gadsie / gadzüsi		H		eaten by warriors during rüpi, the celebratory feast after victory in war, to prevent them from being injured or from dying if the heads had been taken from people who were mentally retarded. When one dies, it is believed, the spirit must pass a gatekeeper (mechiemo) to enter a dark valley called kezeirü; the soul is allowed past only after it bites a stinging caterpillar (mechiemorhei) – and can only then enter the land of the spirits where it settles for eternity; it is believed that by putting a bitter gadzüsi fruit between the teeth of the corpse, when its soul meets the gatekeeper, it can pretend to bite the dreaded caterpillar – while in reality biting the gadzüsi fruit
Phlogacanthus pubiforus Lindau		tesaenye		S	dry exposed area, roadside	other rituals
AMARANTHACEAE - Amaranth Family (1)						
Achyranthes aspera L.		zuyha	zorha (rha pfhü)	H	cliff, damp exposed areas	

Botanical Name	Common English Name	Local Names		Life Form†	Habitat	Ritual Use
		Khonoma	Tsiesema			
ARALIACEAE - Ginseng Family (3)						
Trevesia sp.		hetonye	huto	S	lowlands, roadsides	other rituals
Trevesia sp.		perhünye			higher altitude, moist areas	
T. palmata (DC.) Vis.	snow flake tree	tirhünyü / teirhü / tirhü	teirhünyü	S	exposed, open forest, forest edges	white pith of tirhü plant used in making headdresses worn during performance of ceremonies, such as sei-chape, construction of a new gate, bridge or dormitory bed
ARECACEAE - Palm Family (1)						
Calamus erectus Roxb.	viagra palm	tekhra / tekhrasi / tekhrameri / kipha / kepha	tekhra / therü	V	damp places	weave plates for use on day of Phichü pelhie ceremony
ASTERACEAE - Sunflower Family (1)						
Artemisia indica Willd.	bitter wormwood, mugwort	penia nienu / penia / penie /niapnu / niapfü	ciena / ciena nanu / ciena-napfu	S	abundant in exposed areas with moist soils, such as forest margins, open forests, near roadsides & other degraded areas	performing Tiecha, a ritual of the terraces and jhum fields; during Liedenyi festival, the granary is sprinkled with *Artemisia* leaves to ensure that the rice will not be quickly consumed; people sometimes held a few *Artemisia* branches or wore sprigs of it in their ears as it was believed to repel evil spirits
BETULACEAE - Birch Family (1)						
Alnus nepalensis D. Don	Himalayan alder	rüpo / rüpu / rupou	rüpo / rüpro / rüpruo / rüpho / rüphosi / rüpruo	T	cultivated fields, shady ravines and landslides between 1-2000 m asl	collected by child, together with other plants, in performance of Liede ritual for rice harvesting; Khonoma's founders adopted a rule that wood of the alder tree would not be burnt for charcoal
CUCURBITACEAE - Cucumber Family (1)						
Cucurbita pepo L.	pumpkins	rümo	se rümo / mungunuo	V	cultivated in jhums & gardens	

Botanical Name	Common English Name	Local Names		Life Form†	Habitat	Ritual Use
		Khonoma	Tsiesema			
CYPERACEAE - Sedge Family (2)						
Carex baccans Nees		tsohe / henu / tsohe henü	zohe	H	exposed areas such as cliffs, roadsides, open fields, grasslands	leaves used in Nuoso Kechü, the first ritual carried out on a child after birth; used during a bathing ritual on the third day after the birth of a girl child; the broad-leafed henu (considered the female tsohe plant) was used for a girl-child; the rough-bladed tsohe was used to transfer the sharpness of the grass to the child's nature
C. filicina Nees		tsohe / hepfu / tsohe hepfü	zohe	H	exposed areas such as cliffs, roadsides, open fields, grasslands	leaves used in Nuoso Kechü, the first ritual carried out on a child after birth; used during a bathing ritual on the third day after the birth of a male child; the slender-leafed hepfu (considered the male tsohe plant) was used for a boy-child; the rough-bladed tsohe was used to transfer the sharpness of the grass to the child's nature
FABACEAE - Bean Family (4)						
Cajanus cajan (L.) Millsp.	lentils / pigeon pea	dali	dali	S	cultivated	
Entada scandens (L.) Benth.		tholi / tholimeri / tholirai	tholi	V	exposed forest edges, climbing on trees	
Erythrina indica		hieto	huotuo	T		used in performing Thekirhü, a ritual to deter theft; when someone dies away from the village and the body can not be repatriated, then at least a bone or lock of hair must be brought back; a wooden effigy of the deceased is made of hieto, along with the bone or hair, and given full funeral rites
Glycine max (L.) Merr.	soybeans	südza	südza	H	cultivated	

Botanical Name	Common English Name	Local Names		Life Form†	Habitat	Ritual Use
		Khonoma	Tsiesema			
FAGACEAE - Beech Family (1)						
Quercus serrata Thunb.	European oak	phie / phrie	phrie / phre	T	forest area	collected by child, together with other plants, in performance of Liede ritual for rice harvesting; used ceremoniously as firewood to cook chicken during performance of Phichü pelhie ceremony to invoke the blessing of the elders; aslo used to build a hearth after performing kesia keneikewa ritual to sanctify ornaments;
GLEICHENIACEAE - Ferns (1)						
Dicranopteris sp.		chüli		F	cliff, exposed areas at higher altitudes	collected by child, together with other plants, in performance of Liede ritual for rice harvesting
LAMIACEAE - Mint Family (2)						
Elsholtzia blanda (Benth. in Wall.) Benth.		rünü / runü / rünu	tepfürünu	S	degraded forest, wasteland	
Plectranthus amboinicus (Lour.) Spreng.		shuzhabitse	terhürünu / terhourünu	H		
LAURACEAE – - Laurel Family (1)						
Phoebe hainesiana Brandis		megu		T		ability to withstand pollarding
LILIACEAE - Lily Family (1)						
Allium porrum L.	leek / purret / poro / pearl onion	solie / solia	süla	H	usually cultivated	stuck into the door of every house during Rase ritual to prevent death from visiting
MALVACEAE - Mallow Family (1)						
Urena lobata L.		kushü / kuchü		S	moist roadsides	other rituals, used in reaping ritual

Botanical Name	Common English Name	Local Names		Life Form†	Habitat	Ritual Use
		Khonoma	Tsiesema			
MUSACEAE - Banana Family (2)						
Musa sp.	plantain	siekru				leaf placed on top of *Artemisia* plants during performance of Tiecha ritual; spread out on a rock and a chicken killed on it during Geida sacrifice, performed to defeat the influence of others' evil words; collected by children during Dieruo ritual to allay the evil affects of anything said about the household by others; plucked by woman of the house during Mhochü ritual to sanctify the house
M. paradisiaca L.	banana	tekra / tekhwesi	thayie	T	near river source, also cultivated	other rituals
MYRSINACEAE - Myrsine Family (1)						
Maesa montana A. DC.		kourhie / kurhei / kurhi / jadiatseünyü	kourhie	T	open areas such as roadsides or cliffs	collected by child, together with other plants, in performance of Liede ritual for rice harvesting; used ceremoniously as firewood to cook chicken during performance of Phichü pelhie ceremony to invoke the blessing of the elders; also used to build a hearth after performing kesia keneikewa ritual to sanctify ornaments; kurhi wood is also used to thrust into and around the village gate on the day of chatho (cleaning of water source)
PINACEAE - Pine Family (2)						
Pinus kesiya Royle ex Gordon	pine	tehü / tehu	tehou / tehu	T	forest area, also fields, gardens, etc.	collected by child, together with other plants, in performance of Liede ritual for rice harvesting
P. patula Schltdl. & Cham.	pine	tehü / tehou	tehou / tehu	T	forest area, also fields, gardens, etc.	collected by child, together with other plants, in performance of Liede ritual for rice harvesting
POACEAE - Grass Family (10)						
Arundinella sp.	bamboo	tsoga / tsoganyü	zoga	G	roadsides, grasslands	used in Theke De ritual, performed on those suffering from general ill health, loss of appetite, or nausea
Coix lacryma-jobi L.	Job's tears	kesi	kesi	G	cultivated in jhum fields	

Botanical Name	Common English Name	Local Names		Life Form[†]	Habitat	Ritual Use
		Khonoma	Tsiesema			
Dendrocalamus hamiltonii Nees & Arn. ex Munro	Magar bamboo, kako bamboo, tufted bamboo	kevü	kevü	G		Khonoma's founders adopted a rule that kevü bamboo would not be used for making bamboo shoots.
Eleusine indica (L.) Gaertn.		zusu / prüpre	zochü	G		
Imperata cylindrica (L.) Raeusch.	thatch grass		phrieyaga	G	along roads, in swampy areas, etc.	
Melocanna sp.		keprü		G		
Oryza sativa L.	rice	telha	telha	G	cultivated in both jhums and wet terraces	
Setaria italica (L.) P. Beauv.	millet	sü	chütinuo	G	cultivated in jhums	
Sinarundinaria nagalandiana H.B. Naithani		rücü		G	higher altitudes, moist, thicker forest, ridges, etc.	Khonoma's founders adopted a rule that rücü bamboo would not be used for making bamboo shoots.
unidentified bamboo		segomi		G		split bamboo used to make fire during performance of Phichü pelhie ceremony to invoke the blessing of the elders
bamboo (generally)						bamboo appears prominently in ritual life – fires are often started by rapidly rubbing a bamboo string against a piece of dry wood, and then split bamboo used as kindling; bamboo mugs of beer are also part of some rituals; bamboo baskets are used to contain chickens to be sacrificed; bamboo is split as part of Geida, one of the first sacrifices after marriage
POLYGONACEAE - Buckwheat Family (1)						
Polygonum odoratum Lour.		nhatchü / nhashü		H	moist, deep soil	used in performing Thekirhü, a ritual to deter theft
SOLANACEAE - Potato Family (2)						
Capsicum frutescens L.	chilli	chiecie	chüsi	H	cultivated	other rituals
Solanum nigrum L.		gadzü	gadzu	H	dry, open areas	other rituals. When someone dies, before burial ceremony, will put fruit of gadzü into his/her mouth.

Botanical Name	Common English Name	Local Names		Life Form†	Habitat	Ritual Use
		Khonoma	Tsiesema			
ZINGIBERACEAE - Ginger Family (1)						
Zingiber officinale Rosc.	ginger	kevü	kevü	H	cultivated as condiment in jhums	
UNIDENTIFIED (7)						
		kurhei rhidu				
		kwhferünye				other rituals
		mei kirhü				
		niko		T		berries are used
		tezuthu		T		Used in many household festivities, but not for construction.
		theü				used to make leaf cups for pouring brew during the Tiecha ritual of the terraces and jhum fields
		tsogatha				used in performing Mezu Thuyha ritual on a a person suffering from a debilitating illness with an unknown cause; also used in Theke De ritual, performed on those suffering from general ill health, loss of appetite, or nausea

† Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

APPENDIX 5-42. Master List of Wild Plants used by Study Villages (compilation of appendices 5-36 – 5-41)

Botanical Name	Local Names		Life Form†	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
APPENDIX NO.					**5-36**	**5-37**	**5-38**	**5-39**	**5-40**	**5-41**
ACANTHACEAE - Acanthus Family (6)										
Adhatoda sp.										√
A. vasica Nees	teise / tsiesenyu	tsiesenyü	S	moist exposed areas, up to 1500 m asl; often cultivated as hedge plant			√			√
Andrographis laxiflora (Blume) Lindau	gatsi / gatsino		H		√					√
Phlogacanthus pubiforus Lindau	tesaenye		S	dry exposed area, roadside						√
Pseuderanthemum sp.	tise	metetsüse-ü / metacüse / metecüse / metecüse-ü	T	dry areas, such as along roadsides, rocky areas, & within village area	√		√			
Strobilanthes sp.	gale / galei / theluga	gathu / galelie	H	forest bed, exposed areas	√			√		
S. atropurpurens Nees	galelepienyü	kesega	H	higher altitude, exposed areas	√					
ACTINIDIACEAE - Chinese Gooseberry Family (1)										
Sauravia roxburghii Wall.	pehosi / peho	tehusi / tehuo / tehuosi	T			√				
AMARANTHACEAE - Amaranth Family (3)										
Achyranthes aspera L.	zuyha	zorha (rha pfhü)	H	cliff, damp exposed areas			√	√		√
Amaranthus viridis L.	kehie	tierhütiepfü	H		√			√		

Botanical Name	Local Names		Life Form†	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
Celosia argentea L.	niza / niedza / nidza	niedza	H	cultivated in kitchen garden and in house compound	√			√		
AMARYLLIDACEAE - Amaryllis Family (1)										
Curculigo capitulata (Lour.) Kuntze	segienyü	chagei	H	open spaces, undergrowth at high altitudes, forest floor, exposed cliffs			√			
ANACARDIACEAE - Sumac Family (5)										
Mangifera indica L.	merosi	merosi / mero	T			√				
Rhus sp.	sikhwü / sikwü		T				√		√	
R. semialata Murray	tsomhu / tsomhonyü / tsomhumedzü	zomhoupu / zomhou	T	usually forest edge	√	√	√	√	√	
Spondias axillaris Roxb.	khula	khula / khola	T			√				
S. pinnata (L. f.) Kurz	mezi	mezisi	T			√				
APIACEAE - Carrot Family (3)										
Centella asiatica (L.) Urb.	gara	gara	H	clayey soils in open spaces	√		√			
Eryngium foetidum L.	nhadunyia / dunia (local corriander)	nhadunyia / dhunia	H	stone crevices	√					
Oenanthe linearis Wall. ex DC.	gakra	gakra	H	damp soils along riverbanks, in marshy open spaces & wet fields	√		√	√		
APOCYNACEAE - Dogbane Family (2)										
Catharanthus roseus (L.) G. Don		nyiepu	H	cultivated			√			

Botanical Name	Local Names		Life Form[†]	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
Wrightia tomentosa (Roxb.) Roem. & Schult.		gasiasei	T	forest, up to 1200 m asl; planted as ornamental					√	
AQUIFOLIACEAE - Holly Family (2)										
Ilex sp. (cf)	sichu / megwü	sichü	T			√				
I. aquifolium L.	nicha (holly)		S	cultivated					√	
ARACEAE - Arum Family (4)										
Acorus calamus L.	themeprü	zhovü	H	semi-aquatic, found in high altitude ponds			√			
Alocasia sp.	rüzaru / rü zarü	dzüthekrü	H	moist, wild forest			√		√	
Colocasia sp.	thekrüno	thekrü	H	exposed, open forest	√			√		
C. esculenta (L.) Schott	dzüno / dzuno	dzunuo / dzünuo	H	cultivated	√			√		
ARALIACEAE - Ginseng Family (7)										
Aralia foliolosa (Wall.) Seem. ex Clarke	gasethu	seicha ('tree cotton')	T	higher altitude, forest land	√					
Brassaiopsis griffithii C.B. Clarke	rhütsinyü / rhütsinyu				√					
Panax pseudoginseng Wall.	ginsing	nhavü	H	thick forest floor			√			
Trevesia sp.	hetonye	huto	S	lowlands, roadsides						√
Trevesia sp.	perhünye			higher altitude, moist areas						√
Trevesia sp.	hrütsi		T	moist areas	√					
T. palmata (DC.) Vis.	tirhünyü / / teirhü / tirhü	teirhünyü	S	exposed, open forest, forest edges	√					√

Botanical Name	Local Names		Life Form[1]	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
ARECACEAE - Palm Family (3)										
Calamus erectus Roxb.	tekhra / tekhrasi / tekhrameri / kipha / kepha	tekhra / therü	V	damp places	√	√			√	√
C. viminalis Willd.	kipha	therü	V	moist shady areas					√	
Wallichia densiflora Mart.		kevünyhonyü	T	shaded moist areas					√	
ASTERACEAE - Sunflower Family (19)										
Ageratum conyzoides L.	tephrienha / tephinha	nhana	H	abundant along roadsides, open fields			√			
Anaphalis sp.									√	
A. margaritacea (L.) Benth. ex C.B. Clarke	tieme		H	higher altitudes, open exposed areas, cliffs, etc.					√	
Artemisia indica Willd.	penia nienu / penia / penie /niapnu / niapfü	ciena / ciena nanu / ciena-napfu	S	abundant in exposed areas with moist soils, such as forest margins, open forests, near roadsides & other degraded areas	√		√	√	√	√
Bidens pilosa L.	tsünyütsethu	temvütsüthu	H	shady moist areas, open fields			√	√		
Blumea sp. (cf)	thevohie	phepierü	H	sandy soil, exposed areas			√			
Chromolaena odorata (L.) R.M. King & H. Rob.		tsotsa / tsoca / japannha / tsonha	S	warmer areas			√			
Cosmos sulphureus Cav.			H	cultivated on terrace bunds					√	

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Crassocephalum crepidioides (Benth.) S. Moore	vilhunha / keko	mithudzü / methudzü	H	cultivated areas at mid-altitudes up to 1600 m asl	√		√	√		
Echinops echinatus Roxb.	husi	kikhahu	S	degraded forest, open spaces such as forest edges, grasslands, riversides, etc.			√			
Eupatorium adenophorum Spreng.	tsunha	tsonha	S	open exposed areas			√		√	
Gnaphalium affine D. Don	tieme	ciemega	H	open areas, such as roadsides	√					
Gynura sp.	lievino	lizienuo	H	usually found in backyards, terrestrial, moist areas, etc.	√		√			
Laggera pterodonta (DC.) Sch. Bip. ex Oliv.	pierü	pierü	H	rock cliff, dry exposed areas			√			
Sonchus sp.	gadzu / gadzü	pierükeza-u / pierü kezha-u	H	rock cliffs, crevices, open areas			√			
S. wightianus subsp. *wallichianus* (DC.) Boulos	gadzü / vilhunha	pierü / pierüpu	H	rock cliffs, crevices, open areas	√					
Spilanthes sp.	gatha / nhavei	ramochüsi	H	grasslands, riversides, roadsides			√			
Tagetes patula L.			H	cultivated, often of bunds of wet rice terraces					√	
Tithonia diversifolia (Hemsl.) A. Gray		niakitsu	S	roadsides, cliffs, exposed areas					√	
AZOLLACEAE – Ferns (1)										
Azolla pinnata R. Br.			F						√	

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BALSAMINACEAE - Touch-me-not Family (3)										
Impatiens sp.	tsiekie / tsiekeü / tsieke	tsükanyü	H	moist areas, like riversides, cliffs, roadsides, village & forest	√					
Impatiens sp.	ketsa tsukie		H		√					
I. tripetala Roxb.	lhuchü	tsukanyü	H	moist riversides, roadsides	√					
BASELLACEAE - Basella Family (2)										
Basella sp.		therhie	H	cultivated in kitchen garden and in house compound	√					
B. alba L.	ganyüro / kerünyü	miru	V	wastelands, garbage areas, dry, rocky areas, damp ground, etc.	√				√	
BEGONIACEAE - Begonia Family (3)										
Begonia sp.	tsiequenye		H	riverbed, attached to rocks, thick forest cover	√					
Begonia sp.	tsiekhanha		H	cliff, in between rocks, edge of rock cliffs, etc.			√			
B. palmata D. Don	teise / teise ketsa	techütielenuo / techütieleno / teichü teilenyü	H	forest, usually under growth in shady area, forest floor, moist areas	√		√			
BERBERIDACEAE - Barberry Family (1)										
Mahonia nepalensis DC.	nthoüsi / nthoü / ntho / nthoe	thuopu / ntho	S	near small streams, abundant in scrub forests		√	√		√	

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BETULACEAE - Birch Family (2)										
Alnus nepalensis D. Don	rüpo / rüpu / rupou	rüpo / rüpro / rüpruo / rüpho / rüphosi / rüpruo	T	cultivated fields, shady ravines and landslides between 1-2000 m asl			√	√	√	√
Betula alnoides Buch.-Ham. ex D. Don	rüproprie / rüpopie / rüpopia	pro	T	higher altitudes, in areas exposed to direct sunlight	√					
BIGNONIACEAE - Trumpet-creeper Family (2)										
Oroxylum indicum (L.) Kurz		zaprei / zaprie	T	forest area					√	
Stereospermum colais (Buch.-Ham. ex Dillwyn) Mabb.	pega / piga		T	forest	√		√			
BOMBACACEAE - Kapok-tree Family (1)										
Bombax malabaricum DC.	tilho	chievü / seidzümu	T	open fields					√	
BORAGINACEAE - Borage Family (4)										
Cordia myxa L.	chiemu / chemu / chiemunyü / shiemunyü	chiemupu / chemü / chemu / chiemunyü / chiemou	T	moist, exposed areas such as forests, roadsides, etc.	√			√	√	
Cynoglossum furcatum Wall.	thezü-tae / thezü-mhikou / thezu-mhikou		H	moist shady areas, roadsides, stream banks			√			
Trichodesma khasianum Clarke	mekhuseki	sekisekuo	S	higher altitudes, cliffs, usually in open forest	√					
Trigonotis ovalifolia Bth.			V				√			

Botanical Name	Local Names		Life Form†	Habitat	Category					
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BRASSICACEAE - Mustard or Crucifer Family (2)										
Brassica sp.	gakrie	gakriepu	H	cultivated				√		
Rorippa sp.	segoga	seguoga	H	rock crevices, open exposed areas	√		√			
CANNABACEAE - Hemp Family (1)										
Cannabis sativa L.	ganja nyü	ganja	S	cultivated, open grassland			√			
CANNACEAE - Canna Family (1)										
Canna hybrida Hort.	kedinopu / kedinoni	rütie	H	wet areas such as along ditches or irrigation canals					√	
CAPPARACEAE - Caper Family (1)										
Roydsia suaveolens Roxburgh	rükhusi	rokasi				√				
CAPRIFOLIACEAE - Honeysuckle Family (3)										
Viburnum sp.		gasuo	H					√		
Viburnum sp.	gaphieno / gaphino		T	forest, roadsides, etc.	√					
V. foetidum Wall.	tsakhra / chada / riegesi	tsakhrasi / tsakrasi	T		√	√				
CARICACEAE - Papaya Family (1)										
Carica papaya L.		kopitapu / kopita	T	cultivated				√		
CARYOPHYLLACEAE - Pink Family (1)										
Drymaria cordata (L.) Willd. ex Roem. & Schult.	nya-nya	pfüpfü	H	open fields from 900-2100 m asl			√			

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	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
CEPHALOTAXACEAE - Plum Yew Family (1)										
Cephalotaxus griffithii Hook. f.	sipehü / seipehu		T	forest, at 1500-3000 m asl			√			
CHENOPODIACEAE - Goosefoot Family (1)										
Chenopodium ficifolium Sm.	kehie	theshie / therhie	H	abundant in wet rice terraces	√			√		
COMBRETACEAE - Indian Almond Family (1)										
Terminalia myriocarpa Heurck & Mull. - Arg.	bicha / mecha	mecha	T						√	
COMMELINACEAE - Spiderwort Family (3)										
Commelina benghalensis L.			H				√			
C. diffusa Burm. f.	meünha	me-ünha	H				√			
C. erecta L.	rüzienha		H	common near stream banks and other moist places			√			
CONVOLVULACEAE - Morning-glory Family (1)										
Porana racemosa Roxb.	garibu / gareibu	reitsü / reicü	V	moist areas, roadsides, forest edges, landslide areas	√			√		
CUCURBITACEAE - Cucumber or Cucurbit Family (8)										
Cucumis sativus L.	tsüto	tsütuo	V	cultivated			√			
Cucurbita pepo L.	rümo	se rümo / mungunuo	V	cultivated in jhums & gardens						√
Hodgsonia macrocarpa (Blume) Cogn.		penhuro	V	climbs large trees in forest					√	
Lagenaria vulgaris Ser.	meshü								√	

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Sechium edule (Jacq.) Swartz	kulukushü / squash leaf	eskush	V	cultivated, but can quickly escape and grow wild in forest areas				√		
Solena amplexicaulis (Lam.) Gandhi in Saldanha & Nicolson	temitsüto		V			√				
Trichosanthes sp.	jieru / jieri / hurü / zeirei	dzoru	V	thick forest					√	
T. palmata L.	gauri / gaü-ri / gaüri / thezuchütuo	thezuchütuo	V	riversides, roadsides, marshy areas	√		√		√	
CYPERACEAE - Sedge Family (3)										
Carex sp.	tsohe / henu / tsohe henü	zohe	H	shaded, exposed cliffs, roadsides				√	√	
C. baccans Nees	pfü-pfü-nyü / pfü-pfü-nha / tsohie	zohe	H	exposed areas such as cliffs, roadsides, open fields, grasslands					√	√
C. filicina Nees	tsohe / hepfu / tsohe hepfü / tsohe	zohe	H	exposed areas such as cliffs, roadsides, open fields, grasslands						√
DENNSTAEDTIACEAE – Ferns (4)										
Lindsaea ensifolia Sw.	thevüdokonyü		F	thick forest bed, higher altitudes	√					
Microlepia sp.	sengega / senge	sengega	F	forest floor, ridges, etc.	√					
M. speluncae (L.) T. Moore		gapfü	F		√					

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Pteridium aquilinum (L.) Kuhn	peshü / senega		F		√					
DIOSCOREACEAE - Yam Family (1)										
Dioscorea sativa L.	kiphiesi	chiephodzü	V		√				√	
DRYOPTERIDACEAE – Ferns (6)										
Diplazium sp.	mugia		F	higher altitudes, forest floor	√					
Diplazium sp.		gasülo	F	forest floor	√					
Diplazium sp.	tsiekhrüga	sengega	F	damp forest floors at higher altitudes	√					
D. esculentum (Retz.) Sw.	gathula	gapfü	F	paddy fields, moist forest exposed areas	√					
Dryopteris sp.	merie / meriega	gapfü	F	cliffs, forest floor	√					
unidentified fern	tsuga		F	moist, shady areas	√					
EBENACEAE - Ebony Family (1)										
Diospyros kaki L. f.	jiedi / zhiedi / mezhajiedi	zhiedi / ziedi	T			√			√	
ELAEAGNACEAE - Oleaster Family (1)										
Elaeagnus conferta Roxb.	pechü / peshü	pesüsi / peshü	T	cultivated		√				
ELAEOCARPACEAE - Elaeocarpus Family (1)										
Elaeocarpus lanceaefolius Roxb.	chüjiechükrü / chujiechükrü / chiezhie chükrü	chüziechükrü	T	woodland, sunny edge, dappled shade up to 2400 m asl		√		√		

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ERICACEAE - Heath Family (4)										
Agapetes sp.	niezie / nigie / niejie		S	exposed areas, at higher altitudes, such as Dzukou valley	√				√	
Rhododendron arboreum Sm.	nithüpü	ntho / nitho / kethuo-thuorie	T	higher altitudes with steep slopes			√			
Vaccinium sp.	riezasi	gasesi / mezasi				√				
V. retusum (Griff.) Hook. f. ex C.B. Clarke	nijie / nieza		S	higher altitudes, open grassland					√	
EUPHORBIACEAE - Spurge Family (7)										
Antidesma bunius (L.) Spreng.		gasisei / gasesi	T			√				
Baccaurea sp.	rünyi	kenyüsi				√				
Emblica officinalis Gaertn.	khulhu	chiehu / ciehusi / ciehuhuse	T	open forest at mid-elevations throughout Nagaland		√	√		√	
Euphorbia sp.	soru / sorü	soru	H	open fields, roadsides, dry land			√			
E. pulcherrima Willd. ex Klotzsch	Christmas nyiepou	Christmas niepu	S		√					
Phyllanthus amarus Schumach. & Thonn.	tekhunha		H	moist soil			√			
Ricinus communis L.	luluca	luca	S	open fields			√			
FABACEAE - Bean Family (13)										
Acacia sp.	teqwibi / khulhu		T						√	
A. megaladena Desv.	sokrie / sokhrie	sokro kromho	T	riverside, exposed, open areas					√	

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Albizia lebbeck (L.) Benth.		ze	T						√	
A. procera (Roxb.) Benth.		peu / peü	T						√	
A. stipulata (DC.) Boivin	mego	mego	T	forest, paddy fields up to 1200 m asl					√	
Bauhinia variegata L.	tego / tego-pou / tegou-w	teguopu / teguo	T	roadsides, up to 1800 m asl	√			√	√	
Cajanus cajan (L.) Millsp. (lentils)	dali	dali	S	cultivated						√
Entada scandens (L.) Benth.	tholimeri / tholirai / tholi	tholi	V	exposed forest edges, climbing on trees	√				√	
Erythrina indica Lam.	heto	hutuopu / hutuo	T	forest				√	√	√
Glycine max (L.) Merr.	südza	südza	H	cultivated						√
Millettia sp.	thevübozha	kecienyü	T	directly exposed areas, moist, cliffs, etc.	√					
M. piscidia Wight & Arn.	m-pai	pesiero	V	cliffs, exposed or shady areas					√	
Parkia roxburghii G. Don	teiquebi / thepfibi	thepfibi / thepfica	T	along streams, damp valleys, forest edges	√		√			
FAGACEAE - Beech Family (6)										
Castanopsis sp.		bedu	T						√	
C. tribuloides (Sm.) A. DC.	thejüsi	thezhüsi / theziesie	T			√				
Quercus camellosa	dzüdusi		T			√				
Q. lamellosa Sm.		pego	T						√	
Q. pachyphylla Kurz	pedu	pedusei / pedusi	T			√			√	
Q. serrata Thunb.	phie / phrie	phrie / phre	T	forest area			√		√	√

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GENTIANACEAE - Gentian Family (2)										
Swertia sp.	tsophü						√			
Tripterospermum japonicum (Sieb. & Zucc.) Maxim.	kiterie / kitierie / kiteria	tefudzü	V		√					
GESNERIACEAE - Gesneriad Family (1)										
Rhynchotechum ellipticum (Wall. ex D. Dietr.) A. DC.	gakhwemhü		H	under forest cover	√					
GLEICHENIACEAE – Ferns (1)										
Dicranopteris sp.	chüli		F	cliff, exposed areas at higher altitudes						√
JUGLANDACEAE - Walnut Family (1)										
Juglans regia L.	khwüsi	pfüsi / pfhü / mewe	T			√			√	
LAMIACEAE - Mint Family (10)										
Elsholtzia blanda (Benth. in Wall.) Benth.	rünü / runü / rünu	tepfürünu	S	degraded forest, wasteland					√	√
Gomphostemma sp.	meyha	teizhu	T						√	
Leucas flaccida var. *sebastiana* (Subba Rao & Kumari) D.A. Moulali & T. Pullaiah	saphü		H	roadsides, cliff, thick scrub forest			√			
Leucosceptrum canum Sm.			T						√	
Melissa parviflora Bth.	tepfurünyü / thepfürünyü	rünu	H	grasslands			√			
Mentha arvensis L.	pudina	bedino / bedinuo	H	cultivated	√					

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M. spicata L.	tephinitso	bedinuo	H	rock cliffs			√			
Ocimum basilicum L.	nitso	nietso	H	cultivated in fields			√			
Plectranthus sp.	khamhvü	tepfürünu / thepfürünu	H	usually in open forest, forest edge	√					
P. amboinicus (Lour.) Spreng.	shuzhabitse	terhürünu / terhourünu	H				√			√
LAURACEAE - Laurel Family (5)										
Cinnamomum zeylanicum Blume	riechü	seichü	T	grows wild in plains and hilly regions	√					
Lindera caudata (Nees) Hook. f.	chienia								√	
Litsea sp.	chüjienyü		T						√	
L. citrata Blume	sienguno / singuno/ cie / ciesi / ciesei	ciesci / ciesi / ciesei / cie	T	roadside, other exposed areas	√	√	√		√	
Phoebe hainesiana Brandis	megu		T							√
LILIACEAE - Lily Family (8)										
Allium sp.	ketsa solie		H	rocks, cliffs, woods, tree trunks	√					
Allium sp.	liedi		H	usually cultivated	√					
A. porrum L.	solie / solia	süla	H	usually cultivated	√					√
Aloe vera (L.) Burm. f.	mirunha		H	cultivated			√			
Asparagus filicinus Buch.-Ham. ex D. Don		sieprü	H		√					
Cardiocrinum sp.	ketsü		S	open and exposed areas, grasslands, etc.					√	
Disporum calcaratum D. Don		chüziegare / tsohero	H	cliff, moist, forest floor	√					

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unidentified lily	Dzukou dry flower		H	Dzukou Valley					√	
LOGANIACEAE - Butterfly-bush Family (1)										
Buddleja paniculata Wall.	teisü / teizu / teizü / teishü / teidzü / temepfü	teizhü	T		√				√	
LORANTHACEAE - Catkin-mistletoe Family (3)										
Dendrophthoe sp.	tsatsu / thezhü	thezhü	T						√	
D. pentandra (L.) Miq.	ketsa	tsase							√	
Loranthus sp.	melia tsae / melia-tsai / ketsa	tsase	T	forest area					√	
MAGNOLIACEAE - Magnolia Family (1)										
Michelia champaca L.		seirei	T	thick forest					√	
MALVACEAE - Mallow Family (6)										
Abelmoschus moschatus Medic. ssp. *moschatus* var. *moschatus*	tsünyü		T						√	
Gossypium herbaceum L.	tsosa	techa / seicha / seitecha	S	cultivated					√	
Hibiscus sp.	kerünyü		H	exposed areas					√	
H. syriacus L.	sohenyü / sohe / sohenothe / zohenyü	tsakhaganyü	S	hedge plant abundantly available on dry soils, cliffs	√			√		
Kydia calycina Roxb.	kerunyie / thezumhiku / kerunyu /	kerunyü / kerünyü	T	forest, exposed areas			√	√	√	

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	keruny									
Urena lobata L.	kushü / kuchü		S	moist roadsides						√
MARANTACEAE - Prayer-Plant Family (1)										
Phrynium capitatum Willd.	tekrenyü / tekrenye	thekrenyü	S	exposed areas					√	
MELASTOMATACEAE - Melastome Family (1)										
Osbeckia sp.	khukhe / kukhie	kukhe	S	cultivated			√			
MELIACEAE - Mahogany Family (2)										
Cedrela serrata Royle		zouna / zuna	T						√	√
Melia azederach L.	khusia / khusie	khousie	T	common 200 -1800 m asl			√		√	
MENISPERMACEAE - Moonseed Family (1)										
Tinospora sinensis (Lour.) Merr.	therüsi		V			√				
MORACEAE - Mulberry Family (16)										
Artocarpus chaplasha Roxb.		chierie	T	partial shade		√				
A. lakoocha Wall. ex Roxb.	zhieri	chieriesi	T	forest		√				
Ficus sp.	merie / gwishürho / gwichüro / gwichüronyü	prigei	T						√	
Ficus sp.	prügei	prigei / prigi	T						√	
Ficus sp.	tsatho, niekhupri	tsabo	T						√	

Botanical Name	Local Names		Life Form[†]	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
Ficus sp.	gwishürho / gwichüro / gwichüronyü	prigei	T		√	√				
F. auriculata Lour.	chedi / chiede	chiede / chede	T	common in open fields, along streams & moist valleys up to 1800 m asl		√	√			
F. cunia Buch.-Ham. ex Roxb.	thotseno	thuotsenuo	T	along stream banks and ravines		√				
F. elastica Roxb.	neikhupi / niakhupri	prigi / pregei / priegi / leiteitsasei	T	forest edges, exposed areas	√				√	
F. fistulosa Reinw. ex Blume	khavünyü / khavü	khravü / khravüsi / khravünyü / khrabvünyü	T	open forests, forest edges	√	√		√		
F. hispida L. f. (cf)	temichiede	ketsa khrabvü	T			√				
F. pisocarpa Blume (cf)	pregei / prigei		T						√	
F. pisocarpa Blume (cf)	niakhusi	priegei	T			√				
F. subulata Blume	temichiede	tsawisiü ronyü / tsawisürony ü / tsawishürony ü /	T			√		√		
Morus alba L.	khragunyü / khagru	khragunyü	T	roadside, forest margins	√	√				
M. macroura Miq.	meüsani		T			√			√	
M. nigra L.		khravüsi / khravü	T	wild damp areas		√				

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MUSACEAE - Banana Family (7)										
Musa sp.	siekru									√
Musa sp.	ketsa khweca / ketsa khwesia	pfenuonyü	T	cleared forests, riversides	√					
Musa sp.		ruochünuo	T		√	√				
Musa sp. (wild banana stem)	tekhwüno / tiekwenyu	tiepfetsa	T	cleared forests, riversides				√		
M. paradisiaca L.	khwekreno		T	near river source, also cultivated	√					
M. paradisiaca L.	tekra / tekhwesi	thayie	T	near river source, also cultivated						√
M. paradisiaca L.	tekwenyü	nhanyü	T	near river source, also cultivated					√	
M. rosacea Jacq.	tekhwüno / tsiekwenyü / tiekwenyu / tekhwe	tepferhü, pfetho ('the real' leaf)	T	usually cultivated	√				√	
MYRICACEAE - Bayberry Family (1)										
Myrica esculenta Buch.-Ham. ex D. Don	pezie / pezia	meza	T			√				
MYRSINACEAE - Myrsine Family (6)										
Ardisia sp.	keti		T	forest edges, cliffs	√					
A. crenata Sims	soda / sodai	Christmas niepu	S	degraded forests, riversides, grasslands			√			
Embelia sp.	nihrünya / nirhünye		T		√					
Embelia sp.	keti	tsawisürony ü	V			√				

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Maesa indica (Roxb.) A. DC.	kurhinyü	kurhie / kourhie	S		√				√	
M. montana A. DC.	kourhie / kurhei / kurhi / jadiatseünyü	kourhie	T	open areas such as roadsides or cliffs	√				√	√
MYRTACEAE - Myrtle Family (3)										
Callistemon sp.			T				√			
Pimenta sp.	kizüchi						√			
Psidium guajava L.	muduram / moduram	muduram / moduram	T	cultivated in home gardens, or on terrace bunds			√			
OLEACEAE - Olive Family (1)										
Jasminum dispermum Wall.	mejagakhwü / mejhagakhwü / mezhagakhwü		V	creeping in exposed areas, such as open forest	√					
ORCHIDACEAE - Orchid Family (33)										
Aerides crassifolium Parish & Rchb. f.		bapfu							√	
Ascocentrum miniatum (Lindl.) Schltr.									√	
Coelogyne barbata Lindl. ex Griff.									√	
C. corymbosa Lindl.									√	
C. stricta (D. Don) Schltr.									√	
Cryptochilus sanguineus Wall.	peraphipa / cipfutse								√	
Cymbidium elegans Lindl.									√	
C. iridioides D. Don									√	

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	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
C. lancifolium Hook.									√	
C. longifolium D. Don									√	
C. mastersii Griff. ex Lindl.									√	
C. tigrinum Parish ex Hook. f.									√	
Dendrobium densiflorum Lindl. ex Wall.	kengu								√	
D. eriaeflorum Griff.									√	
D. falconeri Hook. f.									√	
D. fimbriadum Lindl.		kenyu							√	
D. fimbriadum Lindl. (var. *oculatum* Hook)									√	
D. jenkinsii Wall.									√	
D. longicornu Lindl.									√	
D. transparens Wall.									√	
D. wardianum Warner	theku								√	
Epidendrum fulgens Brongn.									√	
Eria Lindl.									√	
Liparis distans C.B. Clarke									√	
L. longipes Lindl.									√	
Oberonia obcordata Lindl.									√	
Otochilus alba Lindl.									√	
Paphiopedilum hirsutissimum (Lindl. ex Hook. f.) Pfitzer									√	

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Phaius tankervilliae (Aiton) Blume									√	
Pleione praecox (Sm.) D. Don									√	
Renanthera imschootiana Rolfe									√	
Thunia alba (Lindl.) Rchb. f.	tse / ketse	tse / tsenhyu		rock cliff, tree branches					√	
Vanda coerulea Griff. ex Lindl.									√	
OXALIDACEAE - Wood-Sorrel Family (2)										
Averrhoa carambola L.			T				√			
Oxalis repens Thunb.	thezushüsi / thezu-chüsi	thezu-tsütuo	S	wet open field and grassland areas		√	√			
PAPAVERACEAE - Poppy Family (1)										
Papaver somniferum L.			H	cultivated in kitchen garden or jhum			√			
PASSIFLORACEAE - Passion-flower Family (2)										
Passiflora adenophylla Mast.	nhabellmeri	nhabell	V	forest area, creeping on other plants	√	√				
P. edulis Sims	bell	bell	V	cultivated, often in hedges			√		√	
PINACEAE - Pine Family (2)										
Pinus kesiya Royle ex Gordon	tehü / tehu	tehou / tehu	T	forest area, also fields, gardens, etc.				√		√
P. patula Schltdl. & Cham.	tehü / tehu	tehou / tehu	T	forest area, also fields, gardens, etc.				√		√

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	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
PIPERACEAE - Pepper Family (5)										
Piper sp.		nhapan / nithupan	V		√					
Piper sp.	thepfa pan		V						√	
P. brachystachyum Vahl	nhapanyu / mithupan / mithu panyü	seipan	V	parasitic climber on trees	√				√	
P. nigrum L.	khwiterinyü / khweterhie nyü	mewiro	V						√	
P. retrofractum Vahl.	khrushünyü / kushünyü		V	found attached to larger trees	√					
PLANTAGINACEAE - Plantain Family (1)										
Plantago major L.	gapa	gapa	H	abundant in moist areas, open spaces, often mixed with lawn grasses	√		√	√		
POACEAE - Grass Family (50)										
Arundinaria sp.	jüpfü / jhepfü	jüpfü / jülei	G					√	√	
Arundineria sp.	jüpfünothe		G	valleys	√					
Arundinella sp.	tsoga / zoga (when young) / tsoganyü	zoga	G	roadsides, grasslands				√		√
Bambusa sp.	keve		G						√	
Bambusa sp.	kipha		G						√	
B. balcooa Roxb.			G						√	
B. nutans G.C. Wall. ex Munro			G						√	
B. pallida Munro			G						√	

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	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
B. tulda Roxb. (jati bamboo)		vüshü	G						√	
Chimonobambusa callosa (Munro) Nakai	thepfü		G	Dzuku valley					√	
Coix lacryma-jobi L.	kesi	kesi	G	cultivated in jhum fields						√
Cyrtococcum sp.			G					√		
Dendrocalamus sp.	venie		G						√	
D. giganteus Wall. ex Munro	vuni / vüni	vünei / vünei riepu	G						√	
D. hamiltonii Nees & Arn. ex Munro	kevü	kevü	G						√	√
D. hookeri Munro			G						√	
D. strictus (Roxb.) Nees	vüpia		G						√	
Digitaria sp.		phirei	G					√		
Eleusine indica (L.) Gaertn.	zusu / prüpre	zochü	G					√		√
Imperata cylindrica (L.) Raeusch.		phrieyaga	G	along roads, in swampy areas, etc.				√	√	√
Melocanna sp.	kepru (bamboo)		G		√				√	√
M. baccifera (Roxb.) Kurz	themopri, vüni	vünei	G						√	
Neohouzeana dullon	vüpri	vüprie	G						√	
Oryza sativa L.	telha	telhapu / telha	G	cultivated in both jhums and wet terraces				√		√
Pennisctum sp.		süzie	G					√		
Phragmites vallatoria (L.) Veldkamp (green)	tsovü	zovü	G						√	

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P. vallatoria (L.) Veldkamp (red)	phikwe	logi	G						√	
Phyllostachys mannii Gamble	jüli / jhülithe	jülei	G						√	
Saccharum officinarum L.	nukrücha	meke / ke	G	cultivated			√		√	
Setaria sp.	tsegenyu / pfünyü		G						√	
S. italica (L.) P. Beauv.	sü	chütinuo	G	cultivated in jhums						√
Sinarundinaria nagalandiana H.B. Naithani	rücü / rucu / rucü / rücüria / kerie		G	higher altitude, moist, thicker forest, ridges, etc.	√				√	√
Thysanolaena maxima (Roxb.) Kuntze	phikwe / phepfü / phipfe (broomgrass)	fipfe	G	roadsides, exposed grasslands, jhum fallows				√	√	
unidentified bamboo	dzuki		G						√	
unidentified bamboo	dzupfie		G	moist, open fields, cliffs					√	
unidentified bamboo		ke-ü	G						√	
unidentified bamboo	kevae		G	rocky cliff					√	
unidentified bamboo		khopri	G						√	
unidentified bamboo		prienie	G						√	
unidentified bamboo		prieyo	G						√	
unidentified bamboo	renere		G						√	
unidentified bamboo	rietho	rietho	G						√	
unidentified bamboo	ruchu		G	forest					√	
unidentified bamboo	rürü / kerie		G	moist shady areas					√	
unidentified bamboo	segomi		G							√
unidentified bamboo	tsovü		G						√	
unidentified bamboo	vüshie		G						√	

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unidentified bamboo	vusie		G						√	
unidentified reed	tekhre	tekhrie	G	high altitudes, such as Dzukou Valley					√	
POLYGONACEAE - Buckwheat Family (9)										
Fagopyrum cymosum (Trevir.) Meisn.	gari / garai / gare	gari / garei	H	abundantly found	√			√		
F. esculentum Moench	gari	garei	H	abundant in cultivated land			√			
Polygonum sp.	chüzie / chuzhie gare	garelie	H	riverside, exposed and open areas	√					
Polygonum sp.	gare , ketsa gare	gare	H	roadsides, riversides, moist places	√			√		
P. capitatum Ham. ex D. Don	prügei	prüzie	H	rock crevices and walls, grasslands			√			
P. chinense L.	gwigagi	garelie	H	roadsides, riversides	√					
P. odoratum Lour.	nhatchü / nhashü		H	moist, deep soil						√
P. plebeium R. Br.	gagi /gagei / gagie	gazie	H	open land, riversides	√			√		
P. runcinatum Buch.-Ham. ex D. Don	phrügie / phrügei / prügie / prügei / prügimedzü	prüzie	H	exposed moist areas such as swampy grasslands, along riverbanks & roadsides	√		√	√		
PONTEDERIACEAE - Water-Hyacinth Family (1)										
Monochoria vaginalis (Burm. f.) C. Presl	nyarü	dzüthekrü	H	aquatic, usually in still water	√					

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PTERIDACEAE – Ferns (1)										
Adiantum capillus-veneris L.			F				√			
RANUNCULACEAE - Buttercup Family (6)										
Clematis sp.	ketsienha	thezucütuo	H	rock cliffs			√			
C. buchananiana DC.		miru / merü	V	sandy, dry places, etc.			√			
Delphinium sp.	ketsu		H	Dzukou Valley					√	
Ranunculus diffusus DC.	mithu chüsi	ramochüsi	H	moist place, exposed, open areas			√			
Thalictrum elegans Wall. ex Royle			H	moist cliff, roadside, stream side			√			
T. foliolosum DC.	nhasiaki		H	common in undergrowth			√			
RHAMNACEAE - Buckthorn Family (3)										
Hovenia dulcis Thunb. (coral tree)	kipia / kipie / kiapie	shisiasi / ciepie	T			√		√		
Rhamnus sp.	cierie	chierie	T	forest			√			
Zizyphus incurva Roxb.	khrogie / khowgie / khroge	khrogei	T	moist shady places up to 2000 m asl		√				
RHIZOPHORACEAE - Red Mangrove Family (1)										
Carallia brachiata (Lour.) Merr.	merüsi	merüsi	T	riverside, forest		√				
ROSACEAE - Rose Family (13)										
Docynia indica (Wall.) Decne.	kipho	ciepho	T	moist, forest areas		√		√	√	
Fragaria indica Andrews	kijürom / kijurom	süzaphitse / süzhaphitse	V	crevices in stone walls, open grasslands		√	√			

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	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
Potentilla fulgens Wall. ex Hook.	kedzü kekhra		H	moist, open grasslands, forest floor			√			
P. mooniana Wight.	kijüchüni	süzaphitse	H	forest floor, moist open grasslands, dry sandy soil, etc.			√			
Prunus sp.	peziakezhau		T			√				
P. avium (L.) L.	pezie / kevi	peziepu / pezie / kezie	T			√		√		
P. domestica L.	plum	plum	T	moist areas, cultivated					√	
P. persica (L.) Batsch	zarsi / zorüsi	ciehumekrü	T	dry areas			√			
Pyrus pashia Buch.-Ham. ex D. Don	kitsu	kitsusi / kicu	T			√				
Rubus sp. (red)	sepfülicü / siepfulichu / kidzu rom	temirom	S			√				
R. ellipticus Sm. (yellow)	mvüyha	rom / ruomvu / ruomvü	S	abundant in scrub forests		√				
R. indicus Thunb. (black)	mvüte / mvüti / mvütei	mvuti	S		√	√				
	niezie-niezie / khavü		S	exposed areas, at higher altitudes					√	
RUBIACEAE - Madder Family (5)										
Hedyotis sp.	kitierie / kitie kitierie / khukhru	kitierie	H	open exposed spaces, degraded forest, higher altitudes			√		√	
Luculia gratissima (Wall.) Sweet	sietho	pfenhinye	S	higher altitude, exposed	√					
Mussaenda sp.	sitho	mewiro					√			
Paederia foetida L.	riena / reina	mewiro	V	forest margins,			√		√	

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	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
				landslide areas at 1400-1800 m asl						
Rubia sikkimensis Kurz	tsienhyu / tsi nyü / tsienyu / tsenyhü		V	cliffs					√	
RUTACEAE - Rue Family (5)										
Citrus sp.		nhashüwhou	T			√				
C. aurantium L.	chühuo	sühuo kemu-u	T	cultivated			√		√	
C. maxima (Rumph. ex Burm.) Merr.	pomello	huolo	T	cultivated					√	
Zanthoxylum acanthopodium DC.	gangasi / ganya / ganyasei / ganyasi	mechinga / ganya / ganyanyü / gangasi	T	open forest, riversides up to 1800 m asl	√	√	√	√		
Z. rhetsa (Roxb.) DC.		khupfü	T	lower altitude forests		√			√	
SALICACEAE - Willow Family (2)										
Salix sp.	sopfu sokhrie, sopfütikhrie	sopfüsokhrie pu / sopfu sokhrie / sopfüciekhrie	T	forest				√	√	
S. tetradenia Hand.-Mazz.	zarosi / zarüsi		T			√				
SAPINDACEAE - Soapberry Family (1)										
Sapindus rarak DC.	khulhucü / khulucü	khurchisi / khurüciesi / khurciesi	T	mid-elevation forest			√		√	
SAURURACEAE - Lizard's-tail Family (1)										
Houttuynia cordata Thunb.	gatha	gatha	H	moist and marshy areas	√		√			

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SAXIFRAGACEAE - Saxifrage Family (1)										
Bergenia stracheyi (Hook. f. & Thomson) Engl.	tsiekha / tsiekha daru		H	dry rocky areas			√			
SCHIZOPHYLLACEAE – Split-Gill Fungi (1)										
Schizophyllum commune Fries	pretsie / tepfüvadi	ciecie	M		√					
SCROPHULARIACEAE - Figwort Family (1)										
Scoparia dulcis L.	khekhrienha / khekhrünha	priezhü	S	exposed clear spaces					√	
SMILACACEAE - Catbrier Family (2)										
Smilax sp.	rürumeri / rüru	pfüpro	V	creeping on floor of degraded forests	√	√				
S. zeylanica L.	khwüpro / khwüpo		T			√				
SOLANACEAE - Potato Family (13)										
Capsicum frutescens L.	chiecie	chüsi	H	cultivated						√
Datura meteloides Dunal	mekriteise / mekrietise / mekritise	lalhopu / lalho	S	moist areas, such as riversides			√	√	√	
Nicotiana tabacum L.	khüpre / khrüprü	khoprü	H	rock crevices and dry areas			√			
Physalis minima L.	kedicahu / kedichahu / thuti	betelnuo / betelenuo	H	moist exposed fields, also cultivated	√	√				
Solanum sp.	kepfü		H	dry areas such as rock crevices			√			
Solanum sp.		keroga	H		√					

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S. khasianum C.B. Clarke	chükrü / shukru / shükru	chükrü / khuziechükrü / chüziechükrü	H	near roadsides, degraded forest, wastelands			√		√	
S. kurzii Prain	kipfü ketsü-u / kikhwu kecu-u / kikhwü kecü-u	ciepfu ketsü / ciepfu ketsü-u	H	dry soil, also cultivated	√		√			
S. macrobotryon Dunal	gratsino		H		√					
S. macrodon Wall. ex Nees	gake		H		√					
S. nigrum L.	gadzu	gadzü	H	dry sandy soil, roadside	√					√
S. spirale Roxb.	zierüprü / zarüpre / zierprü	zierprü / zierüprü	H	moist shady places			√			
S. torvum Sw.	kikhwü	tsociepfü	H		√		√			
STERCULIACEAE - Cacao Family (1)										
Sterculia alata Roxb.	ketsho	kecho	T	low lying, exposed areas up to 1000 m asl					√	
TAXODIACEAE - Bald Cypress Family (1)										
Cryptomeria japonica (Thunb. ex L. f.) D. Don	tehu	tehu	T						√	
THEACEAE - Tea Family (5)										
Adinandra sp.	nirhünyü		T	moist areas	√					
Eurya sp.	shiezienye				√					
E. japonica Thunb. (wild tea)	sisenomeri / sise	seisenuo / seisenuopu	T	exposed warmer areas at higher altitudes	√			√		

Botanical Name	Local Names		Life Form†	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
Schima khasiana Dyer	meshiemedzü	mezasi / ketsacho	T	forest areas, roadsides, etc.	√	√				
S. wallichii Choisy	mashie / mechie	mecho	T	forest					√	
TRICHOLOMATACEAE – Gilled Mushrooms (9)										
Oudemansiella canarii (Jungh.) Höhn.	menyie / menye		M	parasitic growth on deadwood	√					
Pleurotus sp.	preinyii / preinyie / pinyie	cienie	M	parasitic growth on deadwood	√					
Pleurotus sp.	pruzie		M	parasitic growth on deadwood	√					
Pleurotus sp.	menyie	cietho	M		√					
unidentified mushroom	meriaprei / cie		M	parasitic growth on deadwood	√					
unidentified mushroom	pri		M	parasitic growth on deadwood	√					
unidentified mushroom	rüpuprei		M	parasitic growth on deadwood	√					
unidentified mushroom	teyhadzü		M	parasitic growth on deadwood	√					
unidentified mushroom	thevütuyha		M		√					
TROPAEOLACEAE - Nasturtium Family (1)										
Tropaeolum majus L.	kharu niepu	niepu	H	cliffs and other rocky areas			√		√	
ULMACEAE - Elm Family (1)										
Trema orientalis (L.) Blume	thedie	thedie	T	forest clearings, fallowed land			√	√		

Botanical Name	Local Names		Life Form†	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
URTICACEAE - Nettle Family (11)										
Boehmeria sp.	ukhwü		T	roadside, moist areas, open areas					√	
B. diffusa Wedd.	kerunyu, kerünyü	ganyü	S	shaded forest floors				√	√	
Debregeasia longifolia (Burm. f.) Wedd.	yiedu	ganyü	T	grows wild in hilly regions		√		√		
Elatostema sp.	dzükou gajie		H	open forest, moist and wet areas	√					
E. crytandrophium Wedd. var. *platyphyllum*	gadza / gadzie	gajolie	H	moist areas	√					
E. cyrtandrifolium (Zoll. & Moritzi) Miq.	gajie	gajie / gajo	H		√					
E. platyphyllum Wedd. var. *platyphyllum*	garei		H		√					
E. sessile J.R. Forst. & G. Forst.	ziewhinyü / zie whünyü	jiehunyü	H	riversides, moist and marshy areas	√			√		
Girardinia heterophylla (Vahl) Decne. - green	lovie / lhovie / phelovie	zozie	S	roadsides, degraded forests, grasslands, gardens, & other moist areas	√			√	√	
G. heterophylla (Vahl) Decne. - red	tekgwilovie / tepfizozie	tepfizozie	S	grasslands, degraded forest, roadsides & other open spaces	√				√	
Lecanthus wightii Wedd.	gaü / ga-ü		V	creeper on tall trees, riversides, etc.	√			√		
Pouzolzia sp.	khamhvü	khranhyü	H	riversides and other moist areas			√			

Botanical Name	Local Names		Life Form[†]	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
VERBENACEAE - Verbena Family (2)										
Clerodendrum colebrookianum Walp.	gatherü	gathera / gathere / gatherie	S	forest edge, roadside	√		√			
Gmelina arborea Roxb. ex Sm.	thovü / thogwü	thobvü / thovü	T	scattered throughout deciduous forest					√	
VITACEAE - Grape Family (3)										
Leea indica (Burm. f.) Merr.	rieza	kedzahuru	T			√		√		
Vitis sp.	rieza / riezasi / riezameri	roza	V	forest, creeping on tree branches	√	√		√		
Vitis aborata / *V. abovata* ???		voriephenuo	V	moist shady places	√	√				
ZINGIBERACEAE - Ginger Family (9)										
Alpinia sp.	sokrüno	sokrünyü	H	exposed, open forests, cliffs, lowlying, moist areas, forest floor					√	
Costus speciosus (J. König) Sm.	khwünothi / khwnothi	kevicharü	H	forest floor, moist areas such as near streams and rivers, lower altitudes	√		√			
Curcuma sp.		kijunuonie / kijünounyie	H	moist soil			√			
Curcuma sp.	kruziano / kruzieno		H		√					
Curcuma aromatica Salisb.	khwügwü / khwükwü	hupfü	H	forest bed, usually after the forest is burnt	√					
C. longa Linn.	kotsievü	ciesi / ciecie / chietei	H	cultivated			√			

Botanical Name	Local Names		Life Form[†]	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
Zingiber sp.	sokrünuo	vorieto / sokrüno / sokrünuo	H	forest floor, shaded areas		√			√	
Z. officinale Roscoe	kevü	kevü	H	cultivated as condiment in jhums			√			√
unidentified	vonito					√				
UNIDENTIFIED (36)										
		chiega			√					
		cukanyu						√		
		gabo			√					
		keduo								
		kekhitsüpu	T					√		
		keprhie						√		
		ketsa khabvu						√		
	khwisi					√				
	kurhei rhidu									√
	kwhferünye									√
	mei kirhü									√
	meshie								√	
		mvüruo				√				
	niko		T							√
		peratsüzie				√				
		pfemhienyü			√					
		pfüngatsünyü			√					
		rümhisi				√				
		seiteisi				√				
		serie	T						√	

Botanical Name	Local Names		Life Form†	Habitat	Category					
	Khonoma	Tsiesema			Wild Vegetables	Wild Fruit, Nuts and Berries	Medicinal Plants	Livestock Fodder	Other Economic Plants	Ritual Plants
		socüpu	T					√		
		tacha							√	
		tacü				√				
		tefünotse								
		teirhüpu	T					√		
	teizii			widespread in Khonoma					√	
	tezuthu		T							√
		thenyie	T						√	
	theü									√
	tikhra								√	
	tinyhrümie							√		
	tsevünyü				√					
	tsogatha									√
		tsünu						√		
	tsunyie								√	
		zope						√		

† Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

APPENDIX 5-43. Survey of Wild Vegetables Most Frequently Harvested in Khonoma Village

IDENTIFIED WILD VEGETABLES					WEIGHTED VALUES OF FARMER RESPONSES										
Rank#	**LOCAL NAME**	**BOTANICAL NAME**	**FAMILY**	**MONTHS COLLECTED**	**Kh-1**	**Kh-2**	**Kh-3**	**Kh-4**	**Kh-5**	**Kh-6**	**Kh-7**	**Kh-8**	**Kh-9**	**Kh-10**	**TOTAL**
1	tsiekhrüga	*Dryopteris* sp.	DRYOPTERIDACEAE -Ferns	Jan.-Feb.	10	10	10	10	10	10	9	10	8		**87**
2	gajie	*Elatostema cyrtandrifolium* (Zoll. & Moritzi) Miq.	URTICACEAE – Nettle Family	Aug.-Sept.	6	9	9	9	8	9	8	6	9		**73**
3	ganyanyü	*Zanthoxylum acanthopodium* DC.	RUTACEAE – Rue Family	Apr.-May	8	5	7	8	7		10	5	6		**56**
4	tirhünyü	*Trevesia palmate* (DC.) Vis.	ARALIACEAE – Ginseng Family	Jan.-Feb.	9	8		5	9	8	1	2	10		**52**
5	gakra	*Oenanthe linearis* Wall. ex DC.	APIACEAE – Carrot Family	Mar.-Apr.	4		5	4	6	3	6	4	3		**35**
6	gagie	*Polygonum plebeium* R. Br.	POLYGONACEAE – Buckwheat Family	Mar.	2	7		6	5		5		7		**32**
7	thekrüno	*Colocasia* sp.	ARACEAE – Arum Family	Mar.-May	7	4	1	7				3	5		**27**
8	nirhünyü	*Adinandra* sp.	THEACEAE - Tea	Mar.-May					3	7				9	**19**
9	gatha	*Houttuynia cordata* Thunb.	SAURURACEAE – Lizard's-tail Family	Mar.-Apr.			2	3	1		7		2		**15**
10	khamvü	*Pouzolzia* sp.	URTICACEAE – Nettle Family	Mar.-May, Oct.-Nov.	1	3	6			1	4				**15**
11	pri	mushrooms (unidentified)	TRICHOLOMATACEAE – Gilled Mushrooms	Apr.-May	5			2				1	4		**12**
12	gaphieno	*Vibumum* sp.	CAPRIFOLIACEAE – Honeysuckle Family	Mar.										10	**10**
13	gaüri	*Trichosanthes palmata* L.	CUCURBITACEAE – Cucumber or Cucurbit Family	Apr.-May			8				2				**10**
14	merie	*Dryopteris* sp.	DRYOPTERIDACEAE - Ferns	Dec.-Jan.					2			8			**10**

IDENTIFIED WILD VEGETABLES					WEIGHTED VALUES OF FARMER RESPONSES										
Rank#	**LOCAL NAME**	**BOTANICAL NAME**	**FAMILY**	**MONTHS COLLECTED**	**Kh-1**	**Kh-2**	**Kh-3**	**Kh-4**	**Kh-5**	**Kh-6**	**Kh-7**	**Kh-8**	**Kh-9**	**Kh-10**	**TOTAL**
15	khavünyü	*Ficus fistulosa* Reinw. ex Blume	MORACEAE – Mulberry Family	Apr.-May					4					5	**9**
16	mugia	*Diplazium* sp.	DRYOPTERIDACEAE - Ferns	Dec.-Jan.								9			**9**
17	chüri	*Rhamnus* sp.	RHAMNACEAE – Buckthorn Family	Mar.-Apr.										8	**8**
18	tsieke	*Impatiens* sp.	BALSAMINACEAE – Touch-me-not Family	Mar.-Apr.		2				6					**8**
19	khruchü	*Piper* sp.	PIPERACEAE – Pepper Family	throughout year										7	**7**
20	mejagakhü	*Jasminum dispermum* Wall.	OLEACEAE – Olive Family	Mar., Nov.-Dec.	3			1			3				**7**
21	piga	*Stereospermum colais* (Buch.-Ham. ex Pillwyn) Mabb.	BIGNONIACEAE – Trumpet-creeper Family	Dec.-Jan.								7			**7**
22	gari	*Fagopyrum cymosum* (Trevir.) Meisn.	POLYGONACEAE – Buckwheat Family	Mar.			6								**6**
23	lhuchü	*Impatiens tripetala* Roxb.	BALSAMINACEAE – Touch-me-not Family	Mar.-Apr.			1				5				**6**
24	tsevünyü	unidentified	POLYGONACEAE – Buckwheat Family	Apr.										6	**6**
25	gara	*Centella asiatica* (L.) Urb.	URTICACEAE – Nettle Family	Oct.-Nov.			4								**4**
26	ga-ü	*Lecanthus wightii* Wedd.	MYRSINACEAE – Myrsine Family	Mar.-Apr.						4					**4**
27	keti	*Ardisia* sp.	ZINGIBERACEAE – Ginger Family	throughout year										4	**4**

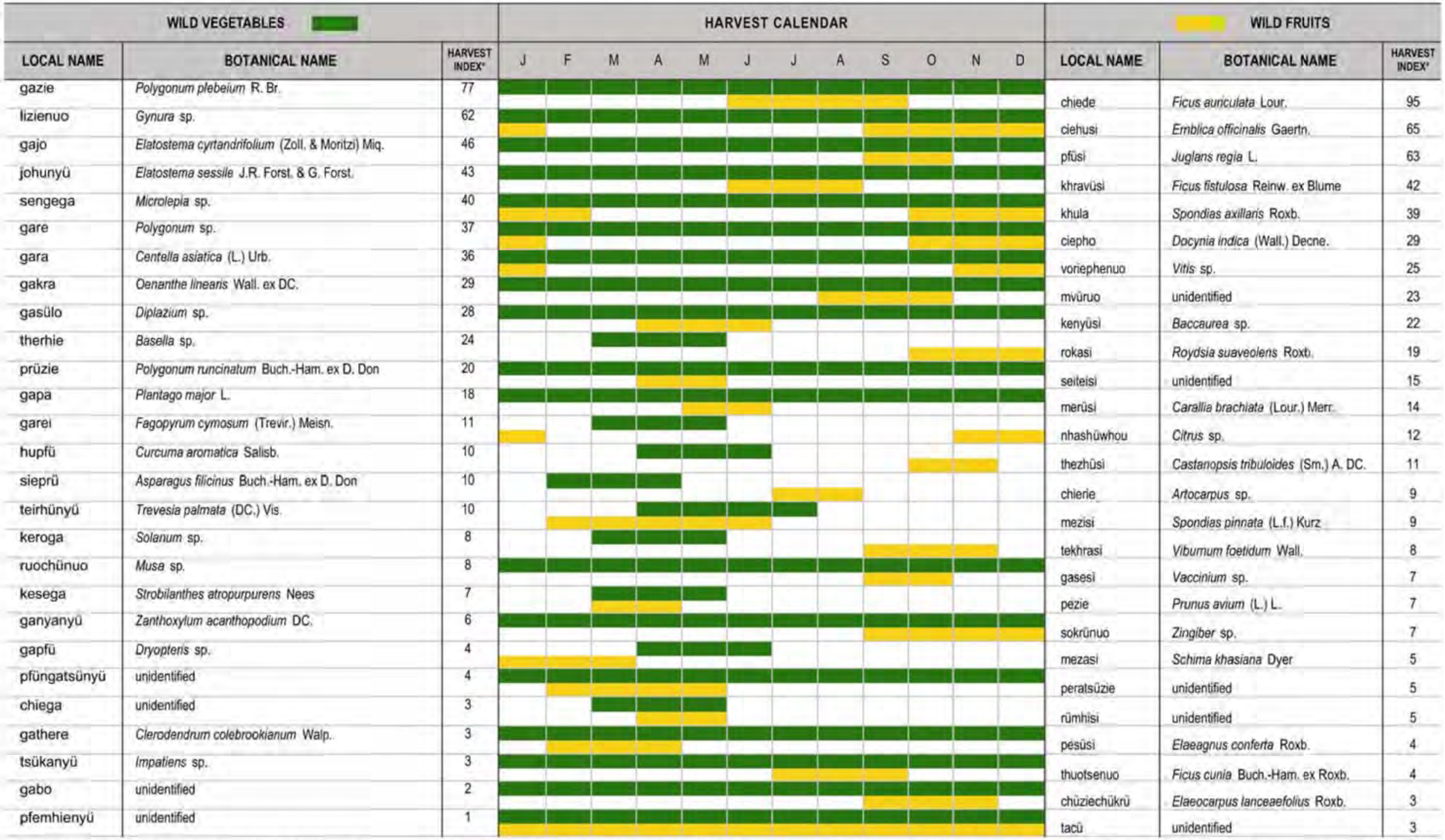
IDENTIFIED WILD VEGETABLES					WEIGHTED VALUES OF FARMER RESPONSES										
Rank#	**LOCAL NAME**	**BOTANICAL NAME**	**FAMILY**	**MONTHS COLLECTED**	**Kh-1**	**Kh-2**	**Kh-3**	**Kh-4**	**Kh-5**	**Kh-6**	**Kh-7**	**Kh-8**	**Kh-9**	**Kh-10**	**TOTAL**
28	krüzieno	*Curcuma* sp.	BORAGINACEAE – Borage Family	May-June										3	**3**
29	mekhuseki	*Trichodesma khasianum* Clarke	DRYOPTERIDACEAE - Ferns	Nov.-Dec.			3								**3**
30	gathula	*Diplazium esculentum* (Retz.) Sw.	ACANTHACEAE – Acanthus Family	Apr.-Oct.										2	**2**
31	gatsino	*Andrographis laxiflora* (Blume) Lindau	MORACEAE – Mulberry Family	Mar.-Apr.						2					**2**
32	gwichüronyü	*Ficus* sp.	URTICACEAE – Nettle Family	Apr.									1		**1**
33	jierhunyü	*Elatostema sessile* J.R. Forst. & G. Forst.	MORACEAE – Mulberry Family	throughout year										1	**1**

APPENDIX 5-44. Survey of Wild Fruits Most Frequently Harvested in Khonoma Village

IDENTIFIED WILD VEGETABLES					WEIGHTED VALUES OF FARMER RESPONSES										
Rank#	**LOCAL NAME**	**BOTANICAL NAME**	**FAMILY**	**MONTHS COLLECTED**	**Kh-1**	**Kh-2**	**Kh-3**	**Kh-4**	**Kh-5**	**Kh-6**	**Kh-7**	**Kh-8**	**Kh-9**	**Kh-10**	**TOTAL**
1	kipho	*Docynia indica* (Wall.) Decne.	ROSACEAE – Rose Family	Dec.-Jan.	10	10	10	10	10	10	10	10	10		**90**
2	chiede	*Ficus auriculata* Lour.	MORACEAE – Mulberry Family	July-Sept.	7	9	9	7	2	9	8	9	4		**64**
3	khulhu	*Emblica officinalis* Gaertn.	EUPHORBIACEAE – Spurge Family	Dec.-Jan.	9	8	3	4	4	7	7	7	6	3	**58**
4	rünyi	*Baccaurea* sp.	EUPHORBIACEAE – Spurge Family	Apr.-May	3	6	8	9	7	4	6	2		9	**54**
5	khula	*Spondias axillaris* Roxb.	ANACARDIACEAE – Sumac Family	Feb.-Mar.	8	7	2	6	9		9	8	5		**54**
6	zhiedi / jiedi	*Diospyros kaki* L. f.	EBENACEAE – Ebony Family	July-Aug.	5	3	4	5	8	3	2	3	2	8	**43**
7	pechü	*Elaeagnus conferata* Roxb.	ELAEAGNACEAE – Oleaster Family	May	6		6	8	6		4	4	9		**43**
8	pezie	*Prunus avium* (L.) L.	ROSACEAE – Rose Family	Apr.-May	2	1	7	2	5		5	5	8		**35**
9	khwüsi	*Juglans regia* L.	JUGLANDACEAE – Walnut Family	Sept.-Oct.	4	5	5	1			3	6	3	2	**29**
10	zhieri	*Artocarpus lakoocha* Wall. ex Roxb.	MORACEAE – Mulberry Family	July-Aug.					3	8		1		7	**19**
11	merü	*Carallia brachiata* (Lour.) Merr.	RHIZOPHORACEAE – Red Mangrove Family	May-July						6				10	**16**
12	mvüti	*Rubus indicus* Thunb.	ROSACEAE – Rose Family	May-June	1		1	3	1				7		**13**
13	khavü	*Ficus fistulosa* Reinw. ex Blume	MORACEAE – Mulberry Family	Aug.-Sept.		4				2				1	**7**
14	therüsi	*Tinospora sinensis* (Lour.) Merr.	MENISPERMACEAE – Moonseed Family	Aug.-Sept.		2				5					**7**

IDENTIFIED WILD VEGETABLES					WEIGHTED VALUES OF FARMER RESPONSES										
Rank#	**LOCAL NAME**	**BOTANICAL NAME**	**FAMILY**	**MONTHS COLLECTED**	**Kh-1**	**Kh-2**	**Kh-3**	**Kh-4**	**Kh-5**	**Kh-6**	**Kh-7**	**Kh-8**	**Kh-9**	**Kh-10**	**TOTAL**
15	chiezhie chükrü	*Elaeocarpus lanceaefolius* Roxb.	ELAEOCARPACEAE – Elaeocarpus Family	Nov.-Feb.										6	**6**
16	keti	*Embelia* sp.	MYRSINACEAE – Myrsine Family	Nov.-Dec.										5	**5**
17	mezi	*Spondias pinnata* (L.f.) Kurz.	ANACARDIACEAE – Sumac Family	Oct.-Feb.										4	**4**
18	sepfülicü	*Rubus* sp.	ROSACEAE – Rose Family	May-June							1				**1**
19	tekhrasi	*Calamus erectus* Roxb.	ARECACEAE – Palm Family	Mar.						1					**1**
20	zarosi	*Salix tetradenia* Hand. - Mazz.	SALICACEAE – Willow Family	Aug.-Sept.									1		**1**

APPENDIX 5-45. Overview of Wild Fruits and Vegetables Harvested by Tsiesema Villagers throughout the Year



WILD VEGETABLES 🟩			HARVEST CALENDAR												🟨 WILD FRUITS		
LOCAL NAME	BOTANICAL NAME	HARVEST INDEX*	J	F	M	A	M	J	J	A	S	O	N	D	LOCAL NAME	BOTANICAL NAME	HARVEST INDEX*
gazie	*Polygonum plebeium* R. Br.	77	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩	🟩	🟩	chiede	*Ficus auriculata* Lour.	95
lizienuo	*Gynura* sp.	62	🟩🟨	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	🟩🟨	ciehusi	*Emblica officinalis* Gaertn.	65
gajo	*Elatostema cyrtandrifolium* (Zoll. & Moritzi) Miq.	46	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩	🟩	pfüsi	*Juglans regia* L.	63
johunyü	*Elatostema sessile* J.R. Forst. & G. Forst.	43	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	🟩	🟩	🟩	🟩	khravüsi	*Ficus fistulosa* Reinw. ex Blume	42
sengega	*Microlepia* sp.	40	🟩🟨	🟩🟨	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	khula	*Spondias axillaris* Roxb.	39
gare	*Polygonum* sp.	37	🟩🟨	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	ciepho	*Docynia indica* (Wall.) Decne.	29
gara	*Centella asiatica* (L.) Urb.	36	🟩🟨	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	voriephenuo	*Vitis* sp.	25
gakra	*Oenanthe linearis* Wall. ex DC.	29	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	🟩	🟩	mvüruo	unidentified	23
gasülo	*Diplazium* sp.	28	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	🟩	🟩	🟩	🟩	🟩	🟩	kenyüsi	*Baccaurea* sp.	22
therhie	*Basella* sp.	24			🟩	🟩	🟩					🟨	🟨	🟨	rokasi	*Roydsia suaveolens* Roxb.	19
prüzie	*Polygonum runcinatum* Buch.-Ham. ex D. Don	20	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩	🟩	🟩	🟩	🟩	🟩	🟩	seiteisi	unidentified	15
gapa	*Plantago major* L.	18	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩	🟩	🟩	🟩	🟩	🟩	merüsi	*Carallia brachiata* (Lour.) Merr.	14
garei	*Fagopyrum cymosum* (Trevir.) Meisn.	11	🟨		🟩	🟩	🟩						🟨	🟨	nhashüwhou	*Citrus* sp.	12
hupfü	*Curcuma aromatica* Salisb.	10				🟩	🟩	🟩				🟨	🟨		thezhüsi	*Castanopsis tribuloides* (Sm.) A. DC.	11
sieprü	*Asparagus filicinus* Buch.-Ham. ex D. Don	10		🟩	🟩	🟩			🟨	🟨					chierie	*Artocarpus* sp.	9
teirhünyü	*Trevesia palmata* (DC.) Vis.	10		🟨	🟨	🟩🟨	🟩🟨	🟩🟨	🟩						mezisi	*Spondias pinnata* (L.f.) Kurz	9
keroga	*Solanum* sp.	8			🟩	🟩	🟩				🟨	🟨	🟨		tekhrasi	*Viburnum foetidum* Wall.	8
ruochünuo	*Musa* sp.	8	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩	🟩	gasesi	*Vaccinium* sp.	7
kesega	*Strobilanthes atropurpurens* Nees	7			🟩🟨	🟩🟨	🟩								pezie	*Prunus avium* (L.) L.	7
ganyanyü	*Zanthoxylum acanthopodium* DC.	6	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	🟩🟨	sokrünuo	*Zingiber* sp.	7
gapfü	*Dryopteris* sp.	4	🟨	🟨	🟨	🟩	🟩	🟩							mezasi	*Schima khasiana* Dyer	5
pfüngatsünyü	unidentified	4	🟩	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩	🟩	🟩	🟩	🟩	🟩	🟩	peratsüzie	unidentified	5
chiega	unidentified	3			🟩	🟩🟨	🟩🟨								rümhisi	unidentified	5
gathere	*Clerodendrum colebrookianum* Walp.	3	🟩	🟩🟨	🟩🟨	🟩🟨	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	pesüsi	*Elaeagnus conferta* Roxb.	4
tsükanyü	*Impatiens* sp.	3	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	🟩	🟩	🟩	thuotsenuo	*Ficus cunia* Buch.-Ham. ex Roxb.	4
gabo	unidentified	2	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩🟨	🟩🟨	🟩🟨	🟩	chüziechükrü	*Elaeocarpus lanceaefolius* Roxb.	3
pfemhienyü	unidentified	1	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩🟨	🟩🟨	tacü	unidentified	3

*"Harvest index" indicates the relative importance of each plant amongst those that villagers gather. Respondents were asked to list, in descending order of importance, 10 types each of wild vegetables and wild fruit that they most commonly harvest. The index was calculated simply by assigning each 1st place listing with a value of 10, 2nd place as 9, and so on down to 10th place listings that were valued as 1. The scores were then totalled for each plant mentioned by the 10 respondents.

APPENDIX 5-46. Survey of Wild Vegetables Most Frequently Harvested in Tsiesema Village

IDENTIFIED WILD VEGETABLES					WEIGHTED VALUES OF FARMER RESPONSES										
Rank#	**LOCAL NAME**	**BOTANICAL NAME**	**FAMILY**	**MONTHS COLLECTED**	**Kh-1**	**Kh-2**	**Kh-3**	**Kh-4**	**Kh-5**	**Kh-6**	**Kh-7**	**Kh-8**	**Kh-9**	**Kh-10**	**TOTAL**
1	gazie	*Polygonum plebeium* R.Br.	POLYGONACEAE – Buckwheat Family	throughout year	10	8	9	3	7	5	10	7	8	10	**77**
2	lizienuo	*Gynura* sp.	ASTERACEAE – Sunflower Family	throughout year	6	9	10	10	8	3	9			7	**62**
3	gajo	*Elatostema cyrtandrifolium* (Zoll. & Moritzi) Miq.	URTICACEAE – Nettle Family	throughout year	5	4			10	10		10	7		**46**
4	johunyü	*Elatostema sessile* J.R. Forst. & G. Forst.	URTICACEAE – Nettle Family	throughout year	4	5	7	7	5	9	6				**43**
5	sengega	*Microlepia* sp.	DENNSTAEDTIACEAE – Ferns	throughout year			8	6	3		8	5	4	6	**40**
6	gare	*Polygonum* sp.	POLYGONACEAE – Buckwheat Family	throughout year	8	6		2	6			6		9	**37**
7	gara	*Centella asiatica* (L.) Urb.	APIACEAE – Carrot Family	throughout year			6	8		8	4		9	1	**36**
8	gakra	*Oenanthe linearis* Wall. ex DC.	APIACEAE – Carrot Family	throughout year	1	1	5	5	4	1	3	9			**29**
9	gasülo	*Diplazium* sp.	DRYOPTERIDACEAE – Ferns	throughout year		2		9	2			8	2	5	**28**
10	therhie	*Basella* sp.	BASELLACEAE – Basella Family	Mar.-May				4		2	5		5	8	**24**
11	prüzie	*Polygonum runcinatum* Buch.-Ham. ex D. Don	POLYGONACEAE – Buckwheat Family	throughout year	7				9	4					**20**
12	gapa	*Plantago major* L.	PLANTAGINACEAE – Plantain Family	throughout year		7	1			7			3		**18**
13	garei	*Fagopyrum cymosum* (Trevir.) Meisn.	POLYGONACEAE – Buckwheat Family	Mar.-May	9						2				**11**

IDENTIFIED WILD VEGETABLES					WEIGHTED VALUES OF FARMER RESPONSES										
Rank#	**LOCAL NAME**	**BOTANICAL NAME**	**FAMILY**	**MONTHS COLLECTED**	**Kh-1**	**Kh-2**	**Kh-3**	**Kh-4**	**Kh-5**	**Kh-6**	**Kh-7**	**Kh-8**	**Kh-9**	**Kh-10**	**TOTAL**
14	hupfü	*Curcuma aromatica* Salisb.	ZINGIBERACEAE – Ginger Family	Apr.-June									10		**10**
15	sieprü	*Asparagus filicinus* Buch.-Ham. ex D. Don.	LILIACEAE – Lily Family	Feb.-Apr.		10									**10**
16	teirhünyü	*Trevesia palmate (DC.)* Vis.	ARALIACEAE – Ginseng Family	Apr.-July					1	6			1	2	**10**
17	keroga	*Solanum* sp.	SOLANACEAE – Potato Family	Mar.-May			3					1		4	**8**
18	ruochünuo	*Musa* sp.	MUSACEAE – Banana Family	throughout year								2	6		**8**
19	kesega	*Strobilanthes atropurpurens* Nees.	ACANTHACEAE – Acanthus Family	Mar.-May							7				**7**
20	ganyanyü	*Zanthoxylum acanthopodium* DC.	RUTACEAE – Rue Family	throughout year		3								3	**6**
21	gapfü	*Dryopteris* sp.	DRYOPTERIDACEAE - Ferns	Apr.-June								4			**4**
22	pfüngatsünyü	unidentified		throughout year			4								**4**
23	chiega	unidentified		Mar.-May								3			**3**
24	gathere	*Clerodendrum colebrookianum* Walp.	VERBENACEAE – Verbena Family	throughout year			2	1							**3**
25	tsükanyü	*Impatiens* sp.	BALSAMINACEAE – Touch-me-not Family	throughout year	3										**3**
26	gabo	unidentified		throughout year	2										**2**
27	pfemhienyü	unidentified		throughout year							1				**1**

APPENDIX 5-47. Survey of Wild Fruits Most Frequently Harvested in Tsiesema Village

IDENTIFIED WILD VEGETABLES					WEIGHTED VALUES OF FARMER RESPONSES										
Rank#	**LOCAL NAME**	**BOTANICAL NAME**	**FAMILY**	**MONTHS COLLECTED**	**Kh-1**	**Kh-2**	**Kh-3**	**Kh-4**	**Kh-5**	**Kh-6**	**Kh-7**	**Kh-8**	**Kh-9**	**Kh-10**	**TOTAL**
1	chiede	*Ficus auriculata* Lour.	MORACEAE – Mulberry Family	June-Sept.	10	10	10	10	10	8	10	10	8	9	**95**
2	ciehusi	*Emblica officinalis* Gaertn.	EUPHORBIACEAE – Spurge Family	Sept.-Jan.	8	9	9	1		9	4	8	9	8	**65**
3	pfüsi	*Juglans redia* L.	JUGLANDACEAE – Walnut Family	Sept.-Oct.	1	8	2	5	2	10	8	7	10	10	**63**
4	khravüsi	*Ficus fistulosa* Reinw. ex Blume	MORACEAE – Mulberry Family	June-Aug.	3	3			9	7	9		7	4	**42**
5	khula	*Spondias axillaris* Roxb.	ANACARDIACEAE – Sumac Family	Oct.-Feb.	9		6	6	1	2	6	5	1	3	**39**
6	ciepho	*Docynia indica* (Wall.) Decne.	ROSACEAE – Rose Family	Oct.-Jan.		5		7				6	5	6	**29**
7	voriephenuo	*Vitis* sp.	VITACEAE – Grape Family	Nov.-Jan.			7		6		7			5	**25**
8	mvüruo	unidentified		Aug.-Oct.				2	8			2	4	7	**23**
9	kenyüsi	*Baccaurea* sp.	EUPHORBIACEAE – Spurge Family	Apr.-June			8		3	6	1	4			**22**
10	rokasi	*Roydsia suaveolens* Roxb.	CAPPARACEAE – Caper Family	Oct.-Dec.	7	1		4	7						**19**
11	seiteisi	unidentified		Apr.-May				8		4			3		**15**
12	merüsi	*Carallia brachiata* (Lour.) Merr.	RHIZOPHORACEAE – Red Mangrove Family	May-June	2			9				3			**14**
13	nhashüwhou	*Citrus* sp.	RUTACEAE – Rue Family	Nov.-Jan.		6							6		**12**
14	thezhüsi	*Castanopsis tribuloides* (Sm.) A. DC.	FAGACEAE – Beech Family	Oct.-Nov.		2				1	5	1		2	**11**
15	chierie	*Artocarpus* sp.	MORACEAE – Mulberry Family	July-Aug.								9			**9**

IDENTIFIED WILD VEGETABLES					WEIGHTED VALUES OF FARMER RESPONSES										
Rank#	LOCAL NAME	BOTANICAL NAME	FAMILY	MONTHS COLLECTED	Kh-1	Kh-2	Kh-3	Kh-4	Kh-5	Kh-6	Kh-7	Kh-8	Kh-9	Kh-10	TOTAL
16	mezisi	*Spondias pinnata* (L.f.) Kurz	ANACARDIACEAE – Sumac Family	Feb.-June						5	3			1	**9**
17	tekhrasi	*Vibumum foetidum* Wall.	CAPRIFOLIACEAE – Honeysuckle Family	Sept.-Nov.	6								2		**8**
18	gasesi	*Vaccinium* sp.	ERICACEAE – Heath Family	Sept.-Out.			4			3					**7**
19	pezie	*Prunus avium* (L.) L.	ROSACEAE – Rose Family	May-Apr.		4	3								**7**
20	sokrünuo	*Zingiber* sp.	ZINGIBERACEAE – Ginger Family	Sept.-Dec.		7									**7**
21	mezasi	*Schima khasiana* Dyer	THEACEAE – Tea Family	Jan.-Mar.			5								**5**
22	peratsüzie	unidentified		Feb.-May					5						**5**
23	rümhisi	unidentified		Apr.-May	5										**5**
24	pesüsi	*Elaeagnus conferta* Roxb.	ELAEAGNACEAE – Oleaster Family	Feb.-Apr.					4						**4**
25	thuotsenuo	*Ficus cunia* Buch.-Ham. ex Roxb.	MORACEAE – Mulberry Family	July-Sept.	4										**4**
26	chüziechükrü	*Elaeocarpus lanceaefolius* Roxb.	ELAEOCARPACEAE – Elaeocarpus Family	Sept.-Nov.			1				2				**3**
27	tacü	unidentified		Jan.-Dec.				3							**3**

APPENDIX 5-48. Summary of Plants Utilized by Research Villages: Breakdown by Plant Family†

No.	FAMILY	NO. OF SPECIES IN EACH PLANT FAMILY										TOTAL NO. OF SPECIES
		DOMESTICATED – WHERE GROWN				WILD - CATEGORY OF USE						
		WET RICE TERRACES	JHUM FIELDS	KITCHEN GARDENS	PERMANENT GARDENS	WILD VEGETABLE	WILD FRUIT, NUTS AND BERRIES	MEDICINAL PLANTS	LIVESTOCK FODDER	OTHER ECONOMIC PLANTS	RITUAL PLANTS	
1	ACANTHACEAE - Acanthus Family	0	0	1	0	4	0	2	1	0	3	**11**
2	ACTINIDIACEAE - Chinese Gooseberry Family	0	0	1	0	0	1	0	0	0	0	**2**
3	AMARANTHACEAE - Amaranth Family	0	1	1	0	2	0	1	3	0	1	**9**
4	AMARYLLIDACEAE - Amaryllis Family	0	0	0	0	0	0	1	0	0	0	**1**
5	ANACARDIACEAE - Sumac Family	1	0	4	1	1	4	2	1	2	0	**16**
6	APIACEAE - Carrot Family	2	2	1	2	3	0	2	1	0	0	**13**
7	APOCYNACEAE - Dogbane Family	0	0	0	0	0	0	1	0	1	0	**2**
8	AQUIFOLIACEAE - Holly Family	0	0	0	0	0	1	0	0	1	0	**2**
9	ARACEAE - Arum Family	2	2	3	3	2	0	2	2	1	0	**17**
10	ARALIACEAE - Ginseng Family	0	0	0	0	4	0	1	0	0	3	**8**
11	ARECACEAE - Palm Family	0	0	0	0	1	1	0	0	3	1	**6**
12	ASTERACEAE - Sunflower Family	0	2	1	1	5	0	12	3	6	1	**31**
13	AZOLLACEAE – Ferns	0	0	0	0	0	0	0	0	1	0	**1**
14	BALSAMINACEAE - Touch-me-not Family	0	0	0	0	3	0	0	0	0	0	**3**
15	BASELLACEAE - Basella Family	0	0	0	0	2	0	0	0	1	0	**3**
16	BEGONIACEAE - Begonia Family	0	0	0	0	2	0	2	0	0	0	**4**

No.	FAMILY	NO. OF SPECIES IN EACH PLANT FAMILY										TOTAL NO. OF SPECIES
		DOMESTICATED – WHERE GROWN				WILD - CATEGORY OF USE						
		WET RICE TERRACES	JHUM FIELDS	KITCHEN GARDENS	PERMANENT GARDENS	WILD VEGETABLE	WILD FRUIT, NUTS AND BERRIES	MEDICINAL PLANTS	LIVESTOCK FODDER	OTHER ECONOMIC PLANTS	RITUAL PLANTS	
17	BERBERIDACEAE - Barberry Family	0	0	1	0	0	1	1	0	1	0	**4**
18	BETULACEAE - Birch Family	0	0	1	1	1	0	1	1	1	1	**7**
19	BIGNONIACEAE - Trumpet-creeper Family	0	0	0	0	1	0	1	0	1	0	**3**
20	BOMBACACEAE - Kapok-tree Family	0	0	0	0	0	0	0	0	1	0	**1**
21	BORAGINACEAE - Borage Family	0	0	1	1	2	0	2	1	1	0	**8**
22	BRASSICACEAE - Mustard or Crucifer Family	1	4	3	3	1	0	1	1	0	0	**14**
23	BROMELIACEAE - Bromeliad Family	0	0	0	1	0	0	0	0	0	0	**1**
24	CANNABACEAE - Hemp Family	0	0	0	0	0	0	1	0	0	0	**1**
25	CANNACEAE - Canna Family	0	0	0	0	0	0	0	0	1	0	**1**
26	CAPPARACEAE - Caper Family	0	0	0	0	0	1	0	0	0	0	**1**
27	CAPRIFOLIACEAE - Honeysuckle Family	0	0	0	0	2	1	0	1	0	0	**4**
28	CARICACEAE - Papaya Family	0	0	1	1	0	0	0	1	0	0	**3**
29	CARYOPHYLLACEAE - Pink Family	0	0	0	0	0	0	1	0	0	0	**1**
30	CEPHALOTAXACEAE - Plum Yew Family	0	0	0	0	0	0	1	0	0	0	**1**
31	CHENOPODIACEAE - Goosefoot Family	0	0	0	0	1	0	0	1	0	0	**2**
32	COMBRETACEAE - Indian Almond Family	0	1	1	1	0	0	0	0	1	0	**4**

No.	FAMILY	NO. OF SPECIES IN EACH PLANT FAMILY										TOTAL NO. OF SPECIES
		DOMESTICATED – WHERE GROWN				WILD - CATEGORY OF USE						
		WET RICE TERRACES	JHUM FIELDS	KITCHEN GARDENS	PERMANENT GARDENS	WILD VEGETABLE	WILD FRUIT, NUTS AND BERRIES	MEDICINAL PLANTS	LIVESTOCK FODDER	OTHER ECONOMIC PLANTS	RITUAL PLANTS	
33	COMMELINACEAE - Spiderwort Family	0	0	0	0	0	0	3	0	0	0	**3**
34	CONVOLVULACEAE - Morning-glory Family	0	1	1	1	1	0	0	1	0	0	**5**
35	CUCURBITACEAE - Cucumber or Cucurbit Family	3	7	6	6	1	1	2	1	4	1	**32**
36	CYPERACEAE - Sedge Family	0	0	0	0	0	0	0	1	2	2	**5**
37	DENNSTAEDTIACEAE – Ferns	0	0	0	0	4	0	0	0	0	0	**4**
38	DIOSCOREACEAE - Yam Family	0	1	1	1	1	0	0	0	0	0	**4**
39	DRYOPTERIDACEAE - Ferns	0	0	0	0	6	0	0	0	0	0	**6**
40	EBENACEAE - Ebony Family	0	0	0	0	0	1	0	0	1	0	**2**
41	ELAEAGNACEAE - Oleaster Family	0	0	0	1	0	1	0	0	0	0	**2**
42	ELAEOCARPACEAE - Elaeocarpus Family	0	0	1	0	0	1	0	1	0	0	**3**
43	ERICACEAE - Heath Family	0	0	0	0	1	1	1	0	2	0	**5**
44	EUPHORBIACEAE - Spurge Family	0	2	4	3	1	3	4	0	1	0	**18**
45	FABACEAE - Bean Family	5	9	7	11	4	0	1	2	9	4	**52**
46	FAGACEAE - Beech Family	0	0	1	2	0	3	1	0	4	1	**12**
47	GENTIANACEAE - Gentian Family	0	0	0	0	1	0	1	0	0	0	**2**
48	GESNERIACEAE - Gesneriad Family	0	0	0	0	1	0	0	0	0	0	**1**
49	GINKGOACEAE - Maidenhair Tree Family	0	0	1	0	0	0	0	0	0	0	**1**
50	GLEICHENIACEAE - Ferns	0	0	0	0	0	0	0	0	0	1	**1**

No.	FAMILY	NO. OF SPECIES IN EACH PLANT FAMILY										TOTAL NO. OF SPECIES
		DOMESTICATED – WHERE GROWN				WILD - CATEGORY OF USE						
		WET RICE TERRACES	JHUM FIELDS	KITCHEN GARDENS	PERMANENT GARDENS	WILD VEGETABLE	WILD FRUIT, NUTS AND BERRIES	MEDICINAL PLANTS	LIVESTOCK FODDER	OTHER ECONOMIC PLANTS	RITUAL PLANTS	
51	JUGLANDACEAE - Walnut Family	0	0	0	1	0	1	0	0	1	0	**3**
52	LAMIACEAE - Mint Family	0	3	4	0	2	0	5	0	3	2	**19**
53	LAURACEAE - Laurel Family	0	0	3	0	2	1	1	0	3	1	**11**
54	LILIACEAE - Lily Family	3	5	1	4	5	0	1	0	2	1	**22**
55	LOGANIACEAE - Butterfly-bush Family	0	0	1	0	1	0	0	0	1	0	**3**
56	LORANTHACEAE - Catkin-mistletoe Family	0	0	0	0	0	0	0	0	3	0	**3**
57	MAGNOLIACEAE - Magnolia Family	0	0	0	0	0	0	0	0	1	0	**1**
58	MALVACEAE - Mallow Family	0	1	2	2	1	0	1	2	4	1	**14**
59	MARANTACEAE - Prayer-Plant Family	0	0	0	0	0	0	0	0	1	0	**1**
60	MELASTOMATACEAE - Melastome Family	0	0	1	0	0	0	1	0	0	0	**2**
61	MELIACEAE - Mahogany Family	0	0	2	1	0	0	1	0	2	0	**6**
62	MENISPERMACEAE - Moonseed Family	0	0	0	0	0	1	0	0	0	0	**1**
63	MORACEAE - Mulberry Family	0	0	6	2	4	12	1	2	6	0	**33**
64	MUSACEAE - Banana Family	1	1	4	2	4	1	0	1	2	2	**18**
65	MYRICACEAE - Bayberry Family	0	0	0	0	0	1	0	0	0	0	**1**
66	MYRSINACEAE - Myrsine Family	0	0	1	0	4	1	1	0	2	1	**10**
67	MYRTACEAE - Myrtle Family	1	0	1	1	0	0	3	0	0	0	**6**
68	OLEACEAE - Olive Family	0	0	0	0	1	0	0	0	0	0	**1**

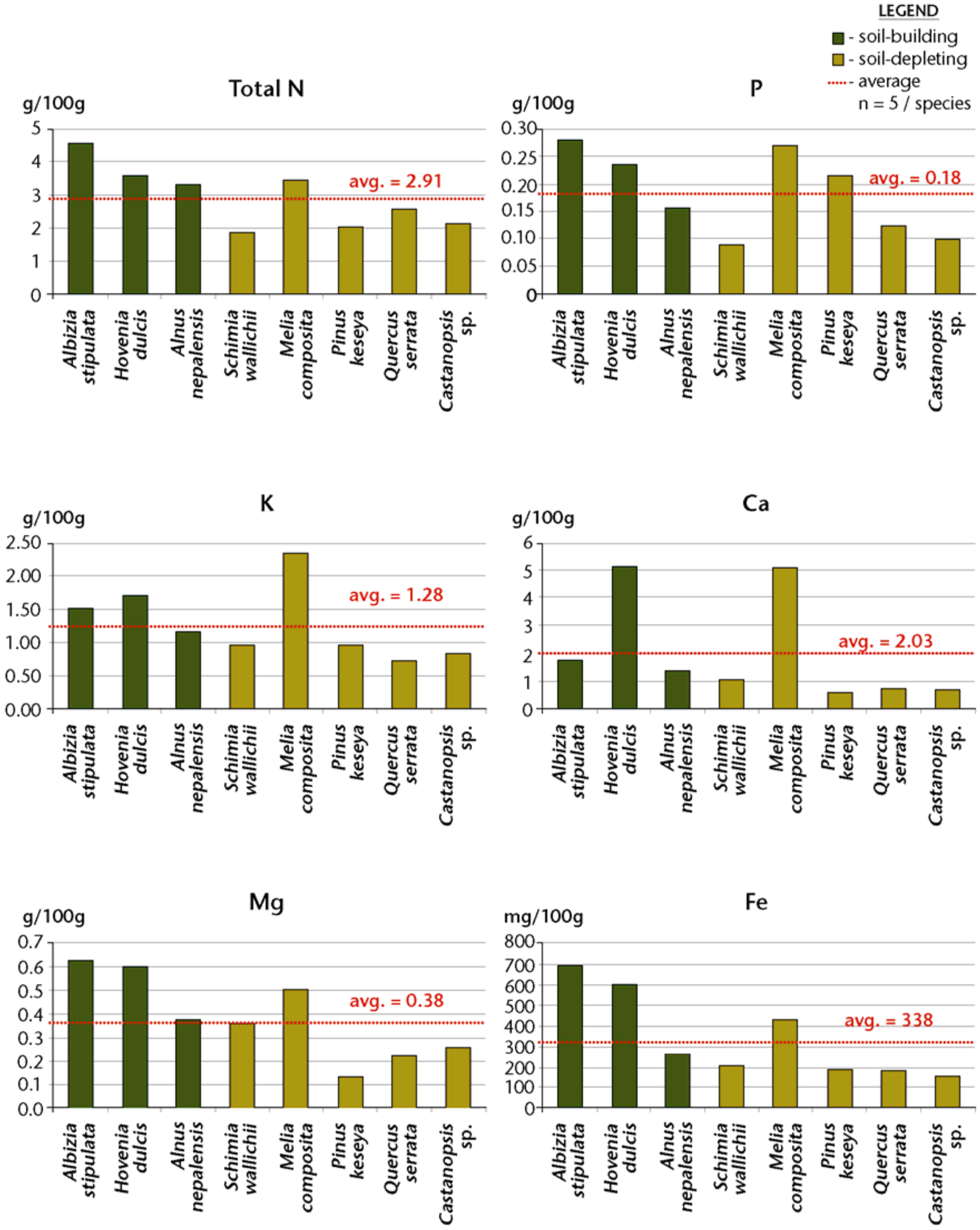
No.	FAMILY	NO. OF SPECIES IN EACH PLANT FAMILY										TOTAL NO. OF SPECIES
		DOMESTICATED – WHERE GROWN				WILD - CATEGORY OF USE						
		WET RICE TERRACES	JHUM FIELDS	KITCHEN GARDENS	PERMANENT GARDENS	WILD VEGETABLE	WILD FRUIT, NUTS AND BERRIES	MEDICINAL PLANTS	LIVESTOCK FODDER	OTHER ECONOMIC PLANTS	RITUAL PLANTS	
69	ORCHIDACEAE - Orchid Family	0	0	0	0	0	0	0	0	33	0	**33**
70	OXALIDACEAE - Wood-Sorrel Family	0	0	0	0	0	1	2	0	0	0	**3**
71	PAPAVERACEAE - Poppy Family	0	0	0	0	0	0	1	0	0	0	**1**
72	PASSIFLORACEAE - Passion-flower Family	0	1	1	1	1	1	1	0	1	0	**7**
73	PINACEAE - Pine Family	0	0	1	1	0	0	0	2	0	2	**6**
74	PIPERACEAE - Pepper Family	0	0	0	0	3	0	0	0	3	0	**6**
75	PLANTAGINACEAE - Plantain Family	0	0	1	0	1	0	1	1	0	0	**4**
76	POACEAE - Grass Family	4	5	7	4	3	0	1	9	40	10	**83**
77	POLYGONACEAE - Buckwheat Family	0	0	3	0	6	0	3	4	0	1	**17**
78	PONTEDERIACEAE - Water-Hyacinth	0	0	0	0	1	0	0	0	0	0	**1**
79	PROTEACEAE - Protea Family	0	0	1	0							**1**
80	PTERIDACEAE – Ferns	0	0	0	0	0	0	1	0	0	0	**1**
81	RANUNCULACEAE - Buttercup Family	0	0	0	0	0	0	5	0	1	0	**6**
82	RHAMNACEAE - Buckthorn Family	0	0	2	0	0	2	1	1	0	0	**6**
83	RHIZOPHORACEAE - Red Mangrove Family	0	0	0	0	0	1	0	0	0	0	**1**
84	ROSACEAE - Rose Family	1	1	6	3	1	8	4	2	3	0	**29**
85	RUBIACEAE - Madder Family	0	0	1	0	1	0	3	0	3	0	**8**
86	RUTACEAE - Rue Family	2	0	5	5	1	3	2	1	3	0	**22**

No.	FAMILY	NO. OF SPECIES IN EACH PLANT FAMILY										TOTAL NO. OF SPECIES
		DOMESTICATED – WHERE GROWN				WILD - CATEGORY OF USE						
		WET RICE TERRACES	JHUM FIELDS	KITCHEN GARDENS	PERMANENT GARDENS	WILD VEGETABLE	WILD FRUIT, NUTS AND BERRIES	MEDICINAL PLANTS	LIVESTOCK FODDER	OTHER ECONOMIC PLANTS	RITUAL PLANTS	
87	SALICACEAE - Willow Family	0	0	0	0	0	1	0	1	1	0	**3**
88	SAPINDACEAE - Soapberry Family	0	1	0	1	0	0	1	0	1	0	**4**
89	SAURURACEAE - Lizard's-tail Family	0	0	0	0	1	0	1	0	0	0	**2**
90	SAXIFRAGACEAE - Saxifrage Family	0	0	1	0	0	0	1	0	0	0	**2**
91	SCHIZOPHYLLACEAE – Split-Gill Fungi	0	0	0	0	1	0	0	0	0	0	**1**
92	SCROPHULARIACEAE - Figwort Family	0	0	0	0	0	0	0	0	1	0	**1**
93	SMILACACEAE - Catbrier Family	0	0	0	0	1	2	0	0	0	0	**3**
94	SOLANACEAE - Potato Family	6	9	10	8	7	1	7	1	2	2	**53**
95	STERCULIACEAE - Cacao Family	0	0	0	0	0	0	0	0	1	0	**1**
96	TAXODIACEAE - Bald Cypress Family	0	0	1	0	0	0	0	0	1	0	**2**
97	THEACEAE - Tea Family	0	1	2	1	4	1	0	1	1	0	**11**
98	TRICHOLOMATACEAE – Gilled Mushrooms	0	0	0	0	9	0	0	0	0	0	**9**
99	TROPAEOLACEAE - Nasturtium Family	0	0	0	0	0	0	1	0	1	0	**2**
100	ULMACEAE - Elm Family	0	0	0	0	0	0	1	1	0	0	**2**
101	URTICACEAE - Nettle Family	0	0	1	0	8	1	1	5	4	0	**20**
102	VERBENACEAE - Verbena Family	0	0	2	2	1	0	1	0	1	0	**7**
103	VITACEAE - Grape Family	0	0	1	0	2	3	0	2	0	0	**8**

No.	FAMILY	NO. OF SPECIES IN EACH PLANT FAMILY										TOTAL NO. OF SPECIES
		DOMESTICATED – WHERE GROWN				WILD - CATEGORY OF USE						
		WET RICE TERRACES	JHUM FIELDS	KITCHEN GARDENS	PERMANENT GARDENS	WILD VEGETABLE	WILD FRUIT, NUTS AND BERRIES	MEDICINAL PLANTS	LIVESTOCK FODDER	OTHER ECONOMIC PLANTS	RITUAL PLANTS	
104	ZINGIBERACEAE - Ginger Family	1	3	5	1	3	2	4	0	2	1	**22**
	UNIDENTIFIED	0	0	1	1	0	0	0	9	10	7	**28**
	TOTAL:	**33**	**63**	**119**	**80**	**137**	**66**	**106**	**59**	**180**	**43**	**886**

[†] The numbers of course do not add up because of overlaps between the categories.

APPENDIX 5-49. Chemical Composition of Leaf Samples Taken from Tree Species that Farmers Associate with Soil Improvement or Degradation *



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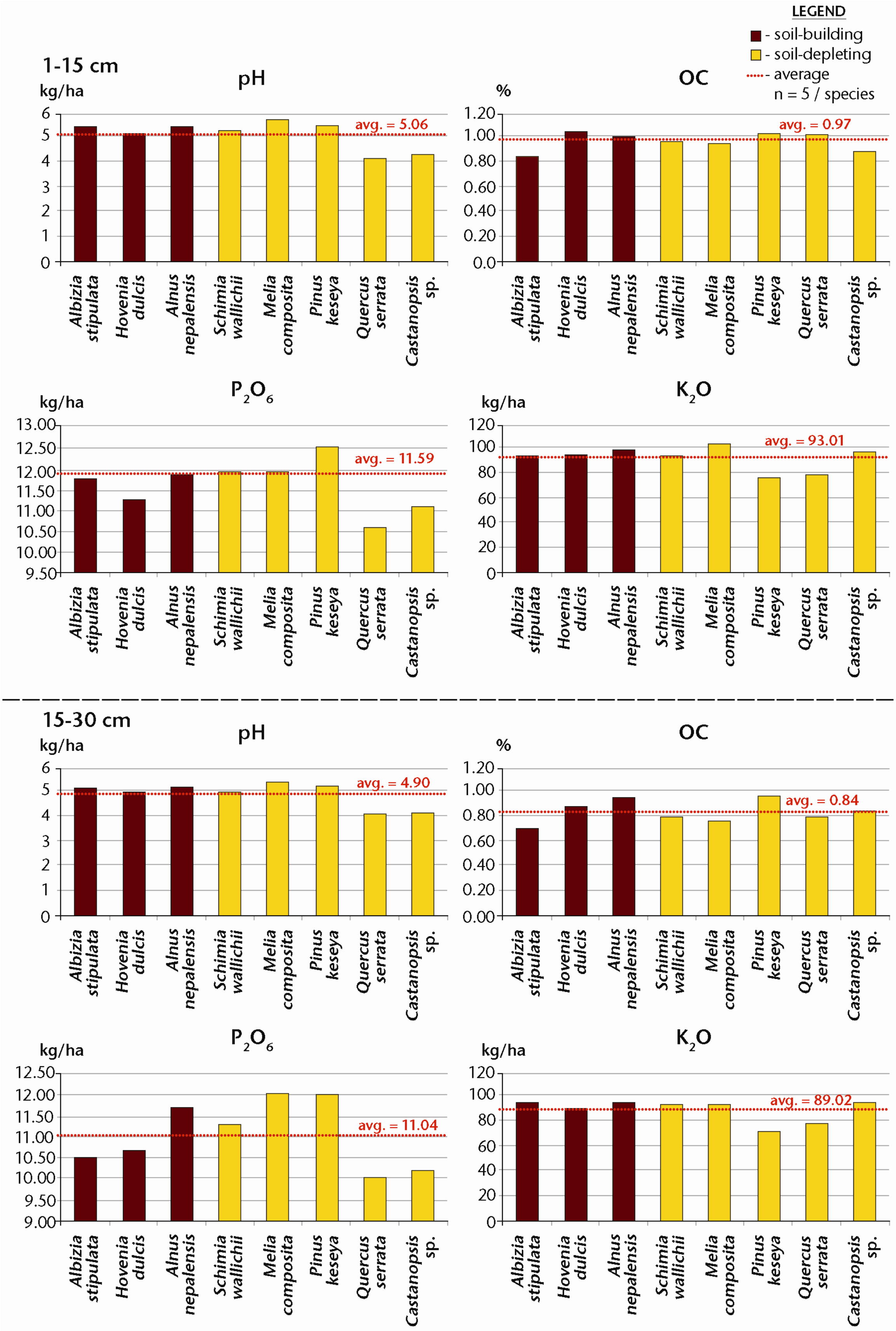
* Leaf samples analyzed by Department of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University, Thailand.

APPENDIX 5-50. Impact of Tree Species on Surrounding Soil Properties and Vice Versa: Testing Farmers' Perceptions of Soil-Building and –Depleting Tree Species



* Soil samples analyzed by Department of Agriculture, Nagaland at its Medziphema lab.

APPENDIX 5-51. Impact of Tree Species on Surrounding Soil Properties: Testing Farmers' Perceptions of Soil-Building and –Depleting Tree Species *

Composition of Leaf Samples taken from Tree Species that Farmers Associate with Soil Improvement or Degradation ‡†

	Total N	**P**	**K**	**Ca**	**Mg**	**Fe**
	g/100 g	*g/100 g*	*g/100 g*	*g/100 g*	*g/100 g*	*mg/kg*
Soil-Building:						
Albizia stipulata	4.53	0.28	1.51	1.76	0.62	696.60
Hovenia dulcis	3.55	0.23	1.72	5.09	0.60	600.00
Alnus nepalensis	3.27	0.16	1.16	1.37	0.37	261.40
AVERAGE	**3.78**	**0.22**	**1.46**	**2.74**	**0.53**	**519.33**
Soil-Depleting:						
Schimia wallichii	1.83	0.09	0.96	1.05	0.36	204.10
Melia composita	3.43	0.27	2.34	5.01	0.50	427.80
Pinus keseya	2.00	0.21	0.96	0.61	0.14	188.10
Quercus serrata	2.54	0.12	0.73	0.72	0.22	180.40
Castanopsis sp.	2.12	0.10	0.83	0.63	0.26	149.50
AVERAGE	**2.38**	**0.16**	**1.17**	**1.60**	**0.29**	**229.98**

‡ Samples analyzed by Department of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University.
† dry matter basis
* n = 5 / species

Chemical Properties of Soil Around Base of Sampled Trees ‡

	pH		**Organic Carbon**		**P_2O_5**		**K_2O**	
	cm.		*cm.*		*cm.*		*cm.*	
	0-15	**15-30**	**0-15**	**15-30**	**0-15**	**15-30**	**0-15**	**15-30**
Soil-Building:								
Albizia stipulata	5.32	5.10	0.84	0.70	11.71	10.51	95.96	93.12
Hovenia dulcis	5.08	4.98	1.04	0.89	11.25	10.67	95.23	91.21
Alnus nepalensis	5.32	5.18	1.00	0.95	11.83	11.69	99.40	93.59
AVERAGE	**5.24**	**5.09**	**0.96**	**0.85**	**11.60**	**10.96**	**96.86**	**92.64**
Soil-Depleting:								
Schimia wallichii	5.22	4.94	0.97	0.81	11.88	11.31	94.87	93.21
Melia composita	5.70	5.40	0.95	0.76	11.93	12.00	103.80	94.16
Pinus keseya	5.40	5.26	1.03	0.96	12.48	12.00	75.99	72.88
Quercus serrata	4.12	4.12	1.02	0.80	10.60	10.01	80.41	78.51
Castanopsis sp.	4.30	4.20	0.88	0.85	11.07	10.16	98.40	95.50
AVERAGE	**4.95**	**4.78**	**0.97**	**0.84**	**11.59**	**11.10**	**90.69**	**86.85**

‡ Samples analyzed by Department of Agriculture, Nagaland at its Medziphema lab.
† n = 5 / species

APPENDIX 5-52. Salaried Positions in Khonoma

GOVERNMENT POSITIONS:

No.	Name of Employee	Place of Birth	Ethnicity	Khel *(if from Khonoma)*	Male *(M)* / Female *(F)*	Approximate Monthly Wages *(Rs)**
1	**PUBLIC WORKS DEPARTMENT**					
1	Lhulie-u	Khonoma	Angami	M-khel	M	6,000
2	Kevingulhu	Khonoma	Angami	M-khel	M	6,000
3	Rovisielie	Khonoma	Angami	M-khel	M	6,000
4	Petuo	Khonoma	Angami	T-khel	M	6,000
5	Janyü	Khonoma	Angami	T-khel	M	6,000
6	Thinohetuo	Khonoma	Angami	M-khel	M	6,000
7	Zerüütuo	Khonoma	Angami	T-khel	M	1,200
8	Cayiesie	Khonoma	Angami	T-khel	M	1,200
9	Zakiengu-ü	Khonoma	Angami	M-khel	F	1,200
10	Visesielie	Khonoma	Angami	M-khel	M	1,200
11	Kruzakie	Khonoma	Angami	M-khel	M	1,200
12	Khotuo	Khonoma	Angami	T-khel	M	1,200
13	Nikiesie-u	Khonoma	Angami	T-khel	M	1,200
14	Yatsievilhu	Khonoma	Angami	T-khel	M	1,200
15	Sahu	Khonoma	Angami	T-khel	M	1,200
16	Nilavolhu	Khonoma	Angami	T-khel	M	1,200
	TOTAL/MO.					**48,000**
2	**DEPARTMENT OF FORESTRY**					
1	Ngusie	Khonoma	Angami	S-khel	M	6,000
2	Khou	Khonoma	Angami	M-khel	M	6,000
	TOTAL/MO.					**12,000**
3	**DEPARTMENT OF EDUCATION**					
	LOWER PRIMARY SCHOOL - S					
1	Khriekhotuo MA	Khonoma	Angami	S-khel	M	9,700
2	Kevisede – p.u.	Khonoma	Angami	M-khel	M	6,200
3	Petevito	Khonoma	Angami	S-khel	M	7,000
4	Khobuno	Khonoma	Angami	S-khel	F	7,200
5	Thohhomo	Mezoma	Angami	-	M	7,000
6	Acüno	Jakhama	Angami	-	F	7,000
	TOTAL/MO.					**44,100**
	LOWER PRIMARY SCHOOL – T (A-III)					
1	Zakiekhotuo	Khonoma	Angami	T-khel	M	7,000
2	Rovikolie	Khonoma	Angami	M-khel	M	6,000
3	Vizieu	Khonoma	Angami	T-khel	M	6,000
4	Nikhotuoü	Khonoma	Angami	T-khel	F	6,000
	TOTAL/MO.					**25,000**
	LOWER PRIMARY SCHOOL – M					
1	Selhu	Khonoma	Angami	M-khel	M	6,000
2	Vinyü	Khonoma	Angami	M-khel	M	6,000
3	Rokosekho	Khonoma	Angami	M-khel	M	6,000
4	Kose	Khonoma	Angami	S-khel	M	6,000
5	Agono	Khonoma	Angami	M-khel	F	6,000
6	Sieno	Khonoma	Angami	M-khel	F	6,000
7	Kediselhu	Khonoma	Angami	S-khel	M	6,000
	TOTAL/MO.					**42,000**

No.	Name of Employee	Place of Birth	Ethnicity	Khel *(if from Khonoma)*	Male *(M)* / Female *(F)*	Approximate Monthly Wages *(Rs)**
	MIDDLE SCHOOL					
1	Dozhü	Khonoma	Angami	M-khel	M	9,700
2	Goshü	Khonoma	Angami	M-khel	M	9,500
3	Thoniu	Khonoma	Angami	M-khel	M	7,000
4	Thinoseno	Khonoma	Angami	M-khel	F	6,000
5	Setuo	Khonoma	Angami	S-khel	M	6,000
6	Megorüzo	Khonoma	Angami	M-khel	M	5,500
7	Kevikelie	Khonoma	Angami	T-khel	M	6,500
8	Pesatuo	Khonoma	Angami	T-khel	M	5,500
9	Metuo	Khonoma	Angami	T-khel	M	4,500
10	Nikho	Khonoma	Angami	S-khel	M	4,600
11	Mathew (outsider)	Kerala	Malayalam		M	10,200
12	Kumar (outsider)	Bihar	Bihari		M	9,700
13	Satuo	Khonoma	Angami	T-khel	M	5,400
	SUBTOTAL/MO.					**90,100**
	TOTAL:					**201,200**
	CHRISTIAN WELFARE SCHOOL (private school)					
1	Piloi (outsider)	Hindi teacher	South Indian		M	10,100
2	Asang (outsider)	Hindi teacher	Ao		F	6,200
	TOTAL/MO.					**16,300**
4	**MEDICAL**					
1	Dr. Ahu	Kohima	Angami		M	15,000
2	Menquseu	Khonoma	Angami	T-khel	M	6,000
3	Khrievozono	Jotsoma	Angami	M-khel	F	8,000
4	Apralie	Jakhama	Angami		F	7,000
5	Akono	Khonoma	Angami	S-khel	F	6,500
6	Kesono	Khonoma	Angami	M-khel	F	6,500
7	Seno	Khonoma	Angami	M-khel	F	6,700
8	Vilakhrie-ü	Khonoma	Angami	M-khel	F	5,500
9	Nizono	Kidima	Angami		F	5,400
10	Niyiezono	Khonoma	Angami	S-khel	F	5,000
11	Visapielie	Khonoma	Angami	T-khel	M	5,000
12	Vimhiesier	Khonoma	Angami	T-khel	M	5,000
13	Vikehie	Khonoma	Angami	S-khel	M	5,000
14	Lebi	Khonoma	Angami	T-khel	M	4,800
	TOTAL/MO.					**91,400**
5	**VETERINARY / ANIMAL HUSBANDRY**					
1	Nilhusa	Khonoma	Angami	T-khel	M	7,000
2	Kongusie	Khonoma	Angami	M-khel	M	5,500
3	Jazolie	Khonoma	Angami	M-khel	M	5,500
4	Kekhrieu	Khonoma	Angami	M-khel	M	5,500
5	Petehesie	Khonoma	Angami	T-khel	M	5,500
	TOTAL/MO.					**12,500**
6	**PUBLIC HEALTH & ENGINEERING**					
1	Kozevi	Khonoma	Angami	T-khel	M	4,500
2	Govi	Khonoma	Angami	M-khel	M	4,000
3	Apie	Khonoma	Angami	M-khel	M	4,500
4	Cakho	Khonoma	Angami	S-khel	M	3,000
5	Visenilhu	Khonoma	Angami	S-khel	M	3,000
6	Dosalie	Khonoma	Angami	T-khel	M	3,000

No.	Name of Employee	Place of Birth	Ethnicity	Khel *(if from Khonoma)*	Male *(M)* / Female *(F)*	Approximate Monthly Wages *(Rs)**
7	Vikhotsoto	Khonoma	Angami	T-khel	M	3,000
8	Selie	Khonoma	Angami	M-khel	M	3,000
9	Petuolo	Khonoma	Angami	M-khel	M	3,000
10	Kosou	Khonoma	Angami	T-khel	M	3,000
11	Gotou	Khonoma	Angami	T-khel	M	3,000
	TOTAL/MO.					**37,000**

SUMMARY:

	GOVERNMENT POSITIONS:	
1	PUBLIC WORKS DEPARTMENT (16)	48,000
2	DEPARTMENT OF FORESTRY (2)	12,000
3	DEPARTMENT OF EDUCATION (30)	201,200
	GOVERNMENT-SUPPORTED HINDI TEACHERS IN CWS (2)	16,300
4	MEDICAL (14)	91,400
5	VETERINARY & ANIMAL HUSBANDRY (5)	12,500
6	PUBLIC HEALTH & ENGINEERING (11)	37,000
	TOTAL (80) :	**418,400**
	AVERAGE:	**5,230**

***** $US 1 = 48.044 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

PRIVATE POSITIONS:

No.	Name of Employee	Place of Birth	Ethnicity	Khel *(if from Khonoma)*	Male *(M)* / Female *(F)*	Approximate Monthly Wages *(Rs)**
1	**BAPTIST CHURCH**					
1	Pastor	Khonoma	Angami	M-khel	M	7,000
2	Assistant pastor	Khonoma	Angami	T-khel	M	2,500
3	peon	Khonoma	Angami	M-khel	F	2,000
	TOTAL/MO.					**11,500**
2	**CHRISTIAN WELFARE SCHOOL (private school)**					
1	Motheu	South India	Malayalam		M	7,000
2	Khushilts	Jakhama	Angami		M	6,000
3	Seyienizo	Jakhama	Angami		M	3,500
4	Megosesie	Khonoma	Angami	M-khel	M	3,500
5	Vikepeno	Khonoma	Angami	M-khel	F	3,500
6	Peter	Sanapoti	Manipuri		F	3,000
7	Sheersha	South Indian	Malayalam		F	3,000
8	Visedelie	Khonoma	Angami	M-khel	M	3,000
9	Megonilhu	Khonoma	Angami	S-khel	M	2,500
10	Rovivono	Khonoma	Angami	S-khel	F	2,000
11	Pelenino	Khonoma	Angami	M-khel	F	2,000
12	Susenh					
13	Denish	Imphal	Manipuri		M	3,500
14	Alfrot	Jakhama	Angami		M	3,500
15	Sangutuo	Khonoma	Angami	M-khel	M	3,000
16	Ato	Khonoma	Angami	M-khel	M	1,500
	TOTAL/MO.					**49,000**

No.	Name of Employee	Place of Birth	Ethnicity	Khel *(if from Khonoma)*	Male *(M)* / Female *(F)*	Approximate Monthly Wages *(Rs)**
3	**CATHOLIC CHURCH**					
1	Priest's helper	Khonoma	Angami	T-khel	M	2,000
2	assistant	Khonoma	Angami	M-khel	M	1,000
	TOTAL/MO.					**3,000**
4	**JOHN BOSCO SCHOOL (private school)**					
1	Josef	Manipur	Manipuri		M	2,000
2	Carlose	Goan	Goan		M	5,000
3	Khriesna	South India	Malayalam		M	2,500
4	Shrie Deir	South India	Malayalam		F	2,500
5	Kathini	Moa	Moa		F	2,000
6	Viseü	Khonoma	Angami	M-khel	F	2,000
7	Kelenno	Khonoma	Angami	S-khel	F	2,000
8	Bobuno	Khonoma	Angami	M-khel	M	2,000
9	Rüüsaü	Khonoma	Angami	M-khel	F	2,500
10	Choju ngurieno	Khonoma	Angami	M-khel	F	2,000
11	John	Khonoma	Angami	T-khel	M	2,500
12	Guna Singh	Manipur	Manipuri		M	2,500
13	Kiron	South Indian	Malayalam		F	3,000
14	Auso	Khonoma	Angami	T-khel	M	2,000
15	Pradept	Assam	Assamese		M	1,500
	TOTAL/MO.					**36,000**

SUMMARY:

PRIVATE POSITIONS:	
BAPTIST CHURCH (3)	**11,500**
CHRISTIAN WELFARE SCHOOL (16)	**49,000**
CATHOLIC CHURCH (2)	**3,000**
JOHN BOSCO SCHOOL (15)	**36,000**
TOTAL (36):	**99,500**
AVERAGE:	**2,764**

***** $US 1 = 48.044 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

SUMMARY OF ALL SALARIED POSITIONS:

Nature of Work	Approximate Monthly Wages *(Rs)*
GOVERNMENT POSITIONS (80)	**418,400**
PRIVATE POSITIONS (36)	**99,500**
GRAND TOTAL WAGES (116)	**517,900**
AVERAGE	**4,465**

APPENDIX 5-53. Salaried Positions in Tsiesema

GOVERNMENT POSITIONS:

No.	Name of Employee	Place of Birth	Ethnicity	Staying in New Village or Old Village?	Male *(M)* / Female *(F)*	Approximate Monthly Wages *(Rs)**
1	**PUBLIC WORKS DEPARTMENT**					
1	K. Yhor	Tsiesema	Angami	old village	M	10,000
2	Sou Yhor	Tsiesema	Angami	old village	M	5,000
3	Kezevi Lhou	Tsiesema	Angami	old village	M	5,000
4	Jheja-o Khro	Tsiesema	Angami	new village	M	5,000
5	Khro Dilie	Tsiesema	Angami	new village	M	4,000
6	Kiyaneiü	Tsiesema	Angami	new village	F	4,000
7	Denuo	Tsiesema	Angami	old village	F	4,000
8	Rübeinuo	Tsiesema	Angami	old village	F	4,000
9	Lhouvilie	Tsiesema	Angami	old village	M	12,000
10	Mhalelhou	Tsiesema	Angami	old village	M	6,000
11	Rüvonuo	Tsiesema	Angami	old village	F	4,000
12	Khriezotuo	Tsiesema	Angami	new village	M	4,000
13	Ketou Kholie	Tsiesema	Angami	old village	M	4,000
14	Vizo Lhou	Tsiesema	Angami	old village	M	4,000
	TOTAL/MO.					**75,000**
2	**DEPARTMENT OF FORESTRY**					
1	Kuosalie	Tsiesema	Angami	old village	M	6,500
2	Khrielezo	Tsiesema	Angami	old village	M	6,500
	TOTAL/MO.					**13,000**
3	**DEPARTMENT OF EDUCATION**					
	TEACHERS					
1	Khriekhotuo MA	Tsiesema	Angami	old village	M	7,000
2	Kevisede – p.u.	Tsiesema	Angami	old village	M	7,000
3	Petevito	Tsiesema	Angami	new village	M	7,000
4	Khobuno	Tsiesema	Angami	old village	M	7,000
5	Thohhomo	Tsiesema	Angami	old village	M	7,000
6	Acüno	Tsiesema	Angami	new village	M	7,000
7	Vigolie	Tsiesema	Angami	old village	F	7,000
8	Ruokuo Lhoulie	Tsiesema	Angami	old village	M	7,000
9	Neikemhiezo	Tsiesema	Angami	old village	M	7,000
10	Mhiebouü	Tsiesema	Angami	old village	F	7,000
11	Zhavilhou	Tsiesema	Angami	old village	M	6,000
12	Thepfusoü	Tsiesema	Angami	old village	F	6,000
13	Kaka	Tsiesema	Angami	new village	F	6,000
	SUB-TOTAL/MO.					**88,000**
	HIGHER TECHNICAL EDUCATION					
1	Pratsolie	Tsiesema	Angami	old village	M	7,000
2	Kedicha	Tsiesema	Angami	old village	M	4,500
3	Sezhü	Tsiesema	Angami	old village	M	4,500
	SUB-TOTAL/MO.					**16,000**
	TOTAL/MO.					**104,000**
4	**MEDICAL**					
1	Mengusatuo	Tsiesema	Angami	old village	M	4,500
2	Neiluolie	Tsiesema	Angami	old village	M	4,500

No.	Name of Employee	Place of Birth	Ethnicity	Staying in New Village or Old Village?	Male *(M)* / Female *(F)*	Approximate Monthly Wages *(Rs)**
3	Thekenuo	Tsiesema	Angami	old village	F	4,500
4	Paisule	Zeliang	Zeliang	new village	F	8,500
	TOTAL/MO.					22,000
5	**VETERINARY / ANIMAL HUSBANDRY**					
1	Lhousimo	Tsiesema	Angami	new village	M	5,000
2	Ruokuotuolie	Tsiesema	Angami	old village	M	5,000
3	Ketoulhoubei	Tsiesema	Angami	old village	M	5,000
	TOTAL/MO.					**15,000**
6	**PUBLIC HEALTH & ENGINEERING DEPARTMENT**					
1	Zavise	Tsiesema	Angami	old village	M	5,000
2	Thinuokuolie	Tsiesema	Angami	old village	M	5,000
3	Sovi	Tsiesema	Angami	old village	M	5,000
4	Ruokuovolie	Tsiesema	Angami	new village	M	3,500
5	Zapuvi	Tsiesema	Angami	new village	M	3,500
	TOTAL/MO.					**22,000**
7	**POLICE**					
1	Thesuohie Mere	Tsiesema	Angami	new village	M	10,500
2	Zakie-o	Tsiesema	Angami	old village	M	6,500
3	Rüya-o	Tsiesema	Angami	old village	M	6,500
4	Menuolhoulie	Tsiesema	Angami	old village	M	6,500
5	Neiphreu	Tsiesema	Angami	old village	M	6,500
6	Rüüzelie	Tsiesema	Angami	old village	M	5,000
7	Mezhütuo	Tsiesema	Angami	old village	M	5,000
8	Noumvü-o	Tsiesema	Angami	old village	M	5,000
9	Lhoulie	Tsiesema	Angami	old village	M	5,000
	TOTAL/MO.					**56,500**
8	**SERICULTURE**					
1	Medoneinuo	Tsiesema	Angami	new village	F	5,000
2	Abenla	Tsiesema	Angami	new village	F	5,000
3	Neikholie	Tsiesema	Angami	old village	M	5,000
4	Kezha Lhoubei	Tsiesema	Angami	old village	M	750
5	Menguzeü	Tsiesema	Angami	old village	F	750
6	Nhielie	Tsiesema	Angami	new village	M	750
7	Zhatuo	Tsiesema	Angami	new village	M	750
8	Ale	Tsiesema	Angami	old village	M	750
9	Ngunuo	Tsiesema	Angami	old village	F	750
	TOTAL/MO.					**19,500**
9	**POST OFFICE**					
1	Neizo	Tsiesema	Angami	old village	M	2,500
2	Kereikielie	Tsiesema	Angami	old village	M	2,500
3	Kruluolie					2,500
	TOTAL/MO.					**7,500**
10	**SOIL & WATER CONSERVATION**					
1	Kruzo	Tsiesema	Angami	new village	M	14,500
2	Neivilie	Tsiesema	Angami	new village	M	5,000
3	Mezhülhou	Tsiesema	Angami	new village	M	5,000
4	Neiselie	Tsiesema	Angami	new village	M	5,000
	TOTAL/MO.					**29,500**

No.	Name of Employee	Place of Birth	Ethnicity	Staying in New Village or Old Village?	Male *(M)* / Female *(F)*	Approximate Monthly Wages *(Rs)**
11	**AGRICULTURE**					
1	Avonuo	Tsiesema	Angami	old village	F	4,500
2	Sonile	Tsiesema	Angami	old village	F	4,500
	TOTAL/MO.					**9,000**
12	**IRRIGATION**					
1	Lhoutuo	Tsiesema	Angami	old village	M	6,000
2	Neingutuo	Tsiesema	Angami	old village	M	5,000
3	Kuosielie	Tsiesema	Angami	old village	M	5,000
	TOTAL/MO.					**16,000**
13	**ELECTRICAL**					
1	Visalie	Tsiesema	Angami	old village	M	4,000
2	Lhouvituolie	Tsiesema	Angami	old village	M	4,000
	TOTAL/MO.					**8,000**
14	**GEOLOGICAL**					
1	Zakiesielie	Tsiesema	Angami	old village	M	10,000
	TOTAL/MO.					**10,000**
15	**SECRETARIAT**					
1	Razoukhrielie	Tsiesema	Angami	new village	M	6,000
2	Nielhousielie	Tsiesema	Angami	new village	M	5,500
3	Rhienuo	Tsiesema	Angami	new village	F	5,500
4	Thepfunyü	Tsiesema	Angami	new village	F	5,500
	TOTAL/MO.					**22,500**
16	**KOHIMA TOWN OFFICE**					
1	Dziesevilie	Tsiesema	Angami	new village	F	5,000
	TOTAL/MO.					**5,000**

SUMMARY:

GOVERNMENT POSITIONS:

1	PUBLIC WORKS DEPARTMENT (14)	75,000
2	DEPARTMENT OF FORESTRY (2)	13,000
3	DEPARTMENT OF EDUCATION (16)	104,000
4	MEDICAL (4)	22,000
5	VETERINARY & ANIMAL HUSBANDRY (3)	15,000
6	PUBLIC HEALTH & ENGINEERING (5)	22,000
7	POLICE (9)	56,500
8	SERICULTURE (9)	19,500
9	POST OFFICE (3)	7,500
10	SOIL & WATER CONSERVATION (4)	29,500
11	AGRICULTURE (2)	9,000
12	IRRIGATION (3)	16,000
13	ELECTRICAL (2)	8,000
14	GEOLOGICAL (1)	10,000
15	SECRETARIAT (4)	22,500
16	KOHIMA TOWN OFFICE (1)	5,000
	TOTAL (82) :	**434,500**
	AVERAGE:	**5,299**

* $US 1 = 48.044 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

PRIVATE POSITIONS:

No.	Name of Employee	Place of Birth	Ethnicity	Staying in New Village or Old Village?	Male *(M)* / Female *(F)*	Approximate Monthly Wages *(Rs)**
1	**AMERICAN BAPTIST CHURCH**					
1	Lhousimo Mere	Tsiesema	Angami	new village	M	3,000
2	Kizouvi	Tsiesema	Angami	old village	M	3,000
3	Thesuohie	Tsiesema	Angami	old village	M	2,000
4	Niesalie	Tsiesema	Angami	new village	M	1,500
5	Kesosalie	Tsiesema	Angami	new village	M	1,500
	TOTAL/MO.					**11,000**
2	**CHRISTIAN REVIVAL CHURCH**					
1	Vihu	Tsiesema	Angami	old village	M	3,000
2	Neiluolie	Tsiesema	Angami	old village	M	2,000
	TOTAL/MO.					**5,000**

SUMMARY:

PRIVATE POSITIONS:	
AMERICAN BAPTIST CHURCH (5)	**11,000**
CHRISTIAN REVIVAL CHURCH (2)	**5,000**
TOTAL (7):	**16,000**
AVERAGE:	**2,286**

***** $US 1 = 48.044 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

SUMMARY OF ALL SALARIED POSITIONS:

Nature of Work	Approximate Monthly Wages *(Rs)*
GOVERNMENT POSITIONS (82)	**434,500**
PRIVATE POSITIONS (7)	**16,500**
GRAND TOTAL WAGES (89)	**450,500**
AVERAGE	**5,062**

APPENDIX 5-54. Products Exported from Khonoma by Daily Buses: Results of a 1-Year Survey (Rs)

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
CROPS:	20,146	34,045	68,993	71,261	40,199	24,059	47,215	29,563	59,192	23,249	18,183	7,533	**443,638**
FIELD CROPS	**20,146**	**32,719**	**64,298**	**64,629**	**40,199**	**24,059**	**46,154**	**29,032**	**32,666**	**22,453**	**18,183**	**7,400**	**401,940**
1 garlic	3,342	28,992	55,385	46,552	8,223		663	875	11,406			265	155,704
2 chayote leaf	1,194			5,464	6,684	9,337	6,870	8,753	7,507	5,690	796	265	52,560
3 potato	531				2,096	5,305	29,828	10,822	2,175	265	531	531	52,083
4 mustard leaf	3,435	902	265	2,626	11,207	531	133		637	3,979	5,783	928	30,425
5 corriander	2,785	995		7,692	5,438	3,316	2,308	531	1,592	1,857	2,321	133	28,966
6 radish	2,308	133		809	4,960	1,326	265		212	2,653	464	531	13,661
7 rice			7,268			796			3,448		531		12,043
8 cabbage		133					2,719	3,621	398	2,122			8,992
9 tree tomato	981					796			531	424	2,281	637	5,650
10 chayote						1,061	796	1,565	796	265	398		4,881
11 kidney bean										1,061	1,645	1,512	4,218
12 maize								743	2,759	531			4,032
13 ginger	265			133	398		133	796	398	345	531	531	3,528
14 carrot	531	265	53				796		212	796	398		3,050
15 beans (unspecified)	2,891												2,891
16 peas		1,061	796	398							265	265	2,785
17 spring garlic leaf										663	928	743	2,334
18 passion fruit leaf				265	265			265		1,194		265	2,255
19 leeks (solie)					133	796	212	265	133	212	40		1,790
20 rice bean	1,485												1,485
21 spring garlic							796	398	265				1,459
22 sugarcane	398	186		292							424		1,300
23 chilli							531					531	1,061
24 mustard				398	265								663
25 onion			531				106						637
26 onion leaf					531								531
27 tomato						398				133			531

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
28 pumpkin											451		451
29 bitter brinjal								398					398
30 taro											398		398
31 radish leaf						398							398
32 sweet potato												265	265
33 pumpkin leaf										265			265
34 cucumber									199				199
35 soybean		53											53
36 gourds (unspecified)													0
37 sponge gourd													0
38 yam													0
39 tapioca													0
40 wing bean													0
41 cow pea													0
42 hycianth bean													0
43 basil													0
44 Rozelle plant													0
45 banana flower													0
46 local corriander													0
47 brinjal													0
48 chilli seedlings													0
49 tree tomato seedlings													0
50 ginger flower													0
51 taro leaf													0
52 taro stem													0
53 cabbage flower													0
FRUIT, NUTS & BERRIES	**0**	**1,326**	**4,695**	**6,101**	**0**	**0**	**1,061**	**531**	**26,525**	**0**	**0**	**133**	**40,372**
1 passion fruit							1,061	531	26,525				28,117
2 *Elaeagnus conferta* (pechü)		1,326	4,695	5,968									11,989
3 banana				133								132	265

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
4 orange (sweet)													0
5 orange (sour)													0
6 pineapple													0
7 papaya													0
8 walnuts													0
9 guava													0
10 plums													0
11 pomelo													0
12 grapes													0
FLOWERS	**0**	**0**	**0**	**531**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**531**
1 paper flowers				531									531
OTHERS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**796**	**0**	**0**	**796**
1 banana leaf										796			796
2 banana stem													0
3 rice husks													0
OTHER FOREST PRODUCTS:	**7,984**	**0**	**0**	**0**	**0**	**928**	**0**	**0**	**0**	**0**	**1,326**	**0**	**10,239**
1 topsoil	7,984												7,984
2 *Dendrophthoe pentandra* (ketsa gum for trapping birds)											1,326		1,326
3 rattan						928							928
4 bamboo shoots													0
5 charcoal													0
HANDICRAFTS:	115,757	72,892	69,894	79,682	69,948	34,536	118,463	176,288	98,966	138,993	72,414	62,865	**1,110,699**
1 baskets	105,253	59,390	63,794	75,783	66,446	33,953	83,820	173,238	93,502	138,728	66,048	60,345	1,020,300
2 sofa sets							29,443						29,443
3 spears		3,979		3,183	1,592		4,509		5,305		3,183	1,592	23,342
4 necklace		8,356	5,305										13,661
5 dried flowers	7,321	133			1,326								8,780

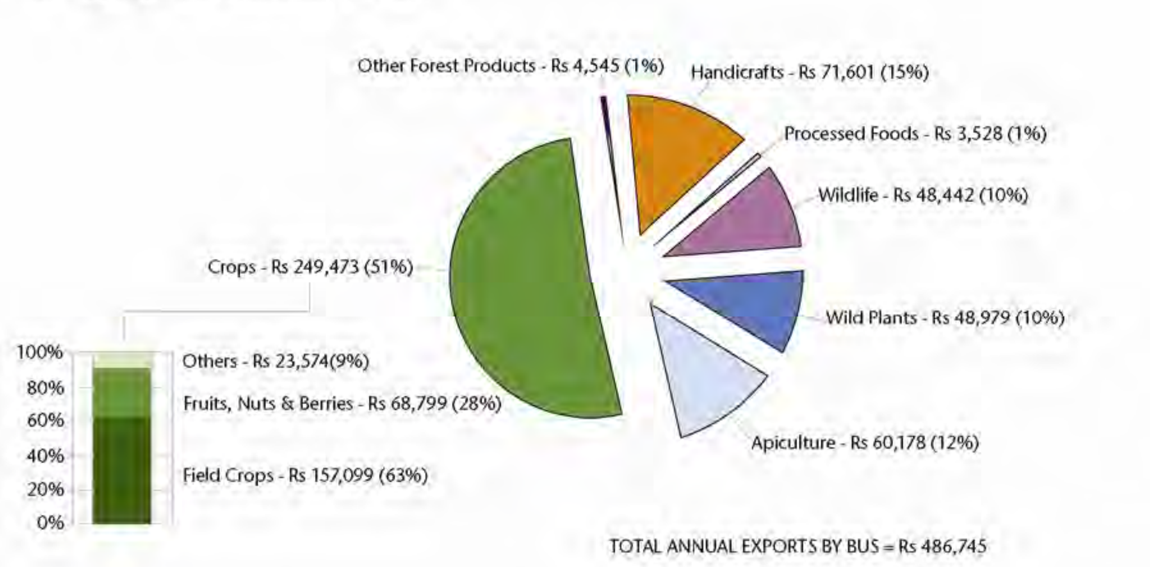
Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
6 basket straps	2,122	796		318	318	318	531	1,061	159	265		928	6,817
7 brooms	1,061	239	796		265	265	159	663					3,448
8 shawls											3,183		3,183
9 rattan kneelets (phiso)								1,326					1,326
10 winnowing trays				398									398
11 field knife (da-u)													0
12 spear handies													0
13 rattan / bamboo strainers													0
LIVESTOCK:	**0**	**18,568**	**0**	**0**	**4,244**	**0**	**0**	**0**	**1,326**	**0**	**0**	**0**	**24,138**
1 pigs		18,568			4,244				1,326				24,138
PROCESSED FOODS:	15,385	2,122	12,467	10,716	6,976	3,263	5,968	6,631	17,242	12,997	27,852	12,997	**134,617**
1 yeast (khekhri)	14,324	2,122	12,467	10,716	6,976	2,069	5,968	6,631	17,242	12,997	27,056	12,997	131,566
2 fried rice	1,061										796		1,857
3 biscuits						796							796
4 fermented soybean						398							398
5 bamboo soup													0
6 cooked soybean													0
7 dried mustard leaf													0
8 dried taro leaf													0
WILDLIFE:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**265**	**0**	**0**	**265**
1 crabs										265			265
2 wild animals (unspecified)													0
3 eagle													0
4 deer													0
5 fish													0
6 frogs													0
7 jungle cat													0

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
8 grubs (from trees)													0
9 snails													0
10 squirrel													0
WILD PLANTS:	**6,446**	**2,918**	**2,334**	**5,942**	**1,034**	**398**	**849**	**2,809**	**4,058**	**1,857**	**14,350**	**26,844**	**69,839**
WILD VEGETABLES & MUSHROOMS	**2,918**	**716**	**2,334**	**4,748**	**1,034**	**398**	**849**	**1,483**	**1,406**	**1,061**	**1,008**	**265**	**18,220**
1 assorted wild vegetables	1,061	27	796	2,891	531			714	531		1,008		7,557
2 *Gynura* sp. (lizienuo)		690	1,538		239	398	53	637	531	1,061			5,146
3 mushrooms				1,857	265		796		212				3,130
4 wild ferns (tsiekhrüga)	796								133			265	1,194
5 *Elatostema cyrtandrifolium* (gajie, gajo)	1,061												1,061
6 *Dryopteris* sp. (merie – fern)								133					133
7 wild banana flower													0
8 wild bean (nharücü)													0
9 *Celosia argentea* (niedza)													0
10 *Trichodesma khasianum* (sekisekuo)													0
11 *Chenopodium ficifolium* (therhie)													0
12 wild taro leaf													0
13 gabo (unidentified)													0
14 *Oenanthe linearis* (gakra)													0
15 *Centella asiatica* (gara)													0
16 *Diplazium esculentum* (gasülo)													0

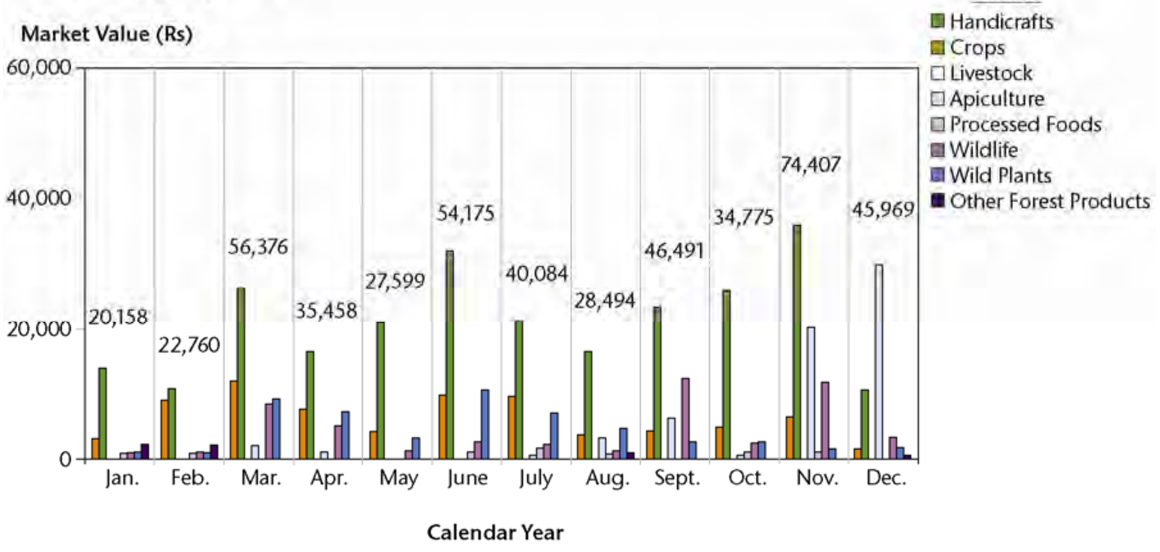
Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
17 *Polygonum plebeium* (gazie)													0
18 dzohunyü (unidentified)													0
19 *Trevesia* sp. (teirhünyü)													0
WILD FRUIT, NUTS & BERRIES	**1,751**	**1,936**	**0**	**0**	**0**	**0**	**0**	**0**	**2,653**	**0**	**12.547**	**26.578**	**45.465**
1 wild apples	1.751	1.936							2.653		12.547	26.578	45.465
2 gooseberry													0
3 peracüzie (unidentified)													0
FLOWERS	**1,777**	**0**	**0**	**133**	**0**	**0**	**0**	**1.326**	**0**	**531**	**796**	**0**	**4,562**
1 flowers	1,777			133				1,326		531	796		4,562
2 orchids													0
OTHERS	**0**	**265**	**0**	**1,061**	**0**	**0**	**0**	**0**	**0**	**265**	**0**	**0**	**1,592**
1 broom grass		265		1,061						265			1,592
2 wild banana leaf													0
3 wild banana stem													0
APICULTURE:	**0**	**3,183**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3,183**
1 bees													0
2 honey		3,183											3,183
TOTAL EXPORTS:	**165,718**	**133,728**	**153,688**	**167,601**	**122,402**	**63,184**	**172,495**	**215,291**	**180,784**	**177,362**	**134,126**	**110,239**	**1,796,617**

APPENDIX 5-55. Products Exported from Tsiesema by Bus Over a 12-Month Monitoring Period *

A. Aggregate Exports for the Year

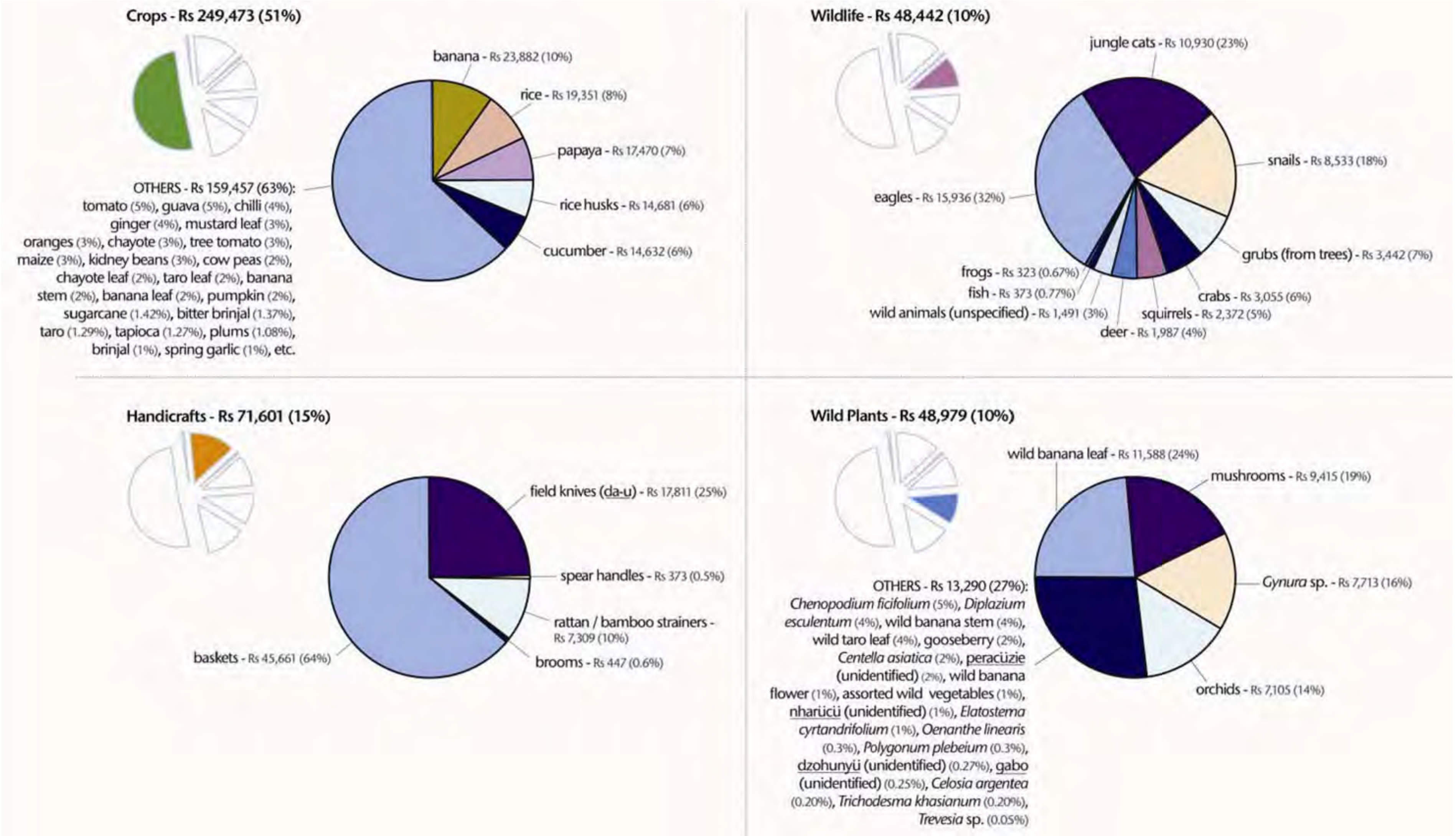


B. Monthly Exports



* Based on 126 days surveyed between 1 Oct., 2001 - 12 Sept., 2002 (12 mo.), roughly the first 10 days that the buses ran in each month, and then extrapolated for the entire year. Clearly this does not include larger volume commodities such as large livestock, firewood, timber, dressed stones, etc. that would be transported by truck.

APPENDIX 5-56. Breakdown of Major Exports from Tsiesema (transported to market by bus)



APPENDIX 5-57. Products Exported from Tsiesema by Daily Buses: Results of a 1-Year Survey (Rs)

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
CROPS:	13,712	10,349	26,379	15,772	20,544	31,817	20,699	15,864	22,879	25,216	35,983	10,259	249,472
FIELD CROPS	**5,664**	**3,776**	**11,971**	**7,552**	**13,886**	**26,431**	**13,489**	**10,933**	**14,408**	**16,124**	**27,276**	**5,589**	**157,099**
1 rice	745	497	7,129	2,087	1,242	621	1,714	1,590	1,490		1,739	497	19,351
2 cucumber					4,360	6,459		1,292	1,143	1,379			14,632
3 tomato			209	298	1,490	7,216	1,590	1,043	323				12,170
4 chilli			124		348	2,882	783	497	1,888	1,826	2,658		11,005
5 ginger	1,789	1,118	994	869	1,217	1,714			683	124	1,018		9,527
6 mustard leaf	1,341	919	25			248			1,168	2,112	1,416	1,453	8,682
7 chayote	224				522				547	1,677	4,447	373	7,788
8 tree tomato		224			472	248	720		1,043	450	3,614		6,772
9 maize				149	422	2,012	1,292	763	621	1,192			6,451
10 kidney bean					770	2,335	248	1,341		286	820	447	6,248
11 cow pea									472	2,037	3,006	472	5,987
12 chayote leaf		50	720	621	646	795	1,093	1,341	224	360	99		5,949
13 taro leaf	298	149	149		522		882	1,081	559	745	298	422	5,105
14 pumpkin				37	161				2,161	661	1,192	99	4,312
15 sugarcane	770	149	894	609		75	547				373	124	3,540
16 bitter brinjal					224	1,640	1,354		199				3,416
17 tar	50	75	385	484	124				869	298	224	696	3,205
18 tapioca											3,006	149	3,155
19 brinjal					50		621		422	1,200	224		2,516
20 spring garlic					447		1,043	1,018					2,509
21 hycianth bean	199		199	149							1,913		2,459
22 soybean	248	298		621	497			124		149	99	199	2,236
23 Rozelle plant					50		224	338	149	238	397	248	1,644
24 beans (unspecified)							795	373					1,168
25 corriander			87	186	75	87	137		273	236	12		1,093
26 wing bean		149		149					75	422	50		845
27 chilli seedlings			323	447									770

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
28 tree tomato seedlings			224	497									720
29 passion fruit leaf			149	99			199		99	75			621
30 ginger flower								132		472			604
31 basil										62	472	12	547
32 garlic					248							248	497
33 taro stem		149					248						397
34 local corriander			286										286
35 banana flower				248									248
36 pumpkin leaf						99				75	25		199
37 mustard												149	149
38 gourds (unspecified)										50	75		124
39 yam											99		99
40 cabbage flower			75										75
41 potato													0
42 radish													0
43 cabbage													0
44 carrot													0
45 peas													0
46 spring garlic leaf													0
47 leeks (solie)													0
48 rice bean													0
49 onion													0
50 onion leaf													0
51 radish leaf													0
52 sweet potato													0
53 sponge gourd													0
FRUIT, NUTS & BERRIES	**6,831**	**4,784**	**8,806**	**4,916**	**4,558**	**4,491**	**4,155**	**2,348**	**6,558**	**9,092**	**8,334**	**3,925**	**68,799**
1 banana	4,397	745	3,739	1,240	1,217	1,168	1,317	1,577	1,540	3,701	2,422	820	23,882
2 papaya	621	2,087	5,068	2,807	1,950	1,486	1,416	770	845		348	75	17,471
3 guava							950		3,913	5,316	1,851	75	12,104
4 orange (sweet)	1,751	1,553		621							2,832	1,292	8,049

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
5 plums					994	1,689							2,683
6 orange (sour)											224	1,317	1,540
7 pomelo	62	400									658	348	1,468
8 grapes				248			472						720
9 pineapple					397				261				658
10 passion fruit						149							149
11 walnuts										75			75
12 *Elaeagnus conferta* (pechü)													0
FLOWERS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1 paper flowers													0
OTHERS	**1,217**	**1,789**	**5,602**	**3,304**	**2,099**	**894**	**3,055**	**2,583**	**1,913**	**0**	**373**	**745**	**23,574**
1 rice husks	472	497	2,285	1,192	1,416	894	2,484	2,583	1,913		373	571	14,681
2 banana stem	745	584	2,012	472	124		397					174	4,509
3 banana leaf		708	1,304	1,640	559		174						4,384
OTHER FOREST PRODUCTS:	**1,813**	**1,863**	**0**	**0**	**0**	**0**	**0**	**621**	**0**	**0**	**0**	**248**	**4,546**
1 charcoal	1,813	1,863										248	3,925
2 bamboo shoots								621					621
3 *Dendrophthoe pentandra* (ketsa gum for trapping birds)													0
4 rattan													0
5 topsoil													0
HANDICRAFTS:	2,956	8,573	11,402	7,092	3,677	9,539	9,235	3,539	3,863	4,521	6,086	1,118	**71,601**
1 baskets	1,714	6,585	6,881	4,136	2,944	7,999	3,552	1,317	1,962	3,329	4,124	1,118	45,661
2 field knife (da-u)	1,242	1,987	3,080	1,863		1,317	3,478	1,590	1,366		1,888		17,811
3 rattan / bamboo strainers			696	1,093	733	224	2,205	633	534	1,192			7,309
4 brooms			373								75		447

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
5 spear handles			373										373
6 spears													0
7 basket straps													0
8 sofa sets													0
9 necklace													0
10 dried flowers													0
11 shawls													0
12 rattan kneelets (phiso)													0
13 winnowing trays													0
LIVESTOCK:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1 pigs													0
PROCESSED FOODS:	248	224	75	0	0	497	1,143	248	99	497	497	0	**3,528**
1 bamboo soup		124					745			497	497		1,863
2 cooked soybean						497	248	248					994
3 dried mustard leaf	248	99					149		99				596
4 dried taro leaf			75										75
5 biscuits													0
6 fried rice													0
7 fermented soybean													0
8 yeast (khekhri)													0
WILDLIFE:	**609**	**795**	**8,322**	**4,844**	**621**	**2,236**	**1,876**	**956**	**11,800**	**1,975**	**11,203**	**3,205**	**48,440**
1 eagle	335	795	5,987	1,267	348	373			1,863		3,999	969	15,936
2 jungle cat				1,987					3,975		3,478	1,490	10,930
3 snails	273		1,466	1,043	273	1,714	1,217	286	323	696	1,242		8,533
4 grubs (from trees)							658	671	869		497	745	3,441
5 crabs						149			1,888	1,018			3,055
6 squirrel			745	447					696	261	224		2,372
7 deer									1,987				1,987

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
8 wild animals (unspecified)											1,490		1,490
9 fish									99		273		373
10 frogs			124	99					99				323
WILD PLANTS:	**820**	**956**	**8,844**	**7,129**	**2,757**	**10,086**	**6,957**	**4,409**	**2,261**	**2,318**	**1,113**	**1,329**	**48,979**
WILD VEGETABLES & MUSHROOMS	**199**	**720**	**5,639**	**4,571**	**1,416**	**7,105**	**3,106**	**2,049**	**1,217**	**219**	**182**	**0**	**26,423**
1 mushrooms			758	845	956	6,707	149						9,415
2 *Gynura* sp. (lizienuo)	199	447	1,838	1,565	460	248	1,441	969	547				7,713
3 *Chenopodium ficifolium* (therhie)			497	820			1,043						2,360
4 *Diplazium esculentum* (gasülo)			1,267	745			99						2,112
5 wild taro leaf			124	50		149		820	671				1,813
6 *Centella asiatica* (gara)			783	323									1,105
7 wild banana flower							348						348
8 assorted wild vegetables										219	50		268
9 wild bean (nharücü)								261					261
10 *Elatostema cyrtandrifolium* (gajie, gajo)		124		124									248
11 *Oenanthe linearis* (gakra)			149										149
12 *Polygonum plebeium* (gazie)		99		50									149
13 dzohunyü (unidentified)											132		132
14 gabo (unidentified)			124										124
15 *Celosia argentea* (niedza)			99										99

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
16 *Trichodesma khasianum* (sekisekuo)		50		49									99
17 *Trevesia* sp. (teirhünyü)							26						26
18 *Dryopteris* sp. (merie - fern)													0
19 wild ferns (tsiekhrüga)													0
WILD FRUIT, NUTS & BERRIES	**273**	**186**	**397**	**0**	**0**	**0**	**0**	**0**	**0**	**224**	**298**	**658**	**2,037**
1 gooseberry	273	186	149							224	298		1,130
2 peracüzie (unidentified)			248									658	907
3 wild apples													0
FLOWERS	**0**	**0**	**2,087**	**2,484**	**1,143**	**248**	**745**	**397**	**0**	**0**	**0**	**0**	**7,105**
1 orchids			2,087	2,484	1,143	248	745	397					7,105
2 flowers													0
OTHERS	**348**	**50**	**720**	**75**	**199**	**2,733**	**3,105**	**1,962**	**1,043**	**1,876**	**633**	**671**	**13,414**
1 wild banana leaf	348		720	75	124	2,733	2,608	1,577	969	1,801	633		11,588
2 wild banana stem		50			75		497	385	75	75		671	1,826
3 broom grass													0
APICULTURE:	**0**	**0**	**1,354**	**621**	**0**	**0**	**174**	**2,857**	**5,589**	**248**	**19,525**	**29,810**	**60,178**
1 bees			112				174	2,857	4,968	248	17,538	29,810	55,707
2 honey			1,242	621					621		1,987		4,471
TOTAL EXPORTS:	**20,159**	**22,760**	**56,375**	**35,458**	**27,599**	**54,174**	**40,083**	**28,495**	**46,490**	**34,775**	**74,407**	**45,969**	**486,744**

APPENDIX 5-58. Plants Related to Soil Fertility

Botanical Name	Common English Name	Local Name		Life Form†	Habitat	Farmer Comments
		Khonoma	Tsiesema			
POSITIVE:						
ANACARDIACEAE - Sumac Family (2)						
Rhus semialata Murray	Naga tenga, nut-gall tree, Chinese gall	tsomhu / tsomhonyü / tsomhumedzü	zomhoupu / zomhou	T	usually forest edge	
Spondias axillaris Roxb.	hog-plum, Naga neem	khula	khula	T		highly valued
ASTERACEAE - Sunflower Family (1)						
Artemisia indica Willd.	bitter wormwood, mugwort	penia nienu / penia / penie /niapnu / niapfü	ciena / ciena nanu / ciena-napfu	S	abundant in exposed areas with moist soils, such as forest margins, open forests, near roadsides & other degraded areas	The presence of penie is an indicator of superior soil.
BETULACEAE - Birch Family (1)						
Alnus nepalensis D. Don	Himalayan alder	rüpo / rüpu / rupou	rüpo / rüpro / rüpruo / rüpho / rüphosi / rüpruo	T	cultivated fields, shady ravines and landslides between 1-2000 m asl	Even in a hot sunny day, water will be dripping from alder. Alder leave are fast-decomposing and curl as they dry up, making it easy for crop seedlings to emerge. Widely recognized by farmers for its soil-buidling properties.
EUPHORBIACEAE - Spurge Family (1)						
Emblica officinalis Gaertn.	Indian Gooseberry / amla	khulhu	chiehu / ciehusi / ciehuhuse	T	open forest at mid-elevations throughout Nagaland	
FABACEAE - Bean Family (3)						
Albizia lebbeck (L.) Benth.	East Indian walnut, black siris		ze	T	selectively retained in jhum fields for building soil and timber value; highly valued	maintained in jhum fields for building soil.

Botanical Name	Common English Name	Local Name		Life Form[†]	Habitat	Farmer Comments
		Khonoma	Tsiesema			
A. procera (Roxb.) Benth.			peu / peü	T	maintained in jhum fields for building soil. Pioneer tree.	maintained in jhum fields for building soil.
A. stipulata (DC.) Boivin	Black Siris	mego	mego	T	forest, paddy fields up to 1200 m asl	in Khonoma's wet rice terraces; very fast decomposition of leaves
JUGLANDACEAE - Walnut Family (1)						
Juglans regia L.	walnut	khwüsi	pfüsi / pfhü / mewe	T		
LAMIACEAE - Mint Family (1)						
Elsholtzia blanda (Benth. in Wall.) Benth.		rünü / runü / rünu	tepfürünu	S	degraded forest, wasteland	The presence of rünu is an indicator of superior soil.
RHAMNACEAE - Buckthorn Family (1)						
Hovenia dulcis Thunb.	Indian coral tree / Japanese Raisin Tree	kipia / kipie / kiapie	shisiasi / ciepie	T	often found growing together with alder in Khonoma jhum fields	
THEACEAE - Tea Family (1)						
Schima wallichii Choisy	needle tree	mashie / mechie	mecho	T	forest, from higher to lower altitudes	crops planted nearby are reported to perform well, some claim that a fallow of about 50% *Schima* will yield a bumper crop when cleared for cultivation – but a pure stand will not
UNIDENTIFIED (2)						
Rhosaleta						thought to build soil fertility, but not as effectively as alder
	wild walnut	kwisi kwibo		T		
NEGATIVE:						
BOMBACACEAE - Kapok-tree Family (1)						
Bombax malabaricum DC.	silk cotton	tilho	chievü / seidzümu	T	open fields	

Botanical Name	Common English Name	Local Name		Life Form†	Habitat	Farmer Comments
		Khonoma	Tsiesema			
FAGACEAE - Beech Family (3)						
Castanea sp.	wild chestnut	phegü		T		
Castanopsis sp.		bedu		T		Leaves decompose slowly, cover the soil, and nothing is able to penetrate.
Quercus serrata Thunb.	European oak	phie / phrie	phrie / phre	T	forest area	Leaves decompose slowly, cover the soil, and nothing is able to penetrate. Nothing will grow under oak.
MELASTOMATACEAE - Melastome Family (1)						
Osbeckia sp.		khukhe / kukhie	kukhe	S		The presence of kukhie suggest poorer soils.
MELIACEAE - Mahogany Family (1)						
Melia azederach L.	ghora neem, lilac	khusia / khusie	kusie / khousie	T	common 200 -1800 m asl	being a fast-growing tree, it may deplete soil; indicates that crops will not grow well
PINACEAE - Pine Family (1)						
Pinus sp.	pine	tehü / tehu	tehou / tehu	T	forest area, also fields, gardens, etc.	Acidifies the soil. Rice will not grow.
POACEAE - Grass Family (1)						
bamboo (generally)				G		Will hinder crop growth. Probably simple competition.
RHAMNACEAE - Buckthorn Family (1)						
Hovenia dulcis Thunb.	Indian coral tree / Japanese Raisin Tree	kipia / kipie / kiapie	shisiasi / ciepie	T		rice can grow but not as good as with alder
ROSACEAE - Rose Family (3)						
Docynia indica (Wall.) Decne.	crab / wild apple	kipho	ciepho	T	moist, forest areas	
Neillia thyrsiflora D. Don		thegasero / thegasiro				The presence of thegasiro suggest poorer soils.
Pyrus pashia Buch.-Ham. ex D. Don	pear	kitsu	kitsusi	T		

Botanical Name	Common English Name	Local Name		Life Form[†]	Habitat	Farmer Comments
		Khonoma	Tsiesema			
THEACEAE - Tea Family (1)						
Schima wallichii Choisy	needle tree	mashie / mechie	mecho	T	forest	
VERBENACEAE - Verbena Family (1)						
Gmelina arborea Roxb. ex Sm.	gumbhar / gomari / gamari	thovü / thogwü	thobvü / thovü	T	scattered throughout deciduous forest	conflicting opinions over *Gmelina*, with some claiming that it enriches the soil
UNIDENTIFIED (3)						
			pegie			Will hinder crop growth. Probably simple competition.

[†] Life Forms: T (tree), S (shrub), V (vine), H (herb), G (grass), and F (fern)

CHAPTER 6

Allocation of Land and Labor, and the Returns that Farmers Receive

APPENDICES

APPENDIX 6-1. Series of Seven Tables (a-g) Providing Supplementary Information on the Farm Households that Collaborated in the Research, their Land Holdings, and Self-Sufficiency in Rice Production

APPENDIX 6-1a. Collaborating Households in Two Study Villages – Personal Data[a]

Field No.	Collaborating Farmers				Children			Social Organizations[b]		
	Husband	Age *(yrs)*	Wife	Age *(yrs)*	Total	At Home	Away	Khel	Clan	Religion[c]
KHONOMA										
1	Vilazosie Punyü	53	Vivino Punyü	52	5	3	2	Thevoma	Chatsu	CB
2	Vitsolie Meyase	43	Kuolhoutono Meyase	40	5	5	0	Merhüma	Meyase	CB
3	Selie Chase	45	Sano Chase	42	9	7	2	Merhüma	Gwizantsu	CB
4	Pelhuhu Chase	53	Avino Chase	50	6	4	2	Merhüma	Gwizantsu	CB
5	Khrieni Meru	45	Gongu Meru	41	3	3	0	Merhüma	Gwizantsu	CB
6	Vingulie Viprü	60	Khrievor Viprü	58	7	1	6	Semoma	Kuthotsu	CB
7	Nirüdo Khate	62	Vilakhrieü Khate	53	7	2	5	Merhüma	Lievüse	CB
8	Visesielie Meyase	43	Meno Meyase	50	7	6	1	Merhüma	Meyase	CB
9	Lhuyazo Talie	53	Khrielevono Talie	50	10	7	3	Thevoma	Kotsu	old beliefs
10	Vipiahu Chücha	33	(unmarried)[d]	-	0	0	0	Semoma	Rülho	CB
		49		**44**	**6**	**4**	**2**			
TSIESEMA										
1	Kipfelie Dzüvichü	48	Neilie-ü Dzüvichü	40	9	7	2	Chazou	Pepfu	CR
2	Mhasizolie Mere	38	Neisalie-ü Mere	38	6	3	3	Kimho	Mere	CB
3	Rüduoui-o Yhor	30	Vilhoukho-ü Yhor	30	4	3	1	Kimho	Yhor	CB
4	Visalie Mere	65	Thenuse-ü Mere	60	10	6	4	Kimho	Mere	CR
5	Rüluotsü Mere	42	Vizohu-ü Mere	39	10	6	4	Kimho	Mere	CB
6	Zapuvi Mere	49	Neikuo-ü Mere	49	8	3	5	Kimho	Mere	CB
7	Ketounei Mere	67	Keduorhie-ü Mere	64	8	2	6	Kimho	Mere	CB
8	Neichutuo Chietsü	67	late Liethovi-ü Chietsü		8	1	7	Kimho	Mere	CB
9	Vikelie Khro	35	Vizovonud Khro	30	4	3	1	Chazou	Khro	CR
10	Dieseketuo Khro	28	Khriesale-ü Khro	30	7	5	2	Chazou	Khro	CR
		47		**39**	**7.4**	**3.9**	**3.5**			

[a] See plates 6-114 - 6-119.

[b] See figure 3-14 for more details about Khonoma's social organization.

[c] CR = Christian Revival, CB = Christian Baptist

[d] Now married to Cukhu-ü.

APPENDIX 6-1b. Data on Wet Rice Terraces (tekhulie) Owned by Collaborating Households – Both Fields that were Monitored and Additional Holdings

Monitored Wet Rice Fields[a]						Other Wet Rice Fields - Unmonitored[b]											
Field No.[c]	Area (m^2)	Alt. (m asl)	Walking Times (hrs)		Nights Slept in Field	Number of Additional Fields Owned	Field #1		Field #2		Field #3		Field #4		Field #5		Total Area of Wet Rice Terraces (m^2)
			To	From			Area (m^2)	Alt. (m asl)	Area (m^2)	Alt. (m asl)	Area (m^2)	Alt. (m asl)	Area (m^2)	Alt. (m asl)	Area (m^2)	Alt. (m asl)	
KHONOMA																	
1	867.4767	1331	0.58	0.75	0	3	1250.447	1220	1675.478	1240	1515.853	1220					**5309**
2	1004.864	1363	0.5	0.58	0	1	498.525	1420									**1503**
3	1054.476	1460	0.33	0.42	0	3	1175.346	1270	1061.119	1330	584.162	1370					**3875**
4	679.7059	1477	0.27	0.33	0	2	1072.323	1220	2179.55	1400							**3932**
5	1099.141	1454	0.25	0.33	0	1	72.928	1450									**1172**
6	2426.164	1396	0.33	0.42	0	3	842.928	1230	1675.478	1160	817.19	1200					**5762**
7	717.2422	1460	0.33	0.42	0	3	1007.7	1230	276.526	1400	1085.659	1350					**3087**
8	1452.387	1527	0.25	0.33	0	2	1277.386	1410	1124.696	1250							**3854**
9	832.031	1425	0.17	0.25	0	3	2726.401	1120	1137.901	1250	2700.007	1385					**7396**
10	1359.271	1381	0.33	0.42	0	5	1271.44	1140	1300.99	1210	552.273	1400	1453.184	1320			**5937**
	1149	**1427**	**0.33**	0.43	**0**	**26**	**1120**	**1271**	**1304**	**1280**	**1209**	**1321**	**1453**	**1320**			**4183**
TSIESEMA																	
1	1999.958	1355	0.2	0.25	0	5	557.3913	1320	1393.103	1190	1115.998	750	2447.653	760	384.5467	800	**7899**
2	4944.104	1167	0.67	1	0	2	3079.382	1000	617.845	1030							**8641**
3	2360.485	1110	0.67	1.17	0	1	612.7286	940									**2973**
4	4653.388	1170	0.67	1	0	2	2570.798	1080	2337.659	850							**9562**
5	1695.255	1284	0.5	0.83	0	2	2481.924	1160	1151.073	760							**5328**
6	1432.96	1040	0.83	1.08	0	2	2301.434	1040	1963.343	570							**5698**
7	2714.49	904	1	1.83	12[d]	0											**2714**
8	2548.677	760	1.67	2.17	12	1	1601.624	1060									**4150**
9	1879.006	1111	0.75	1	0	2	419.079	1220	1190.406	820							**3488**
10	1419	1025	1.17	1.83	0	2	2163.537	1250	1639.02	1000							**5222**
	2565	**1093**	**0.81**	**1.22**		**19**	**1754**	**1007**	**1470**	**889**	**1116**	**750**	**2448**	**760**	**385**		**5568**

[a] See maps 6-1 and 6-2 for locations of these wet rice terraces within the village territories, and appendix 5-21 for inventories of what is grown. Thumbnail maps of each individual field are presented in appendices 6-2 – 6-3.

[b] See appendices 6-12 – 6-13 for thumbnail maps and details of the additional wet rice terraces.

[c] Refer to preceding appendix 6-1a for details on the farmer collaborators cultivating these fields.

[d] Husband only.

APPENDIX 6-1c. Data on Jhum Fields (nhalie) Owned by Collaborating Households – Both those Fields Monitored by the Research and Additional Jhum Holdings [a]

Jhum Fields Opened for Cultivation in 2000 - Monitored[b]								Other Jhum Fields - Unmonitored		
Field No.[c]	Size *(m²)*	Altitude *(m asl)*	Length of Last Fallow *(yrs)*	Walking Time *(hrs)*		Nights Slept in Field	Property Rights	Additional Jhum Fields Cultivated in 2000		Total No. of Jhum Plots Owned
				To	From			No.	Cropping Year	
KHONOMA										
1	2340.214	1640	6	0.42	0.33	0	private	1	2	4
2	1934.47	1682	6	0.5	0.42	0	rent from uncle	1	2	1
3	2803.916	1694	6	0.55	0.47	0	private	1	2	4
4	2137.05	1680	12	0.5	0.42	0	rent	1	2	1
5	1714.603	1718	5	0.58	0.5	0	private	1	2	7
6	1433.191	1684	6	0.58	0.5	0	borrowed from cousin	1	2	10
7	1247.631	1712	6	0.58	0.5	0	private	1	2	8
8	2009.311	1693	6	0.58	0.5	0	rent	1	2	1
9	2002.436	1744	6	0.67	0.58	0	rent from cousin	1	2	4
10	2098.879	1462	7	0.5	0.5	0	private	1	2	12
	1972	**1671**	**7**	**0.55**	**0.52**	0		**10**	**2**	**5.2**
TSIESEMA										
1	1772.43	1360	12	0.17	0.25	0	private	1	2	5
2	722.9343	1453	10	0.08	0.17	0	private	1	2	4
3	1210.875	1430	8	0.12	0.17	0	private	1	2	2
4	2082.219	1414	12	0.17	0.25	0	private	0	-	4
5	3004.135	1173	15	0.58	0.75	0	private	0	-	2
6	3742.355	1173	15	0.61	0.8	0	rent from brother	0	-	5
7	4028.963	1093	21	0.83	1.33	6[d]	private	0	-	4
8	1737.257	967	15	1.83	2.33	0	clan land	0	-	2
9	1845.456	1295	10	0.5	0.67	0	private	0	-	1
10	1254.007	1283	10	0.58	0.83	0	private	0	-	4
	2140	**1264**	**13**	**0.55**	**0.76**			**3**	**2**	**3.3**

[a] See maps 6-1 and 6-2 for locations of the monitored jhum fields within the village territories, and appendix 5-25 for inventories of what was grown.

[b] Thumbnail maps of each individual field are presented in appendices 6-2 – 6-3.

[c] Refer to appendix 6-1a for details on the farmer collaborators cultivating these fields.

[d] Husband only.

APPENDIX 6-1d. Data on Kitchen Gardens (kihiekimhuze) and Permanent Gardens (tize) Owned by Collaborating Households[a]

Field No.[b]	Kitchen Gardens			Permanent Gardens		
	No. of Plots	**Size** *(m^2)*	**Altitude** *(m asl)*	**No. of Plots**	**Size** *(m^2)*	**Altitude** *(m asl)*
KHONOMA						
1	1	271.7	1575	1	938.228	1400
2	1	131.1	1563	1	206.858	1493
3	1	113.9	1560	1	44.662	1490
4	1	1389.6	1526	1	855.992	1503
5	1		1555	1	208.753	1476
6	1		1513	1	112.725	1392
7	1		1552	1	533.421	1475
8	1		1561	1	250.346	1530
9	1		1489	1	59.55	1470
10	1	129.9	1532	1	52.191	1477
	10		**avg. 1542.6**	**10**	**avg. 326**	**avg. 1471**
TSIESEMA						
1	1	3	1484	1	59.966	1466
2	1	5	1492	1	240.808	1415
3	1	8	1467	1	115.569	1470
4	1	4	1489	1	421.838	1197
5	1	3	1476	1	523.869	1270
6	1	3	1463	1	586.914	1183
7	1	2	1466	1	230.259	1475
8	1	3	1466	1	252.572	1464
9	1	4	1485	1	205.384	1407
10	1	2	1495	1	356.248	1398
	10	**avg. 3.7**	**avg. 1478.3**	**10**	**avg. 299**	**avg. 1375**

[a] Refer to appendix 6-1a for details on the farmer collaborators cultivating these fields.

[b] See map 5-4 and appendix 5-30 for locations of these gardens within the research villages, and appendices 5-31 – 5-32 for inventories of what was grown.

APPENDIX 6-1e. Additional Land Outside Khonoma[a], Cultivated by the 10 Collaborating Farmers[b]

FARMER No.	WET RICE TERRACES[c] (*tins[d] of paddy planted : tins of paddy harvested*)					JHUM (*lieherü[e] of Job's tears planted : lieherü of Job's tears harvested*)				PLANTATIONS (*ha*)			
	Owned	**Rented**	**Borrowed**	**Location**	**Ratio (1 : _)**	**Owned**	**Rented**	**Borrowed**	**Location**	**Owned**	**Rented**	**Borrowed**	**Location**
1													
2	18 : 800			Rüziephe	1 : 44								
3	35 : 1300			Socünoma	1 : 37					0.81 (trees[f])			Socünoma
4													
5													
6													
7	2 : 200			Dimapur	1 : 100								
8													
9													
10													
TOTAL	**55 : 2300**				**1 : 41.8**								

[a] Most paddy land owned outside the village is cultivated under sharecropping arrangements, often by families from the plains. The harvests are divided equally between the land-owner and sharecropper.

[b] Data gathered during farmer interviews. Refer to appendix 6-1a for details on the farmer collaborators cultivating these fields.

[c] paddy = with husks (lighter by volume)
rice = without husks

[d] paddy: 1 tin = 13 kg.

[e] Job's tears: 1 lieherü = 1 tin = 7 kg. unthreshed (see appendix 5-8)

[f] 2 acres x 1000 seedlings/acre = 2000 seedlings

CONCLUSIONS: THREE OUT OF 10 STUDIED FARMERS IN KHONOMA OWN LAND OUTSIDE THE VILLAGE. AVERAGE RETURN OF 42 TINS OF PADDY HARVESTED FOR EVERY 1 TIN PLANTED.

APPENDIX 6-1f. Status of Each of the 10 Collaborating Farmers in Khonoma in Terms of Self-Sufficiency in Rice Needs, Sales and Purchases[a]

FARMER No.[b]	PRODUCTION & CONSUMPTION			PADDY BOUGHT			PADDY SOLD		
	TOTAL PADDY PRODUCED / YEAR	TOTAL PADDY CONSUMED / YEAR	SELF-SUFFICIENCY[c]	QUANTITY / YEAR	LOCATION	BUYING PRICE	QUANTITY / YEAR	LOCATION	SELLING PRICE
	(tins[d])	*(tins[d])*	*(%)*	*(tins[d])*		*(Rs[e] / tin[d])*	*(tins[d])*		*(Rs[e] / tin[d])*
1	191	120	159						
2	880	140	629				400	Khonoma	70
3	1360	220	618				800	Khonoma	65
4	168	108	156	4.6	Khonoma	156[f]	4	Kohima	80
5	160	120	133	70	Medziphema	70			
6	280	140	200				15	Khonoma	70
7	127	150	85	100	Tsüürie	65			
8	130	190	68	60	Tehierie	60			
				20	Khonoma	65			
9	285	245	116						
10	164	104	158						
TOTAL	**3745**	**1537**	**244**	**254.6**		**avg. 65**[g]	**1219**		**avg. 71.25**

---

[a] paddy = with husks (lighter by volume)
rice = without husks

[b] Data gathered during farmer interviews. Refer to appendix 6-1a for details on the farmer collaborators cultivating these fields.

[c] Paddy surpluses are stored in large keprüchü baskets or melachü boxes (see codes 7.2.5.2 - 7.2.5.3 in appendix 5-7).

[d] paddy: 1 tin = 13 kg. (see appendix 5-8)

[e] $US1 = 48.044 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

[f] higher-priced sticky rice

[g] Calculation restricted to the four transactions involving nonglutinous rice.

APPENDIX 6-1g. Status of Each of the 10 Collaborating Farmers in Tsiesema in Terms of Self-Sufficiency in Rice Needs, Sales and Purchases [a b]

FARMER No. [d]	PRODUCTION & CONSUMPTION			PADDY BOUGHT			PADDY SOLD [c]		
	TOTAL PADDY PRODUCED / YEAR	TOTAL PADDY CONSUMED / YEAR	SELF-SUFFICIENCY [e]	QUANTITY / YEAR	LOCATION	BUYING PRICE	QUANTITY / YEAR	LOCATION	SELLING PRICE
	(sacks)	*(sacks)*	*(%)*	*(sacks)*		*(Rs[f] / sack)*	*(sacks)*		*(Rs[f] / sack)*
1	50	35	143				2	Kohima	700
2	45	40	113				5	Kohima	700
3	27	15	180				0.25 (sticky)	Kohima	1600 [g]
4	50	40	125				1.5 (sticky)	Kohima	1600 [g]
5	24	24	100						
6	35	30	117				4	Kohima	700
7	28	28	100						
8	20	15	133				2	Kohima	700
9	22	20	110				2	Kohima	700
10	26	20	130						
TOTAL	**327**	**267**	**122**	**0**	**-**	**-**	**16.75**		**avg. 700** [h]

[a] paddy = with husks (lighter by volume)
rice = without husks

[b] paddy: 1 sack (80 kg) = 5 tins; 1 tin = 16 kg. (see appendix 5-8)

[c] Glutinous rice is most commonly sold since it commands a higher price (Rs 1600/sack), compared to nonglutinous varieties (Rs 700/sack).

[d] Data gathered during farmer interviews. Refer to appendix 6-1a for details on the farmer collaborators cultivating these fields.

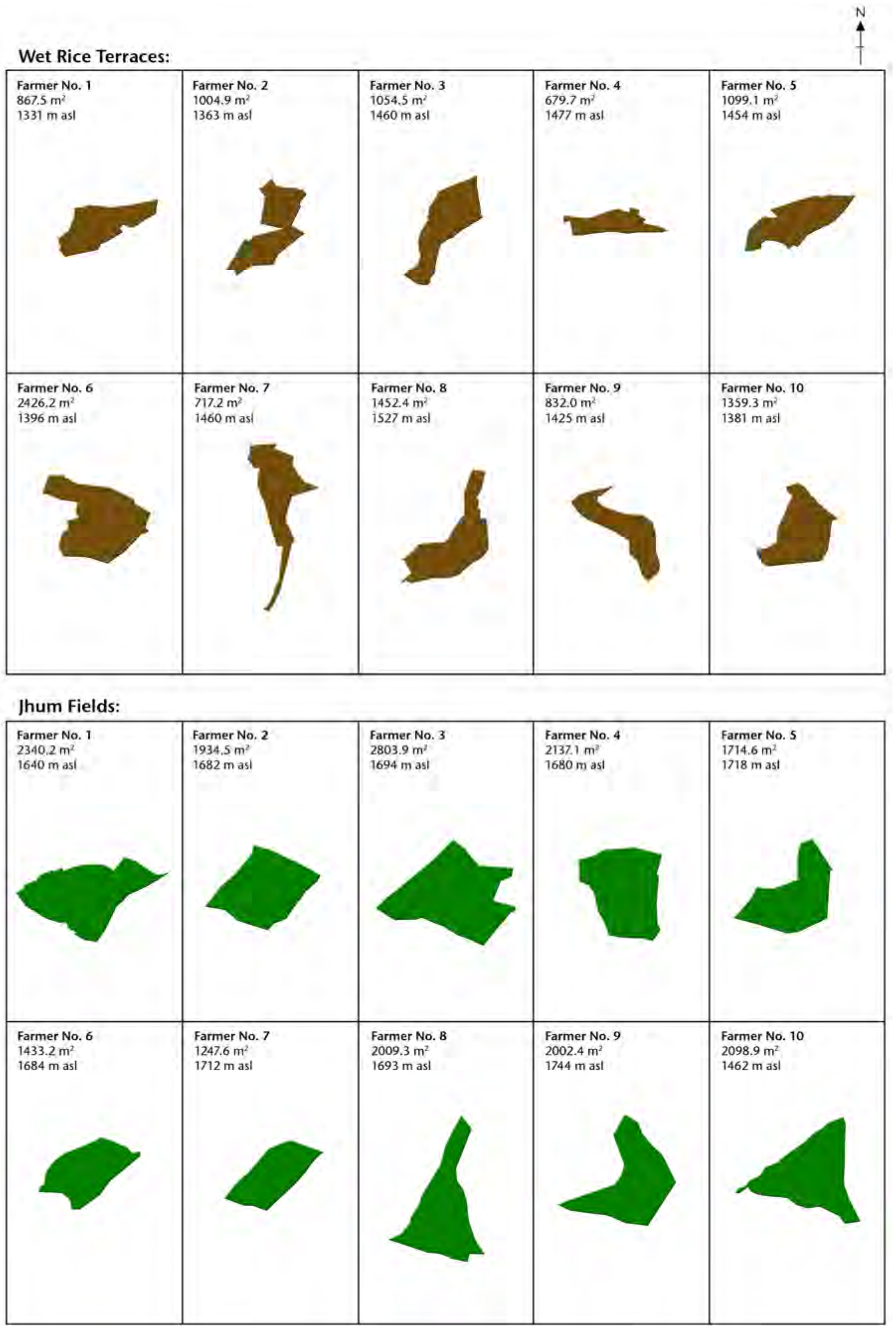
[e] Paddy surpluses are stored in large chü baskets or telhabu boxes (see codes 7.2.5.2 - 7.2.5.3 in appendix 5-7)

[f] $US1 = 48.044 Indian Rupees, as of Dec. 31, 2002, at the end of the fieldwork.

[g] higher priced sticky rice

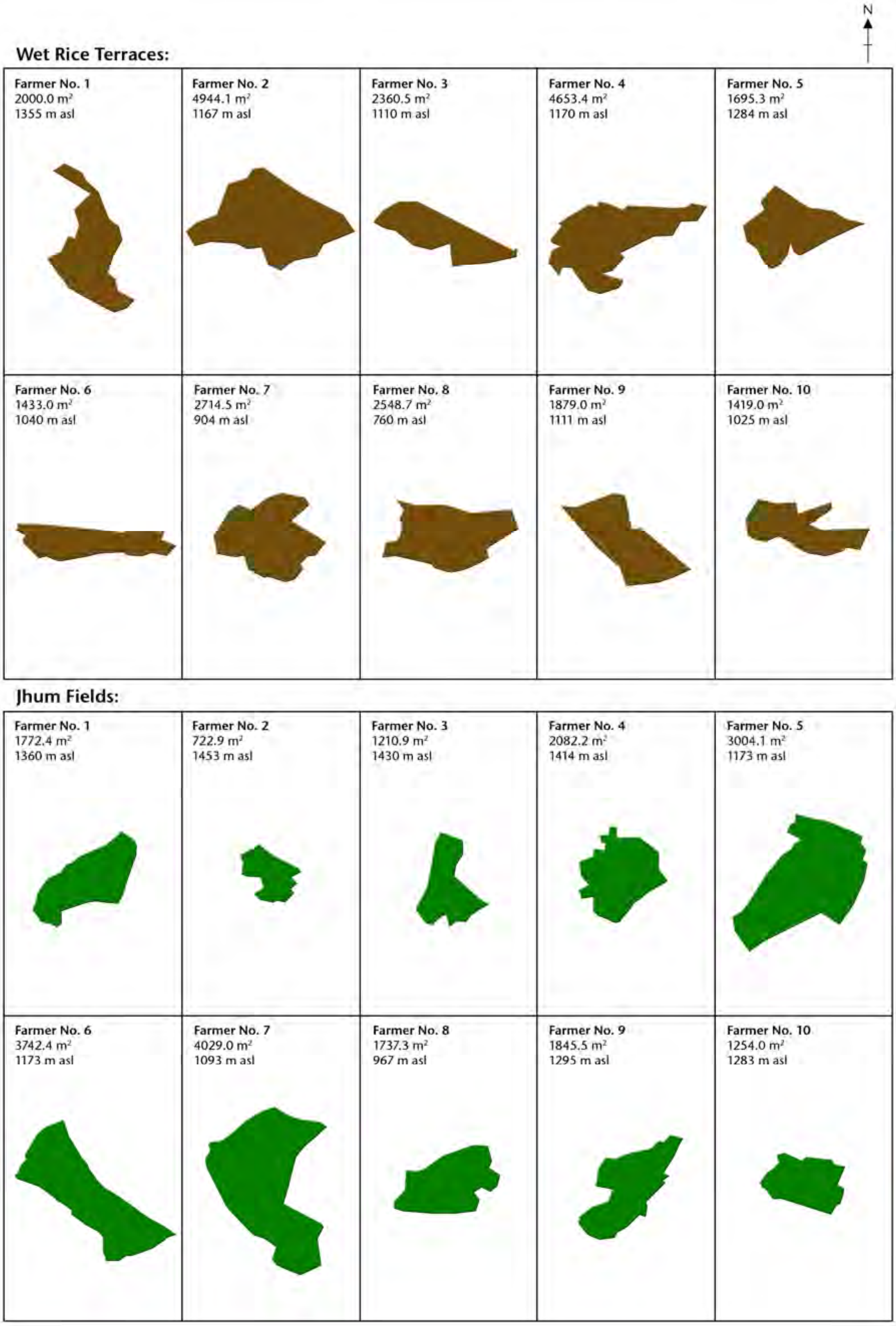
[h] calculation restricted to the five transactions involving nonglutinous rice

APPENDIX 6-2. Thumbnail Maps of Fields Monitored in Main Study Village – Khonoma *



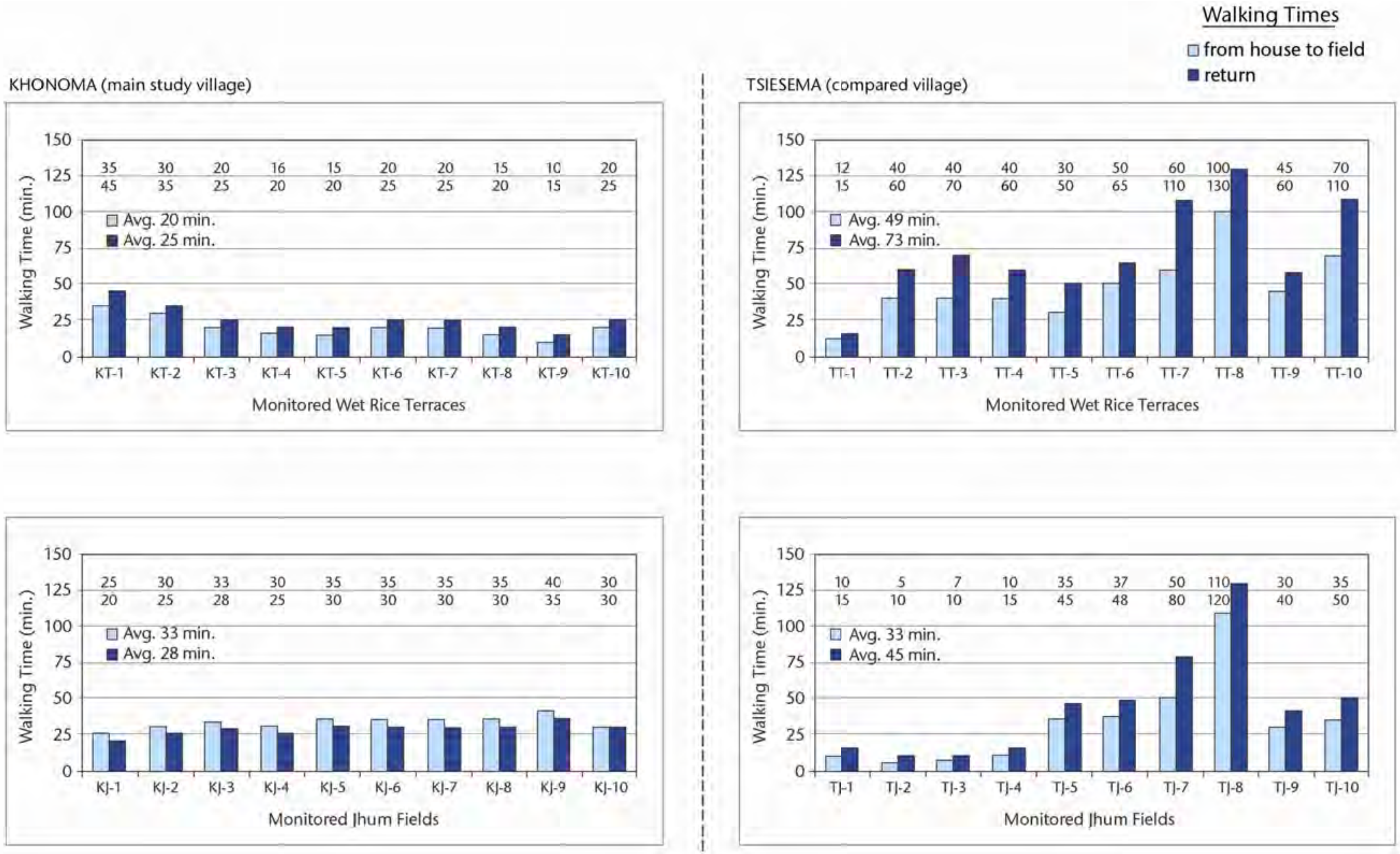
* Roughly in proportion. See map 6-1 for the location of the fields within the village map. Cross-reference with appendices 6-1b and 6-1c for additional details. Summaries of the main findings from monitoring these sample fields are provided in appendices 6-14 and 6-15.

APPENDIX 6-3. Thumbnail Maps of Fields Monitored in Compared Village – Tsiesema *



* Roughly in proportion. See map 6-2 for the location of the fields within the village map. Cross-reference with appendices 6-1b and 6-1c for additional details. Summaries of the main findings from monitoring these sample fields are provided in appendices 6-14 and 6-15.

APPENDIX 6-4. Walking Times to/from Monitored Agricultural Fields



* Cross-reference with appendices 6-1b and 6-1c for additional details.

APPENDIX 6-5. Field Operations in Wet Rice Terraces: Breakdown of Activities in Each Category

1. Wood Harvest
- N/A

2. Nursery Management

Specific to Nurseries Made in Forest Areas –
- slashing small forest area for nursery
- gathering, carrying and piling firewood
- burning remaining slash
- cleaning up unburnt debris

Specific to Nurseries Made in Rice Terraces –
- puddling by deep hoeing and mixing soil with water
- strengthening terrace bunds by applying additional mud

Common to Both –
- turning over soil by hoeing
- breaking up soil clumps
- raking to level seedbed
- broadcasting rice seeds
- weeding by hand or rake / or salt application as weedicide
- thinning out rice plants

3. Field Preparation
- cleaning access path
- repairing fieldhut
- cutting and carrying firewood for use in fieldhut
- cleaning out channels / other maintenance to irrigation system
- slashing back weeds / bushes around field perimeter
- expanding or otherwise altering boundaries of terraced fields – often to repair landslide damage
- clearing and/or burning weeds / residues of previous crops
- application of livestock manure
- repairs to terrace walls
- cleaning weeds from bund walls and throwing into terraces as green manure
- clearing rocks / other field maintenance
- flooding field to soften soil in preparation for tilling
- soil tillage – by hoe, by plowing with draft animals, or with hand tractor
- soil tillage by hoe for non-rice crops
- breaking up soil clumps
- flooding / puddling field – 1st time
- pollarding *Albizia* trees and mixing leaves into soil
- strengthening terrace bunds by applying additional mud
- flooding / puddling field – 2nd time and leveling
- fencing

4. Planting
- uprooting rice seedlings from nursery
- transplanting rice seedlings into terraces
- replacing rice seedlings where necessary
- releasing fish fingerlings
- planting non-rice summer crops
- planting non-rice winter crops
- planting fruit along bunds / nearby field hut

5. Plant Management
- temporarily draining water from terraces 20-30 days after transplanting
- weeding / cleaning rice
- regulating water level at about 3-4 inches
- continued maintenance to irrigation system
- weeding non-rice crops
- trimming back weed growth on bund walls
- over-turning weed piles to assist drying
- pruning dead outer leaves from rice plants
- continued cleaning of field perimeter
- guarding field against pests

6. Harvesting
- harvesting winter crops planted in previous year
- capturing / gathering paddy fauna
- drying out the field for harvest
- bunching rice plants
- harvesting rice
- threshing rice
- winnowing rice
- transporting rice back to village
- harvesting non-rice summer crops

* Cross reference with figures 6-4 and 6-5, 6-18 to 6-24, 6-26 and 6-27.
Also with tables 6-2, 6-7 to 6-9, and 6-12.

APPENDIX 6-6. Field Operations in Jhum Cultivation: Breakdown of Activities in Each Category

1. Wood Harvest
- pollarding / falling trees
- cutting and splitting firewood
- gathering, carrying and piling firewood

2. Nursery Management
- N/A

3. Field Preparation
- choosing field location
- clearing access path
- slashing undergrowth
- drying slash, burning and collecting unburnt biomass
- cutting back unburnt tree stumps and removing roots of smaller ones
- collecting roots and other unburnt biomass, covering with layer of soil and burning
- spreading out burnt mounds
- repairing terrace walls / placing logs across slope contours
- constructing field hut (including gathering materials)
- soil tillage and clearing away rocks
- leveling soil within terraces
- digging channels for water to flow off the field
- clearing brush from around field perimeter
- fencing

Specific to 2nd-Year Fields –
- cleaning up and burning weeds and residues from previous crop, and repairing terraces
- repairing field hut

4. Planting
- trans/planting

5. Plant Management
- hand-weeding
- intertillage and hilling around plant stems, and simultaneous weeding
- collecting seedlings to transplant or sell
- application of livestock manure
- collecting / erecting poles for climbing crops
- training vines to climb up poles / trellises
- planting tree seedlings, both gap-filling within fields or along field boundaries
- thinning alder coppices
- pruning branches / coppices from retained tree stumps (usually non-alder) to minimize shading
- pruning dead outer leaves from rice plants
- slashing weeds (growing amongst crop) with dao
- guarding field against pest damage / constructing scarecrows

6. Harvesting
- bunching rice plants
- harvesting, drying, threshing
- capturing / gathering wild foods
- gathering fodder for pigs

* Cross reference with figures 6-8 and 6-9, 6-12 to 6-16, 6-18 to 6-24, 6-26 and 6-27.
Also with tables 6-3 and 6-4, 6-7 to 6-9, and 6-12.

APPENDIX 6-7. Harvest Seasons and Prices of Major Crops in Both Study Villages

Crop	KHONOMA			TSIESEMA			Comments
	Harvest Season	Price [a] *(Indian Rupees)*	Unit [b]	Harvest Season	Price *(Indian Rupees)*	Unit	
CEREALS							
paddy [c] - non-sticky		60	tin	Sept.-Nov.	65-70 [d]	large tin	paddy sold only by tin, not kg.
paddy - sticky		70-75	tin	Sept.-Nov.	80	large tin	
rice - non-sticky		15	kg.	Sept.-Nov.	15	kg.	Kohima market sells only rice, not paddy
rice - sticky		20	kg.	Sept.-Nov.	20	kg.	
millet	July	20	kg.	June	20	kg.	after milling, Rs 40/kg in Kohima
maize – non-sticky	Sept.	10	kg.	June-Sept.	10-12	kg.	sell by kg., after drying & milling
maize – sticky				Aug.-Oct.	20	10-12 pieces	sell only by cob when fresh
Job's tears - non-sticky		20	tin				does not store well, so consumed quickly
Job's tears - sticky	Oct.-Nov.	25	tin	Oct.-Nov.	20	kg.	
wheat	May			-	-	-	not widely grown
BULBS, ROOTS & TUBERS							
sweet potato	Dec.-Feb.	8	kg.	Dec.-Feb.	10	kg.	
potato	July-Aug.	8-12	kg.	May-June	10-15	kg.	
taro	Nov.-Dec.	10	kg.	Nov.-Dec.	10	kg.	for tuber
					25-30	bundle	leaves fed to pigs
yam		no sales		Dec.-Feb.	12-15	kg.	
cassava		no sales		Aug.-Apr.	8-10	kg.	
garlic		10	bundle				
PULSES							
soybeans	Aug.-Sept.	20	kg.	Nov.	22	kg.	after threshing
rice beans		20	kg.	Nov.	20	kg.	after threshing
CUCURBITS							
cucumber		2-5	piece	May-Sept.	2-5	piece	heaviest supply in July-Aug. in Tsiesema
pumpkin		5-10	piece	July-Sept.	10-15	piece	depending on size
squash		1	piece				Rs 4.5/kg. in Dimapur
SUGAR							
sugarcane				Sept.-Apr.	10-15	piece	Rs 15-20/piece in Kohima
HERBS, SPICES & CONDIMENTS							
chilli – small - fresh		20	kg.	July-Jan.	10	0.25 kg.	

Crop	KHONOMA			TSIESEMA			Comments
	Harvest Season	**Price** [a] *(Indian Rupees)*	**Unit** [b]	**Harvest Season**	**Price** *(Indian Rupees)*	**Unit**	
chilli – small - dry		80-100	kg.		70	kg.	
chilli – Raja - fresh				Apr.-Jan.	150-220	large tin	
chilli – Raja - dry					2	3 pieces	
					1	2 pieces	
GREENS & VEGETABLES							
cabbage		5-8	kg.				
tree tomato		1	2 pieces				
tomato				May-Jan.	10-15	kg.	most in-season in June-July in Tsiesema
OILSEEDS							
perilla		20	kg.				
FRUITS, NUTS & BERRIES							
passion fruit		1	3 pieces				Rs 30/kg in Kohima
wild apple		60	bag				small cement sack
guava				July-Dec.	0.50-1	piece	
oranges				Dec.-Jan.	10	7-8 pieces	for good quality
papaya				Apr.-May	10-20	piece	depending on size
banana				anytime	10	8 pieces	for good quality
					10	hand	for medium quality
pomello				late Nov.-early Dec.	5	piece	for large size
mango				June	5	piece	for large size
					15	kg.	
FIREWOOD							
alder	Nov.-Feb.		stack				
mixed				Nov.-Feb.		stack	

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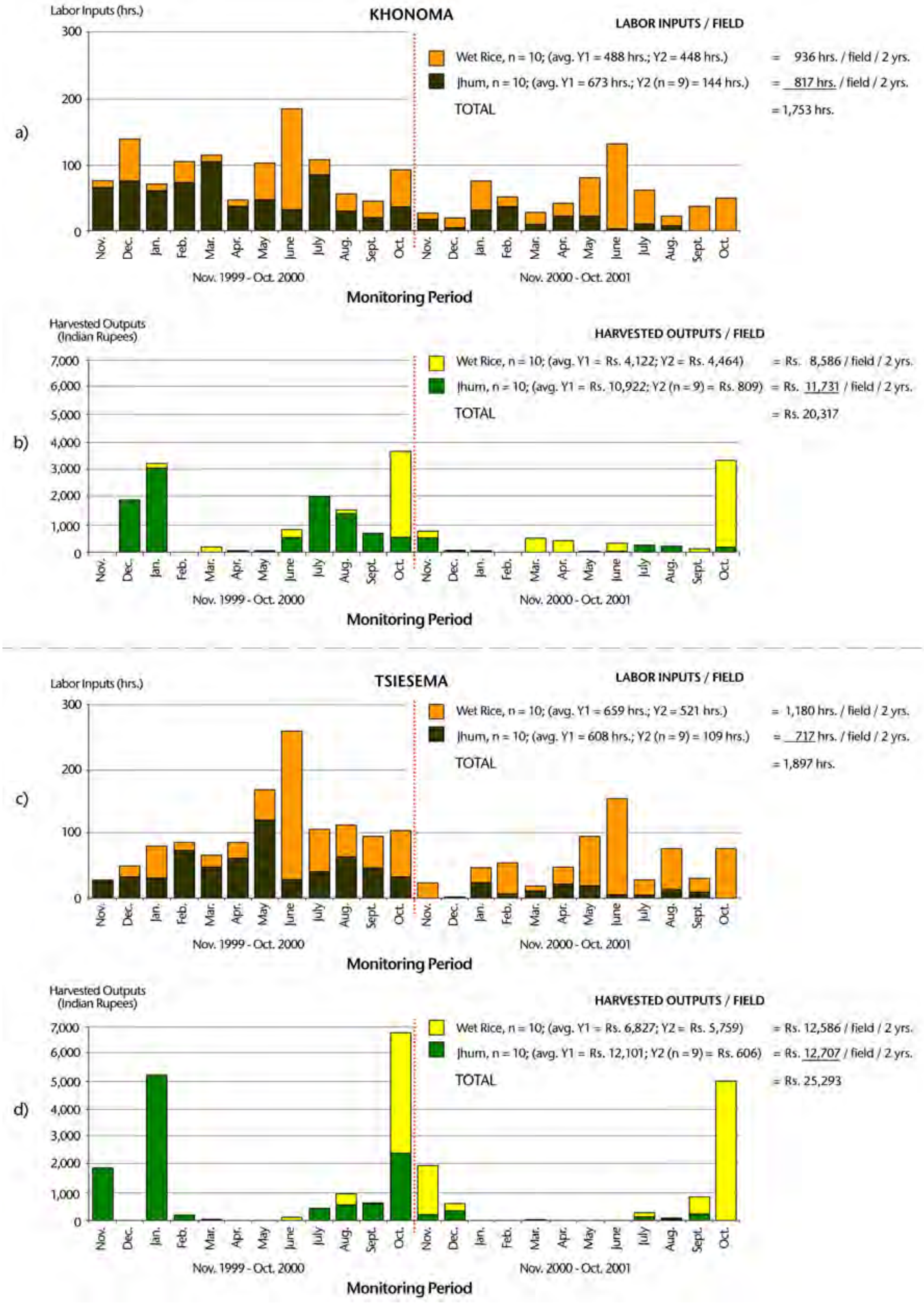
[a] Farm-gate prices. Higher-end of scale indicates out-of-season prices, while lower-end prices are received during prime harvest time when the commodity is most plentiful.

[b] Refer to '*Conversion Table between Local Units of Measure and International Units*' in appendix 5-8.

[c] paddy = with husks (lighter by volume); rice = without husks

[d] More often sold after milling, after which the price increases to about Rs 110/tin.

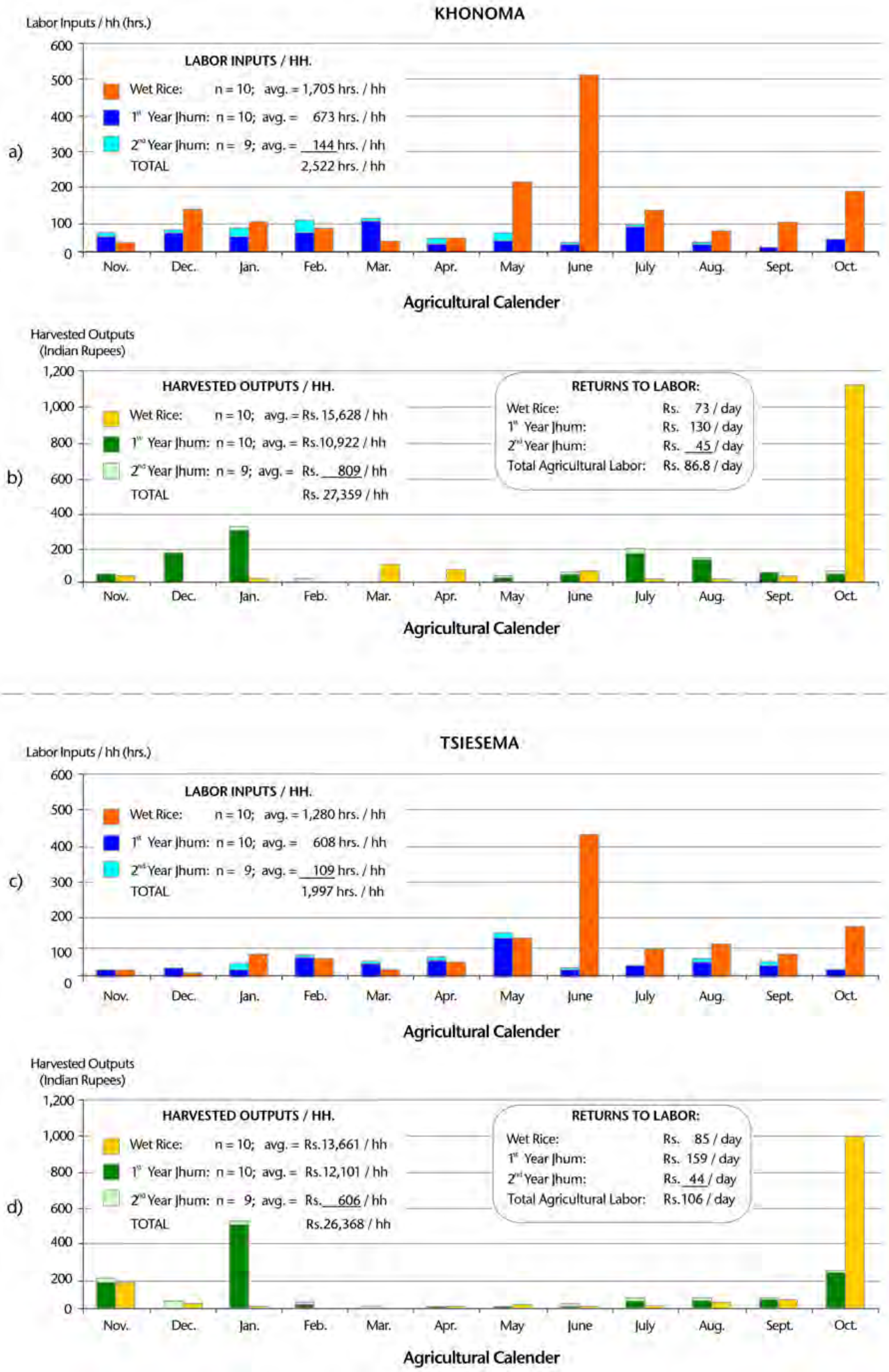
APPENDIX 6-8. Distribution of Average Labor Inputs and Harvested Outputs from Monitored Fields over Two Cropping Seasons (Nov. 1, 1999 – Oct. 31, 2001) (calculated on field basis)*†



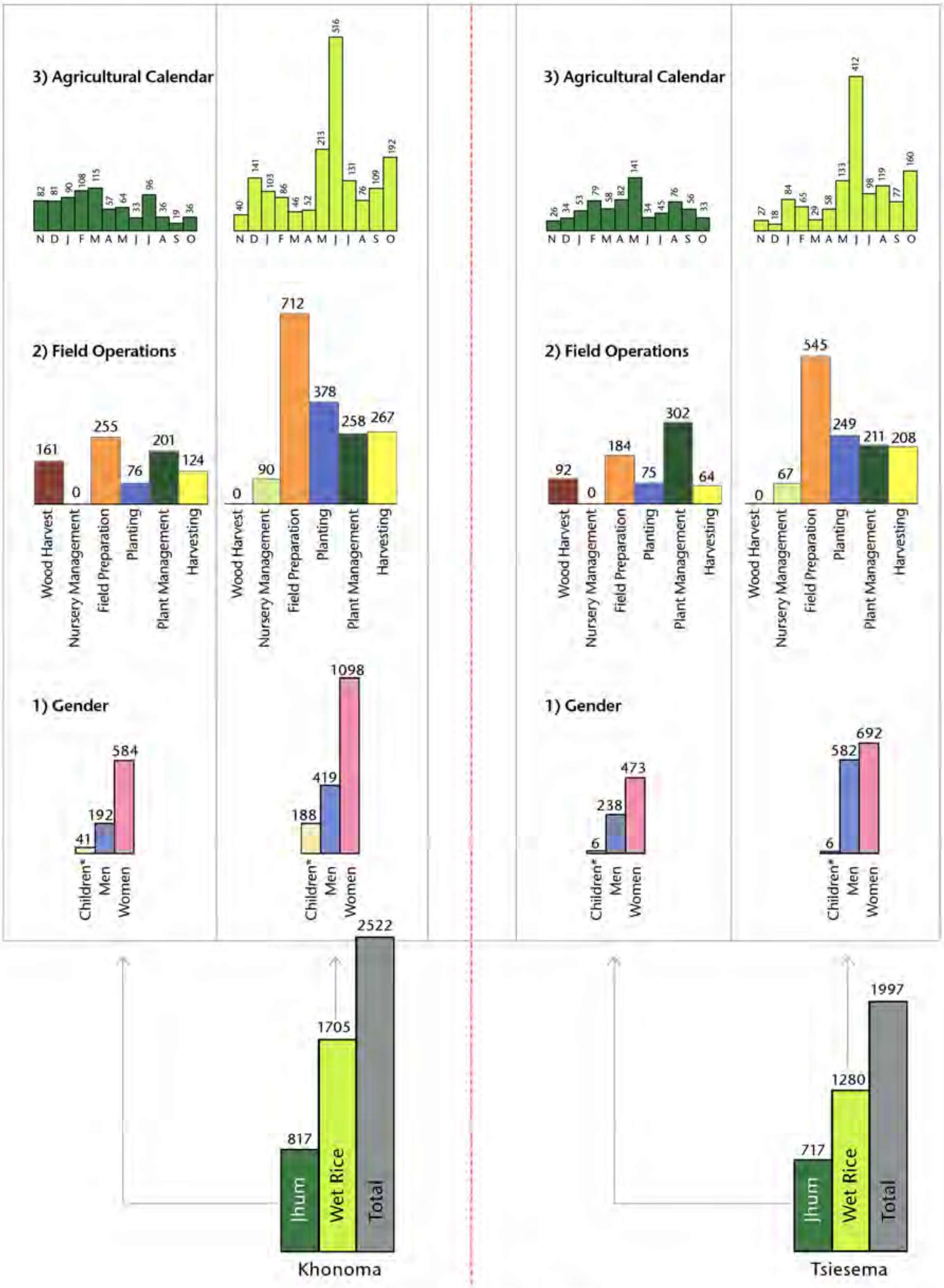
[†] See appendix 6-9 for these data scaled up to the household level, and figure 6-22 for their presentation at the per hectare level.

* Graphs show labor and output data according to actual months. Data summations, however, are adjusted to include outputs and associated harvest labor falling within Nov. - Dec., 2000 as part of year-1, to more accurately reflect the true situation. The same procedure was done at the end of year-2.

APPENDIX 6-9. Distribution of Labor Inputs and Harvested Outputs from Jhum and Wet Rice Fields over a Typical Cropping Year, and Analysis of Returns to Labor (calculated on household basis)



APPENDIX 6-10. Summary of Agricultural Labor and its Breakdown by 1) Gender, 2) Field Operations, and 3) Agricultural Calendar[†]

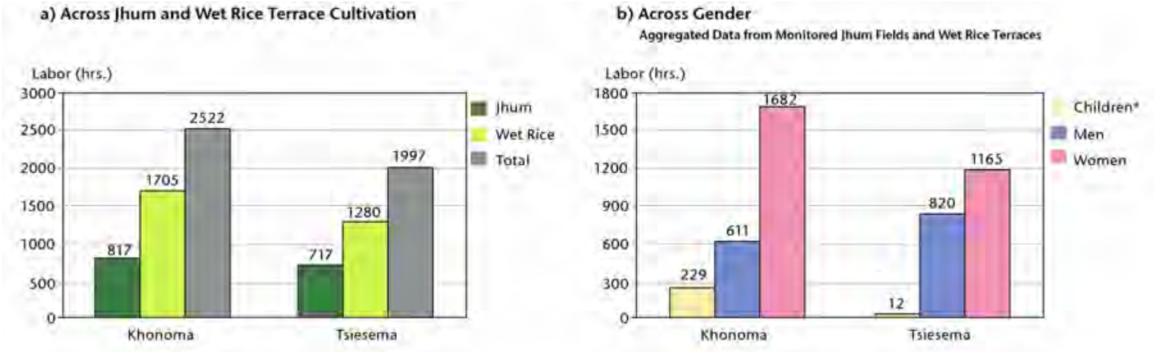


Division of Labor Between
Jhum and Wet Rice Terrace Cultivation

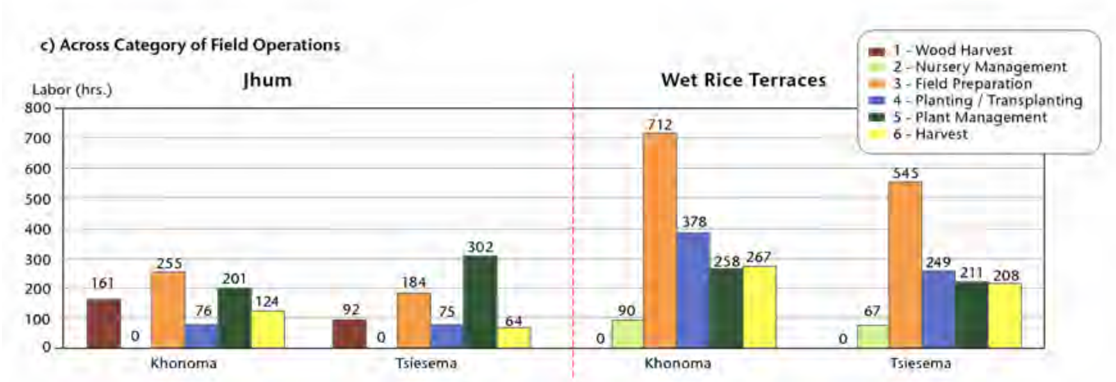
[†] Based on labor diaries maintained by ten households in each study village over 2000-2001.

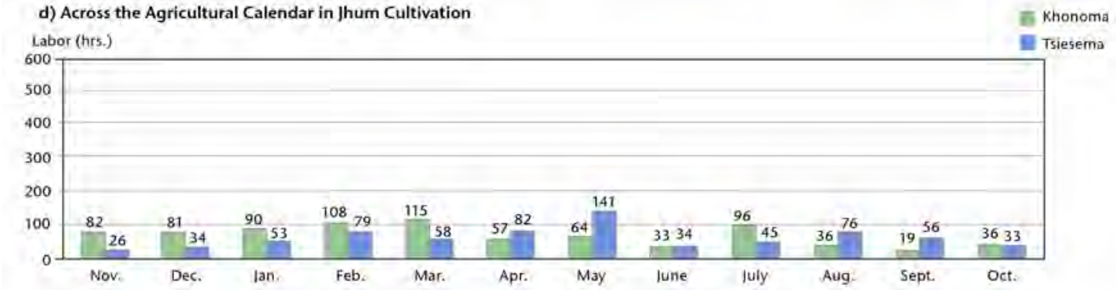
* < 15 years of age

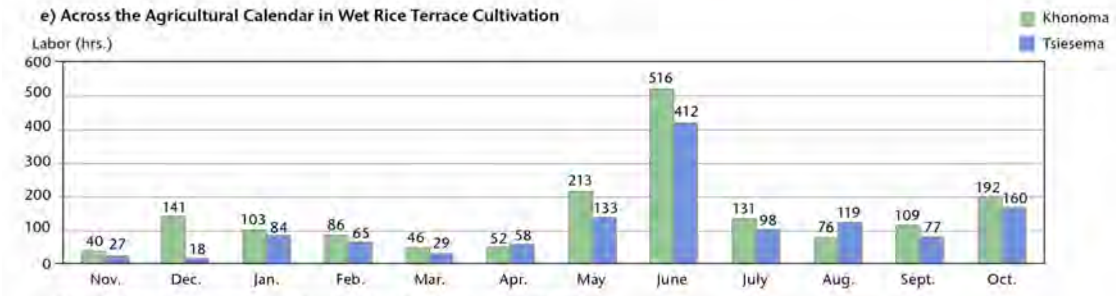
APPENDIX 6-11. Summary of Major Findings Regarding Distribution of Agricultural Labor at the Household Level [†‡]


a) Across Jhum and Wet Rice Terrace Cultivation

b) Across Gender
Aggregated Data from Monitored Jhum Fields and Wet Rice Terraces


c) Across Category of Field Operations


d) Across the Agricultural Calendar in Jhum Cultivation


e) Across the Agricultural Calendar in Wet Rice Terrace Cultivation

† Based on labor diaries maintained by ten households in each study village over 2000-2001.

‡ Khonoma: jhum 3916 sq. m., wet rice terraces 4183 sq. m.
Tsiesema: jhum 4478 sq. m., wet rice terraces 5568 sq. m.

* < 15 years of age

APPENDIX 6-12. Thumbnail Maps of All Wet Rice Terraces Owned by Collaborating Farmers, Beyond those Monitored during the Fieldwork – Khonoma *

Farmer No. 1 1250.4 m² 1220 m asl 	1675.5 m² 1240 m asl 	1515.9 m² 1220 m asl 		**TOTAL WET RICE HOLDINGS:** 5309 m²
Farmer No. 2 498.5 m² 1420 m asl 				**TOTAL WET RICE HOLDINGS:** 1503 m²
Farmer No. 3 1175.3 m² 1270 m asl 	1061.1 m² 1330 m asl 	584.2 m² 1370 m asl 		**TOTAL WET RICE HOLDINGS:** 3875 m²
Farmer No. 4 1072.3 m² 1220 m asl 	2179.6 m² 1400 m asl 			**TOTAL WET RICE HOLDINGS:** 3932 m²
Farmer No. 5 72.9 m² 1450 m asl 				**TOTAL WET RICE HOLDINGS:** 1172 m²
Farmer No. 6 842.9 m² 1230 m asl 	1675.5 m² 1160 m asl 	817.2 m² 1200 m asl 		**TOTAL WET RICE HOLDINGS:** 5762 m²
Farmer No. 7 1007.7 m² 1230 m asl 	276.5 m² 1400 m asl 	1085.7 m² 1350 m asl 		**TOTAL WET RICE HOLDINGS:** 3087 m²
Farmer No. 8 1277.4 m² 1410 m asl 	1124.7 m² 1250 m asl 			**TOTAL WET RICE HOLDINGS:** 3854 m²
Farmer No. 9 2726.4 m² 1120 m asl 	1137.9 m² 1250 m asl 	2700.0 m² 1385 m asl 		**TOTAL WET RICE HOLDINGS:** 7396 m²
Farmer No. 10 1271.4 m² 1140 m asl 	1301.0 m² 1210 m asl 	552.3 m² 1400 m asl 	1453.2 m² 1320 m asl 	**TOTAL WET RICE HOLDINGS:** 5937 m²

* Cross-reference with appendix 6-1b.
Field maps are not to scale. Refer to field areas (m²) for comparative sizes.

APPENDIX 6-13. Thumbnail Maps of All Wet Rice Terraces Owned by Collaborating Farmers, Beyond those Monitored during the Fieldwork – Tsiesema *

Farmer No. 1 557.4 m² 1320 m asl 	1393.1 m² 1190 m asl 	1116.0 m² 750 m asl 	2447.7 m² 760 m asl 	384.5 m² 800 m asl  TOTAL WET RICE HOLDINGS: 7899 m²
Farmer No. 2 3079.4 m² 1000 m asl 		617.8 m² 1030 m asl 		TOTAL WET RICE HOLDINGS: 8641 m²
Farmer No. 3 612.7 m² 940 m asl 				TOTAL WET RICE HOLDINGS: 2973 m²
Farmer No. 4 2570.8 m² 1080 m asl 	2337.7 m² 850 m asl 			TOTAL WET RICE HOLDINGS: 9562 m²
Farmer No. 5 2481.9 m² 1160 m asl 	1151.1 m² 760 m asl 			TOTAL WET RICE HOLDINGS: 5328 m²
Farmer No. 6 2301.4 m² 1040 m asl 	1963.3 m² 570 m asl 			TOTAL WET RICE HOLDINGS: 5698 m²
Farmer No. 7 NONE				TOTAL WET RICE HOLDINGS: 2714 m²
Farmer No. 8 1601.6 m² 1060 m asl 				TOTAL WET RICE HOLDINGS: 4150 m²
Farmer No. 9 419.1 m² 1220 m asl 	1190.4 m² 820 m asl 			TOTAL WET RICE HOLDINGS: 3488 m²
Farmer No. 10 2163.5 m² 1250 m asl 	1639.0 m² 1000 m asl 			TOTAL WET RICE HOLDINGS: 5222 m²

* Cross-reference with appendix 6-1b.
Field maps are not to scale. Refer to field areas (m²) for comparative sizes.

APPENDIX 6-14. Crops Harvested from the Wet Rice Terraces Monitored in the Study Villages during 2000-2001

KHONOMA:

Farmer No.	CROPS HARVESTED			
	2000		2001	
	Annuals Grown within Terraces	Perennials Grown around Terraces	Annuals Grown within Terraces	Perennials Grown around Terraces
1	rice, maize, Job's tears, beans, ginger, solie*	-	rice, rice bean, potato	-
2	rice	-	rice, chilli, pumpkin	-
3	rice, maize, chilli, solie*	-	rice	-
4	rice	-	rice	-
5	rice, cucumber	-	rice, beans, cucumber	-
6	rice, Job's tears, garlic	-	rice, wheat, potato, brinjal	-
7	rice, maize, mustard leaf, chilli, garlic, ginger, cucumber, squash	-	rice, maize, mustard leaf, peas, garlic, cucumber, pumpkin	-
8	rice, maize, coriander, garlic, pumpkin	-	rice, garlic	-
9	rice, maize, potato, garlic	-	rice, garlic, potato	-
10	rice, maize, brinjal, garlic, taro, solie*	-	rice, maize, rice beans, soybeans, french beans, peas, mustard leaf, carrot, potato, garlic, taro, cucumber, solie*	-
avg. (crop types / field)	**4**	**0**	**4**	**0**

* *Allium porrum* L., a wild vegetable.

TSIESEMA:

Farmer No.	CROPS HARVESTED			
	2000		2001	
	Annuals Grown within Terraces	Perennials Grown around Terraces	Annuals Grown within Terraces	Perennials Grown around Terraces
1	rice	banana	rice	peach
2	rice	-	rice	-
3	rice	-	rice	-
4	rice	guava	rice	-
5	rice	-	rice, tomato*	-
6	rice	guava, banana, orange	rice	guava, orange
7	rice, tomato*	guava	rice	guava, pomello
8	rice, maize, chilli	guava	rice, maize	guava
9	rice	-	rice	-
10	rice	guava, mango, orange, pomello	rice	-
avg. (crop types / field)	**1.3**	**1.1**	**1.2**	**0.6**

* See footnote 5-40 for an explanation of how tomatoes are integrated into Tsiesema's wet rice terraces.

APPENDIX 6-15. Wet Rice Fields Monitored[a] over 2000-2001 Cropping Seasons: Data at Levels of Field, Household and Hectare[b]

	KHONOMA[c]	TSIESEMA[d]
DESCRIPTION OF MONITORED FIELDS		
Field Area *(m²)*		
- range	679 - 2426	1419 - 4944
- average	1149	2565
Altitude *(m asl)*		
- range	1331 - 1527	760 - 1355
- average	1427	1093
Walking Times *(min.)*[e]		
- range		
- to fields	10 - 35	12 - 100
- from fields	15 - 45	15 - 130
- average		
- to fields	20	49
- from fields	25	73
DIARY DATA		
Level of Monitored Fields:[f]		
Labor Inputs: *(hrs)*		
- wood harvest	0	0
- nursery management	25	31
- field preparation	196	251
- planting / transplanting	104	115
- plant management	71	97
- harvest	73	96
Total	468	590
Planting Materials: *(Rs)*		
- rice	82.7 (44.8%)	97.6 (94.3%)
- non-rice	101.8 (55.2%)	5.9 (5.7%)
Total	184.5	103.5
Harvested Outputs: *(Rs)*		
- rice	3233.5 (75.3%)	5024 (84.8%)
- non-rice	1059.5 (24.7%)	902.5 (15.2%)
Total	4293	5926.5
Returns to Labor *(Rs/day)*	73	85
Household Level:[g]		
Average Area of Wet Rice Cultivation / Household *(m²)*	4183	5568
Labor Inputs: *(hrs)*		
- wood harvest	0	0
- nursery management	90	67
- field preparation	712	545
- planting / transplanting	378	249
- plant management	258	211
- harvest	267	208
Total	1705	1280
Planting Materials: *(Rs)*		
- rice	301.0	211.8
- non-rice	370.6	12.8
Total	671.6	224.6

		KHONOMA [c]	**TSIESEMA** [d]
Harvested Outputs: *(Rs)*			
	- rice	11,770	10,902.1
	- non-rice	3858	1958.4
	Total	15,628	12,860.5
Productivity / Labor Input *(Rs/day)*		73	85
Per Hectare: [h]			
Labor Inputs: *(hrs)*		0	0
	- wood harvest	215	120
	- nursery management	1702	979
	- field preparation	904	447
	- planting / transplanting	617	379
	- plant management	638	374
	- harvest	4076	2299
	Total		
Planting Materials: *(Rs)*			
	- rice	720	380.4
	- non-rice	886	23.0
	Total	1606	403.4
Harvested Outputs: *(Rs)*			
	- rice	28,133	19,580.0
	- non-rice	9228	3517.2
	Total	37,361	23,097.2

[a] See maps 6-1 and 6-2 for the locations of the monitored fields within each village's territory, and appendices 6-2 and 6-3 for thumbnail maps of each village.

[b] Data derived from diaries of 10 collaborating farmers in each study village. Each farmer kept diaries of 1) labor inputs and 2) material inputs and outputs, for one of his wet rice fields. This then provided a basis for scaling up to per household and per hectare levels. See maps 6-1 and 6-2 for field locations.

[c] Main study village where alder is intensively managed in jhum fields.

[d] Compared village where alder is not managed in jhum fields.

[e] The usual position of Naga villages perched on high vantage points means that their wet rice terraces will almost always be downslope. Walking to the terraces (downhill) will therefore be faster than the return trip back to the village (uphill).

[f] Data as recorded by farmers for their monitored fields.

[g] Data derived by measuring each household's total wet rice cultivation (m^2) and then scaling up the field-level data recorded by farmers.

[h] Since the monitored fields were surveyed to determine their areas (m^2), this allowed calculation of data based on 1 hectare or 10,000 m^2.

APPENDIX 6-16. Jhum Fields Monitored[a] over 2000-2001 Cropping Seasons: Data at Levels of Field, Household and Hectare[b]

	KHONOMA[c]	**TSIESEMA**[d]
DESCRIPTION OF MONITORED FIELDS		
Field Area *(m^2)*		
- range	1248 - 2804	723 - 4029
- average	1972	2140
Altitude *(m asl)*		
- range	1462 - 1744	967 - 1453
- average	1671	1264
Walking Times *(min)*[e]		
- range		
- to fields	25 - 40	5 - 110
- from fields	20 - 35	10 - 120
- average		
- to fields	33	33
- from fields	28	45
DIARY DATA		
Level of Monitored Fields:[f]		
1st-Year Field -		
Labor Inputs: *(hrs)*		
- wood harvest	161	92
- nursery management	0	0
- field preparation	214	152
- planting / transplanting	51	54
- plant management	143	268
- harvest	93	43
Total	662	609
Planting Materials: *(Rs)*	811	421
Harvested Outputs: *(Rs)*	10,921	10,058
Harvested Outputs – Planting Materials = *(Rs)*	10,110	9637
Returns to Labor *(Rs/day)*	122	127
2nd-Year Field -		
Labor Inputs: *(hrs)*		
- wood harvest	0	0
- nursery management	0	0
- field preparation	41	32
- planting / transplanting	25	21
- plant management	58	34
- harvest	31	21
Total	155	108
Planting Materials: *(Rs)*	46	165
Harvested Outputs: *(Rs)*	809	608
Harvested Outputs – Planting Materials = *(Rs)*	763	443
Productivity / Labor Input *(Rs/day)*	39.4	32.8
Both 1st- and 2nd-Year Jhum Fields Cultivated in a Given Year -		
Combined Field Areas *(m^2)*	3944	4280
Labor Inputs: *(hrs)*		
- wood harvest	161	92
- nursery management	0	0
- field preparation	255	184

		KHONOMA [c]	**TSIESEMA** [d]
	- planting / transplanting	76	75
	- plant management	201	302
	- harvest	124	64
	Total	817	717
Planting Materials: *(Rs)*		857	586
Harvested Outputs: *(Rs)*		11,730	10,666
Harvested Outputs – Planting Materials = *(Rs)*		10,873	10,080
Productivity / Labor Input *(Rs/day)*		106.5	112.5
Per Hectare: [g]			
1st-Year Field -			
Labor Inputs: *(hrs)*			
	- wood harvest	816.4	429.9
	- nursery management	0	0
	- field preparation	1085.2	710.3
	- planting / transplanting	258.6	252.3
	- plant management	725.2	1252.3
	- harvest	471.6	200.9
	Total	3357	2845.8
Planting Materials: *(Rs)*		4112.6	1967.3
Harvested Outputs: *(Rs)*		55,380.4	47,000
Harvested Outputs – Planting Materials = *(Rs)*		51,268	45,033
2nd-Year Field -			
Labor Inputs: *(hrs)*			
	- wood harvest	0	0
	- nursery management	0	0
	- field preparation	207.9	149.5
	- planting / transplanting	126.8	98.1
	- plant management	294.1	158.9
	- harvest	157.2	98.1
	Total	786.0	504.7
Planting Materials: *(Rs)*		233.3	771.0
Harvested Outputs: *(Rs)*		4,102.4	2,841.1
Harvested Outputs – Planting Materials = *(Rs)*		3,869	2,070

[a] See maps 6-1 and 6-2 for the locations of the monitored fields within each village's territory, and appendices 6-2 and 6-3 for thumbnail maps of each village.

[b] Data derived from diaries of 10 collaborating farmers in each study village. Each farmer kept diaries of 1) labor inputs and 2) material inputs and outputs, for the jhum field that he opened for the 2000 cropping year. Each household typically opens one new jhum field for cultivation every year. This then provided a basis for scaling up to the per hectare level. See maps 6-1 and 6-2 for field locations.

[c] Main study village where alder is intensively managed in jhum fields.

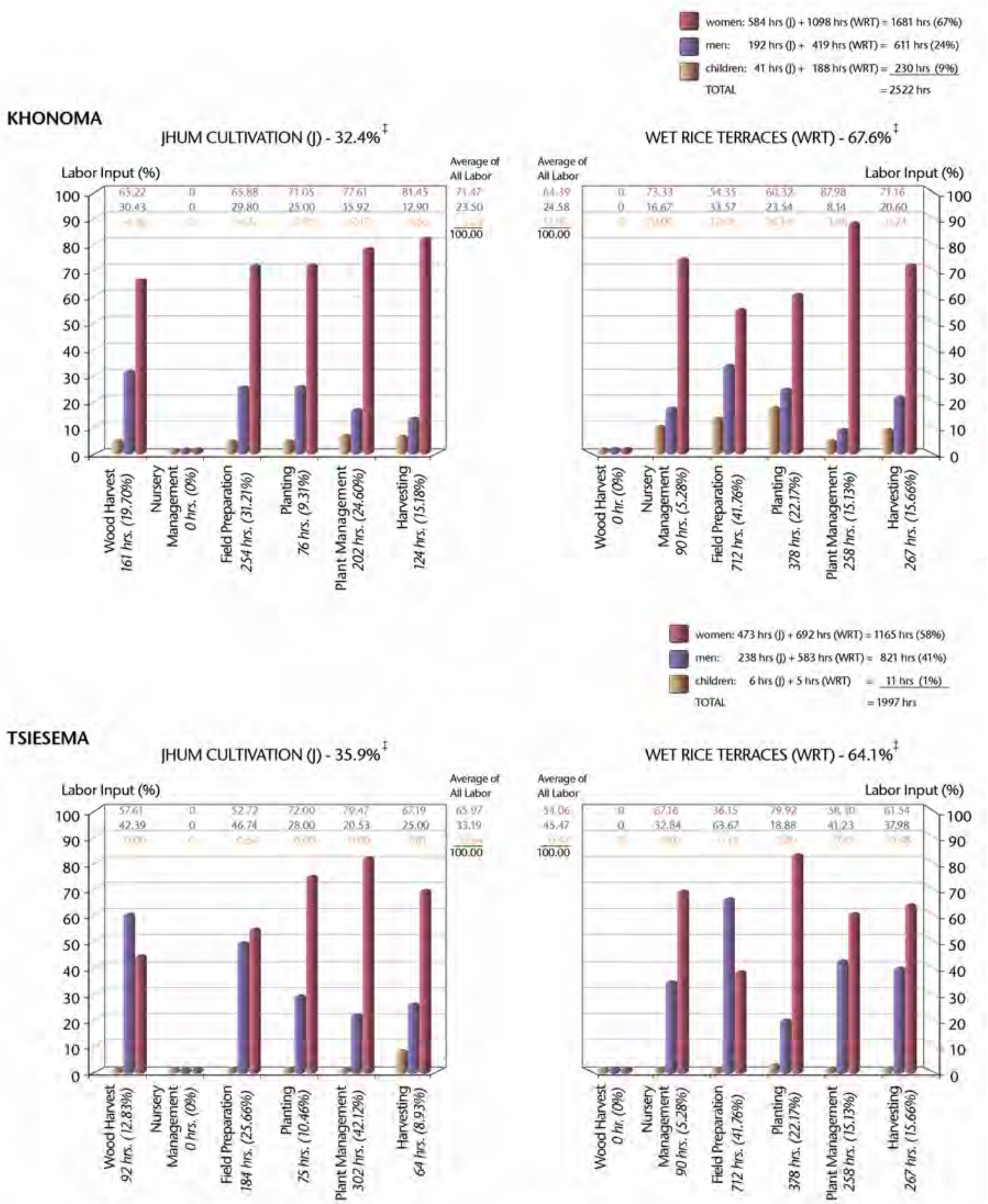
[d] Compared village where alder is not managed in jhum fields.

[e] The relative walking times to and from the jhum fields are different in the two study villages. In Khonoma, most jhum fields are upslope from the village residential area, so it takes longer to walk to the fields (uphill) than the return trip back to the village (downhill). But Tsiesema village is perched on the highest ridge of its territory so all its agricultural fields are downhill. Walking times to its fields (downhill) will therefore always be shorter than the return trip (uphill). The data in appendix 6-4 bears this out.

[f] Data as recorded by farmers for their monitored fields.

[g] Since the monitored fields were surveyed to determine their areas (m^2), this allowed calculation of data based on 1 hectare or 10,000 m^2.

APPENDIX 6-17. Division of Agricultural Labor between Men, Women and Children * Analyzed Separately by Each Category of Field Operation † (as % of total annual labor)

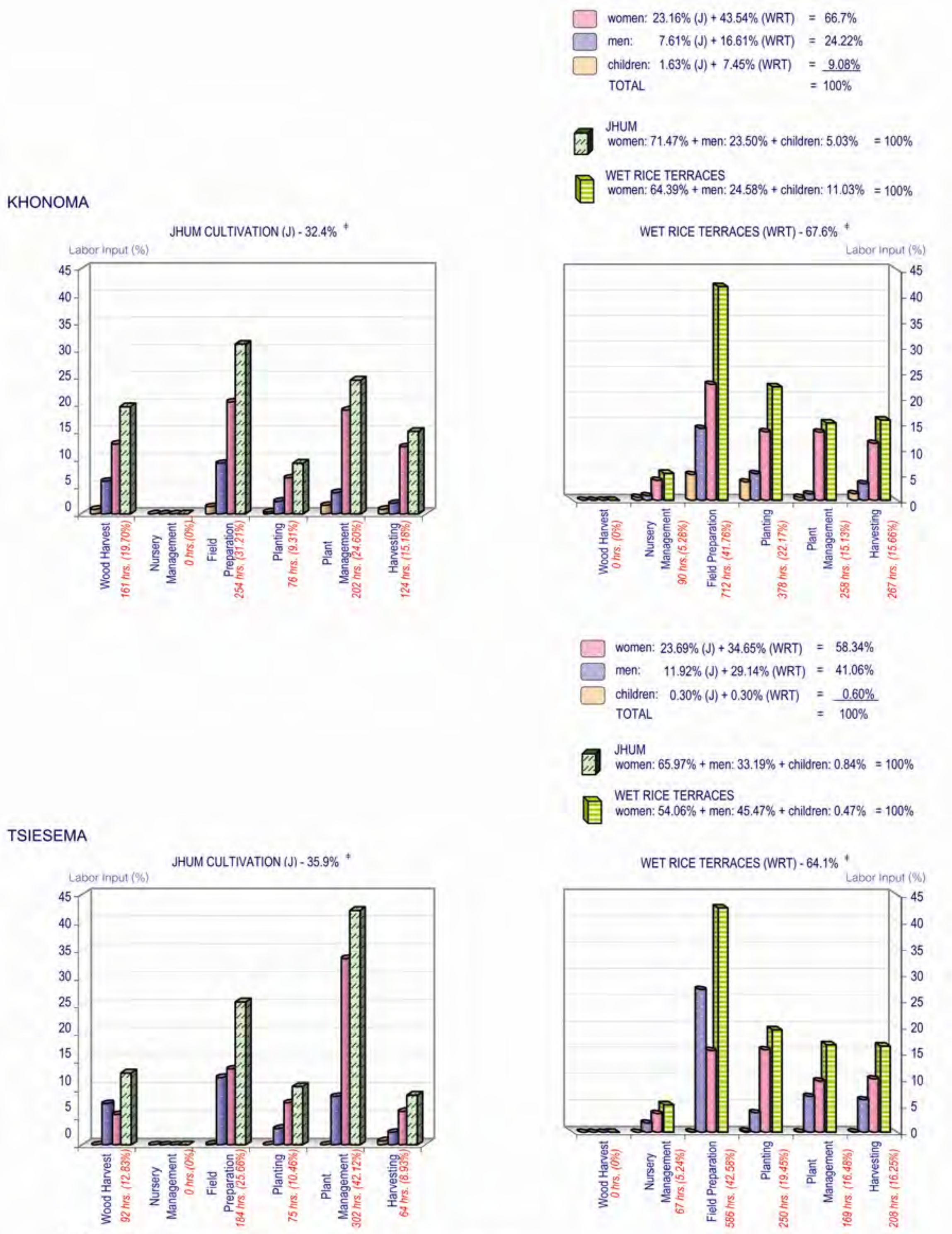


* < 15 years of age

† based on labor diaries maintained by ten households in each study village over 2000-2001

‡ percent of total labor invested in jhum + wet rice terrace cultivation

APPENDIX 6-18. Division of Agricultural Labor between Men, Women and Children * Analyzed by Category of Field Operation † (as % of total annual labor)



* < 15 years of age

† based on labor diaries maintained by ten households in each study village over 2000-2001

‡ percent of total labor invested in jhum + wet rice terrace cultivation

APPENDIX 6-19. Number of Khodi[a] of Rice Harvested for Every 1 Khodi[a] of Seed Planted, as Reported by Tsiesema Farmers[b]

		Non-glutinous	**Glutinous**[c]
		(khodi[a])	*(khodi[a])*
Wet Rice Terraces			
	poor crop	20-21	15
	average crop	25	20
	good crop	30	23-24
Jhum[d]			
	poor crop	10	-
	average crop	30-40	-
	good crop	50	-

[a] 1 khodi = 24 kg of threshed rice (see appendix 5)

[b] Data derived from interviews with Tsiesema farmers.

[c] Glutinous rice is planted only in wet rice terraces, and not in the jhum fields.

[d] There is much more variation in rice yields from jhum fields (up to 60% variation in wet rice terraces: 500% in jhum fields). The best yields of dryland rice come from the lower area of the village's territory where warmer temperatures provide the best conditions for rice. Higher fields around the village residential area would likely achieve yields of 25-30 khodi for every 1 planted.

APPENDIX 6-20. Series of Four Tables (a-d) that Establish Ratio of Seeds Planted to Yield Harvested in Wet Rice Terraces and Jhum Fields of Both Study Villages

APPENDIX 6-20a. Calculation of Yield Returns to Seeds Planted: Based on All Ponded Fields Owned by the 10 Farmers in Khonoma that Collaborated in the Research [a]

FARMER No. [d]	**SIZE OF OWNED WET RICE PLOTS** [b] (*tins of paddy planted : tins of paddy harvested* [c])											
	MONITORED FIELD [e] (2000-2001)		**ADDITIONAL FIELDS** [f]									
	Planted : Harvested	**RATIO** (*1 : ___*)	**1)**	**2)**	**3)**	**4)**	**5)**	**6)**	**7)**	**8)**	**9)**	**TOTAL**
1	0.8 : 40	1 : 52	0.77 : 39	0.85 : 40	0.92 : 50	0.4 : 20						
2	1.2 : 60	1 : 52	0.38 : 20									
3	2 : 60	1 : 30										
4	1 : 40	1 : 40	1.5 : 75	0.62 : 35	0.38 : 18							
5	0.7 : 80	1 : 116	0.5 : 60	0.38 : 20								
6	2 : 120	1 : 60	1 : 40	0.5 : 30	1 : 55	1 : 40						
7	0.4 : 30	1 : 79	0.23 : 13	0.5 : 40	0.15 : 9	0.5 : 35						
8	1.5 : 60	1 : 40	0.77 : 30	1 : 40								
9	0.5 : 30	1 : 60	0.5 : 30	0.5 : 36	0.50 : 34	0.5 : 35	1 : 46	1 : 35	0.5 : 29	0.23 : 10		
10	1 : 28	1 : 28	1.5 : 32	0.31 : 8	0.50 : 15	1 : 30	1 : 32	0.5 : 20				
TOTAL	11 : 548	1 : 50	7.15 : 339	4.66 : 249	3.5 : 181	3.38 : 160	2 : 78	1.5 : 55	0.5 : 29	0.2 : 10		34 : 1649
AVERAGE YIELD	**1 : 50**	**1 : 49**	**1 : 47.4**	**1 : 53.4**	**1 : 52.5**	**1 : 47.3**	**1 : 39.0**	**1 : 36.7**	**1 : 58**	**1 : 43**		**1 : 49**

[a] These seeding rates and yields were reported by the collaborating farmers and based on the assumption that the terraces would all be flooded and planted solely to wet rice. Cross-reference with appendix 6-12 for the area and altitude of these wet rice terraces.

[b] paddy = with husks (lighter by volume)
rice = without husks

[c] paddy: 1 tin = 13 kg. (see appendix 5-8)

[d] Data gathered during farmer interviews. Refer to appendix 6-1a for details on the farmer collaborators cultivating these fields.

[e] See appendix 6-2 for thumbnail maps of the monitored fields.

[f] See appendix 6-12 for thumbnail maps and details of the additional wet rice terraces, beyond the monitored sample fields.

CONCLUSION: AVERAGE RETURN OF 49 TINS OF PADDY HARVESTED FOR EVERY 1 TIN PLANTED.

APPENDIX 6-20b. Calculation of Yield Returns to Seeds Planted: Based on Total Jhum Holdings of the 10 Farmers in Khonoma that Collaborated in the Research[a]

FARMER No.	SIZE OF OWNED JHUM PLOTS (*lieherü of Job's tears planted : lieherü of Job's tears harvested*[b])											
	MONITORED FIELDS[c] (2000-2001)		**ADDITIONAL FIELDS**[d]									
	Planted : Harvested	**Ratio** *(1 : ---)*	**1)**	**2)**	**3)**	**4)**	**5)**	**6)**	**7)**	**8)**	**9)**	**TOTAL**
1	1 : 90	1 : 90	1.5 : 140	1.5 : 140	2 : 180	1.5 : 140	1 : 90					
2	1 : 90	1 : 90	1.5 : 120									
3	2 : 120	1 : 60	0.5 : 60	1 : 90	1 : 100							
4	1.5 : 90	1 : 60	2 : 100									
5	0.5 : 90	1 : 180	0.5 : 90	1.5 : 130	1 : 120	1.5 : 150	1 : 90	1.5 : 140				
6	0.5 : 60	1 : 120	0.5 : 90	0.5 : 90	1.5 : 120	0.5 : 20	0.5 : 30	2 : 200	1 : 120	1 : 120	0.5 : 75	
7	0.5 : 30	1 : 60	1 : 60	0.5 : 30	1 : 60	0.21 : 15						
8	0.5 : 45	1 : 90	1 : 90									
9	0.5 : 70	1 : 140	0.5 : 60	1 : 80	1.5 : 100							
10	1 : 56	1 : 56	1 : 75	1 : 75	1 : 66	0.5 : 48	1 : 75	1 : 81	1 : 60			
TOTAL	9 : 741	1 : 82	10 : 885	7 : 635	9 : 746	4.21 : 373	3.5 : 285	4.5 : 421	2 : 180	1 : 120	0.5 : 75	50.71 : 4461
AVERAGE YIELD	**1 : 82.3**	**1 : 88**	**1 : 88.5**	**1 : 90.7**	**1 : 82.9**	**1 : 88.6**	**1 : 81.4**	**1 : 93.6**	**1 : 90**	**1 : 120**	**1 : 150**	**1 : 88.0**

[a] These seeding rates and yields were reported by the collaborating farmers and based on the assumption that Job's tears would be planted almost as a pure crop, as had been the practice in the not-too-distant past. Cross-reference with appendix 6-1c for further details on these jhum plots.

[b] Job's tears: 1 lieherü = 1 tin = 7 kg. unthreshed (see appendix 5-8)

[c] See appendix 6-2 for thumbnail maps of the monitored fields.

[d] See appendix 6-12 for thumbnail maps and details of the additional wet rice terraces, beyond the monitored sample fields.

CONCLUSION: AVERAGE RETURN OF 88 LIEHERÜ OF JOB'S TEARS HARVESTED FOR EVERY 1 LIEHERÜ PLANTED.

APPENDIX 6-20c. Calculation of Yield Returns to Seeds Planted: Based on All Ponded Fields Owned by the 10 Farmers in Tsiesema that Collaborated in the Research[a]

FARMER No.	SIZE OF OWNED WET RICE PLOTS[b] (bundles of paddy planted : sacks of paddy harvested[c])											
	MONITORED FIELD[d] (2000-2001)		ADDITIONAL FIELDS[e]									
	Planted : Harvested	Ratio (— bundles : 1 sack)	1)	2)	3)	4)	5)	6)	7)	8)	9)	TOTAL
1	70 : 15	4.7 :1	40 : 8	70 : 10	20 : 6	10 : 2	10 : 1					
2	130 : 20	6.5 : 1	80 : 20									
3	80 : 15	5.3 : 1	20 : 3	10 : 3								
4	200 : 25	8 : 1	40 : 10	45 : 12	20 : 3							
5	30 : 8	3.8 : 1	50 : 11	20 : 6								
6	40 : 8	5 : 1	50 : 15	20 : 9								
7	60 : 17	3.5 : 1										
8	30 : 10	3 : 1	25 : 5									
9	90 : 10	9 : 1	30 : 4	10 : 2								
10	50 : 12	4.2 : 1	20 : 6	50 : 8								
TOTAL	780 : 140	53 : 10	355 : 82	225 : 50	40 : 9	10 : 2	10 : 1					1420 : 284
AVERAGE YIELD	**5.6 : 1**	**5.3 : 1**	**4.3 : 1**	**4.5 : 1**	**4.4 : 1**	**5 : 1**	**10 : 1**					**5 bundles : 1 sack**

[a] These seeding rates and yields were reported by the collaborating farmers and based on the assumption that the terraces would all be flooded and planted solely to wet rice. Cross-reference with appendix 6-13 for the area and altitude of these wet rice terraces.

[b] paddy = with husks (lighter by volume)
rice = without husks

[c] paddy: 1 sack (80 kg) = 5 tins; 1 tin = 16 kg. (see appendix 5-8)

[d] See appendix 6-2 for thumbnail maps of the monitored fields.

[e] See appendix 6-12 for thumbnail maps and details of the additional wet rice terraces, beyond the monitored sample fields.

CONCLUSION: AVERAGE RETURN OF 16 KGS. (1 TIN) OF PADDY HARVESTED FOR EVERY 1 BUNDLE OF SEEDLINGS TRANSPLANTED.

APPENDIX 6-20d. Calculation of Yield Returns to Seeds Planted: Based on Total Jhum Holdings of the 10 Farmers in Tsiesema that Collaborated in the Research[a]

FARMER No.	**SIZE OF OWNED JHUM PLOTS**[b] *(tins[c] of paddy[d] planted : sacks[c] of paddy[d] harvested)*											
	MONITORED FIELD[e] (2000-2001)		**ADDITIONAL FIELDS**[f]									
	Planted *(tins[c])* : **Harvested** *(sacks[c])*	**Ratio** *(1 tin[c] : ---sacks[c])*	**1)**	**2)**	**3)**	**4)**	**5)**	**6)**	**7)**	**8)**	**9)**	**TOTAL**
1	1.19 : 3	1 : 2.5										
2	0.25 : 1	1 : 4	2 : 10									
3	0.50 : 1	1 : 2										
4	0.50 : 2	1 : 4	4 : 20	3 : 14	3 : 15	2 : 8						
5	1 : 5	1 : 5										
6	2 : 8	1 : 4	3 : 15	2 : 8	2 : 7							
7	2 : 8	1 : 4	5 : 35	3 : 18	4 : 20							
8	1 : 5	1 : 5	1.5 : 10									
9	0.50 : 3	1 : 6	1 : 7	1 : 5	0.5 : 3							
10	0.25 : 1	1 : 4										
TOTAL	9.2 : 37	10 : 40.5	17 : 97	9 : 45	9.5 : 45	2 : 8						46.7 : 232
converted to kg	147.2 : 2960	16 : 322	264 : 7760	144 : 3600	152 : 3600	32 : 640						739.2 : 18,560
tins planted : sacks harvested		1 : 4.05	1 : 5.9	1 : 5	1 : 4.7	1 : 4						1 : 5
ratio of kg planted : kg harvested	**1 : 20**		**1 : 29**	**1 : 25**	**1 : 24**	**1 : 20**						**1 : 25.1**

[a] These seeding rates and yields were reported by the collaborating farmers and based on the assumption that the jhum fields are primarily rice-based and only sprinkled with an assortment of other crops

[b] Cross-reference with appendix 6-1c for further details on these jhum plots.

[c] paddy: 1 sack (tied shut – 80 kg.) = 5 tins; 1 tin = 16 kg. (see appendix 5-8)

[d] paddy = with husks (lighter by volume)
rice = without husks

[e] See appendix 6-2 for thumbnail maps of the monitored fields.

[f] See appendix 6-12 for thumbnail maps and details of the additional wet rice terraces, beyond the monitored sample fields.

CONCLUSION: AVERAGE RETURN OF 25 KGS. OF PADDY HARVESTED FOR EVERY 1 KG. PLANTED.

APPENDIX 6-21. Series of Two Tables (a-b) that Use Farmers' Reported Planting Rates in Monitored Fields to Convert to a Per Hectare Basis

APPENDIX 6-21a. Calculation of Farmers' Planting Rates and Costs in the Monitored Irrigated Terraces if Planted Exclusively to Wet Rice, as Normal Practice

FARMER No.	**Field Area** [a] *(measured)*	**Seeds / Seedlings Planted** [b] *(estimated)*	**Converted to Kilograms** [c] *(calculated)*	**Planting Rates** *(calculated)*
KHONOMA – Paddy				
	(m^2)	*(tins)*	*(x 13 kg/tin)*	*(kg/ha)*
1	867.48	0.8	10.4	119.89
2	1004.86	1.2	15.6	155.24
3	1054.48	2	26	246.57
4	679.71	1	13	191.26
5	1099.14	0.7	9.1	82.79
6	2426.16	2	26	107.17
7	717.24	0.4	5.2	72.50
8	1452.39	1.5	19.5	134.26
9	832.03	0.5	6.5	78.12
10	1359.27	1	13	95.64
TOTAL	**11492.76**	**11**	**144.3**	**1,283.44**
AVERAGE	**1149.28**	**1.1**	**14.43**	**128.34**
VALUE OF PLANTING MATERIALS [d]**: Rs 4.62/kg x 128.34 kg/ha = Rs 593/ha**				
TSIESEMA – Paddy				
	(m^2)	*(bundles)* [e]		*(bundles/ha)*
1	1999.96	70		350.01
2	4944.10	130		262.94
3	2360.49	80		338.91
4	4653.39	200		429.79
5	1695.26	30		176.96
6	1432.96	40		279.14
7	2714.49	60		221.04
8	2548.68	30		117.71
9	1879.01	90		478.98
10	1419	50		352.36
TOTAL	**25647.32**	**780**		**3,007.84**
AVERAGE	**2564.73**	**78.0**		**300.78**
VALUE OF PLANTING MATERIALS [d]**: Rs xxx/bundle x 300.78 bundles/ha = Rs xxx/ha**				

[a] Measured during fieldwork; appendices 6-2 and 6-3.

[b] Reported by farmers, based on the assumption that the irrigated terraces are planted exclusively with wet rice.

[c] See appendix 5-8 for local system of weights and measurements:
paddy units in Khonoma: 1 tin = 13 kg. unthreshed
paddy units in Tsiesema: 1 sack (tied shut - 80 kg.) = 5 tins; 1 tin = 16 kg.

[d] See appendix 6-7 for farmers' reported value of crops grown:
paddy (nonglutinous) in Khonoma: Rs 60/tin = Rs 4.62/kg.
paddy (nonglutinous) in Tsiesema = Rs 65/tin = Rs 4.06/kg.

[e] Glutinous rice varieties generally tiller less and so seedlings are planted closer together. This higher planting density thus requires more bundles of seedlings to plant a given area, compared to nonglutinous varieties.

CONCLUSIONS: IN KHONOMA, TO PRODUCE ENOUGH RICE SEEDLINGS TO TRANSPLANT 1 HA. OF TERRACES, 128 KGS. OF SEED MUST BE BROADCAST IN THE NURSERY. THIS IS AN INVESTMENT OF ABOUT RS 593/HA. TSIESEMA MEASURES ITS TERRACES IN TERMS OF THE NUMBER OF BUNDLES OF RICE SEEDLINGS NEEDED TO TRANSPLANT THE AREA. SEEDLINGS ARE TRANSPLANTED AT A DENSITY OF ROUGHLY 301 BUNDLES/HA.

APPENDIX 6-21b. Calculation of Planting Rates and Costs in the Monitored Jhum Fields if Planted Almost Exclusively to a Cereal Staple, as Had Been Traditional Practice

FARMER No.	**Field Area** [a] *(measured)*	**Seeds Planted** [b] *(estimated)*	**Converted to Kilograms** [c] *(calculated)*	**Planting Rates** *(calculated)*
KHONOMA – Job's tears				
	(m^2)	*(lieherü)*	*(x 7 kg/lieherü)*	*(kg/ha)*
1	2340.21	1	7	29.91
2	1934.47	1	7	36.19
3	2803.92	2	14	49.93
4	2137.05	1.5	10.5	49.13
5	1714.60	0.5	3.5	20.41
6	1433.19	0.5	3.5	24.42
7	1247.63	0.5	3.5	28.05
8	2009.31	0.5	3.5	17.42
9	2002.44	0.5	3.5	17.48
10	2098.88	1	7	33.35
TOTAL	**19721.7**	**9**	**63**	**306.30**
AVERAGE	**1972.17**	**0.9**	**6.3**	**30.63**
VALUE OF PLANTING MATERIALS [d]**: Rs 2.86/kg x 30.63 kg/ha = Rs 87.60/ha**				
TSIESEMA – Paddy				
	(m^2)	*(tins* or *cienyü)*	*(x 16 kg/tin)*	*(kg/ha)*
1	1772.43	1.19	19.04	107.42
2	722.93	0.25	4	55.33
3	1210.88	0.50	8	66.07
4	2082.22	0.50	8	38.42
5	3004.14	1	16	53.26
6	3742.36	2	32	85.51
7	4028.96	2	32	79.42
8	1737.26	1	16	92.10
9	1845.46	0.50	8	43.35
10	1254.01	0.25	4	31.90
TOTAL	**21400.63**	**9.19**	**147.04**	**652.78**
AVERAGE	**2140.06**	**0.919**	**14.70**	**65.28**
VALUE OF PLANTING MATERIALS [d]**: Rs 4.06/kg x 65.28 kg/ha = Rs 265/ha**				

[a] Measured during fieldwork; see appendices 6-2 and 6-3.

[b] Reported by farmers, based on the assumption that the jhum fields are planted primarily with the staple crop and only sprinkled with an assortment of other crops.

[c] See appendix 5-8 for local system of weights and measurements:
Job's tears: 1 lieherü = 7 kg. unthreshed
paddy: 1 sack (tied shut - 80 kg.) = 5 tins; 1 tin = 16 kg.

[d] See appendix 6-7 for farmers' reported value of crops grown:
Job's tears: Rs 20/lieherü = Rs 2.86/kg.
paddy (nonglutinous) = Rs 65/tin = Rs 4.06/kg.

CONCLUSIONS: JOB'S TEARS ARE SEEDED IN KHONOMA JHUM FIELDS AT A RATE OF ROUGHLY 31 KG/HA, AND PADDY AT A RATE OF 65 KG/HA IN TSIESEMA JHUMS. THE COST OF PLANTING MATERIALS IS THUS RESPECITVELY ABOUT RS 88/HA AND RS 265/HA.

APPENDIX 6-22. Series of Two Tables (a-b) that Use Farmers' Reported Yields from Monitored Fields to Convert to a Per Hectare Basis

APPENDIX 6-22a. *Calculation of Farmers' Expected Yields/Ha from the Monitored Irrigated Terraces if Planted Exclusively to Wet Rice, as Normal Practice*

FARMER No.	**Field Area** [a] *(measured)*	**Normal Harvest** [b] *(estimated)*	**Converted to Kilograms** [c] *(calculated)*	**Yields** *(calculated)*
KHONOMA – Paddy				
	(m²)	*(tins)*	*(x 13 kg/tin)*	*(kg/ha)*
1	867.48	40	520	5,994.40
2	1004.86	60	780	7,762.24
3	1054.48	60	780	7,397.04
4	679.71	40	520	7,650.37
5	1099.14	80	1040	9,461.93
6	2426.16	120	1560	6,429.90
7	717.24	30	390	5,437.49
8	1452.39	60	780	5,370.47
9	832.03	30	390	4,687.33
10	1359.27	28	364	2,677.91
TOTAL	**11492.76**	**548**	**7124**	**62,869.08**
AVERAGE	**1149.28**	**54.8**	**712.4**	**6,286.90** [e]
MARKET VALUE [d]**: Rs 4.62/kg x 6,286.9 kg/ha = Rs 29,045/ha**				
TSIESEMA – Paddy				
	(m²)	*(sacks)*	*(x 80 kg/sack)*	*(kg/ha)*
1	1999.96	15	1200	6,000.13
2	4944.10	20	1600	3,236.18
3	2360.49	15	1200	5,083.70
4	4653.39	25	2000	4,297.94
5	1695.26	8	640	3,775.24
6	1432.96	8	640	4,466.28
7	2714.49	17	1360	5,010.15
8	2548.68	10	800	3,138.88
9	1879.01	10	800	4,257.57
10	1419	12	960	6,765.33
TOTAL	**25647.32**	**140**	**11200**	**46,031.40**
AVERAGE	**2564.73**	**14.0**	**1120**	**4,603.14** [e]
MARKET VALUE [d]**: Rs 4.06/kg x 4,603.14 kg/ha = Rs 18,689/ha**				

[a] Measured during fieldwork; see appendices 6-2 and 6-3.

[b] Reported by farmers, based on the assumption that the irrigated terraces are planted exclusively with wet rice.

[c] See appendix 5-8 for local system of weights and measurements:
paddy units in Khonoma: 1 tin = 13 kg. unthreshed
paddy units in Tsiesema: 1 sack (tied shut - 80 kg.) = 5 tins; 1 tin = 16 kg.

[d] See appendix 6-7 for farmers' reported value of crops grown:
paddy (nonglutinous) in Khonoma: Rs 60/tin = Rs 4.62/kg.
paddy (nonglutinous) in Tsiesema = Rs 65/tin = Rs 4.06/kg.

[e] These yield figures are for paddy, i.e., unmilled rice with husks. According to farmers, about 50% weight loss can be expected during milling.

CONCLUSIONS: FARMERS COULD EXPECT PADDY YIELDS OF ABOUT 6,287 KG/HA AND 4,603 KG/HA IN KHONOMA AND TSIESEMA RESPECTIVELY. UNDER PRICES IN EFFECT DURING THE FIELDWORK, THESE YIELDS WOULD HAVE BEEN VALUED AT RS 29,045/HA AND RS 18,689/HA, RESPECTIVELY.

APPENDIX 6-22b. *Calculation of Expected Yields/Ha in the Monitored Jhum Fields if Fields are Planted Almost Exclusively to a Cereal Staple, as Had Been Traditional Practice*

FARMER No.	**Field Area** [a] *(measured)*	**Normal Harvest** [b] *(estimated)*	**Converted to Kilograms** [c] *(calculated)*	**Yields** *(calculated)*
KHONOMA – Job's tears				
	(m^2)	*(lieherü)*	*(x 7 kg/lieherü)*	*(kg/ha)*
1	2340.21	90	630	2692.06
2	1934.47	90	630	3256.71
3	2803.92	120	840	2995.81
4	2137.05	90	630	2947.99
5	1714.60	90	630	3674.32
6	1433.19	60	420	2930.52
7	1247.63	30	210	1683.19
8	2009.31	45	315	1567.70
9	2002.44	70	490	2447.07
10	2098.88	56	392	1867.66
TOTAL	**19721.70**	**741**	**5187**	**26062.98**
AVERAGE	**1972.17**	**74.1**	**518.7**	**2606.30**
MARKET VALUE [d] **Rs 2.86/kg x 2606.30 kg/ha = Rs 7454/ha**				
TSIESEMA – Paddy				
	(m^2)	*(sacks)*	*(x 80 kg/sack)*	*(kg/ha)*
1	1772.43	3	240	1,354.07
2	722.93	1	80	1,106.60
3	1210.88	1	80	660.68
4	2082.22	2	160	768.41
5	3004.14	5	400	1,331.50
6	3742.36	8	640	1,710.15
7	4028.96	8	640	1,588.50
8	1737.26	5	400	2,302.48
9	1845.46	3	240	1,300.49
10	1254.01	1	80	637.95
TOTAL	**21400.63**	**37**	**2960**	**12,760.84**
AVERAGE	**2140.06**	**3.7**	**296**	**1,276.08** [e]
MARKET VALUE [d]**: Rs 4.06/kg x 1276.08 kg/ha = Rs 5104/ha**				

[a] Measured during fieldwork; see appendices 6-2 and 6-3.

[b] Reported by farmers, based on the assumption that the jhum fields are primarily planted with the staple crop and only sprinkled with an assortment of other crops, as was usual practice.

[c] See appendix 5-8 for local system of weights and measurements:
Job's tears: 1 lieherü = 7 kg. unthreshed
paddy: 1 sack (tied shut - 80 kg.) = 5 tins; 1 tin = 16 kg.

[d] See appendix 6-7 for farmers' reported value of crops grown:
Job's tears: Rs 20/lieherü = Rs 2.86/kg.
paddy (nonglutinous) = Rs 65/tin = Rs 4.06/kg.

[e] These yield figures are for paddy, i.e., unmilled rice with husks. According to farmers, about 50% weight loss can be expected during milling.

CONCLUSIONS: FARMERS COULD EXPECT YIELDS OF ABOUT 2606 KG/HA OF JOB'S TEARS AND 1276 KG/HA OF PADDY IN KHONOMA AND TSIESEMA RESPECTIVELY. UNDER PRICES IN EFFECT DURING THE FIELDWORK, THESE YIELDS WOULD HAVE BEEN VALUED AT RS 7454/HA AND RS 5104/HA, RESPECTIVELY.

APPENDIX 6-23. Calculating Total Jhum Holdings by Using Seeding Rates and Expected Yields as Proxies [a]

	Based on Seeding Rates			Based on Expected Yields			
FARMER No.	**Seed Required to Plant All Plots** [b]	**Seeding Rate / Land Area** [c]	**Calculated Land Area** [d]	**Yield from All Plots** [b]	**Expected Yields / Land Area** [e]	**Calculated Land Area** [d]	**Variation between Two Methods**
Column	**1)**	**2)**	**3)**	**4)**	**5)**	**6)**	**7)**
	kg.	*kg/ha*	*ha*	*kg.*	*kg/ha*	*ha*	*(Col 3÷Col 6 x 100) %*
KHONOMA – JOB'S TEARS							
1	59.5	30.63	1.94	5460	2606.30	2.09	92.73%
2	17.5		0.57	1470		0.56	101.30%
3	31.5		1.03	2590		0.99	103.49%
4	24.5		0.80	1330		0.51	156.74%
5	52.5		1.71	5670		2.18	78.79%
6	59.5		1.94	6475		2.48	78.19%
7	22.5		0.73	1365		0.52	140.26%
8	10.5		0.34	945		0.36	94.54%
9	24.5		0.80	2170		0.83	96.07%
10	52.5		1.71	3752		1.44	119.06%
TOTAL	**355**		**11.59**	**31227**		**11.98**	
AVERAGE	**35.5**		**1.16**	**3122.7**		**1.20**	**1.06**
TSIESEMA – PADDY							
1	19.04	65.28	0.29	240	1276.08	0.19	155.08%
2	36		0.55	880		0.69	79.97%
3	8		0.12	80		0.06	195.48%
4	200		3.06	4720		3.70	82.83%
5	16		0.25	400		0.31	78.19%
6	144		2.21	3040		2.38	92.59%
7	224		3.43	6480		5.08	67.57%
8	40		0.61	1200		0.94	65.16%
9	48		0.74	1440		1.13	65.16%
10	4		0.06	80		0.06	97.74%
TOTAL	**739.04**		**11.32**	**18560**		**14.54**	
AVERAGE	**73.904**		**1.13**	**1856**		**1.45**	**0.98**

[a] Only those jhum fields monitored by the study were surveyed and measured. Although possible, it would have been difficult to survey fallowed fields in which boundaries are obscured by heavy undergrowth. Villagers speak of the size of their fields in terms of the amount of seed required to plant them or the expected harvest. That is, after all, all that really matters to them. By comparing farmers' measurements with our figures for the monitored fields that we had carefully measured, it allowed us to calculate conversion factors between the two systems. This could then be applied to generate a rough estimate of the size of fallowed fields that had not been measured.

[b] Farmer estimates based on past cropping experience.

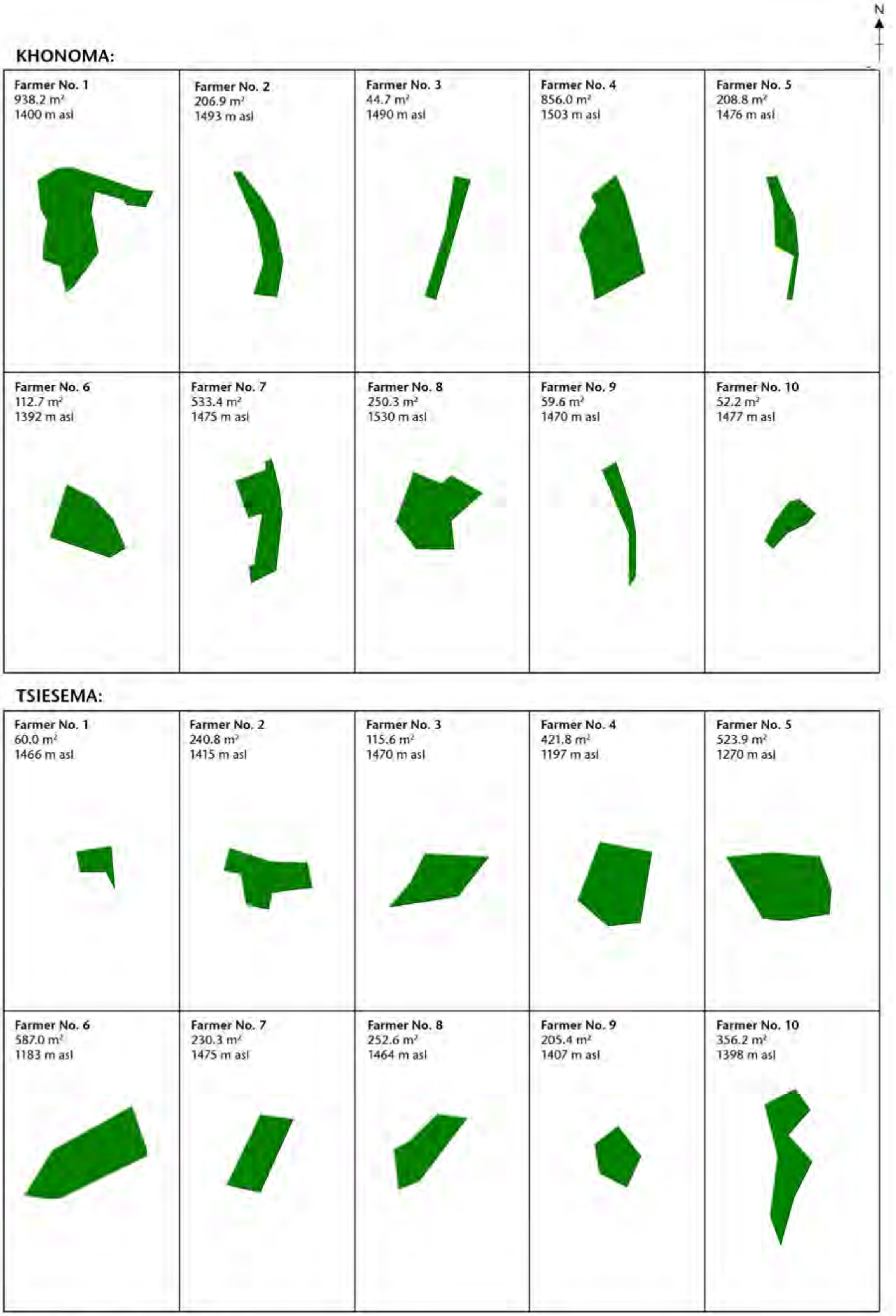
[c] Average calculated from monitored jhum fields, where farmers' reported seed usage could be applied against a known field area to generate a seeding rate per hectare.

[d] Generated from the preceding two columns.

[e] Average calculated from monitored jhum fields, where farmers' reported yields could be applied against a known field area to generate yield figures per hectare.

CONCLUSIONS: ALTHOUGH BOTH METHODS GAVE SIMILAR RESULTS, USING EXPECTED YIELDS AS A SURROGATE FOR MEASURING LAND AREA IS LIKELY TO BE MOST ACCURATE BECAUSE OF THE LARGER VOLUMES INVOLVED. IT SUGGESTS THAT THE STUDIED FARMERS IN KHONOMA EACH HAVE ABOUT 1.20 HA OF JHUM LAND, AND THOSE IN TSIESEMA ABOUT 1.45 HA.

APPENDIX 6-24. Thumbnail Maps of Permanent Gardens Cultivated by Collaborating Farmers in Study Villages *



* Cross-reference with appendix 6-1d.
Field maps are not to scale. Refer to field areas (m^2) for comparative sizes.

CHAPTER 7
CONCLUSIONS

APPENDICES

APPENDIX 7-1.

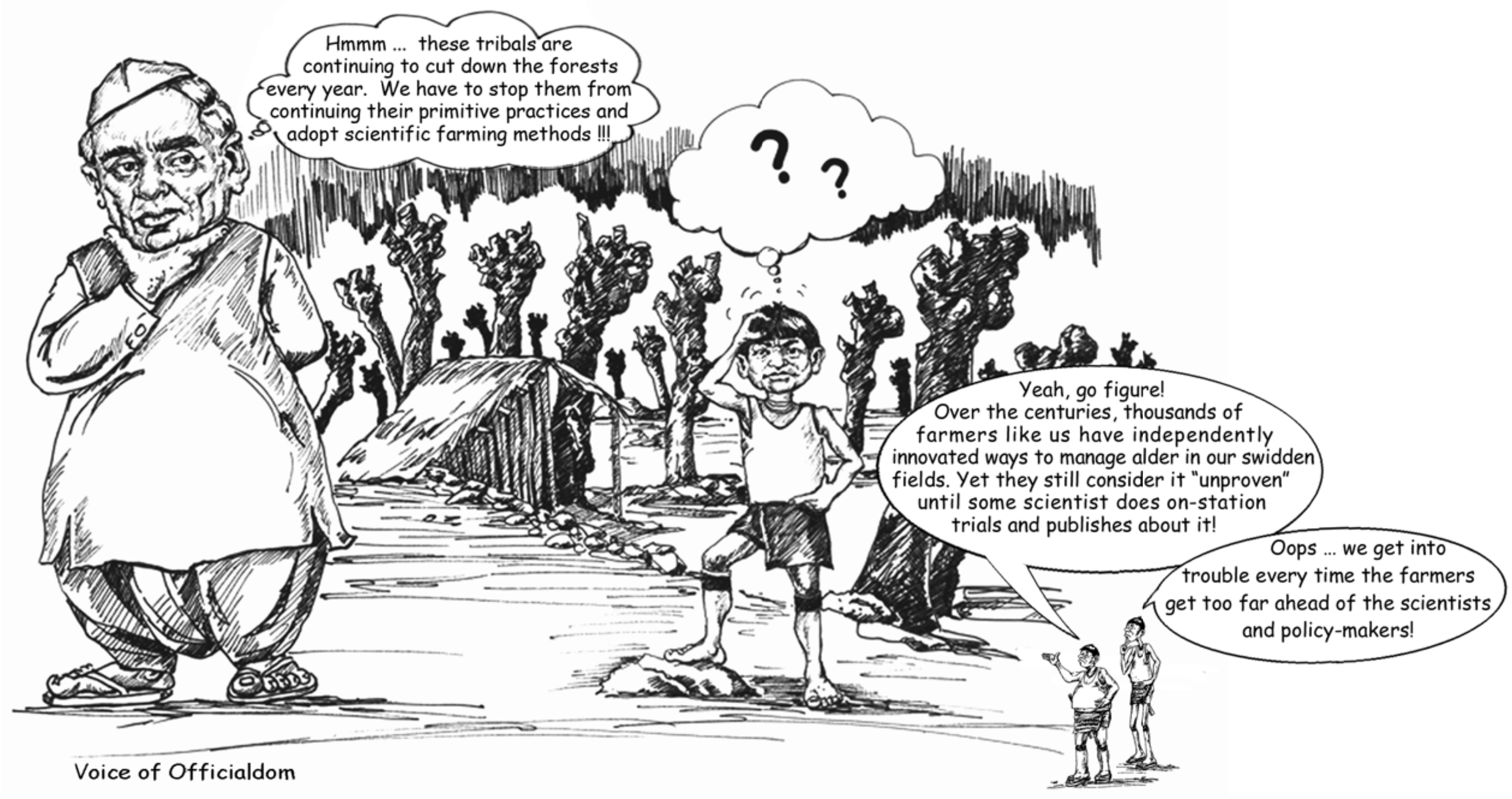
USING HUMOR TO CONCLUDE WITH SOME SERIOUS POINTS,

with enlightened commentary by our two Angami guides, Viko and Zapü

By Malcolm Cairns,
Australian National University
Artwork by Paradon Threemake,
Chiang Mai Night Bazar, Thailand

APPENDIX 7-2.

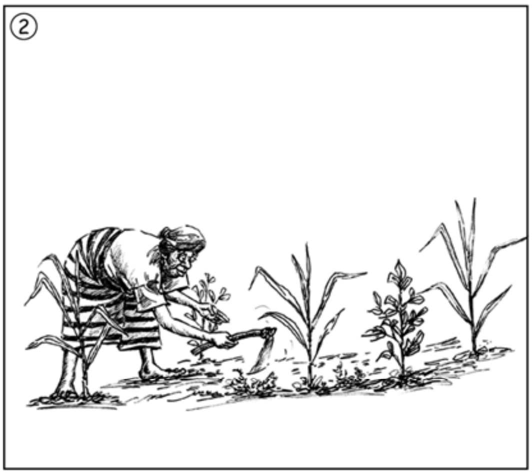
INSTEAD OF LEARNING FROM THEM, PATERNALISTIC GOVERNMENTS COMMONLY DISMISS THE VALUE OF INDIGENOUS TECHNOLOGIES.



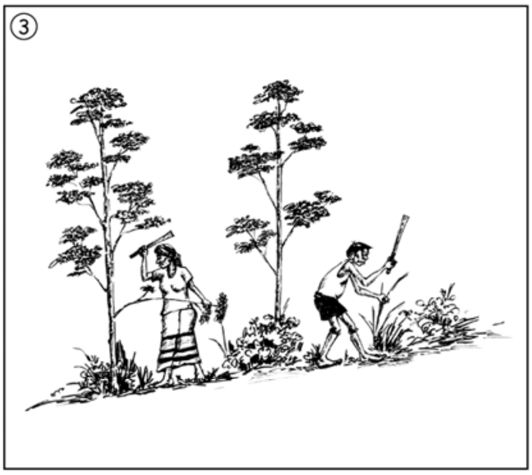
APPENDIX 7-3.

HOW NURTURING FORESTS CAN CREATE UNEXPECTED PROBLEMS FOR SHIFTING CULTIVATORS

It often begins by planting tree seedlings in agricultural fields in a "taungya" pattern.



The young trees benefit from maintenance operations directed at the crops grown with them for the first couple of years.



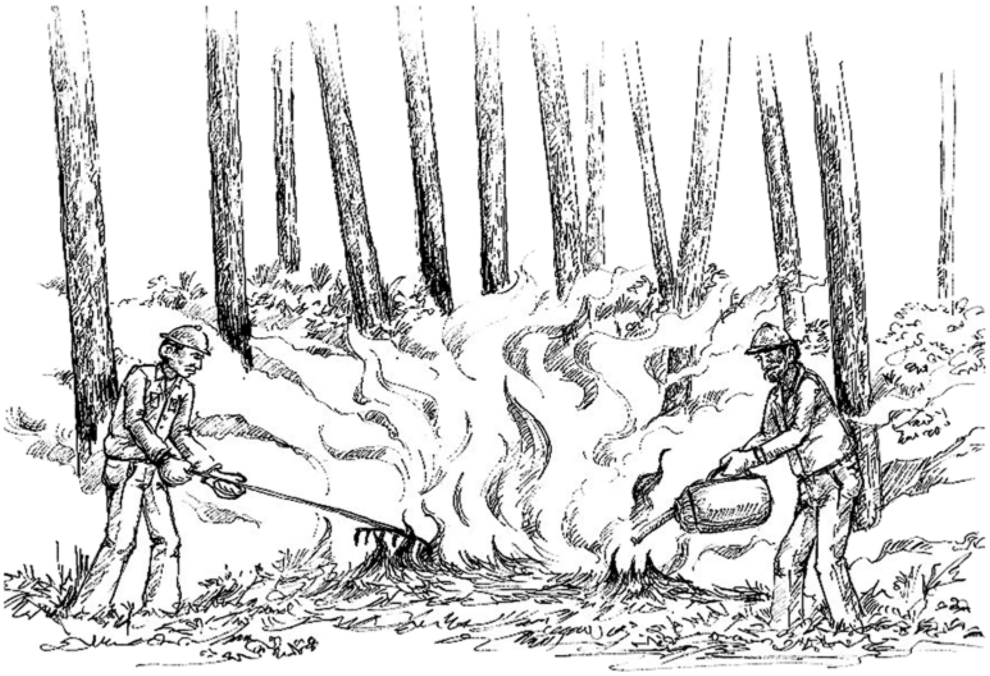
As the trees gain height, farmers prune back their lower branches and keep the weeds slashed back.

But ironically, the healthier the forests that farmers nurture, the greater the danger that the state will accuse them of being squatters in state forests and demand their eviction. The consequences of nurturing trees can thus be nothing less than tragic for shifting cultivators. Lowland farmers that permanently destroy the forests on their lands are not faced with this threat.

APPENDIX 7-4.

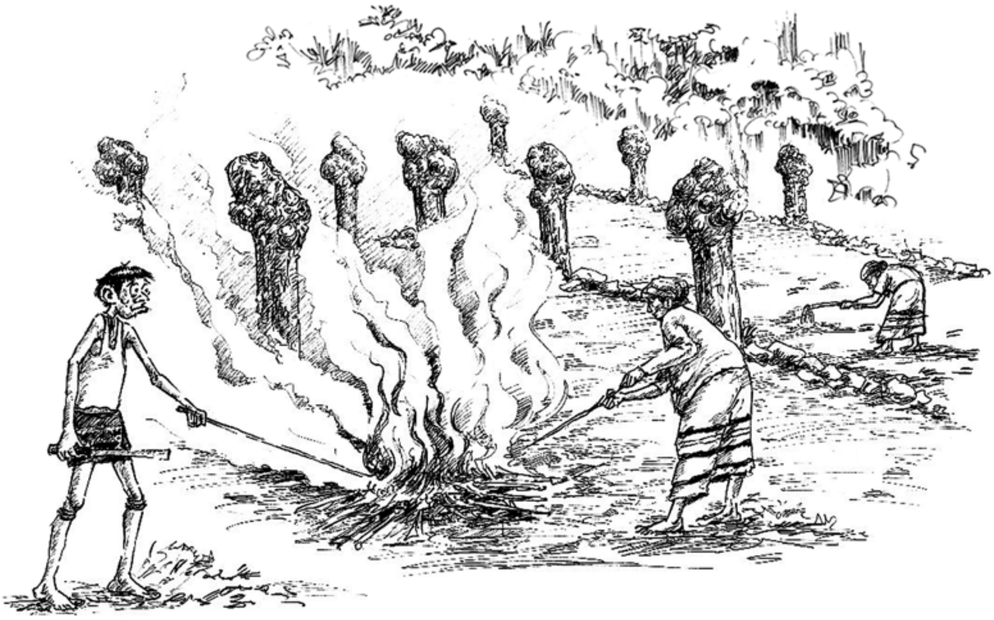
IS CONTROLLED BURNING GOOD OR BAD? DOES IT DEPEND ON WHO IS DOING IT?

THE DEPARTMENT OF FORESTRY ...



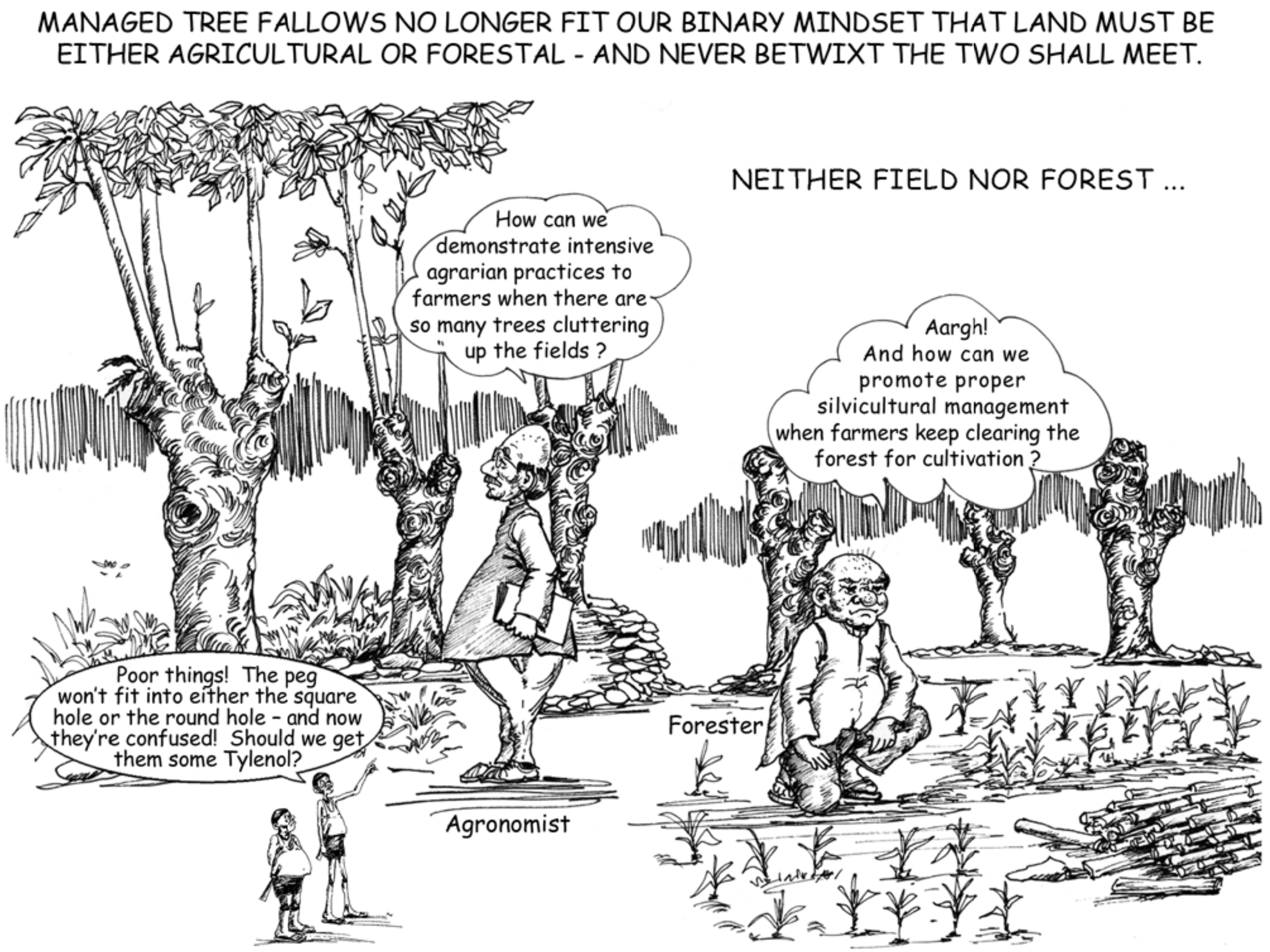
Proscribed Burning - A Recommended Silvicultural Practice?

OR SHIFTING CULTIVATORS ...



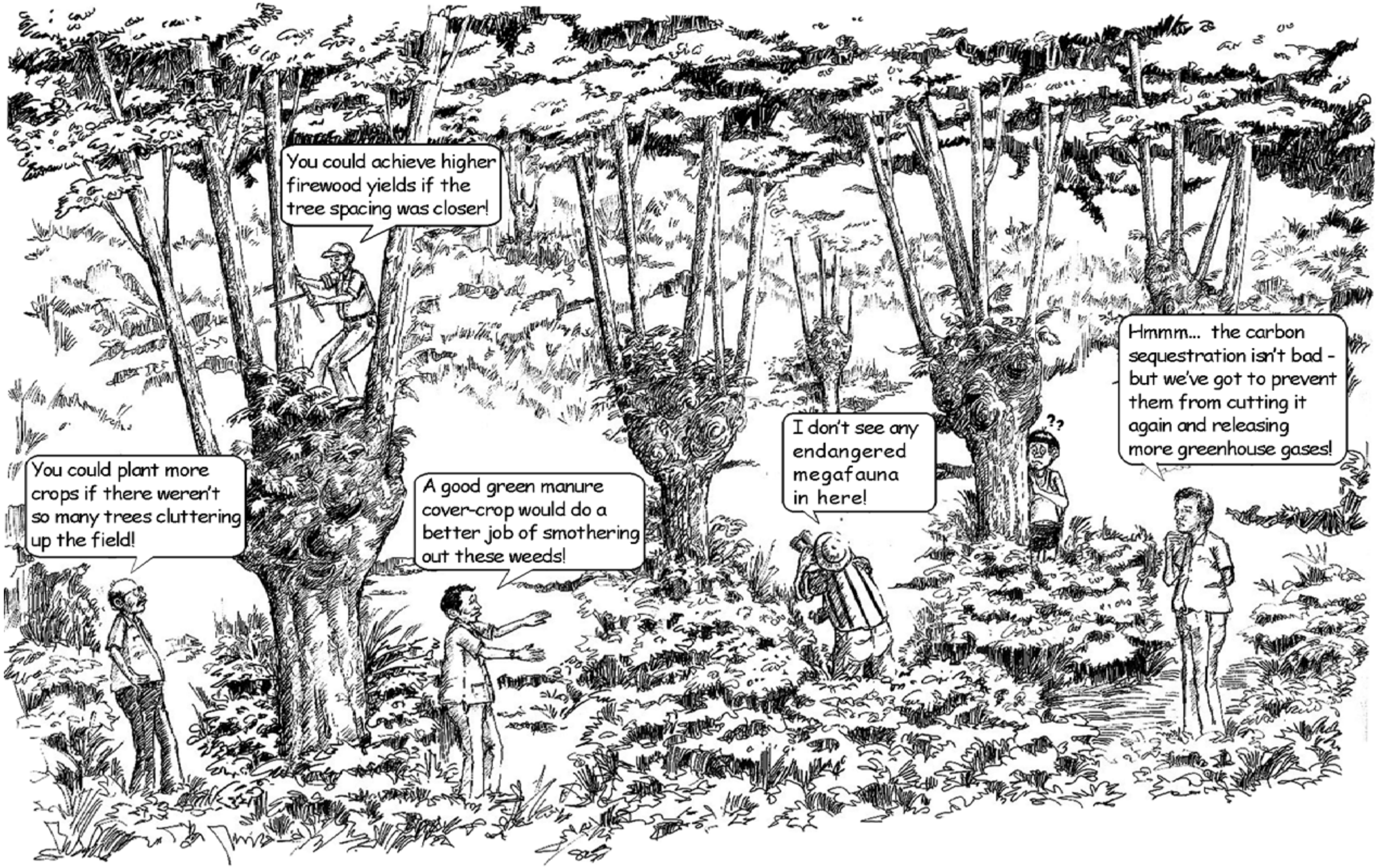
The Burning Operation of Swidden Cultivation - Environmental Destruction that Must be Stopped?!

APPENDIX 7-5.


MANAGED TREE FALLOWS NO LONGER FIT OUR BINARY MINDSET THAT LAND MUST BE EITHER AGRICULTURAL OR FORESTAL - AND NEVER BETWIXT THE TWO SHALL MEET.
NEITHER FIELD NOR FOREST ...
How can we demonstrate intensive agrarian practices to farmers when there are so many trees cluttering up the fields ?
Aargh! And how can we promote proper silvicultural management when farmers keep clearing the forest for cultivation ?
Poor things! The peg won't fit into either the square hole or the round hole - and now they're confused! Should we get them some Tylenol?
Agronomist
Forester

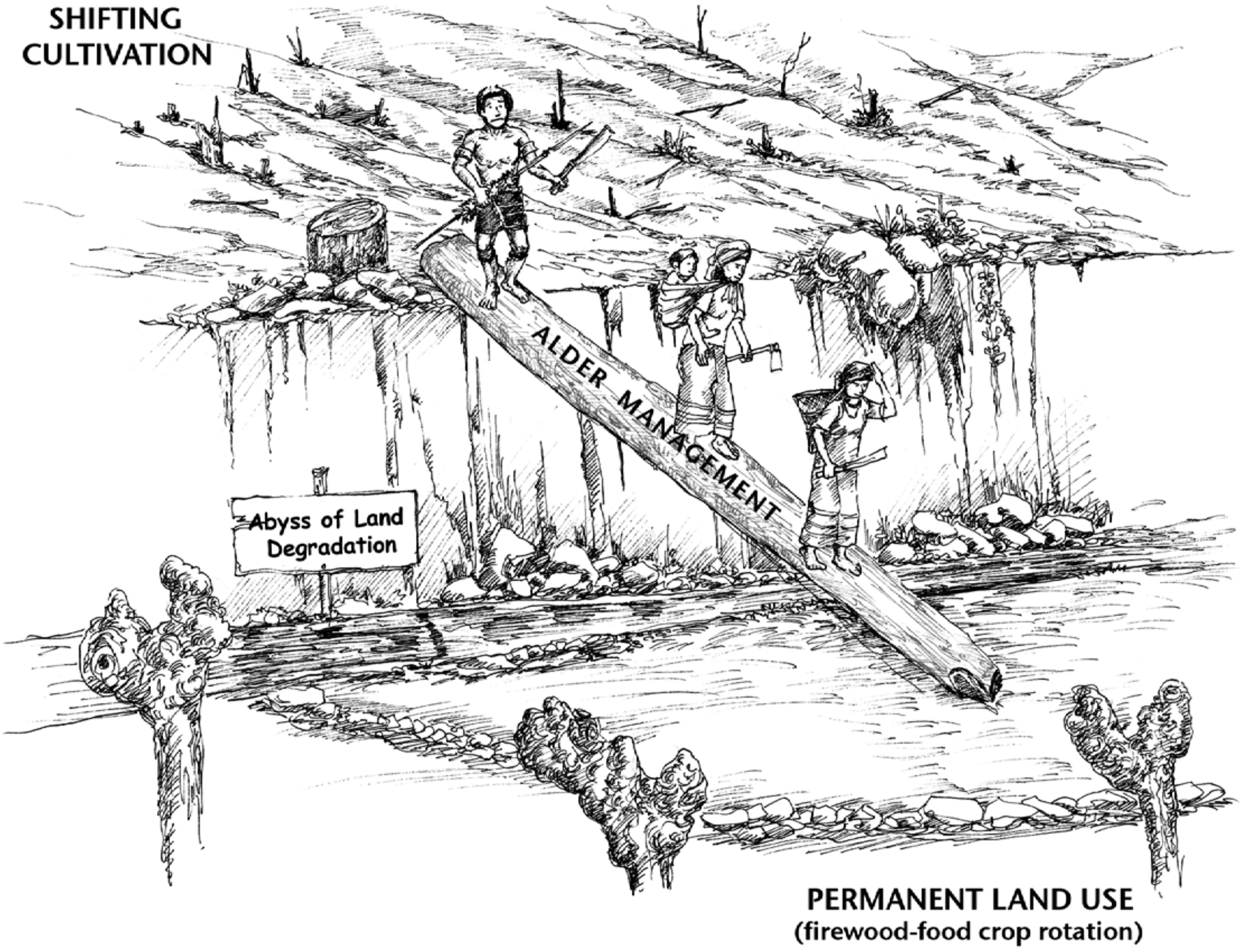
APPENDIX 7-6.

AN IMPROVED FALLOW: BY WHOSE CRITERIA?



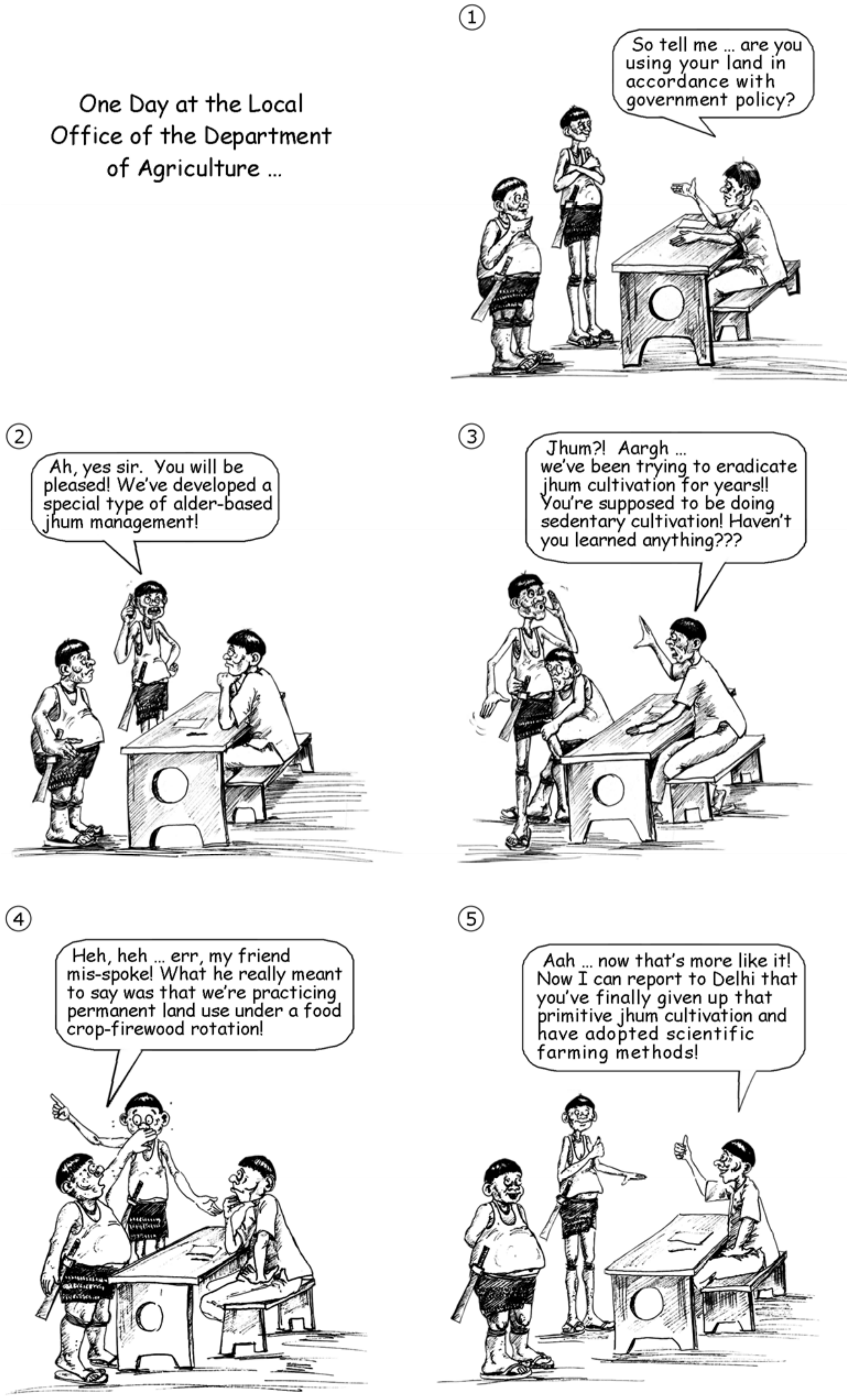
APPENDIX 7-7.

ALDER FALLOWS HAVE PLAYED A BRIDGING ROLE THAT ENABLED KHONOMA TO MOVE EFFORTLESSLY FROM SHIFTING CULTIVATION TO PERMANENT LAND USE.



APPENDIX 7-8.

THE IMPORTANCE OF SEMANTICS WHEN DEALING WITH OFFICIALDOM



APPENDIX 7-9.

KHONOMA'S HISTORICAL SHORTAGE OF AGRICULTURAL LAND SPARKED INNOVATIONS IN INCORPORATING SOIL-BUILDING TREES INTO THEIR FARMSCAPES - USING *ALNUS NEPALENSIS* IN DRYLAND FIELDS AND *ALBIZIA STIPULATA* IN WET RICE TERRACES.

APPENDIX 7-10.

WHAT HAPPENS WHEN "FLY-IN EXPERTS" PEDDLE THEIR FAVORITE TECHNOLOGIES WITHOUT UNDERSTANDING THE LOCAL SITUATION?

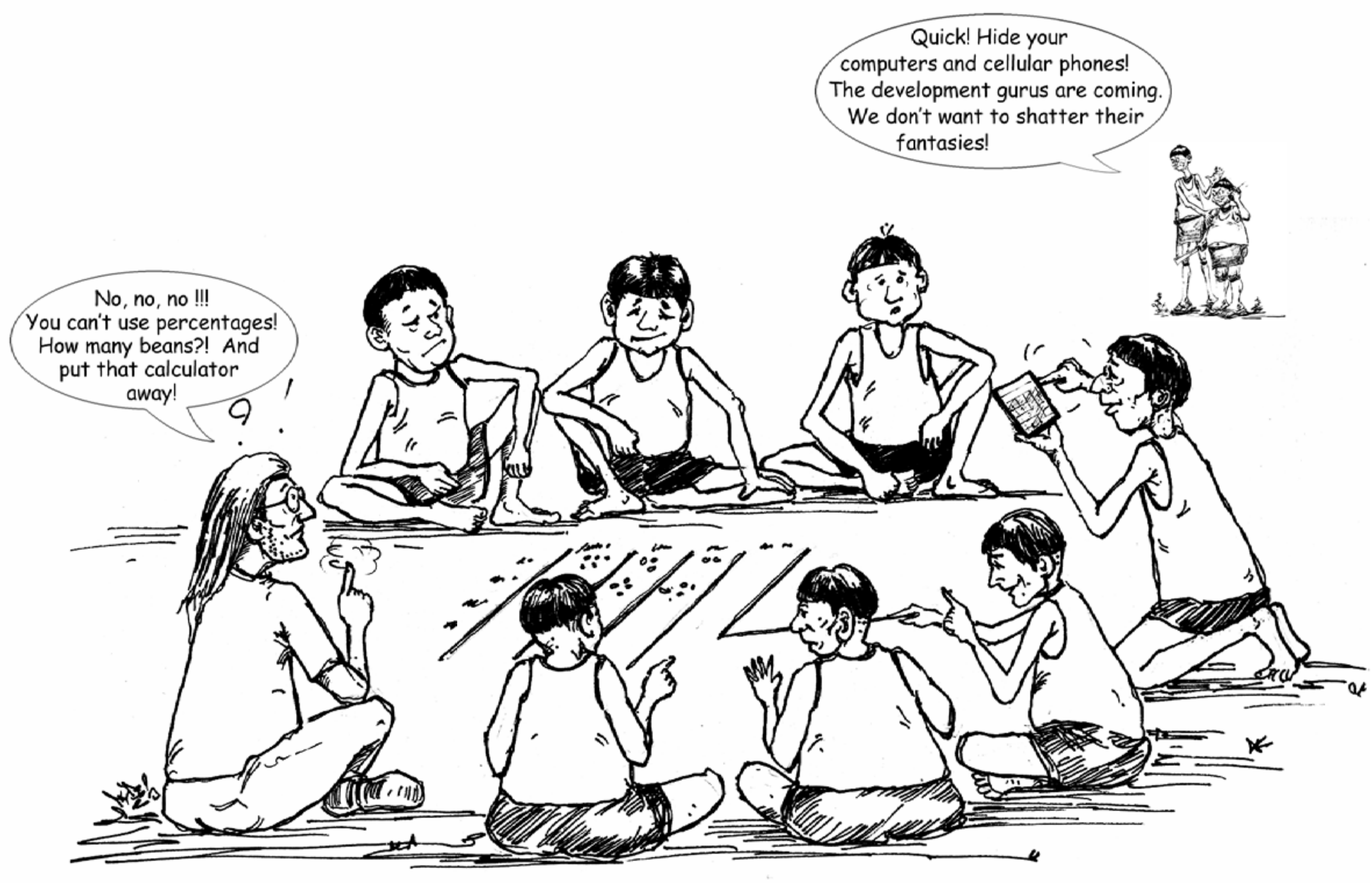
APPENDIX 7-11.

HOW OFTEN DOES RESEARCH GENERATE PRACTICAL SOLUTIONS TO FARMERS' PROBLEMS ... AS OPPOSED TO SIMPLY ADDING TO SCIENTISTS' PUBLICATIONS LISTS?

How often are scientists' efforts really aimed at providing tangible benefits to farmers? And how often at simply building the long publication records that they need to climb their career ladders? There is also a problem in that the knowledge and innovations that farmers willingly share with researchers are often not properly acknowledged.

APPENDIX 7-12.

MEANWHILE BACK AT THE VILLAGE, THE PRA EXERCISE WASN'T GOING QUITE AS PLANNED..



APPENDIX 7-13.

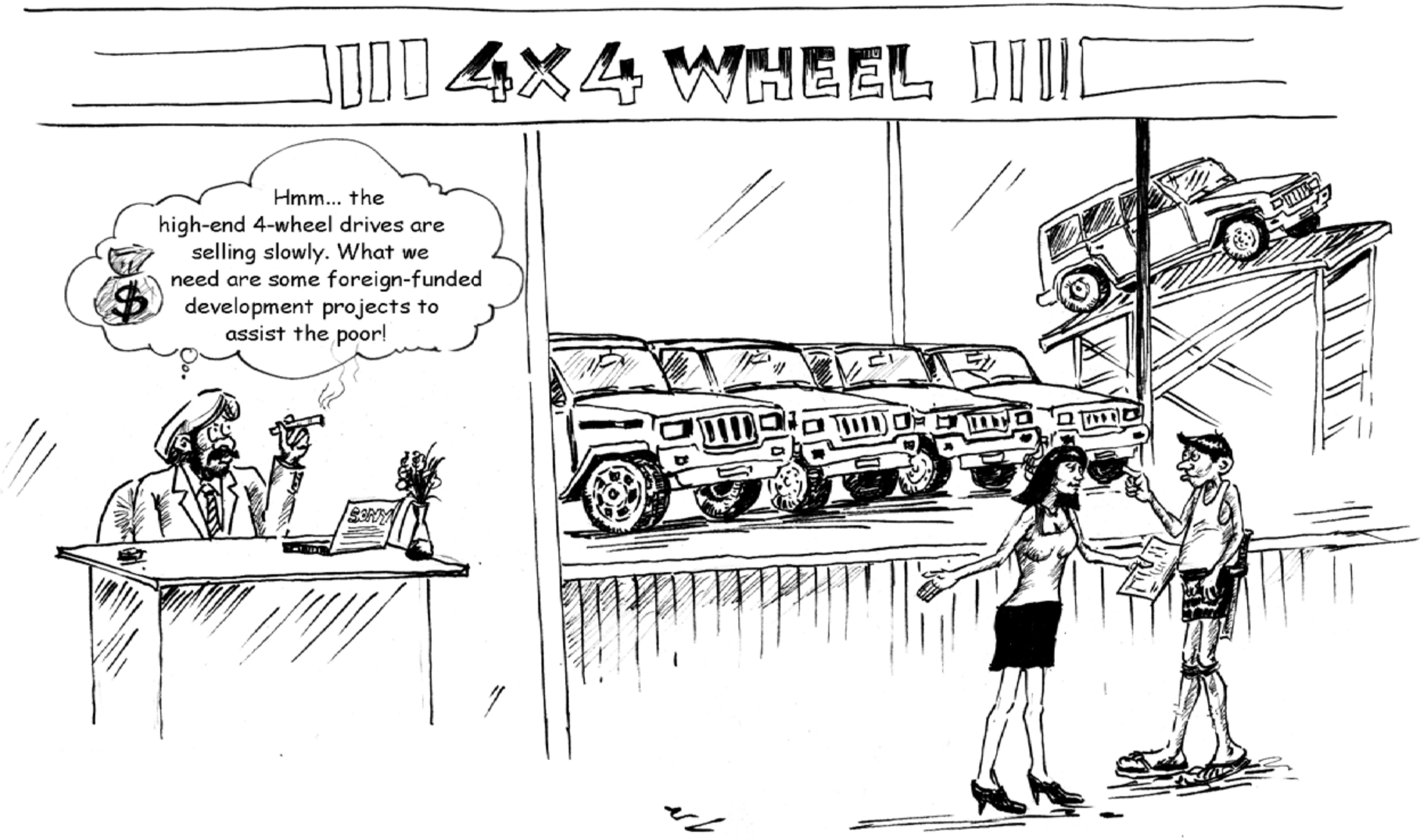
APPENDIX 7-14.

HOW TO ENSURE THAT THOSE WHO MAKE AND INFLUENCE POLICY HAVE MORE FIRST-HAND KNOWLEDGE ABOUT SHIFTING CULTIVATION?

A major problem exists in that most policy-makers have seldom left their footprints in a swidden field - to have gained any first-hand experience in how it actually works. Even some who assume to write about shifting cultivation visit the field about as often as Haley's comet swings past the Earth. That magnifies the importance of scientists undertaking problem-oriented research and making the findings available to policy-makers in clear and easily-digestable formats that can inform wise decisions.

APPENDIX 7-15.

THE REAL BENEFICIARIES OF MOUNTAIN DEVELOPMENT PROJECTS ARE NOT ALWAYS THE ONES PLANNED IN THE PROPOSALS.



APPENDIX 7-16.

WAVES OF WESTERN INFLUENCE IN THE NAGA HILLS

①

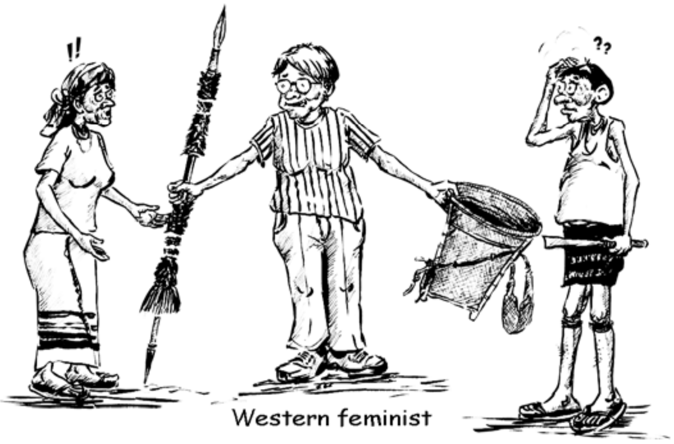
(The race to save Naga souls began in earnest in the early 1900s.)

Religious

②

Economic

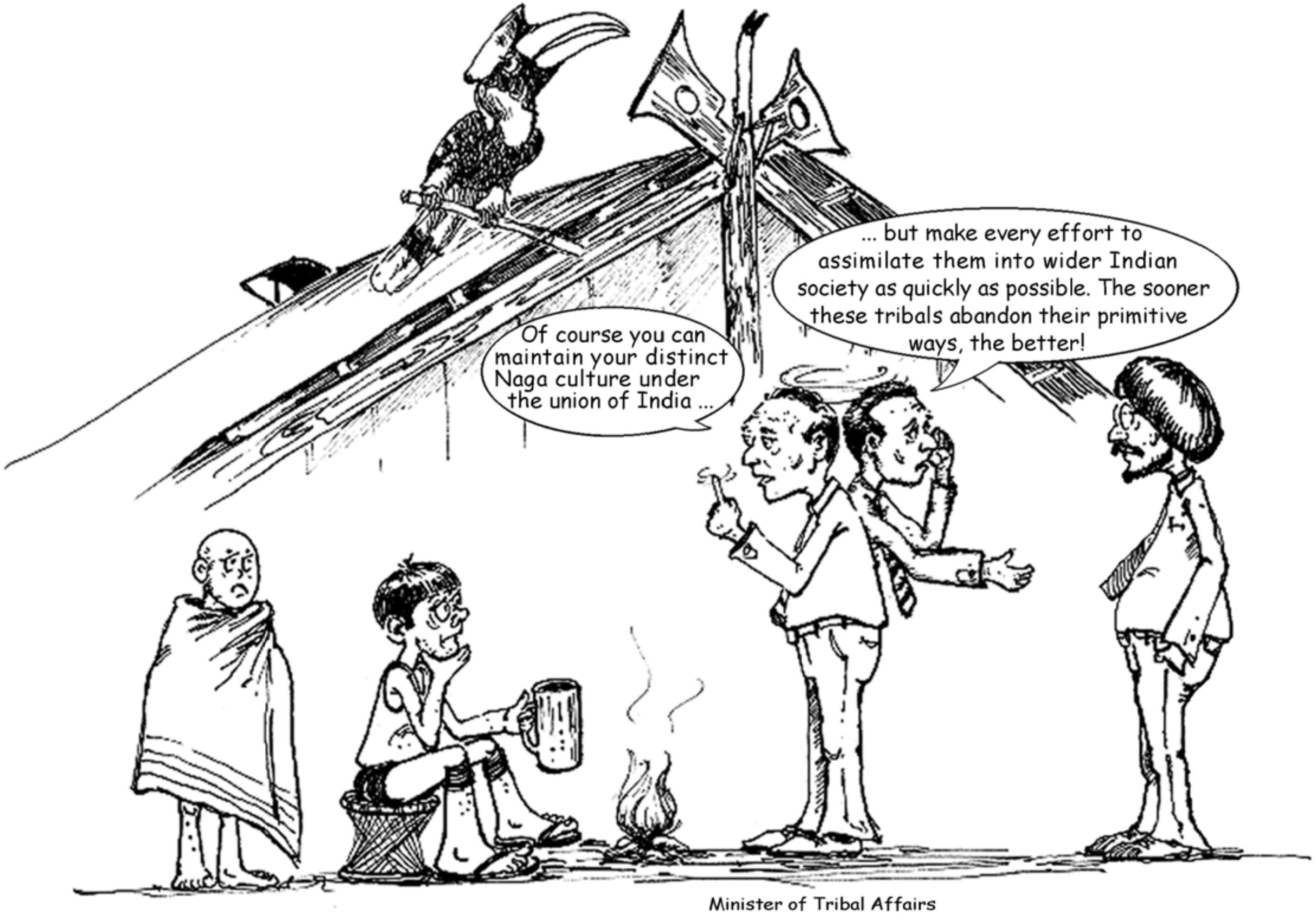
③



Gender Relations

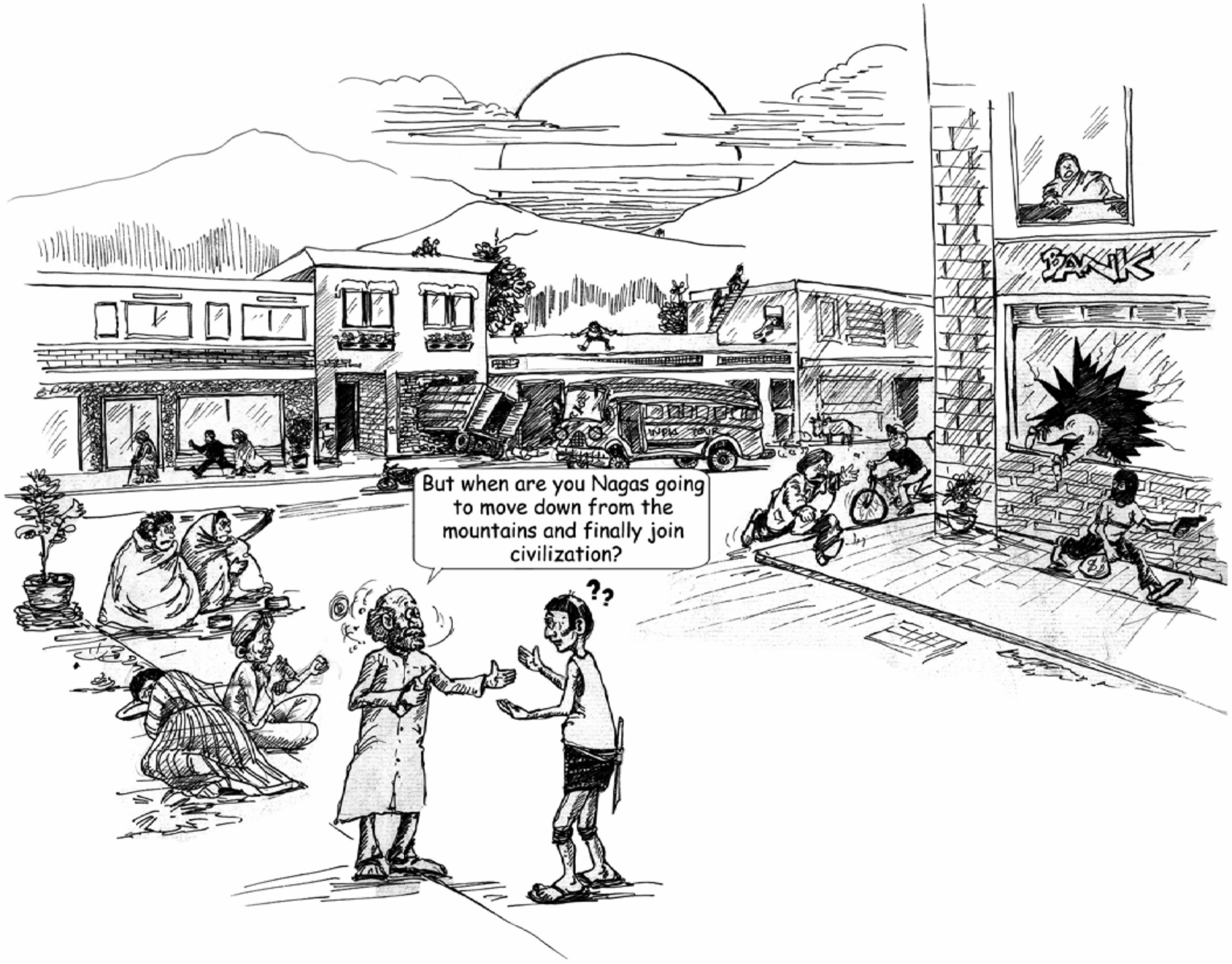
APPENDIX 7-17.

THE DOUBLE-TALK OF OFFICIAL POLICY IN DEALING WITH ETHNIC MINORITY GROUPS



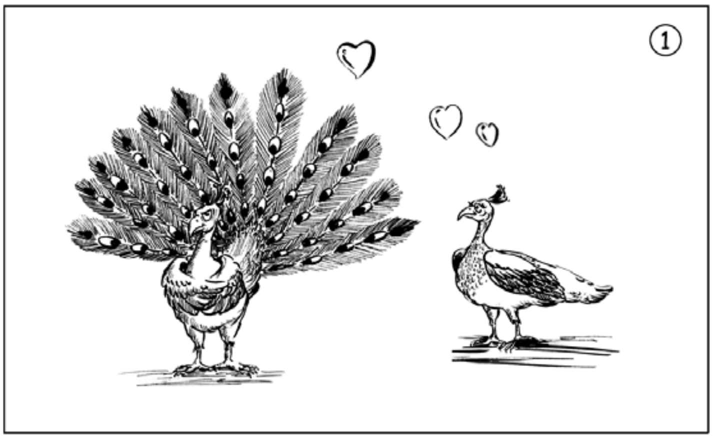
APPENDIX 7-18.

DOWN IN THE PLAINS, THE NAGAS DISCOVERED A DIFFERENT KIND OF JUNGLE ...

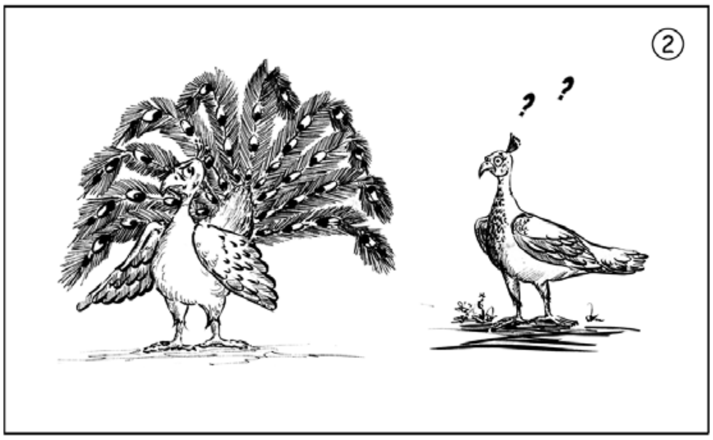


APPENDIX 7-19.

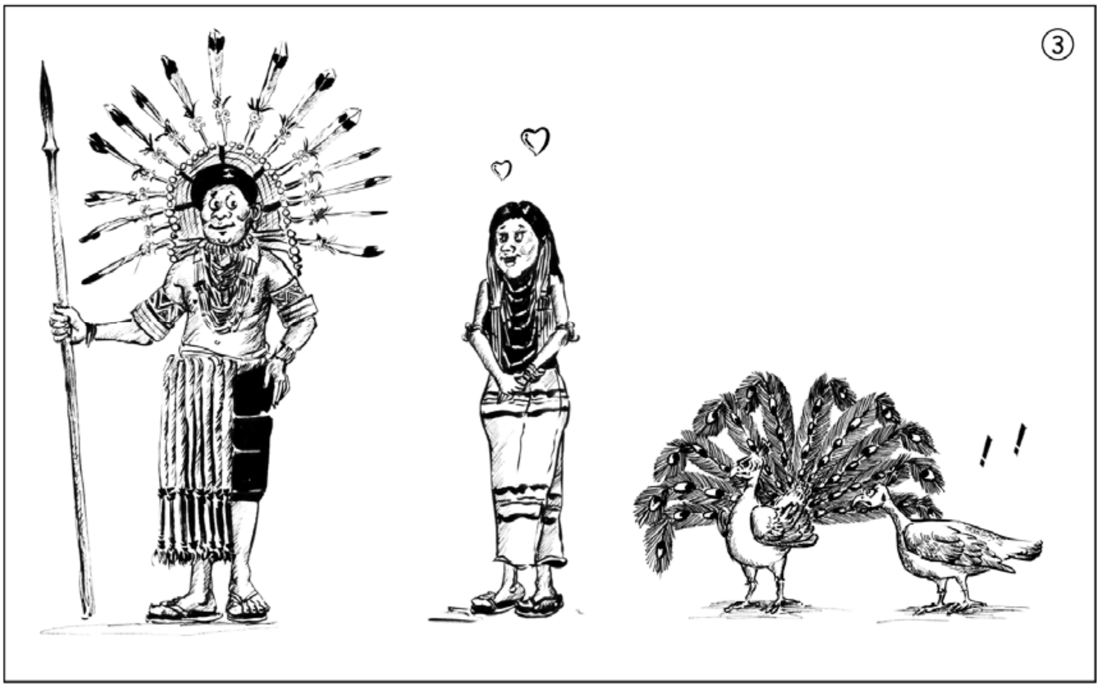
WHY PEACOCKS IN NAGALAND HAVE AN INFERIORITY COMPLEX!



Romance was in the air ...



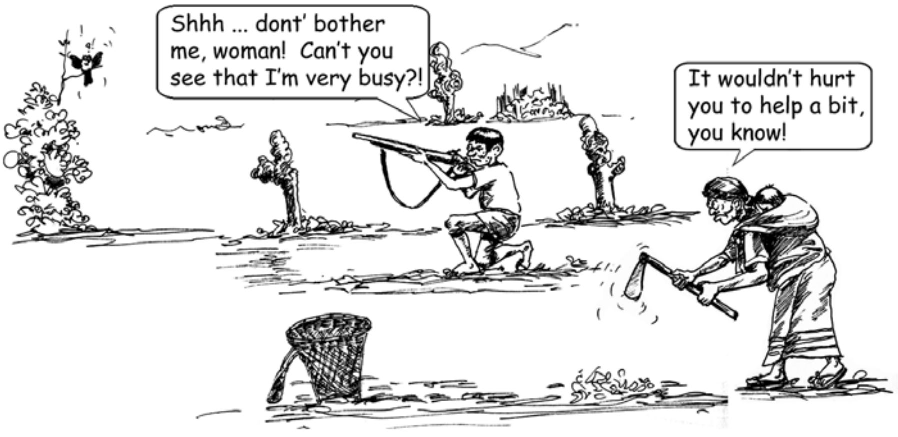
... and then suddenly it wilted ...



... due to a bad case of plummage envy!

APPENDIX 7-20.

A TYPICAL DAY IN THE VILLAGE ...
(What Happens When Great and Proud Warriors become Redundant)



IN THE FIELD ...

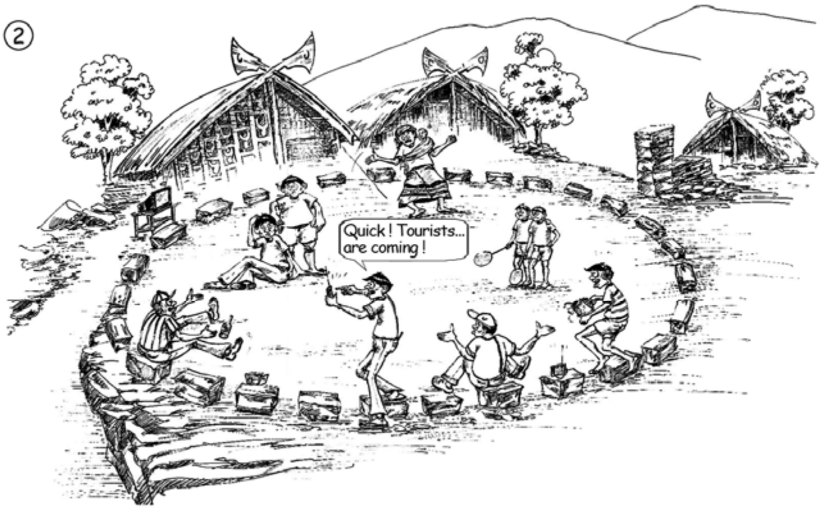
ON THE WAY BACK ...

AT HOME ...

APPENDIX 7-21.

TOURISTS FLOCK TO NAGALAND TO SEE THE PRIMITIVE TRIBALS

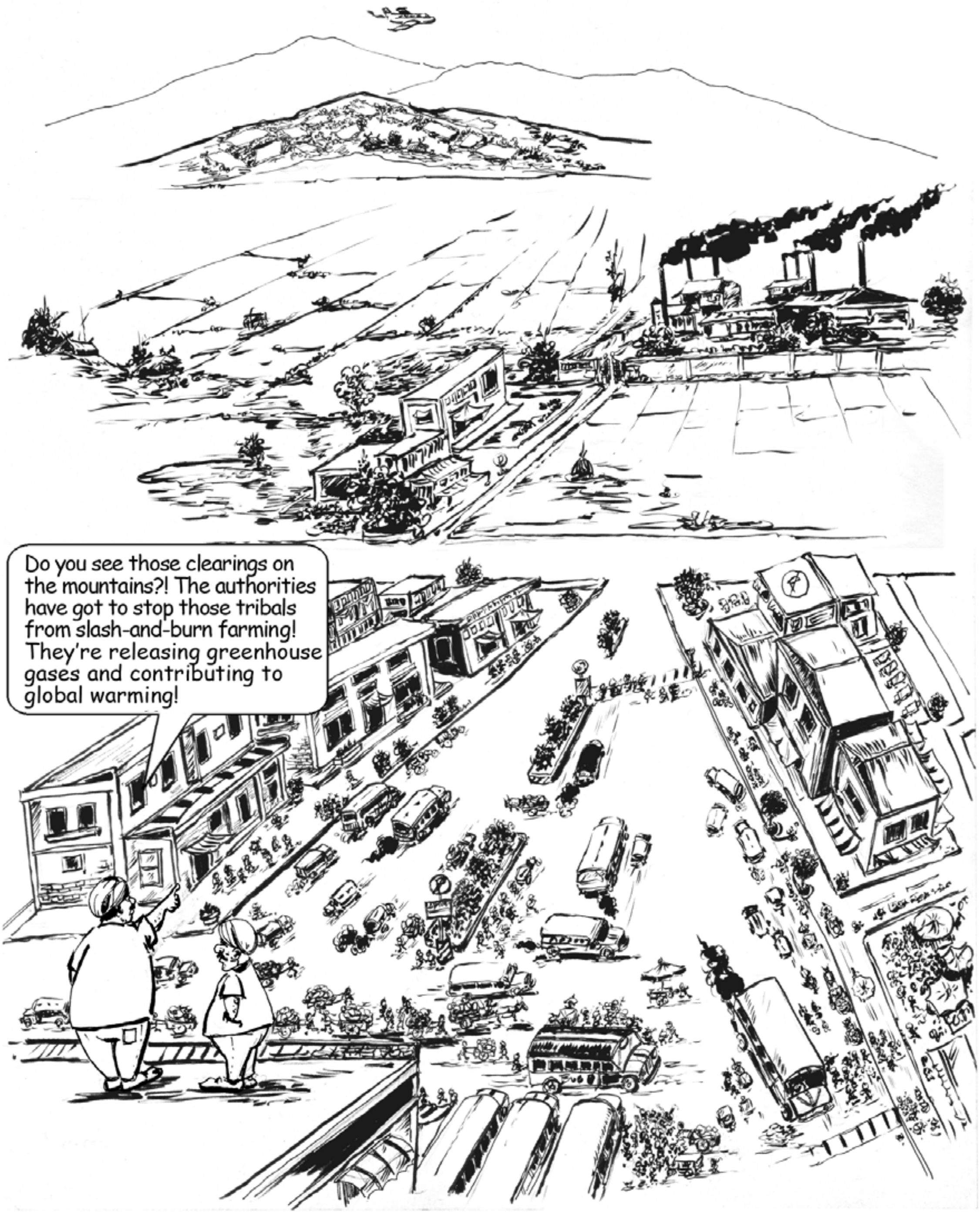
The villagers were enjoying a relaxing day when the peace was suddenly broken by a phone call from an approaching guide for “Adventure Tours”.



Turmoil broke out as the villagers scrambled to create the facade that the foreign visitors had been promised that they would see.

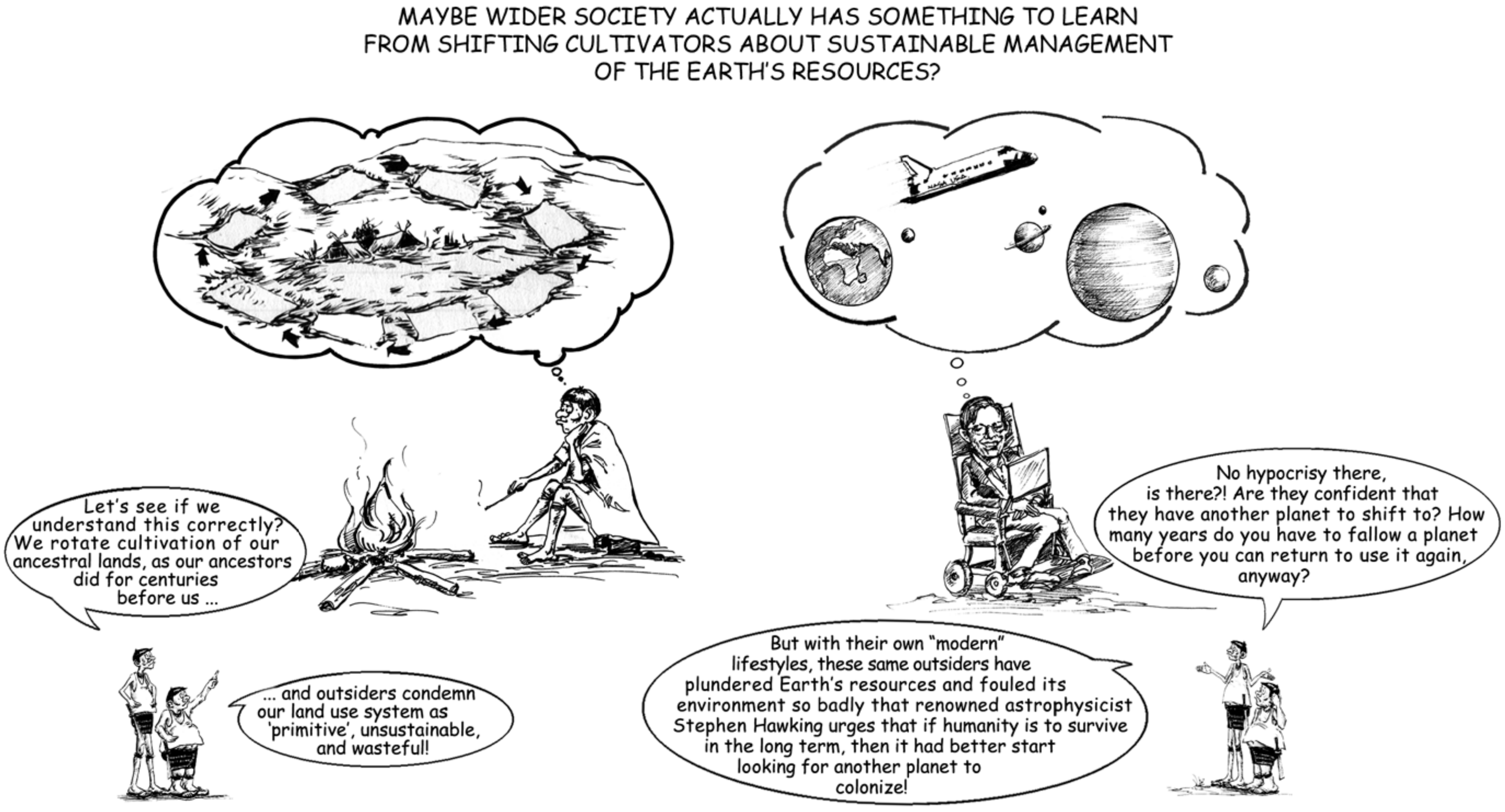
By the time the intrepid adventurers arrived, the transformation was complete and the village scene had been rolled back a century. The visitors clicked happily away, intent on another coffee-table picture book.

APPENDIX 7-22.

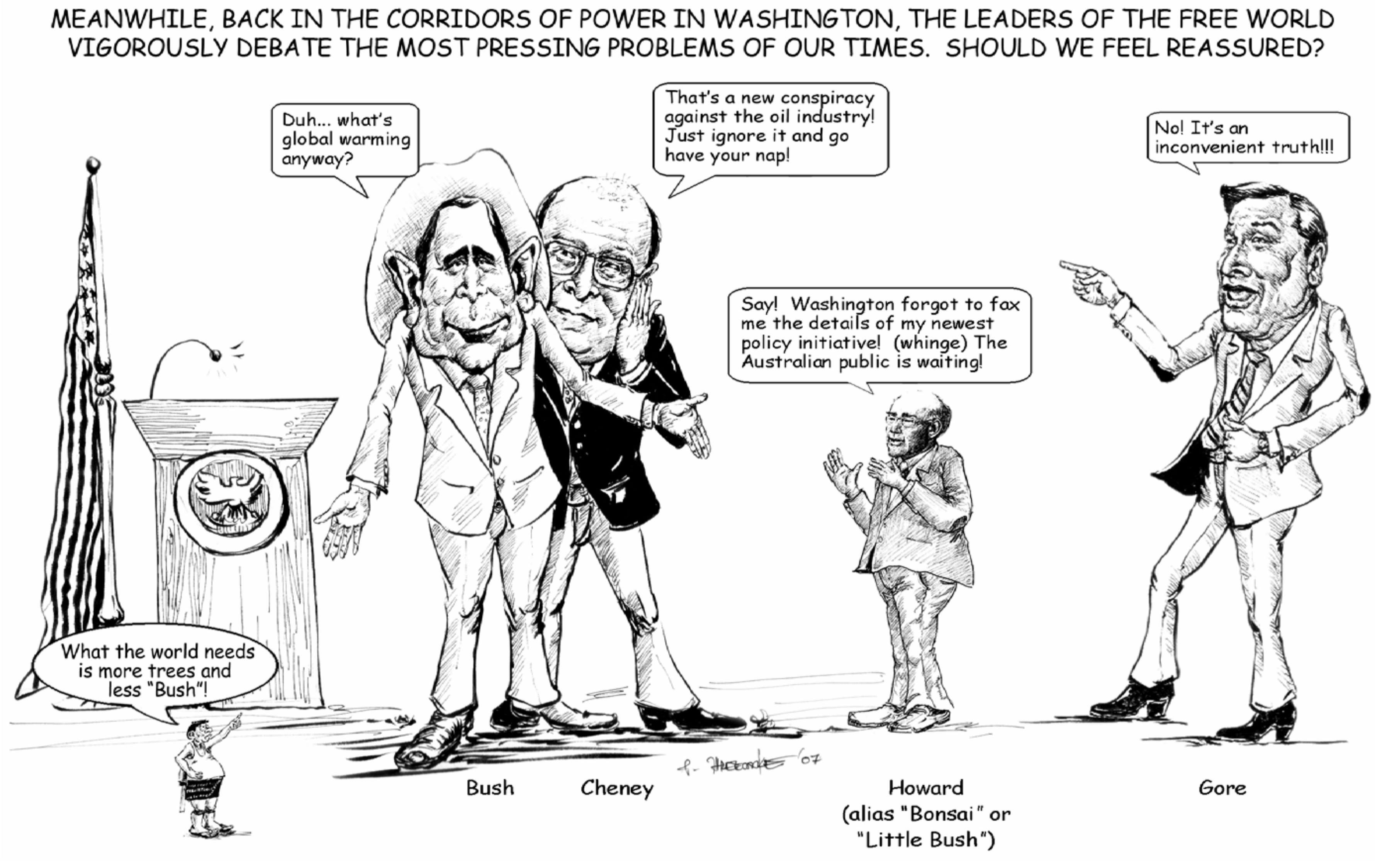


THE DIZZYING HEIGHTS OF HYPOCRISY THAT SHIFTING CULTIVATORS FACE ...

APPENDIX 7-23.



APPENDIX 7-24.



APPENDIX 7-25.

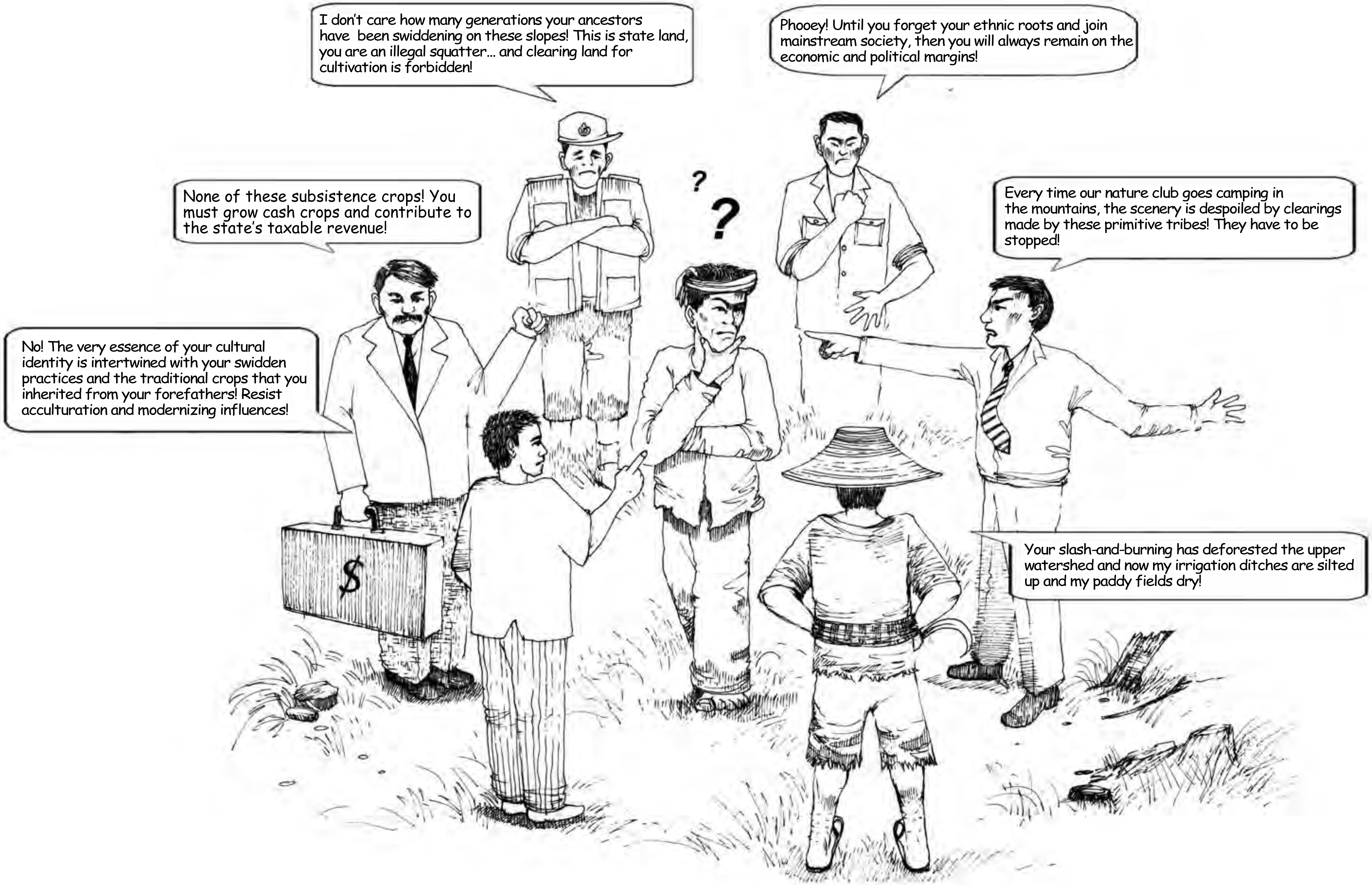
SINCE FIELD RESEARCH INEVITABLY IMPOSES ON VILLAGERS' LIVES,
IT SHOULD OFFER FINDINGS OF PRAGMATIC VALUE
TO THE HOST COMMUNITY.

COVER PAGE FOR CONCLUDING CARTOON SERIES,

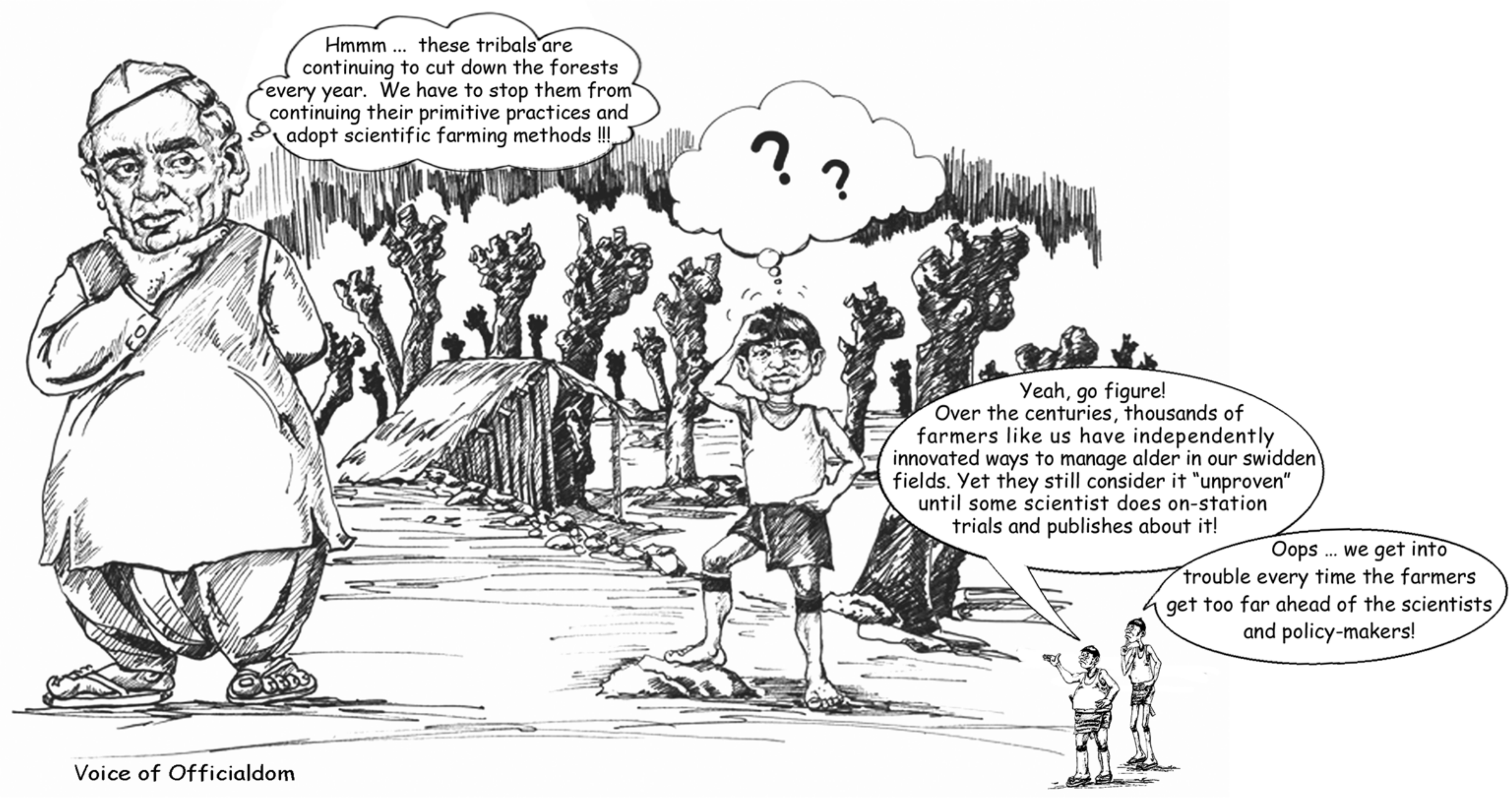
with enlightened commentary by our two
Angami guides, Viko and Zapü

By Malcolm Cairns,
Australian National University
Artwork by Paradon Threemake,
Chiang Mai Night Bazar, Thailand

SHIFTING CULTIVATORS FIND THEMSELVES AT THE CENTER OF A MAELSTROM OF CONTROVERSY AND CRITICISM

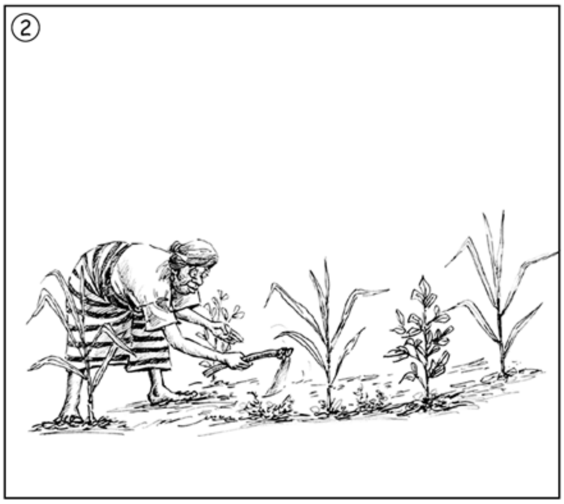


TENDENCY OF THE STATE TO OVERLOOK THE PROMISE OF INDIGENOUS TECHNOLOGIES

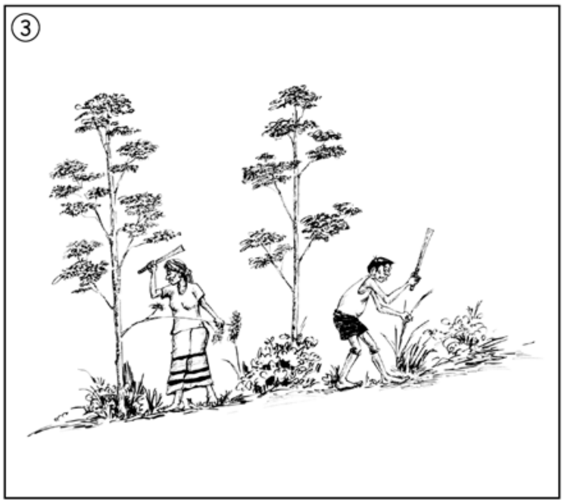


HOW NURTURING FORESTS CAN CREATE UNEXPECTED PROBLEMS FOR SHIFTING CULTIVATORS

It often begins by planting tree seedlings in agricultural fields in a "taungya" pattern.



The young trees benefit from maintenance operations directed at the crops grown with them for the first couple of years.

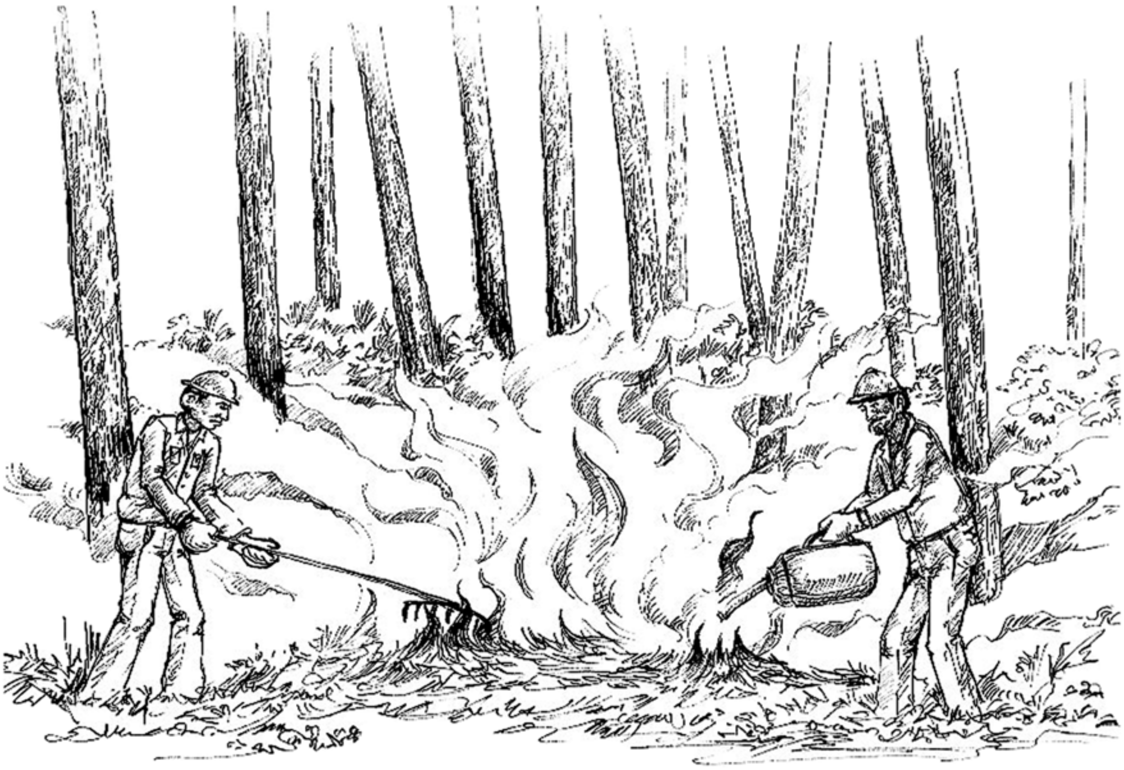


As the trees gain height, farmers prune back their lower branches and keep the weeds slashed back.

But ironically, the healthier the forests that farmers nurture, the greater the danger that the state will accuse them of being squatters in state forests and demand their eviction. The consequences of nurturing trees can thus be nothing less than tragic for shifting cultivators. Lowland farmers that permanently destroy the forests on their lands are not faced with this threat.

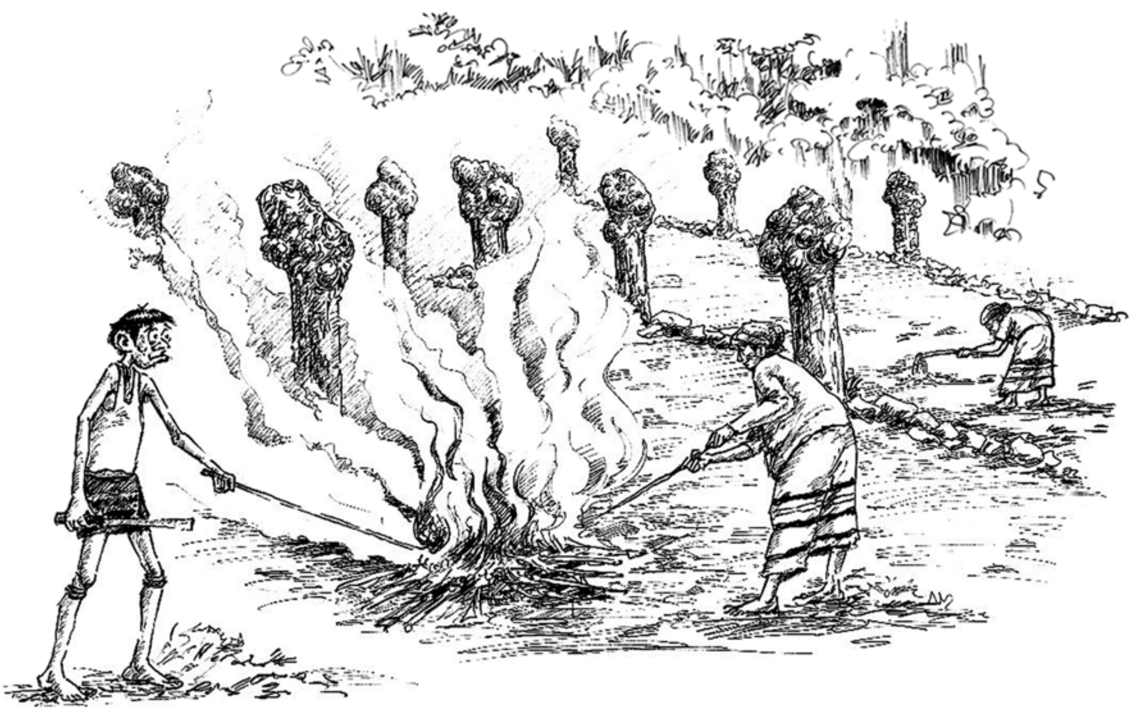
THE DOUBLE-STANDARDS OF HOW CONTROLLED BURNING IS VIEWED

THE DEPARTMENT OF FORESTRY ...



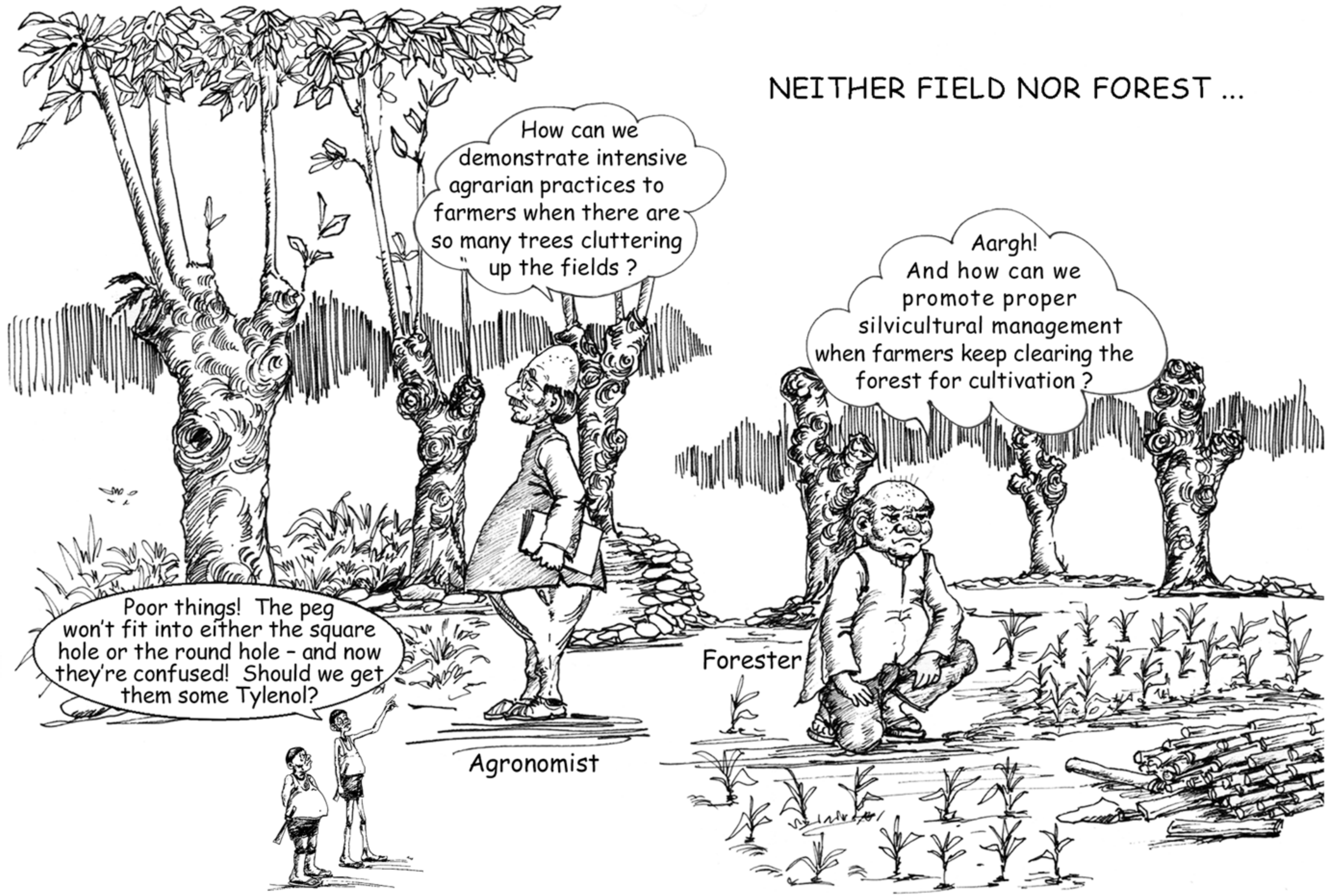
Proscribed Burning - A Recommended Silvicultural Practice?

OR SHIFTING CULTIVATORS ...

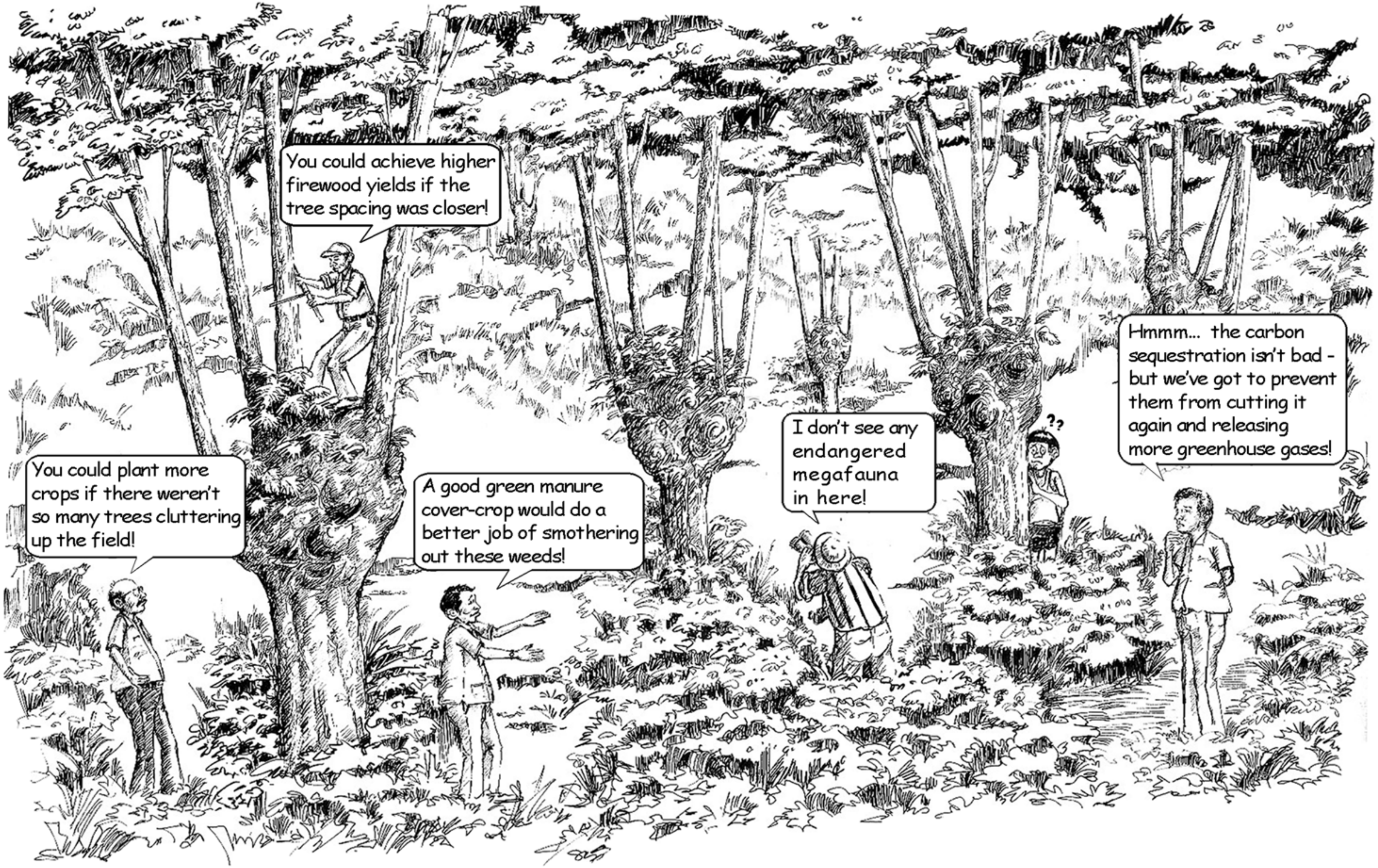


The Burning Operation of Swidden Cultivation - Environmental Destruction that Must be Stopped?!

MANAGED TREE FALLOWS SPAN BETWEEN AGRICULTURE AND FORESTRY

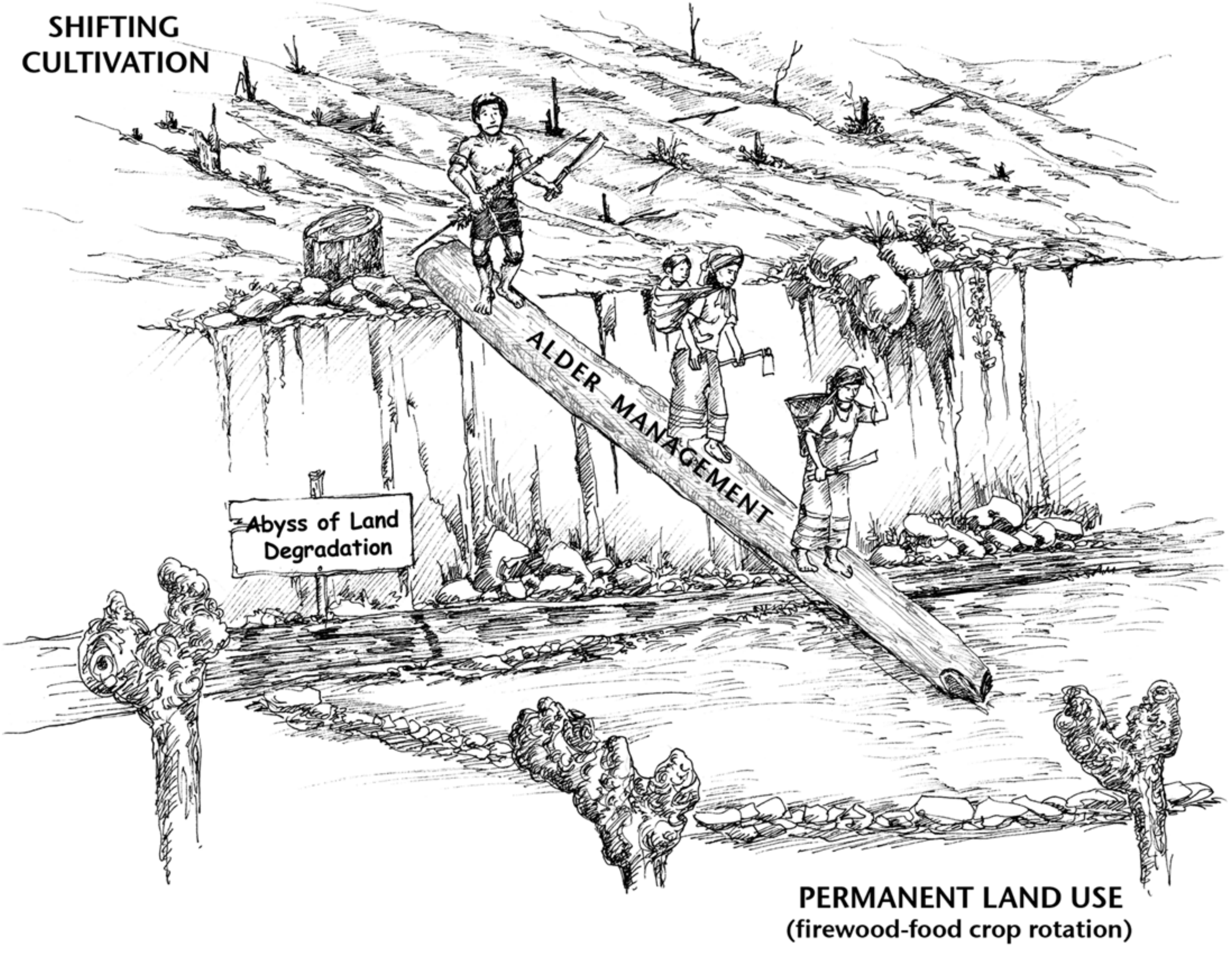


AN IMPROVED FALLOW: BY WHOSE CRITERIA?



KHONOMA'S HISTORICAL SHORTAGE OF AGRICULTURAL LAND SPARKED INNOVATIONS IN INCORPORATING SOIL-BUILDING TREES INTO ITS FARMSCAPES

ALDER'S ROLE AS A BRIDGE THAT ALLOWED FARMERS TO MOVE FROM SHIFTING CULTIVATION TO PERMANENT LAND USE

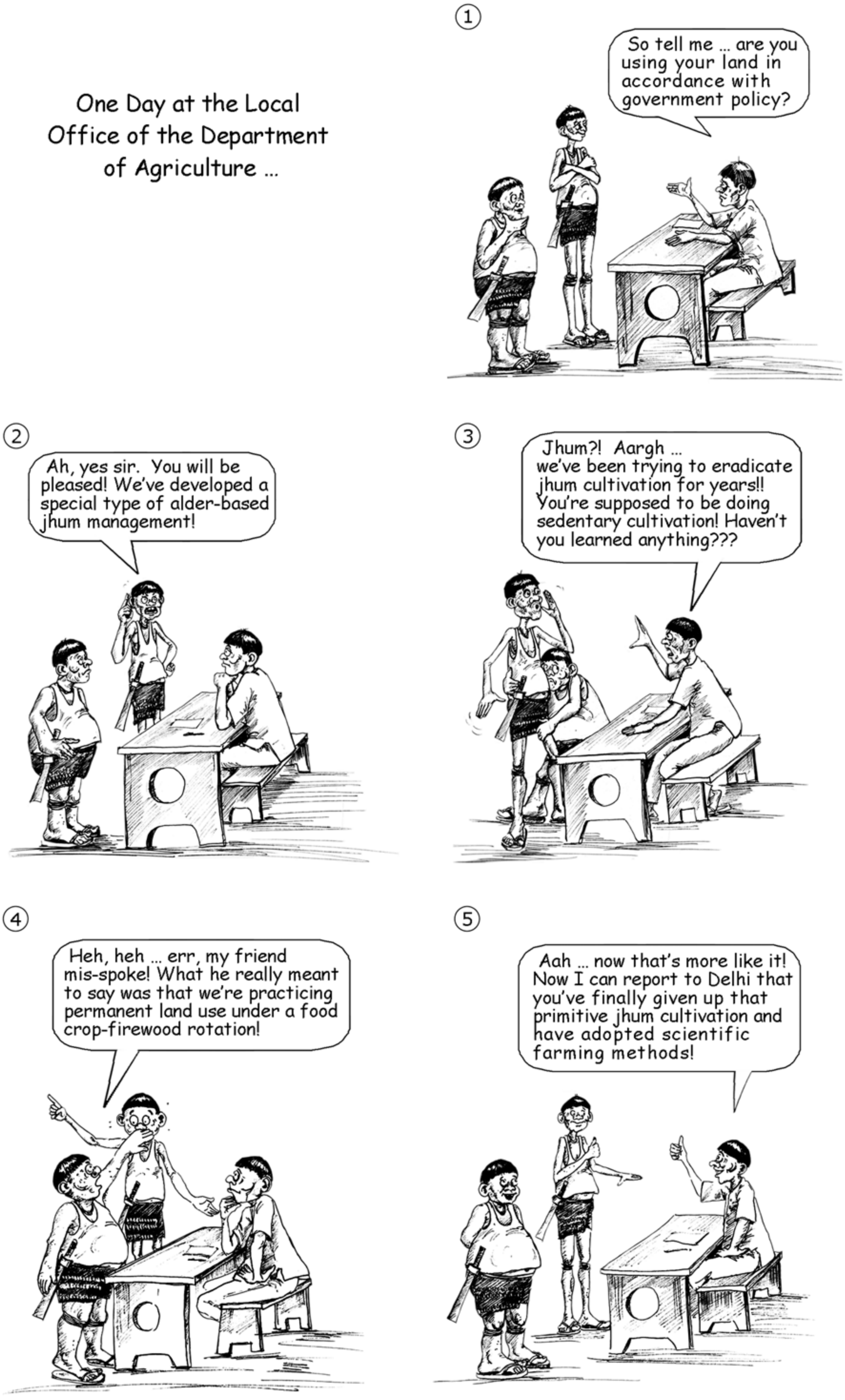


WHAT HAPPENS WHEN "FLY-IN EXPERTS" PEDDLE THEIR FAVORITE TECHNOLOGIES WITHOUT UNDERSTANDING THE LOCAL SITUATION?

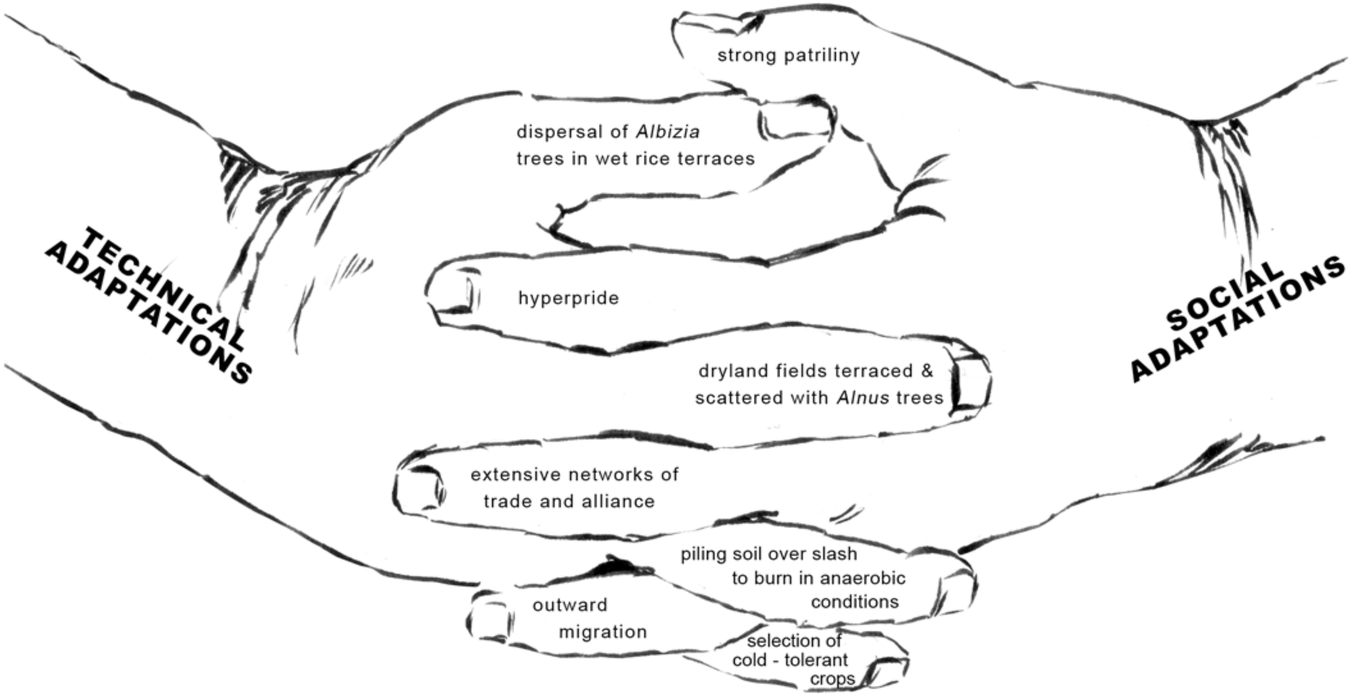
The 3 Most Common Lies:

1. The cheque is in the mail;
2. Yes dear, of course I'll respect you in the morning;
3. I'm from the Government, and I'm here to help you

THE IMPORTANCE OF SEMANTICS WHEN DEALING WITH OFFICIALDOM



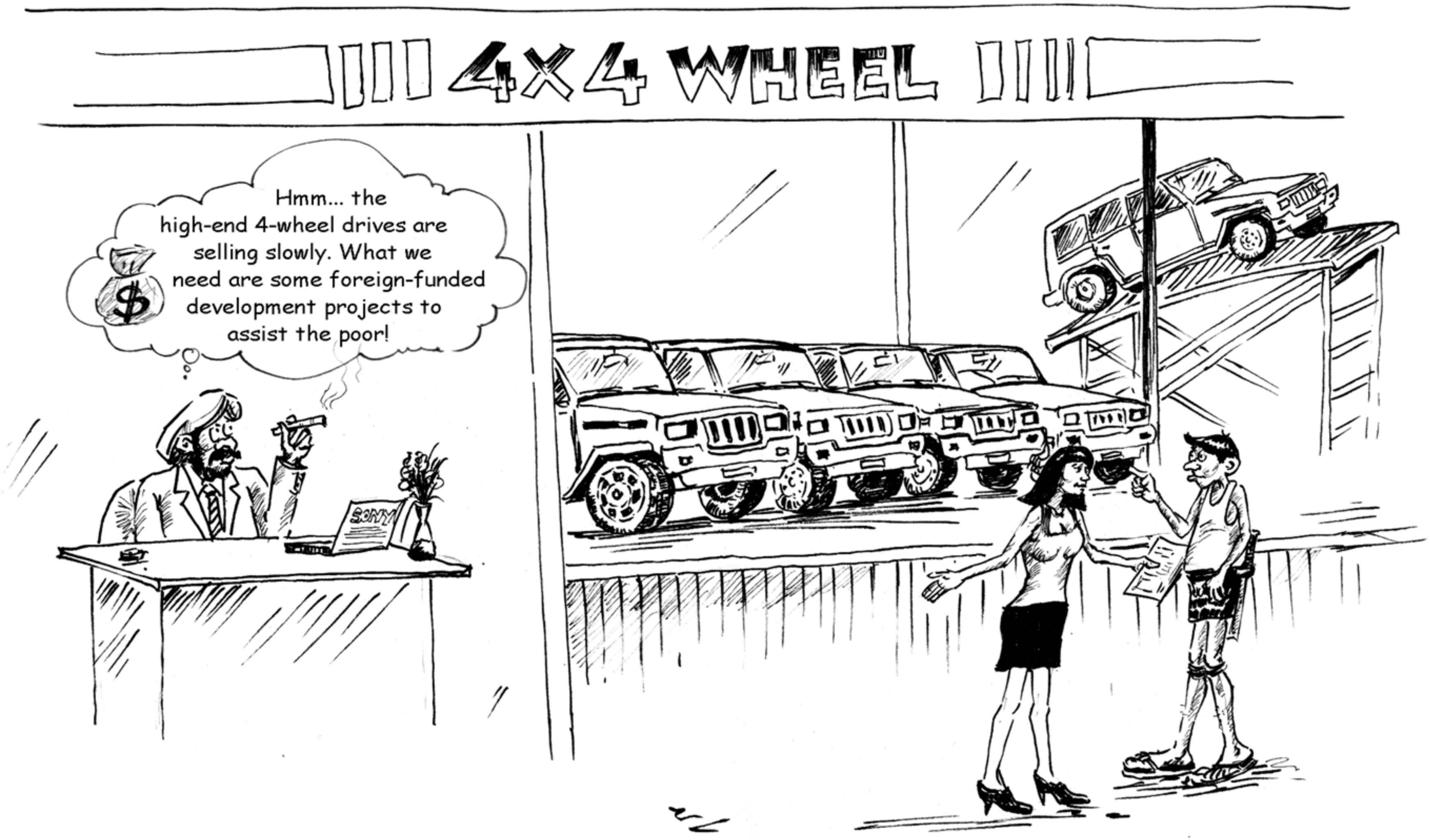
DEPICTION OF HOW KHONOMA HISTORICALLY INTERWOVE A COMBINATION OF TECHNICAL AND SOCIAL INNOVATIONS IN RESPONSE TO ITS SCARCITY OF AGRICULTURAL LAND



PRA METHODS OFTEN UNDERESTIMATE FARMERS' ABILITY TO EXPRESS THEMSELVES AND MAY NOT ALWAYS BE APPROPRIATE


WELCOME TO AIRPORT HOTEL VIP LOUNGE
Where Your Comfort is Our Business!
PARIS
LONDON
TOKYO
POVERTY REPORT: Shifting Cultivation from my Vantage Point As I sit here amongst the peasant huts, looking out across the swidden fields ...
Exactly which hills is he looking at anyway?
Ohh ... so this is how poverty is fought!?

THE REAL BENEFICIARIES OF MOUNTAIN DEVELOPMENT PROJECTS ARE NOT ALWAYS THE ONES PLANNED IN THE PROPOSALS



HOW TO ENSURE THAT THOSE WHO MAKE AND INFLUENCE POLICY HAVE MORE FIRST-HAND KNOWLEDGE ABOUT SHIFTING CULTIVATION?

A major problem exists in that most policy-makers have seldom left their footprints in a swidden field - to have gained any first-hand experience in how it actually works. Even some who assume to write about shifting cultivation visit the field about as often as Haley's comet swings past the Earth. That magnifies the importance of scientists undertaking problem-oriented research and making the findings available to policy-makers in clear and easily-digestable formats that can inform wise decisions.

WAVES OF WESTERN INFLUENCE IN THE NAGA HILLS

①

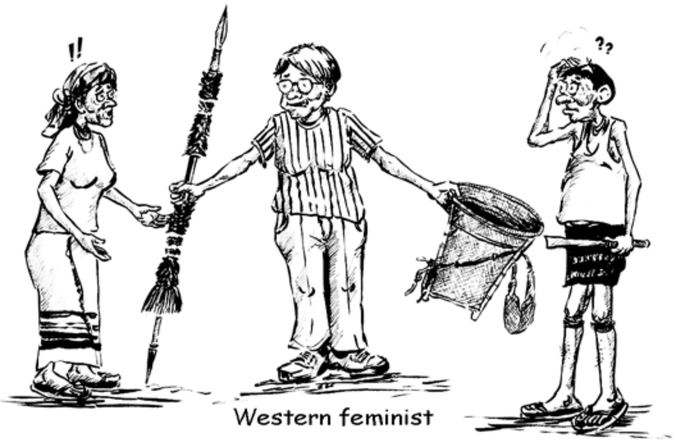
(The race to save Naga souls began in earnest in the early 1900s.)

Religious

②

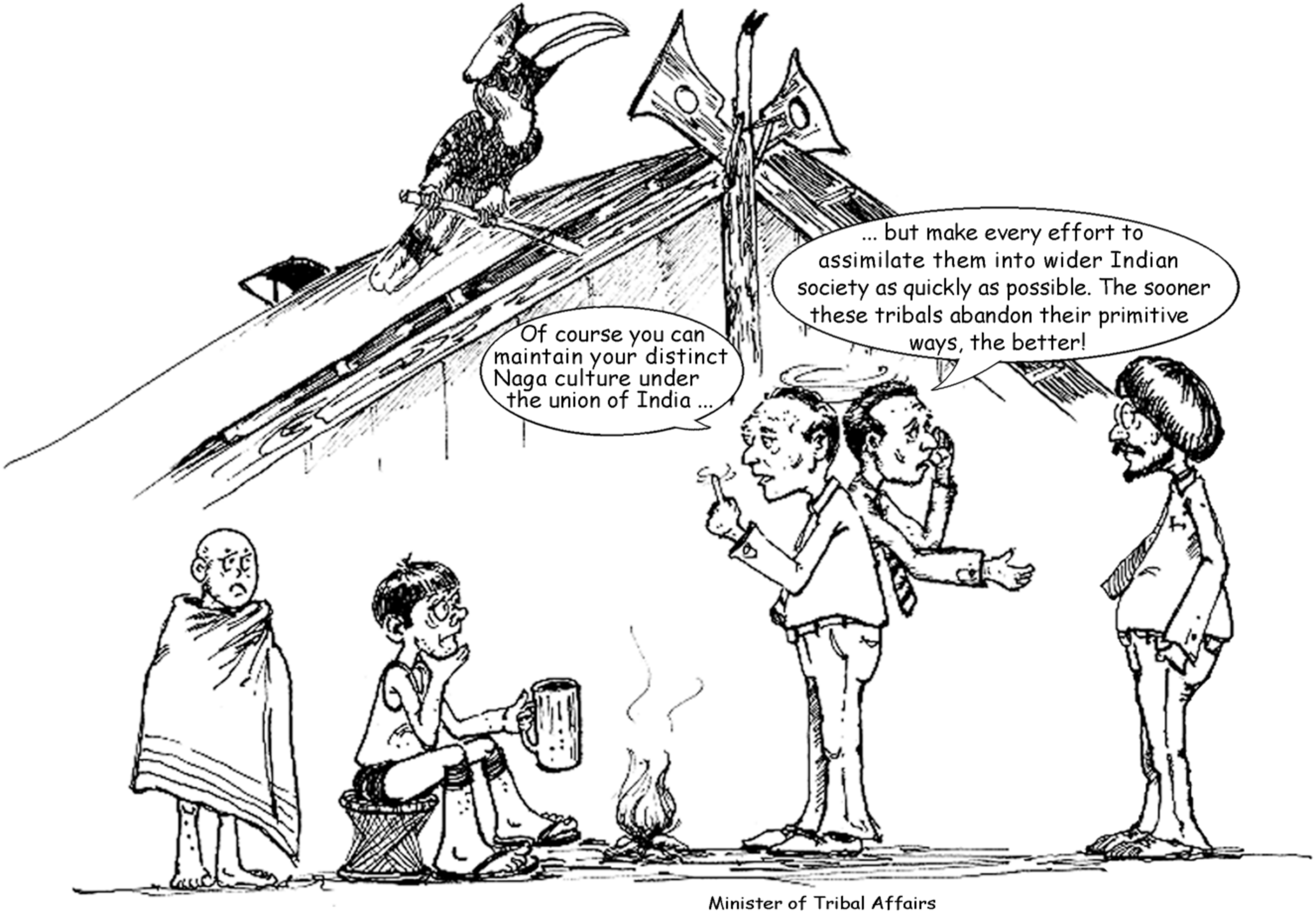
Economic

③

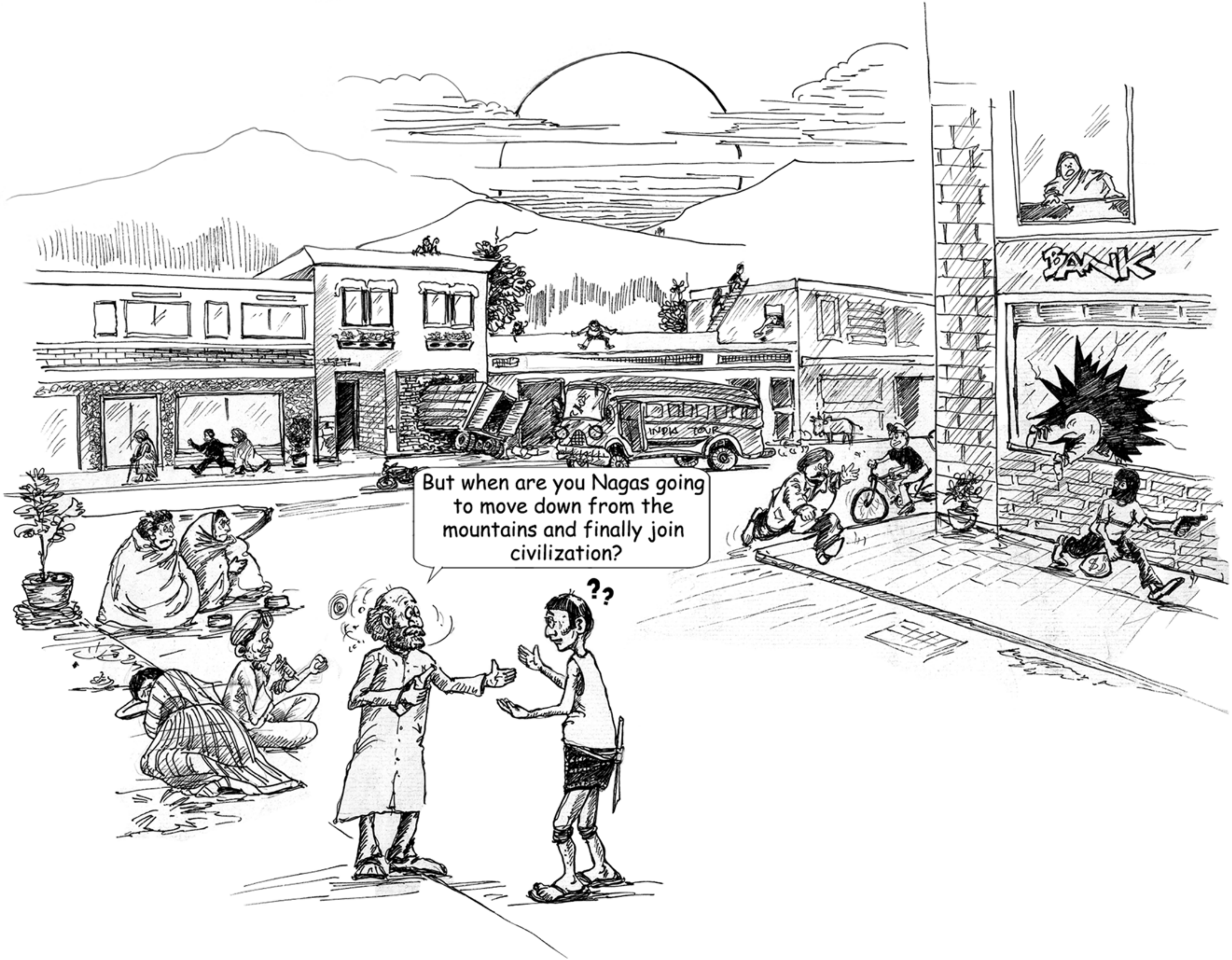


Gender Relations

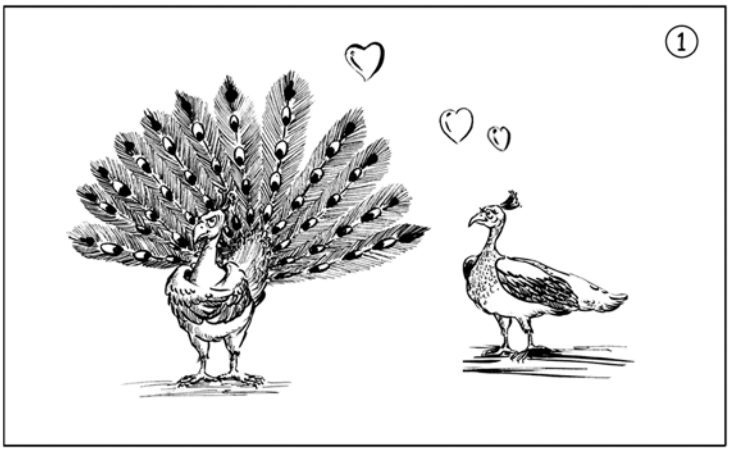
THE DOUBLE-TALK OF OFFICIAL POLICY IN DEALING WITH ETHNIC MINORITY GROUPS



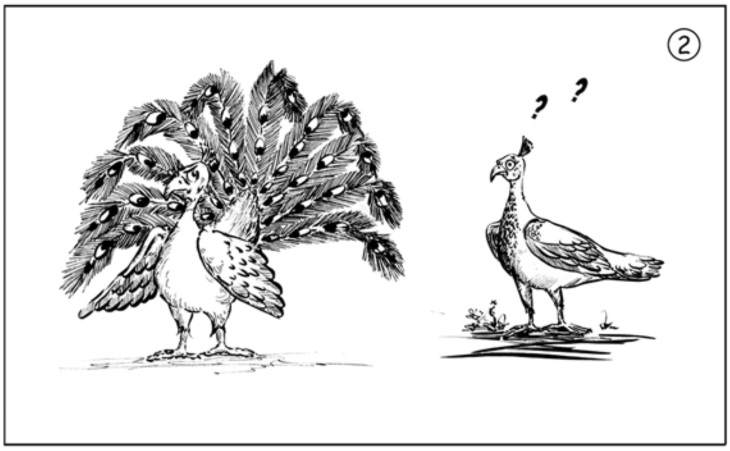
DOWN IN THE PLAINS, THE NAGAS DISCOVERED A DIFFERENT KIND OF JUNGLE ...



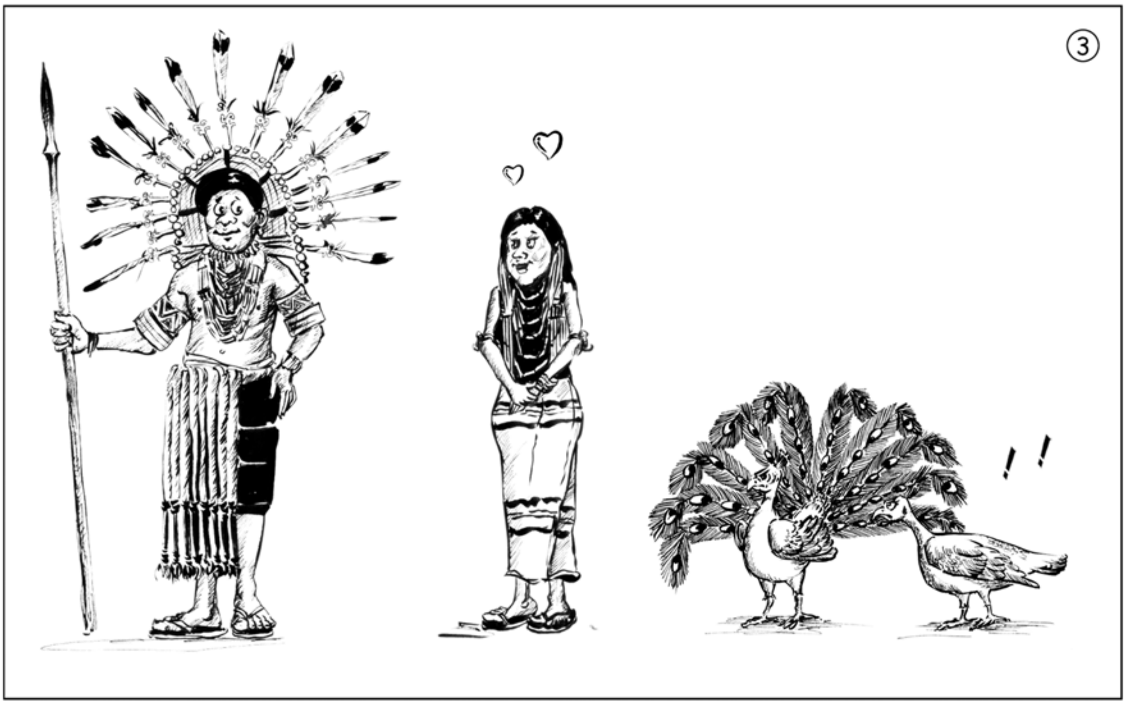
WHY PEACOCKS IN NAGALAND HAVE AN INFERIORITY COMPLEX!



Romance was in the air ...



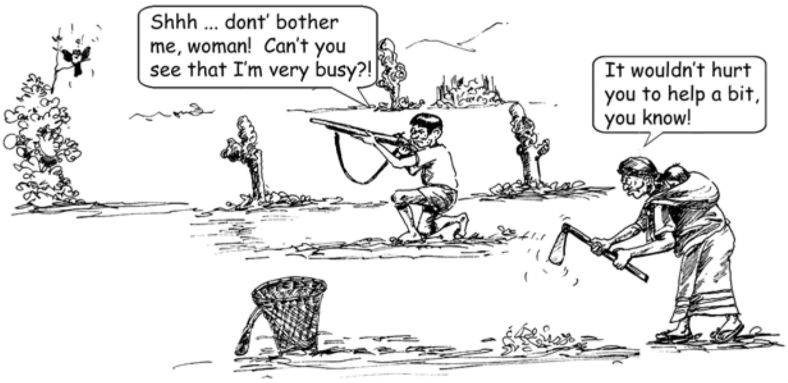
... and then suddenly it wilted ...



... due to a bad case of plummage envy!

THE CHANGING DIVISION OF LABOR AS THE NAGA HILLS BECAME MORE PEACEFUL

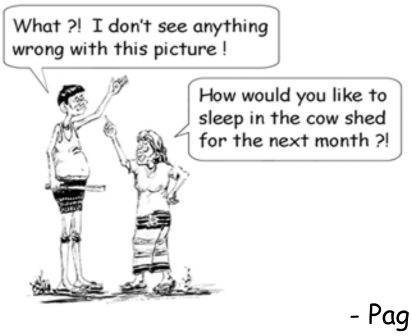
(What Happens When Great and Proud Warriors Become Redundant)



IN THE FIELD ...

ON THE WAY BACK ...

AND AT HOME ...



MAINTAINING THE FAÇADE OF CULTURAL PURITY THAT TOURISTS EXPECT TO SEE

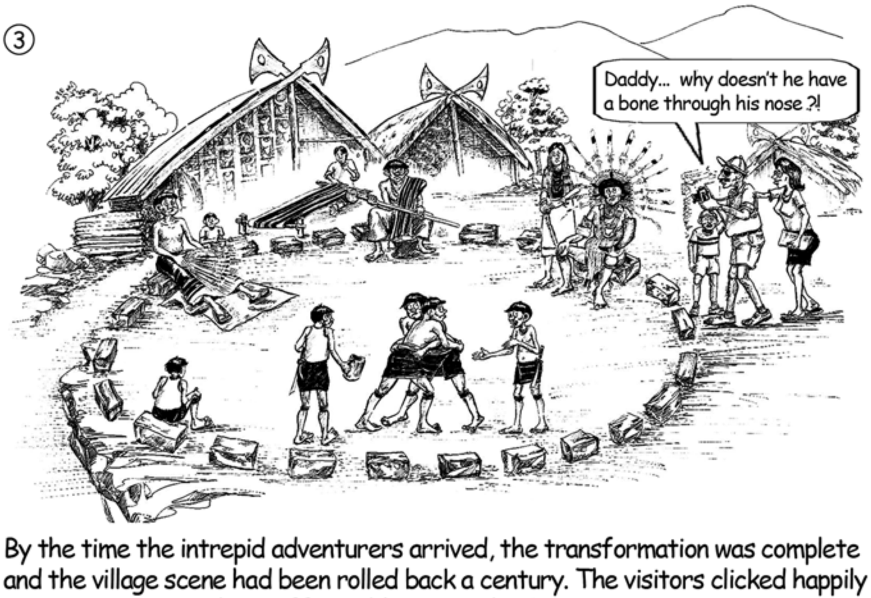
①

The villagers were enjoying a relaxing day when the peace was suddenly broken by a phone call from an approaching guide for "Adventure Tours".

②

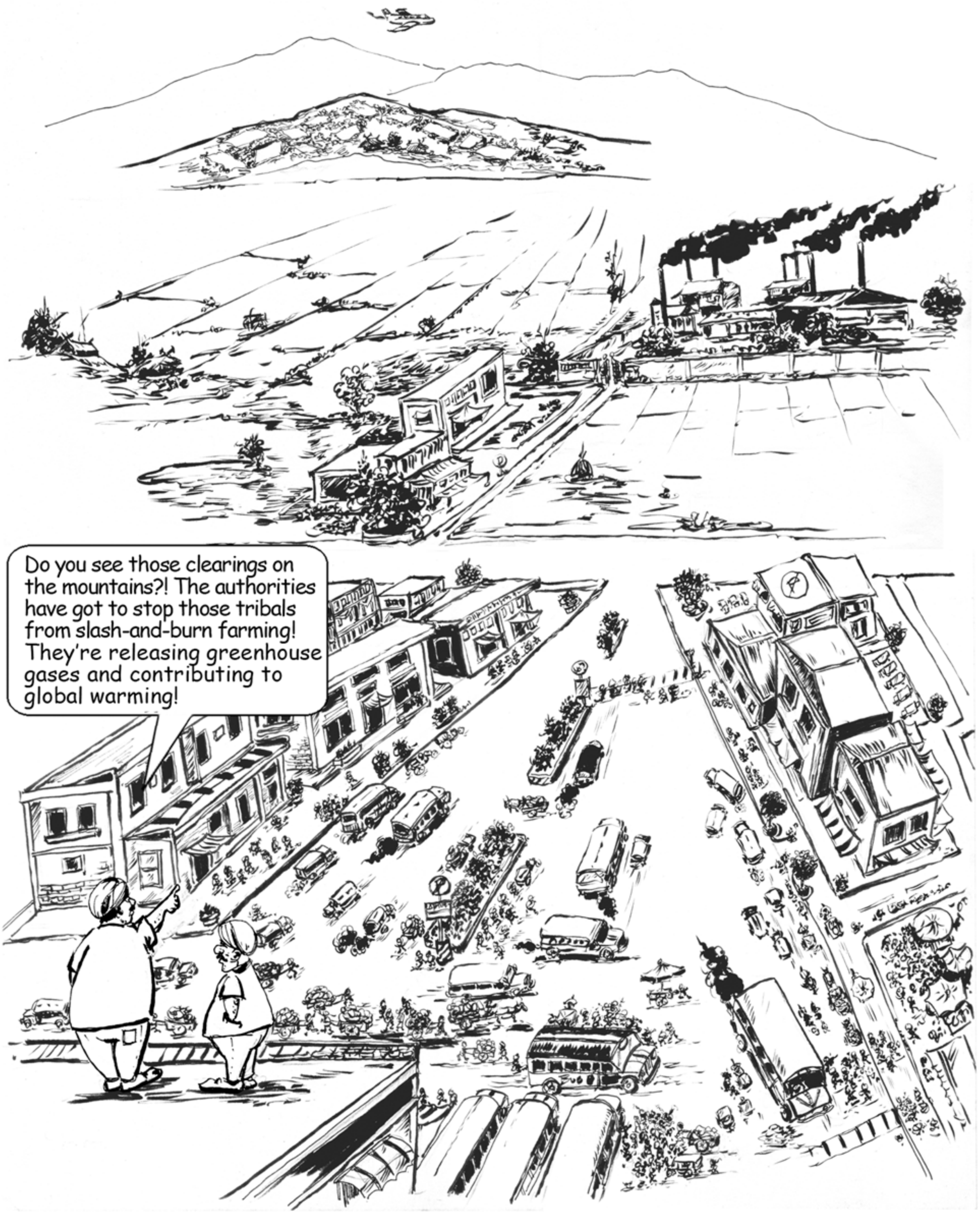
Turmoil broke out as the villagers scrambled to create the facade that the foreign visitors had been promised that they would see.

③

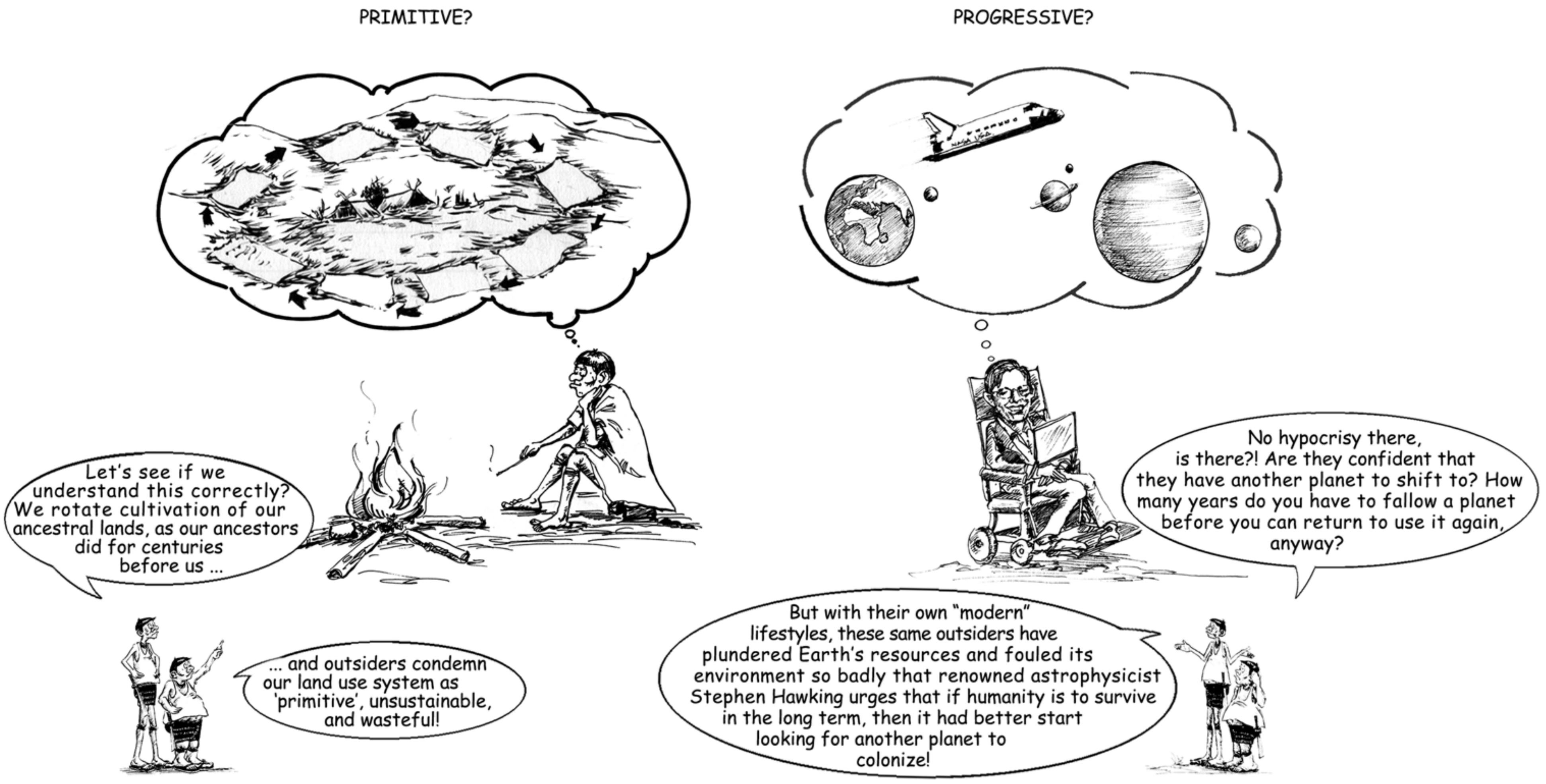


By the time the intrepid adventurers arrived, the transformation was complete and the village scene had been rolled back a century. The visitors clicked happily away, intent on another coffee-table picture book.

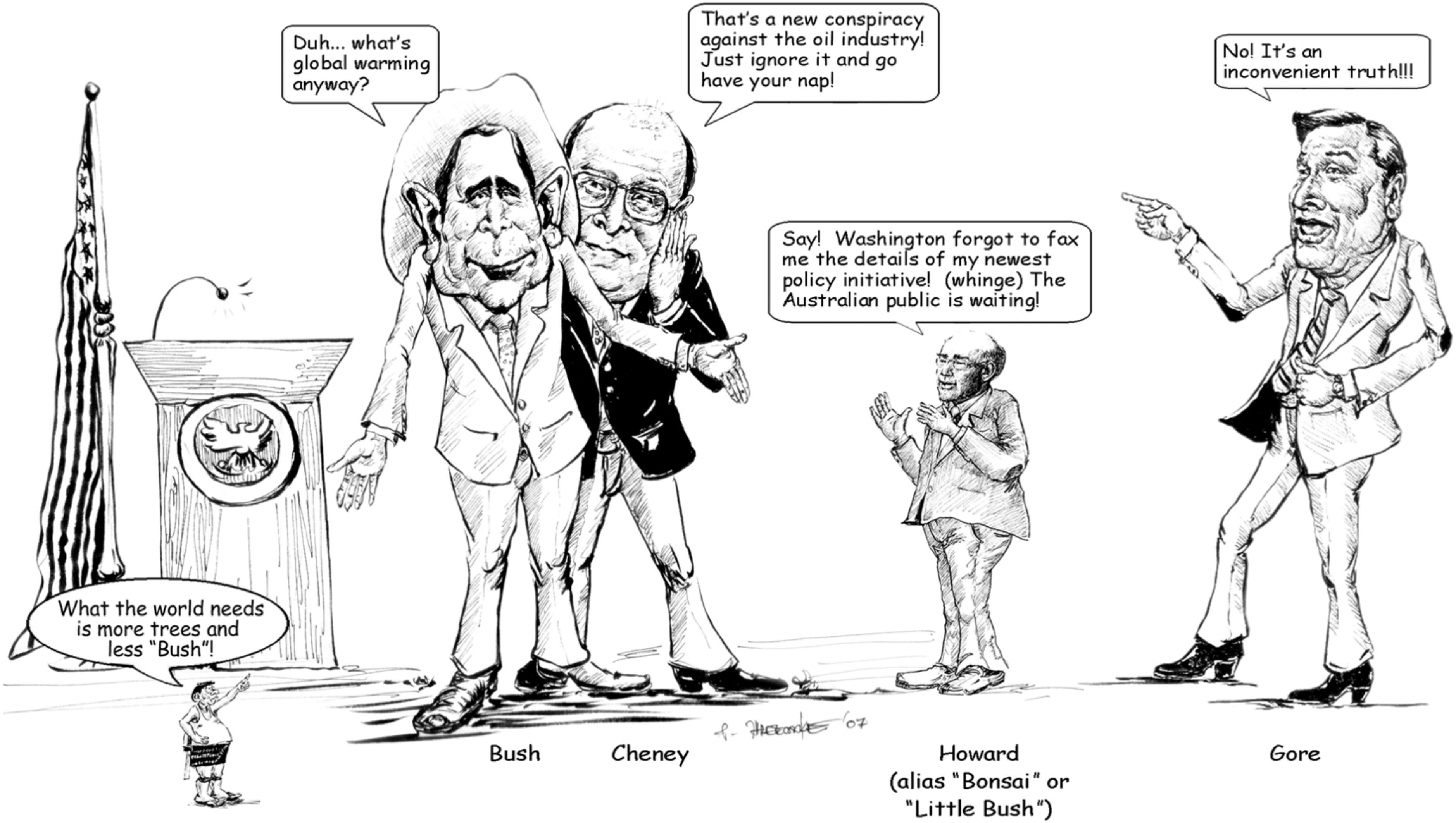
DO LOWLAND POPULATIONS REALLY HAVE THE MORAL AUTHORITY TO CRITICIZE SHIFTING CULTIVATORS FOR THEIR ENVIRONMENTAL IMPACTS?



MAYBE WIDER SOCIETY ACTUALLY HAS SOMETHING TO LEARN FROM SHIFTING CULTIVATORS ABOUT SUSTAINABLE MANAGEMENT OF THE EARTH'S RESOURCES?



THE BUSH ADMINISTRATION'S APPALLING RECORD IN ADDRESSING ENVIRONMENTAL PROBLEMS



THE NEED FOR PROBLEM-ORIENTED RESEARCH THAT PROVIDES PRACTICAL SOLUTIONS TO FARMERS

How often are scientists' efforts really aimed at providing tangible benefits to farmers? And how often at simply building the long publication records that they need to climb their career ladders? There is also a problem in that the knowledge and innovations that farmers willingly share with researchers are often not properly acknowledged.

SOMETIMES IT CAN BE DIFFICULT FOR RESEARCHERS TO STRIKE A BALANCE BETWEEN THOROUGH FIELD WORK AND IMPOSING OVERLY ON THE HOST COMMUNITY