INEQUALITY OF LANDHOLDING IN NEPAL: SOME POLICY ISSUES

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Introduction

Nepal has overwhelmingly an agrarian economy. As of 1991, 81% of the total economically active population in the country was engaged in the agriculture sector (CBSa, 1995). In the fiscal year 1974/75 the agriculture sector in Nepal contributed 72% to the total national Gross Domestic Product (GDP). Eighteen years later in 1992/93, its percentage share constituted 45.6% (MOF, 1995). Thus, although there has been over the years a substantial decline in the share of the agriculture in the GDP, agriculture still commands a significant share of the economic activities in Nepal. In view of these factors, improvement in agriculture has continued to be a priority in the country's national development plans.

One of the policy issues aimed at improving the agriculture sector concerns the concentration of landholding. It is often argued that a high degree of concentration of land deters the productivity and the potential for improvement, since it tends to marginalize the interest of a large proportion of the farmers. It is, therefore, argued that better distribution of land is essential in increasing agricultural productivity and improving the overall agricultural sector. To the extent that equity in land distribution is a major policy intervention, it is imperative to assess the situation of land concentration in the country.

This paper analyzes the pattern of land concentration in the 75 districts of Nepal. Second, we examine the factors associated with the variation in land concentration. Finally, we analyze the relationship between land concentration and agricultural production and draw policy implications of the findings.

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Data and Methods

The data used in the analysis refer to the year around 1991. The data used to estimate land concentration are from the agricultural census (CBS, 1993b). The agricultural census collected data on the size of the landholding and the number of landholders.

Land concentration is measured by Gini Ratio or Gini index. Gini index has long (since 1905) been used to measure inequalities in the distribution of wealth or income (Lorenz, 1905). Gini index is a summary measure of inequality; the value of the index ranges between 0 and 1. A value closer to 0 indicates minimum inequality of the distribution of wealth and a value closer to 1 indicates the existence of severe inequalities. In our analysis, Gini index shows the distribution of operational land area compared with the distribution of number of holdings (or holders). Hence, if the land were equally distributed among the number of holders, there would be no inequality.

Agricultural production data are taken from the agricultural statistics (NPCS, 1994). In our analysis, agriculture production includes eight items: paddy, maize, millet, wheat, barley, oil seed, potato, and sugarcane. These items represent 87% of all the agricultural products nationally.

The data of the eight production items are converted into a standard measure of output, per capita calories per annum, by using the recommended calorie conversion factors (MOA, 1994). The population data from the 1991 census (CBS, 1993c) are used to compute per capita values.

The following ten variables are used as indicators of the socioeconomic development of the districts: (1) topography, (2) road, (3) non-agricultural population, (4) literacy, (5) urbanization, (6) resource access, (7) household modernity, (8) infant mortality, (9) cultivated land, and (10) land tenure.

Topography refers to the percentage of land in each district with greater than 30 degree slope (Subedi, 1995). *Road* refers to the length of road (black-topped, graveled or earthen) in kilometers per 1,000 hectare of land area (Ministry of Works and Transport, 1991).

Non-agricultural population refers to the percentage of economically active population 10 years and older engaged in the non-agricultural sector (CBS, 1993e). *Literacy* refers to the percentage of people six years and older who can read, write and count (CBS, 1993f). *Urbanization* refers to percent of population that lives in nationally defined urban areas (CBS, 1994). *Resource access* refers to the total bank deposits and credits in each district, as reported by the commercial banks as of mid-1991 (Nepal Rastra Bank, nd). *Household modernity* refers to percentage of households who own a bicycle, as reported in the 1991/92 survey (Ministry of Health, 1993).

Public health services utilization refers to percentage of currently married women in reproductive age group (15-49) who have used various maternal and child health services. The services include the following: live births in the five years preceding the survey whose mothers received at least one tetanus toxoid injection (TTI); children among those aged 12-59 months who have received *Bacille Calmette Guerin* (BCG) vaccine; children among those aged 12-59 who have received three doses of *Diphtheria Pertussis Tetanus* (DPT) vaccine; children among those aged 12-59 months who have received three doses of the polio vaccine; children among those 12-59 months who have received the measles vaccine; children under 5 years of age with diarrhea in the two weeks preceding the survey who were given oral rehydration therapy (ORT), either purchased or home-prepared solution; currently married women, with a birth in the five years preceding the survey, who received antenatal care from a doctor, trained nurse/midwife or traditional birth attendant; and women of reproductive age, 15-49, who are currently-in-union and are using contraception to space or limit pregnancies. These data are calculated from a 1991/92 national survey and described in detail elsewhere (Thapa, 1996).

Infant mortality refers to the average number of deaths under one year of age per 1,000 live births during a specific year. The rates are based on the application of an indirect technique to the 1991 census data (Thapa, 1996). *Cultivated land* refers to the amount (in hectares) of cultivated land including, arable land and land under permanent crops (CBS, 1993b). *Land tenure* refers to the percentage of total number of landholding self owned, not rented to or from others (CBS, 1993b).

Results

Table 1 shows the concentration of land, measured by Gini index, in the 75 districts. The table also shows the ranking of the districts, from relatively better to worse situation.

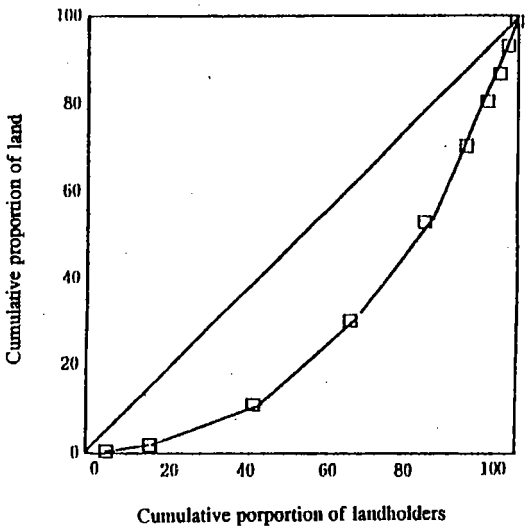
Land concentration ranges from a low of 0.329 in Mugu district to a high of 0.674 in Parbat district. Thus there is a difference of 0.345 among the districts, with the national average of 0.518. Figure 1 shows Lorenz Curve for all Nepal, which shows the pattern of distribution of operational land and number of holders. Gini index refers to the proportion of the total area under the diagonal that lies in the area between the diagonal and the Lorenz curve.

Table 1. Inequality of landholding (as measured by Gini Index) and Gini Rank of 75 districts, Nepal, 1991

District	Gini Index	Gini Rank	District	Gini Index	Gini Rank
Mugu	0.329	1	Udayapur	0.442	39
Humla	0.354	2	Sindhupalchowk	0.443	40
Rukum	0.363	3	Lamjung	0.444	41
Dhading	0.364	4	Manang	0.445	42
Bhaktapur	0.365	5	Solokhombu	0.447	43
Dolkha	0.366	6	Dailekh	0.449	44
Kalikot	0.373	7	Dhankuta	0.450	45
Nuwakot	0.376	8	Kaski	0.451	46
Jumla	0.377	9	Gulmi	0.454	47
Palpa	0.378	10	Pyuthan	0.463	48
Syanja	0.385	11	Rasuwa	0.464	49
Bajhang	0.387	12	Taplejung	0.467	50
Salyan	0.388	13	Bajura	0.468	51
Dadeldhura	0.390	14	Ilam	0.469	52
Myagdi	0.392	15	Rupandehi	0.470	53
Jajarkot	0.394	16	Banke	0.472	54
Gorkha	0.395	17	Chitawan	0.492	55
Achham	0.400	18	Dang	0.505	56
Makwanpur	0.401	19	Khotang	0.506	57
Bhojpur	0.403	20	Panchthar	0.510	58
Doti	0.408	21	Bardiya	0.515	59
Sankhuwasabha	0.410	22	Kapilbastu	0.517	60
Kavrepalanchowk	0.412	23	Saptari	0.529	61
Surkhet	0.413	24	Nawalparasi	0.532	62
Tanahu	0.416	25	Rautahat	0.533	63
Baitadi	0.419	26	Bara	0.537	64
Dolpa	0.421	27	Kailali	0.538	65
Sindhuli	0.422	28	Siraha	0.539	66
Lalitpur	0.423	29	Sunsari	0.541	67
Arghakhanchi	0.424	30	Mahotari	0.542	68
Kathmandu	0.425	31	Sarlahi	0.543	69
Rolpa	0.428	32	Morang	0.544	70
Okhaldhunga	0.430	33	Jhapa	0.551	71
Baglung	0.434	34	Terhathum	0.558	72
Ramechap	0.435	35	Dhanusha	0.560	73
Mustang	0.436	36	Parsa	0.592	74
Kanchanpur	0.438	37	Parbat	0.674	75
Darchula	0.441	38	**All Nepal**	**0.518**	na

Source: Calculated by the authors based on data from the Central Bureau of Statistics (CBS, 1993b). na = not appliable.

Figure 1. Inequality of landholding, Nepal, 1991



In 18 districts, the values range between 0.329 and up to 0.40. These districts have relatively better land distribution situation. That is, these districts have a better balance between the distribution of cultivated land and the number of landholders. In the next 37 districts, the values range between 0.40 and up to 0.50. Compared to the first group of 18 districts, these 37 districts have a relatively worse land concentration situation. An additional 20 districts have the Gini index of over 0.50. These districts have the worst land distribution situation compared to all the other districts. One district (Parbat) has an index value of 0.67, the most unequal distribution of land in the country.

What then accounts for the variations in land distribution? Or what explains better or worse land distribution patterns in the country? In Table 2 we present linear correlation coefficients (r) between concentration of landholding (Gini index) and several socioeconomic and ecological variables for the 75 districts. (In the analysis, Parbat district is excluded because of a statistical anomaly, that is, high standardized residual.) Several interesting results emerge from the data.

First, inequality in landholding in the districts is positively associated with selected indicators of the development level of the districts. The better the geographical topography of a district, the more unequal is the landholding pattern. Districts with higher percentage of non-agricultural population have higher inequality of the distribution land. Similarly, districts with higher percentage of households with modernity asset have higher level of inequality. Infant mortality is lower in districts with higher inequality of landholding. Second, certain development indicators such as

road, literacy and urbanization do not have any significant association with landholding inequality.

Table 2. Correlation of inequality of landholding (Gini Index) with selected indicators of development, 74 districts, Nepal, 1991

Indicator (Variable)	Correlation with Gini Index
Topography	0.612**
Road	0.049
Non-agricultural population	0.390**
Literacy	0.042
Urbanization	0.119
Household modernity	0.585**
Infant mortality	–0.367**
Land ownership	0.513**
Cultivated land	0.729**

** $p<.001$

Note: For definition of the variables, see text. Parbat district is excluded because of high standardized residuals.

Third, the results in the table further suggest that among the variables examined the most important determinant of the inequality of landholding is the amount of cultivated land ($r=0.729$; $p<.001$). The holding is moreunequally distributed in the districts that have larger amount of cultivated land available. Conversely, the land distribution is more even in those districts that have smaller amount of total cultivated land. This implies that in the districts with more unequal distribution of land, the average size of landholding are larger than in the districts with more unequal distribution of land. This is confirmed by the correlation of 0.740 ($p<.001$) between average size of the landholding and Gini index. Further, the correlation between the median size of landholding and Gini index in the districts is 0.555 ($p<.001$) and the range in landholding median size is from a low of 0.21 (in Achham district) to a high of 1.24 hectares (in Bardiya district). The size of landholding even among the 95 percentile of landholders ranges from a low of 0.86 hecator (in Achham district) to a high of 5.83 hectors (in Kapilvastu district).

The results challenge the notion that better equity in land distribution will necessarily lead to the improvements in agricultural sector in Nepal. The

results further raise question as to whether a better distribution of land is a desirable policy intervention to bring about the desired improvements.

We also carried out multivariate regression analysis to test the independent effect of the statistically significant explanatory variables (as shown in Table 2). Some of the explanatory variables are, however, strongly correlated ($r>0.65$) with one another. Strong correlation exists between topography and cultivated land, topography and household modernity asset, road and non-agricultural population, road and urbanization, non-agricultural population and urbanization, and household modernity asset and cultivated land (Table 3).

To avoid the problem of multicollinearity, we estimated five separate regression equations by including the variable, cultivated land, and each of the significant variables in each equations. The results are presented in Table 4. The effect on land inequality of the other variables (viz, topography, non-agricultural population, household modernity, and infant mortality) is statistically insignificant once the variable, cultivated land, is introduced in the equation. Ownership of land and the availability of the amount of cultivated land have independent effects on land concentration. The two factors explain 58% of the total variation in land inequality. Furthermore, of the two variables, land availability assumes the principle role in determining factor of the inequality of the distribution of land in Nepal.

The question of better equity in land distribution is important from the ultimate point of view of productivity. Does better equity in land necessarily mean higher productivity? To examine this, we first did a bivariate regression analysis between the Gini index and annual agricultural production in per capita calories based on the district-level data (excluding Bara and Parbat districts due to high standardized residuals). The scatter-plots are shown in Figure 2. The correlation coefficient between land inequality and production is 0.523 ($p<.001$). This means that production is higher in districts that have higher inequality of landholding.

We further carried out a structural model by using the path analysis (Hanushek and Jackson, 1977) in which agricultural production is a function of land inequality, land ownership and cultivated land. Land inequality is considered an intervening variable. The results are presented in Figure 3.

The variables land ownership and cultivated land do not have a significant *direct effect* on agricultural production. The effects of the two antecedent factors on agricultural production are *indirect*, that is, primarily through land inequality. The *indirect effect* of cultivated land is .271 (or .619 x .438) and the *direct effect* is .124 (or .619 x .200). Thus, the *total effect* is .395. Over two-thirds (68.6%) of the effect of cultivated land on agricultural production operates through land inequality.

Table 3. Simple correlation (r) between the explanatory variables, 74 districts, Nepal, 1991

Variable	Topog-raphy	Road	Non-agricu-ltural popul-ation	Literacy	Urbani-zation	Household 'modernity	Infant mortality	Land ownership	Cultivate-d land
Topography	1.000								
Road	.483**	1.000							
Non-agricultural population	.526**	.735**	1.000						
Literacy	.167	.514**	.496**	1.000					
Urbanization	.434**	.806**	.830**	.549**	1.000				
Household modernity	.753**	.405**	.665**	.154	.563**	1.000			
Infant mortality	.451**	-.345*	-.464**	-.501**	-.362**	-.328**	1.000		
Land ownership	.577**	-.601**	-.564**	-.282*	-.463**	-.411**	.272*	1.000	
Cultivated land	.747**	.111	.339*	.019	.146	.660**	-.368**	-.280*	1.000

*p<.01; **p<.001

Note: Parbat district is excluded because of high standardized residuals.

Table 4. Linear regression results of the effects of cultivated land and other variables on landholding inequality (Gini Index): 74 districts, Nepal, 1991

Equation and independent variables	Beta Coefficient	R^2 (%)	F-ratio
Equation One			
Topography	.152		
Cultivated land	.615**		
		52.84	41.90**
Equation Two			
Non-agricultural population	.162		
Cultivated land	.674**		
		54.17	44.14**
Equation Three			
Household modernity	.184		
Cultivated land	.607**		
		53.76	43.44**
Equation Four			
Infant mortality	-.114		
Cultivated land	.687**		
		52.96	42.09**
Equation Five			
Land ownership	-.280**		
Cultivated land	.619**		
		58.03	50.77**

** p<.001

Note: For equations one to four, Parbat district is excluded because of high standardized residuals. Equation five is based on data from 73 districts. Parbat and Bhaktapur districts are excluded because of high standardized residuals.

Similarly, the indirect effect of land ownership on agricultural production through land inequality is -.123 (or .438 x -.280) and the direct effect is only -.036 (or -.280 x .127). The total effect is -.159. More than three-fourths (77.4%) of the effect of land ownership operates through land inequality.

The results presented in Figure 3 also indicates that only 29.9% of the total variation in agricultural production is accounted for by the three variables considered in the model; and about 70% of the variance remains unexplained. At the same time however, the two antecedent factors (land ownership and cultivated land) explain 58% of the total variance in landholding inequality.

Overall, the results imply that one main reason for low agricultural productivity is smaller size of the landholding. Clearly, better distribution of land does not necessarily mean higher productivity.

Figure 2. Relationship between concentration of land-holding (Gini ratio) and agricultural production (per capita calories per annum): 73 districts, Nepal, 1991

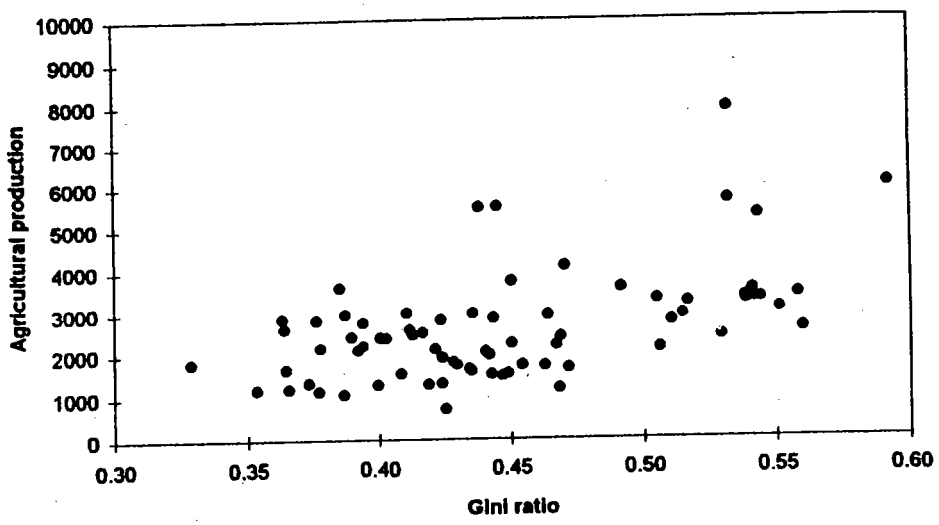
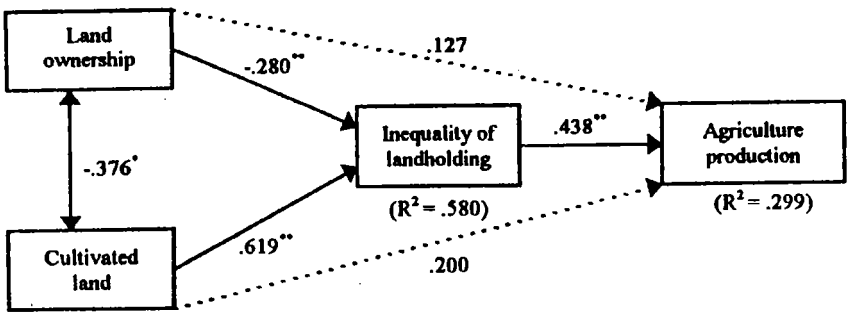


Figure 3. Determinants of inequality of landholding and agricultural-productivity in 73 districts of Nepal: A reduced-form model based on the Path analysis



*p < .01; ** p < .001
Note: Dotted line indicates that the relationship is not significant at p<.05.

Conclusion

In Nepal, more equal distribution of land exists in less developed and topographically rugged districts. Conversely, more unequal distribution of land exits in socioeconomically and topographically better off districts.

The main factor accounting for the variations in inequality in landholding is the amount of cultivated land. In the least developed and topographically rugged districts such as Mugu and Humla, there is a better distribution of landholding, but the amount of land per holder is considerably less than in other better off districts.

To the extent that increasing agricultural productivity is the ultimate goal, the better distribution of land is associated with less productivity in the districts. Agricultural productivity is significantly higher in districts that have larger amount of cultivated land.

In Nepal, better distribution of landholding appears, therefore, to be an *indicator of poverty*. The worse off the districts are, the better the land distribution and vice-versa. This implies that poverty alleviation can not be brought about by a better distribution of the cultivated land. More fragmentation of land is not the route to poverty alleviation. Such a policy prescription will only worsen the overall agriculture productivity and consequently aggravate poverty in Nepal.

The analysis of the district-level data clearly show that efforts to bring about better equity in the distribution of land will not lead to the improvements in the agricultural sector in Nepal. If new land, especially in the most impoverished districts could be brought into cultivation, the amount of production could increase. It will, however, be a difficult proposition, since there is already a scare supply of cultivable land in such districts (Chhetry, 1995). Instead, other types of policy interventions are warranted. They may include, increases in off farm employment, increase in production through improved technologies (e.g., intensive farming practices), expansion of irrigation facilities, higher use of fertilizers, and expansion of high-value crops. These policy interventions have been examined in detail in a recently completed long-term agricultural perspective plan (APROSC and JMA, 1995). Policies and programs need to focus on those aspects.

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