

DYNAMIC PROCESSES OF LAND ACQUISITION: DOES MIGRANT GAIN FROM THE CHANGES OF LAND TEN- URE SYSTEM? EMPIRICAL EVIDENCE IN THE LORE LINDU NATIONAL PARK-INDONESIA

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Abstract: The proposed paper analyses an important question related to the dynamic processes of land acquisition along with the changes of government regulations., taking the case of the Lore Lindu National Park in Central Sulawesi, Indonesia, as an example. The analysis consists of two parts. The first part of the analysis deals with processes of impoverishment in the area of the Lore Lindu National Park. The dynamic process of land acquisition was analysed by using tobit model divided into three important process of land acquisition are forest land, family land and purchase land acquisition. The results showed that there is a close relationship between poverty and forest land acquisition. Family land acquisition is influenced by various factors, including the ownership of forest land and household ethnicity where local/ indigenous people tend to bequeath their lowland or rice land to their extended family. This means that they still maintain their values and that land is a source of self-insurance. The process of land acquisition by purchase is related to the welfare status of the household and the household's ethnicity. The wealthier households and non-local/migrant people accumulate land through purchase from other households while the poorer households use their family labour to clear the forest land. The findings on different modes of land acquisition show that when the traditional mode of land acquisition through clearing forest and inheritance become uncommon and when land becomes scarce, this activates a process of land acquisition through purchase. The second part of the analysis deals with the potential of current policy approaches to solve the complexities of the land acquisition which lead a potential conflict between villager and villager and between villager and government.

Key Words: Land Tenure System, The Process of Land Acquisition, Transformation of Land Ownership, Land Use Change

LAND TENURE AND LAND USE CHANGE IN THE LORE LINDU AREA

The land tenure system is considered to be one of the most important aspects of the farm economy since the main occupation of most households in the area is farming. Access to land in rural areas is an important input for the farmer livelihood. Combined with other variables of input and assets, access to

land helps rural households generate their income.

Land tenure in Central Sulawesi has fundamentally transformed since 1953, when land ownership was converted from the traditional form of ownership in which the land belonged to kings to state ownership. Formerly the king of each region or *swapraja*, which represented each ethnicity in the province, had full access to and control over the land in his territory.

After the change in land ownership status, the state became an agent which had control over the land. This circumstance was then strengthened by a new regulation issued by the Central Sulawesi Governor in 1993 (Governor Decree no. 592.2/33/1993). It stated that the land in Central Sulawesi Province, which previously belonged to the *swapraja*, should be handed over to the state. After this regulation came into act, the process of land tenure started to change.

However, the transformation of land ownership was not beneficial for people who had inherited land from their ancestors which was inside a national park or even on the margin of the forest area. The new regulation prohibited those people from cultivating or even claiming their land, even though they actually had a right to it.

Different types of land acquisition are illustrated in Figure 1. Three important sources of households' access to land are heritage, purchase, and cleared primary forest.

The various processes of land acquisition can be summarized as follows:

In general, households that live in villages located at the forest margin have relatively greater access to the forested land. They begin land preparation for farming by clearing primary forest with the slash and burn method, which is then followed by shifting cultivation. Each new generation requires more land for their farming activities which leads to an expansion of this system over time. Because of some strict regulations from local governments, people experience difficulty when they try to clear the forest. In the case of the current generation, land is obtained through inheritance particularly in lowland areas. Migrants often purchase land from local people.

Table 1 gives an explanation of different types of land acquired by different welfare status groups and ethnic groups. Comparing the three groups, the poorest and local ethnic households obtain farmland mostly by clearing primary forest; an average size is 7.9 Ha. The situation is different respecting the highest welfare group and non-local ethnic group; they acquire land by purchasing it (with, high significance level).

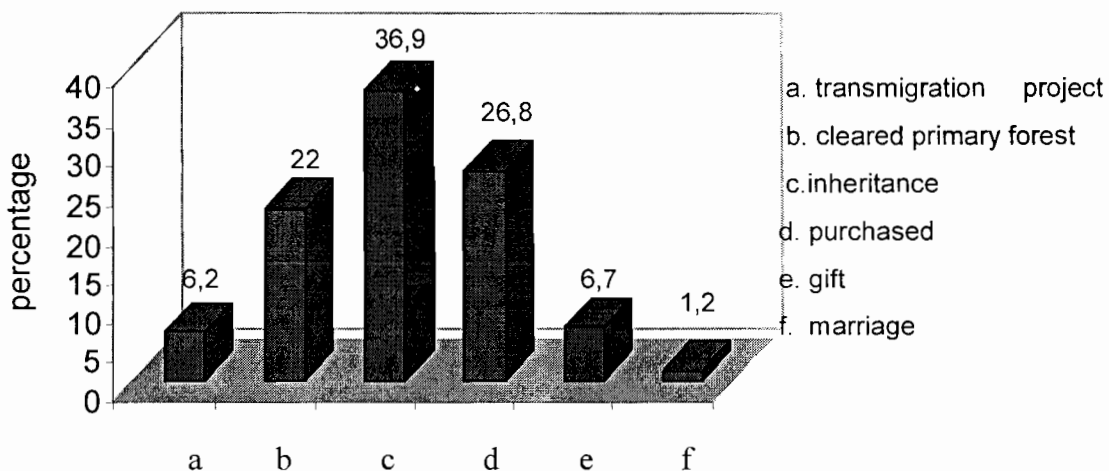


Figure 1. Different Modes of Households' Access to Land in Central Sulawesi

Table 1. Different Types of Land Acquired, by Poverty Groups and Ethnicity (mean land size in Ha)

Modes of land acquired	The poorest		Poor		Less poor	
	Local N=86	Non local N=10	local N=86	Non local N=13	local N=61	Non local N=37
Transmigration	0.5	0.0	0.5	0.0	3.1	0.4
Cleared forest	7.9	1.0	5.7	3.0	4.8	0.5
Purchased	0.4	13.6	2.2	12.3	6.1	18.1
Heritage	6.1	2.6	6.1	2.0	8.1	5.5
Gift	0.6	0.3	1.1	1.6	1.4	2.0
Married	0.4	0.0	0.0	0.6	0.0	0.1

On the average, each farm household in the research area controls more than 1.50 Ha. However, some of the households are able to control much more land which creates even more disparity between different groups. This can be seen by calculating the Gini Index for land distribution. The Gini Index measures the difference between the actual distribution curve and the 45° line which represents absolute equality (Lorenz curve). The gap between the actual distribution curve and the equality line is a function of the degree of inequality. In an egalitarian society, the Gini would be 0.000, because the Lorenz curve would match the 45° line perfectly; a higher Gini Index means a greater distance between these curves and a more unequal distribution of land ownership. The Gini

Index for the research area is 0.46. This means that land distribution in the research area is still within the tolerable range, if the Gini Index is lower than 0.5. However, in the long run some issues should be considered, particularly the high number of households encroaching into the forest and the fact that wealthier households accumulate their land by buying land from the poorest, which concentrates land ownership in the hands of a few households. The descriptive analysis shows that there are significant differences in the amount of land owned by different poverty groups (f test significant at the 5 percent level). The average amounts of land owned by each of groups are 1.936, 1.549, and 2.176 Ha (the poorest, poor and less poor, respectively)

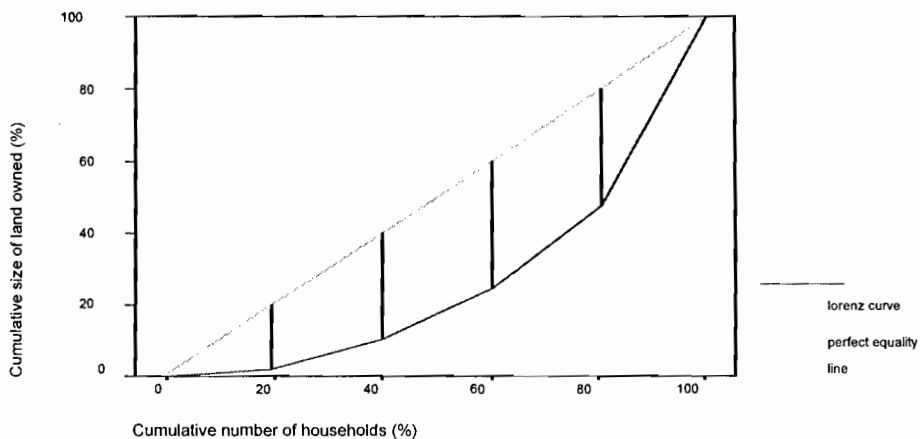


Figure 2. Land Distribution among Households Sampled in Research Area Using The Gini Index

The wealthier households accumulate their land by purchasing it from the households in the lower strata: for example, from the poorest households. For the poorest households, land holding is not merely an asset for agricultural practices but even more a form of social security which is directed for relaxing lack of capital to fulfil their basic needs. In some villages, it has been found that security is the only motivation of the poorest to control land over 2.00 ha. In case of a sudden health problem or educational expense, they can sell their land at a lower price than the normal market price for land (in some cases, it was found that households which faced liquidity problems sold 1 Ha. of their land for only 250,000 rupiah).

LAND TENURE SECURITY

In terms of the ethnicity of the land owners, the problem of land distribution became more important recently. As depicted in Table. 1 (in the previous sub section), the mode of land acquisition differs significantly between indigenous people (local people) and immigrants (non-local people). The process of land acquisition by immigrants has changed the land ownership structure in some villages in the forest margin area. The most important way for migrants in different livelihood strata to gain access to land is by purchasing it.

Unlike immigrants, the two important ways local people within different poverty groups gain access to land are by clearing primary forest and inheritance (allocated among family members).

The change of land ownership from local people to immigrants is considered one cause of the higher incidences of encroachment. Interviews with some immigrants yielded information on the process of land acquisition. The proc-

ess of land occupation can be summarized as follows:

In the first years after arrival, immigrants work as tenants and in other sectors such as a trade. They establish their livelihood and accumulate assets and capital for at least five years after which they buy a piece of land and cultivate it with perennial crops such as coffee and cocoa. The village headman who represents the local government witnesses this process. In some cases, the processes of land transactions are completed without a legal land transfer and land certificate. In terms of land security, particularly from the collateralization effect his has a negative impact if those households want to borrow money from a formal credit institution because the land cannot be used as collateral.

Table 2 gives a detailed picture of different modes of land acquisition concluded with different degrees of land ownership. The degree of land security can be seen from the different types of land registration. The highest degree of land security is achieved with the land ownership certificate which is issued by The National Agrarian Board (Badan Pertanahan Nasional). The lowest degree exists when the households have a right of use granted by the village headman. In that case, the time duration is very limited. More than 40 percent of the plots gained by different modes of land acquisition do not have a letter of land ownership. Even in the case of land transactions through purchase, only 20 percent of the plots were transferred with a land certificate. The fact, that the number of Registered plots were less than 80 percent leads to potential conflicts not only among the inhabitants but also between the inhabitants and the government.

The village headman has the authority to issue a letter of temporary land ownership after a land transaction. How-

ever, the letter issued by the village headman is not strong enough to avoid potential land conflict in the future. The households which have these letters cannot argue that the land belongs to them if someone has another letter of certificate registered by the government. Therefore, the process of land acquisition must be followed by formal land registration. The complexity of the land

registration process and the lack of awareness of the importance of land registration are two reasons why many households do not have a land certificate. As a result, the number of households that register their land, according to the head of BPN District Donggala, is less than 20 percent of the households which hold land certificates.

Table 2. Number of Plots, by Type of Letter of Land Ownership

Mode of land Acquired	Letter of land ownership (number of plots)				No Title	Total number of plot
	Certificate	LT ^a	LVH ^b	Others		
Transmigration	13 (19.7)	4 (6.1)	9 (13.6)	11 (16.7)	29 (43.9)	66 (100)
Cleared forest	12 (6.8)	-	14 (6.8)	5 (2.4)	175 (85)	206 (100)
Inheritance	61 (16.7)	4 (1.1)	33 (9.1)	25 (6.9)	241 (66.2)	364 (100)
Purchase	58 (22.0)	30 (11.4)	34 (12.9)	14 (5.3)	128 (48.7)	263 (100)
Gift	10 (15.1)	-	5 (7.6)	4 (6.1)	47 (71.2)	66 (100)
Married	3 (27.3)	-	-	-	8 (72.7)	11 (100)

Note: number in parentheses is percentage

^a = letter of land transaction

^b = letter from village headman

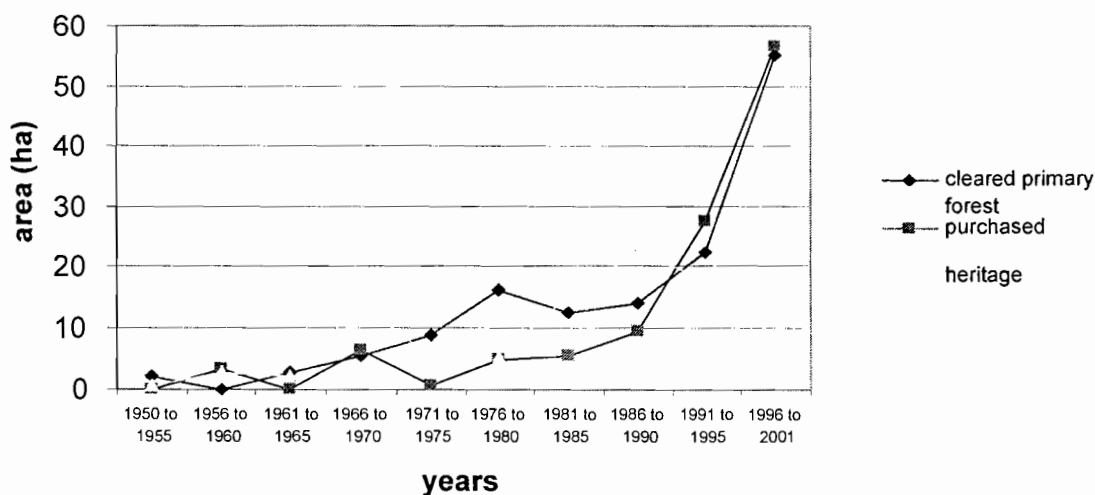


Figure 3. Type of Acquisition of Upland from 1950-2001

To increase the number of transactions concluded with a land certificate the government created a subsidized land certification program (PRONA). At the regional level, it is decided which

villages will obtain a land certification program while considering budget limitations. Due to the process of the village selection, coverage of land registration is not spread among all villagers within one

village or even all among villages in one district. Nevertheless, the cost of land Registration through PRONA is cheaper than the normal procedure conducted by households which are willing to register their land. The cost for getting land certified without any subsidy from the government is over 1000000 rupiah compared to 250,000 rupiah per plot through PRONA.

Different types of land acquired by households in the upland and from 1951 to 2000 are depicted in figure 3. The findings were the results of the response to the question that were asked, as to how they had acquired their plots. In the last fifteen years, dry land acquisition through purchase, either completed with a title or in an informal land market transaction, increased tremendously.

Meanwhile, the amount of cleared primary forest in the same period followed the same pattern of land purchase activity. Both of the processes of dry land acquisition imply that the amount of single family ownership and private ownership increased.

The pattern of land acquired in Figure 4 does not consider the effect of different age groups of the head households. As suggested Deaton (1997) to avoid the different effects of different age of the head households on the time series data, cohort effect should be consider. Figure 5 depicts a pattern of land acquisition after considering cohort effect. The age of the head of the households was divided into three groups: (1) 20 - 40 years old, (2) 41- 60 years old, and (3) 61 - 83 years old.

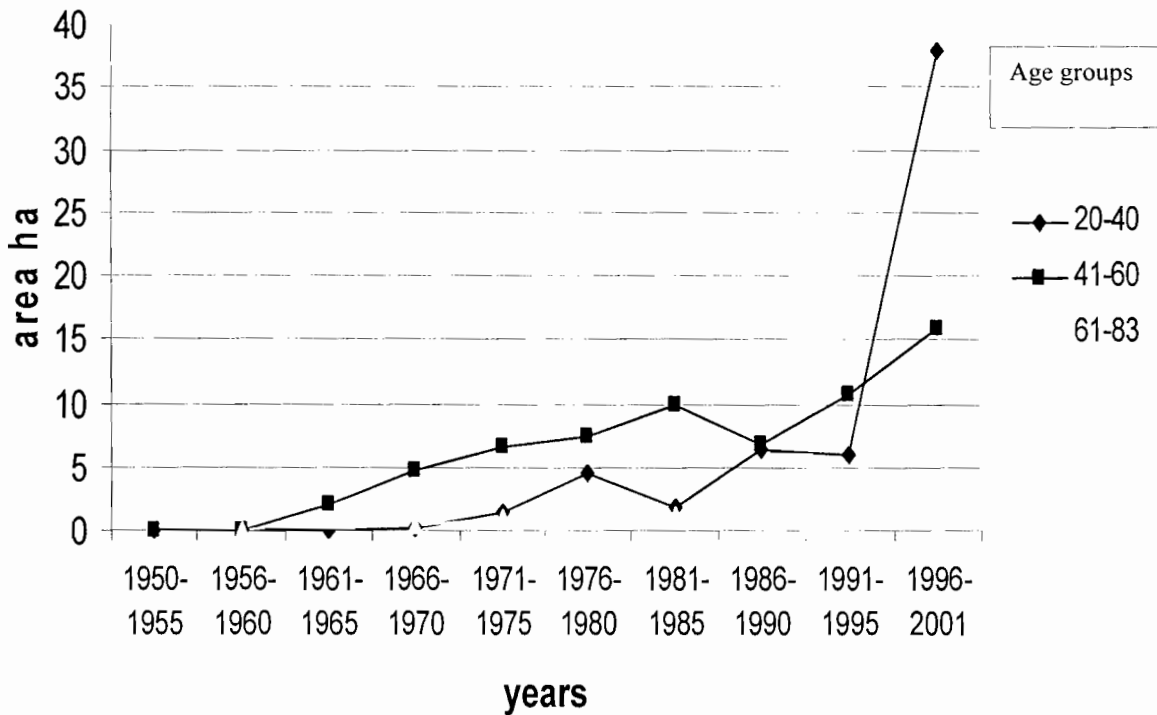


Figure 4. Acquisition of Upland Clearing Primary Forest from 1950 to 2001, Differentiated by Age Groups

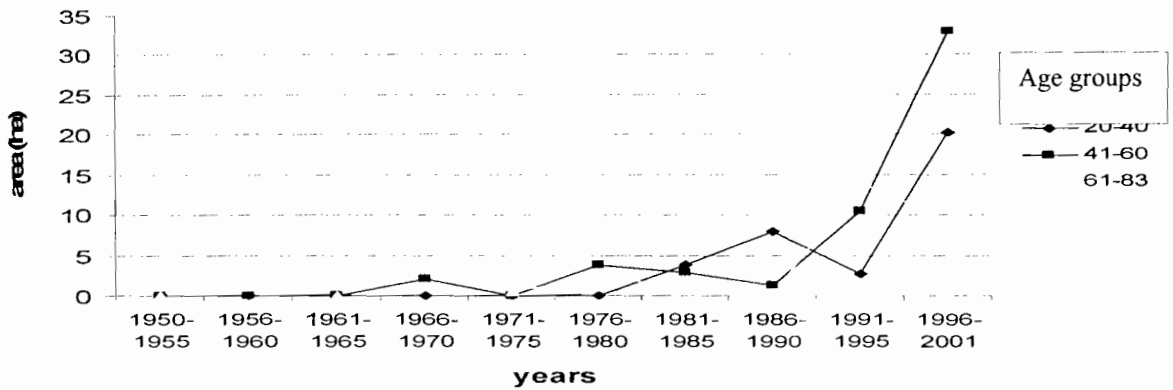


Figure 5. Purchasing of Upland from 1950 to 2001, Differentiated by Age Groups

The three age groups expose different trend of the land acquired by clearing primary forest. The trend of third group was relatively constant throughout the years. The second group exposes an increasing trend in this activity. The head households belong to this group can be categorized in productive age and strong enough to carry out this activity. The increasing trend is more pronounce in the youngest age group. In the last ten years this group accumulated land up to 38 ha.

Besides being in productive age, the second group frequently has achieved better livelihood. The figure shows that the trend of land acquired by purchasing remarkably increased in this

group. Although not so much as the second group, the trend of the first group slightly increased. The third group shows different phenomenon, starting from 1950's the trend fluctuated and in the last ten years seemed to decrease.

A customary system found in the research area is that parents will inherit their own land to the extended family. The Figure 6 shows this circumstance. The first group exhibit the increasing trend. Inheritance process in the second group fluctuated during the years and relatively constant in the third group.

Table 3 gives information concerning different modes of land acquisition in the dry land area differentiated by poverty and ethnic groups.

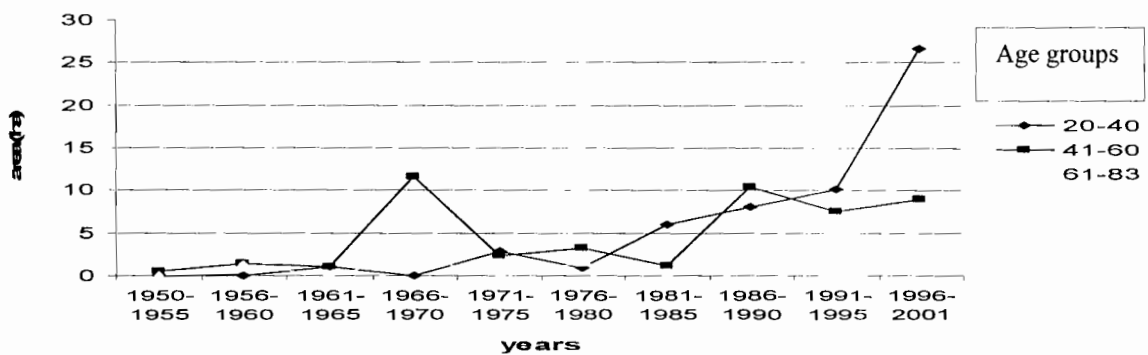


Figure 6. Inheritance of Upland from 1950 to 2001, Differentiated by Age Groups

Table 3. Different Modes of Land Acquisition in Upland According to Different Poverty Groups and Ethnicity

Modes of Land acquisitions	The poorest		Poor		Less poor	
	local N=86	non- local N=10	local N=86	non- local N=13	local N=61	non- local N=37
Cleared forest	7.4	1.0	4.8	2.8	4.3	0.5
Purchased	0.3	11.5	1.2	9.0	3.6	15.1
Inheritance	5.3	1.2	3.9	0.0	3.4	4.8
Gift	0.4	1.5	0.8	1.5	0.9	1.7

Figure 4 shows different types of land acquisition in the lowland area, particularly devoted to paddy from 1951 to 2001. In contrast to the case of dry land, the common mode of land acquisition in rice paddy plots is through inheritance. A rice paddy field is an important asset in rural societies due to its role in maintaining a certain level of food security. Local values also reinforce the prohibition of selling paddy fields. As a consequence the farmers must bequeath this land to their immediate family (son/daughter). The effect of different age groups on the lowland acquisition can be seen in the appendix (Figure 1, 2 and 3).

LAND USE SYSTEM AND TENURE SECURITY

Table 4 provides detailed information at the plot level about different types of land use, differentiated by the way households acquired the land and the degree of land security with which the transaction was completed. The degree of land security is represented by the different types of legal documents.

The first mode of land acquisition is clearing primary forest. The type of land which is often acquired by clearing primary forest is dry land and is cultivated by various perennial crops such as; coffee or cocoa. Almost 87 percent of plots acquired by this process are acquired without any letter of land transfer. These plots seem to be insecure be-

cause they potentially lead to conflicts. Certain rules are followed in order to reduce the conflicts among the villagers. After clearing primary or secondary forest, they put certain trees along the boundary as an indication that the plot belong to someone (information from a personal interview with some households). As also reported by Burkard (2002) conflicts among villagers are rare in a case permanently cultivated plots acquired through cleared forest. However, this situation is still insecure whenever the government inquires about the legal status of their land. The government can argue that the mode of land acquisition was illegal and not register the land in the BPN. Moreover, if these plots are located inside the Lore Lindu National Park, the villagers have very little bargaining power with which to try to keep their plots. The government has another interest to encourage the villagers register their land, in order to obtain income from land tax. Only 8 percent of these plots have an accompanying letter from the village headmen. As explained previously, the village headman has the authority to issue a letter of land transfer, but it is very temporary.

In general, land acquisition through clearing primary/secondary forest is completed without a land title. The second mode of land acquisition is inheritance, which contrary to shows more variety in the types of land titles. For example, in the case of paddy fields (SW)

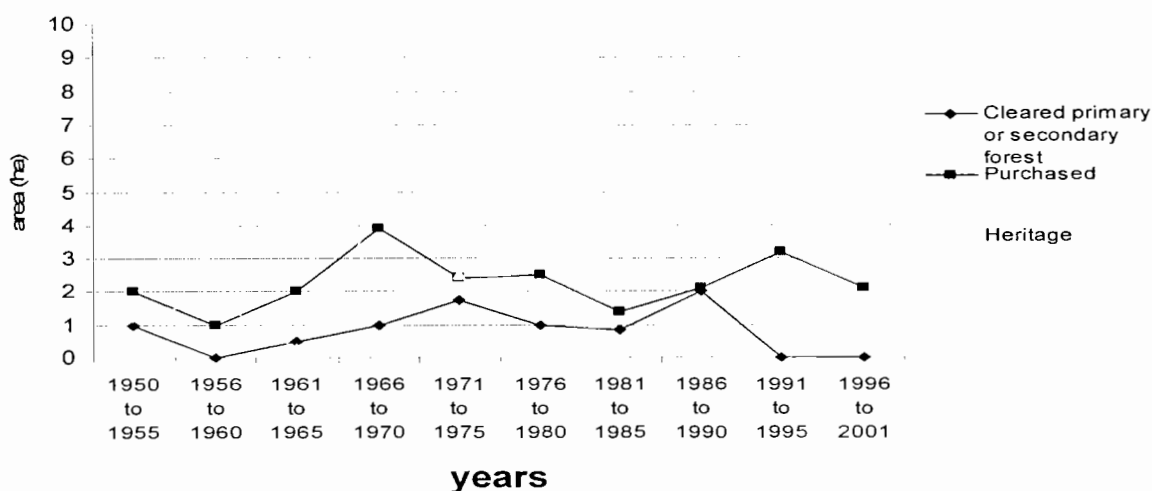


Figure 7. Types of Land Acquisition for Paddy Fields (lowland) from 1950-2001

the percent of plot which had a certificate was 10 percent, 8 percent had a letter of transfer from the village headman, and 9 percent had other types of land titles.

32 percent of the homestead plots which are acquired through in-heritance had a land certificate, and 49 percent did not have any form of legal land transfer. 63 percent of the plots located in lowland cultivated with paddy and 76 percent of the plots in the dry land cropped with perennials crops are acquired without a land title. This lack of land security is hypothesized to lead to a low level of incentives to invest in the long run, such soil conservation.

The land security situation is better when the land is transferred through purchase. For homestead, lowland, and dry land the percentage of plots which had a land certificate are 44, 8, and 17 percent, respectively. However even in the case of the process of land transfer through purchase, many plots are purchased without any legal land transfer. Most of these are dry land plots, with 50 percent of the plot transactions in this category completed without a land certificate.

DETERMINANTS OF LAND POSSESSIONS

The model used to determine the process of land acquisitions follows Otsuka and Quisumbing (2001). This model explains a trend in the type of land acquisition in the research area. The main hypotheses are:

1. In the case when land is not scarce the common mode of acquisition is through clearing forest, followed by inheritance. As land becomes scarce, the process of land acquisition operates through a land market; selling and buying activities;
2. There is a link between poverty and deforestation as can be seen on equation 1.

The formal Tobit model for this analysis is:

$$\text{Forest land acquired by small-holders} = a_0 + a_1 (\text{Vector of exogenous variables}) + a_2 (\text{sub-district dummy}) + e_1 \dots \dots \dots (1)$$

$$\text{Transfer of family land or inheritance} = b_0 + b_1 (\text{Vector of exogenous variables}) + b_2 (\text{sub-district dummy}) + \gamma (\text{forest land acquired by smallholders}) + e_2 \dots \dots \dots (2)$$

Table 4. Distribution of Plots Differentiated by Mode of Land Acquisition, Type of Land, and Type of Land Title.

Modes of Land Acquisition		HS	SW	DL	FG	Nag
Cleared Forest	C	2 (12)	2(33)	6(4)	2(28)	-
	LT	-	-	-	-	-
	LVH	-	-	14(8)	-	-
	O	-	3(50)	2(1)	2(28)	-
	NLT	15(88)	1(17)	142(87)	3(44)	8(100)
	Tot	17(100)	6(100)	164(100)	7(100)	8(100)
Inheritance	C	29(32)	10(14)	18(10)	1(50)	3(15)
	LT	1(1)	-	3(2)	-	-
	LVH	13(14)	8(11)	11(6)	-	1(5)
	O	4(4)	9(12)	10(6)	-	1(5)
	NLT	45(49)	47(63)	132(76)	1(50)	15(75)
	Tot	92(100)	74(100)	174(100)	2(100)	20(100)
Purchase	C	28(44)	3(8)	22(17)	-	5(19)
	LT	5(8)	5(13)	18(14)	-	2(7)
	LVH	3(5)	6(15)	22(17)	-	2(7)
	O	3(5)	4(10)	5(4)	-	2(7)
	NLT	25(39)	21(54)	66(50)	-	16(60)
	Tot	64(100)	39(100)	33(100)	-	27(100)

Notes: C = transaction completed with land certificate,
 LT = completed with letter of land transaction,
 LVH = completed with letter from village headman
 O = other type of land title,
 NLT = transaction completed without land title.

Number in parentheses is percentage of total plot

HS = Homestead
 SW = Paddy field
 DL = Dry land
 Nag = Non-Agricultural Land
 FR = Forest land

Purchased land = $c_1 + c_2$ (Vector of exogenous variables) + c_2 (sub-district dummy) + δ_1 (forest land acquired by smallholders) + δ_2 (transfer of family land) + e_3, \dots (3).

FOREST LAND ACQUISITION AND ISSUE OF POVERTY

The issues of forest encroachment and its agents are still being debated Tole (1998). One of important factors related to forest encroachment is agricultural expansion because of the commercialization of agricultural products. The relative importance of crop income in the re-search area as reported by

Schwarze (2004) is 44 percent of the total household income, with 56 percent generated from perennial and 44 percent from annual crops. Cocoa is considered an important perennial crop. This means that the higher income from crop activities dominated by cocoa encourages households to increase their land possession for agricultural practices by clearing forest. Cocoa is booming in the research area where small holders have attempted to enlarge their land to cultivate cocoa trees since 1990. Moreover, the farmers share of this product as reported by Anggraenie was in 2004, 84 percent FOB (Free on Board) from Central Sulawesi. The attractiveness of cocoa trees attracts

people from outside Central Sulawesi to cultivate it as well as local people.

Table 5 presents descriptive statistics variables used in the Tobit model. Total households was included in the households sample for the analysis of land acquisition are 283 households. All of these households have owned land. Households which had no land were excluded from the analysis.

The results in Table 6 shows that forest land acquisition by small-holders is significantly influenced by household ethnicity, distance to road, social capital, poverty index (as a proxy for different welfare situations) and the dummy variable sub-district Palolo. The other variables have the expected signs although they turned out to be statistically insignificant, such as age of head of household, education of head of household, number of adults. The explanation of each independent variable follows:

As we hypothesized, in our research area there is a close relationship

between poverty and processes of deforestation. Furthermore, the empirical results of the Tobit analysis confirm that poverty is an important variable in determining forest land acquisition. The negative sign and high significance level of this variable explains that the wealthier households (indicated by a higher poverty index) tend to acquire land from cleared primary forest less frequently than other groups. In contrary, Godoy et. al. (1997)) found in Honduras that the wealthier households contribute significantly on deforestation. The higher income of rural households, the larger they cleared primary forest.

The household ethnicity dummy variable also had a negative sign, implying that the local people are more likely to possess land acquired through clearing primary forest than immigrants. As has been pointed out in the preceding subsection, the poorest are mostly local people. This finding is similar to Chomitz (1999) who found that there is close rela-

Table 5. Means and Standard Deviation of Socioeconomic Characteristics Variables in Tobit Model

Variable	Means	Standard deviation
Dependent variable		
Size of land acquisition from the forest	54.28	125.73
Size of family land	77.52	113.58
Size of land purchase	54.98	132.13
Independent variable		
A. Human capital and Socio-economic Characteristics		
Age of head of households (years)	44.07	14.13
Education of head of household (years)	3.86	1.86
Number of adults	3.74	1.71
Migration of head of household (0= non migrant, 1=migrant)	0.51	0.500
Ethnicity of head of household (0=local people, 1= non-local)	0.21	0.41
Index of Social Capital	210,60	261,76
B. Accessibility		
Distance house – road (minute)	0.92	2.71
C. Welfare status		
Poverty index	0.02	1.00
Number of observations		283

Table 6. Determinants of Land Possession at the Household Level; Tobit Regression

Variables	Forest land (cleared forest)		Family land ^a		Purchased	
	Coeff.	t- value	Coeff.	t- value	Coeff.	t- value
Constant	-352.30	-2.82***	32.68	0.47	-147.69	-2.11**
Forest land	-	-	-0.61	-3.46***	-0.133	-1.17
Family land	-	-	-	-	-0.43	-3.30***
Age of head of household	0.92	0.51	-0.61	-0.87	2.13	2.00**
Education of head of household	-3.91	-0.27	-3.15	-0.57	-16.75	-2.00**
Number of adults	14.36	0.97	-0.51	-0.09	1.57	0.17
Migrant status of head of household	24.81	0.50	-52.03	-2.58*	3.35	0.10
Ethnicity	- 219.81	-2.87***	-39.20	-1.47	152.00	3.97***
Distance home-road	12.10	1.62*	8.34	2.45**	7.45	1.24
Index of social capital	0.17	1.84*	0.15	3.98***	0.41	0.68
Poverty index	-51.74	-1.80*	23.68	2.27**	70.13	4.27***
Dummy sub-district Lore Utara	56.19	0.86	119.96	5.00***	112.87	2.87***
Dummy sub-district Palolo	177.22	2.20**	44.52	1.40	43.34	0.94
Dummy sub-district Kulawi	160.31	2.46***	73.68	2.83***	32.54	0.77
Chi-square	48.80		80.08		91.10	
p-value	0.000		0.000		0.000	
Pseudo R square	0.04		0.03		0.05	
Number of observations	283		283		283	

Notes: Family land includes inheritance, gift, and married

***, ** and * are significant at 1, 5, and 10 percent levels respectively

tionship between poverty and deforestation and that the poorest groups are local or indigenous people who lack opportunities elsewhere in the economy. It can be explained that local people which live in the margin area of the forest and far away from a main road depend solely on forestland. This result was supported by the positive sign of the distance variable. Households who live far from the main road indicated that they settled in the forest margin area to have a better access to land from the forest for their agriculture activities. This geographical aspect of the household is considered important for the processes of deforestation.

The fact that the dummy variable sub-district Palolo is statistically significant means that the incidence of house-

holds with land from cleared primary forest is higher compared to other villages. The location of the sub-district Palolo is at the border of a forest (the Lore Lindu National Park) with a population density of 75.8 people/km² and is according to van Rheenen et al. (2003) the second largest densely populated sub-district in the forest margin area. As one of the destinations for the immigrants looking for land, the forest pressure through agricultural activities in this sub-district is very high. Moreover, Maertens (2002) explained that in this sub-district one third of the total area is used for agriculture, while in the others sub-districts this figure is less than 10 percent.

The index of social capital has a positive sign and a 10 percent level of significance. A higher number in the social capital index leads the households to increase land ownership by clearing the forest. In this case, social capital plays an important role in the households' access to the forestland. Social capital refers to the household access to social networks and institutions. When local people interact through the same local organizations, their good relationships and networking supports the activity of clearing the forest.

Sub-district Kulawi (located on the border of Lore Lindu National) as well as sub-district Palolo have a positive sign and high significant coefficients asserting that land was acquired by clearing forest in this sub-district.

FAMILY LAND ACQUISITION

The next column (third and fourth) in Table 6 explains the estimated results for the acquisition of family land which includes inheritance, gifts, and land acquired through marriage. Six out of twelve variables in this model are statistically significant. A detailed explanation of each variable follows: Forest land acquisition has a negative impact on family land holding which suggests that households with a larger forest land holding would decrease the amount of land allocated or given to the extended family.

The ethnicity of the head of the household has a significant negative effect on family land holding. This means that local people tend to bequeath their land to the extended family. This finding is supported by other variables; the dummy variables sub-district Lore Utara and Kulawi have a positive sign and are statistically significant. Compared to other districts, the social values in those

sub-districts are stronger, and villagers still according to their social customs.

The family land holding is influenced by its welfare status can be seen from the positive sign of poverty index with a 5 percent significant level. The wealthier households tend to bequeath their land to their immediate/extended family. This reflects the function of land as an effective instrument to transfer wealth to the next generation.

The social capital index influences family land holding, since family land consists of inherited land, land given as a gift and land acquired through marriage. And it is not transferred as a gift if parties do not have a good relationship before. Therefore, the role of social capital has a positive effect on the land accumulation in this category.

LAND ACQUISITION THROUGH PURCHASE

The last two columns explain the determinants of land acquisition by purchasing. Family land has negative sign with high significantly and also forest land, but insignificantly. Both variables suggest that it is likely that a household will try to find another mode of land acquisition (e.g., purchase) when traditional land transfers, either from ancestors or cleared forest do not suffice. It strengthens the postulate that when land grows scarcer a process of land transactions is activated. This finding is similar to those of Otsuka and Quisumbing (2001) in Ghana.

Contrary to the determinants of land forest acquisition, the variables poverty and ethnicity have a positive sign and are significant at the 1 percent level of significance. It can be explained that wealthier households and non-local/migrant people increase their land accumulation through purchase from others households. One of the motives

for migrants to come to this area is to seek land, and in one village, Watumaeta, the ratio between migrant and local people is one to one (1:1), based on a personal interview with the village headman. Therefore, compare to other sub-districts, the incidence of households accumulating land by buying from others households is significant in the sub-district Lore Utara, to which Watumaeta belongs.

The older the head of the household, the more likely it will be that one can increase land holding through purchase. This can be seen by the positive sign of this coefficient which is significant at the 5 percent level. Probably this occurrence is in line with the ability to maintain their livelihood and accumulates other assets.

CONCLUSION AND POLICY RECOMMENDATIONS

The dynamic process of land acquisition by the rural households can be summarized as follows. In general, households that live in villages located in the forest margins have relatively greater access to forestland. They begin land preparation for farming by clearing primary forest with the slash and burn method, which is followed by shifting cultivation. Each new generation requires more land for their farming activities, which leads to an expansion of this system over time. Because of some strict regulations by local governments, people experience difficulty when they try to clear the forest. In the case of upland areas, common mode for land acquisition is through clear primary forest, even for the young generations. In the case of lowland areas, most land is obtained through inheritance. Migrants often purchase land from local people. Members of the indigenous communities started to sell land, often at prices far below its eco-

nomie value. These changes in land tenure have led to an increasing scarcity of agricultural land for the indigenous population. Another complication is that the process of land transfer often occurs without proof of legal land transfer, such as a land certificate. In term of land security and the function of land as collateral, this evidence has a negative impact particularly if households wish to borrow money from the formal credit market.

This study found that only 20 percent of the plots that belong to rural households have an accompanying land certificate. Respecting these 20 percent, the form of land certificate varies. The complexity of the land registration process as well as the lack of awareness of the households of the need to register land may be a burden to acquiring a land certificate.

The causal analyses of land acquisition showed that there is a close relationship between poverty and forest land acquisition. Also, geographic aspects of the rural households seem to be significant as well. Households which live far from the main roads indicated that they settled in the forest margin area in order to have better access to acquire land from the forest for their agriculture activities.

Family land acquisition is influenced by various factors, including the ownership of forest land and household ethnicity where local/indigenous people tend to bequeath their land to their extended family. This means that they still maintain their values and that land has a security function; therefore they have to bequeath the land to the next generations.

Meanwhile, the process of land acquisition by purchase is related to the welfare status of the household and the household ethnicity. The wealthier households and non-local/migrant people accumulate land through purchase

from others households. The finding on different modes of land acquisition show that when the traditional mode of land acquisition through clearing forest and heritage become uncommon and when land becomes scarce, this activates a process of land acquisition through purchase.

Potential conflicts between inhabitants within and between villages as well as between villagers and the government are predicted to increase in the upcoming years if the government is not careful in handling the issues related to land distributions and acquisition, particularly land ownership between local and non local villagers. Moreover, in recent years the amount of land acquired through purchase and by clearing primary forest has increased tremendously. Therefore, strict regulations governing the limitation of land ownership and encroachment into the Lore Lindu National Park should be enforced

REFERENCES

- Anggaenie, T. 2005. "Market Structure and Price Variability of Agricultural Commodities in Central Sulawesi Province, Indonesia." Master Thesis at the Institute of Rural Development, Georg August University of Goettingen.
- Burkard, G. 2002. *Stability or Sustainability? Dimension of Socio-Economic Security in Arain Forest Margin*. Goettingen.
- Chomitz, K.M. 1999. "Environment-Poverty Connections in Tropical Deforestation." Washington, DC.
- Deaton, A. 1997. *The Analysis of Household Survey*. Baltimore: The John Hopkins University Press.
- Godoy, R., K. O'Neill, S. Groff, P. Kostishack, A. Cubas, J. Demmer, K. Mcsweney, J. Overmen, D. Wilkie, N. Brokaw, and M. Martinez. 1997. "Household Determinants of Deforestation by Amerindians in Honduras," *World Development*, 25, 977-987.
- Nuryartono, N., 2005. *Impact of Smallholders' Access to Land and Credit Markets on Technology Adoption and Land Use Decisions: The Case of Tropical Forest Margins in Central Sulawesi*. Cuvillier Verlag-Goettingen. ISBN 3-86537-644-4
- Maertens, M. 2005. *Impact of Smallholders' Access to Land and Credit Markets on Technology Adoption and Land Use Decisions: The Case of Tropical Forest Margins in Central Sulawesi*. Cuvillier Verlag-Goettingen.
- Otsuka, K., and A. R. Quisumbing. 2001. "Land Right and Natural Resource Management in the Transition to Individual Ownership: Case Study from Ghana and Indonesia," in *Access to Land, Rural Poverty and Public Action*, ed. by A. de Janvry, G. Gordillo, and J.-P. Platteau: Oxford University Press. Oxford.
- Schwarze, S. 2004. "Determinants of Income Generating Activities of Rural Households: A Quantitative Study in the Vicinity of the Lore Lindu national Park in Central Sulawesi Indonesia." PhD Thesis at The Institute of Rural Development Goerg-August University of Goettingen.
- Tole, L. 1998. "Sources of Deforestation in Tropical Developing Countries," *Environmental Management*, 22, 19-33.
- VanRheenen, T., C. Elbel, S. Schwarze, N. Nuryartono, M. Zeller, and B. Sanim. 2003. "Encroachments in Primary Forest: Are They Really Driven by Despair?," in *Land Use, Nature Conservation and the Stability of Rainforest Margins in Southeast Asia*, Berlin: Springer Verlag, 1992-214.