

JSPS - DGHE Core University Program in  
Applied Biosciences

*Proceedings of the 1st Seminar*

**Toward Harmonization between Development and  
Environmental Conservation in Biological Production**



February 21-23, 2001

Yayoi Auditorium  
Graduate School of Agricultural and Life Sciences  
The University of Tokyo, JAPAN

Sponsored by Japan Society for the Promotion of Science

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## Preface

Three years have passed since we started the JSPS-DGHE core university project on applied biosciences, aiming to realize the harmonization between development and environmental conservation in biological production in densely populated rural Indonesia. Establishing sustainable agricultural production system is one of the most important issues in the 21<sup>st</sup> Century, particularly in developing countries. Graduate School of Agricultural and Life Sciences, the University of Tokyo and Bogor Agricultural University have been actively involved in this research project in rural Indonesia with the cooperation of other universities in both countries.

The purpose of the present seminar is to trace back the progress of our three years activities and to ensure the benchmarks for our self-evaluation. This opportunity will provide us not only to exchange the ideas based on the results of individual researches by four groups, but also to search the possibility of integrating academic results to draw the methodological framework toward the challenge for sustainability in biological production. It is extremely important to encourage the junior staff members of the core and corresponding universities through this project. Therefore, this seminar is expected to give them a chance to accept reviews by the senior staff members. We are also inviting some researchers from other Asian countries, who will give us the valuable comments on our research project.

We do hope that the discussion throughout seminar is fruitful and is useful for further researches. In the past three years, we have focused mainly on the basic topics; selection of research topics and study sites, design of methodology, field research activities and laboratory analysis. Now we are willing to move on to the next stage; integration and implementation by applying the results we could obtain throughout our past experiences. It is desired that the results of our project will produce plenty of academic achievements. However, we should never forget that final goal of our project is to realize the harmonization between agricultural development and environmental conservation in rural Indonesia in the near future.

January 29, 2001

Dr. Yoshihiro Hayashi and Dr. Kazuhiko Takeuchi  
Coordinator and Sub-coordinator of Japanese side

# **Tropical Forest Land as a Safety Net for Local People**

## **- Significance of sloping land in Kemang village, West Java, Indonesia-**

by

Makoto Inoue (The University of Tokyo), Siti Sugiah M. Mugniesyah (IPB),  
and Yuuki Tsurudome (The University of Tokyo)

### **1. Introduction**

The forest became known as the "overcoat" for the poor (Westby, 1989), because they could make the difference between survival and death in years when they had difficulties in collecting various products such as wood and non-wood forest products, grazing animals in the forest or in forest clearings, and taking game. The forest has been definitely indispensable for the livelihood of the people who live in and around the forest everywhere in the world.

The Westby's view on the forest may be fitted into the situation in Java during and just after Indonesian economic crisis. In the context of economic crisis, we would like to regard the forest land as a "safety net" for local people, especially for the poor.

According to the Central Bureau of Statistics (Badan Pusat Statistik, 2000), land utilization in Java is classified into several categories: national forest land accounting for 24 percent of total land area; private wood land for 3 percent; dry land including *kebun* and *huma* for 24 percent; agricultural estate for 5 percent; paddy field for 26 percent; home garden for 14 percent. In our experience, there would be a lot of tree stands or tree garden even on the land that is regarded as dry land as well as national forest land and private wood land. It might be estimated that the rate of tree coverage to total land area in Java would range 27- 51 percent, although national forest covers only 24 percent. Most of the land covered with trees must be sloping land.

We could easily suppose that it would be different between a mechanism in which national forest land function as safety net for the people and that in which private land consisting of dry land and private wood land do, because land tenure system might have a strong influence on the social system for land utilization.

The objective of the paper is to clarify the socio-economic mechanism, in which the sloping lands consisting of private land and national forest land, covered with trees, work as a safety net for the people. Specifically, the difference among socio-economic classes in the significance of sloping land for their livelihood is to be identified.

### **2. Land utilization and research methodology**

#### **2-1. Data collection**

We selected Bebur and Cikupa hamlets (or *kampung*) as research sites out of nice hamlets in a Cikupa sub-village (*ordusun*) that is one of three sub-villages in Kemang village with a population of 4346 (1052 households) in 1995, because a lot of people have participated in the program on national forest land and there were a large area of private-owned sloping land.

We collected relevant information by means of a series of group interviews to key informants in the village, group discussions of sloping land owners of men/women, members of forest farmers groups and so forth.

A "simple wealth ranking method" was also applied. We interviewed eight key informants from Bebur and Cikupa hamlets and discussed the important criteria they used to recognize the wealth in the village. Then, based on the combined and integrated criteria, we asked them to divide all the households or 162 households, consisting of 74 households of Bebur and 88 households of Cikupa, into four socio-economic classes (emic category): very rich, rich, middle, and poor. This was done using cards on which the names of husband and wife were written.

Field observation was conducted to know the condition of sloping land utilization in the village. Household survey using a questionnaire, for 65 households that were sampled randomly, was carried out to get detailed information on land ownership, land utilization,



economic condition, and participation in social organizations. Sampled households were categorized into four socioeconomic classes in consistent with the result of simple wealth ranking.

## 2-2. Land use system in the Kemang village

Referring to the literature (Terra, 1953; Wiersum, 1982; Soemarwoto, 1984; Christanty, 1986), it seems that the terminology, indicating the wood land or tree garden in West Java, has not been defined consistently.

For example, "*kebun-talun*" system is a typical rotational land use system, in which the land category is transformed from "*kebun*" or mixed annual field, via "*kebun campuran*" or mixed garden consisting of annual and perennial crops, to "*talun*" or tree garden (forest garden) consisting of perennial crops. Besides, the term of "*kebun*" is often applied referring to tree garden that is far from house and managed extensively.

This fact shows that there has been no general terminology. We should carefully describe peculiar terminology that is used in Kemang village.

### 2-2-1. Former land use system on private sloping land

Local name of swidden is "*huma*" in Sundanese. And they call the natural secondary vegetation "*reuma*", where fruit trees are not planted after harvesting upland rice. Originally three years old *reuma* were cut to make swiddens or *huma*. The system may be called "*huma*" system or "swidden" system. Since 1975 the system has disappeared because fruit trees and other trees were planted due to governmental agriculture extension activities.

They call the virgin forests and the natural secondary forests "*leuweung*", where swidden agriculture has not been practiced for a long time.

### 2-2-2. Present major land use system on private sloping land

Main crops produced by the villagers on sloping land are upland rice, cassava, sweet potato, leguminous plant, maize, cucumber, chilly, pumpkin, banana for leaves and fruits, pineapple, petai, fruit trees such as durian and rambutan, industrial trees such as *sengon*, and naturally regenerated *aren* or sugar palm.

We identify present major land use system as a rotational land use system that may be called "*talun-huma*" system or "swidden-tree garden" system, even though there is no special local terminology. The rotation is shown from a) to f) and back to a) again as follows;

- a) "*Talun*" or tree gardens which are continuously tended by the villagers, consisting of the following three main morphology;
  - 1) Fruit trees, Aren trees, and other natural secondary vegetation
  - 2) Fruit trees and other natural secondary vegetation
  - 3) Aren trees and other natural secondary vegetation
- b) "*Rarahan*" or the field just after slashing and burning but just before sowing. (usually July- September)
- c) "*Huma*" or swidden just after sowing until harvesting. (usually October- April)
- d) "*Jami*" or former swidden just after harvesting till harvesting second crop or Palawija. (usually 5 months - a year after harvest)
- e) "*Reuma Ngora*" or bush where banana leaf is productive. (usually 1-3 years after harvest)
- f) "*Reuma Kolot*" or secondary forest till the harvest of *Sengon* trees. (usually 6-7 years after harvest)

In Kemang village, there are other relevant terminology: "*Kebun Campuran*" or mixed garden consisting of "*jami*", "*reuma ngora*", and "*reuma kolot*"; "*Kebon*" or the field tended by the villagers, consisting of "*kebun campuran*" and "*talun*"; "*pasir*" or sloping land consisting of private land and national land; "*tegalan*" or dry field ever cultivated as *serang* or rice field. Then the land other than "*pasir*" in Kemang village consists of *serang* and *pakarangan* or home garden.

We ascertained the village leaders to consider that present land use system on private land with the cycle of about 30 years was ideal in terms of ecological and socio-economic aspects. Comparing to the former swidden system or "*huma*" system with 3 years cycle, the "*talun-huma*" system must be sustainable in terms of ecological aspects.

### 2-2-3. Cultivation on national forest land

"*Talun-huma*" system can not be seen in the national forest land, even though the land is also included in the category of "*pasir*". Instead, there are some programs, under which the villagers cultivate the national forest land.

Since the economic crisis in 1998 teak trees have been logged illegally by outsiders coming from nearby cities. The villagers began to cultivate the place of illegal logging. Since such activity is also considered to be illegal, *Perum Perhutani* or state forestry corporation dares to make temporary contract with the villagers in order to control their activities.

In terms of the rights the villagers have, four types of cultivation in national forest land can be identified as follows;

- 1) "formal" cultivation under *tumpang Sari* system or intercropping system under the ordinary reforestation activities
- 2) "formal" cultivation under the system of *Perhutanan Sosial* that can be regarded as improved *tumpang Sari* system in terms of agroforestry technology (Stoney and Bratamihardja, 1990)
- 3) "informal" cultivation under temporary contract (seedlings of teak may be provided or not)
- 4) "illegal" cultivation with no permission

Recently, *Perum Perhutani* integrated "forest village society program (*Masyarakat Desa Hutan: PMDH*)" and "*perhutanan sosial*" program into "Integrated forest village society program (*Program Masyarakat Desa Hutan Terpadu: PMDHT*). And the Kemang village was appointed as a model village of *PMDHT* in 1998.

### 2-2-4. Social aspects

Work organizations is very important to show the social relation among the villagers. The most important system in accordance with the objective of the paper is "*Bagi hasil*" or profit sharing system, which is applied for sloping land utilization. In the case of banana leaves harvested in the nearby field, the owners of sloping land go fifty-fifty with collectors on the profit. In the case of collecting banana leaves in the outlying field and *aren* sugar, the owners get a third of the profit and the collectors/tappers get two-thirds of it. This system may function to redistribute the villager's income.

There used to be a "*liliuran*" system or labor exchange system in the village, too. Nowadays, however, the system has not been used any more. Instead, the application of individual family labor is dominant, often supplemented by wage labor. "*Rereongan*" system or labor offering and mobilization system can also be applied.

### 2-3. Working hypothesis

During the *talun* stage for about 30 years under "*talun-huma*" system on private-owned sloping land, *aren* trees can be tapped to make sugar for their income. Even the landless people can tap the *aren* trees, slash and burn the *talun* to carry out swidden agriculture as tenant farmers, and collect banana leaves in *talun*. These are regarded as socio-economic function of income redistribution. These function may be helpful especially in case of economic crisis. The function attributed to the private sloping land can be regarded as a safety net for the villagers. The system on private sloping land could do a favor for a lot of villagers in all the socio-economic classes.

On the other hand, the function of national forest land as the safety net seems to be more simple and focused on formal, informal, and illegal cultivation. The importance of the benefit generated from the cultivation could be the highest for the villagers in the middle and the poor classes.

## 3. Result of analysis

### 3-1. Characteristics of each socio-economic class in terms of sloping land utilization

A simple wealth ranking method showed that the most important criterion of the wealth was the income generated from business; second important criterion was the ownership of private sloping land; and the third one was the ownership of rice field.

However, the ownership of rice field was ever the most important criterion for the wealth

in the village till ten years ago. Most of the trees, except *aren* trees, in the private sloping land are not so important for the livelihood of the villagers, because usually the sloping land or former swidden was covered with natural regenerated vegetation. After introducing the banana for harvesting leaves, the importance of the sloping land suddenly increased.

The characteristics of each class are summarized below.

- 1) Class A (very rich): having large area of private sloping land and rice field in the village as well as other villages. A middleman of banana leaves and three middlemen of *aren* sugar are included here.
- 2) Class B (rich): having relatively large area of private sloping land and rice field. Those who produce and sell the *aren* sugar are also included here.
- 3) Class C (middle): having small area of private sloping land and rice field. Those who produce and sell the *aren* sugar, and run small shops as well as migrant workers, motor cycle taxi drivers, and *aren* sugar tappers are also included here.
- 4) Class D (poor): having no or quite small area of private sloping land and rice field. Landless agricultural workers are included here.

While 162 households were divided into four classes, important information was checked whether someone of each household have experienced to participate in the activities of PMDH and Perhutanan Sosial, and to cultivate national forest land (table 1).

**Table 1. Result of simple wealth ranking**

Classes	Number of households	Participation in PMDH	Participation in Perhutanan Sosial	Cultivation of national forest land*
A	5	5 (100%)	0	0
B	18	13 (72%)	2 (11%)	7 (39%)
C	102	75 (74%)	17 (17%)	57 (56%)
D	37	23 (62%)	5 (14%)	26 (70%)
Total	162	116 (72%)	24 (15%)	90 (56%)

\* Cultivation in national land consists of "informal cultivation under temporary contract" and "illegal cultivation with no permission."

PMDH was operated in 1996 and 1997 in Kemang village. The component of the program were funding village cooperatives, technical assistance for agroforestry, providing the seedlings of fruit trees, constructing bridges, providing cement for constructing the place of worship, providing three sawing machines, constructing water tank, and financing. This is the reason why three quarters of the households participate in the program. It is interesting that all the households in class A took part in the activities, while only did 62 % of the households in class D.

In order to participate in the *Perhutanan Sosial* program the villagers have to organize "forest farmers group (*Kelompok Tani Hutan: KTH*). Official criteria and their priority to select the members of *KTH* are: 1) small land owners or the landless who live in the hamlets near to the target place, 2) other people who live in the hamlets near to the target place, and 3) small land owners or the landless who live in the other hamlets. In Kemang village the program was implemented in 1987 for 54 ha, 1991 for 25 ha, and 1992 for 15 ha. The table suggests that the formal criteria to select the members of *KTH* has not been applied in the village, because significant difference is not recognized between the rich and the poor.

The difference in the percentage of the households who cultivate the national land between the rich and the poor support the hypothesis that the poor, especially the landless, show a tendency to cultivate the national land with temporary contract (informal) and even with no permission (illegal).

The result of the simple wealth ranking is totally supported by the result of household survey for 65 samples (Table 2, Table 3, and Table 4). Table 2 and Table 3 show us that the middle and the poor class (class C and D) are supposed to be more dependent on the national forest land. Table 3 indicates that the poor class (class D) are at a disadvantage to receive

**Table 2. Result of household survey (1) - average cultivated land area (unit: are)**

Classes	Number of households	Rice field			Sloping land			Total (*)
		Owned (*)	Others(a)	Total	Owned (*)	NFL(b) (*)	Others(a)	
A	5	69	0	69	200	0	0	269
B	10	20	1	21	115	0	5	141
C	41	9	5	14	87	20	1	122
D	9	3	0	3	33	22	6	64
Whole		14	1	18	93	16	2	128

Notes: (a) Others: sharecrop, leasehold, and mortgage

(b) NFL: national forest land

(\*) According to the analysis of variance (F-test), there is statistically significant difference in these factors among the socio-economic classes with the critical level of 5%.

Source: household survey

**Table 3. Result of household survey (2) - participation**

Classes (number)	Participation in PMDH (*)	Participation in Perhutanan Sosial	Cultivation of national forest land (*)
A (5)	5 (100%)	0	0
B (10)	9 (90%)	1 (10%)	3 (30%)
C (41)	38 (93%)	10 (24%)	28 (68%)
D (9)	5 (56%)	2 (22%)	7 (78%)
Total (65)	57 (88%)	13 (20%)	38 (58%)

Note: (\*) According to the chi-square test in terms of frequency, there is statistically significant difference in these factors among the socio-economic classes with the significant level of 5%.

Source: household survey

**Table 4. Result of household survey (3) - average annual income (unit: rupiah)**

Classes (numbers)	Farming (a)	Maize (b) (*)	Agri. labor (c)	Other agri.(d)	Others (e)	Total (*)
			(*)		(*)	
A (5)	7,392,000	0	0	446,600	53,006,320	60,844,920
B (10)	4,476,500	105,000	7,000	298,010	2,479,500	7,261,010
C (41)	2,156,256	8,780	31,562	1,017,060	903,573	4,108,451
D (9)	289,672	222	55,889	311,778	1,314,444	1,971,783
Whole	2,657,516	21,723	28,724	764,900	5,210,817	8,661,957

Notes: (a) Farming: income from rice field and sloping land

(b) Maize: one of the income from farming, which is cultivated in sloping land

(c) Agri. labor: wage labor in both of rice field and sloping land

(d) Other agriculture: cattle raising and sugar production from *aren*

(e) Others: trade of sugar and banana (both of leaf and fruit), groceries, stall, etc.

(\*) According to the analysis of variance (F-test), there is statistically significant difference in these factors among the socio-economic classes with the critical level of 5%.

Source: household survey

benefit from the program of *PMDH*. According to Table 4, the income from agricultural labor is quite important for the poor class (class D). It is a point to notice that the contents of other income differ from each class: trade of banana (leaf and fruit) and groceries are important for the upper class (class A and B); trade of sugar is important for the middle class (class C); and stall or *warung* is very important for the poor class (class D). For the poor class, other income accounts for 67% of total income.

### 3-2. Characteristics of the villagers cultivating national forest land

Out of 65 samples for household survey, 38 households cultivated national forest land informally or illegally at the time of our survey; 27 households did not do. We would like to compare the difference between cultivators (those who cultivate national forest land) and non-cultivators in terms of various items we investigate by means of household survey. Parts of the results are indicated in Table 5, in which we bring up only the items showing statistically significant difference between two groups, based on t-test with significant level of 5%.

Table 5. Comparison between those who cultivate national forest land and those who do not

	Number of members living apart (*)	Age of the head of household	Area of cultivated rice field	Number of household participating in <i>Perhutanan Sosial</i>	Income		
					Ratio of farming	Ratio of others	Total income
Cultivator (38)	0.8 persons	42 years	11 ares	13 households	42%	29%	Rp. 2,961,181
Non-cultivator (27)	1.7 persons	52 years	27 ares	none	27%	56%	Rp. 14,047,325

(\*) Some members live apart from their family to work as housemaids or drivers in the Middle East, to work in the city such as Jakarta and Bandung, and to study outside the village.

Source: household survey

Characteristics of the households cultivating national forest land are identified as 1) few numbers of the household member living apart, 2) relatively young head of household, 3) small area of cultivated rice field, 4) participation in ever implemented *Perhutanan Sosial*, 5) dependency on the income from sloping land, 6) rare opportunity to get off-farm income, and 7) low total income.

### 3-3. Characteristics of the villagers utilizing private sloping land

According to the working hypothesis, the rich own their private sloping land to get income; the middle and the poor may sharecrop and lease to cultivate the sloping land, may ask the land owner to collect products such as banana leaves, banana fruits, and to tap the trees of *aren* for sugar. Unfortunately, we failed to get enough data to verify these hypothesis statistically.

Together with Table 4, however, certain implication may be derived from Table 6 that shows the number of households cultivating sloping land under each status regardless of the area under cultivation. While out of the middle and the poor (50 households of class C and D), 64% or 32 households have cultivated national forest land, only 4% or 2 households have cultivated private sloping land owned by other villagers. Moreover Table 4 shows us that the rich (class B) have earned considerable income from maize produced in private sloping land, while the middle and the poor (class C and D) have gotten only a little.

It is supposed that the function of the private sloping land, through the social system such as sharecropping and *bagi hasil* (profit sharing), should not be overestimated and must be less important than that of national forest land in terms of income redistribution.

**Table 6. The number of households by the status of sloping land cultivation**

Class (number)	Ownership	National forest land	Share hold	Leasehold
A (5)	5	0	0	0
B (10)	9	0	0	1
C (41)	37	24	1	0
D (9)	3	8	1	0
Total (65)	54	32	2	1

Source: household survey

#### 4. Discussion and recommendation

We substantiated that national forest land functioned as the safety net for the middle class and the poor class to let them cultivate the land informally and illegally. This function of national forest land must be more important than that provided by the private sloping land, which may function as the safety net only for limited people who are permitted to access the land.

In the vicinity of city in West java, multistoried village gardens including home gardens and tree gardens gradually lose their ecological and economic features as a result of adaptation to the modernization of village economy and society (Michon and Mary, 1994). The villagers prefer commercial crops to various crop combination for subsistence and the cash income from commercial crops obviously increase. Michon and Mary (1994) conclude that gardens either support or supplement non-agricultural activities, and gardening remains more than ever at very heart of the economic strategies of all village social classes.

In the near future, the land utilization of the private sloping land in Kemang village will also be changed in the process of an increase in population and the rise of a market economy. If the villagers in Kemang village may go the same way, the rich who own larger sloping land will get more income by means of introducing commercial crops. Then the function of the national forest land as the safety net for the poor will become more important than ever.

It is true that state forestry corporation or *Perum Perhutani* has made efforts to improve *tumpanghari* system (Indonesian taungya system) and developed intensified taungya cultivation system (Simon and Wiersum, 1992). It seems, however, that such technical improvement alone will be insufficient in order for the national forest land to fulfill its function as the safety net for the poor, because the resources, to which the poor can have access for their livelihood, may be only national forest land.

It is time for the government of Indonesia to consider the possibility to ensure formally the long term right, for the people, to utilize national forest land in Java. Parts of the national forest land might be released from the control under the state forestry corporation, and might apply new permissions in production forests that are provided in the forestry law (article 29) that was enacted in 1999; parts of the land would be managed by state forestry corporation in cooperation with the people. All the stakeholders should encourage the government to elaborate appropriate programs under the new forest policy.

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