FOREST UTILIZATION AND MANAGEMENT IN A FOREST FRONTIER COMMUNITY, NORTHERN SIERRA MADRE

Yoshiki Seki*

Introduction

In the Philippines, exploitative forestry (commercial logging) in the old-growth dipterocarp forest is now going to cease. Exploitative forestry in the Philippine public domain had been conducted under Timber License Agreements (TLA), 25-year titles of logging concessions for private enterprises. However, commercial logging in primary forests was officially banned by Republic Act No. 7586 in 1992. All remaining primary forests were categorized as National Integrated Protected Areas (NIPAS), and the government started cancellation of remaining logging concessions. In 1990, there were still 97 TLAs totaling 3.76 million hectares, whereas they were reduced to 36 totaling 1.56 million hectares by 1996 (DENR 1996).

The big problem remains regarding how and who will manage logged-over secondary forests. Field researches pointed out that logged-over secondary forests turned into a kind of open-access resource (Fujisaka 1986; Seki 1997). Illegal logging continues by local residents and businesses. Farmers from other areas occupied the forests and converted them into farms. Thus, some authors said that the speed of deforestation even accelerated after the cancellation of TLAs (de los Angeles and Oliva 1996). These pessimistic scenarios may happen under a disordered open access resource exploitation regime.

In the 1990s, the Department of Environment and Natural Resources (DENR) has gradually recognized the importance of the role of upland community. The concept is "putting people first so that sustainable forestry may follow". DENR started issuing land titles to upland communities for managing logged-over secondary forest.

In 1989, DENR launched an epochal program called Community Forestry Program (CFP). It is a comprehensive forest management program by local community which includes agroforestry development, reforestation project in open grassland, and selective logging in secondary forest. In 1996, CFP and other people-oriented programs are integrated in the Community-Based Forest Management (CBFM) program by DENR Administrative Order 96-29. Presently, DENR considers the CBFM as the main strategy for managing post-TLA secondary forests (DENR 1997). CBFMs are now strategically implemented on the areas where logging concessions were cancelled.

In this report, we would like to see the village where CBFM was implemented after the cancellation of logging concession.

1) General description of the research site

Northern Sierra Madre mountain range spreads along the eastern side of Cagayan Valley. Sierra Madre mountain range can be described as one of the last forest frontiers in the Philippine archipelago. Commercial logging in Northern Sierra Madre became rampant in the early 1970s and had widely operated until the early 1990s. However, most TLAs were cancelled in the 1990s (see Figure 1).

Field research was conducted in barangay Rang-Ayan and barangay Batong Labang, municipality of Ilagan, province of Isabela ('Barangay' is the smallest administrative unit in the Philippines. It can be translated as 'village'). Both barangays are located at the edge of former logging concession of ACME Plywood and Veneer Company, Inc. The logging concession of ACME was cancelled in 1990 due to illegal logging activity. Then CFP was introduced in 1992.

There are two origins of immigration in the Sierra Madre mountains. One is considered as 'land-seeking migrant', defined as the one who has a strong motivation to acquire land on the frontier area. The other is 'logging motivated migrant', defined as the one who migrates to work for logging companies. Barangay Rang-Ayan was mainly composed of land-seeking migrants, and barangay

* Kyoto University

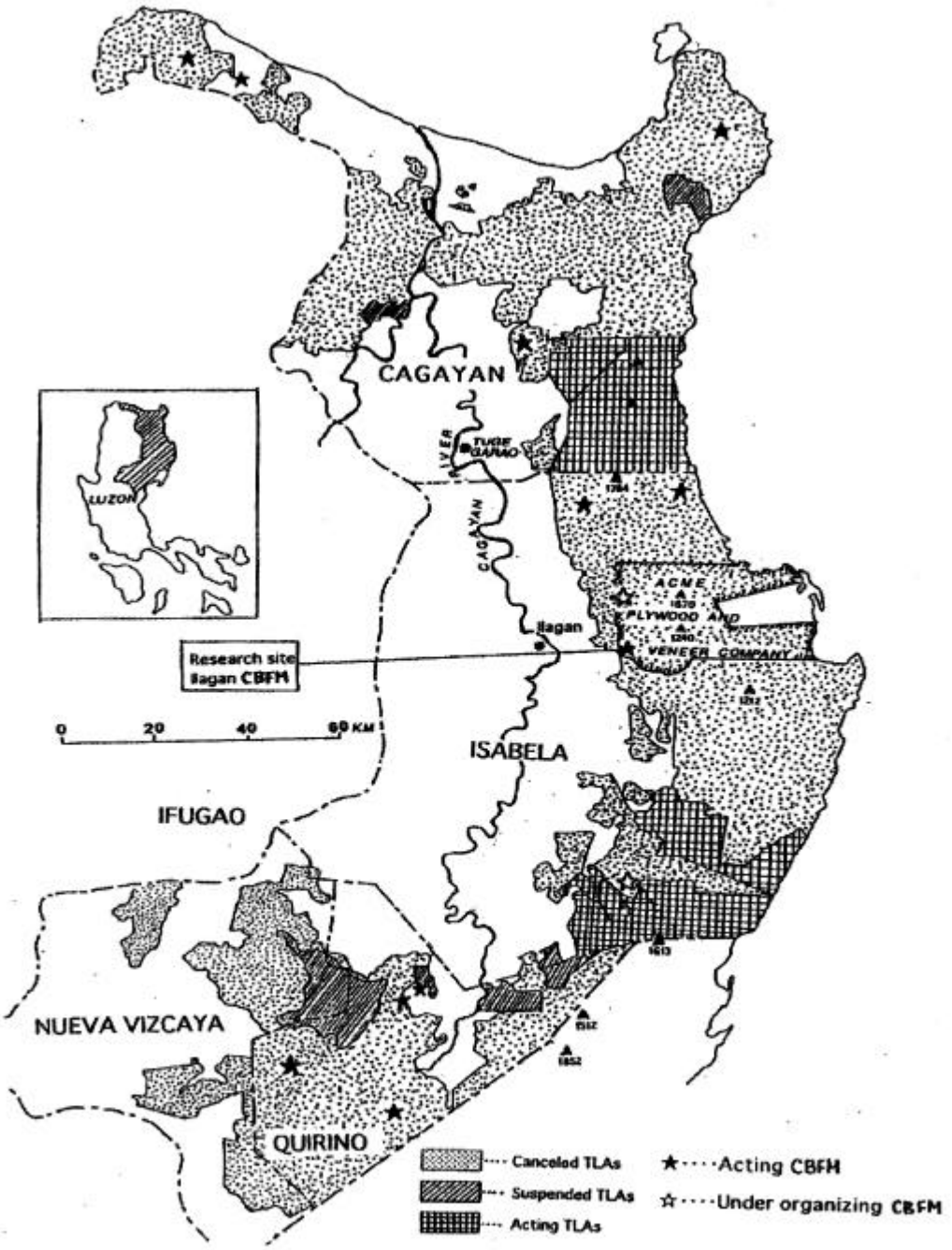


Figure 1. Cancelled and Acting TLAs in Cagayan Region.

Source: Department of Environment and Natural Resources, Region 2

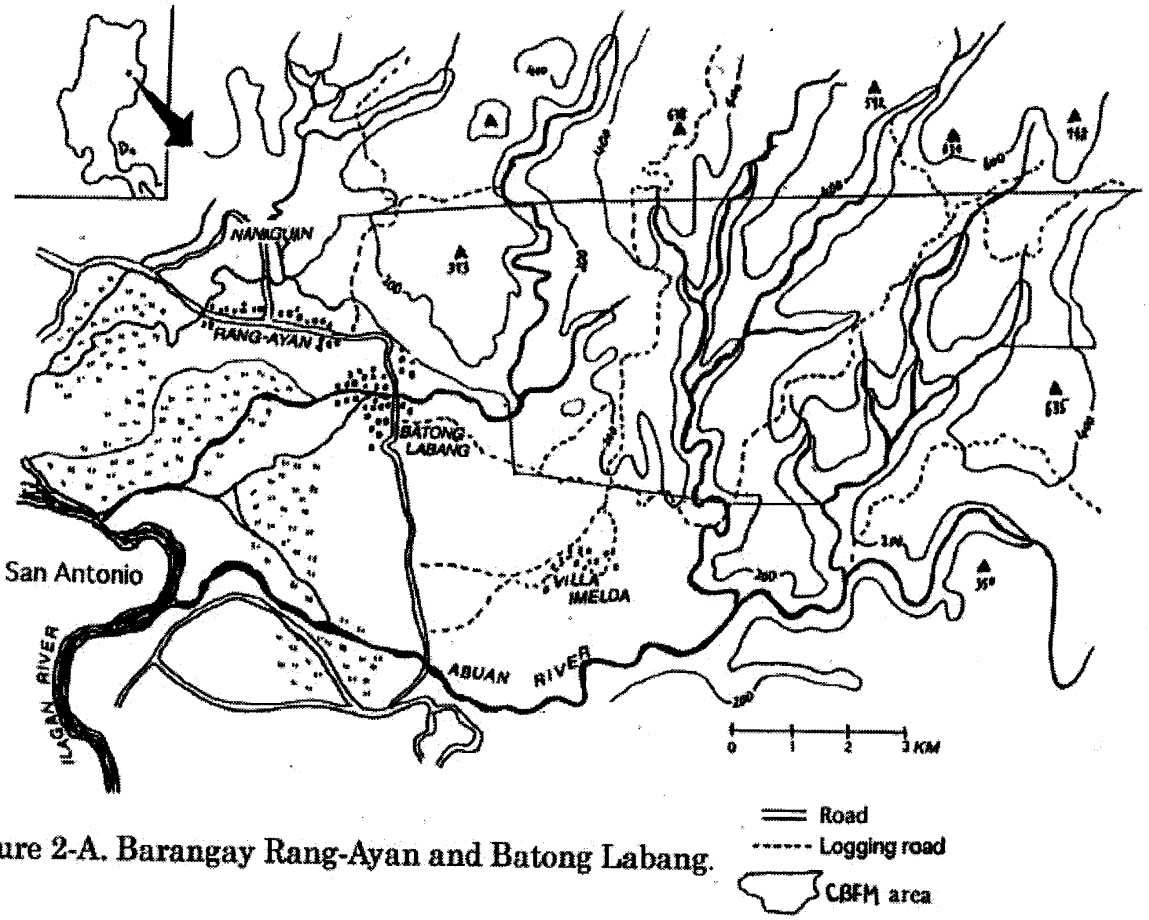
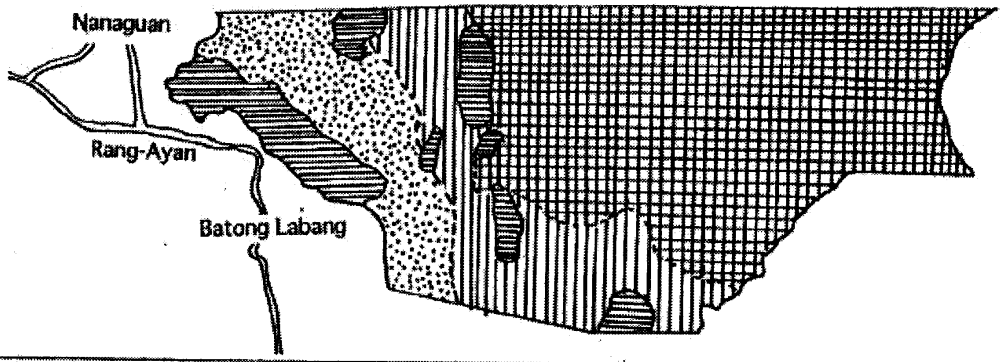


Figure 2-A. Barangay Rang-Ayan and Batong Labang.



Ecological condition	Area (ha)	%	Project
Grassland	629	13%	Reforestation
Shrub	1,425	29%	Timber Stand Improvement
Cultivated	273	6%	Agroforestry
Residual forest	2,518	52%	Production and Rattan planting
Total	4,845	100%	

Figure 2-B. Ecological Conditions in the CBFM site.

Source: Surveyed by Bicol Upland Resource Development Foundation, Inc., 1996.

Batong Labang, in turn, consisted of logging motivated migrants . Two barangays are chosen to study these two different groups comparatively.

The area is moderately sloped and remained as a primary dipterocarp forest until 1954, the time when the first batch of land-seeking migrants arrived. These migrants were encouraged by homestead program of the Magsaysay administration. The Philippine government, at that time, propagated 'land for land-less' program as the strategy to cease peasant rebellion of Hukbong Mapagpalaya ng Bayan (People's Liberation Army) which threatened the government in the early 1950s (Constantino 1978). The government intended farmers to migrate and clear primary forests in some regions. Northern Sierra Madre mountains became one of the target areas under the program. Thus, tenant farmers, mainly from Central Luzon, immigrated in the researched villages. Some were former peasant guerillas who surrendered to the government.

After a cadastral survey was conducted by the Bureau of Lands, relatively flat lands categorized as 'Alienable & Disposable (A&D) land' were granted to spontaneous migrants. The surrounding sloped areas, meanwhile, remained as 'public timber land'.

In 1970, TLA was issued to ACME Plywood and Veneer Company, Inc. The logging concession was so vast, covering an area from the western edge of Sierra Madre to the eastern coast of Luzon (total area: 89,275 hectares; see Figure 1). A sawmill was established in Batong Labang, which made this village the center of ACME's logging operation. Since 1970, a massive migration of logging workers arrived in Batong Labang. As logging and sawmill workers, some veteran and some fresh, immigrated from all over the Philippines, its drastically increased. According to the government's population census, the population of Batong Laban was 280 in 1970. During the 20-year logging operation (1970-90), it burgeoned to 2,357 with an annual growth rate in this period of 11 percent (see Figure 3). In those days, Batong Labang was considered the richest village in the municipality. The village economy was very commercialized and bars and beer halls, frequented by logging workers, were everywhere.

This 'prosperity' came to an end when DENR cancelled ACME's logging concession in 1990. The end of the logging operation had a drastic impact on the village, and the most visible effect was rapid depopulation. Batong Labang lost 37 percent of its original population, from 2,357 in 1990 to 1,483 in 1995 (see Fig. 3). Those who left went elsewhere to seek jobs.

Figure 4 is the age structure of Batong Labang showing birth places. In elder age classes (more than 50 years old), majority were born in other provinces. Then the immigrants inside Isabela province gradually increased. Although the number of second-generation children increases rapidly, the majority of people over 20 years old still consist of immigrants from outside. Thus, most of the households belong to 'first-generation household' which is defined as both house-holder and his (or her) spouse are immigrants from outside the village. Based on the data of available barangay census, 72 percent of the total households in Rang-Ayan and 82 percent in Batong Labang belong to first-generation households. The 70 sampled informants (30 from Rang-Ayan and 40 from Batong Labang) of this report were chosen from first-generation households. Among 70 informants, 38 are logging motivated migrants and other 32 are land-seeking migrants.

2) Forest management and land tenure system

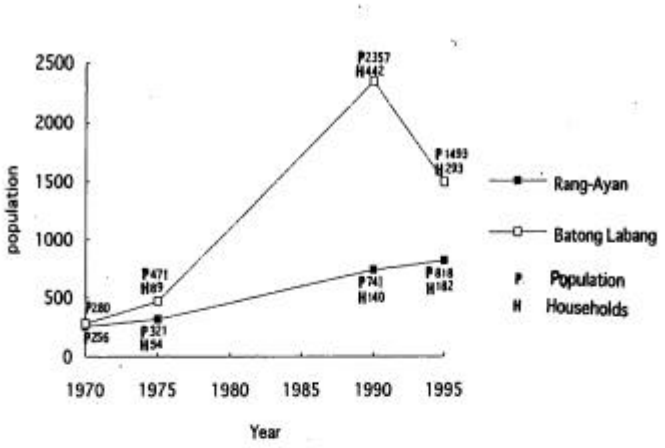
a) Customary forest and land utility system

Because the researched barangays are newly formed villages after the sScond World War, customary norms for utilizing forest resources can not be seen.

Villagers usually categorize the lands as 'lowland' and 'upland'. Lowlands are administratively considered as 'A&D land', in turn, uplands are 'public timber land'. In local terms, lowland means the land where land title was officially recognized. Upland, on the other hand, is the land where land title was not recognized by the government.

Under the government's homestead program in the mid 1950s, A&D lands were gradually cultivated by the pioneer immigrants. A&D land were wholly claimed by pioneer settlers until the mid-1960s. Land-seeking migrants who followed could only purchase lowlands from earlier settlers. If not, cleared timber from public land, though it was illegal. In the late 1960s, some land-seeking migrants already started clearing public domain forests. Among local residents, customary 'ownership' upland was recognized if the forest was once cleared and something planted by somebody.

Although there was no official land title, villagers respect de facto 'ownership' of upland occupants. Upland areas are transacted among villagers without any title.
Since the surrounding public land was categorized as a logging concession in 1970, mountains were



Annual population growth rate (%)

	1970-75	1975-90	1990-95
Rang-Ayan	4.63	5.74	2.00
Batong Labang	10.96	11.33	-8.73
Philippine	2.77	2.47	2.40

Figure 3. Population Dynamics of Rang-Ayan and Batong Labang
Source: National Statistics Office, *Census of Population and Housing*, Various Issues.

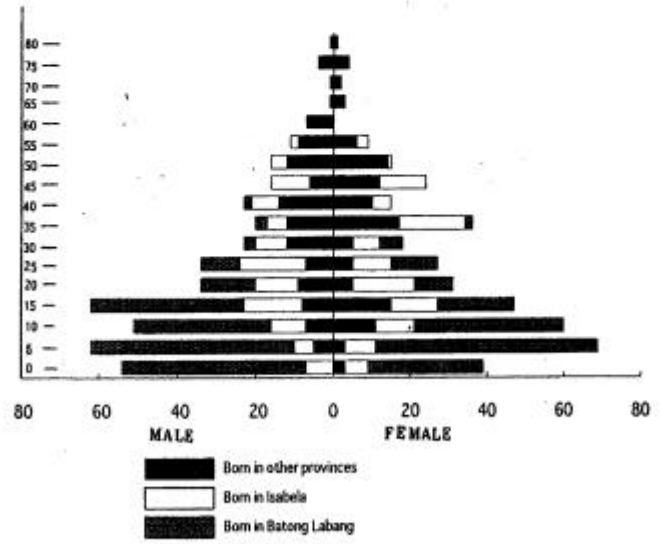


Figure 4. Age Structure of Batong Labang
Source: Batong Labang Barangay Census, Purok 2, 3, and 6. 1997
Note: Out of seven puroks (districts) in Batong Labang, census from three districts were available.
This figure is made from the census of puruk 2, 3, and 6 totaling 727 persons in 188 households.

privately managed by the logging company. The forests became the area that farmers could not access freely. New migrants during this period were mainly logging workers employed by the logging company. Among sampled informants, nobody was able to occupy uplands between 1970-1980 (see

Figure 5).
However, the mountains became open access resources again when the concession was cancelled in 1990. When the ACME company moved out from the concession, the disordered timber exploitation and land cultivation in the ex-concession area began.

b) Forest and land management strategy under CBFM

CBFM is, thus, necessary in order to avoid open access resources utility. CBFM was launched in July 1992 under the financial assistance of the United States Agency for International Development (USAID). Organizing activity was conducted by a NGO namely Bicol Upland Resources Development Foundation, Inc. (BURDFI). In the CBFM strategy, the government is not directly involved in the community organizing work, but a particular NGO, which knows the area well, is chosen as organizer. Under the technical assistance of BURDFI, the People's Organization, VIBANARA Multi Purpose Cooperative, Inc. (VMPCI), was formed with the participation of four neighboring barangays, namely, Villa Imelda, Batong Labang, Nanaguan, and Rang-Ayan (see Figure 2-A). Since then, 4,845 hectares of CBFM area have been managed by VMPCI under the government supervision. Some members of BURDFI still remain in the village to support VMPCI's technical activities although the contract of BURDFI was finished.
All households in the four barangays can be members of VMPCI. Since the establishment of VMPCI, about 40 percent of total households became members. Organizational structure of VMPCI is shown in Figure 5. There are three technical divisions in the organization, Integrated Area Operation Plan (IAOP) Division, Income Generating Project (IGP) Division, and Forest Resources Management Development (FRMD) Division.
IAOP is a division which takes care of selective logging operation. This division needs highly technical knowledge and skills on logging operation such as tree marking and surveying, road management, and mechanical maintenance of sawmill. Since many skilled ex-concession workers have remained in the villages, these technical activities are all done by villagers.
FRMD is a division for managing reforestation project. Since villagers are not knowledgeable about reforestation activities, VMPCI contracts some technical persons for supervising reforestation project. Forester, surveyor, and cartographer are contract person from outside.
Land tenure of CBFM is called Community-Based Forestry Management Agreement (CBFMA), a renewable 25-year title which can be utilized for farming and forestry objectives. In the Philippine history, CBFMA is the first land title which legally admits that local community can use and manage large area of forest in the public land. Figure 2-B shows the present ecological conditions and planned forestry projects within CBFMA area. 273 hectares of already cultivated land is for agroforestry development; 629 hectares of grassland and 1,425 hectares of shrub are allocated for reforestation projects; and 2,517 hectares of residual forest area is utilized for selective logging with assisted natural regeneration.
The reforestation project in the researched CBFM site started in 1996 by reforestation loan of Asian Development Bank (ADB). The total project cost amounted to 13.8 million peso in the 5-year contract period (345 thousand US$; 1 US$=40 peso as of 1998). This reforestation project proposes 200 hectares of yemane (*Gmelina arborea*) plantation in grassland, 250 hectares of enrichment planting of yemane and mahogany (*Swietenia macrophylla*) in shrubs, 197 hectares of agroforestry development, and 350 hectares of rattan plantation inside residual forest.
However, these land allocation strategies planned by the government have raised land conflicts. The government tries to regulate personal landholdings in upland to a 3 hectares/head maximum and allocate open grassland for reforestation purposes. The government wants to minimize agricultural land-uses and maximize industrial tree plantations of fast-growing species. This land allocation strategy takes possible land frontiers away from 'land-less' ex-logging workers.

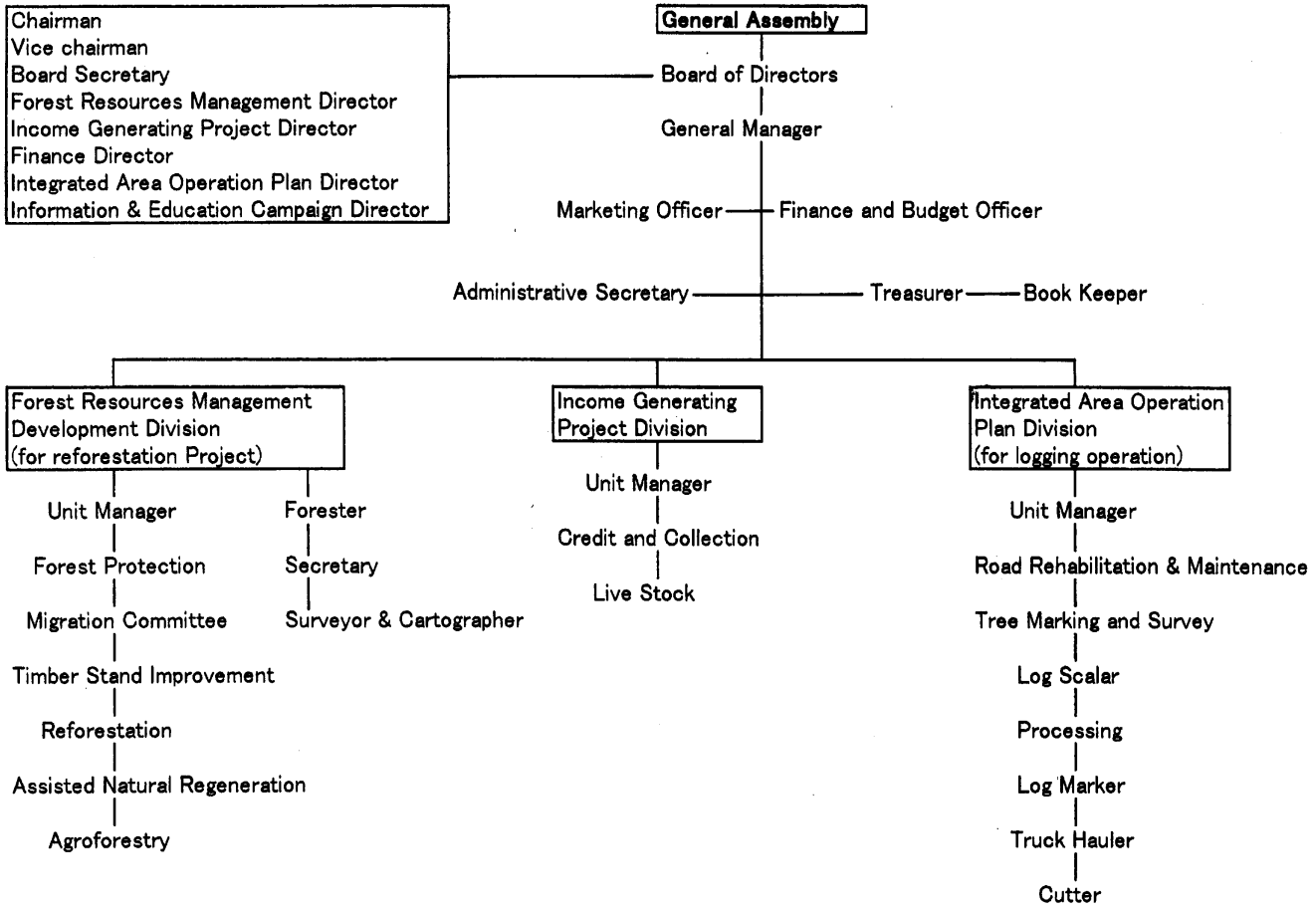
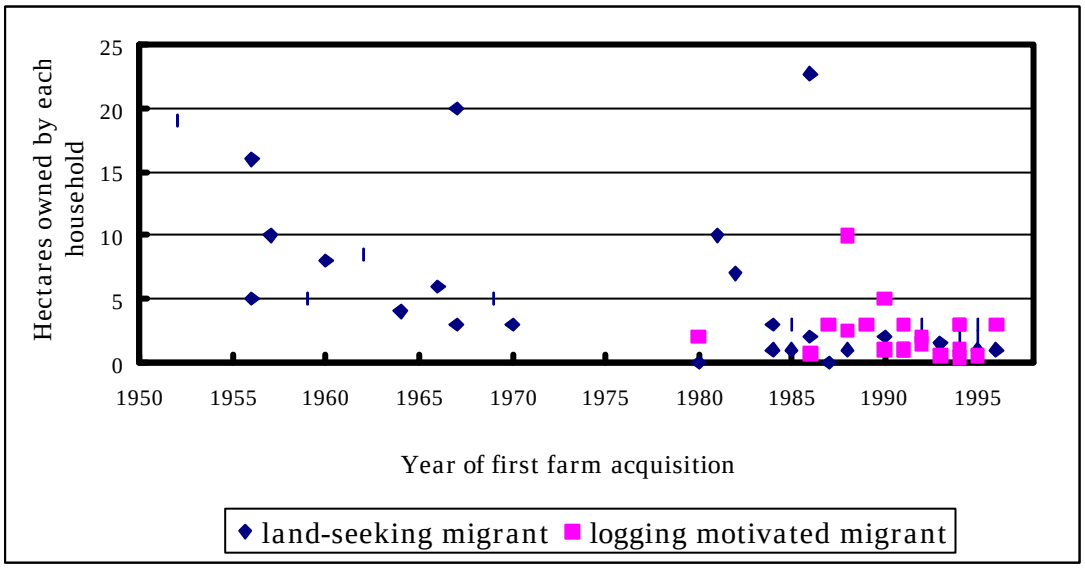


Figure 5. Organizational structure of VIBANARA Multi-Purpose Cooperative, Inc.(VMPCI)

Figure 6 shows the relation between landholding of each informant and the first year of farm acquisition. Since the latter half of 1980s, the number of people who acquired the farm in the upland significantly increased. Especially after 1990, many ex-logging workers who became jobless began to cultivate ex-concession areas. Out of 38 informants who were ex-logging workers, 25 acquired farm land, while 13 are still land-less and just continuing logging.
The new wave of land-seeking migration was also induced from other provinces. However, landholdings of these new applicants in the upland are small. Average landholding of 25 ex-concession workers is 2.2 hectares while average landholding of land-seeking migrants is 5.7 hectares. The difference of landholding between earlier land-seeking migrants and logging motivated migrants is significant as shown in Figure 6.

Figure 6. Agricultural land owned by each migrant (ha)



Note: Landholding of tenant farmers are excluded. Landholding in the upland is included.

The conflict occurs between the government which wants to allocate more open land for reforestation purpose and the new land applicants who want to expand their own farm. Since DENR sets up a reforestation site on the map without considering actual occupants on the site. Many farmlands of new migrants overlapped with the reforestation area. The land enclosure of reforestation also prevents the future land acquisition of land-less households. While DENR intends to regulate 'illegal' logging activity of ex-logging workers, it lacks contingent measures and alternatives for those loggers.

3) Changes in forest utilization

a) Before the homestead program of the government

Indigenous people in the area is called 'Agta', a stream of Negrito people, the early settlers in the Philippine archipelago before the immigration of Malay Filipino. The Agta livelihood is hunting and gathering depending on non-wood forest products such as rattan, Manila copal, and wild animals. Agta people exchanged of these forest products for agricultural crops with low-lander Christian Filipinos.

b) Period of first wave of migration (1954-1970)

In 1954, first wave of land-seeking migration began. The colonizers during the 1950s were able to occupy relatively large areas (10 to 16 hectares; see Figure 6). During this period, primary dipterocarp forest was rapidly converted into farmland of upland rice and maize. Pioneer cultivators cut down trees by axe. Valued trees on the occupied lands were sold. Timbers which were sold at that time were mainly molave (*Vitex parviflora*) and narra (*Pterocarpus indicus*). Molave was a hard wood

that was used for common construction materials in the traditional Philippine society. However, since the stock of molave is heavily depleted nowadays, it is now categorized as 'total log ban species'. Narra is known for its beautiful grain and used for furniture purposes. The income from these species was very important during first years while they were still developing the farm.

The remaining trees including dipterocarp species were just cut down and burned. According to villagers, "there was no middleman for dipterocarp timber at that time." In the traditional Philippine society, there was no custom to utilize dipterocarp for construction and other purposes. Dipterocarp species were considered as 'low quality' and not qualified for construction. Local market for dipterocarp has emerged only after the arrival of big scale logging companies.

c) Period of large-scale commercial logging (1970-1990)

During the period of commercial logging, surrounding mountains of Batong Labang and Rang-Ayan became logging concession of ACME Plywood and Veneer Company. The company constructed network of logging roads. The annual allowable cut of the ACME company was 65,420 m^3 (as of 1989). The large-diameter dipterocarp trees were rapidly disappeared.

Agta people, meanwhile, were not able to survive under such heavy logging operations. They transferred to the eastern slope of Sierra Madre mountains and cannot be seen in the village now.

Land cultivation inside the concession was not allowed. Among 70 informants, nobody occupied the land inside the concession from 1970 to 1980. Villagers were able to claim peripheral areas of the concession when the company finished harvesting all big trees in lower portion and moved to higher elevation of the mountains.

d) Period of an open access resource utility (1990-)

When the logging concession was cancelled by the government, the land and forests became open access resources. Ex-logging concession workers who remained in the village have continued logging illegally. Another wave of land-seeking migrants, mainly they are from Ifugao Province, occupied logged-over secondary forests.

In 1993, unprecedented forest fires which continued for three months, from May to August, burned out thousands of hectares of remaining secondary forest. Once a secondary forest was burned down, other fires easily followed almost every dry seasons. Thus, grasslands dominated by cogon (*Impelata cylindrica*) and talahib (*Sacchrum spontaneum*) spread as fire climax vegetation. Presently, grasslands occupies 13 percent of the CBFM site (see; Figure 2-A). Most of grasslands emerged after 1993 fires. Residual forests were narrowly protected from fires by the existence of rivers. New land applicants started occupying these denuded areas and planting bananas.

e) The emergence of Community-Based Forest Management Paradigm

In 1992, the 4,845 hectares of CFP was officially approved by the government. The land title gave an incentive to local residents for self governance of residual forest. It seems the consciousness of 'our forest' has gradually permeated villagers. VMPCI is trying to regulate slash and burn method of agriculture and illegal timber harvest in NIPAS area. The meeting of upland farmers are organized periodically to discuss how to develop agroforest farm.

In 1995, VMPCI started selective logging operation in the residual forest with assisted natural regeneration method. Some illegal loggers were able to enter VMPCI's legal logging operation. Although there are still numerous problems regarding on the logging operation as described in following chapter, self-forest management activity of villagers has been emerging without a doubt. It can be said that now is the transitional period from open access regime to communal resources management regime.

4) Livelihood structure and utilization of forest products in present

Table 1 shows present livelihood structure among sampled informants. Livelihood structure is divided between 'logging motivated migrants' and 'land-seeking migrants' because the differences between the two group are significant.

Table 1. Livelihood Structure and Estimated Income (as of 1997)

Income source		Logging motivated migrants (n=38)		Land-seeking migrants (n=32)	
		% Families engaged in activity	Average annual gross income (peso)	% Families engaged in activity	Average annual gross income (peso)
Farming (M,W,C)*					
Annual Crop	Maize	21.1%	11,740	65.6%	40,680
	Upland rice	18.4%	11,880	56.3%	17,660
	Rice(irrigated)	5.3%	48,000	0.0%	-
	Root crops	7.9%	1,400	21.9%	3,500
	Vegetables	7.9%	500	12.5%	2,300
	Tobacco	0.0%	-	9.4%	11,640
Perennial Crop	Banana	47.4%	17,600	71.9%	22,200
	Coffee	0.0%	-	3.1%	3,000
	Fruits tree	0.0%	-	9.4%	5,500
Sub total		65.8%	25,890	100.0%	55,500
Exploitative Forestry (M)					
Water/carabao logging (illegal)		42.1%	39,500	15.6%	33,920
CBFM logging (legal)		21.1%	44,100	9.4%	44,100
Sub total		52.6%	49,760	25.0%	37,740
Regenerative Forestry (M,W,C)					
Yemane**		26.3%	0	40.6%	0
Bamboo		0.0%	-	6.3%	1,200
CBFM reforestation***		7.9%	21,200	9.4%	24,000
Other resources gathering (M,C)					
Charcoal production		7.9%	12,600	21.9%	12,000
Cogon gathering		2.6%	10,000	3.1%	10,000
Bamboo gathering		2.6%	1,200	0.0%	-
Other income sources					
Live stock (M,W)		7.9%	n.a	0.0%	-
On-farm wage labor (W,M)		28.9%	2,000	43.8%	1,250
Carpentry (M)		5.3%	15,000	3.1%	3,000
Middle man (W)		5.3%	7,680	9.4%	6,500
Small store (W)		2.6%	n.a	6.3%	n.a
Remittance		26.3%	n.a	15.6%	n.a
Pension		7.9%	16,600	0.0%	-
Others		7.9%	n.a	3.1%	n.a

Average annual gross income is calculated from average gross output. Net income is not calculated.
* Activity conducted is indicated as men (M), women (W), and children (C).

** Intensive yemane planting has just emerged since 1996. There are no informants who already harvested yemane.
*** Regularly employed worker only.

a) Farming activity

Major crops in the area are maize, upland rice, and banana. Maize and upland rice are major crops in the lowland (A&D land). While maize is produced for commercial purposes, upland rice is mainly for subsistence needs (Income of upland rice in Table 1 is calculated from total harvest of rice though it is for house consumption).

Banana is a main crop in the upland. Since upland rice and maize are not able to be produced continuously on steep slope lands, farmers prefer planting bananas upland. Although some farmers plant maize and upland rice are in the upland, relatively lower slope areas are allocated.

Present agricultural landscape in the upland is a mosaic structure with intensive banana plantation in steeper sloping condition and patches of upland rice, maize in moderate sloping condition with fallow where carabaos (water buffaloes) are pastured.

Farming system in the researched area can not be considered as slash and burn cultivation. Fires are usually used only first year of cultivation for land clearance. Upland farmers, who occupied grasslands, planted bananas from gully areas and expanded towards the ridge. They are changing the grassland landscape into perennial banana plantation. Thus, more farmers' cultivation in the grassland will result in further decrease of denuded landscape. Considering this situation, the general understanding that kaingin (slash and burn agriculture) is the main cause of grassland expansion is very much questionable. Grassland vegetation emerged by 1993 forest fires. Farmers cultivation in such areas, at least, changes the area of productive banana plantation.

b) Gathering of non-timber products

Upland areas are not only used for farming and logging purposes but non-timber resources are also gathered mainly for subsistence needs.

Cogon (*Impelata cylindrica*), a dominant species in the grassland, is commonly used for grass roofs of local houses. Bamboo, bountiful in shrub and secondary forest vegetation, is used for walls of local houses. Although some houses of the relatively high income class have zinc roofs and timber or block walls, the majority of houses in the villages are constructed by cogon and bamboo which were gathered by owners. Some households are engaged in gathering cogon and bamboo for commercial purposes as a side occupation.

Fire wood is usually gathered from one's own farm-lots. Farmers usually plant legume species such as ipil-ipil (*Leucaenea leucocephala*) in their farm-lots mainly for boundary making. Such legume trees are used for fire wood. Ipil-ipil is a regenerative species that can be harvested continuously.

Charcoal making is one of the side occupations of farmers. The resources are gathered from their own lots and also open brush in the upland. 21.9 percent of land-seeking migrants produce charcoal for commercial purposes. Charcoal production is a popular activity especially during dry season (December to May). One sack of charcoal is sold for 35 pesos.

Hunting is also practiced by some upland farmers. However, wild animals are now so scarce that no informants are engaged in this activity as an income source. Upland farmers sometimes get wild pigs and monkeys in the mountain for house consumption.

c) Exploitative forestry and timber resources

Fifty two point six percents (52.6%) of ex-concession workers depend on logging activities as a main income source. Even 25.0% of land-seeking migrants are also engaged in logging. Exploitative forestry is still the second most important income generating activity. Although commercial logging is officially banned by the government, ex-logging workers have to continue logging for their survival. Although logging activity of these ex-logging workers have been considered as illegal by the government, illegal loggers usually bribe military and DENR officials so that they are allowed to pass the check point and bring timbers to the market.

Under the CBFM strategy, the government accepted selective logging activity by people's organizations in order to give job opportunities for ex-logging workers. In 1995, the government permitted logging activity of VMPCI under the government's supervision. However, employment

capacity of VMPCI's logging is not enough. The Annual Allowable Cut (AAC) in 1997 was 840 m^3 while the AAC of ACME company in 1989 was 65,420 m^3. Under this logging capacity, VMPCI was able to employ only about 60 workers (as of 1997) which is capable only more or less 10 percent of total employment in ACME's logging operation. Thus, among the logging motivated migrants group, while 21.1% of informants engaged in 'legal' logging activity of the VMPCI, 42.1% still have to continue 'illegal' logging activity. Illegal loggers harvest timbers from NIPAS area where commercial logging activity was officially banned.

After the cancellation of large scale mechanized logging, the possible methods of logging by the local residents are the following two ways. One is called 'water logging' which utilizes creeks and rivers to transport harvested timber. The other is called 'carabao logging' which uses water buffalo to pull timber. The majority of loggers among land-seeking migrants usually employe the carabao logging method. Loggers among ex-concession workers, in turn, usually employ the water logging method. Table 2 shows the price of timber by different classes. There are four classes of timber in the area.

The most expensive variety is narra (*Pterocarpus indicus*). Narra is well known for its hardness and beauty of the grain. It is widely used for making high-grade furniture. Because furniture making is the major industry in Ilagan, narra timber is in great demand by the local furniture makers.

Narra extraction became rampant when the logging concession was cancelled. Since the government did not permit the logging company to harvest narra, this variety was relatively well stocked in the ex-concession area.

Table 2. Price of Timber / Board foot (pesos): Case of illegal logging.

Class	Common name	Scientific name	Middleman** to buyer	Market price in Ilagan
1)	Narra	*Pterocarpus indicus*	30	38
2)	Guijo	*Shorea guiso*	15	20
3)*	Red lauan	*Shorea negrosensis*	12	17
	Tangile	*Shorea polysperma*	12	17
	Mayapis	*Shorea palosapis*	12	17
	Yemane	*Gmelina arborea*	12	17
4)	Binuan	*Octomeles Sumatrana*	10	15
	Malaikmo	*Celtis philippinensis*	10	15

* Class (3) are popular dipterodarp species locally called 'RTM' class.

** Middleman (amo) is a villager who gather timbers in the village and sells timber to outside-buyers.

As of October, 1998.

Logging company mainly harvested dipterocarp species for making veneer and plywood. The company brought the majority of logs directory to Manila. Timber supply for local market even increased after the imposition of the logging ban since illegal loggers began to sell timber for local timber dealers. Because narra is in great demand by the local market, many ex-logging workers were able to start narra exploitation activity by means of carabao logging or water logging. It is said that the number of local furniture makers doubled after the cancellation of the logging concession.

The second class of timber is a high quality dipterocarp variety such as guijo (*Shorea guiso*). Since guijo timber has a beautiful grain, it is used for high quality construction material.

The third class is ordinary dipterocarp varieties locally called RTM species, representing red lauan (*Shorea negrosensis*), tangile (*Shorea polysperma*), and mayapis (*Shorea palosapis*). It is commonly used for ordinary construction material. However, because of the narra shortage in recent years, local furniture makers began to utilize guijo and RTM variety for furniture purposes.

Yemane (*Gmelina arborea*) is also transacted as the third class timber. Yemane, locally called gmelina, is the fast-growing species which is the most frequently chosen as a reforestation variety in the Philippines. It takes only 5 to 8 years to be harvested, and it is easy to collect seeds for germination. Compared to other fast-growing species, yemane also has the best fire tolerance quality and is ideal for construction purposes. The yemane market suddenly expanded in recent years, whereas natural timber

stocks are declining. Local furniture makers and timber dealers began to consider yemane as an alternative material because the resource shortage of natural species became serious in recent years. The fourth class is a miscellaneous variety which is used for temporary construction purposes. These non-dipterocarp varieties are softer and not qualified for furniture and other uses.

d) The problem of logging operations under CBFM strategy

DENR permitted controlled logging operation of VMPCI since 1995. While water/carabao loggers exploit logs almost as if it were an open access method, the logging operation of VMPCI uses scientific methods of selective logging with assisted natural regeneration. However, conflicts occurs between illegal loggers and legal loggers in terms of timber price. A board foot of red lauan which is harvested by water/carabao loggers is 12 pesos in the villages. Red lauan of VMPCI, on the other hand, is 18 pesos, 50 percent higher than illegal one. As Table 3 shows, logging under CBFM needs a higher amount for operational costs because of the necessity of administration.

Table 3. Price formation of timber / board foot: Case of red lauan.

(1) Water logging

Items	Cost (peso)
Chainsaw operator	
Chainsaw helper	3
Water hauler	5
Middleman	2
Truck transport	2
Total	12

(2) CBFM logging

Items	Cost (peso)
Chainsaw operator	
Chainsaw helper	0.5
Truck driver	
Truck helper	3.5
Bulldozer	2
Administration	3
Cooperative	3
Sawmill workers	2
Trust Fund	1
Forest charges	3
Total	18

Furthermore, legal logging operations have to pay forest charges (3 peso/board foot) to the government which makes the price of legally harvested timber higher than illegally harvested timber. Thus, members of VMPCI claim that they lose out to illegal timber in market competition.

If the government really wants to stop illegal logging activity, it should approve an increase in the allowable cut to create more jobs for those engaged in illegal logging. Otherwise, it will continue to cause social conflict between the two.

5) Evaluation of forest utilization from the view point of sustainability

a) The decline of illegal exploitative forestry

Timber resources of natural forest are clearly over-exploited. Table 4 shows how labor input for transportation of timber from the mountain increased since 1990. It proves the trend of over-exploitation.

Table 4. Transportation Cost and Price of Natural Species

		1990	1998
Narra	Labor Input for Timber Transportation (man-day)	1	12
	Timber Price/ board foot (peso)	8	30
Dipterocarp	Labor Input for Timber Transportation (man-day)	1	3
	Timber Price/ board foot (peso)	8.5	12

According to water/carabao loggers, narra trees were still bountiful when the logging concession was cancelled. They could bring down narra timber from the logging area within one day. However, since many ex-concession workers entered into narra exploitation activity, this trend resulted in the 'tragedy' of narra species. Rapid depletion of narra in the lower portion of Sierra Madre forced the cutting area farther away from the village. As the cutting area moved away, carabao logging became impossible, because it is only possible within the distance that carabao can go up and down in a day. Thus, water logging became the only method for narra extraction. As of 1998, the cutting areas of narra were almost near the ridge of mountains.

Water loggers had to spend almost two weeks just for one operation. Labor input for transporting narra increased more than 10 times compared to 8 years ago. They sleep two weeks continuously on the river bank, eating crabs, small fishes, and edible plants such as rattan in the forest. They are also threatened by malaria and physical injury. Although price of narra is getting higher as transportation cost increases, the present narra extraction seems to be almost the limit of man's physical ability. Narra loggers believe that narra resources in the western slope of Sierra Madre will disappear soon.

The rapid exhaustion of narra resources made loggers shift their target to dipterocarp and other miscellaneous species. The stock of dipterocarp resources are in relatively better condition. Water loggers are able to transport dipterocarp timbers from cutting area to the village within three days. However, if over-exploitation of water/carabao logging continues without any regulations, sustainable resource utilization is difficult. Dipterocarp species might follow the same destiny of narra.

b) Selective logging method under CBFM

The logging activity under CBFM strategy uses selective logging methods. In the case of VMPCI, they make 50 hectares of logging plots every year and trees over 60 cm in diameter are selectively harvested. Because 2,518 hectares of secondary forest still remain within the CBFM site, 50 hectares can be cycled in 50 years. After finishing a 50 year cycle, they will come back to the first plot which is expected to be recovered for another logging operation. If the logging operation of VMPCI is practiced in this theory, sustainable forestry will be possible.

However, there is no scientific date proving that the composition of dipterocarp trees can regenerate as it is. The big dipterocarp trees in present VMPCI's logging plot were once logged by ACME company. It seems the stock of dipterocarp is depleted and percentage of miscellaneous species is higher than under natural ecological conditions. Based on the official record of VMPCI, 283.7 m^3 of logs were harvested between May 19 and July 22, 1997. Out of 283.7 m^3, 42.2 percent were miscellaneous trees and 57.8 percent were dipterocarp trees.

c) Emergence of spontaneous regenerative forestry

One important phenomenon occurring in the researched village is the emergence of farmer's spontaneous tree planting within private farm-lots. In 1996, farmers in Rang-Ayan and Batong Labang suddenly began to plant fast growing species, particularly yemane.

Theoretically speaking, the decline of natural timber stocks forces logging to occur under increasingly marginal conditions, resulting in higher transportation cost. When the transportation cost of harvested timber from natural forests exceeds afforestation costs near a village, the economic incentive emerges to manage man-made forest. Thus, regenerative forestry takes over exploitative forestry. In the researched villages, it seems that this historical phenomenon is finally taking place.

It seems there are two reasons why villagers suddenly started regenerative forestry in 1996. The government, at that time, intensified regulation against timber middlemen except those who transact man-made timber. Thus, some timber middlemen started buying yemane timber. Local furniture makers and timber dealers began to utilize yemane as an alternative. The market price of yemane timber eventually increased as high as the price of red lauan. With the market for fast growing species established, farmers noticed the potential profitability of regenerative forestry activity.

The government initiated reforestation project inside the CBFM area, which began in 1996, was also an important reason. Through the reforestation project, farmers learned how to establish a nursery and timber plantation.

Among 38 informants of ex-concession workers, 25 have obtained a parcel of farm in the upland. Out of the 25 who started farming, 10 already planted yemane intensively in their farm-lots. While they continue 'illegal' logging activity, they are expecting a future income source when planting yemane. When the time comes to harvest enough volume of yemane timber from their agroforestry farms, illegal logging activity will disappear.

Thus, if this trend continues, exploitation of natural forests may cease and the remaining forest could be conserved. As man-made forests expands from lower to higher areas, the forest cover in Sierra Madre will be restored.

Establishment of small-scale tree plantations inside farm-lots is cost-efficient and requires basic security and protection. Unfortunately, the government does not recognize the advantages of small-scale regenerative forestry to its full potential. The government appears to be more interested in obtaining foreign loans to establish large-scale reforestation projects. This government strategy resulted in problems such as land conflicts.

The people are now inclined to plant trees through their own initiatives. This scenario seems to be more viable than foreign loan-driven reforestation projects.

References

Constantino, Renato, Constantino, Letizia R. 1978. *The Philippines: The Continuing Past*. The Foundation for Nationalist Studies. Quezon City.

de los Angeles, Maria S., Oliva, Robert V., International Resource Group. 1996. *Logging Bans: Economic and Environmental Consequences*. DAI (Development Alternatives Inc.) under contract of USAID (United States Agency for International Development). Quezon City.

DENR. 1996. *1996 Philippine Forestry Statistics*. Department of Environment and Natural Resources: Quezon City.

DENR. 1997. *Moving CBFM into the 21st Century: DENR Strategic Action Plan*. Department of Environment and Natural Resources: Quezon City.

Fujisaka, Sam. 1986. "Pioneer Shifting Cultivation, Farmer Knowledge, and an Upland Ecosystem: Co-evolution and Systems Sustainability in Calminoe, Philippines." *Philippine Quarterly of Culture & Society* 14. pp. 137-164.

Seki, Yoshiki. 1997. "Syougyou-bassai go no Firipin Sanson no Henyou: Nueba-Eshiha syuu Gabarudon cho no jirei (Transformation of Philippine Upland Village after Commercial Logging: Case of Gabaldon, Nueva Ecija)." *Ringyo-Keizai Kenkyu* (Journal of Forest Economics), Vol. 43, No. 1. pp. 87-92.