A Geographical Study on the Basis for Existence of Mountainous Villages in Northern Laos

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ABSTRACT

The purpose of this study is to clarify the basis for existence of mountainous villages in northern Laos. As a study area, the author selected 16 settlements of Ngoi district, located in Luang Phabang province in northern Laos, where there are no roads at all, and analyzed the relationship between economic activities, settlement location, and ethnicity from the spatial point of view.

The study area contains settlements of three ethnic groups: ethnic Lao, Khmu, and Hmong. In terms of economic activities, people carry out agricultural activities such as subsistence agricultural production, gathering of forest products, livestock raising, and so on. In addition to this, there are non-agricultural activities such as general store management, and agri-forest products brokerages.

The main economic activity is rice farming in swidden fields. In the study area, the methods of cultivating crops make use of the people's indigenous knowledge acquired from their long history, for example regarding the selection of planted rice varieties and mixed crops.

Although many farmers engage in rice farming, hardly any households obtain cash income from rice farming. The most important activity contributing to cash income for farm households in the study area was the gathering of forest products, especially benzoin. Benzoin is gathered from styrax trees (*Styrax tonkinensis*), which grow in the fallowed swiddens as secondary vegetation. Thus, people practice agroforestry-like land use combined with swidden field use. Gathering benzoin needs a long fallow period, so it plays an important role in preservation of the forest resources.

In the study area, two periodic markets and a settlement with permanent general stores are located along the riverside. These provide people with opportunities both for merchandise sales and purchase of agri-forest products.

The Khmu reside throughout the whole area from the mountainous area to the riverside and obtain cash income from forest products. The Hmong reside only in the mountainous area and obtain cash income from opium. On the other hand, most ethnic Lao reside on the riverside and adopt an occupation style of half-farmer and half-trader, engaging in both agricultural and non-agricultural activities, and they obtain cash income from the non-agricultural activities. The occupation structure of ethnic Lao obviously differs from that of the Khmu and Hmong.

The economic systems in the study area consist of "Producing Systems" based on agricultural activities, and "Trading Systems" based on non-agricultural activities. The Producing Systems are chiefly maintained by Khmu and Hmong in the mountainous area, while the ethnic Lao on the riverside mainly carry out activities concerned with the Trading Systems. The Producing Systems alone used to be an activity ensuring self-sufficient production, but have now become a cash income activity by connecting to the Trading System. As a result, it is clear that the basis for existence of the mountain villages is sustained when a state of balance is maintained between both systems.

Keywords: Laos, ethnic minority, settlement location, economic activity, swidden, agri-forest products, benzoin, periodic market

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CHAPTER I

INTRODUCTION

1. Subject of the Mountainous Regions of Mainland Southeast Asia Studies and the purpose of study

For a number of reasons the parts of five countries referred to here as "the Mountainous Region of Mainland Southeast Asia", i.e. the Shan States of Myanmar and the hilly areas of Yunnan, northern Thailand, northern Vietnam and northern Laos, have been of increased interest to scholars of Southeast Asia area studies.

First, the same or similar ethnic groups are mosaically distributed by across the modern borders of these countries. Until the first half of 19th century, the Mountainous Region of Mainland Southeast Asia consisted of three kingdoms, Dai Viet, Lan Xang and Lan Na (Stuart-Fox 1997: 6-19). Thus, each ethnic group in the Mountainous Region of Mainland Southeast Asia had resided in the same country, and there was no limitation in the traveling. For example, the Lan Xang kingdom, centered in modern northern Laos included a part of Xishuangbanna, and parts of modern Thailand and Vietnam. When French delimited the territories of Laos, Vietnam, formally separating them from Thailand, China, and Myanmar, each ethnic group was dispersed within each country. Ethnic groups that had originally had a common culture changed, in part as a result of different national policies of the five "new" governments and administrations

Second, the ethnic groups in the Mountainous Region of Mainland Southeast Asia are territorially found on the periphery in each of the five

countries, while the national policy was made at the capital or principal city as "the center" of the country by the ethnic majority. Due to delimitation of the border line, each country began to impose its own national policy over its territory. Indigenous people in the Mountainous Region of Mainland Southeast Asia became minorities in the larger units, at the same time as their region became geographically more distant from the Center of the country. As a result, the Mountainous Region of Mainland Southeast Asia found themselves on a periphery where economic development and infrastructure construction and maintenance had lagged behind or never occurred[1)].

Third, proceeding from the above-mentioned problem, the Mountainous Region of Mainland Southeast Asia was changed into an area that unites universality with peculiarity, both in occupational forms and in socio-economic aspects. The Mountainous Region of Mainland Southeast Asia is a homogeneous regional unit having a tropical monsoon based natural environment. In such an environment self-sufficient combined occupational forms such as swidden cultivation, paddy cultivation, hunting, gathering, fishing and livestock raising were practiced. In the century that has passed since the border line was delimited each ethnic group must have changed as a result of both internal and external pressures.

In a particular ethnic group, similar changes may occur even in different countries because of the original common culture and indigenous knowledge of the group. This may be termed the universality of cultures of the Mountainous Region of Mainland Southeast Asia. On the other hand, however, quite different occupational structure might be shown in a single ethnic group whose members find themselves living in different countries. Factors leading to change are of

particular interest to Mountainous Region of Mainland Southeast Asia studies. Especially, the collapse of the Communist monolith and the subsequent changeover to a market economy in the latter half of 1980's brought big changes to China, Vietnam and Laos. Consequently, it is conceivable that the differences of politics and economics of each country are contributory to the peculiarity of the Mountainous Region of Mainland Southeast Asia.

From the above-mentioned three points, the Mountainous Region of Mainland Southeast Asia may be a fruitful area of study as a cultural ecological field. Accordingly, to clarify the socio-economic change that occurred in the region and to build an eco-history might contribute toward elucidating relationships between poverty, environmental destruction, social structural changes and so on, which are widely seen in many places of the third world at present.

In order to illuminate a characteristic region such as the Mountainous Region of Mainland Southeast Asia, each region as the woof, and each study field of natural science, social science and cultural studies as the warp, and then the method of weaving a big cloth from the woof and the warp must be adopted. To weave a part of the big cloth — the Mountainous Region of Mainland Southeast Asia — this research takes up the mountainous area of northern Laos, and attempts to analyze agricultural and non-agricultural activity in the mountainous area from a spatial point of view by paying attention to the inter-relationship between ethnic groups, the village locations and economic activities. The purpose of this paper is to clarify the basis for existence of people's life in the mountainous area of northern Laos.

2. Ethnic minorities and spatial distribution in Laos

To define the position of the mountainous area of northern Laos, let us start with the taking a general view about the ethnic groups of Laos — which may occasionally assume a complicated aspect.

In Laos up to now ethnic classification has not been defined in any fixed and agreed-upon way, so that the numbers of ethnic groups has changed whenever the census was taken (Hayashi 1998). In general ethnicity tends to be classified based on four ethno-linguistic families: the Tai-Kadai, the Mon-Khmer (or Austroasiatic), the Hmong-Mien and the Sino-Tibetan. Due to the method of interpreting the dendrogram of ethno-linguistic family, however, the number of ethnic groups is changing from 47 groupings to 131 groupings[2)].

Against such a fluid classification, the following three categories have been established to classify ethnic groups depending on habitat location (and altitude especially): *Lao Lum* ('Lowlander'); *Lao Tueng* ('Midlander'); and *Lao Sung* ('Highlander'). These distinctions are not a formal classification in the opinion of the government. Nevertheless, since these categories are used not only in public discourse as a kind of report but also in academic papers, it is necessary to utilize them here. If this method of categorizing is compared to ethno-linguistic family, *Lao Lum*, *Lao Tueng* and *Lao Sung* correspond to Tai-Kadai, Mon-Khmer and Hmong-Mien/Sino-Tibetan ethno-linguistic families respectively.

However, even within these three categories, two ethnic groups within the same category often cannot communicate with one another. In addition to this, a clear delineation of the ethnic group may not be possible because of various understandings within the region and among individuals

In this manner, over the years various confusions related to ethnic

classification developed in Laos. Recently, in 2000, the Lao Front for National Construction produced the system of 49 groupings based on four ethno-linguistic family as the official system of classification (Table 1). Comparing the new classification with the previous one used in the 1995 census, three small changes can be noted: two ethnic groups were brunched from the other, two ethnic groups were integrated with others, two ethnic groups were newly created, and nine ethnic names were changed. Official ethnic names are displaced from Lao language that mainly used ethnic Lao group into the language of each ethnic groups based on what groups prefer to call themselves[3)]. For instance, an ethnic name denoting contempt such as "*Phou Noy*" (meaning "dwarf") in Lao language has disappeared from official documents. This change is said to show that the government of Laos leans to the minority side in the interest of nation-state building.

In each province the ethnic distribution corresponds to geographical location (Table 2). Ethnic groups such as Khmu, Phuthai and Hmong occupy the first place of the population by northern six provinces, Borikhamxay province and Xaysomboun special region in central region. In addition, Akha occupies the second place at the almost same ratio to first place in Phongsaly province and Luang Nam Tha province in northernmost of Laos. Katou, Talieng and Halack occupy the high rank of the population ratio in Sekong province of southern Laos.

These ethnic groups are recognized to be the minority since the population of them is extremely low comparing with ethnic Lao which is the predominant people in Laos. Provinces where many ethnic minorities reside tend to be located in the mountainous areas. To grasp these concepts regarding the mountainous

Table 1 Classification of Ethnic Group based on Ethno-linguistic Family by the Lao Front for National Construction

Ethno-linguistic Family	No.	New Classification in 2000	Census 1995			Remarks
			Classification	Population		
				Total	Ratio(%)	
Tai-Kadai	1	*Lao*	*Lao*	2,403,891	52.5	
	2	*Phuthai*	*Phuthai*	472,458	10.3	
	3	*Tai*				Branched from *Phuthai* group
	4	*Lue*	*Lue*	119,191	2.6	
	5	*Nhouan*	*Nhouan*	26,239	0.6	
	6	*Nhang*	*Nhang*	4,630	0.1	
	7	*Xek*	*Xek*	2,745	0.1	
	8	*Thai Neua*				Branched from *Lue* group
Mon-Khmer	9	*Khmu*	*Khmu*	500,957	11.0	
	10	*Pray*	*Thin*	23,193	0.5	Changed name
	11	*Xingmoun*	*Xingmoun*	5,834	0.1	
	12	*Phong*	*Phong*	21,395	0.5	
	13	*Then*				Not found in Census 1995
	14	*Eudou*				Not found in Census 1995
	15	*Bit*	*Bit*	1,509	0.0	
	16	*Lamet*	*Lamet*	16,740	0.4	
	17	*Sam Tao*	*Sam Tao*	2,213	0.0	
	18	*Katang*	*Katang*	95,440	2.1	
	19	*Makong*	*Makong*	92,321	2.0	
	20	*Tri*	*Tri*	20,906	0.5	
	21	*Jru*	*Laven*	40,519	0.9	Changed name
	22	*Talieng*	*Talieng*	23,091	0.5	
	23	*Ta Ooy*	*Ta Ooy*	30,876	0.7	
	24	*Jeh*	*Jeh*	8,031	0.2	
	25	*Brau*	*Lavae*	17,544	0.4	Changed name
	26	*Katou*	*Katou*	17,024	0.4	
	27	*Halak*	*Alak*	16,594	0.4	Changed name
	28	*Ooy*	*Ooy*	14,947	0.3	
	29	*Kriang*	*Ngeh*	12,189	0.3	Changed name
	30	*Cheng*	*Cheng*	6,511	0.1	
	31	*Sadang*	*Sadang*	786	0.0	
	32	*Xouey*	*Xouey*	45,498	1.0	
	33	*Nhahoen*	*Nhahoen*	5,152	0.1	
	34	*Lavi*	*Lavi*	538	0.0	
	35	*Pako*	*Pako*	13,224	0.3	
	36	*Khmer*	*Khmer*	3,902	0.1	
	37	*Toum*	*Toum*	2,510	0.1	
	38	*Ngouan*	*Ngouan*	1,344	0.0	
	39	*Meuang*	*Mone*	217	0.0	Changed name
	40	*Kri*	*Kri*	739	0.0	
Sino-Tibetan	41	*Akha*	*Ko* *Kheu*	66,108 1,639	1.4 0.0	Changed name from *Ko*, and integrated *Kheu* into *Akha*
	42	*Singsili*	*Phou Noy*	35,635	0.8	Changed name
	43	*Lahu*	*Muxoe* *Kouy*	8,702 6,268	0.2 0.1	Integrated *Muxoe* and *Kouy*, and changed name to *Lafu*
	44	*Sila*	*Sida*	1,772	0.0	Changed name
	45	*Hayi*	*Hayi*	1,122	0.0	
	46	*Lolo*	*Lolo*	1,407	0.0	
	47	*Ho*	*Ho*	8,900	0.2	
Hmong-Mien	48	*Hmong*	*Hmong*	315,465	6.9	
	49	*Iu Mien*	*Yao*	22,665	0.5	Changed name
Others				10,201	0.2	
Not Stated				24,084	0.5	

Source: Lao Front for National Construction 2000 and National Statistical Centre 1997

Table 2 Ethnic Group Structure by Province, 1995

Regional Division	Provinces	Population	1st Group (%)	2nd Group (%)	3rd Group (%)	Total the Upper 3 Groups (%)
North	Phongsaly	152,848	*Khmu* (24.4)	*Akha* (20.0)	*Singsili* (19.4)	63.8
	Luang Nam Tha	114,741	*Khmu* (24.7)	*Akha* (23.9)	*Lue* (15.8)	64.4
	Oudomxay	210,207	*Khmu* (57.7)	*Hmong* (13.1)	*Lue* (12.2)	83.0
	Bokeo	113,612	*Khmu* (23.8)	*Lue* (20.6)	*Lao* (13.4)	57.8
	Luang Phabang	364,840	*Khmu* (45.9)	*Lao* (28.6)	*Hmong* (15.2)	89.7
	Huaphanh	244,651	*Phuthai* (31.5)	*Lao* (30.0)	*Hmong* (20.3)	81.8
	Xayabouri	291,764	*Lao* (63.4)	*Khmu* (9.0)	*Lue* (8.1)	80.5
Center	Xieng Khuang	200,619	*Lao* (44.3)	*Hmong* (34.2)	*Phuthai* (10.2)	88.7
	Xaysomboun Special Region	54,068	*Hmong* (53.7)	*Lao* (19.4)	*Khmu* (16.7)	89.8
	Vientiane	286,564	*Lao* (63.8)	*Phuthai* (14.0)	*Khmu* (12.5)	90.3
	Vientiane Municipality	524,107	*Lao* (92.6)	*Phuthai* (3.1)	*Hmong* (1.4)	97.1
	Borikhamxay	163,589	*Phuthai* (41.0)	*Lao* (40.2)	*Hmong* (9.2)	90.4
	Khammuane	272,463	*Lao* (59.4)	*Phuthai* (21.7)	*Makong* (13.4)	94.5
	Savannakhet*	671,758	*Lao* (57.5)	*Phuthai* (18.9)	*Katang* (8.7)	85.1
South	Saravane	256,231	*Lao* (60.0)	*Katang* (13.3)	*Xouey* (8.1)	81.4
	Sekong	64,170	*Katou* (24.3)	*Talieng* (21.8)	*Halack* (15.5)	61.6
	Champasack	501,387	*Lao* (84.8)	*Lavi* (4.9)	*Xouey* (2.4)	92.1
	Attapeu	87,229	*Lao* (36.9)	*Lavi* (17.4)	*Ooy* (16.4)	70.7

Source: Census 1995, the National Statistical Centre
* Savannakhet province is sometime categorized as south region.

areas from the spatial point of view we must pay attention to the culture and the socio-economic trends of the Mon-Khmer, Hmong-Mien and Sino-Tibetan ethno-linguistic family.

3. Previous studies

Studies on the economic activity in the mountainous area of northern Laos, research work has been made from various viewpoints by the many researchers. Much material is related to swidden agriculture. The earliest swidden study in the mountainous area of northern Laos is the monograph by Izikowitz (1951) of Lamet belonging to Mon-Khmer ethno-linguistic family. The Swidden agriculture system of the Lamet is characterized by not slashing the tree after 12-15 years until the tree grows up by blocking the sunlight with the canopy, and by distinguishing between the different kinds of soil. Later Halpern (1961b), using statistical data of domestic and neighboring countries proved that productivity of swidden is by no means low compared with paddy field (Halpern 1961a). However, Halpern mentions that the then government of Laos had taken a critical attitude toward swidden agriculture because deforestation caused by population pressure had also occurred, especially in the northern areas.

Forests in Laos are certainly decreasing. Forest cover in the 1950s was estimated at 70 percent; today, the amount of forest cover is only around 40 percent (Chape 2002). The deforestation is remarkable in the northern region, and it is said that the reason is excessive forest use by swidden (Rigg and Jerndal 1996). Most of the land in the northern Laos is, however, so unsuitable in terms of geographical features for developing paddy fields that swidden agriculture is

only the method of producing rice. Accordingly, the present study is not an attempt to argue right or wrong of swidden, but to shift to an experimental and a verificational study as to whether to continue swidden agriculture. For example, the mainstream of swidden study at present is to clarify the necessity of improving the fallow cycle (Fujisaka 1991; Roder 1997; Roder et al. 1995, 1997) and the possibility for participatory forest management (Sharma 1992). In addition to this, by monitoring of swidden fields using satellite data or aerial photographs, studies that clarified the change of forest use in terms of historical events and socio-economic situation (Sandewall et al. 2001) and the relationship between settlements and swidden fields (Nagasawa et al. 1998) were carried out. These studies are very important to consider sustainability of swidden agriculture in the northern Laos, and also valuable as fundamental materials for analyzing the factors in deforestation.

On the one hand, swidden agriculture is a self-sufficient economic activity to produce the staple food: rice; on the other hand, economic activities to get cash income are cash crop cultivation, livestock raising and forest products gathering. However, those studies are hardly more than the development project reports[4)] by the international organizations, the governmental institution and NGOs, and academic achievements are not many.

In terms of cash crop cultivation, Chen et al. (2001) showed in a case study in Oudomxay province of northern Laos that opium poppy cultivation provides 80 percent of the villagers' income. Opium cultivation is extremely high return for labor, because the income per day-day was 6.7 times that of upland rice cultivation in swidden fields. It is said that the opium poppy is a highly efficient crop. In northern Laos, except for the opium poppy, according to Department of

Agriculture (2002); the following are cultivated as cash crops: feed corn, sweet corn, black soybean, garlic, cassava, sweet potato, shallot, orange, pomelo, pineapple, mango, papaya, jackfruit, tamarind, pear, squash, sugarcane and Job's tear.

Regarding the forest products, from the survey at Vang Vieng district, Vientiane province, Chanthirath (2000) clarified the relationship between kinds of forest products and the place of gathering. Furthermore, Takeda (2001), and Kashio and Johnson (2001) mention that benzoin resin from styrax tree (*Styrax tonkinensis*) contributes significantly to the cash income of people of a mountainous village in Luang Phabang province. According to Foppes and Khetphanh (2001), exported Forest products other than benzoin, are flower of tiger grass (*Thysanolaena maxima*), coconut of sugar palm (*Arenga westerhoutti*), bark of paper mulberry (*Amomum villosum*), Puack Muack (*Boehmeria sp.*), eagle wood (*Aquilaria sp.*) and bitter bamboo shoot (*Indosasa chinensis*).

Concerning the selling and barter of these products, the broker called *Lam* played an important role until the 1950s (Halpern 1958: 69-74). *Lam* had acted as an intermediary between forest products that were gathered by people in the mountainous area and merchandise that were traded by merchants in the town. Then gathered forest products were benzoin and the stick-lak, and merchandise sent to the mountainous area were salt and clothes. The *Lam* himself was ethnic Lao in the urban area, and frequently a village chief (*Nai baan*) or district chief (*Chao tassen*). It is said that the hilltribe who had used *Lam* was Khmu.

Although Hmong had obtained income by opium poppy cultivation, they did not trade with ethnic Lao (*Lam*) but with the Ho peddler from Yunnan. According to Iwata (1960a), however, it is described that ethnic Lao purchased

the opium from Iu Mien in Vang Vieng district, Vientiane province. The Lamet transported surplus harvested rice by boat to the ethnic Lao merchant in the lowland, and exchanged for iron products such as farming implements, edged tools and so on (Izikowitz 1951: 308-315). The existence of *Lam* between the settlement of Lamet and the lowland village of ethnic Lao was not mentioned. Stuart-Fox (1998: 48-49) states that trading between *Lam* and Khmu was established during the Lang Xang Kingdom era a considerable time ago. In northern Laos, until recently opium trade was carried out with Yunnan. In the case of trading southward however, the opium was purchased not by Ho but by ethnic Lao, claims Iwata. As for opium, it is thought that the difference of the trading other party, Ho or ethnic Lao, was determined by geographic position with regard to China.

According to these studies, Khmu, Lamet, Hmong and Iu Mien peoples inhabiting in the mountainous areas were sustained by trading with the lowland ethnic Lao or the Ho in Yunnan.

Giving an outline of previous studies, the studies that carried out from 1950s to 1960s such as Izikowitz (1951) and Halpern (1958, 1961b) tried to grasp the region from an interdisciplinary viewpoint, even though an anthropological emphasis was clear. However, these were no more than monographs of local communities because of the constraints on data gathering caused by social circumstances at the time and especially difficult access to the mountainous area. With the advent of the period of Socialism in 1975 field studies in Laos by foreigners were prohibited[5]. Research restarted after the collapse of socialism in the latter half of 1980's, but then the focus of study was on narrow specific fields such as swidden farming systems and crop cultivation. Although the present

research may seem to be connect environmental and development issues, it is insufficient in terms of accumulation of regional basic data.

4. Methodology and the study area

There are four types of data constraints which can hinder this kind of research in Laos: (1) Large-scale topographical maps (more than 1/50,000) do not exist for all areas. Even if one does exist, it may have been issued in 1960s. (2) The social statistics data at the village level generally cannot be obtained. (3) The economic statistics data of production and collection of the agri-forest products does not exist. (4) Historical materials at a country level are hardly left.

In such a situation, in order to accomplish the purpose of this study there is no method other than making a map and obtaining statistical data in person through fieldwork at the village level in the small area. This kind of survey is never carried out on a large scale. Based on the result grasped in the small area, neither a monograph nor a case study, it is necessary to refer to the universality of the mountainous area of northern Laos as much as possible. Then, this study took up Pak Luang sub-district, Ngoi district, Luang Phabang province as something like an epitome of the mountainous area of northern Laos, where two or more ethnic groups are living in the same area and an appropriate number of villages are located, ranging from lowland to highland (Fig. 1).

The survey carried out from April 2001 to September 2002. The author's stay in the study area was total 60 days. Data acquired in the study area were general statistics of village, economic activities of household, forest use, agricultural products and land use. Regarding general statistics of village, the population, the number of household and the occupation structure of all

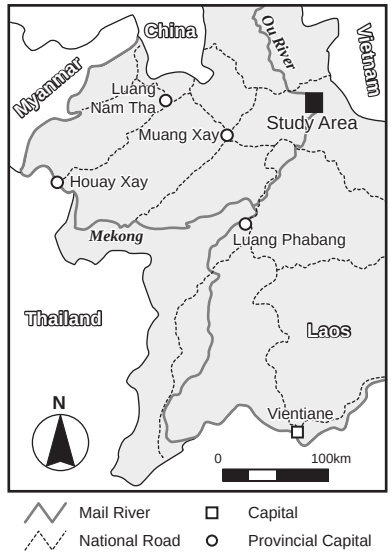


Fig. 1 Study Area, 2001

households were obtained by interviewing to the elders and the settlement chief. Moreover, 4-19 households per a village were selected according to the village size, and the data of the economic activity of 160 households in total was acquired (Appendix 1-4). Survey of the forest use and agricultural products were carried out in all villages, and survey of the land use was carried out only in the Hatsa village.

Moreover, the topographical map of the study area issued in Laos was only scale of 1/50,000, and even in the settlement, locations have not seen on the map. Therefore, in order to make a map and survey the settlement location, GPS was used. The technique of making land use map using GPS and GIS was fully described in Yokoyama (2001a).

To begin with, in Chapter 2, defining the location of the mountainous area of northern Laos, the universality of the occupation structure to be commonly shown in settlements of the study area is clarified. Next, in Chapter 3, the difference caused by place of residence and ethnicity is clarified by analyzing agricultural activity, such as agricultural production, forest product gathering and so on. On the other hand, common universality in the study area is also clarified. Then, in Chapter 4, the present trading system between settlements in the mountains area, riverside periodic markets and the urban areas is clarified by paying attention to the non-agricultural activity, especially general store management and agri-forest products brokerage. Chapter 5, attempts to explain the base for existence of mountainous village from inter-relationships between settlement location, ethnicity and economic activities, based on the result of the preceding chapter. Finally, in Chapter 6, through such consideration, the author summarizes the general universality and the specific peculiarity of a region, and

then considers a future change based on a geo-ecological viewpoint and a political ecological viewpoint.

CHAPTER II

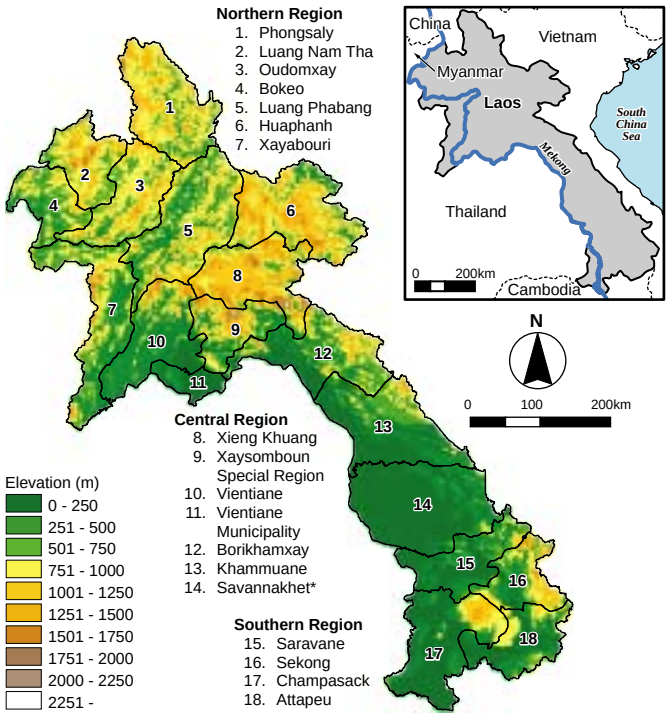
ENVIRONMENT OF THE MOUNTAINOUS REGIONS IN LAOS AND THE STUDY AREA

1. Characteristics of natural and socio-economic environments

In Laos, more than 70 percent of the country area is mountainous (Fig. 2). The mountainous region of Laos originated from an orogenenic movement called Annamia in the Paleozoic era. After that, the central highlands (a part of the Indosinia massif), such as the Annamese Cordillera, the Xieng Khuang Plateau and the Bolovene Plateau, were formed by new orogenenic movement in the Mesozoic era (Workman 1991). The landform classification of Laos is divided into two regions; "the Mountainous Division of Mainland Asia" with high relief mountains (including a part consisting of low relief mountains) and "the Plateau Division" which extends from the Khorat Plateau and accumulated a deep rock salt layer in the topmost layers in the Cretaceous period (Furukawa 1989).

In the administrative region of Laos shown in Fig. 2, the Mountainous Division of Mainland Asia corresponds to the northern seven provinces, northern Vientiane province, Xaysomboun special region, eastern Borikhamxay province and Sekong province. On the other hand, the others located in the Mekong basin are included in the Plateau Division.

The Bolovene Plateau, located in Champasack province, southern Laos, is a volcanic plateau of basal base formed by eruption in the Quaternary period. It exhibits a different landscape from the mountainous area because of its table shape without relief (Iwata 1960b). The French colonial government showed interest in development of the Bolovene Plateau[6)], and simultaneously with



* Savannakhet province is sometime categorized as south region.

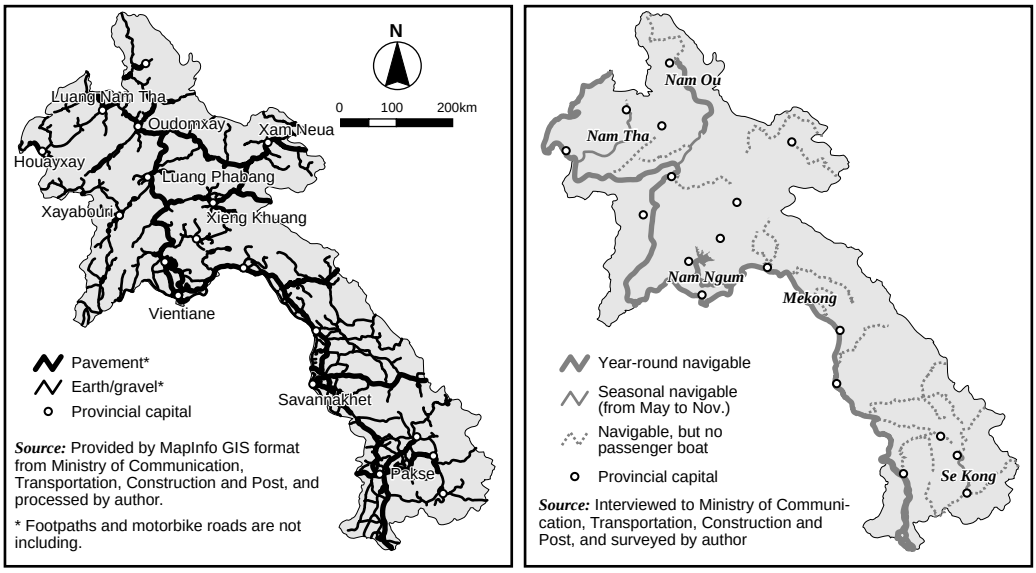
Fig. 2 Provinces and Elevation of Laos

Source: GTOPO30 DEM, U. S. Geological Survey

colonizing, they introduced coffee plantation and cardamom cultivation exploiting the cool and pluvial climate. Afterwards, in the 1950's those products became the main export goods (Vercouttre 1959). Hence, the Bolovene Plateau is historically different from the mountainous region of northern Laos.

There are clear differences in social infrastructure investment between the Mountainous Division of Mainland Asia and the Plateau Division, notably an enormous difference in road maintenance. The road infrastructure of Laos is extremely poor, and the mountainous area is especially lacking in road maintenance (Fig. 3). The stretches of paved road are limited to the riparian areas along the Mekong River and between the provincial capitals. In the mountainous area, at most there are unpaved roads and often none at all. In regions without road access, river transportation is being used. However, public transportation operates on only five rivers: the Mekong River (*Me Nam Kong*), the Tha River (*Nam Tha*), the Ou River (*Nam Ou*), the Ngum River (*Nam Ngum*), and the Kong River (*Se Kong*). While there are other rivers where boat operation is possible in Laos, public transportation is not seen because of a small population.

When a survey was conducted at village level in Oudomxay province and Luang Phabang province in northern Laos, villages with road access comprised only 949 villages (48.9 percent) out of 1,941 villages. About half of villages settle in remote areas where people cannot access roads (Table 3). In Oudomxay province, villages with road access comprised 42.1 percent of the total, and only 25.7 percent of villages can access to the road all year round. In Luang Phabang province, although many settlements have road access in Luang Phabang district (registered as a World Heritage site), other areas have few roads. In the whole of Luang Phabang province, villages with road access comprise only 53.3 percent of



(a) Road Transportation Network **(b) River Transportation Network**

Fig. 3 Transportation Network, 2001

Table 3 Number of Villages with Road Access, 2000

Province	District*	No. of Villages	Number of Villages with Road Access (Total)	(All Year Round)	(Dry Season Only)
Oudomxay	Xay	154	86	55	31
	La	64	26	15	11
	Namo	101	50	18	32
	Nga	100	13	3	10
	Beng	99	55	38	17
	Houn	169	78	53	25
	Pakbeng	80	15	15	0
	Total	767	323 (42.1%)	197 (25.7%)	126 (16.4%)
Luang Phabang	Luang Phabang	126	123	113	10
	Xieng Ngeun	100	65	64	1
	Nan	79	47	39	8
	Pak Ou	71	48	38	10
	Nam Bak	160	70	62	8
	Ngoi	158	61	47	14
	Pak Xeng	109	54	51	3
	Phon Xay	92	23	10	13
	Chomphet	84	49	30	19
	Vieng Kham	147	60	52	8
	Phou Khoune	48	26	8	18
	Total	1,174	626 (53.3%)	514 (43.8%)	112 (9.5%)

Source: IRAP Project Database

* The seat of the Provincial Office is shown as a shaded district.

the total, and it becomes a lower ratio if Luang Phabang district, the tourist site, is excluded.

Regarding agriculture, the most important industry in Laos, regional differences are also found between the mountainous area and the Mekong basin. The agriculture of Laos is focused on rice farming, and rice production in the paddy field or swidden field accounts for 91.6 percent of all agricultural land (Agricultural Census Office 2000). Changes in rice production are shown in Fig. 4. Rice production has approximately tripled during the past 25 years, from 6,609,000 tons in 1976 to 22,017,000 tons in 2000. In the meantime, the population of Laos has grown from 2,890,000 in 1976 to 5,220,000 in 2000. The population growth rate and the rate of increase in production of rice during this period were approximately 80.6 percent and 233.1 percent, respectively. Clearly, rice production has increased rapidly in recent years.

It can be observed that the plain along the Mekong has accomplished the production increase of rice by the development of both rainfed paddy fields and irrigated paddy fields in the last 5 years. In contrast to this, the mountainous areas in the northern region and the southern region with high relief have hardly developed new paddy fields at all. People living there must rely on the paddy fields in valley bottoms and on swidden fields, and a remarkable increase in the production of rice is not found in these locations. Clearly, a big regional difference regarding the increase in production of rice exists.

The relation between geographical features and agricultural land such as "the plains and paddy field" and "the mountainous region and swidden" can be explained by using Fig. 5. In most provinces which are included in the mountainous area, the ratio of swidden field is high and many farm households

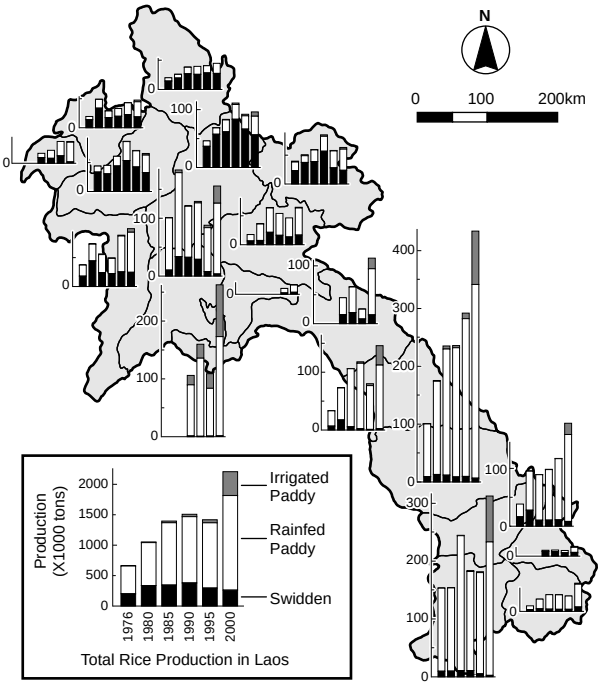


Fig. 4 Change of Rice Production, 1976-2000

Source: National Statistical Centre 2000, 2001

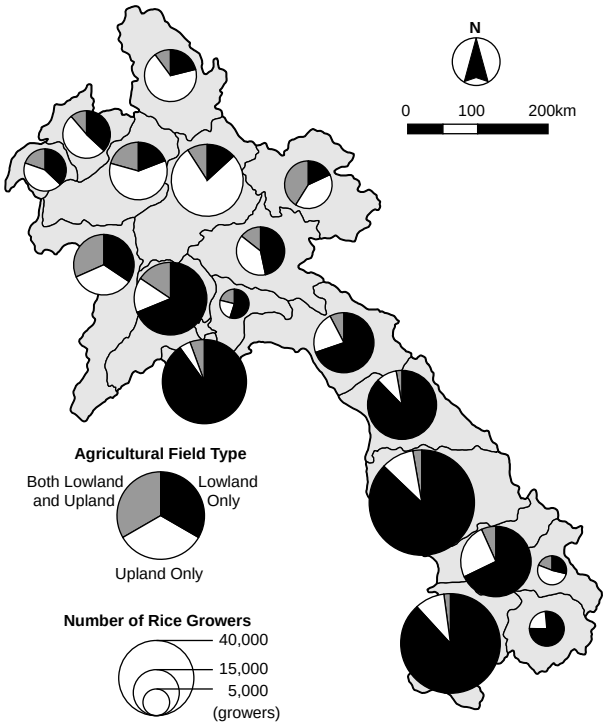


Fig. 5 Regional Differentials of Agricultural Field Type, 1998

Source: Agricultural Census Office 2000

are cultivating rice only in swidden fields. Mountain villages cultivating rice using the paddy fields in valley bottoms also exist; however, it is difficult to develop the paddy fields to a large enough size so that they alone can support the population. In such villages in the northern mountainous region, rice field holdings that combine swidden fields and paddy fields are commonly found. According to a finding of Yokoyama (2001b), who surveyed the relationship between rice production and agricultural land type in a mountain village in northern Laos, on the one hand, households having only a swidden field or a paddy field mostly lacked rice; on the other hand, households with both types were mostly self-sufficient in rice (Fig. 6). In the mountainous areas, swidden cultivation helps to compensate for the insufficiency of rice cultivated in paddy fields; that is, a mutual complementarity of different types of agricultural land is found.

Subsistence agriculture through practicing swidden cultivation is the main economic activity in the mountainous region of Laos because of geographical constraints. However, the basis of swidden agriculture production is very unstable because it greatly depends upon nature. In addition to this, if people arbitrarily use the forest as common land, the recycling of resources becomes impossible — a situation dubbed "The Tragedy of the Commons (Hardin 1969)" may arise. Thereby, when agriculture, especially swidden agriculture, is discussed, it is crucial to consider land tenure systems of Laos such as agricultural land holding and forest use.

2. Land tenure system

At present, although an individual may be given tenant's rights to

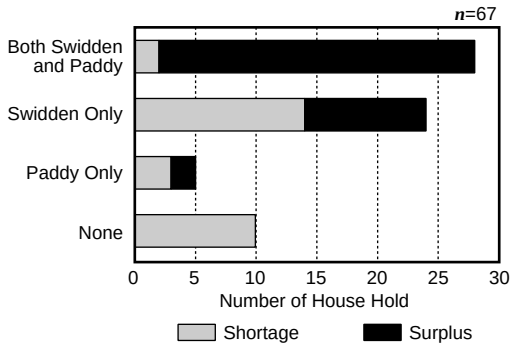


Fig. 6 Surplus and Shortage of Rice by Different Types of Rice Field Holding in Phongsavang Village, Oudomxay, 1999

Source: Yokoyama, 2001b

forestland, he cannot buy or sell it. On the other hand, individuals may be granted freehold rights over housing land and agricultural land by the state, and can thus buy and sell such types of land. This tenure system has not significantly changed since the French colonial period[7]. However, for a period from the latter half of the 1970s to the middle of the 1980s, agricultural land was held in common between the members of cooperatives (*Sahakon*) (Evans 1990: 90-122). The original purpose of the cooperatives was the distribution of work and crops based on socialist principles.

The cooperatives in Laos were organized by pooling the paddy land of the cooperative members, and land ownership was vested in the cooperative. According to a survey by the author in Vang Vieng district of Vientiane province, the cooperative of the Vang Vieng area had functioned for only 2 years from 1979. Moreover, Inoue (1994) relates how a Khmu village in Oudomxay province where people practice swidden agriculture had also organized a cooperative, but it functioned for only three years from 1984. Overall, the cooperative system was in place for a short period of time only, and its organization by elements of the government was often weak.

A big change in the land tenure system occurred with the starting of the land allocation project (*Beang Din Beang Pa*) and land zoning (*Mob Din Mob Pa*) from 1994. In the initial stage of land allocation, an individual who wants to use a certain land plot applies to the district agriculture and forestry office (DAFO), and then the land boundary is drawn by DAFO. The allottee is given a Temporary Land Use Certificate (*Bai Ta Din Suakhao*) from the Ministry of Agriculture and Forestry for 3 years. If the allottee of land uses the land appropriately for 3 years, he or she is entitled to a Permanent Land Title (*Bai Ta*

Din) from the Land and Housing Management Department of the Ministry of Finance. According to Article 17 of the Land Law promulgated in 1997, a household[8)] is permitted the allocation of agricultural land under the following conditions: (1) Up to one hectare for rice and fish farming; (2) Up to 3 hectare for commercial crops; (3) Up to 3 hectare for orchard; and (4) Up to 15 hectare of deforested land or grass land for pasture.

Regarding the forestland, individuals and households are allocated the land in a form of land borrowing from the state (*Misit Ko Sao Nam Lat*). According to Article 16-22 of the Forest Law, it is possible for individuals and households to be allocated forestland of up to 3 hectares of degraded forest (out of five classifications shown in Table 4). However, in reality it is impossible to practice swidden agriculture in degraded forest. The intention is for people to convert to commercial afforestation land and agricultural land; consequently, no forest at all is allocated for swidden agriculture. Only customary forest use under the administration of a village is permitted (in Article 30 and Article 63 of Forest Law), thereby maintaining the current elasticity of forest use in line with the present situation of a particular. .

Forest types that a village can actually use for agricultural production are production forest, regenerated forests and degraded forest (except for the protected areas shown in Table 5). The total area of the protected areas accounts for 21.8 percent of the national land. The ratio of its forest to total forest area in Laos becomes 46.3 percent, thus the village cannot freely use almost half the area of forest in Laos. Forest data shown in Table 5 was obtained in 1989, and it was still being used as official data by the government of Laos as late as 2002. According to an interview conducted with an official of the Department of

Table 4 Decree on the Management and Use of Forests and Forest Land

Type	State	Purposes of Management	Use
Protection Forests "*Pa Pongkan*"	Forest lands	Allotted for the protection of water resource, Protection against soil erosion, of steep slopes, national strategic defence areas, protection against natural disasters, protection environment and others	To exploit forest produces, except if specially authorized by the Ministry of Agriculture and Forestry
Conservation forests "*Pa Sa-ngoan*"	Forest lands	Allotted for the preservation of life, nature and others which hold special value for the environment, education and culture	To undertake any exploitation of forest produces and hunting, except if specially authorized by the Ministry of Agriculture and Forestry
Production forests "*Pa Palit*"	Forest land in their complete or incomplete state	Allotted in order to meet the requirements in national economic development and people's living conditions in terms of the sustainable supply of forest produce without any impact on the environment	All activities and use of forests existing in such forest land must comply to the forest management plans and all relevant rules and principles
Regenerated forests "*Pa Funfu*"	Forest land in their incomplete state	Regenerated and maintained into production forests or other forest type	All activities and use of forests existing within such forest land shall comply to the forest management plans
Degraded forest lands "*Pa Sout-som*"	Forest land which forest cover is seriously damaged or land without forest cover or bald land	Allotted for its conversion to the use or assigned to the population in permanent agriculture, forestry and livestock production or other purposes	

Source: Forest Low, National Assembly

Table 5 Protected Areas in Laos

(Unit: ha)

Provinces			NBCA ** (2002)	Provincial Protected Area*** (2002)	District Protected Area*** (2002)	Total Area and the Ratio in Province (2002)	
Name	Area (2002)	Forest Cover* (1989)				Area	Ratio (%)
Phongsaly	1,627,000	3,565,000	222,000	0	76,820	298,820	18.4
Luang Nam Tha	932,500		69,000	47,000	2,649	118,649	12.7
Oudomxay	1,537,000		0	0	65,000	65,000	4.2
Bokeo	619,600		0	78,000	135,534	213,534	34.5
Luang Phabang	1,687,500		50,000	0	75,506	125,506	7.4
Huaphanh	1,650,000		328,000	29,100	108,899	465,999	28.2
Xaynabouri	1,638,900		175,254	N/A	N/A	175,254	10.7
Xieng Khuang	1,588,000	3,739,000	0	73,055	0	73,055	4.6
Xaisomboon Special Region	710,500		42,000	N/A	N/A	42,000	5.9
Vientiane	1,592,700		106,080	0	100,687	206,767	13.0
Vientiane Municipality	392,000		79,400	0	2,875	82,275	21.0
Bolikhamxay	1,486,300		277,320	187,581	0	464,901	31.3
Khammuane	1,631,500		552,000	NA	2,200	554,200	34.0
Savannakhet	2,177,400		326,944	295,680	1,134	623,758	28.6
Saravane	1,069,100	3,866,000	239,983	124,100	3	364,086	34.1
Xekong	766,500		87,112	27,045	5,801	119,958	15.7
Champasak	1,541,500		330,507	239,540	0	570,047	37.0
Attapeu	1,032,000		254,000	292,274	61,800	608,074	58.9
Total	23,680,000	11,168,000	3,139,600	1,393,375	638,908	5,171,883	21.8

Source: Ministry of Agriculture and Forestry 1992, Lao consulting group 2002 and National Statistics Centre 2001

* The ministry of agriculture and forestry defines the forest as more than 20 % canopy cover.
** “NBCA” stands for “National Biodiversity Conservation Area”. Areas of NBCAs are either “as declared” or in some instances, as surveyed, proposed or amendment in process.
*** “Protected Forest“ means Conservation Forest and Protection Forest.

Forestry, there has been a decreasing trend in forest area since 1989. Hence, the ratio of the protected areas occupied to present forest could be higher. Certainly, the forest that can be used by people of the mountainous area for agricultural production is decreasing.

In the case of Laos, it is doubtful whether the law is actually effectively implemented and enforced. The gap between the law and present forest use is growing (Hyakumura 2001), a situation that cannot continue indefinitely. Forests that are currently unmanaged by the government could change radically if the law were effectively enforced, a development that would reduce people's discretion as to how they use the forest and may well have impacts on people's livelihoods and the natural environment.

3. Settlements of the study area

The settlement location of Pak Luang sub-district, Ngoi district in Luang Phabang province (taken up as the study area to clarify the basis for existence of people in the general mountainous area of northern Laos) is shown in Fig. 7. Pak Luang sub-district is composed of 14 villages and 23 settlements, of which 12 villages and 16 settlements were surveyed. The minimum altitude in the study area is that of the Ou riverside, which is around 400m above sea level. The highest peak is Mt. Pha Onng, which is located in the southwest of Fig. 7, some 1,267 m above sea level. The study area features a mountainous landscape (Photo 1).

The study area is inaccessible by road, hence access is limited to transportation using the Ou River and on foot. The urban areas near the study area are Muang Khoa, which is the seat of Khoa district office of Phongsaly

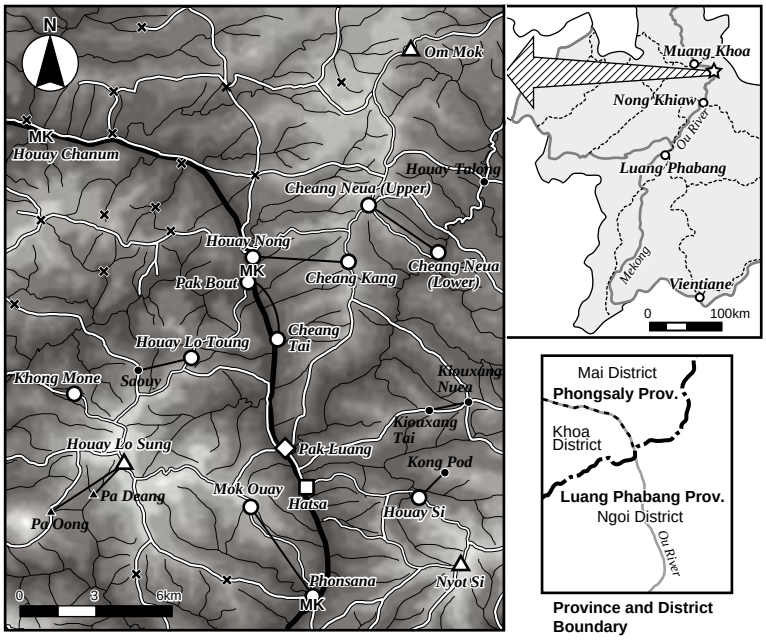


Fig. 7 Settlements Location in the Study Area, 2001

Source: Made DEM from National Geography Department 1983 (B.Ngoi-Nua and Khoa 1/100,000 topographical maps) and 1999 (aerial photographs) by GIS, and surveyed by author

Photo 1　Mountain Landscape of the Study Area

(Overlook Mt. Pa Oong from swidden field after slashed trees, Houay Lo Sung Settlement, March 2002)

province and is located in the upper Ou River area, and Nong Khiaw, which is the seat of Ngoi district office located in the lower Ou River area[9]. A single slow boat ticket from Hatsa village (which functioned as the center village in the study area) to the Muang Khoa area is 15,000kip (about US$1.7; about 1.5-2 hours), and to the Nong Khiaw area is 18,000kip (about US$2.0; about 3-3.5 hours). Two passenger boats a day ply between the Nong Khiaw and Muang Khoa areas. In addition to passenger boats, small cargo boats and individual boats come and go along the Ou River, and people can catch them for prices settled by negotiation.

There are no vehicles such as cars, motorcycles and bicycles in the study area because there are only hilly footpaths. A periodic market is held on the riverbank at two places, Phonsana settlement and Pak Bout settlement. These periodic markets have the function of both selling necessities and purchasing agri-forest products. Stallholders in these periodic markets come from Hatsa village, Pak Luang village and villages outside the study area which are mostly located in Muang Khoa district of Phongsaly province. The periodic markets play an important role in the distribution of merchandise and agri-forest products for the study area, as will be discussed in detail in Chapter IV.

Profiles of the 16 settlements studied are shown in Table 6 (Photo. 2). The ethnic composition of the settlements is formed by four different types: eleven Khmu settlements; three settlements consisted of almost all Hmong; one settlement consisted of almost all ethnic Lao; and one settlement mixed ethnic Lao with Khmu. Two Hmong settlements, Om Mok village and Nyot Si village, contain only one ethnic Lao household each. In both cases, they are single-person households dispatched by the district education office as primary schoolteachers.

Table 6 Characteristics of Studied Settlements, 2001

Village Name	Settlement Name*	Ethnic	Main Religion	Household	Population	History (Years)	Altitude** (m)	Access from Ou River*** (min)	Facilities****	Remarks
Cheang Neua	Upper	Khmu	Animism	28	168	300	960	128	Thresher	Branched off in 2000. Upper settlement will move to lower settlement within 2002.
	Lower	Khmu	Animism	30	172	2	485	218	Thresher, Electricity, Incomplete School	
Cheang Kang	Cheang Kang	Khmu	Animism	45	248	200	830	128	Thresher, Incomplete School	Branched off in 1985
	Houay Nong	Khmu	Animism	20	109	16	450	Riverside	Thresher, Electricity, Incomplete School	
Phonsana	Mok Ouay	Khmu	Animism	33	229	150	1,040	132	Thresher, Incomplete School	Merged in 2000.
	Phonsana	Khmu	Animism	51	315	21	400	Riverside	Thresher, Complete School	
Pak Bout	Pak Bout	Khmu	Buddhism	26	135	19	400	Riverside	Thresher, Electricity, Incomplete School, Temple	Merged in 1999.
	Cheang Tai	Khmu	Animism	27	110	3	400	Riverside	Thresher, Electricity, Incomplete School	
Houay Si		Khmu	Animism	39	173	19	615	123	Thresher, Incomplete School	Merged with Kong Pod in 2000.
Houay Lo Toung		Khmu	Buddhism	30	138	21	780	96	Thresher, Incomplete School	Merged with Saouy in 2001.
Houay Lo Sung		Hmong	Animism	23	154	23	1,020	237	Thresher, Incomplete School	Merged with Pha Oong and Pha Deang in 2001.
Om Mok		Hmong Lao	Animism Buddism	19 1	139	19	800	286	Thresher, Incomplete School	
Hatsa		Lao Khmu	Buddhism Animism	57 3	270	350	400	Riverside	Thresher, Health Center, Water Supply, Electricity, Complete School, Temple	
Pak Luang		Lao Khmu	Buddhism Animism	21 15	188	300	400	Riverside	Thresher, Electricity, Incomplete School	Khmu households came from Kiuxan in 1998
Nyot Si		Hmong Lao	Animism Buddism	34 1	225	18	1,015	179	Thresher, Incomplete School	
Khong Mone		Khmu	Buddhism	40	211	33	590	243	Thresher, Incomplete School	
Total				543	2,984					

Source: Surveyed and Interviewed by author and IRAP Luang-Phabang 2000.

* Main village that has a village chief is shown as a shaded settlement.
** Measured by GIS using DEM converted from 1/100,000 Topographical Map.
*** Calculated by author using GPS track log in dry season.
**** Electricity is generated by Micro-hydro units made in Vietnam. “Complete School” has 5 Grades of primary school (in theory, compulsory in Laos). “Incomplete School” has the lower 2 grades only.

(a) Lao Settlement

(The houses of a tin roof and wooden house faced with concrete which was originally a stilt houses are seen. Hatsa Village, September 2002)

(b) Khmu Settlement

(The house of a tin roof is hardly found . Most house is a stilt type. Khong Mone Village, March 2001)

(c) Hmong Settlement

(Hmong is built the house directly on ground. Nyot Si Village, November 2001)

Photo 2 Landscape of Settlements

The others are all Hmong households except for schoolteachers' households. There are three Khmu households in Hatsa village, but this paper defined the village as an ethnic Lao village because the ethnic Lao form an overwhelming majority. As of the end of 2001, in the study area, the number of households was 543; the population was 2,984 in total; and the ethnic structure ratio of Khmu, ethnic Lao, and Hmong was for 69.8 percent, 15.5 percent and 14.7 percent respectively.

In general, it can be said that the ethnic Lao are Buddhist, and that the Khmu and Hmong are Animist (LeBar and Suddard 1960: 35-60). However, three Khmu settlements located in the northwest of the Ou River, Pak Bout settlement, Houay Lo Toung settlement and Khong Mone settlement, are of Buddhist faith too. Pak Bout settlement has a small Buddhist temple (*Wat*). In these Khmu settlements, various events following the Buddhist calendar of the ethnic Lao are held, in addition to traditional Animistic rites. Therefore, it is said that some Khmu people mix the Animist and Buddhist faiths. Both Buddhist Khmu and Animist Khmu use their own calendar. These calendars correspond to neither the Gregorian calendar, the solar calendar, nor the lunar calendar. One month consists of 30-days (the same system as the solar calendar), and they count their calendar in cycles of 10-days as a minimum[10] (Chazée 1999: 64).

The social infrastructure of the study area is very poor. Regarding health facilities, there is nothing other than the Hatsa health center[11]. Before 1999, there was no modern medical facility, so people living in the study area had to rely on theotherapy by traditional healers or had to purchase medicines at the Hatsa pharmacy (started as a business in 1997). In case of serious illness which cannot be treated at the Hatsa health center, most people go to a district hospital in the

Nong Khiaw area.

The educational facilities are also poor. The education system in Laos comprises 5 years' primary education, 3 years' lower secondary education, 3 years' upper secondary education and 2-6 years' post-secondary education (Dawson 1994). Although 5 years' primary school is compulsory in Laos, in the study area there are only two complete primary schools, in Hatsa village and Phonsana settlement. The others are schools with only two grades called "incomplated school[12)]". In case of Cheang Neua (Upper) settlement, they do not have even an incomplated school. In settlements with only the incomplated school, many households leave the schoolchild in the charge of a friend or relative living in another settlement.

The poor educational situation is also a result of the lack of schoolteachers. While the district education office is trying to send teachers to primary schools, it is difficult to find teachers who are able to live in remote areas. Three elementary schools in Cheang Neua (Lower) settlement, Houay Si settlement and Cheang Tai settlement have not been allocated teachers from the district education office; accordingly, the settlement is operating the school themselves by selecting and employing the teacher from among the villagers[13)].

In the study area, there were 14 villages and 23 settlements, as of the end of 2001. Until the middle of the 1990s, the study area had 21 villages and 22 settlements. The reason for the change in the number of villages and settlements is that the district office carried out village merging following a government decree (No.102/PM, Decree on the organization and administration of villages) that stated "any area comprising less than 20 households are placed under a neighboring village". In addition to this, one additional settlement appeared

because Cheang Neua village divided into two settlements in 1999. Before village mergers in the middle of the 1990s, similar branching off had been carried out at Cheang Kang village in 1981.

Village mergers are implemented with ethnic purity in mind in order to avoid creating dissension among ethnic groups. However, it raises new questions, in that communication between settlements is bad. For example, Mok Ouay settlement was merged into Phonsana village in 2000, but it takes 2 hours to walk between the two settlements. Although the administrative unit is the same, the dwelling units are different; moreover, comings and goings between settlements are not so common. Hence, this study uses not "village" but "settlement" as a unit for discussion in the text in order to reflect the actual situation[14].

4. Characteristics of occupation structure

The main economic activity in the study area is agriculture, and 91 percent of households are engaged in agricultural activities such as rice farming, cash crop cultivation and livestock raising[15] (Table 7). On the other hand, technical work such as building a house, making a boat and being a blacksmith, agri-forest products brokerage, general store management, primary schoolteacher, nurse and resident officer comprise non-agricultural activities in the study area. Primary schoolteachers, a nurse and a resident officer are public servants belonging to the Ngoi district office, and most of them come from another area.

The occupations seen in the study area as shown in Table 7 lack variety. The Lao Standard Classification of Occupation in the 1995 census is classified into the following three items: major groups in 9 items, intermediate groups in

Table 7 Occupations of Studied Settlements, 2001

(Unit: Household)

Village Name	Settlement Name	Location	Ethnic Group	Household	Agricultural Activity*	Non-agricultural Activities**								Remarks
						Technical work***	Brokerage			General Store	Teacher	Nurse	District Officer	
							Level-1	Level-2	Level-3					
Cheang Neua	Upper	Mountain	Khmu	28	28	0	0	0	0	0	0	0	0	
	Lower	Mountain	Khmu	30	30	0	0	0	1	0	1	0	0	A teacher is dispatched by district education office.
Cheang Kang	Cheang Kang	Mountain	Khmu	45	45	0	0	0	1	0	1	0	0	A teacher is dispatched by district education office.
	Houay Nong	Riverside	Khmu	20	20	0	0	1	0	0	1	0	0	
Phonsana	Mok Ouay	Mountain	Khmu	33	33	0	0	0	0	0	0	0	0	
	Phonsana	Riverside	Khmu	51	49	0	2	0	0	0	3	0	0	There are 3 teachers, of which one teacher's hometown is Nong Khiaw.
Pak Bout	Pak Bout	Riverside	Khmu	26	25	0	1	4	0	0	1	0	0	
	Cheang Tai	Riverside	Khmu	27	27	0	0	0	0	0	1	0	0	
Houay Si		Mountain	Khmu	39	39	0	0	0	0	0	1	0	0	
Houay Lo Toung		Mountain	Khmu	30	29	0	0	0	0	0	1	0	0	A teacher is dispatched by district education office.
Houay Lo Sung		Mountain	Hmong	23	23	0	0	0	0	0	1	0	0	
Om Mok		Mountain	Hmong	19	19	0	0	0	1	0	0	0	0	
			Lao	1	0	0	0	0	0	0	1	0	0	A teacher is dispatched by district education office.
Hatsa		Riverside	Lao	57	26	3	11	0	0	15	2	1	1	A nurse is dispatched by district health office. There are 2 teachers, of which one teacher's hometown is Nong Khiaw.
			Khmu	3	3	0	0	0	0	0	0	0	0	
Pak Luang		Riverside	Lao	21	10	1	6	0	0	5	1	0	0	
			Khmu	15	15	1	0	0	0	0	1	0	0	A teacher who lives in Pak Luang is teaching at Hatsa primary school.
Nyot Si		Mountain	Hmong	34	34	0	0	0	0	0	0	0	0	
			Lao	1	0	0	0	0	0	0	1	0	0	A teacher is dispatched by district education office.
Khong Mone		Mountain	Khmu	40	39	0	0	0	0	0	1	0	0	A teacher is dispatched by district education office.
Total****				543	494	5	20	5	3	20	18	1	1	

Source: Surveyed and Interviewed by author

* All farmers are practicing swidden agriculture in the study area.
** Number in parentheses shows the number of household doing agricultural activities.
*** Technical work refers to an occupation that requires some special skills such as house building a house, boat making and working as a blacksmith.
**** Total number of occupations is not equal to the number of households, because some households are doing more than one activity.

27 items and minor groups in 114 items[16] (National Statistical Centre 1997: 92-93). Although this study used a classification corresponding to the intermediate groups of the 1995 census, only seven items existed in the study area. One of the reasons for this is that people in the mountainous area have learned necessary techniques and skills for a living from daily life which depends on self-sufficient agriculture. For example, people make knives and farming tools by themselves using a public workshop with bellows. Moreover, constructing or repairing a house is collaborative work performed by the settlement. These technical works would not be economically feasible as forms of vocational work in the mountainous area. People engaged in technical work shown in Table 7 are only living at Hatsa and Pak Luang located at the Ou riverside, not in the mountainous settlements. The difference in a living environment is reflected in the differences in occupation structure.

Agri-forest products brokerage differs greatly in the income and the contents of the activity by the spatial range of trading. Thus, this study divided agri-forest products broker into three levels (Table 8). Level-1 brokers purchase the agri-forest products at periodic markets or their own village from everyone (including other brokers), and then sell these to brokers/exporters living outside the study area. Level-2 brokers also purchase the agri-forest products from the same range as Level-1, but they sell the products purchased not to brokers/exporters living outside the study area but to Level-1 brokers. Level-3 brokers purchase the agri-forest products from forest products gatherers and agricultural products growers in the same village, and then sell these at the periodic markets or to Level-1 brokers. Only Level-1 brokers extend their trading to outside the study area. The range of activity of Level-2 and Level-3 brokers is

Table 8 Classification of Agri-forest Brokers According to Spatial Range of Trading

Broker Type	Range of the Products Purchasing	Selling Destination
Level-1	Forest products gatherers, agricultural products growers, Level-2 brokers and Level-3 brokers at the market and the village	Brokers or Exporters living outside study area
Level-2	Forest products gatherers and agricultural products growers at the market and the village	Level-1 brokers
Level-3	Forest products gatherers and agricultural products growers in the same village	The markets and Level-1 brokers

Source: Surveyed by author

limited to inside the study area.

The situation regarding whether or not brokers have other economic activities is influenced by the spatial range of trading (table 9). On the one hand, all Level-2 and Level-3 brokers are farmers with a side job; on the other hand, only 15 percent of Level-1 brokers are engaged in agriculture as a side job. It is clear that it is easy for Level-2 and Level-3 brokers to do a side job because they do not leave their settlement for a long period. In case of Level-1 brokers, since they frequently leave their settlement for long periods to purchase and make shipments, it is difficult to follow a side job.

For the same reason, it is difficult for general store managers to do a side job. They have to open their stall in the periodic market at two or three places once every 10 days and purchase merchandise in the urban area. In the case of general store managers in Hatsa village, they have to tend their shop because they have opened a business at the village. For this reason, only one general store manager is following a side job in the study area. The general store managers can, however, easily engage in agri-forest brokerage as a side job. Eight general store managers out of twenty are engaged in agri-forest brokerage. At the same time as opening their stall in the periodic market, they can purchase agri-forest products at the stall. Agri-forest products can be simultaneously transported to the brokers when they go to purchase merchandise in the urban areas. The reason side business is made easy is that the place of activity is the same.

Table 9 Matrix of Business on the Side in Studied Settlements, 2001

	Agriculture (*n*=494)	Technical work (*n*=5)	Brokerage Level-1 (*n*=20)	Brokerage Level-2 (*n*=5)	Brokerage Level-3 (*n*=3)	General Store (*n*=20)	Teacher (*n*=18)	Nurse (*n*=1)	District Officer (*n*=1)
Agriculture	–	2	3	5	3	1	7	0	0
Technical work	2	–	1	0	0	2	0	0	0
Brokerage Level-1	3	1	–	0	0	8	1	0	0
Brokerage Level-2	5	0	0	–	0	0	0	0	0
Brokerage Level-3	3	0	0	0	–	0	0	0	0
General Store	1	2	8	0	0	–	1	0	1
Teacher	7	0	1	0	0	1	–	0	0
Nurse	0	0	0	0	0	0	0	–	0
District Officer	0	0	0	0	0	1	0	0	–
Ratio (%)	4	100	65	100	100	65	50	0	100
Ratio to Agriculture (%)	–	40	15	100	100	5	39	0	0

(Unit: Household)

Source: Surveyed and interviewed by author

CHAPTER III

AGRICULTURAL ACTIVITIES IN THE MOUNTAINOUS AREA

General characteristics of the economic activates have been described in the preceding chapter. In this chapter, agricultural activities engaged by many people of the study area are explained in detail. Especially two activities, the rice production in swidden field and forest products gathering which is greatly contributing to cash income, are discussed with relation to forest use.

1. Land use of settlement

Firstly, an actual example of land use[17] is considered from the case of Hatsa village (Fig. 8). Hatsa village, located riverside, is engaged in swidden cultivation and livestock raising in addition to general store management. Hatsa village is the only village in which one can see both agricultural activities and non-agricultural activities.

The village presents String Village form, and houses and general stores are built along the footpath penetrating the settlement center from north to south. The northern area of the settlement near the Buddhist temple is the old area. As it goes to the south, it becomes the new area, that is to say, the expansion of the settlement has progressed from the northern area to the southern area. The public facilities such as the primary school, the Buddhist temple, and the health center are located on an extension of the footpath. Four footpaths run from the residential area to the boatslip at the Ou riverside, and any household can access the Ou River easily. In Hatsa village with its many general store managers and agri-forest products brokers, the nearer to the boatslip a store is located, the

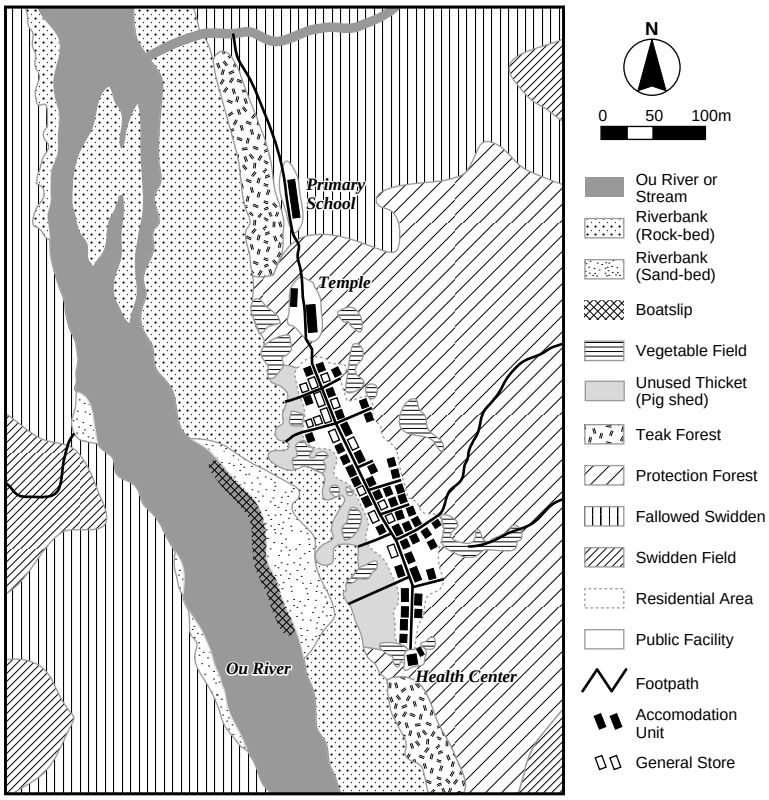


Fig. 8 Land Use of Hatsa Village, 1999

Source: Base map is made from aerial photograph C20-51, National Geography Department, dated 24 January1999 using GIS apprication "Idrisi 32", and the ground truth observations were carried out by author using GPS in 24 April 2001, 1 December 2001 and 19 January 2002.

lighter is the labor of loading and unloading the merchandise and the agri-forest products. Clearly, people's livelihoods greatly depend on the river, and the settlement's String Village form parallels the Ou River. In the study area, such String Village form is only seen at Hatsa village. The other settlements are taking on Cluster Village form or Round Village form; even in those villages located at the Ou riverside, there is only one path between the Ou River and the settlement.

In the boatslip are moored boats with an engine that are used for carrying the agri-forest products and small boats without an engine for traveling to swidden fields or for fishing. There were 25 boats as of the end of 2001.

Footpaths continue to Houay Si settlement and Nyot Si settlement in the east of the settlement, and there is also a footpath connected with Mok Ouay settlement, Houay Lo Sung settlement, and Khong Mone village in the east of the settlement. These footpaths play an important role in connecting Hatsa village to the mountain settlements.

The seasonal change of the width of the Ou River is very large. Although it is 50-70m wide in the dry season, in August (the time of highest water level in the rainy season) it extends to 120-150m and most of the riverbank shown in Fig. 8 vanishes under the Ou River. Regarding the basement of the riverbank, the boatslip near the settlement is rock-bed, and the other riverbank is sand-bed. In Laos, vegetable fields on the riverbank are often seen in the dry season. In the study area, vegetable fields such as kitchen gardens were interspersed in Cheang Neua (Lower) settlement located along the branch of the Ou River; however there was no vegetable field along the Ou riverside because the ground of the riverside is rock-bed and sand-bed. Teak trees (*Tectona grandis*) have reforested the riverside of the southern area of the village and the northern area of the

village. Teak trees are reforested to sell, so they are often found along the riverside for easy logging. The teak forest of the Hatsa village is about 20 years in the oldest part, and the thickness of trees has reached a size suitable for sale. However, the usage is limited to the building materials for houses or boats because there is no demand outside the study area.

The vegetable fields are scattered in the village neighborhood, and the vegetables for self-consumption are grown there. Between the village and the riverbank, there is a coppice, and bananas, papayas and coconuts are planted with miscellaneous trees. Moreover, people make simple hog pens in the coppice, and pig-raising is carried out there (Photo 3). Forestland at the back of the village is classified as protection forest, in which tree-cutting is prohibited. In the protection forest, there is a graveyard for the settlement. It serves as a burial forest (*Pa Sa*).

Agricultural activities are practiced in the forests, except the protection forest. Swidden fields and fallowed swidden surround the protection forest. Swidden fields and fallowed swidden in the west of the Ou River belong to Mok Ouay settlement, and those in the east of the Ou River belong to Hatsa village. Swidden agriculture is practiced by each settlement unit. The swidden field has been selected depending on vegetation growth. In case of Hatsa village, swidden fields are usually shifted in 12 plots. When the vegetation growth is inadequate to do swidden agriculture even though 11 years has passed, people leave the plot until the vegetation has grown to a certain extent. On the other hand, a plot deemed to be suitable for practicing swidden agriculture will be cut even if it has only been fallowed for 9 years. Therefore, it can be said that the cutting cycle is not rigidly defined. This is the same method of selecting the swidden field as

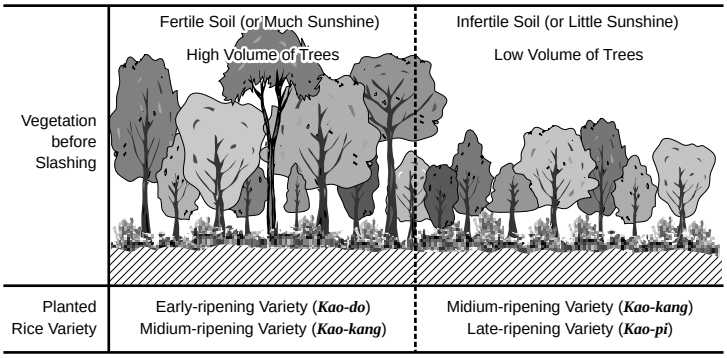
Photo 3　Pig-raising

(Hatsa Village, September 2002)

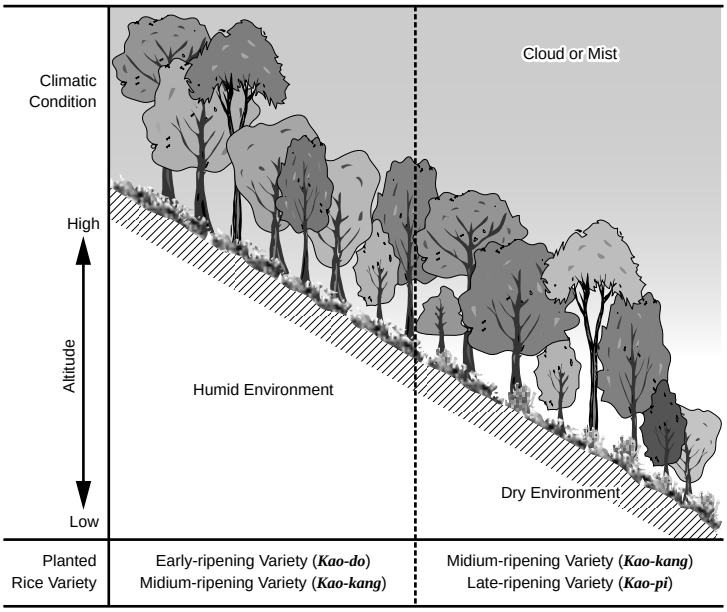
was used in the village of Lamet surveyed by Izikowitz (1951). It is impossible to select the cultivation field by vegetation growth if people practice the swidden for a short cycle with only a few fallowed swidden. In such cases, people are inevitably forced to use fallowed swidden in annual order. When cultivation is repeated in the forests with infertile soil or slow vegetation growth, there is a strong possibility that the land will become bare in the future. In the study area, to practice sustainable swidden agriculture, people are adopting a method of forest use that takes into consideration vegetation recovery rates based on peoples' previous experience.

2. Agriculture and forest use

Indigenous knowledge was evident in the planted varieties of upland rice. Three kinds of upland rice existed in the study area: a long-ripening variety, with a growth period of about 4 months; a middle-ripening variety with a growth period of about 3 months; and an early-ripening variety with a growth period of about 2 months or more. Those varieties had been planted out 'according to the land environment (Fig. 9). In the case of an early-ripening variety, although the growth period is short, fertile soil and adequate rainfall is required to grow the rice. In a long-ripening variety with a long growth period, a satisfactory harvest is possible even in land with infertile soil or a low rainfall environment, because the period for absorbing soil nourishment and energy from the sun is long. The market sales price is the same for all types therefore an early-ripening variety has the advantage for the farmer because the weeding period is shorter. However, since an early-ripening variety must be harvested in the rainy season and ear of rice plant puts away the ground by the rainfall, the harvest is more difficult than



(a) Relationship between Vegetation and Planted Rice Variety



(b) Relationship between Climatic Condition and Planted Rice Variety

Fig. 9 Relationship between Physical Condition of Swidden Field and Planted Rice Variety

Source: Surveyed by author

for other varieties, so there is a risk of a decrease in production.

Planted rice varieties are decided by the farmers themselves in consideration of the land environment [Fig. 9 (a)]. For instance, the growth of trees might differ according to the soil even in the same plot. The farmers observe the forest vegetation before cutting trees, and decide which type of rice varieties to plant there. If the forest physiognomy of the plot has a high tree height and dense forest, they judge that there is good soil. An early-ripening variety with a short growth period is planted on the plot. On the other hand, if the forest physiognomy of the plot has a low tree height and open forest, a long-ripening variety with a long growth period is planted there. With respect to middle-ripening varieties, farmers plant this in any kind of plot, but of course the harvest from plots with fertile soil is much better.

Moreover, farmers also select rice varieties depending on the altitude [Fig. 9 (b)]. This choice is influenced by not only the difference in altitude but also the climate condition. If the vegetation growth before cutting trees is the same, an early-ripening variety is planted in high altitude land because a humid environment is provided by the clouds and the morning mist. On the other hand, a long-ripening variety is planted in low altitude land which has a dry environment without cloud cover. Selecting the planted rice variety according to the land environment is effective in years with low rainfall.

Farmer's indigenous knowledge brought about the selection of planted rice varieties in order to correspond to changes in the natural environment and to reduce risks. Such selection is practiced in many Khmu villages. In villages with mixed Khmu and ethnic Lao populations, such as Pak Luang village, on the one hand, the Khmu tend to select high altitude land as a means of guaranteeing

food security – a practice established over a long history. On the other hand, ethnic Lao tend to select low altitude land in consideration of work efficiency.

The agricultural fields in the study area are roughly classified into swidden fields and permanent fields. Swidden fields include ramified swidden fields for upland rice and swidden fields for corn. Permanent fields include ramified kitchen gardens and opium poppy fields. There are no paddy fields in the study area.

The swidden system of the study area is "short cultivation, long fallow[18)]" with only a single year cultivation period and 7-11 years fallow period. The major crops in the swidden fields are upland rice and corn. Each swidden field of upland rice and corn is prepared separately, but the swidden fields for corn are smaller. In the swidden fields for upland rice, yam (*Man-pao*, *Man-oon*), taro (*Man-puack*), cassava (*Man-ton*), sweet potato (*Man-dang*), chili (*Mak-pet*), cucumber (*Mak-teng*), melon (*Mak-ten-rai*), gourd (*Mak-bouap*, *Mak-tao*), pulse (*Mak-thoua*), Eggplant (*Mak-khua*), job's tear (*Mak-douay*), tobacco (*Ya-suup*) and sesame (*Mak-nga*) are grown along with upland rice (Photo 4).

Mixed cropping featuring upland rice and other crops is done in a disorderly fashion. However, tubers and vegetables tend to be planted intensively in soil with a lot of moisture in the valley. Cassava, sometimes used in new fields, may be planted separately in a swidden field for rice and corn. Swidden fields for cassava are not "short cultivation, long fallow", but "long cultivation, long fallow" with several year cultivation periods and several decades fallow period.

The cash crop in the swidden field is sesame only. In the northern mountainous region, job's tear is being cultivated as a cash crop[19)] but people in

(a) Sesame
(Pak Bout Settlement, September 2002)

(b) Job's tear
(Pak Bout Settlement, September 2002)

(c) Taro
(Pak Bout Settlement, September 2002)

(d) Chili
(Pak Luang Village, September 2002)

(e) Cucumber (Left) and Cassava (Right)
(Pak Luang Village, September 2002)

Photo 4 An Example of Mixed Cropping of Upland Rice and Other Crops in Swidden Field

the study area stopped cultivating it as a cash crop in 1999. Agri-forest products brokers in the study area stopped purchasing job's tear because the selling price was too low to cover transportation costs. The price of job's tear is almost the same as rice. Farmers think that planting rice is better than planting job's tear because rice is the staple food. At present, job's tear is only cultivated on a small scale for self-consumption.

All ethnic groups practice mixed cropping in swidden fields, and the kinds of crops are different according to the ethnic group (Table 10). Regarding ethnic Lao, rice exceeds other crops in the swidden fields for upland rice, and they plant less sesame, tubers, and vegetables than the Khmu and Hmong. The Khmu plant all kinds of crops and produce a lot compared with other groups. In the case of the Hmong, mixed cropping of tubers and vegetable is found but sesame is a little in their swidden fields for upland rice.

In addition to this, the species of corn planted is different between the ethnic groups. There are two kinds of corn in the study area; animal feed corn (*sali-keang*) and eating sweet corn (*sali-waan*). The Hmong grow a lot of feed corn though the ethnic Lao and Khmu grow both feed corn and sweet corn at almost the same rate. The Hmong mainly give feed corn to pigs (Halpern 1958:39); on the other hand, the ethnic Lao and Khmu give a variety of food to pigs, mixing chaff and cereals. The differences in feed for pigs are shown as a different ratio of planted species of corn.

The opium poppy cultivated in permanent fields is only grown in Hmong settlements. A valley or area of sloping ground with a sunny aspect and good drainage is chosen for the opium poppy field. Regarding soil condition of the opium poppy field, people say that "cold soil mixed with rocks" is good. Since

Table 10 Mixed Cropping in Swidden Fields of the Study Area

Ethnic Group	Swidden Field for Upland-rice				Swidden Field for Corn	
	Upland-rice	Mixed Cropping with Upland-rice			Sweet Corn (*Sali-oon*)	Feed Corn (*Sali-Keang*)
		Cash Crop	Tubers	Vegetables		
Lao	many	little	little	little	ordinary	ordinary
Khmu	many	ordinary	ordinary	ordinary	ordinary	ordinary
Hmong	many	little	ordinary	ordinary	little	ordinary

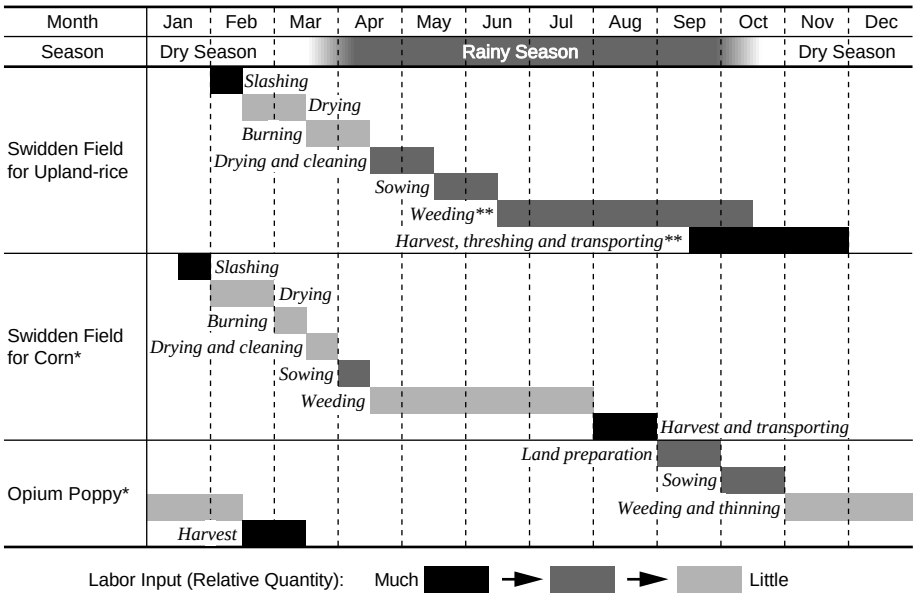
Source: Surveyed by author

the sedimentary rock around the study area is limestone, the area conforms to the selection criteria of opium poppy fields used by Hmong villages in northern Thailand where people favor limestone hollows with high pH [Keen (1978)].

Kitchen gardens are placed near the settlement or along the riverside, which provides a convenient water supply, as mentioned before. The crops grown there are chiefly pulses and spices. However, only a few kinds of vegetables are grown, and leaf vegetables such as cabbage, lettuce, Chinese cabbage and so on, often eaten in the lowland, are hardly seen. The main reason why people do not grow leaf vegetables is that there is no perishable foods market nearly. In addition to this, Hmong and Khmu living in the mountains area do not eat many leaf vegetables compared with ethnic Lao living along riverside. People of Hmong and Khmu tend to eat forest products such as bamboo shoots, the vines or the leaves of grass plants, and creeper plants. These different eating habits might be one of the reasons for not growing these vegetables.

With regard to crop cultivation from land preparation to transportation, upland rice, corn, and opium poppies require 10 months, seven-and-a-half months, and six-and-a-half months respectively (Fig. 10). The flow plan of swidden work, both for upland rice and corn performed is, in order: slashing, drying, burning, drying-and-cleaning, sowing, weeding, harvest, threshing, and transporting. The crop calendar and the type of work are no different between the ethnic groups.

Slashing, transportation from the swidden fields for both upland rice and corn, and the harvest of opium poppy are defined as heavy labor in terms of agricultural work. Manpower distribution is considered so that heavy labor does



* Only Hmong is cultivating Opium Poppy (*Papaver somniferum*) in the study area.
** A period of activities is depending on the rice variety.

Fig. 10 Crop Calendar in the Study Area

Source: Surveyed by author

not overlap in each crop. Slashing of swidden fields for corn is carried out in advance of that for swidden fields for rice. As a result, the harvest of the two crops does not overlap because the growth period is different. Moreover, the opium poppy cultivation is started only after the Hmong have finished the corn harvest, and the opium is harvested after slashing of the swidden fields for upland rice. It is cultivated mostly during the off-season of upland rice cultivation.

The biggest difference between corn cultivation and upland rice cultivation is the labor input for land preparation and weeding. Weeding for corn cultivation is carried out only twice, just after first sprouting and then one-month after this first weeding. Therefore, the land preparation of swidden fields for corn, such as the removal of residual logs, is rougher than that of swidden for upland rice (Simana 1997: 63-68). Weeding for opium poppy fields is also extensive, and is carried out once when thinning. On the other hand, weeding for upland rice is heavy work. Weeding is carried out at least three times during the growth period by all household members. Phengkhay (1999: 44-51) described how this burden is taken up mostly by women, and farmers sometimes hire laborers from another household. In addition to weeding, farmers have to go to their hut (*Tiang Hai*) and patrol the swidden field as long as there is no special business. Upland rice cultivation requires a lot of time for cultivation if compared with other crops.

Swidden agriculture is practiced through most of the year and involves very long working hours in the field. This is thought to be a factor in restricting the kinds of side job available, as shown in the preceding chapter in Table 9.

3. Forest products gathering and forest use

In the study area, gathering of forest products is vigorously carried out as well as crop cultivation. Forest products are usually gathered when people travel between the swidden field and their dwelling. In addition to this, it is recognized that women and children have their own roles in the household and actively go out for gathering[20]. Therefore, forest products are widely gathered by farm and non-farm household members alike. There are vast numbers of forest products, such as resin, bark, fruits and so on, as well as insects and animals. Only non-timber forest products (NTFP), having an economic value[21] and gathered continuously, were considered as forest products in this paper because it is impossible to refer to all kinds. In the study area, seven kinds of non-timber forest products are gathered and produce cash income: cardamom, benzoin, Puack Muack[22], paper mulberry, rattan fruits (dragons blood), galangal fruits, and tiger grass (Table 11, Photo 5). These are non-timber forest products with demand outside the study area and people in the study area do not use these products at all. The following five kinds of non-timber forest products: cardamom, paper mulberry, rattan fruits, galangal fruits, and tiger grass, can be gathered everywhere in the mountain region of Laos. Puack Muack can be gathered only in the northern region. Benzoin is special kind of non-timber forest product because it can be gathered only in the limited environment of northern Laos.

Cardamom is sometimes categorized as a cash crop because it is cultivated in the southern part of Laos, but people in the study area gather wild cardamom. Regarding rattan fruits, people call it *Mak Wai* in the Lao language which means “rattan fruits”, but “rattan” is not a plant name but rather a plant family name.

Table 11 Characteristics of Non-timber Forest Products

Name				Type	Product	Crop Season	Local Purchase Price in 2001 (kip/kg)	Use
(Local Lao)	(English)	(Japanese)	(Scientific)					
Mak Neng	Cardamom	カルダモン	*Amomum villosum*	Perennial Plant	Seed	Aug.-Sep.	15,000	Medicine
Nhan	Benzoin	安息香	*Styrax tonkinensis*	Tree	Gum	Apr.-May	45,000	Flavor and Fragrance Industries, Medicine
Puack Muack (Sapan)	(None)	（不明）	*Boehmeria sp.**	Perennial Plant	Bark	Year-round	2,000	Incense stick, Glue
Po Sa	Paper Mulberry	カジノキ	*Broussonetia papyrifera*	Tree	Bark	Year-round	2,000	Paper
Mak Wai	Rattan Seed (Dragons blood)	キリンケツ（麒麟血）	*Daemonorops draco*	Tree	Seed	Aug.-Sep.	4,000	Medicine
Mak Kha	Galangal Seed	ナンキョウ（南薑）	*Alpinia galanga*	Perennial Plant	Seed	Jul.-Sep.	4,000	Medicine
Khem	Tiger Grass	ヤダケガヤ	*Thysanolaena maxima*	Perennial Plant	Flower	Mar.-Apr.	2,500	Broom

Source: Surveyed by author

* The scientific name cannot be identified.

(a) Cardamom Grown in Clusters

(Cheang Kang Settlement, November 2001)

(b) Benzoin Resin

(Cheang Kang Settlement, January 2002)

(c) Puack Muack (*Boehemia sp.*)

(Houay Lo Sung Settlement, March 2002)

(d) Barking a Paper Mullbery

(Pak Bout Settlement, January 2002)

(e) Rattan Fruits (Dragon Blood)

(Pak Bout Settlement, January 2002)

(f) Mediated Agri-forest Products and Its Processed Goods

Upper Right: Puack Muack
Uppert Left: Insence Stick Using Puack Muack
Lower Right: Rattan Fruits (Doragons Blood)
Lower Center: Galangal Fruits
Lower Left: Job's Tear

(Nam Bak District, November 2002)

(g) Drying Flowers of Tiger Grass in the Sun

(Pak Bour Settlement, March 2002)

Photo 5 Non-timber Forest Products in the Study Area

In fact, the rattan fruits which people gather in the study area are "dragon's blood (*Daemonorops draco*)". Benzoin, a balsamic resin obtained from the styrax tree (*Styrax tonkinensis*), is called "Siam benzoin" in the world market. Siam benzoin is regarded as a high-class commodity compared with Sumatra benzoin of which there is a large quantity in the marketplace (Konoshima and Nagai 1969). Siam benzoin is produced almost solely in Laos at present, and is gathered in the mountainous region of northern Luang Phabang province, Phongsaly province, and Houaphanh province only.

Non-timber forest products are closely connected to forest vegetation, thus the relationship between forest type and the gathering place of non-timber forest products should be considered. Cheang Kang settlement, located 830m above sea level, is used as an example (Fig. 11). The settlement surroundings are enclosed by four types of forest: protection forest, fallowed swidden of one year of age, fallowed swidden of 3 years of age, and fallowed swidden of 6 years of age (Photo 6).

In fallowed swidden of one year of age, styrax trees and tiger grass grow to about 2 meters and 1.5-meters in height respectively. In this type of forest, tiger grass is gathered. In fallowed swidden of 3 years of age on the north side of the settlement, styrax trees reach about 4-5 meters in height, and the tree species have more variety than with fallowed swidden of one year of age. Tiger grass is still gathered in this older fallowed swidden, but the quantity is less than with fallowed swidden of one year of age. In fallowed swidden greater than 3 years of age, perennial plants such as tiger grass can hardly be found. Trees such as styrax are grown instead. In fallowed swidden of 6 years of age located to the south of the settlement, styrax trees grow to about 10 meters. It is possible to

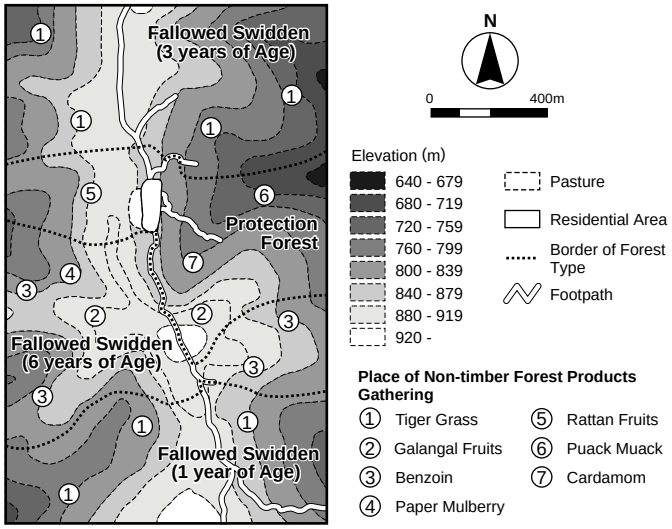
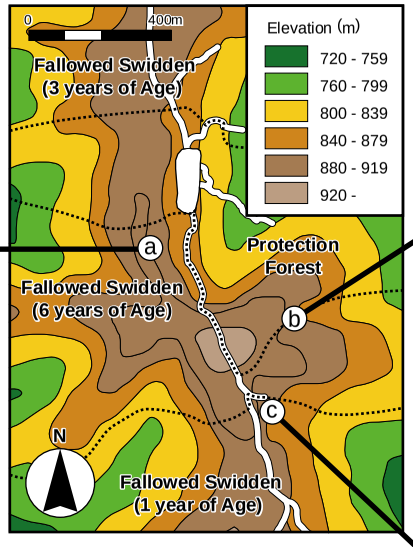


Fig. 11 Relationship between Forest Type and Non-timber Forest Products in Cheang Kang Settlement, 2001

Source: Surveyed by author using GPS

(a) ***Styrax tonkinensis*** Forest of 6 Years Fallowed Swidden (6 Years and 8 Months after Cutting Trees)
(Cheang Kang Settlement, November 2001)



(b) Boundary between Protection Forest and 6 Years Fallowed Swidden
(Cheang Kang Settlement, November 2001)

(c) Growing ***Styrax tonkinensis*** as a Dominant Species at 1 Year Fallowed Swidden (1 Year and 8 Months after Cutting Trees)
(Cheang Kang Settlement, November 2001)

Photo 6 ***Styrax tonkinensis*** in Fallowed Swidden of Cheang Kang Settlement

gather benzoin there. In the moist environment, people gather the bark of the paper mulberry, which reaches about 10 meters in height, and the fruits of galangal grown on the lower levels of the tree.

In the protection forest, styrax trees have not yet been found. The styrax tree, an intolerant species, grows fast, but will die after about 15 years because of being surrounded by taller tree species. Multi layered vegetation is formed, comprising bushes and tall trees. The tree height reaches 20-30 meters, and the forest physiognomy presents a mature mixed Dipterocarp forest. People gather the fruits of the rattan, which is a climbing plant, and the fruits of the galangal on the ground. Cardamom and Puack Muack can be gathered, too. According to local people, although cardamom sprouts 2-3 years after burning of old trees, a period of another 3 years or more is required before fruits can be gathered. Thus, a total of 5-6 years is needed to be able to gather cardamom. However, cardamom was not grown in fallowed swidden of 6 years of age in Cheang Kang settlement when the author surveyed the area. Although people said that Puack Muack had fallowed swidden of over 2-3 years of age in a humid environment.

Regarding the gathering rights of forest products such as benzoin and tiger grass that are grown as secondary vegetation along with swidden agriculture, a right of use of swidden field plots allotted for each household continues to apply to fallowed swidden. The allottee can gather these forest products only within his fallowed swidden. Generally, other forest products can be gathered anywhere. As for cardamom, the settlements in the study area, except for Hatsa village, decide the date for commencement of gathering of forest products[23]. The date of commencement refers only to the place of gregarious habit. There are no regulations for gathering at places where few

cardamoms grow.

There are various kinds of gathering methods for forest products, which differ according to the environment, taking into account factors such as the period of fallowed swidden and humidity. Fallowed swidden is not only fallowed for the next cultivation but also used as places where people gather forest products.

4. Incomes of farm households in the mountainous area

Let us now look at farmers' income in detail. The amount of cash incomes of 136 farm households, calculated by household interview data (Appendix 1-4), and trade price and profit of agri-forest products (Table 12), is shown in Table 13.

The average cash income of farm households is 2,334,494kip (about US$259.4) and a difference between the riverside and mountainous area is hardly seen. The characteristics common to many households are that rice cultivation, which is the main activity for farm households, rarely contributes to cash income. In the survey, only 20 out of 136 farm households could obtain surplus rice, 30 farm households had a sufficiency, and 86 households had a shortage. Briefly, more than 60 percent of households had a shortage though they were cultivating rice.

The agricultural activities contributing to cash income for farm households are cash crops, forest products and livestock, rather than rice cultivation. The kind of agricultural activities contributing to cash income differ between the ethnic groups; ethnic Laos earn from livestock and forest products; the Khmu earn from forest products and livestock; and the Hmong earn from cash crops and forest products. In the case of the ethnic Lao, although farm households

Table 12 Trade Price of Products, Profit of Agri-forest Products and General Store Sales in the Study Area, 2001

Category	Sub-category	Price (kip)	Unit	Note
Rice	Unhuled Rice	800	kg	
	Rice	2,000	kg	
Cash Crop	Sesame	3,000	kg	
	Opium	500,000	pong	Pong is a standard unit of weight used in South East Asia for opium only. 1 pong is equivalent to 0.375 kilograms. (U.S. Department of Justice 2001)
Non-timber Forest Products	Cardamom	15,000	kg	
	Benzoin	45,000	kg	
	Puack Muack (*Sapan*)	2,000	kg	
	Paper Mulberry	2,000	kg	
	Rattan Seed	4,000	kg	
	Galangal Seed	4,000	kg	
	Tiger Grass	2,500	kg	
Livestock	Water Buffalo	2,000,000	head	
	Cattle	1,000,000	head	
	Pig	400,000	head	Profit of pig-raising at Pak Luang and Hatsa is about 30 percent of the selling price.
	Piglet	200,000	head	
	Chicken	15,000		
	Duck	20,000		
Agri-forest Products Brokerage	Sesame	1,000	kg	
	Cardamom	5,000	kg	
	Benzoin	10,000	kg	
	Puack Muack (*Sapan*)	500	kg	
	Paper Mulberry	500	kg	
	Rattan Seed	1,000	kg	
	Galangal Seed	1,000	kg	
	Tiger Grass	500	kg	
General Store (Periodic Market)	Pak Bout Market Phonsana Market	855,000	year	Profit: 30,000 kip/day (Apr.-May, Aug.-Dec., total 21 days) 15,000 kip/day (Jun.-Jul. total 15 days) Stall fee: 500 kip/day
	Houay Chanum Market	4,506,000	year	Profit: 100,000 kip/day (Apr.-May, Aug.-Dec., total 21 days) 50,000 kip/day (Jun.-Jul. total 15 days) Stall fee: 500 kip/day

Source: Surveyed by author

Table 13 Average Cash Incomes of Surveyed Farm Households, 2001

Settlement Location	Ethnic	Economic Activity	Cash Income	
			(kip/household)	(%)
Mountainous Region (*n*=80)	Hmong (*n*=21)	Rice Farming	41,905	2.0
		Cash Crop Cultivation	1,029,238	49.2
		Non-timber Forest Products Collecting	595,452	28.5
		Livestock Raising	248,048	11.9
		Fishery	0	0
		Agri-forest Products Brokerage	130,952	6.2
		General Store Management	0	0
		Others	45,714	2.2
		Hmong Total	2,091,309	100.0
	Khmu (*n*=59)	Rice Farming	122,305	5.1
		Cash Crop Cultivation	58,119	2.4
		Non-timber Forest Products Collecting	1,571,203	65.5
		Livestock Raising	429,322	17.9
		Fishery	0	0
		Agri-forest Products Brokerage	158,475	6.6
		General Store Management	0	0
		Others	61,017	2.5
		Khmu Total	2,400,441	100.0
	Mountainous Region Total		2,319,294	
Riverside (*n*=56)	Khmu (*n*=45)	Rice Farming	16,000	0.8
		Cash Crop Cultivation	100,133	5.0
		Non-timber Forest Products Collecting	941,539	47.1
		Livestock Raising	597,333	29.9
		Fishery	55,556	2.8
		Agri-forest Products Brokerage	278,333	13.9
		General Store Management	0	0.0
		Others	11,111	0.5
		Khmu Total	2,000,006	100.0
	Lao (*n*=11)	Rice Farming	60,582	1.6
		Cash Crop Cultivation	32,727	0.9
		Non-timber Forest Products Collecting	709,182	18.6
		Livestock Raising	1,424,545	37.4
		Fishery	381,818	10.0
		Agri-forest Products Brokerage	470,909	12.3
		General Store Management	409,636	10.7
		Others	324,000	8.5
		Lao Total	3,813,399	100
	Riverside Total		2,356,208	
Total			2,334,494	

Source: Surveyed by author

carry out swidden agriculture, much of their income comes from activities unrelated to agriculture, such as fishing, agri-forest products brokerages, general store management and so on. The Hmong make up their cash income which cannot be obtained from rice by specializing not in non-agricultural activities but in cash crop cultivation. In the case of Khmu living in both the mountain area and on the riverside, one of the largest ethnic groups in the study area, their income from forest products is overwhelmingly large compared with other activities. The income from raising livestock occupied the second place. For the Khmu of the mountainous area, the income from forest products gathering is three times higher than for livestock raising so they tend to specialize in forest products gathering.

Let us clarify the economic level of farm households in Laos, comparing the income of the study area with other regions. Data used for the comparison come from the survey of the Nakai plateau, Kammuane province in the central Laos, by Foppes and Khetphanh (1997) which surveyed 191 households in five villages in 1996. The elevation of the Nakai plateau is about 800 meters, and people in the Nakai plateau live by subsistence agriculture, forest products gathering, and raising livestock. The occupation structure is close to that of the study area. The biggest difference is that each village has road access.

An average cash income of a household in Nakai plateau was 204,038 kip in 1996. In the case of Laos, the incomes of two different years cannot be compared simply at face value because prices have risen steeply. Consequently, the income in 1996 was converted into the income in 2001 using the CPI (Consumer Price Index)[24]. As a result, the income in 2001 was calculated to be equivalent to 1,529,563 kip (about US$170.0). Since the income of farm

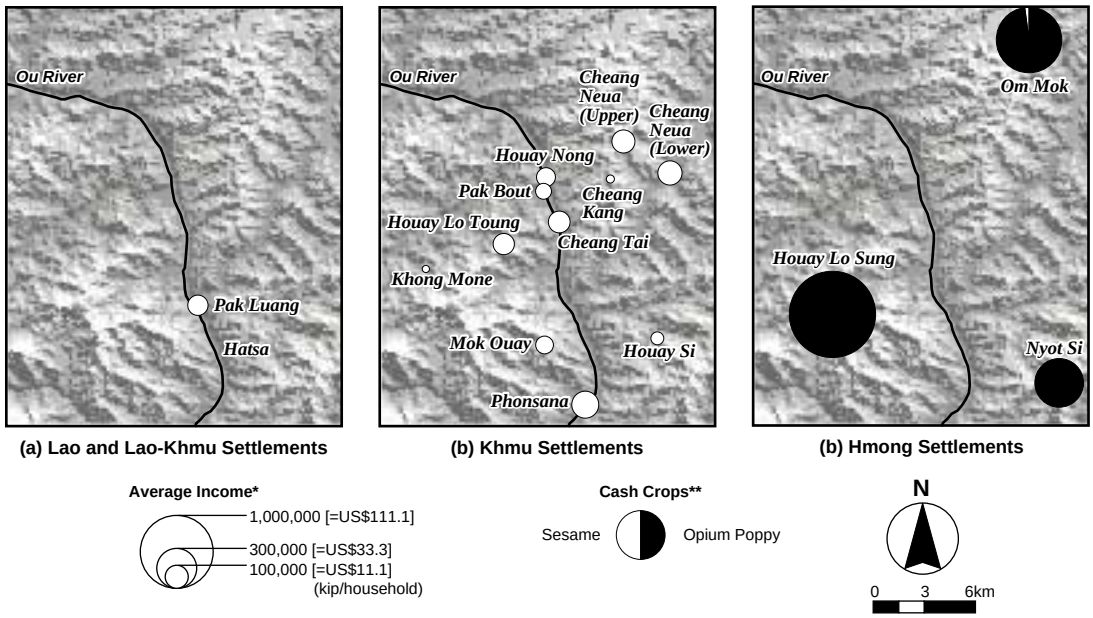
households in the study area was 2,337,751 kip (about US$259.8), it can be seen that they earn about 1.5 times as much as a village with road access in central Laos.

In addition to this, the income of farm households is not low in comparison with a teacher's salary (PL-4 in Appendix 4) of 2,796,000 kip (about US$310.7). The study area seems to be lost to development and to be a remote area both geographically and economically because it has neither road access nor a permanent market. However, it is not economically poor at all.

5. Relationship between settlement location, ethnicity and income of agricultural activities

Let us now, in exploring the relationship between settlement location and ethnic groups, consider the characteristics of income from cash crops, livestock, and forest products in the study area. Since livestock raising and forest products gathering are carried out even in non-farm households, all 160 surveyed households are considered for analysis here, without distinction between farm or non-farm households.

Two kinds of crops, sesame and opium poppy, are cultivated in the study area as cash crops. According to the cash incomes of farm households shown in Table 13, cash crops hardly contribute to income for ethnic Lao and Khmu. In Fig. 12, however, all Khmu households cultivate sesame, and 94.6 percent of sesame cultivation is carried out by Khmu. Although the Khmu engage actively in sesame cultivation, the trading price of sesame is only 3,000kip/kg while the opium obtained from the poppy is 500,000kip/pong (1,333,333kip/kg). On the one hand, an average Hmong household income obtained from opium is



* US1$ was equivalent to 9,000 kip as of December 2001.
** Number of sampled households was 160 in 16 settlements, 12 villages.

Fig. 12 Income from Cash Crops, 2001

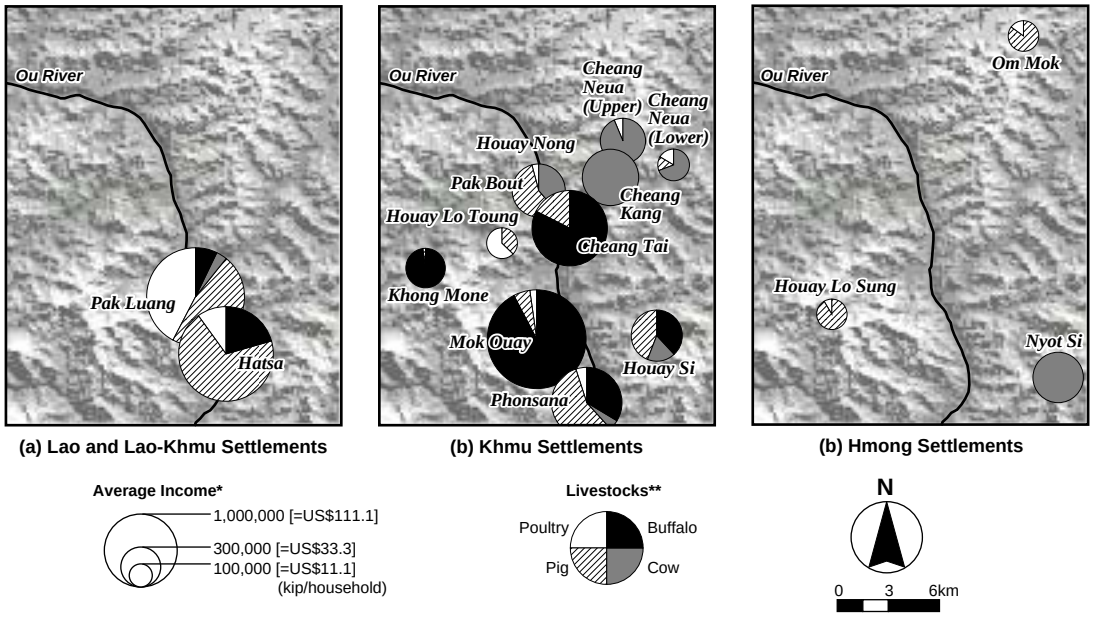
Source: Surveyed by author

1,023,810 kip (about US$113.8); on the other hand, an average Khmu household income obtained from sesame is only 76,611 kip (about US$8.5). Sesame is so cheap that a large income difference is produced between Khmu and Hmong. What has to be noted is that sesame is being hidden by opium in the statistics because the unit price of opium is very high.

Turning now to livestock, buffalo, cow, pig and poultry (chicken and ducks) are raised in the study area (Fig. 13). Although horses are raised as beasts of burden only in Hmong settlements, they are not sold.

Many pigs are raised in the riverside settlements, especially ethnic Lao and Lao-Khmu settlements. Pak Luang village and Hatsa village obtain a large income from pigs. Many households in these two villages practice piglet-raising. The people of Pak Luang village and Hatsa village purchase piglets weighing about 20 kilograms from the neighboring settlements, and then fatten them up over about six months until they weigh about 50 kilograms. The piglets are sold to the Muang Khoa and Nong Khiaw areas. They are wholesaled at an average price of 400,000 kip per head. Actual profit accounts for about 30 percent of the selling price when various costs such as piglet purchase, feed, and transportation are deducted. The villages which sell the piglets to Pak Luang village and Hatsa village are Phonsana village and Pak Bout village of Khmu, located on the riverside. Therefore, a relationship between Khmu settlements which raise parent pigs and sell piglets to ethnic Lao villages (including Lao-Khmu village), and ethnic Lao villages which purchase and fatten up piglets, has formed in four villages along the Ou River.

Buffalo contribute a large income source to Mok Ouay settlement in the mountainous area and Cheang Tai settlement along the Ou riverside. In the case



* US1$ was equivalent to 9,000 kip as of December 2001.
** Number of sampled households was 160 in 16 settlements, 12 villages.

Fig. 13 Income from Livestock, 2001

Source: Surveyed by author

of Mok Ouay settlement, in 2001 a livestock broker living in the Nam Bak district to the west of the study area, visited the settlement, and many households raising the buffalo sold their animals. As a result, the livestock income increased. On the other hand, in the case of Cheang Tai settlement, the household selling buffalos had parted with all of the three animals it possessed in order to pay a medical bill for a sick person in the household. Buffalo are very expensive, and provide large earnings. However, they are difficult to re-purchase once they have been sold. In the study area where paddy cultivation is not carried out, buffalo have value as quick assets.

Livestock is also raised as food for self-support and for sacrificial purposes in farming and religious rites (LeBar and Suddard 1960: 46; Halpern 1961b: 66-72). Therefore, even if livestock sales are small, it is a mistake to conclude that raising of livestock is not actively carried out.

The next category of agricultural product described here is forest products. There are so many kinds of forest product in the study area that it is difficult to discuss the relationship between the gatherers, settlement location, income, and ethnicity. From the result of Table 13, it has already been found that Khmu settlements along the riverside conduct less forest product gathering than settlements in mountainous areas. In order to analyze the difference between the gathering location and income, this paper divides the study area into five zones by altitude: the Ou riverside, middle-lowland, middleland, middle-highland and highland (Fig. 14).

Income from benzoin clearly increases in proportion to height. Rattan fruits and galangal fruits are actively gathered in the riverside settlements. The gathering of other forest products; cardamom, Puack Muack, paper mulberry

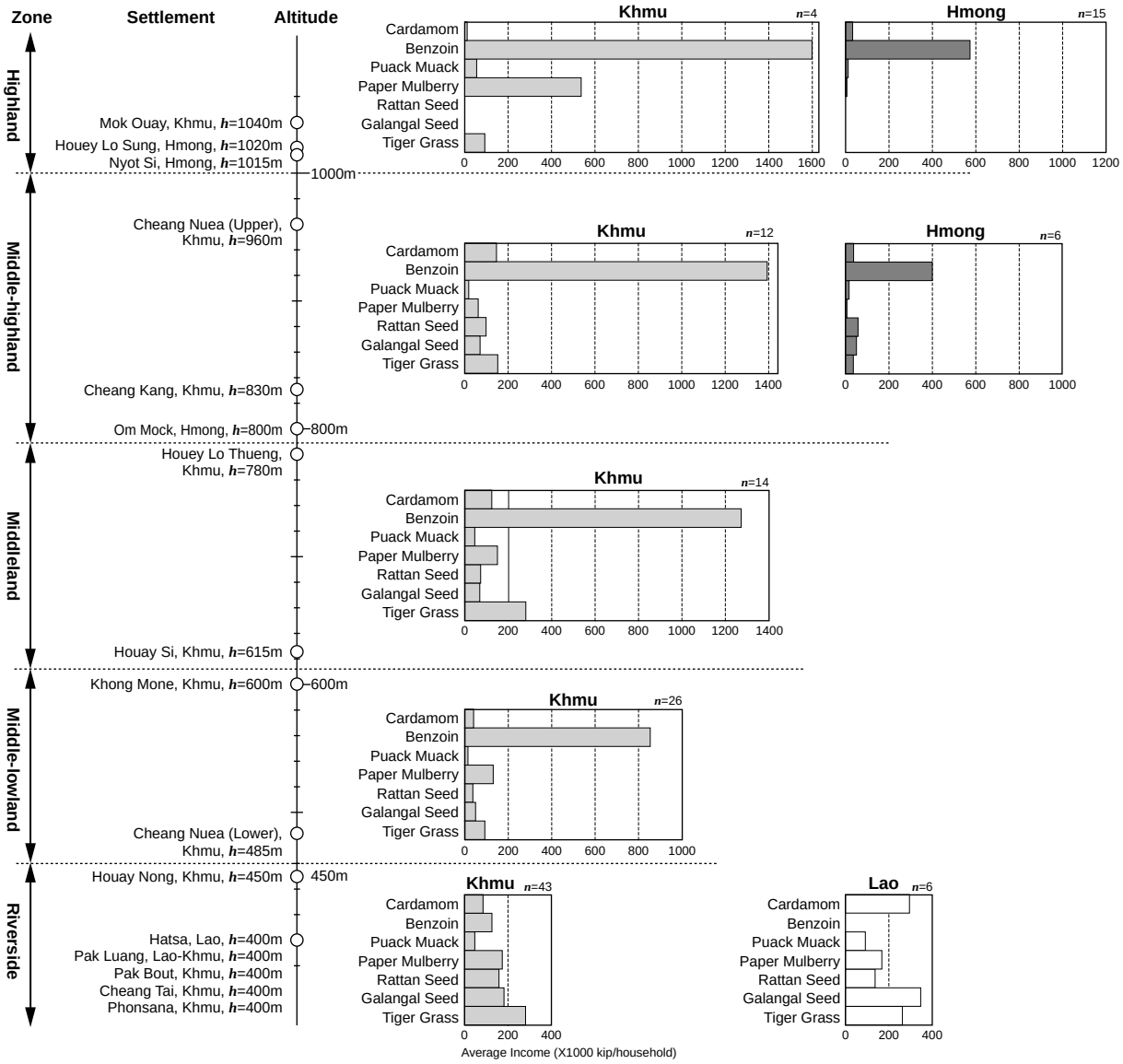


Fig. 14 Average Income of Non-timber forest Products by Altitudinal Zone, 2001

Source: Surveyed by author

and tiger grass, does not show any tendency to vary by the altitude zone.

Average household incomes from forest products for ethnic Lao, Khmu, and Hmong were 251,645 kip (about US$26.5), 1,276,910 kip (about US$134.4) and 595,452 kip (about US$62.7) respectively. The income from forest products of the Khmu stands out among the others. Benzoin is the most profitable forest product in the study area. The Khmu's income from benzoin is larger than that of the Hmong settlements residing at the same altitude zone. Moreover, it is clear that the ethnic Lao do not gather benzoin at all.

The reason that the ethnic Lao do not gather benzoin is, firstly, that many of them live in non-farm households which do not practice swidden agriculture. It is impossible to gather benzoin if swidden agriculture is not practiced because the styrax tree is grown as secondary vegetation in fallowed swidden. Second, the ethnic Lao do not have swidden fields in the highlands even if they practice swidden agriculture. In the lowlands, people cannot gather benzoin resin because a biological peculiarity of the styrax tree means it does not produce resin here.

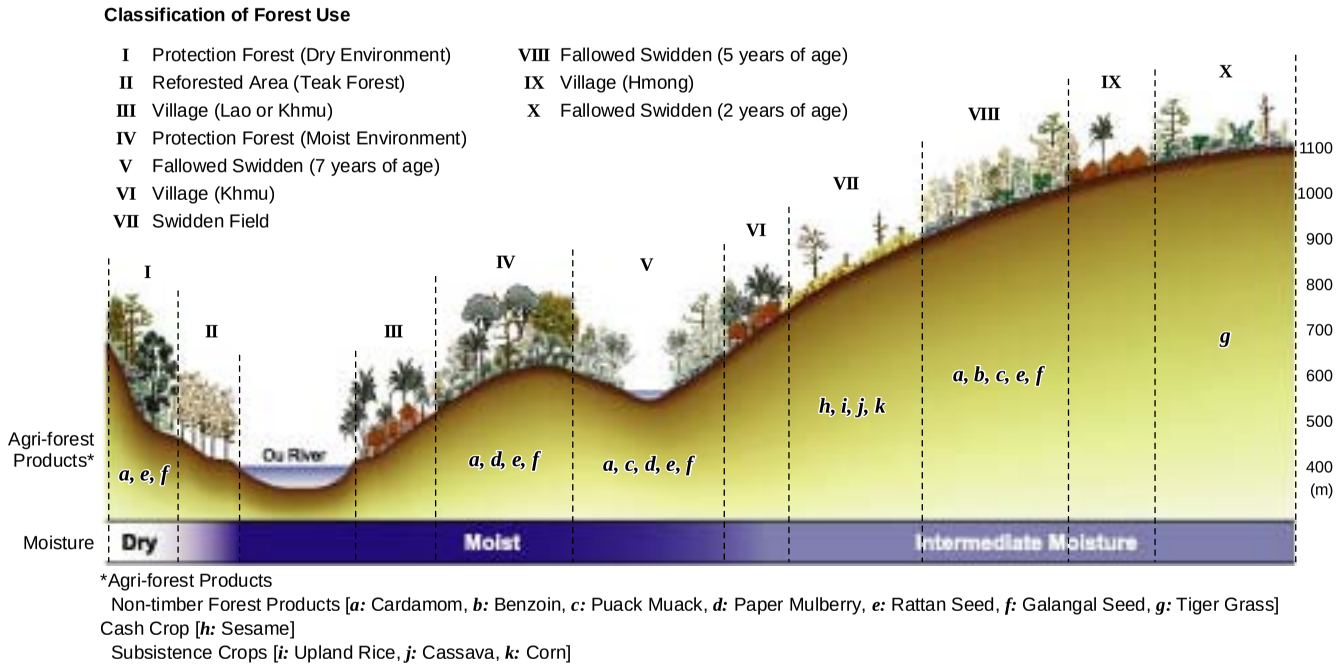
Regarding the relationship between altitude and benzoin gathering, as Takeda (2001) pointed out, people in the Nam Bak district of Luang Phabang province gather benzoin from trees aged over 5 years located at an altitude of over 750 meters. In addition to this, in terms of the relation of benzoin gathering to the diameter of the trunk of the styrax tree, Kashio and Johnson eds. (2001) described that tree having a DBH (diameter at breast height) less than 13 centimeters were found to be unsuitable for tapping[25]. According to the survey by the author at Pak Bout settlement, on the one hand, fallowed swidden at an altitude of about 600 meters can provide benzoin from trees aged of 6-7 years; on

the other hand, styrax trees located an altitude of about 400 meters near the Ou River are sapless even after many years. It seems that the natural environment such as altitude, temperature, and humidity has a physiology effect on the styrax tree and whether or not resin is produced from it. However, no one could clarify the functions. One fact that is known for sure is that people can gather benzoin resin from a younger tree if the altitude is high.

6. Forest use and production activities in the mountainous area

The forest use model shown in Fig. 15 can be produced from the relation between forest use and agri-forest products which has been explained before. Here, forest vegetation is divided into ten groups according to typical forest use, altitude, and moisture.

Forest Use I in protection forest presents a forest physiognomy in which dried Dipterocarp, and cardamom, rattan fruits and galangal fruits are gathered. In Forest Use II along the Ou riverside, teak forests are reforested. The reforested land is private forest afforested by ethnic Lao or Khmu people living in Forest Use III. Forest Use IV is protection forest taking on the forest physiognomy of mixed Dipterocarp. Protection forest reaches its maximum, but much of it is secondary forest. In addition to cardamom, rattan fruits, and galangal fruits, which are gathered in protection forest of Forest Use I, the bark of the paper mulberry is also gathered. Paper mulberry is gathered less at greater altitudes; it can be grown in moist environments, especially near a stream and a spring in the case of the study area. Rattan seed grows in protection forest of mixed Dipterocarp forest and can also be found in the long period fallowed swidden. Land use in which protection forest encloses the village can be seen even in Tai



*Agri-forest Products
Non-timber Forest Products [***a:*** Cardamom, ***b:*** Benzoin, ***c:*** Puack Muack, ***d:*** Paper Mulberry, ***e:*** Rattan Seed, ***f:*** Galangal Seed, ***g:*** Tiger Grass]
Cash Crop [***h:*** Sesame]
Subsistence Crops [***i:*** Upland Rice, ***j:*** Cassava, ***k:*** Corn]

Fig. 15 Generalized Model of Forest Use and Agri-forest Products in Northern Ngoi District

(or Dai) settlement in Xishuangbanna of southernmost China near northern Laos. In the settlement in Xishuangbanna, Landscape Forest and Watershed Forest corresponding to protection forests of Laos are located in the village neighborhood there (Apel 2000). A relation between village and protection forest like this is often found in the Mountainous Regions of Mainland Southeast Asia.

Styrax trees providing benzoin grow in fallowed swidden of 7 years of age in Forest Use V. They sprout naturally after tree burning, and then take over as the dominant species until they are about 15 years of age. However, benzoin cannot be tapped there because the altitude of Forest Use V is about 500-600 meters. Therefore, forest products gathered there are cardamom, Puack Muack, paper mulberry, rattan fruits, and galangal fruits.

Khmu settlements are located in the middle-highlands of Forest Use VI. Khmu settlements are particularly found in the middle-highlands though they are also widely found from the Ou riverside to the highlands. Sesame, cassava, and corn, in addition to upland rice, are planted in swidden fields of Forest Use VII. The following Forest Use VIII is fallowed swidden of 5 years of age. Even if the period of fallowed swidden is shorter than Forest Use V, benzoin can be tapped because of the high altitude. On the other hand, paper mulberry hardly grows there owing to the absence of a humid environment. Hmong settlements are located in the highlands of Forest Use IX. In Forest Use X, tiger grass is gathered in fallowed swidden of 2 years of age.

People in the mountainous area of northern Laos know a great deal about how the environment provides forest products. In particular, the styrax tree provides benzoin, which is a very significant contributor to people's cash income and is closely related to swidden agriculture. The styrax tree eventually dies

since it is an intolerant tree. Therefore, in order to tap benzoin, people need to burn the forest at regular intervals. In the study area, the regeneration of styrax trees is practiced in combination with swidden agriculture.

An example of swidden cultivation involving eight fallow plots is shown in Fig. 16. Practicing swidden agriculture in the reference year is one plot, and the remaining seven plots are fallowed swidden. Benzoin cannot be gathered at an altitude of below 600 meters, so that the explanation here assumes that the land is above this altitude. Since the benzoin resin cannot be gathered from the first to the third fallow year, the styrax tree is left as it is. In fact, people gather benzoin at fallowed swidden of 4-5 years of age. The number of fallow years after which it becomes possible to tap styrax trees differs depending upon altitude. In the highlands, people can tap trees from 4 or 5 years, and even in the forest at an altitude of below 700 meters trees can be tapped from 6 years. Therefore, benzoin is gathered from two places to a maximum of four places in the highlands in the case of swidden cultivation involving eight fallow plots.

Although people practice swidden cultivation involving eight or more fallow plots, the number of fallowed swidden where benzoin can be tapped does not increase. There is a tolerance in the resin of the styrax tree and a tree producing a large quantity of resin dies. In the experience of local people, it is better to start gathering the resin as early as possible because resin production declines after 11 years. Besides, some trees produce only for one year, and some produce over a 2-year stretch. Consequently, it can be seen that the period of gathering at one plot needs to be at least 2 years.

Recently, a few examples where fallowed swidden have been shortened to 5 years or less by population pressure have been reported (Roder 1997; Suzuki

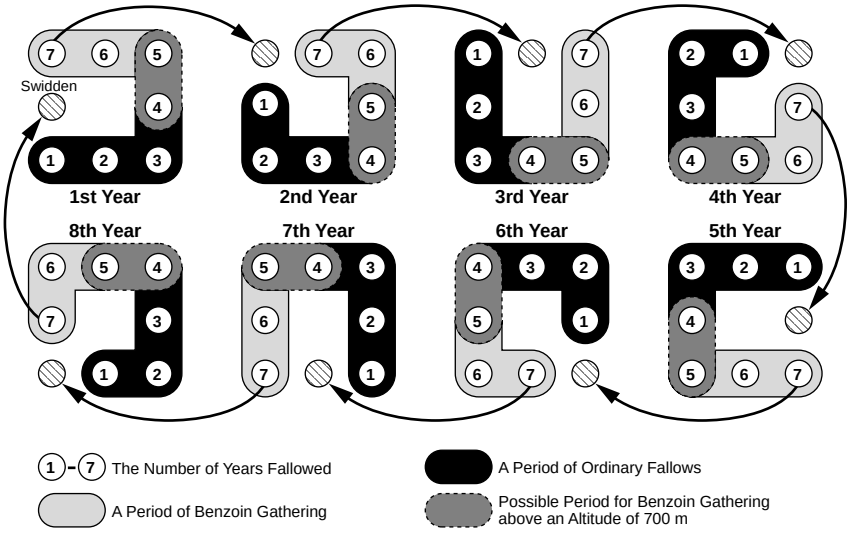


Fig. 16 Swidden System in Combination with Benzoin Gathering

and Yasui 2002). In the study area, however, they can maintain swidden cultivation involving eight or more fallow plots because benzoin is an important cash income source. This kind of method has already been practiced for several decades. Agroforestry, by which agriculture is combined with forestry, has attracted attention lately (Nair 1989). It can be said that the people of the mountainous area are also practicing sustainable agroforestry-like land use, combining swidden agriculture with benzoin gathering.

CHAPTER IV

NON-AGRICULTURAL ACTIVITIES IN THE MOUNTAINOUS AREA

The forest products gathered in the study area are used for neither food nor religious rites, and all are transported to outside the study area. Therefore, analysis of trading in agri-forest products, covering subjects such as the market place and distribution, is necessary to clarify the fundamentals of life in the study area. Accordingly, this chapter considers the market system and the interconnection between the study area and the urban area.

1. Introduction of non-agricultural activities and the nature of these activities

The history of non-agricultural activities, which have been introduced mainly to riverside ethnic Lao does not extend beyond the past 20 years. During a period of about 15 years from the first half of the 1970s to 1988, the government-managed trader called "Governmental Trade Shop (*Han Kha Khong Lat*)" sold merchandise at the Ou riverside settlements and purchased agri-forest products from people at the same time. Privately managed general stores and periodic markets on the Ou riverside started in 1988 or thereabouts when the Governmental Trade Shop finished. In a previous study carried out in the 1960s, Iwata (1963) described how all markets in Thailand and Laos were of the permanent type, and no periodic markets were found, though it is uncertain how many remote areas Iwata surveyed. The periodic market in the study area opened not long ago.

In Hatsa village, seven households have opened general stores since 1985,

and at present 15 households are running a general store. In Pak Luang village, two households have opened general stores since 1992, and at present five households are running a general store. The general store managers of the two villages are all ethnic Lao.

In Hatsa village and Pak Luang village, agri-forest brokerages started at the same time as the general stores opened in the villages. When these brokerages started in 1985, the brokers sold the purchased agri-forest products to the Governmental Trade Shop. After the Governmental Trade Shop closed in 1988, they started selling the products to brokers in the Nong Khiaw or Luang Phabang areas.

Agri-forest products brokerages have extended beyond ethnic Lao villages. They appeared in Pak Bout settlement in 1994 and Phonsana settlement in 1997. These are both Khmu settlements located along the Ou riverside. Afterwards, brokers appeared in Cheang Neua (Lower) settlement and Cheang Kang settlement, which are Khmu settlements in the mountainous area, and Om Mok village, which is Hmong, also in the mountainous area.

The periodic market in the Ou riverside started in 1990 and still continues. Many stalls at periodic markets are opened by general store managers in Hatsa village and Pak Luang village. All general store managers from Hatsa village have stores both in the village and in the periodic market but on the other hand, the general store managers from Pak Luang village have stores only in the periodic market.

Merchandise sold at the general store and the periodic markets comprises daily necessities, clothes, and food, all of which is made in Thailand, Vietnam, or China. The general store managers go to the Luang Phabang and Muang Khoa

areas to purchase merchandise and lay these in for selling at least once a month[26]. Moreover, they ask friends or relatives who reside in those areas to send merchandise if the occasion arises. The general stores of the Hatsa village shared a truck from the Muang Khoa area between five managers who went directly to Mengla town in China to purchase Chinese goods from 1997 to 2000[27]. A large amount of merchandise, however, was imported from China, and the price fell. As a result, the purchase of this merchandise was discontinued in January 2000 in order to reduce the advantage of purchasing directly.

Thus, non-agricultural activities of the study area have been introduced from ethnic Lao households residing along the river where accessibility to the urban area has been comparatively good since the middle 1980s. Later, those activities diffused to the Khmu households residing along the river, then finally to the Khmu and Hmong households residing in the mountainous area. However, regarding the agri-forest products brokers, Level-1 brokers are found only in riverside households which were introduced to the activity in the early stages. In addition to this, general stores exist in riverside ethnic Lao households. Periodic markets are also held on the riverside. It is understandable that geographic settlement location influenced by traffic networks such as the road network and the river network greatly contributes to the introduction of non-agricultural activities[28].

2. Periodic markets in the mountainous area and supply of merchandise

In the study area, two periodic markets are held at Pak Bout settlement and Phonsana settlement on the Ou riverside, and permanent general stores are located in Hatsa village (Photo 7). These two periodic markets and general stores

(a) Pak Bout Market

(Pak Bout Settlement, November 2001)

(b) Phonsana Market

(Phonsana Settlement, April 2001)

(c) General Store at Hatsa Settlement

(Hatsa Village, September 2002)

Photo 7 Periodic Markets and General Store in the Study Area

at Hatsa village provide the only market function for people in the mountainous area. A market is held once every 10 days according to the Khmu calendar. Phonsana periodic market and Pak Bout periodic market are held on the third day (*Kat*) and the tenth day (*Huay*) respectively.

Periodic markets have occurred in many places in every time period, and it is no exaggeration to say that the periodic market exists or has existed not only in Laos but also in all the main civilized areas of the world such as Europe and Africa (Ishihara 1987: 8-16). Furthermore, there is an affinity between these periodic markets throughout the world, for example the market are held at regular intervals, goods are traded, and the market functions as a social place where many people gather including local citizens, traders, and craftsmen from the periphery (Ishihara 1987: 16-34). The periodic markets in the study area follow this pattern.

A "market hinterland" has formed in the surroundings of each periodic market and general stores of Hatsa village, and there is a clearly defined area of consumers using each facility to buy their merchandise (Fig. 17). The hinterland of Pak Bout periodic market includes 12 settlements. This is the biggest market hinterland in the study area and it is said to be the largest periodic market along the Ou riverside. As many people come to Pak Bout periodic market, it is held on both banks of the Ou River at different times. The Pak Bout settlement side on the west bank of the Ou river holds the periodic market from around 5:30 am to 8 am and then the stalls move to the Houay Nong settlement side on the east bank of the Ou River where the market is held from around 8 am to 10 am.

In Hatsa village, 15 general stores have been open since the end of 2001, and its market hinterland contains six settlements. The general store also serves

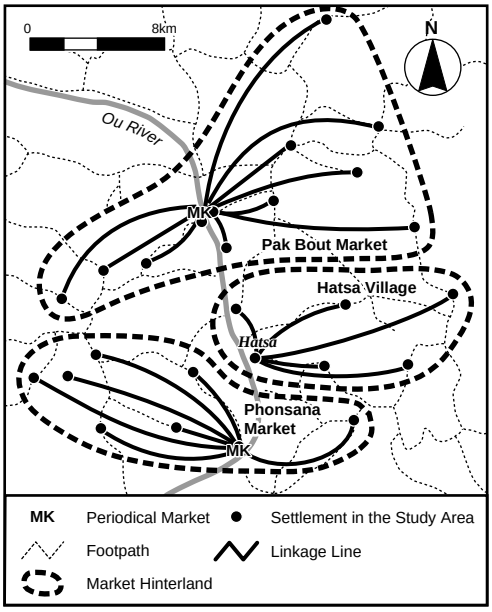


Fig. 17 Market Hinterland of the Periodic Markets and Hatsa Village, 2002

Source: Surveyed by author

as a house. The merchandise is displayed so as to be visible from the roadside, and customers can buy the merchandise without entering the store. Most general stores in Laos use this display method and the supermarket type of store is limited to city areas such as Vientiane, the capital of Laos.

Phonsana periodic market is smaller than Pak Bout periodic market, and its market hinterland contains eight settlements. This periodic market displays the merchandise on the sand using plastic mats, and many general store managers do not open their stalls in the rainy season. Phonsana periodic market is held only on the west bank of the Ou River. For this reason its market hinterland contains only one settlement in the east of the Ou River. Some settlements to the west of the Ou River are contained within the market hinterland of general stores of Hatsa village. The reason that general stores in Hatsa village on the east of the Ou River have a large market hinterland is that, in addition to the problem of distance, ferrying to the west bank of the Ou River is needed[29]. It is therefore conceivable that the Ou River has become a physical barrier to the formation of the market hinterland.

Let us leave the market hinterland; we will next consider the characteristics of each periodic market. No stalls in the two periodic markets come from a settlement where a periodic market is held. Apart from the general stores, stalls come from outside the study area. In the case of Pak Bout periodic market, stalls coming from the Muang Khoa area are more numerous than those from inside the study area. On the other hand, the general store managers in Hatsa village and Pak Luang village have stalls in Houay Chanum periodic market. The number of stalls and their flow patterns (hereafter termed 'flows') to the periodic market are shown in Fig. 18.

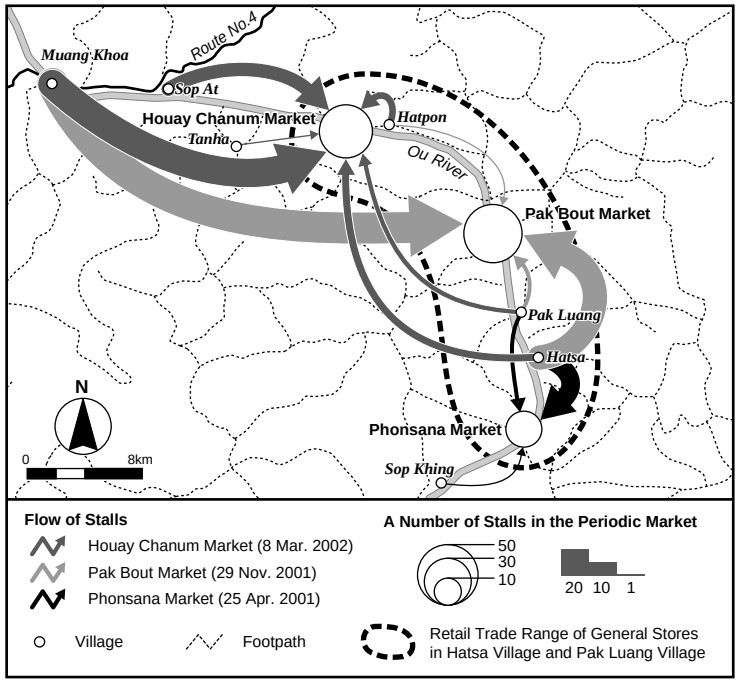


Fig. 18 Number of Stalls and these Flows to the Periodic Market

Source: Surveyed by author

In Pak Bout periodic market on 29 November 2001, there were 47 stalls, coming from four settlements. From the study area, Hatsa village and Pak Luang village had 19 stalls and 3 stalls respectively, and from outside the study area, Muang Khoa area (Khoa district, Phongsaly province) and Hatpon village (Mai district, Phongsaly province) had 24 stalls and 1 stall respectively. The Phonsana periodic market on 25 April 2001 was small-scale, with 18 stalls from three settlements. From the study area, Hatsa village and Pak Luang village had 14 stalls and 3 stalls respectively; and from outside the study area, Sop Khing village (Ngoi district) had one stall. In Houay Chanum periodic market which is opened every ninth day (*Hap*), on 8 March 2001, 4 stalls came from Hatsa village and 3 stalls came from Pak Luang village. The number of stalls in Houay Chanum periodic market was 39, and this is the second largest periodic market along the Ou riverside, after Pak Bout periodic market.

Houay Chanum periodic market on every ninth day (*Hap*) and Pak Bout periodic market on every tenth day (*Huay*) are held for two straight days. Some general store managers with stalls at Houay Chanum periodic market do not return to their settlements even after the market closes. Instead, they move to the following Pak Bout periodic market directly and stay the night at their market stall.

Stalls deal largely in small general merchandise such as sundries, appliances, and foods (Table 14). Although accurate categorization is difficult because stalls deal in a variety of merchandise, many stalls deal primarily in daily necessities and clothes. In addition to this, there are also stalls dealing in noodles or confectionery. In this connection, general stores at Hatsa village are not considered in Table 14; all kind of merchandise except electrical products can

Table 14 Characteristics of Stalls in Periodic Markets

(Unit: Stalls)

Merchandise Category	Merchandise Sub-category	Phonsana Market *25 April 2001*	Pak Bout Market *29 November 2001*	Houay Chanum Market *8 March 2002*
Sundries	Daily Necessities	6	11	12
	Clothes and Bedclothes	8	20	11
	Lamp Oil and Gasoline	0	1	2
	Medicine	1	2	4
Appliances	Electrical Products	0	2*	1*
	Tools	0	2*	1*
	Watch Repairer	1	1	1
Foods	Noodle	1	4	4
	Confectionary	1	4	3
Total		18	47	39

Source: Surveyed by author

* Chinese merchants

be bought in Hatsa village.

Among the general store managers, a number of Chinese merchants have opened stalls dealing in electrical products and tools at Pak Bout periodic market and Houay Chanum market. Laotian general store managers at the markets are only ethnic Lao, and no Khmu or Hmong general store managers are found at the markets. The Chinese run general stores dealing in electrical products as the main line of merchandise in the Muang Khoa area, and they have had stalls at the periodic markets since 2000. When it is considered that the general store managers of Hatsa village discontinued merchandise sales to China as mentioned above, it might be said that Chinese merchants have advanced to the mountainous area of Laos since 2000 or thereabouts.

3. Purchasing of Agri-forest products in the mountainous area

The function of these markets is not only to sell merchandise, but also to buy agri-forest products from people (Photo 8). Stalls at the periodic market, as well as agri-forest brokers, are also involved in purchasing of agri-forest products. Moreover, some people barter their products for merchandise. However, when stalls at the periodic market purchase or barter agri-forest products, the products traded are limited to small and lightweight ones such as benzoin, rattan fruits, galangal fruits and sesame. The reason for this is that general store managers with stalls at the periodic market cannot carry large quantities of agri-forest products. Therefore, voluminous agri-forest products such as paper mulberry bark and Puack Muack, are not traded by these general store managers, but by agri-forest brokers with big boats who specialize in purchasing agri-forest products.

(a) Purchasing Paper Mulberry Bark

(Voluminous agri-forest products, such as paper mulberry bark and puack muack, are purchased at open space which is located near market place. Houay Chanum Market, March 2002)

(c) Agri-forest Broker (right) and Benzoin Collecor (left)

(Houay Chanum Market, March 2002)

(b) Loading Purchsed Paper Mulberry Bark into Boat

(Pak Bout Market, November 2001)

(d) Selling Benzoin to Owner of Pharmacy Stall

(Houay Chanum Marke, March 2002)

Photo 8 Purchasing Agri-forest Products at Periodic Markets

Brokerage of agri-forest products is carried out not only at the periodic market, but also at the brokers' houses. The range of purchasing of agri-forest products at the periodic market and the general stores of Hatsa village is not the same as in the market hinterland. An "agri-forest products collection area", which is different from the market hinterland, is being formed. For the moment, let us attempt to clarify the agri-forest products collection area based upon acquired data of agri-forest products sales locations of growers and gatherers at each settlement.

As shown in Fig. 19, three agri-forest products collection areas have been formed: agri-forest products collection area A, which centers on Pak Bout settlement, Houay Nong settlement, and Pak Bout periodic market; agri-forest products collection area B, which centers on Hatsa village; and agri-forest products collection area C, which centers on Phonsana settlement. Every heartland is the same as the market hinterland, but its range is different. There is an overlap between part of agri-forest products collection area B and part of agri-forest products collection area C. This means that people sell products to both areas.

In agri-forest products collection area A, there are nine brokers in five settlements. There is only one Level-1 broker — Mr. K at Pak Bout settlement, and the other brokers are Level-2 and Level-3. Level-2 brokers living in Pak Bout settlement and Houay Nong settlement sell almost all products they purchase to Mr. K. However, Level-3 brokers living at Om Mok settlement, Cheang Neua (Upper) settlement, and Cheang Kang settlement on the east side of the Ou River, sell the products they purchase not to Mr. K but to Level-1 brokers who come from Hatsa village or Pak Luang village at Pak Bout periodic market. Level-3

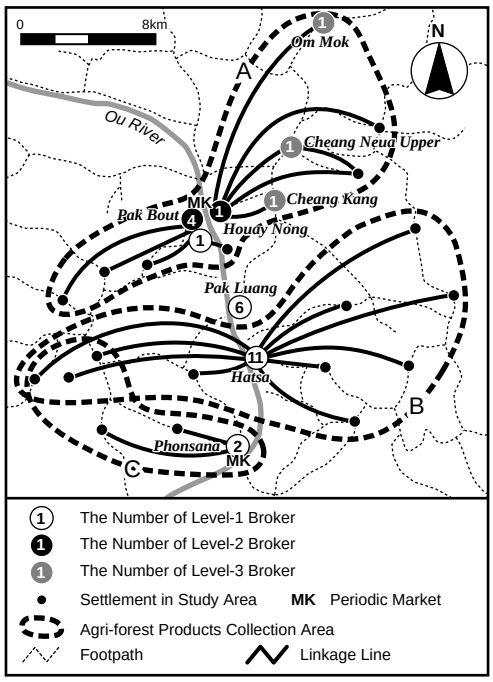


Fig. 19 Agri-forest Products Collection Area of the Periodic Markets and Hatsa Village, 2002

Source: Surveyed by author

brokers living in the mountainous area cannot transport the agri-forest products to Pak Bout settlement on the opposite bank because they have no boat.

On the day of the Pak Bout periodic market centering on agri-forest products collection area A, and Phonsana periodic market centering on agri-forest products collection area C, many agri-forest products brokers with abundant resources living in other settlements, such as Hatsa village and Pak Luang village, come to purchase products and a competition of acquisition occurs between the brokers. To cope with this situation, Level-1 and Level-2 brokers living in Pak Bout settlement, Houay Nong settlement, and Phonsana settlement offer free accommodation to people in the mountainous area on the previous day to the periodic market[30], and then the brokers purchase products from these people who have stayed at their home. This method of purchasing was introduced in 1998. Even if people in the mountainous area stay at the broker's house, they have no obligation to sell the agri-forest products to the broker. However, in this case, the role of buyer and gatherer has usually been fixed already, i.e. a trading relationship has been built between the regular broker and the regular gatherer. Consequently, although brokers offer their houses at no charge, this method has a big advantage because the broker can definitely purchase the agri-forest products.

Moreover, Mr. T who is a Level-2 Khmu broker living at Pak Bout settlement, has been going the rounds of villages in the mountainous area and purchasing forest products. He went the rounds of three Khmu villages, Houay Lo Toung settlement, Saouy settlement, and Khong Mone settlement, ten times in 2001[31].

He employs people in the mountainous area as porters to carry the agri-forest

products he buys. The advantage in purchasing from the mountainous area is that he can obtain products at a cheaper price than if he bought at the periodic market or Pak Bout settlement, even with the extra porter charge.

There are few brokers like Mr. T who go the rounds of the villages in the mountainous area in this way but there are many brokers who contract with gatherers and pay cash in advance in order to keep a reliable body of forest products gatherers. This method is especially used for purchasing benzoin and cardamom.

Regarding agri-forest products collection area B, this is characterized by the way it extends over a large area. The area is wider than the market hinterland of the general store in Hatsa village, which is limited to the west of the Ou River, as shown in Fig. 17. The agri-forest products collection area is extended to the east of the Ou River. The main reason is that Hatsa village supplies the daily demand for both purchasing of agri-forest products and selling of merchandise. Hatsa village is very convenient in comparison to the periodic market which is held only once every 10 days.

Meanwhile, Pak Luang village has no agri-forest products collection area in spite of being the place of residence of six Level-1 brokers and five general store managers in the village. All brokers and managers carry out their business mainly at the periodic markets, so no general store managers have stores in the village. Accordingly, people in the mountainous area do not select Pak Luang village, where there is no general store in the village, but instead choose Hatsa village as the best location for trading agri-forest products. As for purchasing of agri-forest products, the broker in Pak Luang village does this mainly at the periodic market and from Level-2 or Level-3 brokers.

It has been clarified that both the market hinterland and the agri-forest products collection area are centered on Pak Bout periodic market, Phonsana periodic market, and Hatsa village. Merchandise sales and agri-forest products brokerages are closely geared together (Fig. 20). The broker purchases the agri-forest products from people in the mountainous area, and hands them cash. People in the mountainous area buy the merchandise from the general store using this money. We can see there is a circulation of cash as money is passed from the broker to people in the mountainous area, and finally to the general store manager. The agricultural products, cash, and merchandise remain in the hands of the broker, general store manager, and people in the mountainous area, respectively.

Selling merchandise is the role of the ethnic Lao, and buying it is chiefly done by Khmu and Hmong people. In addition, it is generally ethnic Lao living in the Ou riverside who purchase agri-forest products, and Khmu and Hmong people living in the mountainous area who sell them. From this, on the one hand, regarding merchandise dealing, the ethnical contrast becomes clear; on the other hand, regarding agri-forest products brokerage, the spatial contrast becomes clear. Although it appears simple, merchandise dealings and trading of agri-forest products in the mountainous area are part of a complex system influenced by ethnicity, the residential location, and occupation.

4. Interconnection between the mountainous area and the urban area

Let us now attempt to examine the market system in the study area as a general agri-forest products distribution system including settlements in the mountainous area, urban area, and foreign countries.

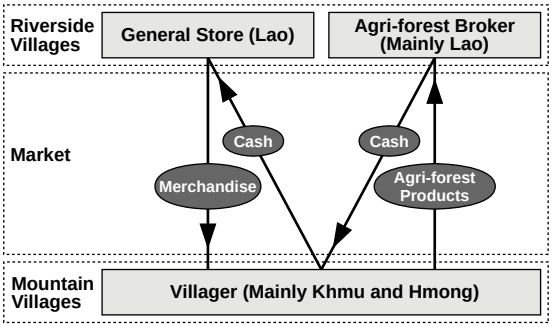
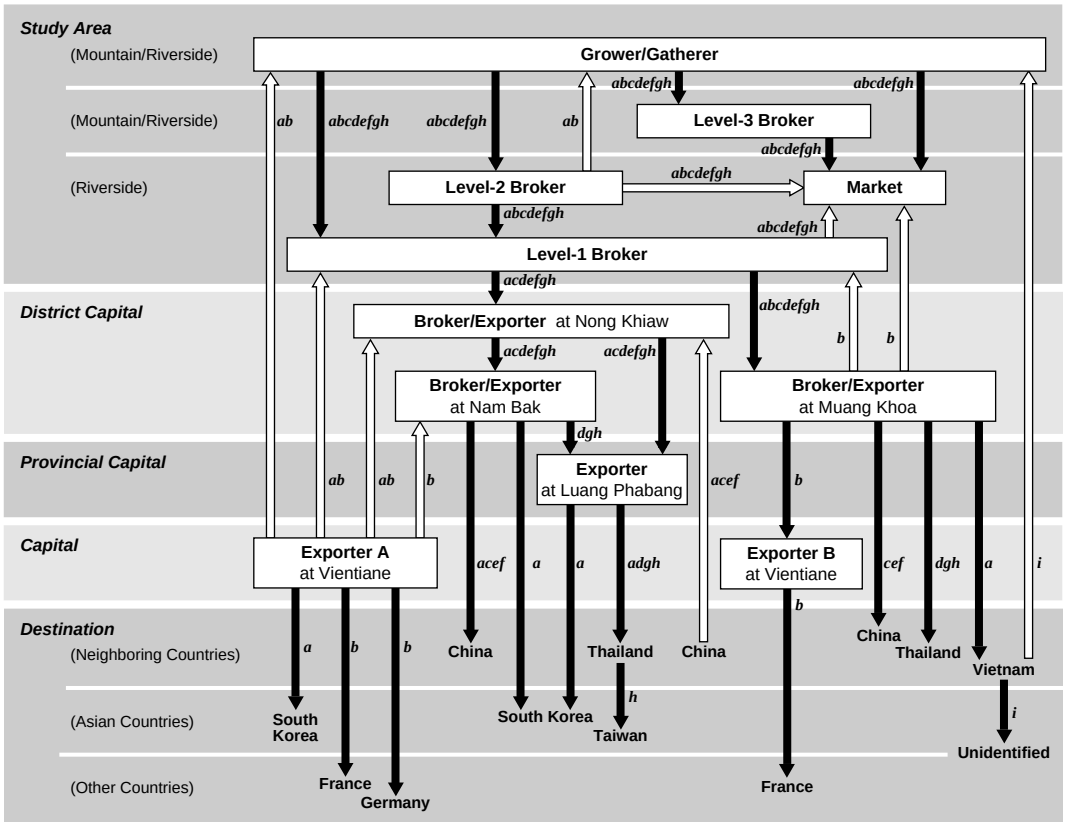


Fig. 20 Circulation of Agri-forest Products, Merchandise and Cash

The distribution flow of agri-forest products from the study area to destinations is very complicated. On the one hand, we can see complicated flows that reach destinations via six brokerages; on the other hand, there are flows in which a broker living in an urban area or foreign country purchases the products directly [Fig. 21 (a)]. We will take the example of benzoin (*b*) to illustrate the flows. It is possible to classify these flows into three types. First, there is "Direct Purchasing". This is a flow in which exporter A in Vientiane makes a trading contract with a settlement in the mountainous area, or with a Level-1 broker and goes to purchase directly. Second, there is “Consignment Purchasing”. This is a flow in which Exporter B in Vientiane entrusts the purchase of benzoin to a broker/exporter in the Muang Khoa area. Here Exporter B does not go to the study area; the broker/exporter in the Muang Khoa area carries out the actual purchase instead. Finally, there is a general “Phased Brokerage”. This is a flow in which benzoin is transferred in stages from a Level-1 broker to Exporter A in Vientiane via the Nong Khiaw and Nam Bak areas.

A similar brokerage method was observed for products being exported to China, such as cardamom, Puack Muack, galangal fruits and rattan fruits. Chinese brokers come directly to the Nong Khiaw area to buy. This is “Direct Purchasing”. As shown in Fig. 21(b), there are four brokers/exporters in the Nong Khiaw area, and three out of four of these brokers/exporters trade directly with China. According to brokers/exporters in the Nong Khiaw area, Chinese brokers come to purchase at regular intervals of 2-3 weeks from August to October, during the gathering period for cardamom, galangal fruits and rattan fruits. At other times, brokers/exporters in the Nong Khiaw area sell the agri-forest products to the Nam Bak or Luang Phabang areas.



Non-timber Forest Products

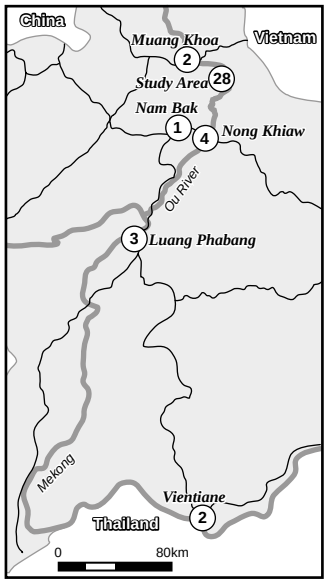
- ***a:*** Cardamom (*Mak Neng*)
- ***b:*** Benzoin (*Nhan*)
- ***c:*** *Puack Muack*
- ***d:*** Paper Mulberry (*Po Sa*)
- ***e:*** Rattan Seed (*Mak Wai*)
- ***f:*** Galangal Seed (*Mak Kha*)
- ***g:*** Tiger Grass (*Khem*)

Cash Crop

- ***h:*** Sesame (*Mak Nga*)
- ***i:*** Opium (*Ya Fin*)

Selling Flow Purchase Flow

(a) Flow of Agri-forest Products Brokerage



④ The Number of Broker/Exporter*

Main Road

* Only brokers/exporters related to the study area are shown in this figure.

(b) Distribution of Brokers/Exporters

Fig. 21 Flow of Agri-forest Products Brokerage and Distribution of Brokers/Exporters, 2001

In the case of brokers/exporters in the Nam Bak and Muang Khoa areas, the purchased agri-forest products are exported to China using self-owned trucks. Brokers/exporters in the Luang Phabang area also arrange their own transport when exporting purchased agri-forest products from the Nong Khiaw and Nam Bak areas to China. This brokerage system, which involves several brokers, is known as "Phased Brokerage".

As for opium, "Direct Purchasing" is executed between an overseas broker and settlements in the mountainous area without involving a domestic broker/exporter. According to interviews conducted in Houay Lo Sung settlement, which cultivates the opium poppy, Vietnamese brokers who come to purchase opium do not only pay in cash but also barter for Vietnamese goods. The opium of the study area is illegally smuggled out and the Vietnamese brokers enter the country secretly using neither a passport nor an entry permit[32]. By the way, although Halpern (1958) reported that Ho peddlers came from Yunnan in order to purchase opium in the 1950s, no historical evidence to back up this claim was found in the study area.

The agri-forest products of the study area are exported from four export points using six transportation routes which combine land routes with river routes (Fig. 22). The export points are Boten on the Chinese border, Houay Xay and Vientiane on the border with Thailand, and Tai Chang on the border with Vietnam. Among these, Tai Chang is a domestic border across which only Lao and Vietnamese nationals can pass.

Benzoin (a) is transported to the exporter in Vientiane by a land route, and then airlifted to France or Germany from Vientiane. Cardamom (b) is exported to China from Boten, to Vietnam from Tai Chang, and to South Korea from both

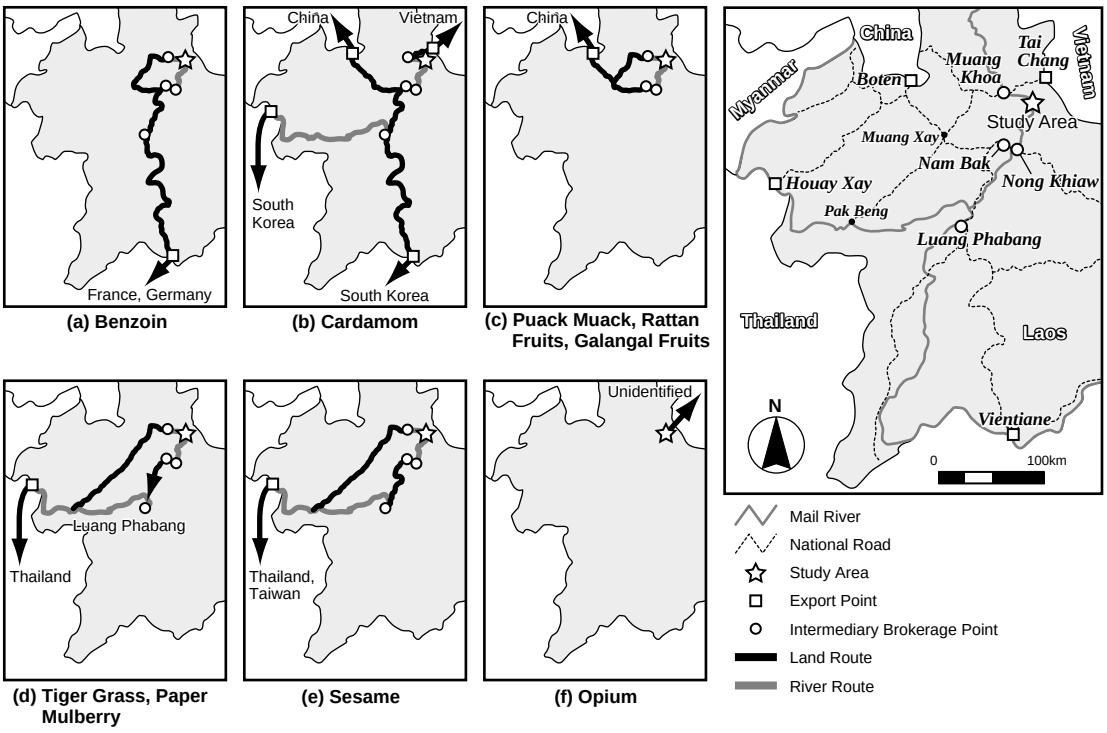


Fig. 22 Distribution Channels of Agri-forest Products, 2001

Source: Surveyed by author

Vientiane and Houay Xay. This is the agri-forest product with the greatest variety of channels in the study area. All cardamom exported to Vietnam using the land route involves a broker/exporter in the Nam Bak area, and other products exported to China using a land route involve a broker/exporter in the Muang Khoa area. The broker/exporter in the Nam Bak area exports the cardamom to South Korea in addition to China. This broker/exporter separates the cardamom into two groups according to the fruit size; big fruits are sent to China and small fruits are sent to South Korea. The cardamom exported to South Korea is not transported to Vientiane, but is carried to Thailand from Houay Xay by a river route via Luang Phabang. After being transported to Bangkok by land, it is airlifted to South Korea.

All Puack Muack, rattan fruits, and galangal fruits (c) are exported to China from Boten by a land route. As for tiger grass and paper mulberry (d), the broker/exporter in the Muang Khoa area transports these products to Pak Beng by land route, and then transfers them to a boat for transport to Houay Xay where the products are exported to Thailand. On the other hand, the shipments dealt with by the brokers/exporters in the Nong Khiaw and Nam Bak areas are transported to an exporter in the Luang Phabang area, who then transports the products to the paper mill in Thailand by boat. The tiger grass is carried to Thailand as it is without being processed, but some of the paper mulberry bark is exported to Thailand after being processed by the paper mill of Company X in the Luang Phabang area. Company X doubles as a broker/exporter. Company X started the operation of its small-scale paper mill in 1999 by introducing paper-making machines from Chiang Mai, Thailand. Although Company X has purchased about 300 tons of paper mulberry bark, about 200 tons has been

exported to Thailand without processing because the processing capacity of the paper mill is only 100 tons a year.

Sesame (e) is exported without processing by the same route as tiger grass and paper mulberry bark by way of the Luang Phabang area. Some sesame sent to Thailand from Houay Xay by boat is carried to the sesame oil factory in Thailand, and the remainder is exported to Taiwan. Finally, regarding opium (f), the export destination and the location for heroin processing after transport to Vietnam are uncertain.

So far, the author has described the distribution channels and brokerage method of agri-forest products from the study area to foreign countries. As for the distribution channel of the agri-forest products, the land transportation route was used only by the exporter from Vientiane who conveys benzoin and cardamom between Luang Phabang and Vientiane where the road is paved, and over the short-distance to China or Vietnam. All the other agri-forest products exported to Thailand or by way of Thailand used the river route of the Mekong River. In northern Laos where the road is underdeveloped, we can reconfirm that the role of the river has played an important role as a distribution channel of the agri-forest products in the study area.

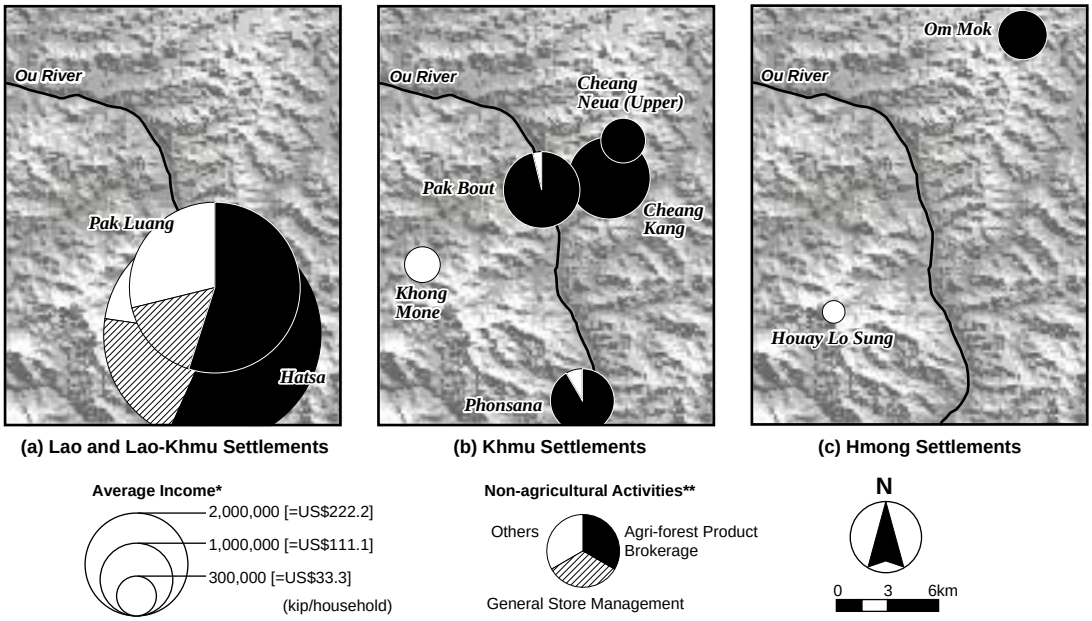
The brokerage method of the agri-forest products presents a very complex structure. It should be noted especially that Direct Purchasing brokers from Vientiane and abroad purchase agri-forest products directly from the growers/gatherers in the mountainous area. Even in remote areas without road access, namely, places isolated from urban areas, people have direct contact with brokers from the urban areas and foreign countries. The people in the mountainous area, despite having no transport or means of outside

communication, have also obtained information and new knowledge through trading of agri-forest products. The opportunity for contact with brokers of urban areas and foreign countries must have made great contributions to change in the mountainous area.

5. Spatial characteristics of income from non-agricultural activities

The calculation result of income from non-agricultural activities using household data (Appendix 1-4) is shown in Fig. 23. From the figure, it can be understood that income from non-agricultural activities is very large compared with the income of the agricultural activity shown in Fig. 12-14. Ethnic Lao and Lao-Khmu villages, Hatsa village, and Pak Luang village, obtained a big income. Both villages introduced non-agricultural activities at an early stage compared to others in the study area. The average household income from non-agricultural activities was as follows: Hatsa village was 8,912,211 kip (about US$990.2) and Pak Luang village was 5,506,941 kip (about US$611.9). The breakdown of the income included in *Others* is public servants' salary, drugstore sales, and technical workers' earnings.

In the settlements of Khmu, the average household income of Cheang Kang settlement, where only one Level-3 broker resided, was larger than Pak Bout settlement and Phonsana settlement where Level-1 brokers resided[33]. The income of the broker in Cheang Kang settlement came from three tons of benzoin brokerage even though it was only Level-3. The breakdown of 'Others' income seen in the settlement of Khmu was as follows: a public servant salary in Khong Mone village, and a Video-CD show[34] in Pak Bout settlement and Phonsana settlement. The Video-CD show was given by a broker who had a TV and a



* US1$ was equivalent to 9,000 kip as of December 2001.
** Number of sampled households was 160 in 16 settlements, 12 villages.

Fig. 23 Income from Non-agricultural Activities, 2001

Source: Surveyed by author

Video-CD set and was provided for people in the mountainous area who stayed with him the evening before the periodic market day. The owner of the device earned a show fee of 500kip/person from the audience. Children were charged half-rate. The Video-CD show is a special activity which is found only in settlements without electric power equipment as in the study area.

In the settlement of Hmong, income from non-agricultural activity comprised the income of the agri-forest products brokerage in Om Mok village and a pension income in Houay Lo Sung settlement.

According to The second Lao expenditure and consumption Survey (LECS2) carried out in 1997/1998 fiscal year, the average household commerce income of seven northern provinces was 1,860,000 kip (National Statistics Centre 1999). The commerce income in 1998 was converted into the commerce income in 2001 using CPI[35] — the same method used by the author in Chapter III. As a result, the commerce income in 2001 was calculated to be equivalent to 5,730,043 kip (about US$636.7)[36]. In Hatsa village, the commerce income, which includes brokerage income and general store income, was 6,888,948 kip (US$765.4). When the LECS2 income is compared with the income of Hatsa village, it is clear that Hatsa village has a higher than average commerce income for northern Laos. It is surprising that this remote area, with no roads, exceeds the average commerce income of northern Laos.

In the study area, agri-forest products brokerage income was larger than retail income such as that from general stores. It may be said that this is peculiar to this study area where special forest products such as benzoin are gathered.

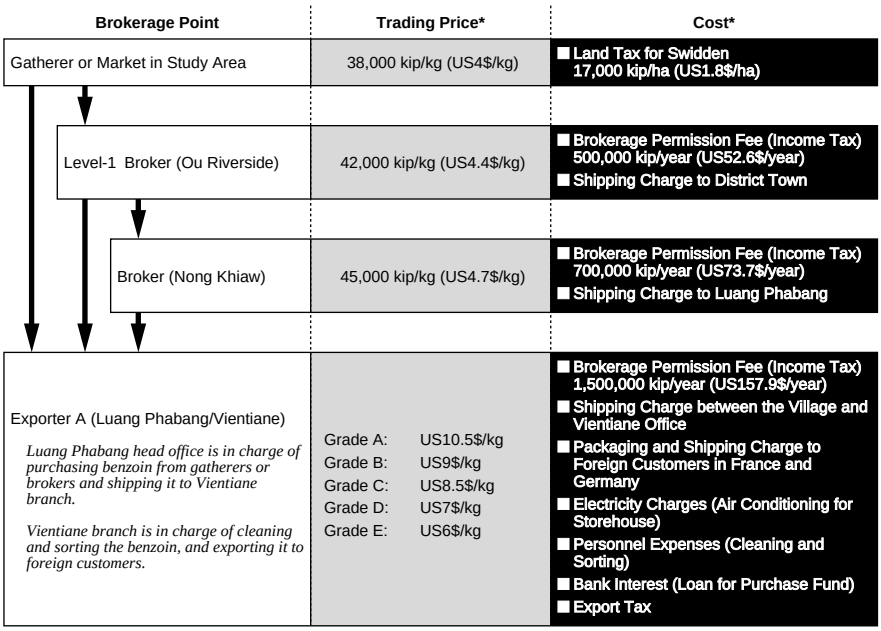
In case of the agri-forest products brokerage the income is large, but costs are also large. Here, let us attempt to clarify the realities of agri-forest products

brokerage from the relation between the trading price and the cost at every brokerage point from the gatherer to the exporter. The agri-forest product we will use as an example is benzoin. It is comparatively easy to follow the brokerage flow of benzoin because there are only three export companies in the country.

The trading price[37] and the cost at every brokerage point in 2002 are shown in Fig. 24. The trading price of benzoin in the gathering area is set at a price in Laos kip equivalent to US$4 every year. In 2002, the benzoin trading price was set at 38,000kip/kg because the exchange rate of US$1 was equivalent to 9,500 kip. However, the price changes occur during the gathering period from March to the end of May through a competition of acquisition among brokers, because the region which can supply benzoin is limited. In the study area, price fluctuation did not occur in 2002 though the trading price soared in 2001[38]. When the price soars, the broker also raises the trading price according to the range of fluctuation. The exporter, however, cannot have the trading price for foreign customers change at the whim of exporters. Therefore, the exporter's profit will decrease when the price soars.

The gatherer does not incur costs for gathering benzoin. All that could be said is that the land tax for the swidden field might be considered as a cost, because benzoin is gathered in fallowed swidden plots.

The Level-1 broker sells benzoin purchased at 38,000kip/kg to brokers in the Nong Khiaw area or exporter A at 42,000kip/kg. The profit yielded is 4,000kip/kg. However, it is necessary to pay a yearly brokerage permission fee of 500,000 kip to the district office, which corresponds to income tax. If the broker deals only in benzoin, the balance becomes a deficit unless 125 kilograms (about



* US1$ was equivalent to 9,500 kip as of Apr. 2002

Fig. 24 Trading Price and Cost of Benzoin at Brokerage Point, 2002

US$500) of benzoin are involved. If a broker deals only in forest products such as Puack Muack and paper mulberry bark, and makes a profit of only 500kip/kg a brokerage of 1 ton (about US$263.2) is needed. In the study area, only a few brokers with financial ability are efficiently purchasing agri-forest products by specializing in benzoin, and the majority of brokers have mainly dealt in forest products with a cheap unit price. It seems that the net profit of brokerage is not so great although the amount of cash income is large. Of particular note is that brokers who deal mainly in heavy, low profit forest products have to bear the cost for transport, and so the profit decreases further.

A broker in the Nong Khiaw area, which is the seat of Ngoi district office, is in almost the same situation as the Level-1 broker. The brokerage permission fee for a broker in the Nong Khiaw area is large compared with that for a Level-1 broker. In addition to this, the shipping charge for agri-forest products greatly affects the profit. The shipping charge by truck from the Nong Khiaw area to the Luang Phabang area is 100,000kip/ton, and the brokers transport 3 tons of forest products once a week on average. The shipping charge alone amounts to 14,400,000kip (about US$1515.8). Although a shipping charge for benzoin is rarely needed because exporter A often comes to purchase, the shipping charges for other forest products, especially paper mulberry bark, are high.

The exporter A in Vientiane exports the benzoin to France and Germany, 15 tons to each. When exporting, the benzoin is divided into five grades from A to E according to the size of the resin. Little high grade resin remains after cleaning and sorting. The brokerage permission fee which exporter A has to pay is 1,500,000kip (about US$157.9). Other charges in addition to this are the shipping charge between the village in mountainous regions and the Vientiane

office, and the packing and shipping charge to foreign customers in France and Germany. Moreover, many other costs are incurred compared with other brokers, such as personnel expenses to pay workers for cleaning and sorting of benzoin, the electricity charge for air-conditioning of storehouse[39], the bank interest rate[40], the export tax and so on.

For the forest products gatherers in the mountainous area, the only cost is the land tax, so that the more gathering is done, the more the gatherer profits. On the other hand, the agri-forest brokers in the study area must process a considerably large amount of forest products to make a profit because they have to pay high brokerage permission fees. The cost for benzoin brokerage increases exponentially from remote areas, to district areas, to urban areas. The international trading price of valuable forest products such as Siamese benzoin is high, and the broker requires considerable capital to carry out the purchase.

In the study area, although there were 28 agri-forest products brokers in 2001, only 15 brokers bought more than 125 kilograms of benzoin, which represents a value equivalent to the brokerage permission fee. Three brokers did not purchase benzoin because they had insufficient funds, and a lot of benzoin was purchased by brokers outside the study area. The brokers in the remote area cannot get finance from the bank because they are unable to get a mortgage. Exporter A, residing in Vientiane, can obtain a bank loan, but the loan amount is small. Moreover, even if exporter A purchases agri-forest products by taking out a heavy bank loan, he has great problems meeting the high interest of the loan.

In a developing country such as Laos, agri-forest products brokers and exporters face considerable hardships regarding the raising of funds. If the exporters reduce funds for purchasing agri-forest products from brokers, the

brokers, who are at a subordinate Level to exporters, must in turn reduce the quantity of products they purchase. Then, the forest product gatherer can do nothing but decrease the amount of the product gathered. As a result, the cash income of people in the mountainous area is bound to decrease drastically. The shortage in purchase funds of the broker is immediately related to a decrease in income of the agri-forest products gatherer in the mountainous area.

CHAPTER V

BASIS FOR EXISTENCE OF VILLAGES IN THE MOUNTAINOUS AREA

1. Relationship between settlement location, ethnicity, and economic activities

Let us consider the relationship between settlement location, ethnicity, and economic activities that is illustrated in Fig. 25. As for settlement location, the differences in three ethnic groups are clearly shown. The most populous people in the study area, the Khmu, reside throughout the whole region from the mountainous area to the Ou riverside. On the other hand, the Hmong reside only in the mountainous area, and most ethnic Lao reside in the Ou riverside. Ethnic Lao households residing in the mountainous area are limited to the household of the teacher dispatched from the Ngoi district office.

Khmu have settled in the Ou riverside since 1981. Phonsana settlement began with the move of 30 households in 1981 from Samnun village near the Vietnamese border. The place where the village was built was vacant land, the former location of Houay Gay village, an ethnic Lao village that moved to Sop Kin village at few kilometers down the Ou riverside in 1980. People for whom relocating from mountainous sites to the Ou riverside was a long-cherished desire relocated to the vacant land and Phonsana settlement was built. Such a relocation of a Khmu settlement also happened with Cheang Tai settlement in 1998.

Relocation from mountainous sites to the Ou riverside is being continued for the improvement of accessibility, but there are also cases where relocation is discontinued. Houay Nong settlement was built at the Ou riverside by nine

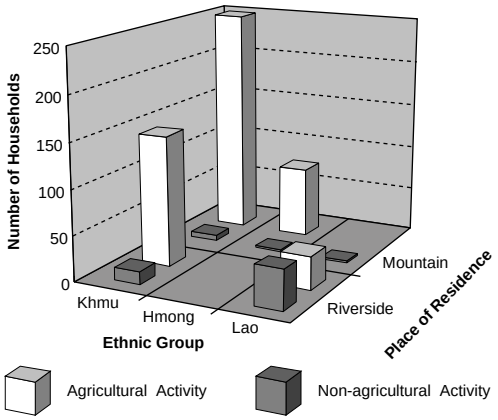


Fig. 25 Relationship between Ethnic Group, Place of Residence and Economic Activities in Studied Settlements, 2001

Source: Surveyed by author

households that branched off from their Cheang Kang village in 1985. When they moved, all the households had planned to settle at the riverside. However, Cheang Kang village did not settle at the riverside because people in Houay Nong settlement could not gather the benzoin that contributes to their cash income. Even if convenience were improved through settling at the riverside, gathering of benzoin could not be carried out. It was obvious that the availability of benzoin is what made people stay on in the mountainous area despite having no road access. The reason that Khmu reside both on the riverside and in the mountainous areas is that the following two types of settlement exist together in the study area. The first type is Khmu settlements that stay in the mountainous area to maintain the present economical stability; the second type is Khmu settlements that require improvement of infrastructure and the introduction of non-agricultural activities.

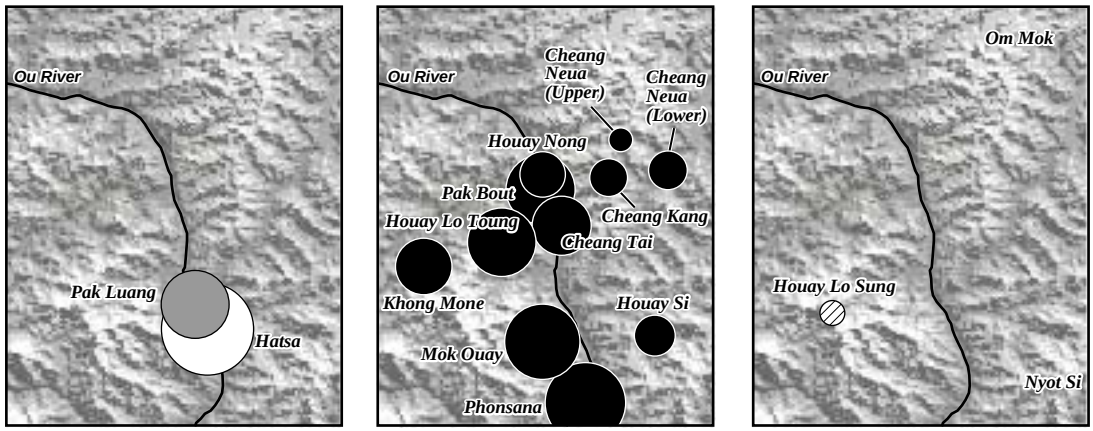
In addition, regarding the relation between economic activities and ethnicity, most Khmu and Hmong chiefly engage in agricultural activities. Khmu who continue with agricultural activities even after moving to the riverside contrasts strongly with ethnic Lao who have introduced many non-agricultural activities in the riverside. In the case of ethnic Lao, there are few differences in the ratio of agricultural to non-agricultural activities. As Hayashi (1998) pointed out, the ethnic Lao have historically accomplished the improvement of their life by practicing half-farmer and half-trader styles of economic activity, seeking raw land and negotiating with the indigenous inhabitants. In the study area, ethnic Lao farmers double as swidden agriculture and agri-forest brokerages (or general store managers); on the other hand, ethnic Lao brokers actively raise livestock. A half-farmer and half-trader style was exactly what was found in the

study area too. The occupation structure of the ethnic Lao was obviously different from that of the Khmu and Hmong who specialized in agriculture and hunting-gathering.

Both the Khmu and Hmong engage in agricultural activities and there is little difference in their occupation structure, except that the Hmong obtain income mainly from opium poppy cultivation and the Khmu from forest products. However, there is one significant difference in their spending patterns. It is that the Hmong spend comparatively little on rice.

Annual expenditure on rice by ethnic group is shown in Fig. 26. In commercially-oriented villages such as Hatsa village and Pak Luang village, (ethnic Lao and Lao-Khmu villages respectively) a slice of income from non-agricultural activities is used for rice expenses, therefore, the expenditure on rice is high. In Khmu settlements in the mountain area to the east of the Ou River, rice expenditure is low. Cheang Neua (Upper) settlement had a good harvest in 2000 especially, and six out of eight surveyed households obtained surplus rice. On the other hand, the other settlements spend a lot of money on rice despite putting much effort into cultivating rice. Hmong settlements feature very little expenditure on rice. It is a mistake to think that only Hmong settlements have large areas of swidden fields or rich soil for rice cultivation.

A staple food of the Lao and Khmu is sticky rice (*Kao Nyao*), but the Hmong rely on ordinary rice (*Kao Chao*). It cannot be said which is better. Sticky rice makes one feel fuller for longer but it must be steamed to eat, so that it is not easy to mix with other foodstuffs[41]. The Lao and Khmu must buy additional rice when supplies are low. On the other hand, ordinary rice can be mixed with other foodstuffs because it has to be boiled in order to be made edible. Hmong people



* US1$ was equivalent to 9,000 kip as of December 2001.
** Number of sampled households was 160 in 16 settlements, 12 villages.

Fig. 26 Annual Expenditure on Rice by Ethnic Group, 2001

Source: Surveyed by author

can stave off hunger by boiling rice mixed with many kinds of cereals and tubers, thereby avoiding the need to buy rice when supplies are low. This difference in food culture appears as a difference in rice expense compared to the Lao and Khmu, whose staple food is sticky rice.

2. Basis for existence of villages in the mountainous area

In the mountainous area with its poor infrastructure, the economic activities fall into two categories. First, there are "Producing Systems" in which the farmers' livelihood is based on producing agricultural products in swidden fields and gathering forest products in the forest including fallowed swidden. Second, there are "Trading Systems" in which the farmers' and traders' livelihoods are ensured by the provision of opportunities and locations to trade in products (Fig. 27).

Settlements in the mountainous area feature livelihoods that involve the cultivation of agricultural products, the gathering of forest products, the raising of livestock, and the hunting of wild animals. These activities are practiced in the residential areas, rivers, and agricultural fields such as swidden fields, fallowed swiddens, protected forests, cleared fields, and pastureland. None of these is isolated from the others, and the activities are mutually related geographically. All agricultural fields are in the forest, the river water comes from the forest, and livestock raised in the residential areas is fed on corn cultivated in the swidden fields. That is, the forest is the base for all production, and the continuance of sustainable use of the forest is related to the maintenance of the Producing Systems. However, even in the mountainous area, it is difficult to live only by the Producing Systems, which are limited to products obtained from the forest. In

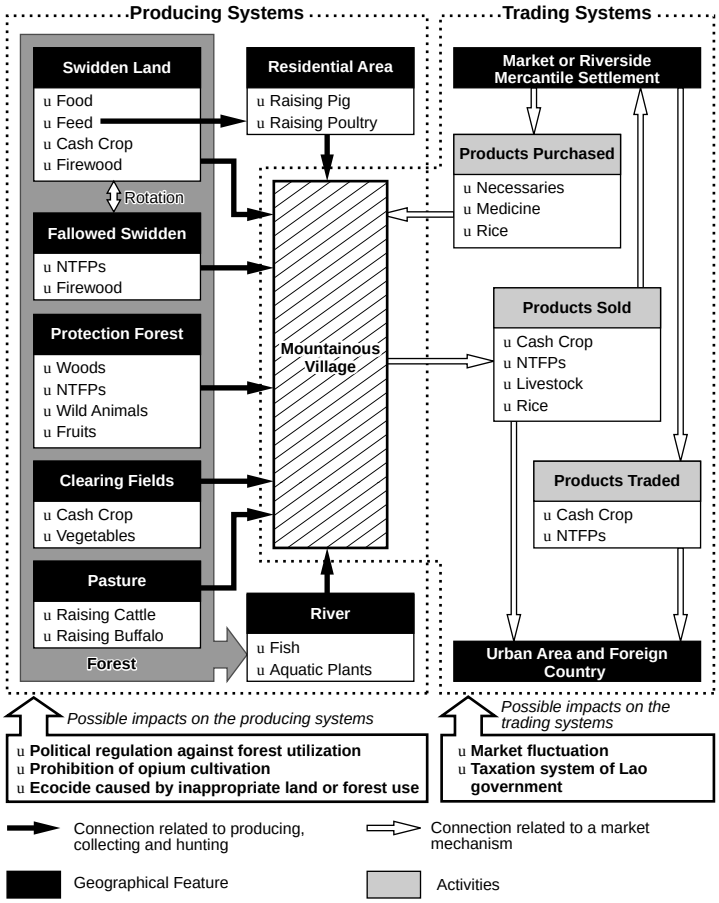


Fig. 27 The Basis for Existence of Mountainous Villages in Northern Laos

other words, the period in which the Producing Systems were not been linked to the Trading Systems represented a period of self-sufficiency without dependency on resources from outside the settlement, and this period has come to an end.

In contemporary Laos, as I mentioned before, people cannot live without money any longer. In the settlement with only an incompleted school, the costs for having children board out with other settlements are entailed in order to provide the primary education for children. In addition to this, there are unavoidable expenses for transportation, receiving medical service, and medicinal purchases. Therefore, there is a need for a market in which people can obtain money for their agri-forest products obtained from the Producing Systems, such as cash crops, forest products, livestock, and rice. Thus far, this paper has accounted for the importance of markets such as Pak Bout periodic market, and riverside mercantile villages such as Hatsa village as places providing conversion of products to cash. People purchase commodities at periodic markets and mercantile villages using the money obtained by selling agri-forest products. Those economic activities, making up both outgoing flow of agri-forest production from settlements and incoming flow of merchandise into settlements, are defined as the characteristics of the Trading Systems.

In terms of the interrelation between economic activities found in the study area, no activities are independent. Although the Producing Systems and the Trading Systems differ widely from each other, these two types of connection are naturally maintained by the relationship of inputs and outputs through the mountain villages. It can be said that this is characteristic of the basis of existence in the mountainous region. Many areas of the Producing Systems, as has been mentioned before, are being maintained by Khmu and Hmong farm households

residing in the mountainous area. On the other hand, the Trading Systems are maintained mainly by ethnic Lao non-farm households residing along the riverside, and agri-forest products brokers/exporters residing in the urban areas.

However, there is a possibility of losing this balance in the future. Possible impacts on the Producing Systems include political regulations against forest utilization, prohibition of opium cultivation by bowing to the tide of world opinion, and ecocide caused by inappropriate land or forest use. In addition, in terms of the Trading Systems, market fluctuations and the heavy taxation system imposed by the government bear on the budget of the agri-forest products broker and influence people's activities.

The political regulations against forest utilization are sure to have a decisive impact on gathering benzoin owing to the decrease in the area of swidden fields. The original purpose of the land and forest allocation was to prevent illegal logging by providing people with management, and to carry out sustainable forest use and production activities. At present, however, the land and forest allocation is intended to reduce swidden cultivation. While the land allocation has been effective in reducing illegal logging (meaning extension of swidden fields at the people's discretion) because plot boundaries were clarified by titling land to individuals, the implementation has reduced the forestland for swidden cultivation use. This has led to fallow period reduction. From the survey result by Phengkhay (1999), who compares the numbers of swidden plots before and after the land and forest allocation at three villages in Luang Phabang province, the average number of swidden plots by household decreased to 3 plots after land and forest allocation compared to 7.5 plots before the implementation. Moreover, the Asian Development Bank (2001: 52-55) and the

Lao Consulting Group (2002: 17-34) pointed out that reducing the fallowed period due to land and forest allocation leads to soil degradation. This means that people cannot continue to gather benzoin and produce rice simultaneously, in which case the Producing Systems and the Trading Systems become unbalanced, causing grave damage to settlements.

In addition, regarding restriction of opium poppy cultivation, the United Nations organizations and international NGOs have already begun an approach which incorporates alternative crop cultivation and road construction to improve accessibility to the market place. In the near future, this influence will extend to the study area. When it does, how will it change Hmong settlements where opium poppy cultivation serves as the main income source?

This example illustrates the fact that the basis for existence of mountainous villages is fragile because people depend on the forest for all their productive activities. What are the conditions necessary to maintain the balance of the Producing system and the Trading systems? It is not to implement various kinds of regulations on a national scale spatially, but to grasp the actual condition of the forest use based on the people's indigenous knowledge, and to find clues to problem solution on a local scale first.

CHAPTER VI

CONCLUSION

In this study, the author attempted to clarify the basis for existence of mountainous villages in northern Laos by analyzing the relationship between economic activities, settlement location, and ethnicity from the spatial point of view. The results can be summarized as follows:

OCCUPATION STRUCTURE IN THE MOUNTAINOUS AREA

The characteristics of northern Laos are that ethnic minorities are the predominant people, most provinces are in mountainous areas, and the roads are underdeveloped. Moreover, subsistence agriculture through practicing swidden cultivation is the main economic activity because of geographical constraints. The study area contains settlements of three ethnic groups: ethnic Lao, Khmu and Hmong. In terms of economic activities, people mainly carry out agricultural activities such as subsistence agricultural production, gathering of forest products, livestock raising, and so on. In addition to this, non-agricultural activities such as general store management and agri-forest products brokerages are found in the villages of Hatsa and Pak Luang, which are located on the Ou riverside. The occupations found in the study area lack variety. Households introducing non-agricultural activities rarely conducted as agricultural activities as well because agriculture is practiced through most of the year and involves very long working hours.

AGRICULTURAL ACTIVITIES OF THE MOUNTAINOUS AREA

Agriculture is the main economic activity in the study area. Of particular note is that rice firming in swidden fields is regarded as the most important activity for supplying the staple food, and 136 out of 160 surveyed households were farm households which practiced rice farming in swidden fields. The swidden system of the study area is "short cultivation, long fallow" with only a single year cultivation period and 7-11 years fallow period. The method of cultivating the crops involves the use of indigenous knowledge acquired from the people's long history of farming, for example regarding the selection of planted rice varieties and mixed crops.

Rice cultivation rarely contributes to cash income despite being the main activity for farm households. The kinds of agricultural activities contributing to cash income differ between the ethnic groups; the ethnic Lao earn from livestock and forest products; the Khmu earn from forest products and livestock; and the Hmong earn from cash crops and forest products. Regarding the income from agricultural activities, it was clarified that the income of farm households in the study area is high despite the lack of road access, even in comparison with the income of another mountainous area which do have road access. One of the reasons for this high income in the study area is that people actively gather forest products.

Benzoin, which is regarded as one of the most valuable forest products in the world, can be gathered in the study area. In order to gather benzoin, people practice agroforestry-like land use combined with swidden fields. Benzoin is obtained from styrax trees (*Styrax tonkinensis*) which grow in the fallowed swidden as secondary vegetation, so styrax trees need a long fallow period.

Fallowed swiddens are not only fallowed for the next cultivation but also used as places where people gather forest products. Gathering benzoin has resulted in preservation of the forest resources.

NON-AGRICULTURAL ACTIVITIES OF THE MOUNTAINOUS AREA

The history of non-agricultural activities does not extend beyond the past 20 years. In the beginning, from the middle 1980s, general store management and agri-forests brokerages were introduced from ethnic Lao households residing along the river. Later, agri-forests brokerages diffused to the Khmu households residing along the river, then finally to the Khmu and Hmong households residing in the mountainous area. However, general stores are only operated by ethnic Lao households residing on the riverside. In addition to this, agri-forest products brokers who trade outside the study area, are limited only to riverside households. Periodic markets are also held on the riverside. Geographic settlement location greatly contributes to the introduction of non-agricultural activities.

In the study area, two periodic markets are held on the Ou riverside, and permanent general stores are located in Hatsa village. These two periodic markets and general stores provide the opportunity both to sell merchandise and to buy agri-forest products for people in the mountainous area. Both the market hinterland and the agri-forest products collection area are centered on Pak Bout periodic market, Phonsana periodic market, and Hatsa village. The general store managers in Hatsa village and Pak Luang village have stalls outside as well as inside the study area. There was a close relationship between the merchandise sales at the periodic market and the general store, and the agri-forest products

brokerage. We can see there is a circulation of cash as the broker purchases the agri-forest products from the gatherers, and then the gatherers buy merchandise from the general store using the money they have received. Selling merchandise is the role of the ethnic Lao, and buying it is chiefly done by Khmu and Hmong people. In addition, it is generally the ethnic Lao living on the Ou riverside who purchase agri-forest products, and Khmu and Hmong people living in the mountainous area who sell them.

The distribution flow of agri-forest products from the study area to destinations is very complicated. It should be noted especially that brokers from Vientiane and abroad purchase agri-forest products directly from the growers/gatherers in the mountainous area. Even in remote areas without road access, namely, places isolated from urban areas, people have direct contact with brokers from the urban areas and foreign countries.

BASIS FOR EXISTENCE OF MOUNTAINOUS VILLAGES AND ITS FUTURE

The socio-economic characteristics of the mountainous area of northern Laos are shown in the above-mentioned three points. When these characteristics are linked to each other, then the following spatial characteristics are obtained.

The Khmu reside throughout the whole region from the mountainous area to the Ou riverside, and engage in agricultural activities. The Hmong reside only in the mountainous area and engage in agricultural activities too. On the other hand, most ethnic Lao residing on the Ou riverside adopt an occupation style of half-farmer and half-trader and engage in both agricultural and non-agricultural activities. Khmu, Hmong, and ethnic Lao obtain their cash income principally from the gathering of forest products, opium poppy cultivation, and non-

agricultural activities respectively. The occupation structure of ethnic Lao is obviously different from Khmu and Hmong who specialize in crop cultivation and hunting-gathering.

In terms of the interrelation between economic activities found in the study area, no activity is independent. Every activity is mutually related geographically, and contributes towards the basis of existence in the mountainous region. The economic systems in the study area consist of "Producing Systems" based on agricultural activities, and "Trading Systems" based on non-agricultural activities. The Producing Systems are chiefly maintained by Khmu and Hmong in the mountainous area, while ethnic Lao on the riverside mainly carry out the activities concerned with the Trading Systems. The Producing Systems alone used to be just an activity ensuring self-sufficient production, but have started to bring in cash income because the Trading Systems provide the place and opportunity to convert people's agri-forest products into cash.

The stability of the forest use which supports the Production Systems has a particular importance for the subsistence of economic activity. Even a small change in forest use based on the indigenous knowledge of the people, would cause the current stability to collapse. Such a change might be caused by political regulations against forest utilization. The accessible forest is decreasing through land allocation in Laos. If land allocation is carried out in the study area it is sure to have a decisive impact on gathering benzoin owing to the decrease in the area of swidden fields. People in the mountainous area have not experienced such a rapid change though their indigenous knowledge adapts to change occurring over a long period, such as natural environmental change. The basis for existence,

depending on the forest for all their productive activities, could therefore be fragile.

For the future, resource utilization by local people and related political concerns should not be dealt with as local issues, but must be managed as political ecology issues, considered in relation to the global political economy (Bryant and Bailey 1997).

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NOTES

1) In Laos, Bourdet (1998) analyzes that the northern mountainous area is in a poor situation on income and infrastructure investments compared with the central area or the southern area from statistical data.

2) In resent studies on ethnic classification, Chamberlain (1995) and Chazée (1999) had classified the people using four ethno-linguistic families. The system of 47 groupings developed by government of Laos which was adopted for the Lao census in 1995, and the system of 131 groupings are developed by Chazée (1999).

3) Taking the change the name from *Ngeh* to *Kriang* as an example, Pholsena (2002) points out that *Ngeh* people do not call themselves *Kriang*, and criticizes this ethnic grouping for not calling oneself.

4) There are enormous reports. For example, in the northern Laos: Opium poppy cultivation (United Nations International Drug Control Programme 2001), bamboo shoot gathering and its marketing (Soydara and Ketphanh 2001), Oleoresin gathering (Ankarfjärd 1994), benzoin gathering (Kangkarn 1997), and benzoin marketing (Coppen 1997).

5) After the Pathet Lao communism government had started in 1975, Hasegawa (1978) described that village survey by the foreign researcher had become difficult.

6) Japan also showed interest to the Bolovene plateau development. According to Iwata (1960b), Japan conducted feasibility studies there in order to examine to send the emigrant.

7) In the urban area, land registration (*Sammano Tadin*) was carried out under the management of France after 1936. In the rural area, it is clarified that land for housing and agricultural land were individual possession from the past to present by surveying in Vang Vieng county, Vientiane province, executed by Namura and Inoue (1998).

8) Formally, the expression "per full-time family labour unit" is used.

9) Administrative unit of Laos comprises “Village”, “District” and “Province”, “Town” and “City” does not exist. Urban area of Laos such as Nong Khiaw and Muang Khoa is formed one built-up area by gathering more than two villages; therefore, this dissertation called these "Area".

10) The calendar of Khmu that has composed one cycle in 10 days is as follows; First day: *Mung*, second day: *Puk*, third day: *Kat*, fourth day: *Kot*, fifth day: *Huang*, sixth day: *Tao*, seventh day: *Ka*, eighth day: *Kap*, nineth day: *Hap*, and tenth day: *Huay*.

11) It was constructed in 1999 with the assistance of the United Nations Volunteers and the Swiss Red Cross, and now a nurse who was dispatched by the district health office is stationed at the health center.

12) Many of primary schools in the mountainous area are incomplated schools, and Dawson (1994) and Peters (1998) point out that a lot of children is not given opportunities to receive education for 3 years or more.

13) Settlement pays employed teacher an annual reward of 1,200,000kip (about US$133.3). All households are evenly bearing the reward. This allowance is half amount of the dispatched teacher by government.

14) Om Mok village, Khong Mone village, Pak Luang village, Hatsa village,

and Nyot Si village that are shown in Fig. 6 are using the term "village" because one village is formed in one settlement, and the others are using the term "settlement". However, the term "village" is used in case of discussing the administrative village formed in some settlements. For instance, this dissertation describes it like “Phonsana village consists of Phonsana settlement and Mok Ouay settlements”.

15) The agricultural activities described here were limited to the cultivation of farm products. Although livestock raising is also included in agricultural activity, it is difficult to grasp the raising situation accurately. Moreover, the households which breed the domestic animal by the sales purpose is and there is a home only of breeding of several chickens for the self-support while it is, too. Moreover, while raising livestock for selling, some households are raising only several chickens for self-support. Discussing about occupation structure using one category of livestock raising, therefore, will remain the problem. However, since it cannot ignore livestock raising as a cash income source, this dissertation analyzes as an economic activity of the surveyed household in Chapter III.

16) For example, there is a major group "Technicians and associate professionals (code 3)", intermediate group "Teaching associate professionals (code 33)" is placed under code 3, and more, minor group "Primary education teaching associate professionals (code 331)" is placed under code 33.

17) Since the large-scale topographical map of the study area that is usable for the base of a land use map was not issued, this landuse map shown in Fig.

7 was made by an aerial photograph and GPS survey. The boundary of the Ou River, riverbank, protection forest, fallowed swidden and swidden field was determined from the aerial photograph, and the others are from GPS surveyed data. The aerial photograph is resampled by the method of Nearest Neighbor using GPS surveyed Ground Control Point on GIS (Idrisi32).

18) Here, the definition of Kunstadter and Chapman (1978) which classified the swiddens of northern Thailand into four from the viewpoint of the relation between the cultivation period and the fallow period was used. For instance, "forest land of 3 years fallowed swidden" means 3 years have elapsed since harvesting and 4 years since burning the cleared field.

19) Job's tear can be cultivated in any kind of soil, and it grows fast. It is possible to cultivate it extensively without frequent weeding. In the roadside villages of Luang Phabang province, the selling price of Job's tear is higher than rice because it is possible to trade directly with brokers living in urban areas. Consequently, people plant job's tear in the same area as rice or in larger areas in the roadside villages.

20) Irson (1996: 179-205), Phengkhay (1999: 44-51) and Thomsaon and Baden (1993) also point out the role of women in forest products gathering.

21) Only the kind which the agriculture and forestry product brokers buy is made into forest products with economical value. Trading of forest products in only villages and periodic markets is not targeted. In the study area, for instance, villagers gather bamboo shoots called *No kom* for food from December to February. Even if they sell these in the settlements or the

periodic markets, the cost is only 1,000kip (about US$0.1) for about ten bunches. *No kom* did not provide a cash income in the study area though Soydara and Ketphanh (2001) reported that it contributed to the villagers' cash income in Oudomxay province, northern Laos.

22) There is no English or Japanese name, so it is shown in the Lao language. It is called *Sapan* (though this may vary according to the region).

23) Setting the commencement date of forest products gathering is the role of the village chief or the settlement chief. Cheang Tai settlement sets the commencement date of forest products gathering for Galangal fruits and Rattan fruits in addition to Cardamom, so as not to give the villagers cause for complaints of unfairness.

24) When the CPI in 1995 was set at 100, the CPI figures in 1996 and 2001 were 113.0 and 847.1 respectively (IMF Statistics Department 2002).

25) This is based on the measurement result at Kachet village, Nam Bak county, Luang Phabang province, carried out from 1997 to 1998. However, trees which did not provide full quantities of resin even over 13 DBH centimeters existed. The research location for these and the study area of this dissertation adjoin, and the natural environment is almost the same.

26) The general store managers buy in Thai and Chinese products from the Luang Phabang area, and Chinese and Vietnamese products from the Muang Khoa area. Chinese products can be bought in both areas, so they can choose to buy where the price is lower.

27) Regarding long-distance trade in northern Laos, Walker (1999: 138-162) illustrates that women traders known as Mee Kha are playing a central

role in trading merchandise. In the study area, traders who went to Mengla of Xishuangbanna to buy merchandise were also women.

28) Yokoyama (2001b) discussed how the economic activities newly introduced to the villages are related to the village location, and new information obtained from the surrounding villages through the road link is the biggest influence on it.

29) One-way ferry charge to cross the Ou River is 500 kip (about US$0.1).

30) People of Om Mock village, Houay Lo Sung settlement, and Khong Mone settlement located in the mountainous area take about 4 hours to reach the Ou River on foot. In order to be in time for the periodic market which is held only in the morning, they have to leave the village at midnight and walk along a pitch black road.

31) Broker Mr. T does not go to the Hmong villages to buy. He said that it was impossible to buy forest products at all, although he went on buying trips in 1999. Hmong people dislike reducing the price of their products in the settlement so they tend to come to the periodic markets or Hatsa village.

32) Since the author did not have an opportunity to hold an interview with the opium broker, details are uncertain. It is very difficult and dangerous to clarify the opium distribution situation so this study only shows that Vietnamese brokers come to purchase opium.

33) There is a broker in Houay Nong settlement, but data on cash income could not be obtained because he was absent when the survey was carried out. Therefore, data relevant to this is not reflected in the data of Fig. 23.

34) Although Yokoyama (2001b) reports on income from a VCR show in the

mountainous village of Oudomxay province, this show was not found in the survey of the study area as of 2002. It is thought that the VCR show had changed to a Video-CD show. Video-CDs have become commonplace in Southeast Asia because it is easy for people to burn Video-CDs into CD-Rs using their PCs. Video-CD software, such as movies, is often bought in the Nong Khiaw and Muang Khoa areas. The thresher generator in the settlement is used as a power supply.

35) Whereas the CPI in 1995 was set as 100, the CPI in 1998 was 275.2 (IMF Statistics Department 2002).

36) The LECS2 survey includes the urban area. If it had included only rural villages as the object of study, the average income might have been lower.

37) Note that the prices in 2001 shown in the preceding chapters have some errors.

38) In the study area, a group related to exporter A and a group related to exporter B developed stiff competition in purchasing benzoin in 2001. Benzoin appeared on the market in March and disappeared in late May. The trade price in March was set annually based on US$4. At the beginning of trading, the price started from 35,000kip/kg (about US$3.9/kg) in March, and finally increased to 55,000kip/kg (about US$6.1/kg) in May.

39) Benzoin is a milk white color when gathered, then changes color to brown when it oxidizes. It is necessary to carry out cooling dehumidification in the storehouse to prevent oxidation before export.

40) The bank interest rate is greatly affected by the exchange rate of the Lao

kip to US dollar. The Kip loan interest in 2002 was high at about 30%.

41) Simana (1997: 78) states that “Khmu mash or mix the steamed sticky rice”, however, this method of cooking is rarely observed in the study area.

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(J): written in Japanese

(JE): written in Japanese with English abstract

(L): written in Lao

Appendix 1 Sampled Households Data of Khmu Settlements in Mountainous Region, 2001

Village and Household (HH) Information					Rice				Agri-forest Products*									Livestock Income (X1,000kip)					Fishery Income (X1,000kip)	Brokerage*								Remarks
Settlement	HH Name	Ethnic	Occupation	HH size	Swidden**	Production	Buy (kg)	Sell (kg)	A	B	C	D	E	F	G	H	I	Buffalo	Cow	Pig	Duck	Chicken		A	B	C	D	E	F	G	H	
Cheang Kang	CK-2	Khmu	Farmer	10	1	Surplus	0	0	3	10	9	10	20	5	60	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CK-3	Khmu	Farmer	7	1	Surplus	0	1500	3	32	0	0	0	0	250	12	0	0	3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CK-4	Khmu	Farmer	2	1	Shortage	350	0	20	6	2	20	50	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CK-5	Khmu	Farmer	2	1	Surplus	0	1500	30	0	0	8	8	0	50	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CK-9	Khmu	Farmer	5	1	Shortage	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	370	0	0	200	800	3000	0	
Cheang Nuea	CN-1	Khmu	Farmer	9	1	Surplus	0	1000	5	40	0	60	30	70	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
(Lower)	CN-2	Khmu	Farmer	4	1	Surplus	0	300	2	70	15	15	49	25	50	24	0	0	0	0	0	75	0	0	0	0	0	0	0	0	0	0	0	
	CN-3	Khmu	Farmer	10	1	Shortage	1000	0	15	50	20	50	50	100	100	150	0	0	0	350	0	165	0	0	0	0	0	0	0	0	0	0	0	
	CN-5	Khmu	Farmer	4	1	Sufficiency	0	0	3	25	0	40	0	8	20	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CN-6	Khmu	Farmer	5	1	Sufficiency	0	0	5	16	5	0	10	10	30	30	0	0	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CN-7	Khmu	Farmer	8	1	Shortage	35	0	10	10	3	30	30	20	40	40	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	
	CN-8	Khmu	Farmer	3	1	Sufficiency	0	0	5		10	10	5	6	10	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CN-9	Khmu	Farmer	4	1	Sufficiency	0	0	2	25	1	50	5	15	60	50	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	
	CN-10	Khmu	Farmer	5	1	Sufficiency	0	0	6	60	20	40	10	10	50	20	0	0	0	0	0	75	0	0	0	0	0	0	0	0	0	0	0	
	CN-11	Khmu	Farmer	8	1	Shortage	800	0	1	20	8	10	6	4	10	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CN-12	Khmu	Farmer	6	1	Shortage	30	0	2	40	2	10	10	5	20	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CN-13	Khmu	Farmer	8	1	Shortage	25	0	5	0	0	10	2	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CN-14	Khmu	Farmer	9	1	Shortage	700	0	5	30	3	10	15	20	50	22	0	0	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cheang Nuea	CN-15	Khmu	Farmer	10	1	Sufficiency	0	0	5	10	30	100	60	60	120	20	0	0	0	0	0	75	0	0	0	0	0	0	0	0	0	0	0	
(Upper)	CN-16	Khmu	Farmer	7	1	Surplus	0	1000	5	50	20	100	0	0	60	20	0	0	1600	0	0	0	0	0	0	300	0	0	0	0	0	0	0	
	CN-17	Khmu	Farmer	4	1	Surplus	0	1100	5	170	10	30	5	10	30	5	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CN-18	Khmu	Farmer	6	1	Surplus	0	50	2	30	2	10	10	20	20	40	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	
	CN-19	Khmu	Farmer	4	1	Surplus	0	1300	10	35	8	10	20	15	10	100	0	0	1200	0	0	75	0	0	0	0	0	0	0	0	0	0	0	
	CN-20	Khmu	Farmer	2	1	Surplus	0	500	2	5	0	15	52	27	25	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CN-21	Khmu	Farmer	5	1	Surplus	0	500	2	10	0	20	20	10	30	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CN-4	Khmu	Farmer	5	1	Shortage	600	0	30	60	30	50	50	50	60	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Houay Si	HS-1	Khmu	Farmer	8	1	Surplus	0	270	0	10	10	20	10	0	50	0	0	0	0	400	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HS-2	Khmu	Farmer	6	1	Shortage	270	0	0	45	50	20	15	10	100	20	0	0	0	340	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HS-3	Khmu	Farmer	7	1	Shortage	50	0	30	100	50	50	50	0	100	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HS-4	Khmu	Farmer	5	1	Shortage	200	0	30	30	100	60	40	0	100	36	0	0	700	500	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HS-5	Khmu	Farmer	6	1	Shortage	160	0	1	35	10	15	5	0	50	3	0	1500	0	500	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HS-6	Khmu	Farmer	3	1	Shortage	0	0	4	0	15	45	10	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HS-7	Khmu	Farmer	4	1	Shortage	700	0	30	6	30	30	30	0	70	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HS-8	Khmu	Farmer	7	1	Shortage	380	0	1	4	19	20	20	0	60	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Houey Lo	HLT-1	Khmu	Farmer	4	1	Sufficiency	0	0	12	96	0	200	10	100	100	130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Thueng	HLT-2	Khmu	Farmer	10	1	Shortage	875	0	0	20	30	200	50	50	300	0	0	0	0	400	0	600	0	0	0	0	0	0	0	0	0	0	0	
	HLT-3	Khmu	Farmer	5	1	Shortage	875	0	0	0	0	20	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HLT-4	Khmu	Farmer	10	1	Shortage	625	0	0	20	0	100	0	0	100	20	0	0	0	0	0	75	0	0	0	0	0	0	0	0	0	0	0	
	HLT-5	Khmu	Farmer	8	1	Shortage	1100	0	4	10	4	80	9	25	90	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HLT-6	Khmu	Farmer	7	1	Shortage	250	0	5	70	10	200	10	50	400	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Mok Ouay	PS-17	Khmu	Farmer	13	1	Shortage	2500	0	0	90	60	1000	0	0	70	60	0	1600	0	0	0	135	0	0	0	0	0	0	0	0	0	0	0	
	PS-18	Khmu	Farmer	3	1	Sufficiency	0	0	0	0	0	3	0	0	8	10	0	3200	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	
	PS-19	Khmu	Farmer	5	1	Shortage	500	0	3	50	50	50	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PS-20	Khmu	Farmer	2	1	Sufficiency	0	0	0	20	0	20	0	0	20	10	0	2000	0	400	0	0	0	0	0	0	0	0	0	0	0	0	0	
Kong Mone	KM-1	Khmu	Farmer	4	1	Sufficiency	0	0	0	20	15	200	20	0	150	0	0	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-2	Khmu	Farmer	4	1	Shortage	250	0	0	8	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-3	Khmu	Farmer	7	1	Shortage	600	0	4	10	0	80	0	20	80	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-4	Khmu	Farmer	10	1	Shortage	375	0	0	40	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-5	Khmu	Farmer	4	1	Shortage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-6	Khmu	Farmer	7	1	Shortage	1500	0	0	7	0	0	6	5	10	20	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-7	Khmu	Farmer	9	1	Shortage	625	0	2	8	0	10	0	4	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-8	Khmu	Farmer	3	1	Shortage	500	0	0	0	0	20	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-9	Khmu	Farmer	7	1	Shortage	1500	0	0	10	0	0	0	0	0	0	0	2300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-10	Khmu	Public servant	4	1	Shortage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Teacher
	KM-11	Khmu	Farmer	7	1	Shortage	500	0	0	12	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-12	Khmu	Farmer	7	1	Shortage	500	0	0	25	0	50	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-13	Khmu	Farmer	3	1	Sufficiency	0	0	0	5	100	200	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-14	Khmu	Farmer	7	1	Sufficiency	0	0	0	20	0	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	KM-15	Khmu	Farmer	4	1	Sufficiency	0	0	0	5	0	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

*Abbreviations of agri-forest products and brokerage A: Cardamom (kg), B: Benzoin (kg), C: Puack Muack (kg), D: Paper Mulberry, E: Rattan Fruits (kg), F: Galangal Fruits (kg), G: Tiger Grass (kg), H: Sesame (kg), I: Opium (pong

**Swidden 0: Not practicing, 1: Practicing

Appendix 2 Sampled Households Data of Riverside Khmu Settlements, 2001

Village and Household (HH) Information					Rice				Agri-forest Products*									Livestock Income (X1,000kip)					Fishery Income (X1,000kip)	Brokerage*								Remarks
Settlement	HH Name	Ethnic	Occupation	HH size	Swidden**	Production	Buy (kg)	Sell (kg)	A	B	C	D	E	F	G	H	I	Buffalo	Cow	Pig	Duck	Chicken		A	B	C	D	E	F	G	H	
Houay Nong	CK-1	Khmu	Farmer	8	1	Surplus	0	0	10	0	2	50	30	10	100	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CK-6	Khmu	Farmer	10	1	Shortage	750	0	3	0	10	30	0	50	200	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CK-7	Khmu	Farmer	6	1	Shortage	350	0	3	0	20	30	20	3	50	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CK-8	Khmu	Farmer	8	1	Sufficiency	0	0	2	0	5	50	20	5	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pak Bout	PB-1	Khmu	Broker	4	0	Shortage	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	100	1000	2000	400	400	2000	1000	Video-CD income	
	PB-2	Khmu	Farmer	4	1	Shortage	1000	0	0	0	0	0	0	0	0	0	0	0	0	500	0	0	0	50	300	100	500	200	300	500	300		
	PB-3	Khmu	Farmer	5	1	Shortage	200	0	0	0	0	0	0	0	0	0	0	0	0	1800	0	0	0	100	50	700	400	200	300	500	200		
	PB-4	Khmu	Farmer	10	1	Shortage	1000	0	0	0	0	0	0	0	0	0	0	0	0	700	0	0	0	50	300	50	200	100	100	400	100		
	PB-5	Khmu	Farmer	6	1	Shortage	700	0	0	0	0	0	0	0	0	0	0	0	0	200	0	0	0	20	50	100	500	100	100	500	200		
	PB-6	Khmu	Farmer	4	1	Sufficiency	0	0	1	5	0	100	30	30	200	0	0	0	1500	1300	0	300	0	0	0	0	0	0	0	0	0	0		
	PB-7	Khmu	Farmer	6	1	Shortage	1300	0	5	74	40	50	10	50	150	90	0	0	0	270	0	0	0	0	0	0	0	0	0	0	0	0		
	PB-8	Khmu	Farmer	3	1	Shortage	50	0	5	20	15	70	70	50	100	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PB-9	Khmu	Farmer	8	1	Shortage	1300	0	40	0	40	100	150	100	100	30	0	0	2000	0	0	75	0	0	0	0	0	0	0	0	0	0		
	PB-10	Khmu	Farmer	4	1	Shortage	600	0	0	6	0	50	10	20	80	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PB-11	Khmu	Farmer	4	1	Shortage	330	0	2	3	50	150	30	60	200	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PB-12	Khmu	Farmer	8	1	Shortage	1000	0	1	10	5	40	10	30	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PB-13	Khmu	Farmer	3	1	Sufficiency	0	0	5	5	0	150	20	50	150	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PB-14	Khmu	Farmer	4	1	Sufficiency	0	0	1	4	0	50	5	15	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PB-15	Khmu	Farmer	10	1	Shortage	480	0	30	3	10	300	50	90	200	44	0	0	0	400	0	0	0	0	0	0	0	0	0	0	0	0		
	PB-16	Khmu	Farmer	3	1	Sufficiency	0	0	10	3	20	60	30	50	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PB-17	Khmu	Farmer	5	1	Shortage	800	0	3	2	0	30	50	40	60	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Cheang Tai	CT-1	Khmu	Farmer	8	1	Shortage	625	0	3	0	20	20	40	20	30	20	0	0	0	120	0	0	80	0	0	0	0	0	0	0	0	0		
	CT-2	Khmu	Farmer	5	1	Shortage	750	0	10	0	10	30	70	20	60	10	0	0	0	600	0	0	170	0	0	0	0	0	0	0	0	0		
	CT-3	Khmu	Farmer	3	1	Sufficiency	0	0	5	0	20	40	80	10	20	30	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0		
	CT-4	Khmu	Farmer	6	1	Shortage	1125	0	10	0	20	30	80	150	5	30	0	0	0	600	0	0	0	0	0	0	0	0	0	0	0	0		
	CT-5	Khmu	Farmer	5	1	Sufficiency	0	0	5	0	40	50	40	30	40	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	CT-6	Khmu	Farmer	5	1	Shortage	750	0	10	0	10	20	30	50	70	70	0	3200	0	0	0	0	500	0	0	0	0	0	0	0	0	0		
	CT-7	Khmu	Farmer	3	1	Sufficiency	0	0	0	0	0	0	0	0	5	20	0	3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Phonsana	PS-1	Khmu	Broker	12	1	Shortage	225	0	0	0	30	200	0	0	300	53	0	4000	0	2600	0	150	0	10	50	0	2000	100	0	2000	0	Video-CD income	
	PS-2	Khmu	Farmer	6	1	Sufficiency	0	0	0	0	50	250	0	50	200	300	0	0	0	2000	0	0	0	0	0	0	0	0	0	0	0	0		
	PS-3	Khmu	Farmer	7	1	Shortage	1100	0	0	0	100	300	100	200	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PS-4	Khmu	Farmer	7	1	Shortage	1450	0	0	0	50	200	100	60	60	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PS-5	Khmu	Farmer	11	1	Shortage	1000	0	1	0	20	60	30	0	100	50	0	0	0	1000	0	0	0	0	0	0	0	0	0	0	0	0		
	PS-6	Khmu	Farmer	11	1	Shortage	2250	0	0	0	0	120	5	60	10	0	0	1050	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PS-7	Khmu	Farmer	2	1	Sufficiency	0	0	0	0	5	5	8	10	30	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PS-8	Khmu	Farmer	9	1	Shortage	1000	0	0	0	30	50	0	0	100	80	0	0	0	0	0	0	600	0	0	0	0	0	0	0	0	0		
	PS-9	Khmu	Farmer	7	1	Shortage	625	0	0	0	20	20	10	5	50	100	0	0	0	130	0	0	300	0	0	0	0	0	0	0	0	0		
	PS-10	Khmu	Farmer	4	1	Shortage	112	0	0	0	20	100	30	0	60	8	0	0	700	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PS-11	Khmu	Farmer	8	1	Shortage	250	0	0	0	30	60	20	0	70	0	0	0	0	0	0	0	400	0	0	0	0	0	0	0	0	0		
	PS-12	Khmu	Broker	13	0	Shortage	3500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	300	300	2500	500	500	2500	1000		
	PS-13	Khmu	Farmer	12	1	Shortage	1000	0	0	0	10	0	30	50	200	20	0	0	0	2400	0	300	0	0	0	0	0	0	0	0	0	0		
	PS-14	Khmu	Farmer	5	1	Shortage	212	0	0	0	0	0	0	0	6.5	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	PS-15	Khmu	Farmer	8	1	Shortage	1000	0	0	0	20	100	60	0	100	50	0	0	0	400	0	150	250	0	0	0	0	0	0	0	0	0		
	PS-16	Khmu	Farmer	7	1	Surplus	0	300	0	0	50	100	0	20	150	10	0	0	0	0	0	150	0	0	0	0	0	0	0	0	0	0		

*Abbreviations of agri-forest products and brokerage A: Cardamom (kg), B: Benzoin (kg), C: Puack Muack (kg), D: Paper Mulberry, E: Rattan Fruits (kg), F: Galangal Fruits (kg), G: Tiger Grass (kg), H: Sesame (kg), I: Opium (pong

**Swidden 0: Not practicing, 1: Practicing

Appendix 3 Sampled Households Data of Hmong Settlements, 2001

Village and Household (HH) Information					Rice				Agri-forest Products*									Livestock Income (X1,000kip)					Fishery Income (X1,000kip)	Brokerage*								Remarks
Settlement	HH Name	Ethnic	Occupation	HH size	Swidden**	Production	Buy (kg)	Sell (kg)	A	B	C	D	E	F	G	H	I	Buffalo	Cow	Pig	Duck	Chicken		A	B	C	D	E	F	G	H	
Om Mock	OM-1	Hmong	Farmer	10	1	Shortage	0	0	1	10	10	0	40	10	20	10	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	OM-2	Hmong	Farmer	8	1	Shortage	0	0	1	20	20	10	30	20	10	10	1	0	0	0	0	30	0	10	200	100	100	250	200	200	50	
	OM-3	Hmong	Farmer	6	1	Shortage	0	0	1	5	20	10	12	6	15	0	1	0	0	900	0	54	0	0	0	0	0	0	0	0	0	
	OM-4	Hmong	Farmer	5	1	ს	0	0	10	5	0	0	0	10	0	8	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	OM-5	Hmong	Farmer	10	1	Shortage	0	0	2	10	0	0	0	20	12	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	OM-6	Hmong	Farmer	11	1	Shortage	0	0	0	10	0	0	5	10	30	10	1	0	0	0	0	75	0	0	0	0	0	0	0	0	0	
Houey Lo	HLS-1	Hmong	Farmer	4	1	Shortage	625	0	0	0	50	0	0	0	0	0	2	0	0	300	0	0	0	0	0	0	0	0	0	0	0	0	
Sung	HLS-2	Hmong	Farmer	11	1	Surplus	0	800	0	6	0	0	0	0	0	0	3	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	There is a pensioner.
	HLS-3	Hmong	Farmer	9	1	Sufficiency	0	0	0	20	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HLS-4	Hmong	Farmer	5	1	Sufficiency	0	0	0	10	0	0	0	0	0	0	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HLS-5	Hmong	Farmer	10	1	Sufficiency	0	0	0	25	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HLS-6	Hmong	Farmer	10	1	Surplus	0	300	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HLS-7	Hmong	Farmer	10	1	Shortage	0	0	0	22	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	HLS-8	Hmong	Farmer	10	1	Shortage	200	0	0	0	0	0	0	0	0	0	4	0	0	0	0	150	0	0	0	0	0	0	0	0	0	0	
	HLS-9	Hmong	Farmer	10	1	Sufficiency	0	0	0	7	0	0	0	0	0	0	7	0	0	1200	0	0	0	0	0	0	0	0	0	0	0	0	
	HLS-10	Hmong	Farmer	10	1	Shortage	0	0	0	18	0	35	0	0	0	0	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nyot Si	NS-1	Hmong	Farmer	11	1	Sufficiency	0	0	0	32	0	0	0	0	0	0	1	0	900	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NS-2	Hmong	Farmer	14	1	Shortage	0	0	0	40	40	10	0	0	0	0	1	0	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NS-3	Hmong	Farmer	8	1	Shortage	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NS-4	Hmong	Farmer	5	1	Shortage	0	0	0	25	0	0	0	0	0	0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NS-5	Hmong	Farmer	8	1	Shortage	0	0	0	10	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

*Abbreviations of agri-forest products and brokerage A: Cardamom (kg), B: Benzoin (kg), C: Puack Muack (kg), D: Paper Mulberry, E: Rattan Fruits (kg), F: Galangal Fruits (kg), G: Tiger Grass (kg), H: Sesame (kg), I: Opium (pong

**Swidden 0: Not practicing, 1: Practicing

Appendix 4 Sampled Households Data of Lao and Lao-Khmu Settlements, 2001

Village and Household (HH) Information					Rice				Agri-forest Products*									Livestock Income (X1,000kip)					Fishery Income (X1,000kip)	Brokerage*								Remarks
Settlement	HH Name	Ethnic	Occupation	HH size	Swidden**	Production	Buy (kg)	Sell (kg)	A	B	C	D	E	F	G	H	I	Buffalo	Cow	Pig	Duck	Chicken		A	B	C	D	E	F	G	H	
Pak Luang	PL-1	Lao	Farmer	4	1	Shortage	600	0	0	0	50	50	0	50	100	0	0	0	0	0	0	0	800	0	0	0	0	0	0	0	0	
	PL-2	Lao	Farmer	4	1	Shortage	200	0	50	0	20	13	100	0	50	120	0	0	0	3600	390	0	0	20	0	0	0	50	30	0	0	Pig-rising
	PL-3	Lao	Farmer	5	1	Shortage	100	0	2	0	25	30	0	0	0	0	0	0	0	1000	0	150	200	0	0	0	0	0	0	0	0	
	PL-4	Khmu	Public servant	8	1	Shortage	260	0	15	0	100	28	80	100	170	60	0	0	0	600	0	150	0	0	0	0	0	0	0	0	0	Teacher
	PL-5	Lao	Farmer	5	1	Shortage	600	0	20	0	50	60	100	150	100	0	0	0	0	0	120	240	1500	0	0	0	0	0	0	0	0	
	PL-6	Khmu	Farmer	4	1	Surplus	0	300	10	0	20	50	30	70	200	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PL-7	Khmu	Farmer	4	1	Shortage	50	0	0	0	0	50	20	40	0	36	0	0	0	0	0	45	100	0	0	0	0	0	0	0	0	
	PL-8	Khmu	Farmer	9	1	Shortage	140	0	50	0	100	350	100	250	500	100	0	0	0	500	0	390	0	0	0	0	0	0	0	0	0	Edged tool maker
	PL-9	Khmu	Farmer	3	1	Surplus	0	300	3	0	20	200	200	100	100	70	0	0	1100	0	0	0	0	0	0	0	0	0	0	0	0	
	PL-10	Lao	Farmer	6	1	Surplus	0	333	6	0	30	50	5	20	80	0	0	2200	0	900	0	300	500	0	0	0	0	0	0	0	0	
	PL-11	Lao	Broker	4	0	Shortage	1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300	3000	0	0	0	0	0	0	General store
	PL-12	Lao	Broker	4	0	Shortage	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	100	1000	3000	1500	1000	5000	1500	General store
	PL-13	Lao	Storekeeper	3	0	Shortage	1050	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	0	0	0	0	0	0	0	0	0	General store
	PL-14	Lao	Farmer	7	1	Shortage	1000	0	40	0	100	300	0	300	300	0	0	0	0	0	0	150	300	0	0	0	0	0	0	0	0	
	PL-15	Lao	Public servant	3	0	Shortage	800	0	0	0	0	0	0	0	0	0	0	0	0	2400	625	375	0	100	0	0	1500	300	500	1000	0	Pig-rising, Teacher
	PL-16	Lao	Storekeeper	7	0	Shortage	2300	0	0	0	0	0	0	0	0	0	0	0	0	3000	0	4500	1200	150	0	0	0	300	200	0	0	Pig-rising, General store
	PL-17	Lao	Broker	4	0	Shortage	900	0	0	0	0	0	0	0	0	0	0	0	0	2400	2500	3000	0	20	30	0	1500	1000	800	5000	0	Pig-rising, Boat maker
Hatsa	HT-1	Lao	Broker	9	0	Shortage	2700	0	0	0	0	0	0	0	0	0	0	2700	0	1080	0	0	0	350	1000	2000	3000	0	0	6000	0	Pig-rising, General store
	HT-2	Lao	Farmer	6	1	Surplus	0	500	0	0	0	0	0	0	0	0	0	0	0	2400	0	0	0	0	100	2000	2000	0	0	2000	1000	Pig-rising, General store
	HT-3	Lao	Pharmacy	4	0	Shortage	2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	0	800	0	0	1000	0	Pharmacy, General store
	HT-4	Lao	Broker	5	0	Shortage	1100	0	0	0	0	0	0	0	0	0	0	0	0	1800	2000	1200	0	0	500	0	2000	500	0	2000	1000	Pig-rising, General store
	HT-5	Lao	Broker	2	0	Shortage	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	20	1000	1000	50	0	2000	100	General store
	HT-6	Lao	Storekeeper	2	0	Shortage	1750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	300	0	0	700	0	0	0	General store
	HT-7	Lao	Broker	6	0	Shortage	1500	0	0	0	0	0	0	0	0	0	0	0	0	720	0	0	0	120	250	300	0	100	0	3500	0	Pig-rising, General store
	HT-8	Lao	Farmer	2	1	Sufficiency	0	0	0	0	0	0	0	0	0	0	0	900	0	720	0	0	0	0	0	0	0	0	0	0	0	Pig-rising
	HT-9	Lao	Broker	5	0	Shortage	1500	0	0	0	0	0	0	0	0	0	0	0	0	480	0	0	0	0	300	1000	3000	400	0	2000	800	Pig-rising, Noodle shop at markets
	HT-10	Lao	Broker	5	0	Shortage	1600	0	0	0	0	0	0	0	0	0	0	0	0	1200	0	0	0	0	100	0	0	200	500	1000	200	Pig-rising, Noodle shop at markets
	HT-11	Lao	Broker	5	0	Shortage	1250	0	0	0	0	0	0	0	0	0	0	0	0	6000	0	0	1800	400	300	0	0	1000	1000	10000	1000	Pig-rising
	HT-12	Lao	Broker	3	0	Shortage	1050	0	0	0	0	0	0	0	0	0	0	0	0	1200	0	0	200	50	100	400	2000	0	0	3000	0	Pig-rising, Boat maker
	HT-13	Lao	Storekeeper	5	0	Shortage	1150	0	0	0	0	0	0	0	0	0	0	1500	0	1200	0	0	0	0	0	0	0	0	0	0	0	Pig-rising, General store
	HT-14	Lao	Broker	4	0	Shortage	1250	0	0	0	0	0	0	0	0	0	0	0	0	1200	0	0	500	1000	0	2000	3000	0	2000	5000	1000	Pig-rising
	HT-15	Lao	Farmer	6	1	Shortage	1000	0	0	0	0	0	0	0	0	0	0	0	0	1200	0	0	500	0	0	0	0	0	0	0	0	Pig-rising
	HT-16	Lao	Broker	5	0	Shortage	1750	0	0	0	0	0	0	0	0	0	0	1500	0	1200	0	0	0	300	250	1000	1000	500	800	2000	1000	
	HT-17	Lao	Farmer	3	1	Shortage	100	0	0	0	0	0	0	0	0	0	0	0	0	800	0	0	0	0	0	0	0	0	0	0	0	
	HT-18	Lao	Farmer	4	1	Sufficiency	0	0	0	0	0	0	0	0	0	0	0	0	0	600	0	0	400	0	0	0	0	0	0	0	0	Noodle shop at markets
	HT-19	Lao	Public servant	3	0	Shortage	900	0	0	0	0	0	0	0	0	0	0	0	0	500	0	0	200	0	0	0	0	0	0	0	0	District officer, General store

*Abbreviations of agri-forest products and brokerage A: Cardamom (kg), B: Benzoin (kg), C: Puack Muack (kg), D: Paper Mulberry, E: Rattan Fruits (kg), F: Galangal Fruits (kg), G: Tiger Grass (kg), H: Sesame (kg), I: Opium (pong

**Swidden 0: Not practicing, 1: Practicing