JAPAN INTERNATIONAL COOPERATION AGENCY
MINISTRY OF AGRICULTURE AND FORESTRY, LAO P.D.R.

THE STUDY ON WATERSHED MANAGEMENT PLAN FOR FOREST CONSERVATION IN VANGVIENG DISTRICT IN LAO PEOPLE'S DEMOCRATIC REPUBLIC

SOCIO-ECONOMIC BASELINE SURVEY REPORT

SEPTEMBER, 1998

JAPAN FOREST TECHNICAL ASSOCIATION (JAFTA)

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SOCIO-ECONOMIC BASELINE SURVEY REPORT

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1 INTRODUCTION

The socio-economic baseline survey (hereinafter referred to as "the Survey") was carried out in the course of the Study on Watershed Management Plan for Forest Conservation in Vangvieng District (hereinafter referred to as "the Study") during the period from November 1996 to February 1997, as one of the most important survey works of the Phase 1 Study. The principle objective of the Survey was to clarify the socio-economic conditions in each village in the Model Area [1] for which, using the survey results, an appropriate watershed management practices/ measures would be assessed and the watershed management plan would be formulated in the Study. The major works of the Survey including field questionnaire survey and data processing using computer were subletted to a local consulting firm of Societe Mixte D'etude Et De Development (SMED; hereinafter referred to as "the Subcontractor").

In the consecutive Phase 2 of the Study, the participatory rural appraisal (PRA) was carried out during the period from August to November 1997. The results of the Survey were adopted to the design of PRA, and some Survey results particularly for the village boundaries were reviewed and modified in PRA. In this report, however, only the survey results clarified in the Survey made in the Phase 1 period are presented. The final output of the watershed management plan which was formulated based on all the survey results from the Survey, PRA and other relevant studies is presented in the Final Report of the Study in a separate volume.

This report consists of three chapters. After Chapter 1, the survey objectives and methodology are presented in Chapter 2, and all major survey outcomes are described in Chapter 3.

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[1] : There were three study objective areas stated in the Scope of Work for the Study on Watershed Management Plan for Forest Conservation in Vangvieng District, i.e. (i) aerial photography area, (ii) study area and (iii) model area. Details of these study objective areas are explained in Chapter 1 of the Main Report.

2 SURVEY OBJECTIVES AND METHODOLOGY

2.1 Objective Villages

The villages covered by the Survey were located in the Namon Area and the Somboun Area in Vangvieng district, Vientiane Province[1]. These two areas have been selected as the Model Area for the Study. There were 14 villages in the Namon Area and 15 villages in the Somboun Area and all these villages were the objective villages of the Survey as listed below:

Namon Area

1) Vangmiang	2) Namon-Tai	3) Namon-Nua
4) Phonsavang	5) Phonkeo	6) Ngiou
7) Nalao	8) Nakhom	9) Phongnang
10) Nangeun-Nua	11) Nangeun-Tai	12) Vanghua
13) Houaysan	14) Nampath-Nua	

Somboun Area

1) Houaymo-Nua	2) Houaymo-Tai	3) Thahua-Nua
4) ThahuaTai	5) Houaypamom	6) Somsanouk
7) Nampat	8) Vangkhi	9) Phonthong
10) Taothan	11) Nampath-Tai	12) Houayxi
13) Namphao	14) Phakoup	15) Sivilai

2.2 Survey Objectives

The socio-economic baseline survey was conducted with the following objectives:

1) To clarify the current socio-economic conditions and their characteristics in each objective village of the Survey,
2) To delineate village boundaries for all the objective villages on 1:50,000 topographic maps in order to know the sphere of villagers in each village for slash and burn cultivation, livestock raising, and other forest/ farming activities,
3) To clarify economics and living conditions of households in each objective village and identify the relationship between rural socio-economic factors and environmental issues such as reduction of forest area, soil erosion, land use, etc.,

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[1]: After the establishment of a new district of Hinheup in January 1997, six villages in Somboun sub-district were moved to this new district. These were Sivilai, Somsanouk, Nampat, Vangkhi, Phonthong and Taothan. As a result, the number of villages in Somboun sub-district become nine. However, the Socio-economic Baseline Survey including the table compilation for the presentation of its results were carried out in accordance with the old boundaries.

4) To grasp intention of household members for improvement/ development of their economy and living standard,
5) To provide opportunities for rural people to consider various problems related to their lives and environment and their solutions, and
6) To establish baseline data to measure the effects of the long-term assistance being provided by the Forest Conservation and Afforestation Project (FORCAP).

2.3 Survey methodology

In order to fulfill the above objectives, the four kinds of surveys were designed for the execution. They were (i) village profile survey, (ii) village boundary survey, (iii) household survey, and (iv) household member survey. The number of survey villages and sample size of each survey were as follows:

Survey	Sample No. / Size
1) Village profile survey	29 villages
2) Village boundary survey	29 villages
3) Household survey	585 households
4) Survey for household members	874 household members

The survey team organized by the Subcontractor was composed of 1 team leader, 4 supervisors, 16 enumerators, 1 computer specialist, and 2 computer operators. For the execution of the field survey, four groups were organized. Each group consisted of 1 supervisor and 4 enumerators, and was responsible for seven to eight villages. Interview survey using questionnaires was carried out basically by the enumerators for both surveys for the households and household members. The supervisors, at the field level, checked up all answers collected by the enumerators in the questionnaires. Beside, the supervisors conducted village profile and boundary surveys asking some supports to the enumerators.

After the check of supervisors, the questionnaires with answers were sent to a head office of the survey team in Vientiane. In the head office, the computer specialist and computer operators took responsibility for data input, data cleaning, and data processing using computers. When some errors were found in the data cleaning process, the field groups were requested to make resurvey. The team leader supervised all the above survey activities and carried out final tabulation based on the processed data.

(1) Village profile survey

The village profile survey attempted to collect and compile the data and information on socio-economy, agriculture, forestry, natural hazard, and development activities in each village. In the survey, the survey team contacted mainly with village leaders for the collection of data and information using data collection forms.

(2) Village boundary survey

Approximate village boundaries were drawn on a topographic map of 1:50,000 scale through interview with village leaders and by walking around the villages. The extent of economic activities of villagers in each village was delineated on the map including that of slash and burn cultivation, lowland paddy cultivation, etc.

(3) Household survey

A total of 585 households was surveyed. The sample size was different from village to village depending on the total household size in each village (see Table 2-3-1). Sampling of households was carried out at random in each village. The survey was conducted through interviews to a head of each sample household using the questionnaire translated into Lao. The questionnaire (English version) used in the household survey is attached in Appendix-2.

(4) Household member survey

The total number of sample household members was 874. The sample size in each village was decided base on that of the household survey (see Table 2-3-1). Sampling was done at random among the members of sample households selected in the household survey. Household members whose ages were more than 18 years old were the subject of the survey. The survey was conducted through interviews to each sample household member with the use of the questionnaire translated into Lao. The questionnaire (English version) used in the survey is attached also in Appendix-3.

3 SURVEY RESULTS

3.1 Result of Village Profile Survey

Data and information collected from the villages in the village profile survey are summarized in Appendix-1. However, as mentioned in Section 3.2, their reliabilities are considered to be very low particularly those on the land use and village land areas, and the result of household survey is considered to be more reliable for the analysis of these conditions. In this Section, therefore, the analysis is made only for the data and information which reliability is considered to be high. In addition, the data and information which were not collected in the other surveys are also analyzed in this Section (for instance, information on village establishment and cropping patterns were not collected in the household survey). Demographic data from the village profile survey is also examined in this Section in order to compare those with the secondary data from the district's statistic office and other primary data from the household survey.

3.1.1 Establishment of Villages

Within the 14 villages in the Namon Area, Namon-Nua is the oldest village having 211 years history. Other villages having more than 100 years history are Vanghua (established 200 years ago) and Nalao (established 108 years ago). On the other hand, Nampath-Nua is the newest village (established 2 years ago) followed by Phonkeo (established 9 years ago) and Namon-Nua (established 18 years ago).

In the Somboun Area, Vangkhi is the oldest village with 200 years' history, and the other villages are comparatively new within the range from 2 years (Sivilai village) to 35 years (Houaymo village). There are two special villages in this area, i.e. Sivilai and Somsanouk. The former village is a Lao Sung village established by returned refugees from Thailand, and the latter is a village established for lepers for medical treatment and self-support. (see Table 3-1-1).

3.1.2 Demography

According to the result of village profile survey, the total population in the Model Area is 16,157 of which 6,779 or 42% live in the Namon Area and 9,378 or 58% are in the Somboun Area. The male and female ratio is nearly balanced at 49 : 51 in the Namon Area, 50 : 50 in the Somboun Area and 50 : 50 in the Model Area as a whole. The total number of

households is 1,069 in the Namon Area, 1,530 in the Somboun Area and 2,599 in the Model Area, and the average size of household is thus calculated at 6.3 persons, 6.1 persons and 6.2 persons, respectively. In the Namon Area, there are six large villages which population is more than 500. They are Vangmiang, Namon-Tai, Namon-Nua, Phonsavang, Phonkeo and Vanghua. In the Somboun Area, the number of large villages is eight consisting of Houaymo-Tai, Thahua-Nua, Thaheua Tay, Houaypamon, Somsanouk, Vangkhi, Namphao and Phakoup. Among these large villages in the Somboun Area, Thahua-Nua, Huay Paman and Namphao are the villages with more than 1,000 population. Woman-headed households accounts for 2% of the total households in the Namon Area, 6% in the Somboun Area and 5% in the Model Area as a whole, showing comparatively higher proportion in the Somboun Area. Particularly in Sivilai village, the woman-headed households account for 23% of the total households (see Table 3-1-1).

The result of survey on migration during 1992-96 period shows that the out-migrants from the Model Area are 200 households and in-migrants from other areas are 255 households. In Namon Area, the in-migrant households are considerably larger than the out-migrant households, and the excess of in-migrate households is 46 households during 1992-96 period. While in- and out-migrant households are almost balanced in the Somboun Area (the excess of in-migrants is only nine households during the same period). Major destinations of the out-migrants from the Namon Area are other districts within Vientiane province and other villages within the Vangvieng district including Vangvieng town. In addition, Vientiane municipality is the major destinations in case of out-migrants from the Somboun Area. Original places of in-migrants are other districts within Vientiane province and other villages within the Vangvieng district including the Vangvieng town. In addition, considerably large numbers of in-migrants of the Namon Area and the Somboun Area are from Xieng Khouang province and Xai Somboun Special Zone (see Appendix-1).

3.1.3 Ethnic Groups

Almost all villages in the Model Area can be ethnically classified as the ones with dominancy of particular ethnic groups, i.e. Lao Lum, Lao Theung and Lao Sung. In the Namon Area, there are seven Lao Lum villages (Vangmiang, Namon-Tai, Phonsavang, Ngiou, Nakhom, Phongnang, and Vanghua), four Lao Sung villages (Namon-Nua, Phonkeo, Nangeun-Nua and Nangeun-Tai) and two Lao Theung villages (Huaysan and Nampath-Nua). Each of these 13 villages has households belonging to a particular ethnic group accounting for more than 70% of the total households. The remaining one village of Nalao is ethnically more mixed with 64% of Lao Lum and 36% of Lao Theung households. It is noteworthy that both Namon-Tai

and Vanghua villages with more than 200 years' history are classified as Lao Lum villages (see Table 3-1-1).

In the Somboun Area, according to the same criterion, there are seven Lao Lum villages (Houaymo-Tai, Thahua-Nua, Thaheua Tay, Huaypamom, Vangkhi, Phonthong and Phakoup), four Lao Theung villages (Houaymo-Nua, Nampat, Tao Than and Nampath-Tai) and one Lao Sung village (Sivilai). The remaining three villages (Somsanouk, Houaysi and Namphao) are ethnically more mixed. The oldest village of Vangkhi (established 200 years ago) is classified also as a Lao Lum village. Lao Lum are considered to be the oldest inhabitants in the Model Area. They may have settled down on good farming areas where flat land and water were comparatively well available. They increased their population and expanded their area along rivers. Then, about 20 years ago, peoples of other ethnic groups came to the Area mainly from the northern provinces escaping from disturbances due to the revolution.

3.1.4 Development Activities

Development projects which are now completed, on-going and planned in each village are listed in Table 3-1-2. As seen in the table, most villages have certain development projects except for three villages in the Somboun Area. Sources of fund differ from project to project. They are the Lao PDR government, foreign governments' aid agencies, international aid agencies and NGOs. There are also some projects funded by villagers themselves.

The table below summarizes the development projects by simple category. According to the table, the project categories having many completed and on-going projects are related to agriculture, irrigation, school and drinking water. In the Namon Area, there are many agriculture and irrigation related projects, and many school and drinking water related projects in the Somboun Area. Leaders in six villages in the Somboun Area answered that reforestation projects under JICA would be commenced in the future in their villages. This perception of the village leaders is probably because of recent study activities of FORCAP frequently made in the Somboun Area.

Unit: No. of villages with project

Project Category	Namon Area				Somboun Area				Model Area			
	Com-pleted	On-going	Plann-ed	Total	Com-pleted	On-going	Plann-ed	Total	Com-pleted	On-going	Plann-ed	Total
1. Agriculture a/	3	7	0	10	1	1	1	3	4	8	1	13
2. Irrigation	5	1	0	6	1	0	0	1	6	1	0	7
3. Reforestation	0	0	1	1	0	0	6	6	0	0	7	7
4. Drinking water	1	0	3	4	4	0	0	4	5	0	3	8
5. Roads	0	1	(1)	2	0	0	1	1	0	1	2	3
6. Electrification	0	0	0	0	1	1	1	3	1	1	1	3
7. handicraft	0	2	0	2	0	0	0	0	0	2	0	2
8. School const.	2	1	(1)	4	2	4	0	6	4	5	1	10
9. Health service	1	2	0	3	0	0	0	0	1	2	0	3
10. Toilet const.	0	0	0	0	1	2	0	3	1	2	0	3
Total	12	14	4	32	10	8	9	27	22	22	15	59

Note: a/; Including crops, livestock and fishery
( ); Project status is unknown.

3.1.5 Forest

In the village profile survey, the existence of two kinds of village forests was asked to leader(s) in each village, one was the forest in which tree felling was not allowed among the villagers and the other was a forest for the use of all villagers. Simultaneously, the existence of slash and burn areas and man-made forests was also confirmed in each village. Table 3-1-3 summarizes these information by Area (refer to Appendix 1 for details).

(1) Village forest in which tree felling is not allowed

In the Namon Area, 10 villages have forest in which tree felling is not allowed. As for the status of this type forest, boundaries in seven villages were delineated by the villagers themselves and those in three villages were decided by the government. In the Somboun Area, this type of forest exists in 13 villages of which boundaries in 10 villages were delineated by villagers themselves, those in two villages were decided both by the villagers and the government, and the status of the village forest is unknown in the remaining one village. The land areas of this type forest reported from the villages vary from 2 to 800 ha in the Namon Area and 1 to 590 ha in the Somboun Area, although reliabilities of these information are considered to be low.

(2) Village forest for the use of all villagers

It was reported that all the villages in the Namon Area have the forest for the use of all villagers. As for the status of this type of forest in the Namon Area, boundaries in nine villages were delineated by the villagers themselves, those in three villages were decided by the government, and those in two villages are not fixed yet. In the Somboun Area, this type of forest exists in 14 villages of which boundaries in 10 villages were delineated by villagers themselves, those in two villages were decided by villagers and the government, those in one village were delineated by the government, and the status is unknown in the remaining one village. The only village which does not have this type forest is Sivilai. As already mentioned above, this village was established by returned refugees from Thailand, and basically no forest and agriculture lands are allocated to this village.

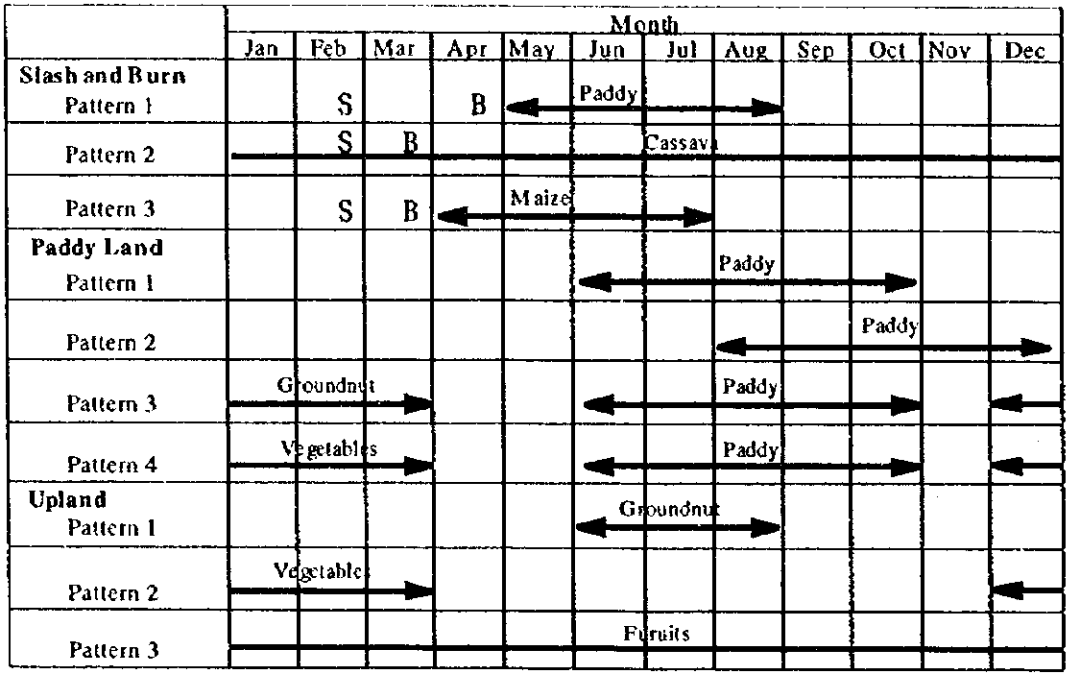
As for the utilization of this type of forest, in the Namon Area, six villages are mainly for fuelwood harvesting, three villages for slash and burn cultivation, another three villages for timber production, and the remaining one village for livestock grazing. In the Somboun Area, nine villages utilize this type of forest mainly for fuelwood harvesting, two villages for slash and burn cultivation, another two villages for timber production, and the remaining one village for non-forest products collection. In the survey, the existence of regulations on the use of this type of forest was also confirmed in each village. As a result, in the Namon Area, there are regulations in 12 villages of which written documents are available in five villages, while, in the Somboun Area, there are regulations in 11 villages of which written documents are available in seven villages. The land area of this type forest in each village vary from 2 to 1,800 ha in the Namon and 2 to 2,400 ha in the Somboun Area, although reliabilities of these area information are considered to be low.

(3) Slash and burn area and man-made forest

As for regulations on the use of slash and burn areas, all 14 villages have regulations in the Namon Area (of which 9 villages have written documents), and 10 villages have it in the Somboun Area (of which 4 villages have written documents). As for the existence of man-made forest, three villages in Namon Area and six villages in the Somboun Area have this type forest. Although the reliabilities are considered to be low, the land area of man-made forest in each village vary from 1 to 2 ha in the Namon Area and from 0.5 to 8 ha in the Somboun Area. Major tree planted in the man-made forest is teak.

3.1.6 Cropping Pattern

The major crop cultivated in the Model Area is paddy both in the slash and burn area and the lowland paddy area. As other crops, cassava and maize in the slash and burn area, and groundnuts and vegetables in the lowland paddy area are also cultivated as second crops in limited areas. In the upland areas, fruit trees are also cultivated in addition to vegetables and groundnuts. The major cropping patterns including these crops are illustrated in the figure below.



Legend : S: Slash
B: Burn

3.2 Result of Village Boundary Survey

The result of village boundary survey which is drawn on a 1/50,000 topographic map is simplified as presented in Fig. 3-2-1. The findings of this survey are summarized as follows:

1) Village boundaries are unclear for most of the mountainous land areas which locations are far from the national roads of Routes 13 and 13B, and most villagers recognize that these areas are out of their villages, although slash and burn cultivation areas are scattered considerably over these areas.

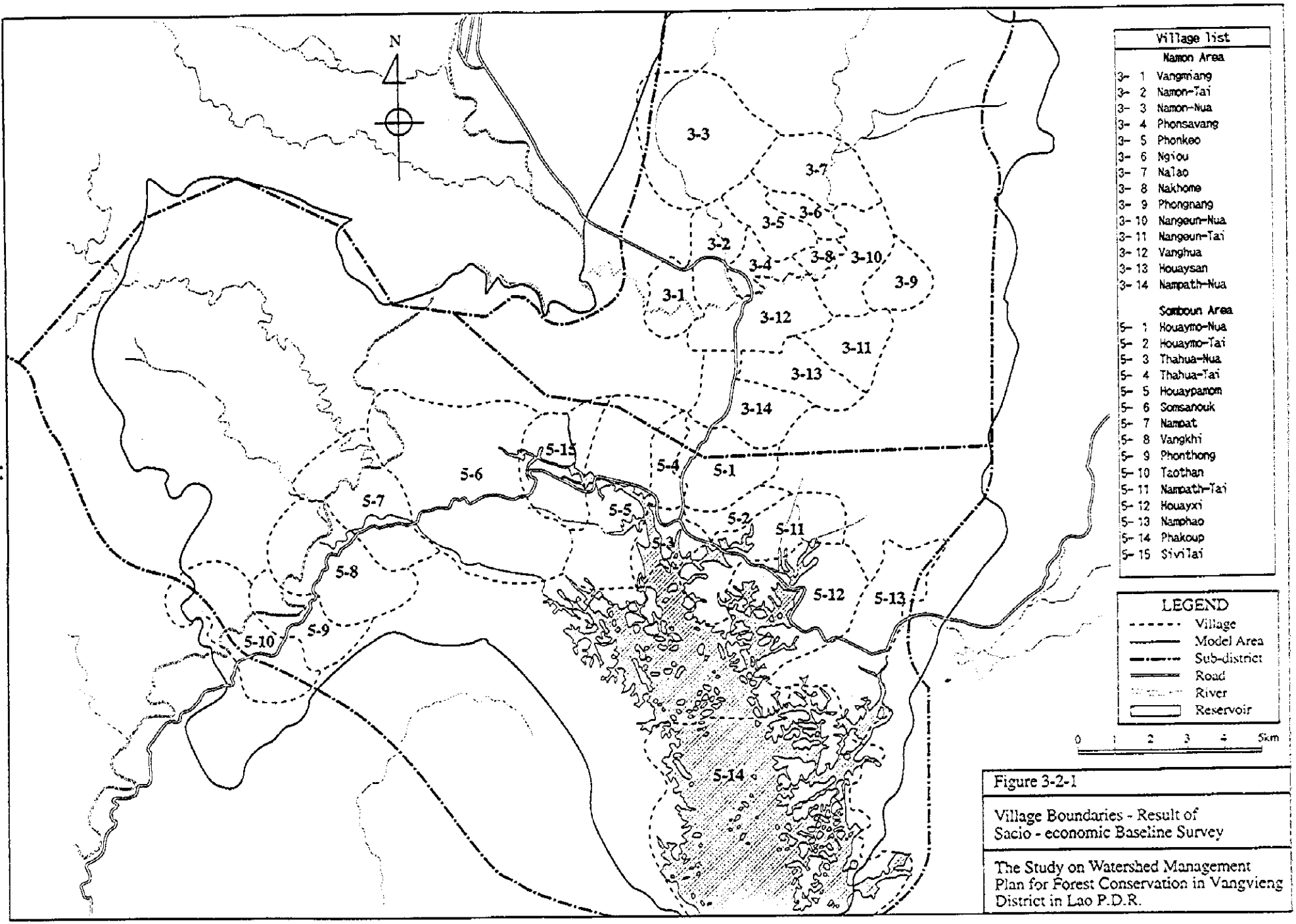


Figure 3-2-1

Village Boundaries - Result of Sacio - economic Baseline Survey

The Study on Watershed Management Plan for Forest Conservation in Vangvieng District in Lao P.D.R.

2) Based on the 1/50,000 map with village boundaries, the total area of village territories including the area of water surface is estimated at 74.1 km^2 (14 villages) in the Namon Area, 183.3 km^2 (15 villages) in the Somboun Area, and 257.4 km^2 (29 villages) in the whole Model Area. These land areas correspond to 27%, 44% and 37% of the respective areas measured based on the secondary data of administration map prepared by the Vangvieng District Head Quarter (see table below).

Sub-district	Results of Socio-economic Baseline Survey			Secondary Data on Admin. Area a/
	Village Boundary Survey		Village Profile Survey	
	Water Area Included	Water Area Excluded		
Namon Area (km^2)	74.1	74.1	90.6	276.0
(Admini. area=100)	(26.9)	(26.9)	(32.8)	(100.0)
Somboun Area (km^2)	183.3	144.2	78.7	418.0
(Admini. area=100)	(43.9)	(34.5)	(18.8)	(100.0)
Model Area Total (km^2)	257.4	218.3	169.2	694.0
(Admini. area=100)	(37.1)	(31.5)	(24.4)	(100.0)

Source: a/; Estimated based on map provided by District Head Quarter, Vang Vieng

3) In addition, there are great discrepancies between the village land area data from village boundary survey and village profile survey. As shown in the above table, the total village area in the Model Area is 218.3 km^2 (without water area) according to the result of village boundary survey, while that is 169.2 km^2 according to the result of village profile survey. Moreover, in the Namon Area, the total village area of the village profile survey (90.6 km^2) is larger than that of the village boundary survey (74.1 km^2). Based on these survey results, It can be concluded that the village boundaries and the extent of village lands are generally unclear for all the village chiefs and villagers in the Model Area.

3.3 Result of Household Survey

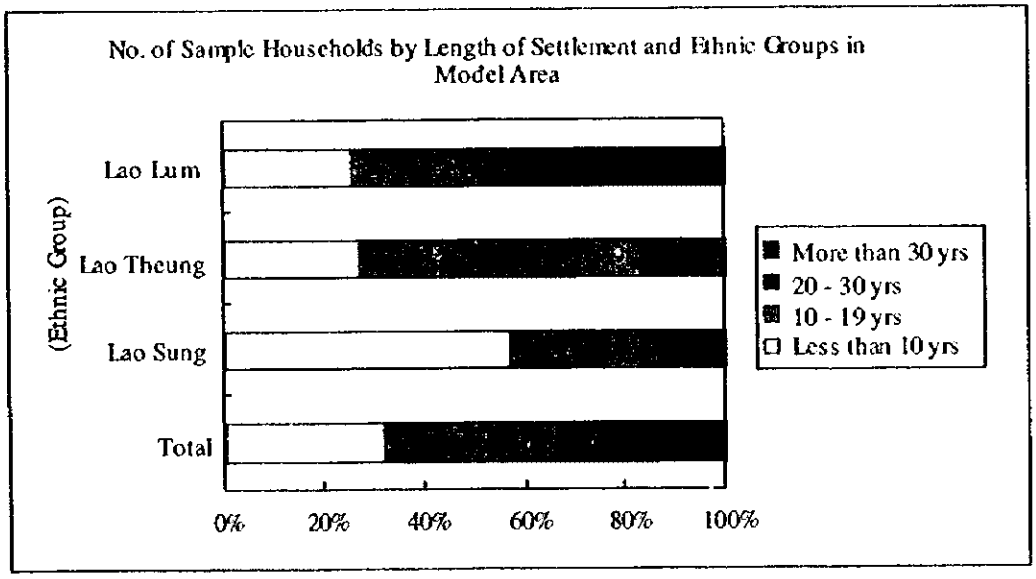
3.3.1 Demography

(1) Household and population

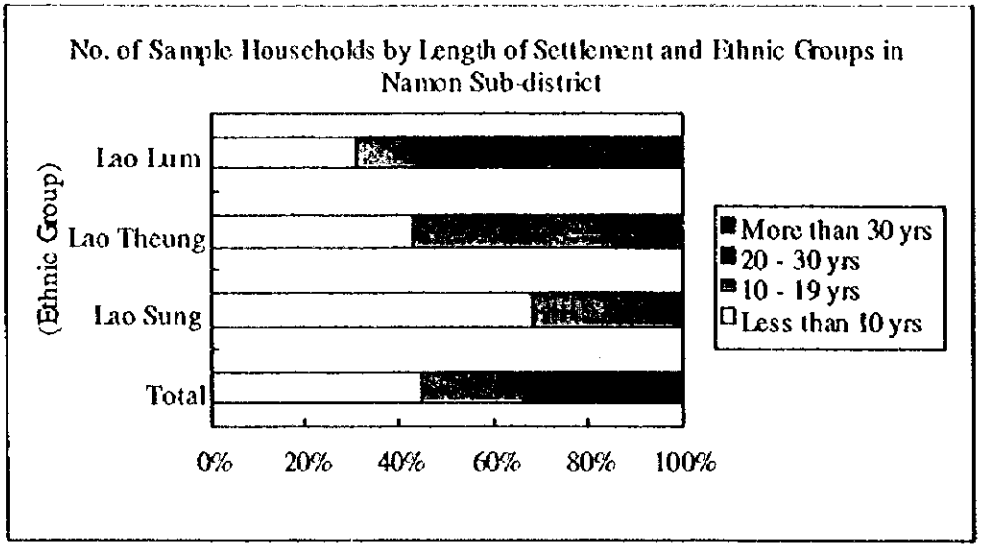
The demographic conditions of sample households clarified in the household survey is summarized in Table 3-3-1. The total sample households is 585, of which 228 or 39% are in the Namon Area and 357 or 61% are in the Somboun Area.

As for ethnic composition of the sample households, Lao Lum households are dominant and occupies 62% of the total households in the Model Area. The proportions of Lao Theung and Lao Sung households are comparatively small at about 19% of the total households, respectively. In the Namon Area, the proportion of Lao Sung households is considerably high at about 35% of the total households, while that is only 9% in the Somboun Area. On the other hand, the proportion of Lao Theung households is high (25% of the total sample households) in the Somboun Area comparing to that in the Namon Area (9% of the same). Applying the same criterion of the village classification based on the ethnic groups mentioned above (particular ethnic group households should be more than 70% of the total households), all 14 villages in the Namon Area are classified more clearly than the classification made in Subsection 3.1.2, i.e. eight Lao Lum villages, four Lao Sung villages and two Lao Theung villages. In the Somboun Area, however, the result of this classification is the same with that made in Subsection 3.1.2, seven Lao Lum villages, four Lao Theung villages and one Lao Sung village.

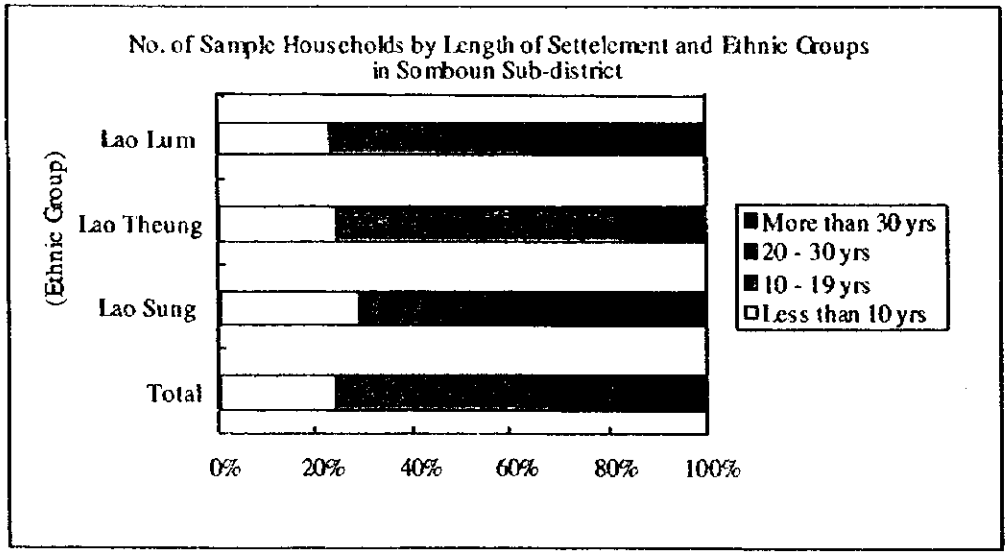
As for the period of settlement, 68% of the total sample households in the Model Area have settled in their villages within the last 20 years as shown in the following figure (see also Table 3-1-1). New settlers are comparatively of higher proportion among Lao Sung households. On the contrary, old settlers are of higher proportion among Lao Lum households. In case of Lao Theung households, about 57% are the settlers for 10 to 19 years.



In the Namon Area, 45% of sample households have settled within the last 10years as shown in the following figure. Nearly 100% of Lao Sung and 90% of Lao Theung households are of new settlers within the last 19 years, while more than 50% of Lao Lum households are the settlers over 20 years.



In the Somboun Area, new settlers staying less than 10 years are comparatively low in proportion, and 45% of sample households are the settlers from 10 to 20 years as shown in the following figure. In this Area, nearly 50% of Lao Sung households are staying more than 20 years. The proportion of Lao Lum households staying more than 30 years are small comparing to that in the Namon Area.



The proportion of women-headed sample households is 5% in Namon Area, 8% in the Somboun Area, and 7% in the Model Area.

The total population of the sample households is 3,711 with male and female ratio of 50 : 50 and average size of household is 6.3 in the Model Area. Of the total population, 1.4% in the Namon Area and 2.7% in the Somboun Area are absent in the villages for more than 3 months in a year. Despite a close distance from Vientiane municipality, only a few villagers are absent due probably to their working and studying out of the villages, and the most of villagers' livelihood depend on the circumstances in and around the villages. The villages with high rate of such absentees are Nakhom (8% of the total population of the sample households), Thahua-Nua (8% of the same) and Nampath-Tai (11% of the same).

As for the age group composition, no big differences are found between the Namon Area and the Somboun Area, although some differences are found among villages. The table below shows the age group composition by ethnic groups. As seen in the table, the proportions of 0 - 14 years old population in Lao Sung and Lao Theung are slightly higher than the average. This may indicate a higher birth rate in these ethnic groups.

Unit: %

Sub-district	Lao Lum (age group)			Lao Theung (age group)			Lao Sung (age group)			Average (age group)		
	0 - 14	15 - 59	> 60	0 - 14	15 - 59	> 60	0 - 14	15 - 59	> 60	0 - 14	15 - 59	> 60
Namon Area	41.7	52.4	5.9	53.9	37.4	8.7	53.0	43.0	4.0	46.8	47.8	5.4
Somboun Area	46.4	47.1	6.5	48.4	45.6	6.0	42.4	50.5	7.1	46.6	53.0	6.4
Model Area	44.7	49.0	6.3	49.3	44.2	6.5	50.3	44.9	4.8	46.7	47.3	6.0

(2) Education status

Education status of economically active population (EAP, 15 - 60 years old) is tabulated in Table 3-3-2. The proportion of non-educated population is 27% of EAP in the Model Area. This proportion is nearly the same in each district, 29% in the Namon Area and 26% in the Somboun Area. However, the education levels between male and female are considerably different as shown in the table below. The proportion of non-educated population is much higher among females (39%) than males (14%). The proportion of population who gave up primary schools is 25% among males and 26% among females showing small differences between them. In case of female, however, it can be said that 65% of EAP are non-educated and/or non-graduats of primary schools.

Unit: % of EAP

Sub-district	Male			Female			Average		
	(1)	(2)	Total	(1)	(2)	Total	(1)	(2)	Total
Namon Area	13.6	26.1	39.7	43.1	22.9	66.0	28.6	24.5	53.1
Somboun Area	13.4	23.5	36.9	37.1	27.3	64.4	25.6	25.5	51.1
Model Area	13.5	24.6	38.1	39.4	25.6	65.0	26.8	25.1	51.9

(1): No formal education
(2): Some classes of primary school

As for the ethnic groups, the proportion of the non-educated population is remarkably high in the Lao Sung and Lao Theung populations. In addition, the proportion of the population who gave up primary school is high in Lao Theung comparing to other ethnic groups (see table below).

Unit: % of EAP

Sub-district	Lao Lum			Lao Theung			Lao Sung			Average		
	(1)	(2)	Total	(1)	(2)	Total	(1)	(2)	Total	(1)	(2)	Total
Namon Area	14.9	22.4	37.3	40.0	35.6	75.6	52.9	26.4	79.3	28.6	24.5	53.1
Somboun Area	17.4	24.5	41.9	37.9	31.1	69.0	53.1	17.7	70.8	25.6	25.5	51.1
Model Area	16.5	23.7	40.2	38.2	31.7	69.9	52.9	23.8	76.7	26.8	25.1	51.9

(1): No formal education
(2): Some classes of primary school

(3) Occupation

The occupation of EAP in each village and in each Area is shown in Table 3-3-3. As seen in the table, the proportion of farmers is the highest in both areas, i.e. 65% in the Namon Area and 70% in the Somboun Area, 5% higher in the latter area. On the contrary, the proportion of salary workers is higher in the Namon Area (8%) than that in the Somboun Area (4%). The proportion of unemployed is low at 4% in the Model Area. However, there are three villages in which the proportion of unemployed is more than 10%.

The questionnaire asked the involvement in farming by the members of sample households including youngsters and elders. The results show that the proportion of women involvement (53%) is slightly higher than that of men involvement (47%) in the Model Area as shown in Table 3-3-4. As for involvement ratio in farming by age group, it is notable that the proportion of people who belong to below 14 years old is 4% in the Namon Area and 1% in the Somboun Area. Since there are many villages with high proportion of farmer population in the Namon Area, labor shortages may occur in this Area during peak seasons of farming.

The table below summarizes the proportion of the major three occupations (farmer, private business and salary worker) by areas and ethnic group. As seen in the table, the proportion of farmers in Lao Sung and Lao Theung is about 20% higher than that in Lao Lum. On the contrary, the proportion of private business and salary workers in Lao Lum is higher than that in other ethnic groups.

Unit: % of EAP

Sub-district	Lao Lum			Lao Theung			Lao Sung			Average		
	Farmer	Private Busine	Salary Worker	Farmer	Private Busine	Salary Worker	Farmer	Private Busine.	Salary Worker	Farmer	Private Busine.	Salary Worker
Namon Area	53.4	9.7	12.0	80.0	2.2	8.9	85.5	2.6	0.9	65.3	7.0	8.3
Somboun Area	64.1	10.3	4.7	84.1	0.8	2.7	79.2	1.0	2.1	70.3	7.1	4.0
Model Area	60.0	10.1	7.5	83.5	1.0	3.6	83.6	2.2	1.2	68.3	7.1	5.7

(4) Involvement in organizations

The organizational membership of adult sample population (above 15 years old) is shown in Table 3-3-5. Among several community organizations, the Women's Unions, Youth Organizations and Elder's Groups are the major ones in the Model Area, and 44% of the sample population are the member of certain organizations as a whole. Since Women's Unions are well organized in all the villages in the Model Area, the involvement ratio of females in the community organizations is considerably high at 25% comparing to that of males (27%).

(5) Cash income source

The importance of cash income sources of sample households is indicated in score as shown in Table 3-3-6. The score is calculated as follows:

$$(A*3 + B*2 + C*1) / T / 3 *100 \quad \text{(Max. score=100, Min. score=0)}$$

where: A: number of answer for 1st priority
B: number of answer for 2nd priority
C: number of answer for 3rd priority
T : number of total answer for the question

As a result, it is evaluated that, among several income sources, livestock/poultry is the most important cash income source in the Model Area, and shows the highest score in many villages. The number of villages with a high score of more than 70 for livestock/poultry is seven in the Namon Area and four in the Somboun Area. Other important cash income sources following livestock/poultry are wage, fishes, vegetables, forest vegetables/crops, handicraft, and salary in order of importance. However, the order of importance of these cash income sources varies greatly much in different villages.

Some sample households are getting cash income from lowland paddy (kao na), and there are five villages in which the score of lowland paddy is more than 20 in the Namon Area. In addition, a few sample households sell upland paddy (kao hai) as one of their cash income

sources, and there are three villages in which the score of upland paddy is more than 10 in the Somboun Area.

As for the income sources relevant to forests, there are three villages in which the score of fuelwood is more than 20. In these villages, fuelwood harvesting is considered to be carried out on a certain scale for supply to Lao Vangvieng Cement Plant. Since tree felling is not allowed in the district, the score of timber as an income source is zero in most of the villages except for one village of Sivilai (score of timber is 14). It is noteworthy that the importance of forest vegetables/crops is ranked fifth in the Model Area, and the number of villages in which the score of forest vegetables/ crops is more than 20 is seven in the Namon Area and four in the Somboun Area.

Table 3-3-7 presents the average annual amount of cash income by sources in each village. As a whole, the important cash income sources are private business, livestock/poultry, fishes, salary, wage, handicraft, vegetables and forest vegetables/crops in order of cash value, which differ from the order of importance in terms of score analyzed above. The average cash income is comparatively large in the villages having markets. In these villages, many households are getting cash income from trading and/or retailing. On average, the annual cash income per household is Kip 716,200 in the Model Area, the highest cash income is in Phonsavang (Kip 1,541,400), and the lowest is in Nampath-Nua (Kip 60,800). It is evaluated that the difference between rich and poor is becoming wider in the Model Area at the village level as well as at the individual level.

There is a significant difference in the amount of cash income by ethnic groups. As shown in the table below, the annual average cash income in minority groups is nearly half of that in Lao Lum. It is thus evaluated that there are many households under the self-supported production system in the minority groups.

Unit: Kip 1,000

Sub-district	Lao Lum	Lao Theung	Lao Sung	Average
Namon Area	864.5	316.2	524.2	696.1
Somboun Area	869.6	486.5	363.6	729.1
Model Area	867.8	454.3	479.0	716.2

In addition to the above ethnic characteristics, cash income from private business is the second highest in Lao Sung households, indicating their excellence in business ability also in the Model Area, which is widely known in Lao PDR. In Lao Sung households in addition, remittance from abroad is the forth highest, indicating their close relation to foreign countries

(as the result of further analysis made on "others" which is one of the cash income sources asked in the questionnaire).

The similar analysis is made on the amount of cash income based on the different periods after settlement. However, no big differences are found in amount of cash income in such analysis as shown in the table below:

Unit: Kip 1,000

Sub-district	<10 Yrs	10-20 Yrs	20-30 Yrs	>30 Yrs	Average
Namon Area	686.2	591.2	752.0	794.0	696.1
Somboun Area	770.9	707.8	767.2	563.5	729.1
Model Area	724.7	676.9	763.6	721.6	716.2

3.3.2 Living Conditions

(1) Drinking water

The major drinking water sources of sample households by seasons are tabulated in Table 3-3-8. As seen in the table, there are great differences between the villages in water sources. Significant differences are also found between the areas. In the Namon Area, many households depend on wells (68% in the wet season and 67% in the dry season), while in the Somboun Area, many of them are reliant on piped water (35% in the wet season and 41% in the dry season), rivers (24% in the wet season and 29% in dry season) and wells (18% in the wet season and 14% in the dry season). There are 7% of households using a rain water in the wet season in the Somboun Area, but no such household in the Namon Area.

Distance or time required (go and back) to the major water sources by seasons and villages is summarized in Table 3-3-9 for wells, Table 3-3-10 for piped water and Table 3-3-11 for rivers. In the Namon Area, the average time required to reach major water sources is comparatively short and is less than 30 minutes in many villages. In the Somboun Area, however, the proportion of households which take more than 30 minutes is considerably high, and the number of villages in which such households is more than 50% of the total households is one for wells, three for piped water, and another three for rivers in the wet season, and three for wells, four for piped water and another four for rivers in the dry season.

Based on the above analysis, it can be said that many villages and/or households face difficulties in getting drinking water in the Somboun Area. This situation is more clearly shown in Table 3-3-12 which summarizes the answers of sample households on sufficiency of

drinking water. As seen in the table, in the Somboun Area, there are eight villages in which more than 50% of the sample households answered short or very short in supplying water. However, the number of such villages is only three in the Namon Area.

(2) Fuel source

Table 3-3-13 shows the score of importance of fuel sources for cooking and heating purposes by ethnic groups. As seen in the table, fuelwood is the most important fuel source, and the importance of other fuel sources is negligible for most of the sample households. This importance of fuelwood is almost the same in all the villages and all the ethnic groups.

The answers of sample households on fuelwood consumption is tabulated in Table 3-3-14. On average, the annual consumption is 6.9 La /household in the Namon Area, 13.8 La/ household in the Somboun Area, and 11.1 La/ household in the Model Area (1 La is about $0.5m^3$). The average consumption per household in the Somboun Area is double that in the Namon Area. The per capita consumption of fuelwood in the Model Area is calculated at 1.8 La based on the above average consumption per household. Since the population in the Model Area is 16,097[/1], the total consumption of fuelwood in the area is estimated at about 29,000 La/year (14,500 m^3/year).

Most households harvest fuelwood by themselves, and the proportion of purchasing volume in the total consumption is small at 13% in the Namon Area and 4% in the Somboun Area. Even in self-harvesting, 27% of the households in the Namon Area pay for labor, around Kip 865/ La for its collection. In the Somboun Area, however, most of households harvest fuelwood using family labor. The average price of fuelwood to purchase is Kip 2,825/ La in the Namon Area, Kip 2,450/ La in the Somboun and Kip 2,687 in the Model Area.

Table 3-3-15 presents distance or time required (one way) to fuelwood forests for the collection. On average, time required to the first source is 44 minutes in the Namon Area and 56 minutes in the Somboun Area. For the second source, it takes 73 minutes in the Namon Area and 51 minutes in the Somboun Area. Two villages in the Namon Area and six villages in the Somboun need more than 60 minutes to the first source of fuelwood forests.

The degree of fuelwood availability stated by the sample households is summarized in Table 3-3-16. The proportion of households who answered "very difficult" in getting fuelwood is

[/1] : This population was clarified in the village profile survey made in the course of socio-economic baseline survey. According to data from the statistic office of Vangvieng district, the population in the Model Area was 16,158 in 1996.

negligible (2% in the Namon Area and 0% in the Somboun Area), although there are eight villages in which average time required to reach the fuelwood forests is more than 60 minutes. The proportion of households who answered "difficult" in getting fuelwood is higher in the Namon Area (25%) than in the Somboun Area (17%), and the proportion of households answered "easy" is higher in the Somboun Area (88%) than in the Namon Area (72%). As for ethnic group comparison, the proportion of households who answered "easy" is comparatively high in Lao Theung (95%) in the Namon Area and in Lao Sung (97%) in the Somboun Area. Spending about 60 minutes to reach fuelwood forests is probably common for most people in the Model Area, and they may feel difficulty in getting fuelwood even under such circumstances.

(3) Food

The degree of food sufficiency of the sample households is presented in Tables 3-3-17 to 3-3-22, and the table below summarizes the proportion of households who answered "not enough" in cereals, roots and tubers, vegetables, meat and fishes.

Unit; % of HH

Sub-district	Cereals	Roots & Tuber	Vegetables	Meat	Fishes
Namon Area	48.7	10.5	11.8	84.2	30.7
Somboun Area	72.0	37.8	41.7	94.1	27.2
Model Area	62.9	27.2	30.1	90.3	28.6

In the Model Area, many households answered that foods are "not enough" cereals and meat, but few households answered that there are "not enough" roots and tubers, vegetables and fishes. The proportion of households which have a deficit in foods is high in the Somboun Area (e.g. 72% of households in cereals and 94% in meat), comparing to that in the Namon Area.

In the villages getting cash incomes from paddy and vegetables, the proportion of food deficit households in these food items is small. However, the degree of food sufficiency in meat is low in many villages, even though livestock/poultry is one of their important income sources. It can be evaluated that many households raise livestock/poultry for cash income and do not consume meat usually.

(4) Health and sanitation

The major diseases in the last 12 months and availability of toilet of the sample households are presented in Table 3-3-23. The most common disease is a cold followed by malaria, diarrhoea, eye disease and dysentery. Few sample households answered "no disease", which indicates the high incidence of disease among the villagers. The results of ethnic group-wise analysis show that the proportion of households getting diarrhoea is the second highest in Lao Sung. This proportion is comparatively low in other ethnic groups.

To the question about a treatment when they catch diseases, many households selected an answer of "buy medicine". This was probably because of the high incidence of a slight disease of cold. Few sample households answered "any treatment not be done" when they catch a disease. They may select the facilities in accordance with the degree of their illness among pharmacies, health centers and Vientiane Provincial Hospital in Vangvieng.

The proportion of sample households who own a toilet is 28% in the Namon Area, 21% in the Somboun Area and 24% in the Model Area. This proportion is slightly higher in the Namon Area. However, it differs much from village to village, and even in the Namon Area there are seven villages in which no sample households own a toilet.

The table below shows the availability of toilets by ethnic groups. As seen in the table, the availability is the highest in Lao Lum households (31%) followed by Lao Sung (15%) and Lao Theung (8%). It can be evaluated that the toilet availability is low in general, and it is particularly low in the minor ethnic groups.

Unit: % of HH

Sub-district	Lao Lum	Lao Theung	Lao Sung	Average
Namon Area	42.2	14.3	8.9	28.1
Somboun Area	25.4	6.7	32.3	21.3
Model Area	31.3	8.1	15.5	23.9

(5) Family planning

Table 3-3-24 presents the survey results on the status of family planning. Of the sample households, 76% in the Namon Area and 13% in the Somboun Area are visited by family planning workers, showing their inactivity in the latter Area. For the answers of contraceptive methods used by sample households, the proportion of households answering "not used" for any method is 38% in the Namon Area and 55% in the Somboun Area, showing also inactiveness of family planning workers in the latter area. Among the several

contraceptive methods asked in the questionnaire, use of pills is the most popular among the sample households followed by traditional methods. The proportion of households using other methods such as surgical methods and condoms is negligible.

3.3.3 Crop Production

(1) Farm land area

Table 3-3-25 shows the average operated land areas of sample households for 1995/96 crop season by types of farm land. As seen in the table, there is a big difference between the Namon Area and the Somboun Area in farm land areas. The proportion of households having lowland paddy area is high in the Namon Area, and on the contrary this proportion for slash and burn (paddy) area is high in the Somboun Area. The number of villages in which more than 50% of the sample households own lowland paddy area is 12 in the Namon Area and only one in the Somboun Area. On the other hand, the number of villages in which more than 50% of sample households operate slash and burn (paddy) area is seven in the Namon Area and 12 in the Somboun Area. A village in which many households operate slash and burn (paddy) area has a few households operating lowland paddy area. These results reveal that paddy production is one of the most important farming activities for many villagers, whether made in lowland or slash and burn areas. On average, farm households cultivate 0.7 ha in the Namon Area and 1.2 ha in the Somboun Area for slash and burn (paddy) area, and 0.8 ha in the Namon Area and 0.6 ha in the Somboun Area for lowland paddy area.

The results of ethnic group-wise analysis for farm land area are presented in the table below. As seen in the table, the proportion of households depending on slash and burn area is generally high in the minority groups in the Model Area. For lowland paddy area, there are big differences between the Areas, i.e. the proportion of Lao Lum households cultivating this type land is 81% in the Namon Area and only 18% in the Somboun Area. Since the availability of lowland paddy area is low in the Somboun Area, the proportion of households having this type land in this area is low in all the ethnic groups. As an other characteristic, the average size of lowland paddy area is large in Lao Lum households in the Namon Area compared to that in other ethnic groups.

	Cultivator Hhold (%) a/				Cultivated Area (Ha)			
	Hai for Paddy	Hai for Others	Lowland Paddy	Upland	Hai for Paddy	Hai for Others	Lowland Paddy	Upland
Overall								
- Namon Area	37.3	8.8	69.7	22.8	0.70	0.34	0.78	0.35
- Somboun Area	69.5	9.2	17.6	21.3	1.20	0.35	0.63	0.55
- Model Area	56.9	9.1	37.9	21.9	1.07	0.35	0.74	0.47
Lao Lum								
- Namon Area	18.8	3.9	80.5	27.3	0.55	0.31	0.85	0.32
- Somboun Area	63.6	8.9	18.2	22.0	1.13	0.33	0.64	0.61
- Model Area	47.8	7.1	40.1	23.9	1.05	0.32	0.78	0.49
Lao Theung								
- Namon Area	71.4	4.8	23.8	4.8	0.89	0.40	0.42	0.80
- Somboun Area	76.7	12.2	21.1	22.2	1.13	0.38	0.63	0.45
- Model Area	75.7	10.8	21.6	18.9	1.08	0.38	0.59	0.46
Lao Sung								
- Namon Area	58.2	17.7	64.6	20.3	0.71	0.35	0.68	0.39
- Somboun Area	93.5	3.2	3.2	12.9	1.70	0.60	0.60	0.20
- Model Area	68.2	13.6	47.3	18.2	1.10	0.37	0.68	0.36

Note: a/: 100% = Number of households belong to each ethnic group

Table 3-3-26 presents the land ownership of each type of farm land. As seen in the table, the characteristics of land ownership are different between types of farm lands and villages. As a whole, however, the characteristics can be summarized as follows:

1) Many households have privately owned lowland paddy area (99% of the sample households) and upland (78% of the same), and

2) The land ownership for slash and burn area for paddy and other crops is more complicated, and privately owned (36% of the sample households), traditionally cultivated with a right (34% of the same) and just cultivated without knowing the land title (34% of the same) are the major ownership.

(2) Utilization of slash and burn area

Table 3-3-27 summarizes the average time required (one way) to slash and burn area of the sample households. On average, it takes 1.13 hour in the Namon Area and 1.44 hours in the Somboun Area. However, the average time required differs much from village to village, and there are seven villages with households who take more than 3 hours to their slash and burn area in the Somboun Area (only one such village in the Namon Area).

Table 3-3-28 presents the rotation period of slash and burn area answered by the sample households. In general, the slash and burn area is insufficient in the Model Area, and for the most of cultivators it is difficult to keep the proper rotation period. The survey results show that only 7% of 1996 slash and burn paddy cultivators utilize the land with more than a 5-year rotation period. On average, the period of rotation is 2.56 years in the Namon Area and 2.61

years in Somboun Area for 1996 slash and burn cultivators. In both Areas, however, about 40% of 1996 slash and burn cultivators were going to re-use the same land in the next year. These results reveal that the land availability for slash and burn cultivation differs from villager to villager, i.e. some cultivators use the land with a longer rotation period and some do not do so.

The table below summarizes the average rotation period and the proportion of households who re-use the slash and burn area in the next year by ethnic groups. As shown in the table, there is less land for slash and burn cultivation for Lao Theung households, since nearly half of them have to re-use the same land in the next year and their average rotation period is the shortest among the ethnic groups.

Sub-district	Lao Lum		Lao Theung		Lao Sung		Average	
	To be Used in the Next Year (%)	Average Period of Rotation (Year)	To be Used in the Next Year (%)	Average Period of Rotation (Year)	To be Used in the Next Year (%)	Average Period of Rotation (Year)	To be Used in the Next Year (%)	Average Period of Rotation (Year)
Namon Area	42.9	2.4	45.5	2.3	39.5	2.7	41.3	2.6
Somboun Area	36.6	2.6	50.0	2.3	36.0	3.2	40.3	2.6
Model Area	37.3	2.6	49.2	2.3	38.1	2.9	40.6	2.6

For 1996 slash and burn (other crops) area, the average period of rotation is 2.1 years in the Namon Area and 1.9 year in the Somboun Area. The proportion of households who will re-use the same land in the next year is 50% in the Namon Area and 89% in the Somboun Area.

The questionnaire asked the 1996 slash and burn (paddy) cultivator households whether they would re-use the same land in the future or not. As a result, more than 70% of the households in the Model Area answered that they would re-use it again in the future. This result reveals that many slash and burn cultivator households re-use the same land with a certain period of rotation. The questionnaire also asked the households who had no plan to re-use the 1996 slash and burn (paddy) land whether new land is easily available for slash and burn cultivation. As a result, 68% and 55% of the households answered that new land is difficult to find in the Namon Area and the Somboun Area, respectively.

(3) Cultivated crops

As shown in Table 3-3-29, the major crop cultivated in slash and burn areas in the wet season is paddy, and 79% of slash and burn cultivator households grow this crop. For other crops, the proportion of cultivator households is small at 10% for cassava, 6% for maize and 1% for chile. There are a few cultivator households in the slash burn area in the dry season and only 4% of slash and burn cultivator households in the wet season grow chile, cucumber, cassava, etc.

In the lowland paddy area in the wet season, paddy is also the major crop cultivated. As shown in Table 3-3-30, 95% and 98% of the lowland paddy area cultivators grow paddy in the Namon Area and the Somboun Areas, respectively. Crops cultivated in the lowland paddy area are somewhat diversified in the Namon Area, and there are some households cultivating chili, watermelon and other vegetables. However, in the Somboun Area, such households cultivating other crops are few. In the dry season, the cultivator households for lowland paddy area are small in proportion, i.e. 24% and 3% of the cultivator households in the wet season in the Namon Area and the Somboun Area, respectively. As shown in Table 3-3-31, there are few households cultivating paddy in the low land paddy area in the dry season. However, a higher proportion of the cultivator households grow groundnuts in both areas. As other dry season crops in the lowland paddy area, cucumbers and other vegetables are cultivated mainly in the Namon Area.

(4) Crop area and production

The table below summarizes the results of the survey on the number of cultivator households, average cultivation area and yield, and production of major crops in the slash and burn and lowland paddy areas. The number of cultivator households analyzed here is different from that analyzed in Sub-section 3.3.3 (1), since the year of crop cultivation was not fixed in the questionnaire on crop production.

		Namon Area	Somboun Area	Model Area
Slash & Burn Area (Hai)				
Paddy				
H'hold	(No.)	83	247	330
Area	(ha/HH)	0.70	1.19	1.06
Yield	(kg/ha)	1,139	896	936
Production	(kg/HH)	798	1,063	996
Cassava				
H'hold	(No.)	11	37	48
Area	(ha/HH)	0.24	0.35	0.33
Yield	(kg/ha)	2,923	2,871	2,880
Production	(kg/HH)	691	1,011	938
Lowland Paddy (Na)				
Paddy				
H'hold	(No.)	162	64	226
Area	(ha/HH)	0.80	0.59	0.74
Yield	(kg/ha)	2,416	1,856	2,289
Production	(kg/HH)	1,925	1,091	1,688
Groundnut				
H'hold	(No.)	20	0	20
Area	(ha/HH)	0.26	-	0.26
Yield	(kg/ha)	1,937	-	1,937
Production	(kg/HH)	495	-	495

The average crop yields evaluated in the above table are compared with those in the Vangvieng district, Vientiane province and Lao PDR. As a result; the crop yields in the Model Area are lower than those in the other regions except for groundnuts as shown in the table below.

Unit: ton/ha

Crop	Model Area	Vangvieng District	Vientiane Province	Lao PDR
Slash and Burn Paddy	1.00	1.20	1.44	1.65
Cassava	2.88	3.00	9.02	7.06
Lowland Paddy	2.29	2.60	3.25	2.92
Groundnut	1.94	1.50	1.20	1.02

Source: Statistic Office of Vang Vieng District Head Quarter, 1996
Agricultural Statistics, 1995, Ministry of Agriculture and Forestry

The status of chemical fertilizer use for crop cultivation is shown in Tables 3-3-32 and 3-3-33. As seen in the table, no households apply fertilizer to crops cultivated in slash and burn area. In the lowland paddy area, many households apply it to vegetables, but only few households use it for paddy.

The answers of sample households on crop damages are tabulated in Tables from 3-3-34 to 3-3-37. Among several crops cultivated in slash and burn areas and lowland paddy areas, crop damages are serious to both upland and lowland paddy. The proportion of households who have crop damages to lowland paddy is 93% in the Namon Area and 78% in the Somboun Area. The most serious damage to upland paddy is done by animals such as rats (68% of the sample households in the Model Area) followed by insects (10% of the same). The crop damages to lowland paddy are more various, and animals (30%), insects (25%) and diseases (24%) are listed as major ones. To cassava (in slash and burn areas), damages are light in the Namon Area and heavy in the Somboun Area where 62% of sample households are suffered damage by animals. To groundnuts (in lowland paddy area), a total of 56% of sample households is suffered damage by insects and diseases, although the answers on this crop were obtained only from the Namon Area.

(5) Sale of crop products

Table 3-3-38 presents the crop marketing status of sample households. A large part of groundnuts and vegetables produced in lowland paddy areas is sold. The proportion of households who sale these crops is 23% in the Namon Area. In the Somboun Area, however, cash crops are cultivated in limited area and few households sell these crops. In the Namon Area, almost all chili produced in the slash and burn area are also sold. Considerable amounts of lowland paddy are marketed in the Namon Area (26% of the production of sample households), but upland paddy is sold in small amount (2% of the production of sample households in the Namon Area, 4% of the same in the Somboun Area and 3% of the same in the Model Area). It is evaluated that the status of crop production surplus is much better in the Namon Area than that in the Somboun Area, not only for paddy but for cash crops.

(6) Consumption of paddy rice

Table 3-3-39 presents the status of paddy production and consumption of the sample households. As it is clarified in the table, there are few villages with a production surplus, and all the villages in the Somboun Area show a deficit of paddy. Annual average production per cultivator household is 1,811 kg in the Namon Area and 1,181 kg in the Somboun Area and 630 kg higher in the the Namon Area. On the other hand, annual average consumption per cultivator household is 1,785 kg in the Namon Area and 1,680 kg in the Somboun Area, and there is only a 105 kg difference between the two areas.

In the Model Area, annual average production is 1,447 kg and annual average consumption is 1,724 kg per cultivator household. Using these figures, the food balance of paddy in the Model Area (with 2,599 households) is roughly calculated. The result reveal that the total paddy production is 3,210 tons, consumption is 4,420 tons, and the deficit is 1,210 tons or about 38% of the total production in the Model Area.

Per capita consumption of rice is calculated at 177 kg, based on figures on the annual average consumption per sample household (1,724 kg), average size of sample households (6.34 persons) and paddy milling rate (assumed at 65%). This level of per capita consumption is 9% lower than the figure estimated by FAO for Lao PDR which is 195.4 kg (average of 1992 - 94). The people in the Model Area may consume other food crops (e.g. maize and cassava) instead of rice more than the people in other regions.

3.3.4 Livestock and Fishery

(1) Livestock population

The number of livestock farmer households and livestock population are compiled in Table 3-3-40. Except for poultry, pig is the most commonly raised animal (67% of sample households) followed by cattle (45% of the same) and buffalo (37% of the same). The proportion of households who raise goat is small at 6%. The proportion of households who raise buffalo is considerably high at 61% in the Namon Area, because this animal is used for land preparation for lowland paddy cultivation. However, the proportion is only 21% in the Somboun Area where there is less lowland paddy area.

For poultry, the proportion of households who raise chicken is the highest at 85% followed by duck (28%) and turkey (9%). Many households raise chicken both in the Namon Area

(93%) and in the Somboun Area (80%). However, a few households raise duck and turkey particularly in the Somboun Area. The average population of poultry per farmer households is 16.9 heads for chicken, 5.8 heads for duck and 5.0 heads for turkey in the Model Area.

(2) Livestock feed and its sufficiency

Table 3-3-41 summarizes the status of livestock feed by seasons. As seen in the table, grass is the most popular feed for cattle and buffalo, and nearly 100% of the livestock farmer households feed it in both seasons. Grass is also popular feed for goat. However, 11% of the households feed tree fodder in both seasons in the Model Area.

The sufficiency of livestock feed is tabulated in Table 3-3-42. There are a few households facing a feed shortage in the wet season. In the dry season, however, the proportion of households who answered feeds are "short" or "very short" is considerably high at 21% for cattle, 24% for buffalo, and 20% for goat. According to the results of area-wise analysis, the sufficiency of livestock feeds in the Somboun Area is inferior to that in the Namon Area.

(3) Fish culture

As shown in Table 3-3-40, the proportion of sample households who own a fish pond is 26% in the Namon Area and 4% in the Somboun Area, showing better condition in fish culture in the former Area. In all the villages in the Namon Area, there are households who own a fish pond. In the Somboun Area, however, the number of villages with fish pond owner households is only eight. The differences between the Namon Area and the Somboun Area in the fish pond availability may depend on the availability of lowland paddy area which is usually converted into fish ponds.

3.3.5 Private Forest

The survey results on private forest reveal that there is no household who owns private forest in the most of villages with the exception of three villages in the Namon Area and four villages in the Somboun Area. Even in the villages in which some households have private forest, the proportion of owner households is small at 3 to 5% in the Namon Area. However, this proportion is 14 to 29% in the Somboun Area within three villages among four which have private forests. The average land area of private forest per owner household is 0.7 ha in the Namon Area and 1.0 ha in the Somboun Area.

3.3.6 Horticulture Trees

The number of owner households of horticulture trees is tabulated in Table 3-3-43. The proportion of owner households is high in mango (51% in the Namon Area and 29% in the Somboun Area), coconut (46% in the Namon Area and 25% in the Somboun Area), banana (40% in the Namon Area and 30% in the Somboun Area), and tamarind (38% in the Namon Area and 16% in the Somboun Area). As other horticulture trees, about 10 to 20% of households cultivate papaya, orange and lemon. The average number of trees per each horticulture household is the largest in banana (19 trees in the Namon Area and 67 trees in the Somboun Area) followed by papaya (7.6 trees in the Namon Area and 12.2 trees in the Somboun Area) and guava (6.2 trees in the Namon Area and 12.1 trees in the Somboun Area). For other trees, the average number per each horticulture household is small at 1 to 2 trees. Because many kinds of horticulture trees are grown in the Model Area, fruits development would have high potential, although fruit is not major income source of the villagers at present.

3.3.7 Cash Expenditure

As shown in Table 3-3-44, the average cash expenditure differs much in the villages, and is large in the villages in which the average cash income is large. However, there is little difference in the cash expenditure between the areas, i.e. Kip 506,000/ month in Namon Area and Kip 505,000/ month in the Somboun Area. In general, the proportion of cash expenditure for food is high in the villages in which the average cash income is large. This means that the households getting a large cash income from private business, etc. purchase a lot of food. The cash expenditure for food is small in the villages in which the average cash expenditure is small, indicating the high degree of self-sufficiency of food in these villages.

The table below summarizes the average cash expenditure by category and ethnic group. In general, the cash expenditure is large in Lao Lum and small in the minority groups, and its amount of Lao Sung is nearly the half of that of Lao Lum. As for cash expenditure for each category, the proportion of food in Lao Sung is lower than that in other ethnic groups, indicating a higher self-sufficiency rate in this ethnic group. The proportion of expenditure for education is lower in Lao Sung in the Somboun Area, showing a lower school attendance rate of children of this ethnic group in this area.

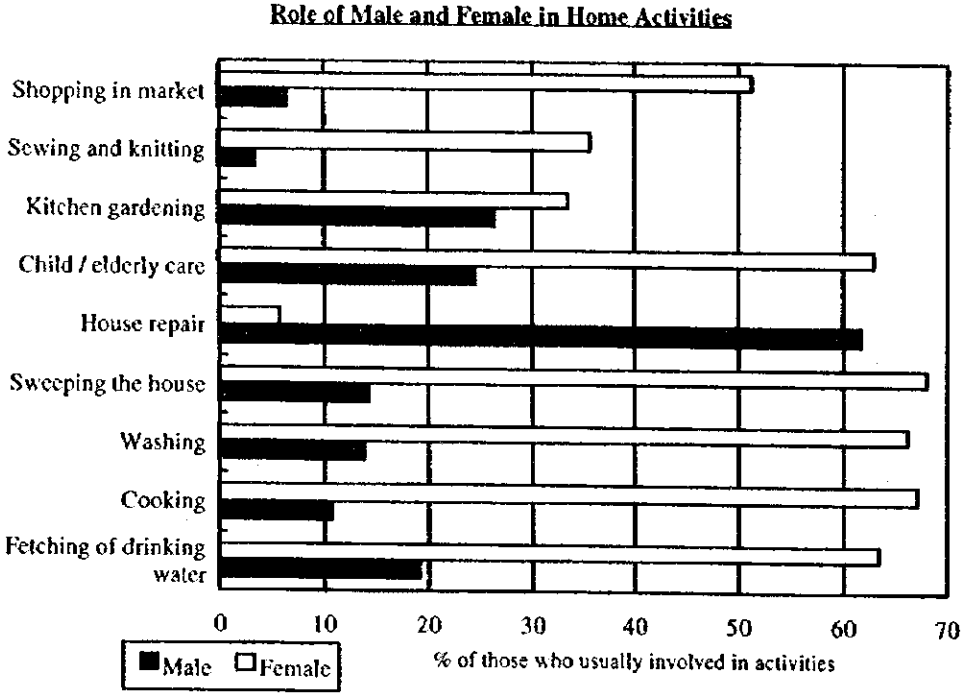
Sub-district	Food	Clothes	Edu-cation	Others	Total or Average
Average Cash Expenditure/ Month (Kip)					
Overall					
Namon Area	27,463	6,593	3,126	5,018	42,200
Somboun Area	27,897	6,170	1,862	6,138	42,067
Model Area	27,728	6,335	2,355	5,702	42,120
Lao Lum					
Namon Area	37,238	7,330	4,038	5,255	53,861
Somboun Area	32,371	6,732	2,202	6,855	48,160
Model Area	34,082	6,942	2,847	6,292	50,163
Lao Theung					
Namon Area	21,517	4,333	2,200	3,205	31,255
Somboun Area	20,031	5,133	1,326	4,027	30,517
Model Area	20,312	4,982	1,491	3,871	30,656
Lao Sung					
Namon Area	13,207	5,997	1,896	5,116	26,216
Somboun Area	16,677	4,900	837	6,810	29,224
Model Area	14,185	5,688	1,598	5,594	27,065
Comparison of Ave. Cash Expenditure (Ave. of Model Area = 100)					
Overall					
Namon Area	99.0	104.1	132.7	88.0	100.2
Somboun Area	100.6	97.4	79.1	107.6	99.9
Model Area	100.0	100.0	100.0	100.0	100.0
Lao Lum					
Namon Area	134.3	115.7	171.5	92.2	127.9
Somboun Area	116.7	106.3	93.5	120.2	114.3
Model Area	122.9	109.6	120.9	110.3	119.1
Lao Theung					
Namon Area	77.6	68.4	93.4	56.2	74.2
Somboun Area	72.2	81.0	56.3	70.6	72.5
Model Area	73.3	78.6	63.3	67.9	72.8
Lao Sung					
Namon Area	47.6	94.7	80.5	89.7	62.2
Somboun Area	60.1	77.3	35.5	119.4	69.4
Model Area	51.2	89.8	67.9	98.1	64.3
Percentage Distribution of Ave. Cash Expenditure (total =100)					
Overall					
Namon Area	65.1	15.6	7.4	11.9	100.0
Somboun Area	66.3	14.7	4.4	14.6	100.0
Model Area	65.8	15.0	5.6	13.5	100.0
Lao Lum					
Namon Area	69.1	13.6	7.5	9.8	100.0
Somboun Area	67.2	14.0	4.6	14.2	100.0
Model Area	67.9	13.8	5.7	12.5	100.0
Lao Theung					
Namon Area	68.8	13.9	7.0	10.3	100.0
Somboun Area	65.6	16.8	4.3	13.2	100.0
Model Area	66.3	16.3	4.9	12.6	100.0
Lao Sung					
Namon Area	50.4	22.9	7.2	19.5	100.0
Somboun Area	57.1	16.8	2.9	23.3	100.0
Model Area	52.4	21.0	5.9	20.7	100.0

3.4 Result of Household Member Survey

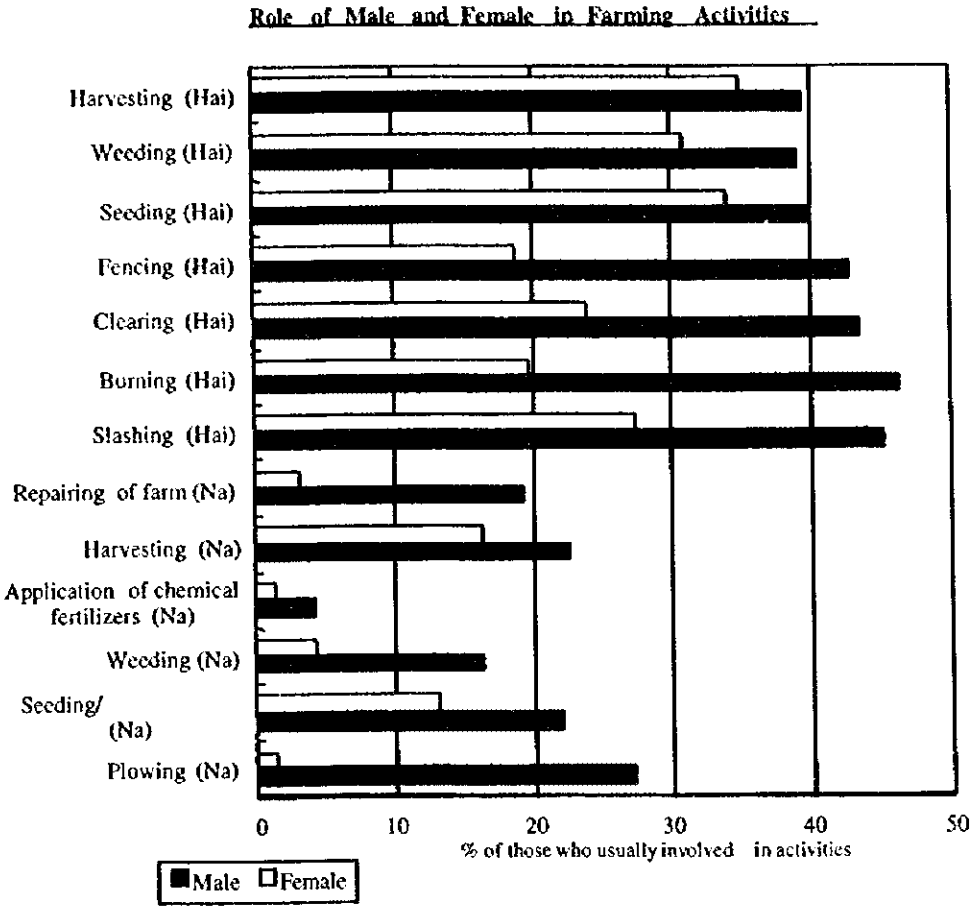
3.4.1 Role of Men and Women

In order to identify the role of male and female members of households, adult members were asked about the frequency of their involvement in major activities. The overall results for the Model Area are tabulated in Table 3-4-1. To make a simple presentation in this Sub-section, 62 items of the activities in the table are grouped into six categories, i.e. (i) home activities, (ii) farming activities, (iii) animal raising, (iv) fishery related activities, (v) forest related activities, and (vi) processing and marketing of agriculture products. For each of these categories, the percentages of "usually engaged" by male and female for the respective activities are graphed and presented hereinafter.

Home activities include fetching of drinking water, cooking, washing, sweeping the house, house repair, child/ elderly care, kitchen gardening, sewing and knitting, and shopping in market. The survey result shows that women are much more responsible for most of these activities except for house repair and kitchen gardening. The proportion of men "usually engaged" is higher in house repair, and both male and female are engaged in kitchen and gardening, although female's engagement is slightly higher in this activity.

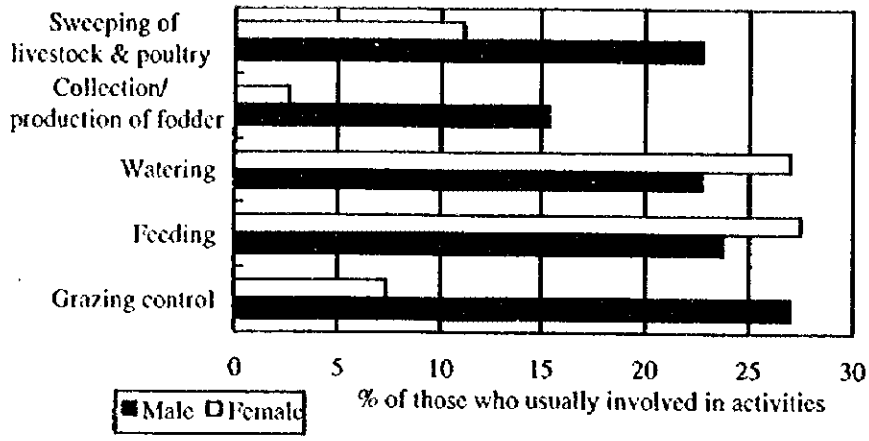


In the farming activities, the proportion of men "usually engaged" is generally higher than that of women in many activities. However, women are also engaged in certain activities such as harvesting, weeding and seeding with high engagement rate. The proportion of men is generally high in heavy labor works such as slashing and burning, and that of women is high in the time consuming labor works.



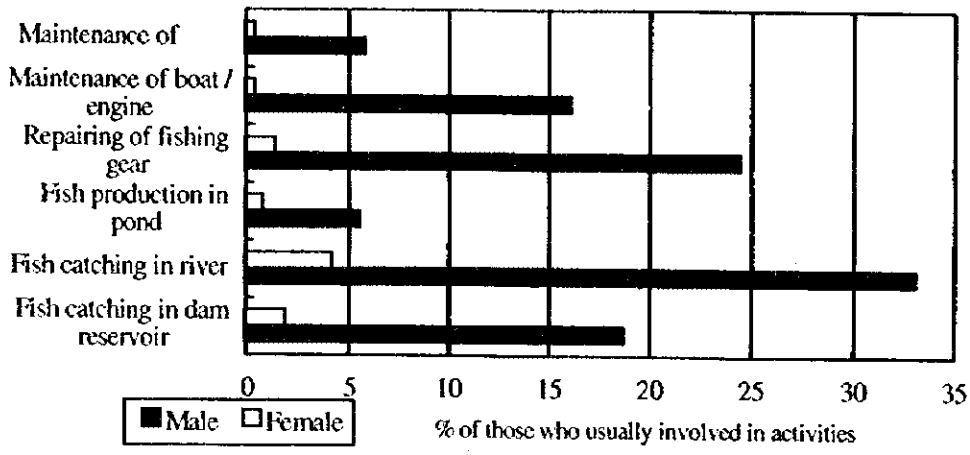
In the animal raising, the proportion of men "usually engaged" is high in the activities for grazing control and collection/ production of fodder. Women's engagement rate is high in watering and feeding, but for these activities men are also involved to a certain extent.

Role of Male and Female in Animal Raising



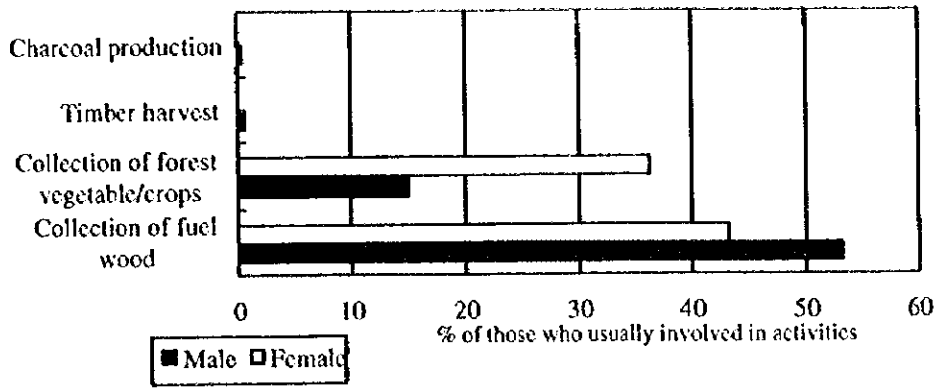
In the fishery related activities, the proportion of men "usually engaged" is totally high in all the activities, and that of women is quite low.

Role of Male and Female in Fishery Related Activities



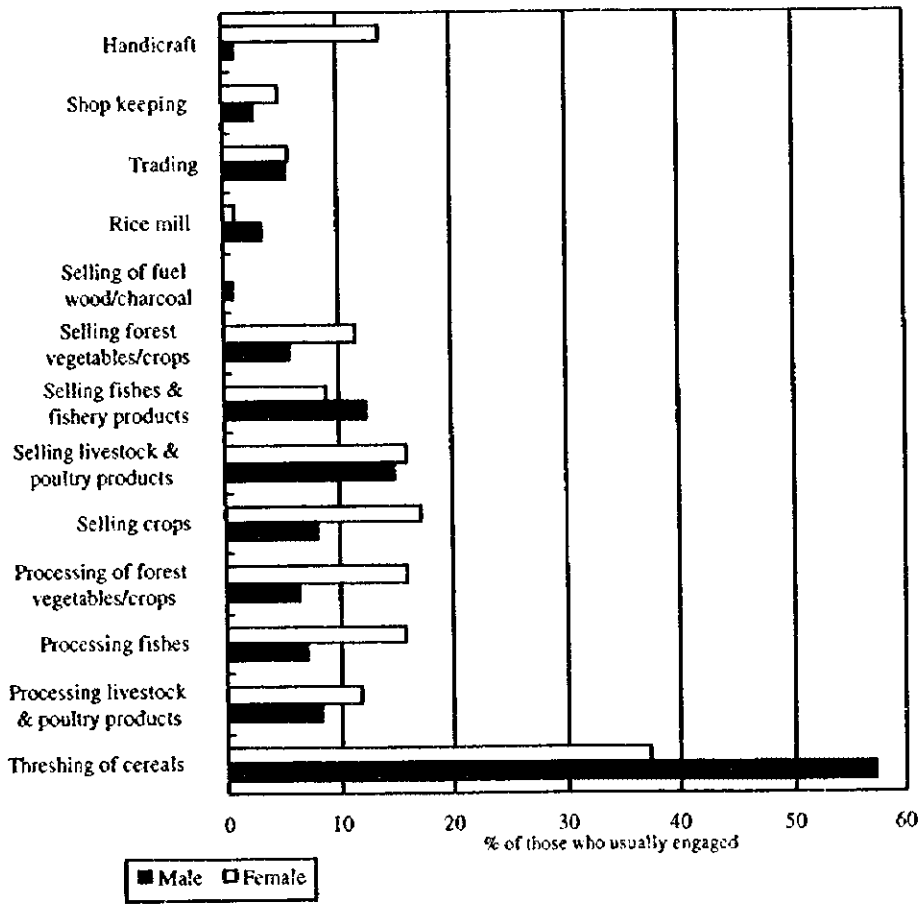
In the forest related activities, 53% of male and 43% of female are "usually engaged" in fuelwood collection. In collection of forest vegetables/ crops, women's engagement rate is higher. The proportion of male and female who "usually engaged" in charcoal production and timber harvest is negligible small.

Role of Male and Female in Forest Related Activities



In the processing and marketing of agriculture products, the engagement rate is low at less than 20% both for men and women. Among people "usually engaged" in these activities, however, the proportion of men is generally higher than that of women.

Role of Male and Female in Processing and Marketing Activities



In the other activities of religious and cultural, the proportion of men "usually engaged" is higher (59%) than that of women (18%). The rates of involvement in the activities which need to have a relation with external people or matter (e.g. "resolving in village conflicts" and "political discussion with others") are higher in man than those in women.

3.4.2 Activities that People Want to Make Easy

In the household member survey, adult members were asked which activity they want to lighten their work load among their daily activities, and to select one activity among 50 activities listed in Table 3-4-1. The survey results are presented also in Table 3-4-1, and the table below summarizes it for the activities with higher scores.

Whole Model Area				
Work Item	Men's Priority		Women's Priority	
	Order	Score	Order	Score
Fetching of drinking water	1	35.9	1	54.5
Slashing in S&B	2	32.2	3	21.4
Plowing in lowland paddy	3	25.2	-	1.9
Collection of fuelwood	4	21.7	2	22.2
House repair	5	21.3	-	5.5
Child/ elderly care	-	11.2	3	21.4
Cooking	-	7.2	5	19.8

In the Model Area, both men and women selected the activity of "fetching of drinking water" as the first priority for lightening of their work load. After the second highest scores, the orders of score are different between men and women. Among Men, the second highest score is "slashing in slash and burn cultivation" followed by "plowing in lowland paddy" and "collection of fuelwood". Among women, "collection of fuelwood" stands No. 2, followed by "slashing in slash and burn cultivation" and "child/elderly care".

In addition, the area-wise analyses were made as shown in Tables 3-4-2 and 3-4-3, and summarized in the table below.

Namon Area					Somboun Area				
Activity	Men's Priority		Women's Priority		Activity	Men's Priority		Women's Priority	
	Order	Score	Order	Score		Order	Score	Order	Score
Plowing in lowland paddy	1	49.9	-	4.5	Slashing in S&B	1	45.1	2	28.0
Fetching of drinking water	2	36.3	1	55.8	Fetching of drinking water	2	35.6	1	53.8
Harvesting in lowland paddy	3	27.2	2	29.8	House repair	3	24.4	-	4.3
Collection of fuelwood	4	23.8	4	22.3	Collection of fuelwood	4	20.2	4	22.2
House repair	5	16.9	-	7.8	Weeding in S & B	5	18.2	-	17.3
Seeding/transplanting in L.P.	-	12.6	3	25.0	Child/ elderly care	-	16.2	3	25.2
Washing	-	11.1	5	21.9	Cooking	-	7.7	5	21.7

As seen in the above table, the higher scores are shown by the work items related to the paddy cultivation both men and women, for lowland paddy in the Namon Area and upland paddy in the Somboun Area. As a whole both in the Namon Area and the Somboun Area, it can be evaluated that their needs for lightening their work load are mostly on the activities related to the farming for men and home activities for women.

3.4.3 People's Concerns

The level of people's concerns for the selected items in the questionnaire are presented in Table 3-4-4. As seen in the table, the importance of people's concerns indicated in the score by items is different between the Areas and sexes. However, if the above 10 important items are selected, these items are similar in both areas and sexes.

The overall results show that the people in the Model Area strongly concerned about food availability, drinking water availability, fuelwood availability, and cash income, and all these items are ranked within the highest fifth in both sexes. The items of people's concerns having large differences between men and women are security and sanitation. Security is ranked fourth in men (25th in women), and sanitation is ranked fifth in women (13th in men). For other items ranked from sixth to 10th, labor force availability, worship of religion, festival, dance party and education of children are listed in order of importance.

As the results of area-wise analysis, it is clarified that (i) the level of people's concerns in the food availability is the highest in both men and women in the Namon Area where land condition is better than the Somboun Area, while (ii) the people's concerns for food availability is the second highest after drinking water availability in the Somboun Area. These results reveal that the land availability is becoming difficult for many people in the Namon Area, and drinking water is very difficult to get for many people in the Somboun Area and the less availability of drinking water distresses them more seriously than the shortages in foods.

The items with lower scores which indicate less concern of people are flood, drought, land slide and soil erosion, degradation of soil fertility, and mailing system both for men and women. Drought may damage upland crops in the Model Area, but the people's concerns are low about it. Yields of upland crops are probably too low (e.g. about 1.0 ton/ha for upland paddy) for people to think about drought damage.

Table 3-4-5 summarizes the people's concerns for above 10 items by ethnic groups and sexes. As seen in the table, above five items analyzed here are similar with the overall results analyzed for the Model Area both for men and women. However, items under sixth analyzed here are different from the overall results, and items of slash and burn land availability, upland availability, and lowland availability are listed as the people's concerns of minority groups, indicating many of them are facing land shortages.

The people's concerns by different age groups are also analyzed. As a result, it is found that there are little difference in the people's concerns between the results of overall analysis and those of age group analysis. However, two important characteristics are pointed out as (i) the people's concerns about the item of labor force availability is the fifth score in the young age group (18 to 25 years old) of men, and (ii) those with the item of worship of religion is the highest score in the old age group (more than 50 years old) of both men and women.

(1) Cash income sources that people want to improve or develop

The intention of the sample household members regarding cash income sources which they want to improve or develop in the villages was asked in the questionnaire to the selected members who answered "concern" or "strongly concern" about cash income. The results are presented in Table 3-4-6 and summarized as follows (respondents are 555 or 64% of the sample household members):

Unit: % of Answers

Items of Cash Income Sources to be Improved/Developed	Namon Area	Somboun Area	Model Area
1.Kao Na Production	61.7	20.7	39.6
2.Kao Hai Production	6.3	35.8	22.2
3.Livestock/poultry raising	13.7	9.4	11.4
4.Vegetables Production	6.3	10.4	8.5
5.Trading	3.5	7.4	5.6
6.Handicraft	2.3	4.0	3.2
7.Fruits Production	1.2	3.0	2.2
8.Others	5.1	9.4	7.4

The proportion of answers is high in the item of Kao Na production in the Namon Area, and in the items of Kao Hai and Kao Na production in the Somboun Area for improvement or development of their cash income sources. This result reveals that many people want to get cash income through improvement or development of their present paddy production system. However, the potential is unknown whether it is possible to improve or develop the present system of paddy production instead of vegetables and fruits production in the slash and burn area and lowland paddy area.

(2) People's intention on measures to prevent forest fire due to slash and burn cultivation

The intention of the sample household members on measures to prevent forest fire due to slash and burn cultivation was also asked in the questionnaire making inquiries to the selected members who answered "concern" or "strongly concern" about forest fire (respondents are 63 or 19% of the sample household members). As a result, as shown in Table 3-4-7, 86% of the answers in the Namon Area and 79% of the same in the Somboun Area selected the answer of "make buffer zone before burn" among several measures listed in the questionnaire. Although the answers to the other measures are comparatively small in number, they are enumerated as "watch during burning (10% in the Namon Area and 5% in the Somboun Area)", "establish a penal regulation (0% in the Namon Area and 8% in the Somboun Area)", and "consider wind direction for burning (4% in the Namon Area and 2% in the Somboun Area)".

3.4.4 Importance of Forest and Measures to Improve Forest Condition

(1) Importance of forest

The sample household members were asked to prioritize the importance of forest functions. The answers are tabulated as shown in Table 3-4-8, and the table below summarizes the area-wise results.

Item	Namon Area		Somboun Area		Model Area	
	Order	Score	Order	Score	Order	Score
Source of Fuel Wood	3	(45.1)	2	(47.9)	1	(46.8)
Source of Forest Vege./ Crops	2	(45.7)	3	(42.5)	2	(43.8)
Function to Conserve Water	1	(46.3)	5	(39.3)	3	(42.0)
Source of Fodder/ Grazing	4	(40.5)	4	(38.8)	4	(39.5)
Source of Kao Hai	7	(20.5)	1	(49.6)	5	(38.3)
Source of Timber	6	(31.3)	6	(24.0)	6	(26.8)
Source of Medicinal Plants	5	(32.4)	7	(22.7)	7	(26.5)

In the Model Area, many people utilize forest for slash and burn cultivation, fuelwood collection, animal grazing and timber harvest, and accordingly the scores are high in these items in both Areas. As an interesting result, "source of Kao Hai" shows the highest score in the Somboun Area, although this stands No. 7 in the Namon Area. Moreover, the forest is important for many villagers as a source of forest vegetables/ crops and medicinal plants.

(2) Measures to improve forest condition

The survey asked the sample household members to prioritize the selected measures for the improvement of forest conditions. The results are tabulated as shown in Table 3-4-9 and summarized as follows:

Unit: % of Answer Nos.

Measures to Improve	Items for Importance of Forest				
	Kao Hai Source	Fuel Wood Source	Water Conserv.	Fodder/ Grazing	Timber Source
Tree planting in slash and burn areas	66.7	45.2	50.4	53.9	66.7
Tree planting in community forests	4.6	0.0	4.3	9.0	4.6
Determination of boundary for protection forests	1.8	2.4	1.7	0.0	1.8
Development of new paddy land	12.3	35.7	16.2	28.1	12.3
Increase of crops/livestock productivity	1.8	2.4	11.1	3.4	1.8
Creation of new income sources	10.9	9.5	6.8	2.3	10.9
Use of improved stove to reduce fuel wood	2.1	4.8	4.3	0.0	2.0
Use of other energy sources (gas, kerosene, etc.)	0.0	0.0	0.9	0.0	0.0
Others	0.0	0.0	4.3	1.1	0.0
No answer	0.0	0.0	0.0	2.3	0.0

Many sample household members selected the answer of "tree planting in slash and burn areas" for all the items of importance of forest. They may made general answers for the importance of forest without consideration of the respective items of importance of forest.