

CHAPTER IV

VILLAGE SYSTEM ASSESSMENT

4.1. Introduction

Sobngouang is a local village reestablished more than 30 years ago after Indochina war. It is an upland community and farming households have engaged in upland rice production in shifting cultivation for subsistent requirement and grazing animals, especially cattle for supplementary cash income. According to the Environmental Management Division (EMD) of Theun-Hinboun Hydropower Project, This village is considered as first priority impacted village and it is also classified as a poor village by Khamkeuth District.

Since the completion of Theun-Hinboun Hydropower Project in 1998 many changes have taken place with development assistance from external supports to improve living standard and surrounding environment of the village as a whole (Theun-Hinboun Power Company, 2002). Although many progresses have been made, some difficulties still exist. Shifting cultivation remains, despite the suppression with many alternatives to produce rice and many cash crops. Little is known about the function of village ecosystem in response to development inputs. The role of upland rice in village agroecosystems will have to be better understood and the inputs of development from both Theun-Hinboun Hydropower Project as well as local government agencies will have to be analyzed in the context of village ecosystem change.

In this study, secondary and primary data were collected in order to analyze the significance of upland rice in the context of external push from development and policy effects and internal pull from local community in focus of their organization, local knowledge and local demand.

4.2. Data collection and field survey

Secondary data and existing information were collected from various sources. Relevant publication, documents and reports from library and internet were compiled which included Lao government policies on upland agriculture, government development plans related to upland management, Theun-Hinboun Hydropower Project documents about development program. Appointments were made to interview key policy makers, their names and organizations were located in Appendix B with a summary of check list for interviewing.

These included representatives of government agencies, organization, local authorities and Theun-Hinboun Power Company. The major topics of interviews were past, current and future of the policies for upland agriculture, successes and failures of implementation those policies and lesson learned and future improvement for planning and implementation. A policy dialogue was also planned after completion of the thesis.

For a general trend, land use data at district level were available for years 1992 and 2002, before and after completion of the Theun-Hinboun Dam in 1998. With digital information, land use change was analyzed using GIS package. Field checks were carried out to verify land use and land use change with key farmers. At village level, sketch mapping of general land use was available and this was transferred to scale 1:25,000 for in-depth discussion with farmers. Two meetings were organized for group discussion. Participants included village headman, members of village committee and other villagers who attended the meeting on voluntary basis.

Soil profiles identification were conducted by dug pits at the representative sites of forest fallows, undisturbed forest and rice production systems with assistance of a Lao soil specialist.

Announcements were made to invite villages prior each meeting. The meeting consisted of 20-30 participants each. Attention was drawn to the issues of village boundary demarcation, past and present land use, agricultural change, crop production and grazing area.

Once land use mapping were agreed upon in the meeting, transect walk with key farmers was conducted to verify the map, modify the existing land use and discuss the management practices leading to sustainable land use on a long run. Local officials and project personnel were also invited to participate in transect walk. Key issues raised and used in this chapter. GPS was employed to mark village boundary and land use types. These were used to revise land use map as the final results.

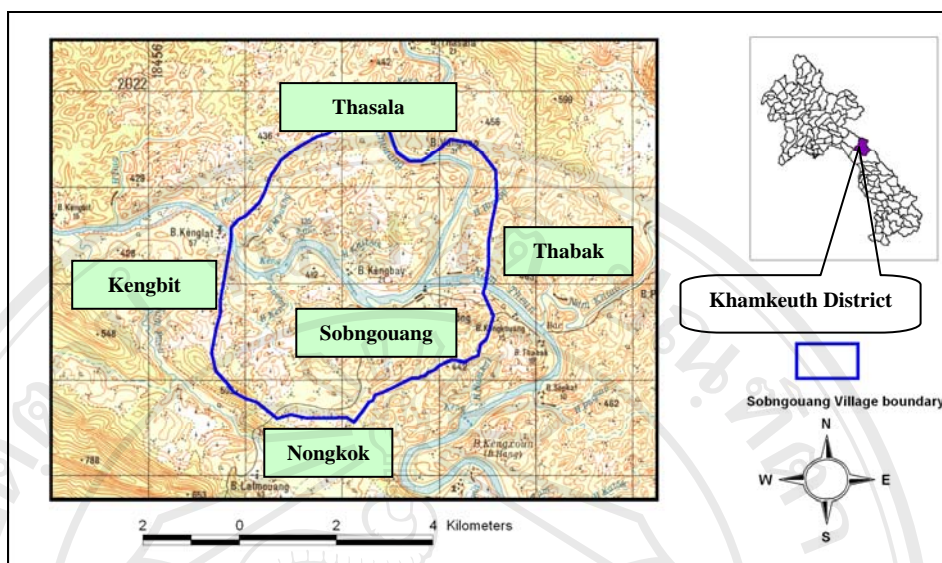
4.3. Village system and context

4.3.1. Village boundary

Sobngouang is geographically located between 461219 N and 2016696 E at elevation of 412 masl in Khamkeuth District of Bolikhamxay Province, Lao PDR.

Sobngouang shares borders with:

- Thasala village in the North
- Nongkok Village in the South
- Thabak Village in the East and
- Kengbit Village in the West (Figure 4.1)



Source: EMD GIS, 2005.

Figure 4.1 Location of Sobngouang Village

Village is, however located on the upstream of NamTheun river which is originated in the Annamite mountain chain that form the border between Laos and Vietnam.

4.3.2. Climate and soils

The climate in Sobngouang is a tropical monsoonal climate with distinct wet and dry season. The rainy season starts in May and ends in September (table 4.1). Total amount of rainfall varied between 1,947 mm in 1999 to 4,003 mm in 2005, giving an average 2,819 mm per year. The annual variation in rainfall had strongly impact on upland rice as the dominant rain fed crop in the village. In 2005 when activities of the present study were conducted, the crop suffered severely from drought at the beginning of the season and water stress seemed to be one of the major problems. Details analysis of upland rice production will be presented in the next chapter. At the end of wet season the winds which arises from the south west monsoons swings to the north east and becomes cooler and drier.

Table 4.1 Rainfall (mm) recorded at the Damsite of Theun-Hinboun

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1999	3.3	0	113	114	728	407	650	405	160	NA	6.7	0	2,587
2000	0	111	24.7	216	278	495	491	475	372	19.8	0	0	2,483
2001	9.7	14.7	40.7	171	514	240	429	504	250	121	0.5	0	2,295
2002	0	19.6	40.3	92.1	455	929	796	482	202	9	0	20	3,045
2003	3.8	8	23.9	31.5	210	415	347	696	194	17.9	0	0	1,947
2004	14.5	82.4	103	177	517	505	453	1,729	414	6.4	1.5	0	4,003
2005	0	6.8	0	176	177	661	783	1,185	377	0	9	4	3,379
Avg	4.47	34.6	49.4	140	411	522	564	782	281	29	2.53	3.43	2,819

Source: EMD monitoring data.

Generally temperature in Theun-Hinboun Hydropower Project area was great in the average around 20-35°C. In dry season, temperature may rise to above 30°C in May. With adequate water supply, dry season rice may be planted during February/March to June/July. Pump irrigation was installed for introduced production system such as mixed annual/perennial plots to ensure dry season water.

Table 4.2 Average temperature (°C) at the Damsite of Theun-Hinboun

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1999	NA	26.1	28.0	28.5	28.2	28.8	29.5	29.6	30.8	NA	26.3	19.9
2000	23.6	23.4	27.1	30.0	29.0	29.0	29.5	29.4	28.5	29.0	26.0	24.1
2001	25.4	25.4	27.0	31.3	29.1	29.0	27.9	28.8	29.8	29.7	24.4	23.5
2002	21.7	25.4	27.2	31.0	30.0	28.4	28.0	28.9	29.5	29.8	28.0	26.1
2003	21.3	24.4	26.2	31.1	30.2	28.6	29.5	27.2	28.8	28.3	27.2	23.2
2004	20.5	23.4	27.6	28.5	28.5	27.8	27.2	27.4	27.7	27.8	26.6	24.1
2005	22.9	24.3	24.5	27.9	30.3	27.1	27.9	26.9	29.3	27.0	24.6	30.0
Avg	22.57	24.63	26.8	29.76	29.33	28.39	28.5	28.31	29.2	28.6	26.16	24.41

Source: EMD monitoring data.

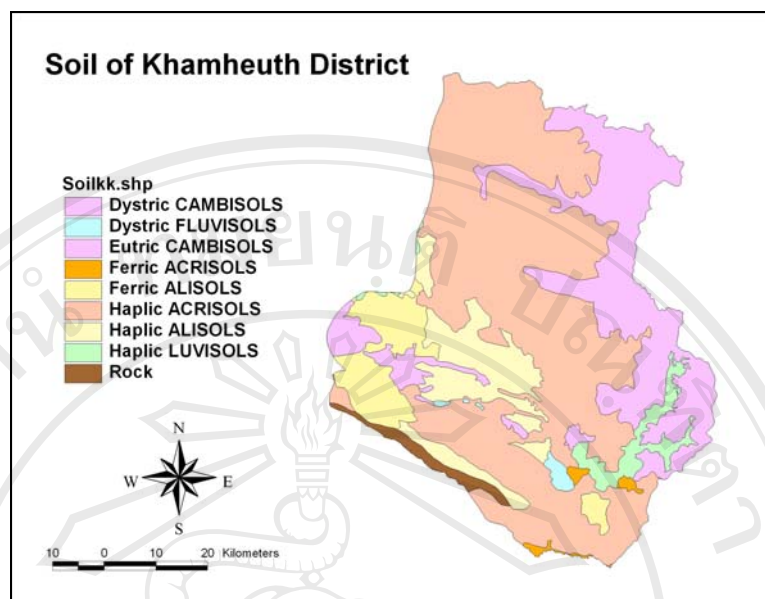
From the village key informant interviews, the villagers told us about 2 events of big flooding happened in the village since they have recorded (i) 1996 before the completion of Theun-Hinboun, its impact was not so great and the villagers could move to higher area in time, (ii) in 2002, the high flooding happened again and this time the impact was severe due to high water level raised so quickly. The cause of the flooding was because of a rainstorm in Vietnam.

Based on FAO/UNESCO 1990, soil classification system, the soil in Khamkeuth district was identified as many as 8 different units (table 4.3 and Figure 4.2). Major soils in this area are Haplic acrisols and Eutric cambisols, accounting for almost 80% of total area in Khamkeuth District.

Table 4.3 Soil of Khamkeuth District, Bolikhamxay Province

No.	Soil Unit	Area (ha)	Area (%)
1	Dystric fluvisols	2,737.59	0.62
2	Dystric cambisols	9,403.60	2.14
3	Eutric cambisols	98,022.11	22.30
4	Ferric alisols	30,763.08	7.00
5	Ferric acrisols	2,769.73	0.63
6	Haplic acrisols	234,992.71	53.46
7	Haplic alisols	40,901.29	9.31
8	Haplic luvisols	13,396.10	3.05
9	Rock	6,546.04	1.49
	Total	439,532.24	100.00

Source: Soil survey and land classification center, November, 2005



Source: Soil survey and land classification center

Figure 4.2 Soil classification map of Khamkeuth District

In a course of this study, eight soil pits were dug in different filed types where rice production is the major component of the system. On the upper fields where upland rice are growing, Haplic Acrisols is dominated (table 4.4)

In lower fields with paddy terrace, the soil type was Euthic Cambisols. These soils are dominated from siltstone, delluvial deposit and sandstone as parent materials.

Table 4.4 Soil of Sobngouang

No.	Pit site	Soil sub-unit
1.	5 years old fallow	Veti- Haplic Acrisols
2.	7 years old fallow	Veti- Haplic Acrisols
3.	12 years old fallow	Humi- Haplic Acrisols
4.	Undisturbed forest	Skeleti- Haplic Acrisols
5.	Rotational upland field	Skeleti- Haplic Acrisols
6.	Permanent field	Veti- Haplic Acrisols
7.	Highland paddy field	Stagni- Eutric Cambisols
8.	Mixed annual-perennials fields	Veti- Haplic Acrisols

Source: Soil profile survey, 2005.

Acrisols is well to excessively drained soil with highly acidic, cation exchange capacity in B horizon is low, 24 units with base saturation of <50%. These soils developed on different types of land form e.g. undulating terrace, rolling and hilly with slope ranging from 2-30%. The status of nutrient content is classified as low to medium.

Cambisols soils are in transition of immature and matured soils. These soils developed on undulating terrace and valley with slopes ranging from 2 to 8%. They are deep soils depending much on the position of topography, where soils are developed; the physical composition of soil is silty loam. They are moderately well-drained soils and the status of soil fertility is classified as medium.

At selected soil pits site for soil identification in Sobngouang, soil can be further classified in four different sub-unit of:

- Vet-Haplic Acrisol is the soil with characteristic of exchangeable bases plus exchangeable acidity in at least some sub-horizon. This has been found in 5 years old fallow, 7 years old fallow, Permanent field, Mixed annual-perennials fields
- Humi-Haplic Acrisol is soil found in 12 years old fallow in Sobngouang which is having a high organic carbon content, low base saturation.
- Skeleti-Haplic Acrisol is the soil with gravel or other coarse fragments in around 100 cm from surface. Undisturbed forest, Rotational upland field is the area found this groups of soil.
- Stagni-Eutric Cambisol is soil filled with water or stagnic at 50 cm of soil surface, high base saturation. The soil has been found in Highland paddy field or Na Homhuai.

Soil profile pictures can be seen in appendix D.

4.3.3. Water and electricity

NamTheun river is one of the major Mekong tributary in Laos. The source of NamTheun is from the border of Laos and Vietnam. NamTheun river itself having 3 main tributaries consisting of NamPhao, NamNgouang and NamMouan rivers.

NamTheun provides considerable amount of water each year, table 4.5 below showed the inflow measurement at Kengbit village where currently is become Damsite for Theun-Hinboun Hydropower Project. NamTheun river is renamed to NamKading right at this place.

Table 4.5 Average inflow (m³/s) at Damsite Theun-Hinboun

Duration	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986-1992	113	89	76	58	149	578	830	1,087	726	744	287	170
1999 - 2005	80	63	52	56	143	433	821	1,218	1,293	434	232	124

Source: EMD monitoring data.

In the dry season, average amount of water during dry season period of 1999-2005 (after dam constructed) has reduced compared with the period 1986-1992 (before construction of the project) but during the months with high intensity of rainfall in August and September the amount of water is higher this is because of the flooding during 2002.

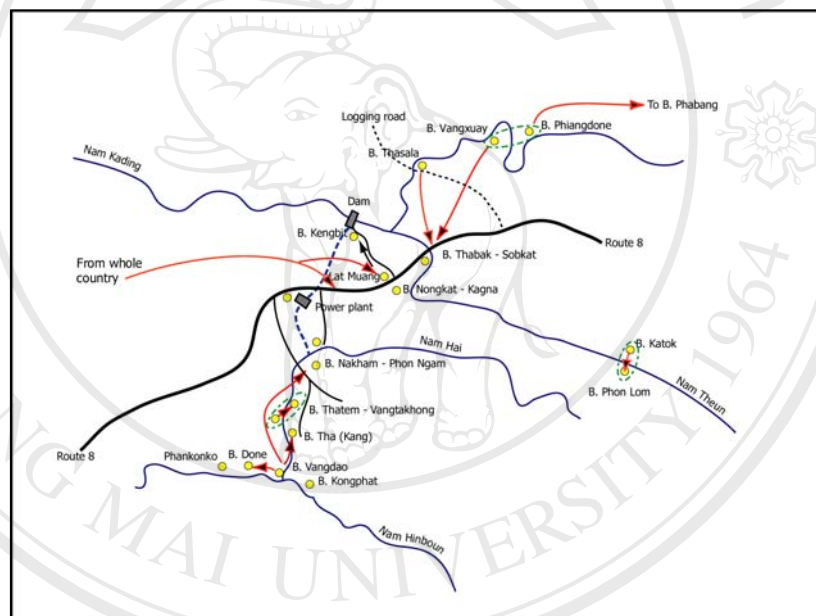
A floating pump was installed in Theun river to supply domestic water to the villagers. With electricity, the costs of operation have been reduced gravity with big electric pump. Although pumping irrigation was introduced for small scale production, expansion of irrigation would expect to increase and intensify the existing production systems for both subsistence and supplementary cash, e.g. remaining river

bank gardens, mixed fruit trees with various perennial and annual crop and small fruit orchard.

Electricity has reached Sobngouang in year 2002. This provided a good opportunity for improvement of village living standard for all villagers in the village. The electricity use has been extended to improve domestic water supply with a cheap cost of operation in the village.

4.3.4. Settlement and administration

After the completion of Theun-Hinboun Hydropower Project, many villages moved and settled along the road (Figure 4.3) Spontaneous movement and settlement of people is common in the project area in general. This was due to low standard of living, lack of adequate services and infrastructure and lack of work opportunities. However, local decision for movement resettlement may be much more complicated.



Source: Sparkes, 2000.

Figure 4.3 Map of village movement around Theun-Hinboun area

Before settling permanently in the area, Sobngouang has had a long history. According to Lao National Front for Construction (2005) mentioned about Tai Men and Tai Meuag ethnic subgroup is belonging to the Tai ethnic group and The Lao-Tai language family. The original of this ethnic group was moving from South of China and Vietnam by NamDam River, NamMao River in Son La, Dien Bien Fu and Lai Chao province of Vietnam. The main reasons of this migration were due to the war and lack of land for agricultural areas that very important for their livelihoods. This ethic group in Lao PDR has settled from the Northern part to Bolikhamxay Province. The Tai language is in the Austro-Thai family. Some groups are having old scripts for writing but many of these have been forgotten and no promotion. Shifting cultivation on upland rice is the culture of their practice as well as growing vegetable along the river bank for household consumption. Men and women are particular skill in handicraft and weaving.

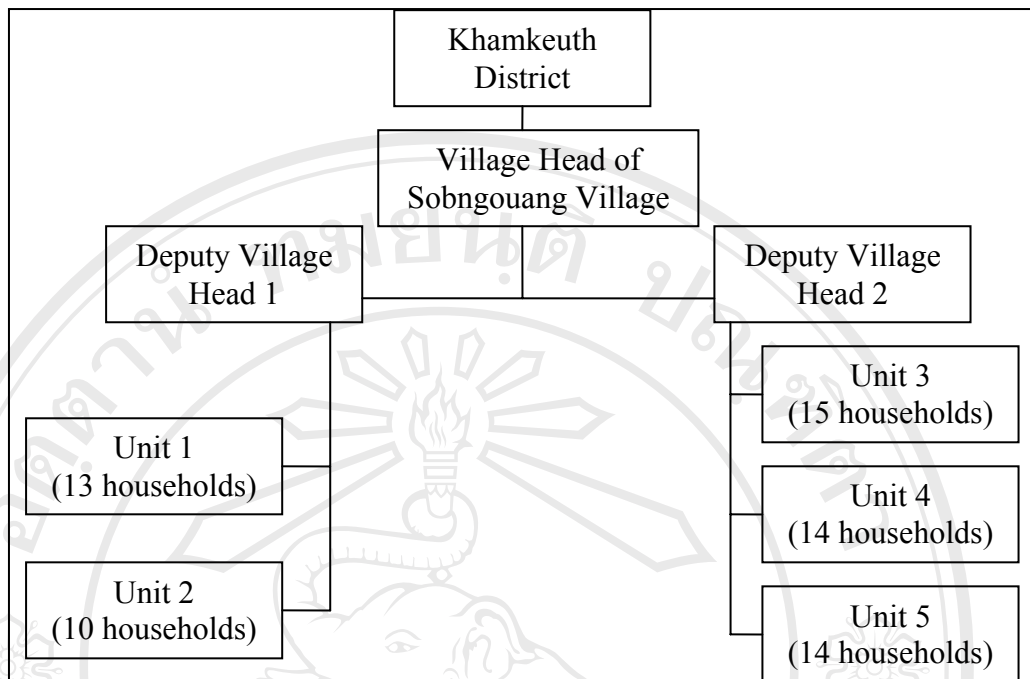
Tai men and Tai Meuag in Sobngouang Village are now merged a lot with low land people. So there is not much particular symbol of their ethnic left especially for the young generation now is being modernized by using mobile telephone, drinking beer and wearing clothes from outside.

According to discussion with the village old man and key informants during field survey 2005 the main reason why village moved from the former village site was “Hai Kao Lau Cheud” this means “old field and bad fallow” and with other few reasons of epidemics or rat broom in the village. This would force people to look for the new areas for rice cultivation. The original village of these people was closed to Lao-Vietnam border. Most of people in Sobngouang moved from Ban Vangpond Village. The first groups had been settled at Ban Vangsao Village (now not existed any more) after that the village was grownup then villagers decided to move again to Kapab 19 households and Sobngouang 20 households later all the rest from Ban Vangpond Village come along. To move from the old village, villagers made up a bamboo raft and carried all of their family members and belongings travel along Namngouang these took about 2-3 days to reach where village now.

The other main reason of resettlement of the village was the Indochina war which this area was a battle field of both sides. A lot of bombing were found in that areas so that the villagers left their old village and rice fields. Most of them had been migrated to the other areas such as Vientiane, Khammouane province, some of them have been staying in the cave in the areas. But the migration was not only during the war, there are still ongoing of village moment in the area because of infrastructure development. Firstly, construction of Route 8 was a major force for villagers to move and establish a new village. It is pretty clear in a case of Thabak Village, where the former site was ferry boats. Every trucks arrived there and stop for crossing the river, sometimes the ferry boat broken they had stayed there for a while. This event made an opportunity for villagers closed by to come and sell food and drink and later setting up as village. Other huge infrastructure development of Theun-Hinboun provided job opportunity for many local people in the country. this is the other reason why people moved into the area.

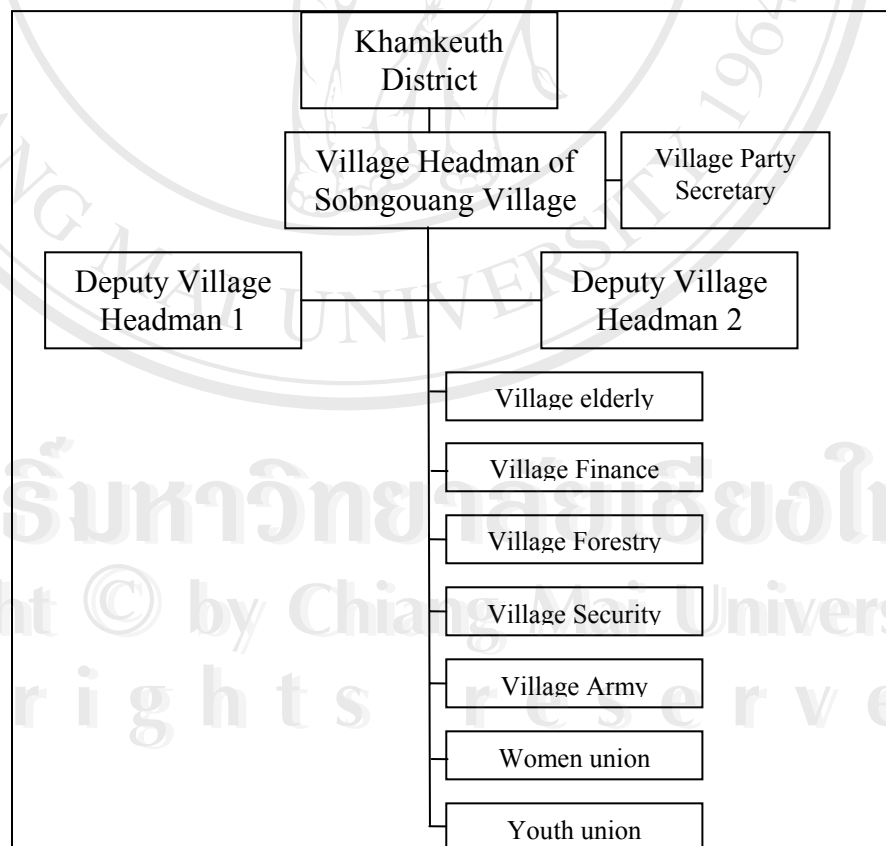
After merging of former Kapap and Sobngouang villages, Sobngouang is now formally established as official village under administration of Khamkeuth District, Bolikhamxay Province. At the lowest level, the administration divides into 5 units, composing 10-15 households in each unit (Figure 4.4 and 4.5). Unit chief elected from household members plays co-ordination role between village head and villagers. Information from village headman passes through this channel for distribution. Unit chief also collects requests from the household members and presents them to village head for future supports, assistance and further services from local government or relevant agencies. This bottom up progress encourages the local households and individuals to initiate and share their ideas in village development as whole.

As Sobngouang is organized in 2 separate communities, deputy village headman represent community heads and work closely with village headman who is officially recognized. The village administration committee is established to assist village head and deputy to organize village administration works.



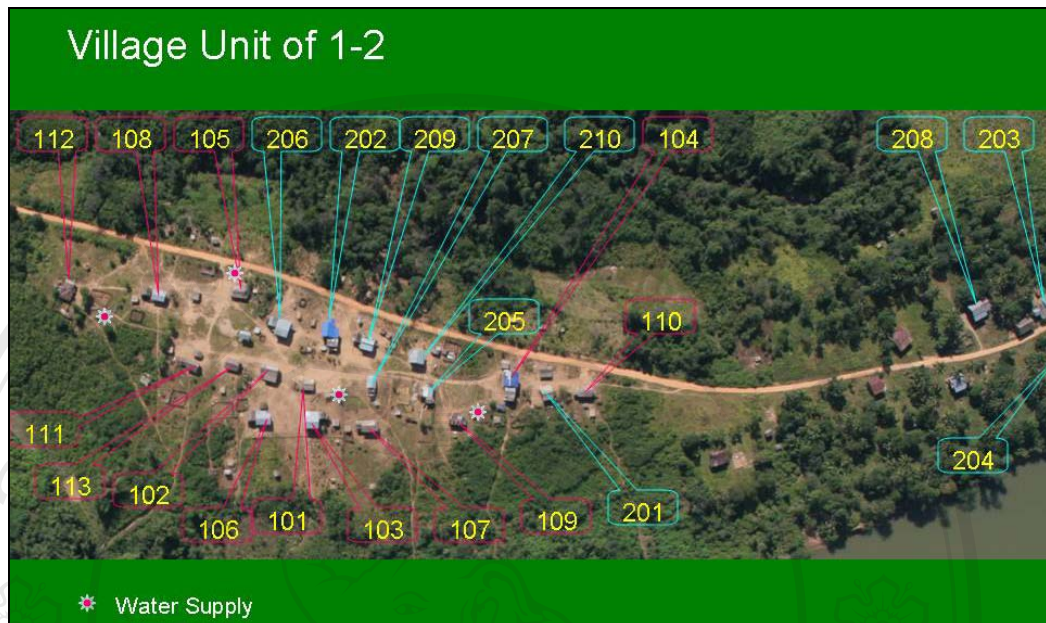
Source : Village consultation, 2005.

Figure 4.4 Administration unit of Sobngouang



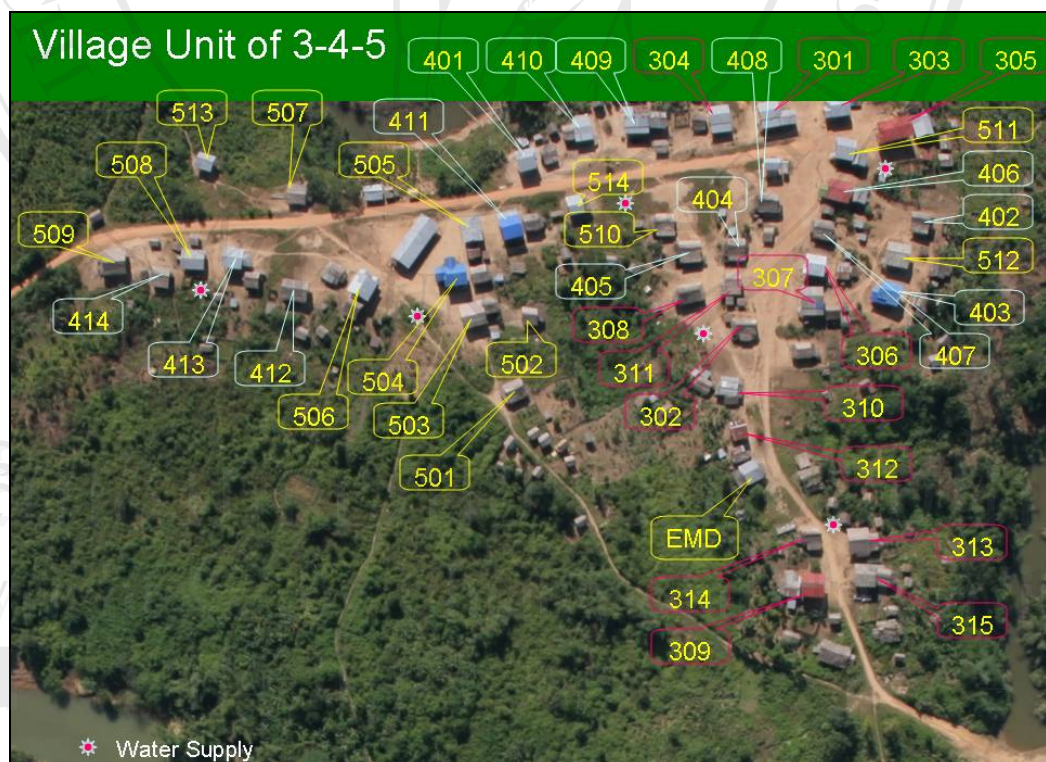
Source : Village consultation, 2005.

Figure 4.5 Administration committee chart of Sobngouang



Source: Picture taken from balloon by THPC, 2005.

Figure 4.6 Sobngouang community (Unit 1 and 2)



Source: Picture taken from balloon by THPC, 2005.

Figure 4.7 Kapap community (Unit 3, 4 and 5)

Even two communities are now merged together as one administration. But based on location of these two communities, there is still a separation of village

administration team but share one village headman. Village administration is consisting of village financing, village forestry, village security, village army, women union and youth union.

The each village administration committee will have the chief and assistant of village to function of village administration. When district or project officers come to village this village organization will be called for a meeting and work with those officers each dependant on what topic.

An important influence of village administration is village party secretary which play a role on advising and monitoring of village administration.

This village administration organization will be a basic unit to certify for the villagers in the village. For example in the case of tax payment each year when district tax officers come to village they will have to closely cooperate with this village administration to work out the tax amount that each household will have to pay.

4.3.5. Population and income

1) Population

According to Schouten, et al. (2004), population in the Headpond area of Theun-Hinboun is increasing dramatically. Sobngouang is one of the villages where population increased were due to recent in-migration (Table 4.6).

Table 4.6 Number of households, number of people, household size, and population growth between 1995 and 2002 in the villages in the Headpond area of Theun-Hinboun

Village	Location/ River	Number of Households		Population Number		Household Size		Percentage Population Growth From 1995 To 2002
		1995	2002	1995	2002	1995	2002	
Phonelom	Headpond	21	29	130	172	6.2	5.9	32
Sobpone	Nam Ngouang	36	45	217	276	6.0	6.1	27
Phabang	Nam Ngouang	15	17	102	111	6.8	6.5	9
Thasala	Headpond	31	82	181	491	5.8	6.0	171
Sobngouang	Headpond	46	68	292	389	6.3	5.7	33
Kengbit	Headpond	30	75	181	407	6.0	5.4	125

Source: THPC, 2004.

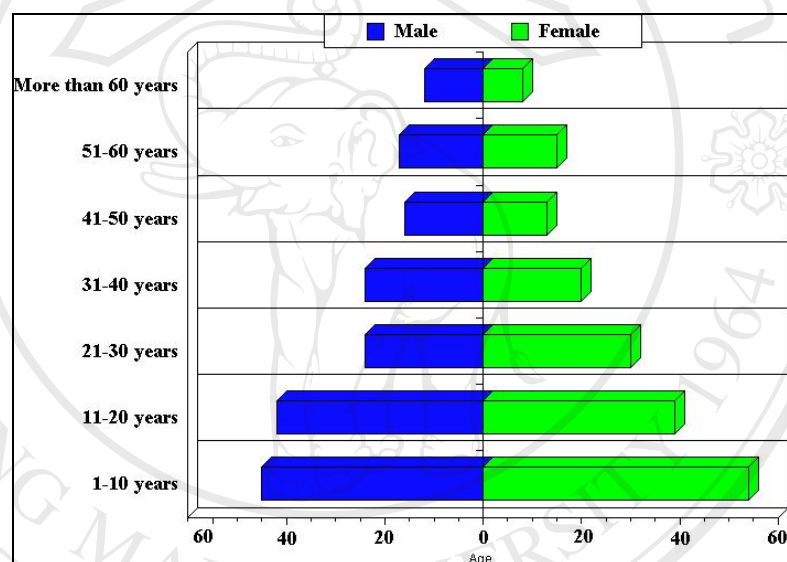
In 2005, Sobngouang Village consists of 66 household with total population of 359 people with 180 men and 179 women. From 2002, number of people in the village has slightly decreased. After, households moved out from the village to join relatives or friend to find a better land for rice production.

Despite population movement, intrinsic population growth in Sobngouang is expected to be exponentially increased and this will create tremendous pressure on land use in the village in the near future (Table 4.7 and Figure 4.8).

Table 4.7 Age structure of the population in Sobngouang

Age Structure	Male	Female	Total	%
1-10 years	45	54	99	27.6
11-20 years	42	39	81	22.6
21-30 years	24	30	54	15.0
31-40 years	24	20	44	12.3
41-50 years	16	13	29	8.1
51-60 years	17	15	32	8.9
More than 60 years	12	8	20	5.6
Grand Total:	180	179	359	100.0

Source: Household questionnaire 9-20/11/2005.



Source: Household questionnaire 9-20/11/2005.

Figure 4.8 Age graph of villagers in Sobngouang Village in 2005

4.3.6. Household economy and livelihoods

Household economy in Sobngouang remains predominantly subsistence with increasing supplementary income from both on-farm and off-farm activities (table 4.8). On average a farming household have engaged in 5-6 livelihood activities, giving a total at least 15-20 activities in the village at the moment. Diversity of livelihood activities has increased greatly as the results of the Theun-Hinboun development for the past few years.

1) Income generation and livelihood activities

a) On-farm

As mentioned that rice is the most important for the villagers in Sobngouang Village. For on-farm activities that provide income and livelihood of the village are cash crop production, livestock and fishery. As shown in the table 4.8 and figure 4.9, it was found that income generation sources of the household is from livestock 27.5%,

rice 17.6% , cash crop 8.1% and 4.4% from fishery which covered not so big amount of the income generation any more.

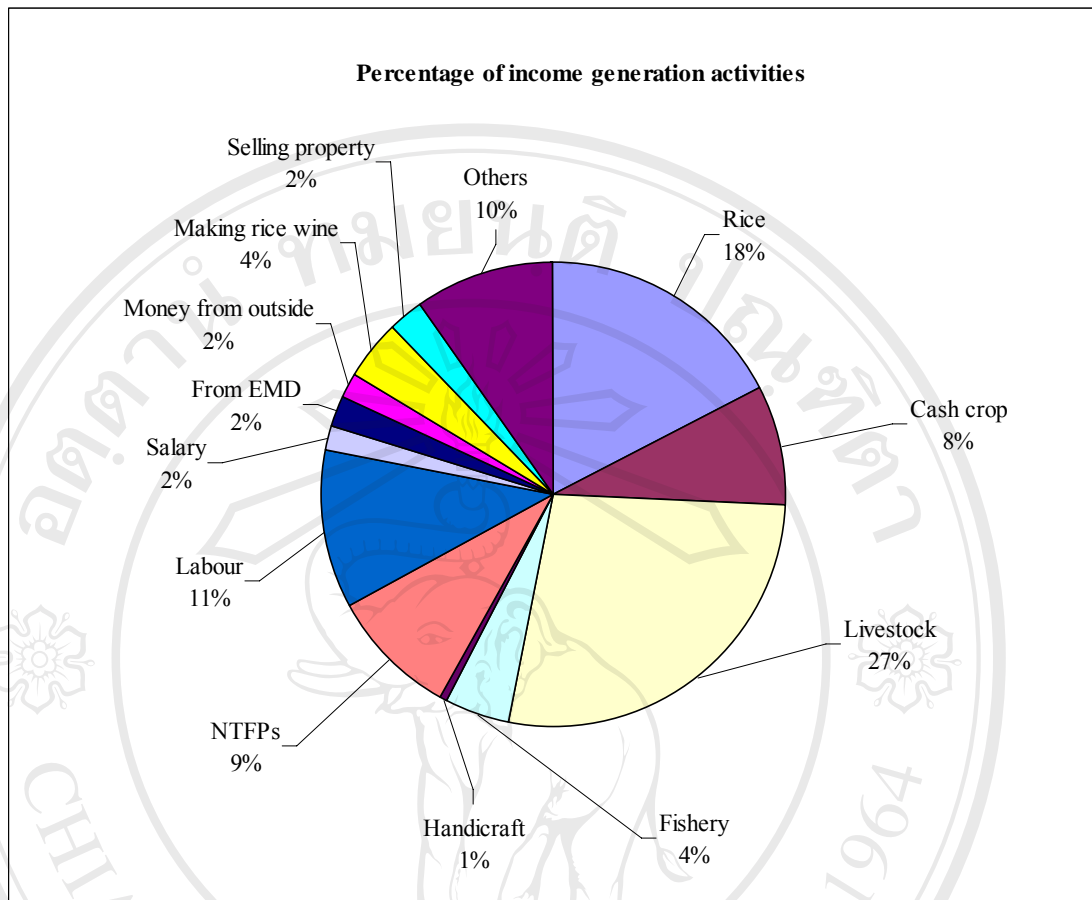
b) Off-farm

For the off-farm activities that can provide as sources of income to villagers in Sobngouang Village according to household interview 2005 found that labor covered 11.0% for both inside and outside village. NTFPs covered 8.9% which is in reasonable amount because of the market is available for this compared with the time before.

Table 4.8 Income generation source and amount from villagers in Sobngouang in 2005

Income source	Number of HH	Total (Kip)	Percentage of total
1. On-farm			
- Rice	60	77,505,000	17.6
- Cash crop	48	35,450,000	8.1
- Livestock	62	120,760,000	27.5
- Fishery	30	19,230,000	4.4
2. Off-farm			
- Handicraft	5	2,560,000	0.6
- NTFPs	49	38,995,000	8.9
- Labor	32	48,530,000	11.0
- Salary	2	7,800,000	1.8
- From EMD	23	9,794,000	2.2
- Money from outside	6	7,030,000	1.6
- Making rice wine	36	18,620,000	4.2
- Selling property	2	10,000,000	2.3
- Others	28	43,300,000	9.9
		439,574,000	100

Source: Household interview, 2005.



Source: Household interview, 2005

Figure 4.9 Income generation activities of Sobngouang

From the above income source if we try to figure out these income into cash from each village units. We found that village unit 1 can generate higher income than the other by 91,330,000 Kip and village unit 5 is the lowest of income generation only 53,500,000 Kip. The average income generation is 5,485,894 Kip per household.

2) Expenditure

The household interview gave us information related to village expenditures that villagers have to spent on their daily life.

Table 4.9 Household expenditure Sobngouang

Expenditures	Number of HH	Total (Kip)	Percentages
1. Food	65	59,160,000	18.0
2. Rice	57	74,525,000	22.6
3. Clothes	62	20,750,000	6.3
4. Medicine and hospital	61	57,914,000	17.6
5. Education	57	29,940,000	9.1
6. Production investment	8	7,915,000	2.4
6. Water supply, electric bill	65	6,629,000	2.0
7. Social contribution	23	5,790,000	1.8
9. Necessary consuming	61	17,769,000	5.4
10. Unnecessary consuming	50	10,584,000	3.2
11. Electrical equipment	13	24,309,000	7.4
12. Taxes	22	924,000	0.3
13. Others	53	13,005,000	4.0
Grand total		329,214,000	100.0

Source: Household interview, 2005

From table 4.9 we can see the biggest expenditure of the villagers in Sobngouang Village is buying rice which covered 22.6%. This may indicate that during this transition of rice production system from the traditional upland system to permanent rice production system basis, the production is not enough for household consumption. Farmers will have to find or buy rice from outside village for consumption.

4.4. Analysis of Land Use and Agricultural Systems

In general, land use pattern or land cover in Khamkeuth District is still dominated with natural forest (Table 4.11). Agricultural land is accounted for only 4.0% of the total area. Sobngouang is dominated by every green and mixed deciduous forest (Figure 4.10). The condition of the forests and regeneration of secondary forests from farmer shifting cultivation will be examined in the later chapter.

4.4.1 Land use pattern and management

1) Land use changes

Land and forest allocation have been implemented in Sobngouang Village since 2003. The main objectives of this exercise were to demarcate village boundary and determine land use zone. Once these could be finalized, granting of certificate to individual household would be made and land tax would be collected accordingly.

In 2003, land and forest allocation were conducted by the Land Use Planning and Land Allocation Committee (LUP/LA) from district authority and financially supported by Environmental Management Division of Theun-Hinboun Hydropower Project (EMD). After the completion and agreement on village boundary and land zoning, productive land would be allocated to individual household by LUP/LA

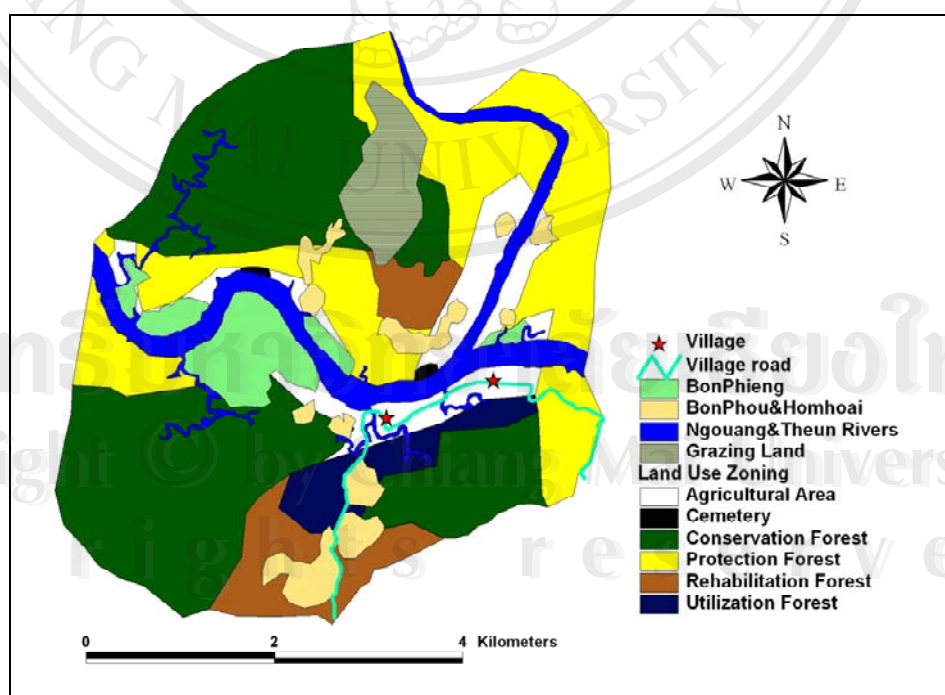
committee. Each household was allowed to remain or choose the land for permanent farming. At the beginning land allocation for permanent plots is agreed 1 hectare per household. The land owner would then inform the committee to inspect the land and make measurement. After committee approval land would be issued for land use certificate. Selling or transforming of land is not permitted without any development and improvement of the land, the authority has the right to take the land back after 3 years of insurance.

Land use in Sobngouang is now classified into 6 different types with a total area of 2,584 ha (Table 4.10 and Figure 4.10). Almost 1,000 ha of former shifting cultivation fields were presumably released for natural forest regeneration and rehabilitation. In reality much of this area is being used for short rotational shifting cultivation of 3-5 years.

Table 4.10 Land use in Sobngouang after land allocation in 2003

Land Use Types	Area(ha)	%
Conservation Forest	1,149	44.5
Protection Forest	719	27.8
Agricultural Area	372	14.4
Rehabilitation Forest	220	8.5
Utilization Forest	118	4.6
Cemetery	6	0.2
Total:	2,584	100

Source: Village land use, 2005.



Source: Village land use, 2005

Figure 4.10 Land use and forest conservation map of Sobngouang Village in 2005

Table 4.11 Land use and forest classification of Khamkeuth District in 2002

No.	Land use and Forest type	Area in 2002 (ha)	%
1	Unstocked Forest	173,521	39.41
2	Upper Mixed Deciduous	115,115	26.14
3	Upper Dry Evergreen	83,863	19.05
4	Savannah	13,182	2.99
5	Scrub	12,169	2.76
6	Grassland	10,260	2.33
7	Rice Paddy	9,384	2.13
8	Ray	8,487	1.93
9	Barren Land and Rock	7,170	1.63
10	Mixed Broad-Leaved and Coniferous	4,000	0.91
11	Lower Mixed Deciduous	1,160	0.26
12	Swamp	844	0.19
13	Water Bodies	743	0.17
14	Lower Dry Evergreen	216	0.05
15	Urban or Built up area	213	0.05
16	Other Agriculture Land	8	0.00
Grand Total		440,336	100

Source: Ministry of Agriculture and Forestry, 2005.

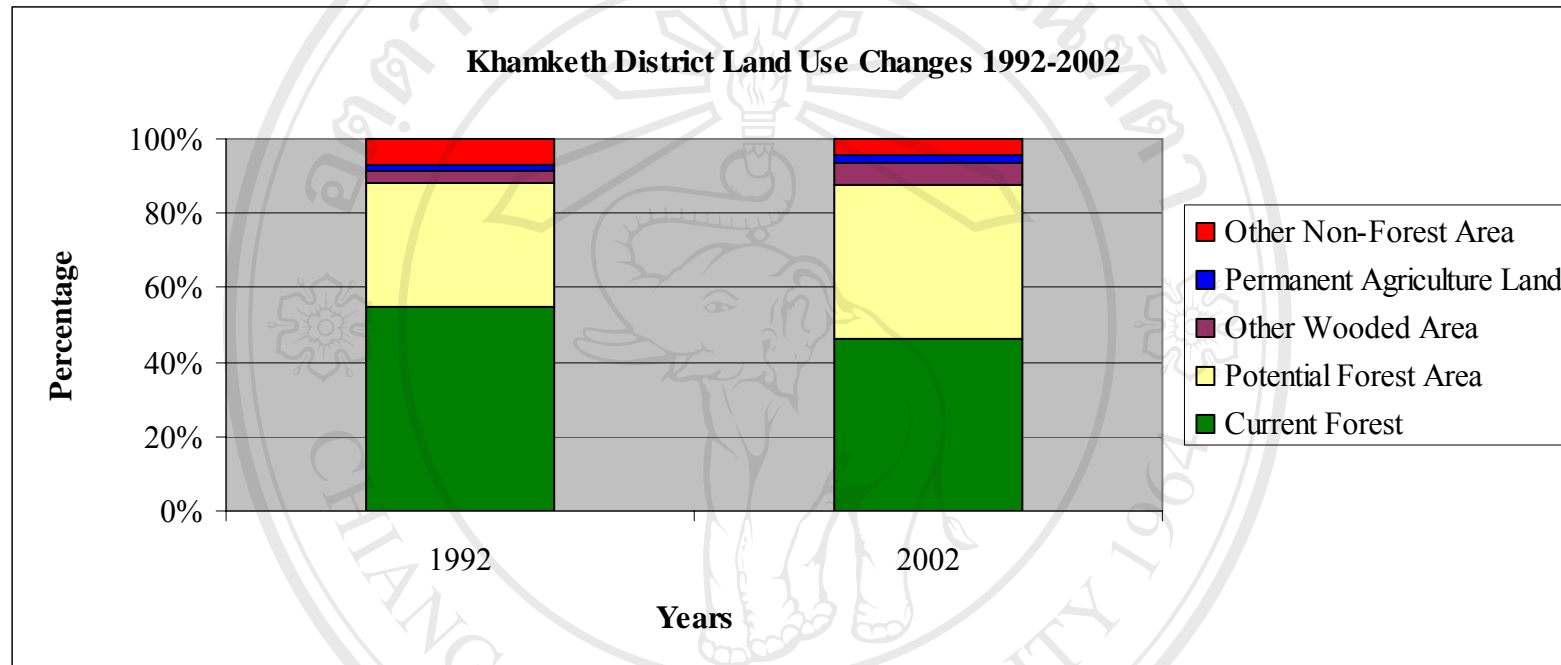
As shown in Table 4.14 land use in Khamkeuth District in past 10 years has been greatly changed. Current forest of 37,089 ha has been transformed to other types of land use. Other non-forest area has been reduced as well of 12,570 ha. The greatly increase of potential forest this may Ministry of Agriculture and Forestry reclassified the fallow a potential forest and this has been increased of 31,866 ha.

Ray or shifting cultivation area has been increased of more then 2,000 ha as of 6,226.83 ha in 1992 to 8,487.49 ha in 2002.

Table 4.12 Land use changes of Khamkeuth District in 1992 and 2002

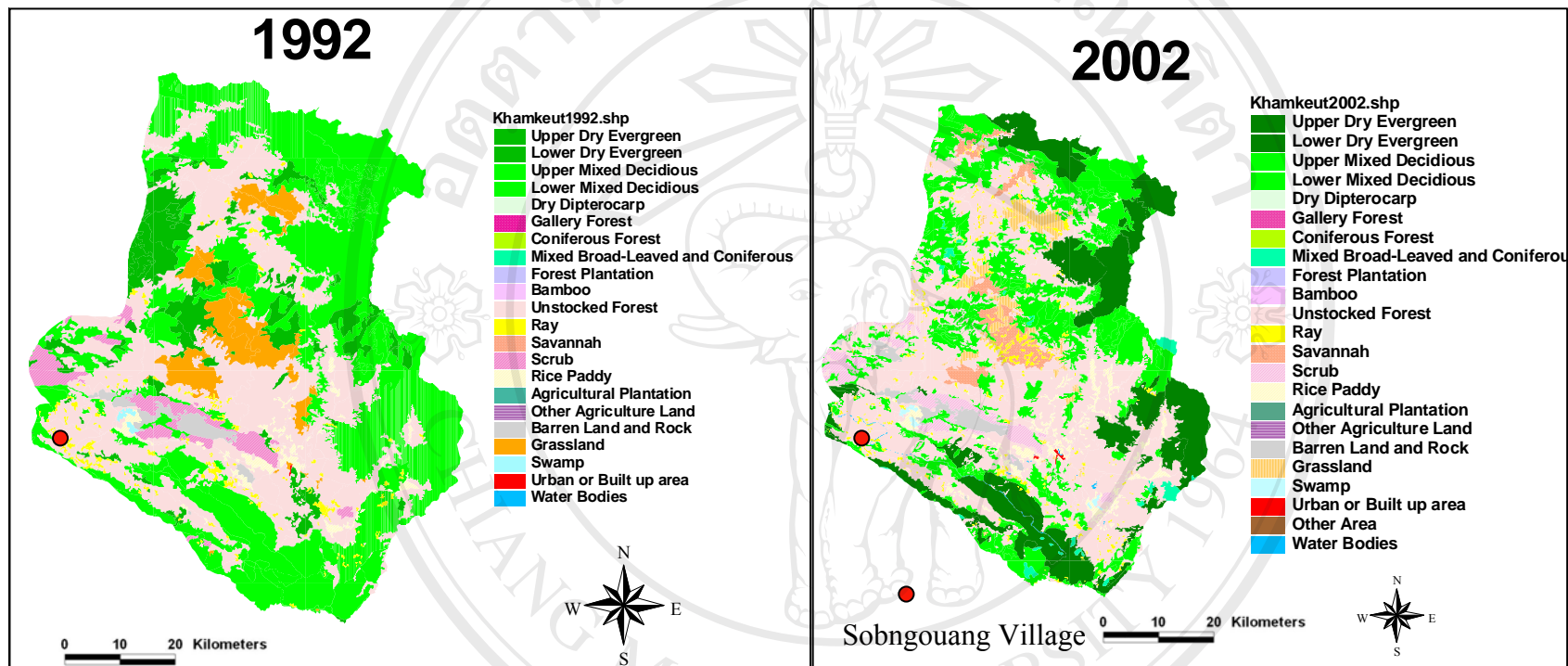
		Year 2002						Grand Total	Increased/ reduced
	unit : ha	Current Forest	Other Non-Forest Area	Other Wooded Area	Permanent Agriculture Land	Potential Forest Area	Ray		
Year 1992	Current Forest	190,852.27	696.14	1,960.70	310.09	46,440.83	1,183.58	241,443.61	-37,089
	Other Non-Forest Area	1,287.92	15,218.58	9,235.61	165.42	3,565.84	2,334.00	31,807.37	-12,576
	Other Wooded Area	680.31	237.21	10,363.06	35.13	1,905.79	12.87	13,234.37	12,116
	Permanent Agriculture Land	0.19	204.69		5,232.99	531.69		5,969.56	3,422
	Potential Forest Area	11,517.89	2,780.04	3,774.72	3,432.76	117,207.01	2,941.95	141,654.37	31,866
	Ray	15.77	94.28	16.61	215.37	3,869.71	2,015.09	6,226.83	2,261
	Grand Total	204,354.35	19,230.94	25,350.70	9,391.76	173,520.87	8,487.49	440,336.10	

Source: Ministry of Agriculture and Forestry, 2005.



Source: Ministry of Agriculture and Forestry, 2005.

Figure 4.11 Land use changes of Khamkeuth District in 1992 and 2002



Source: Ministry of Agriculture and Forestry, 2005

Figure 4.12 Forest and land use change of Khamkeuth District in 1992 and 2002

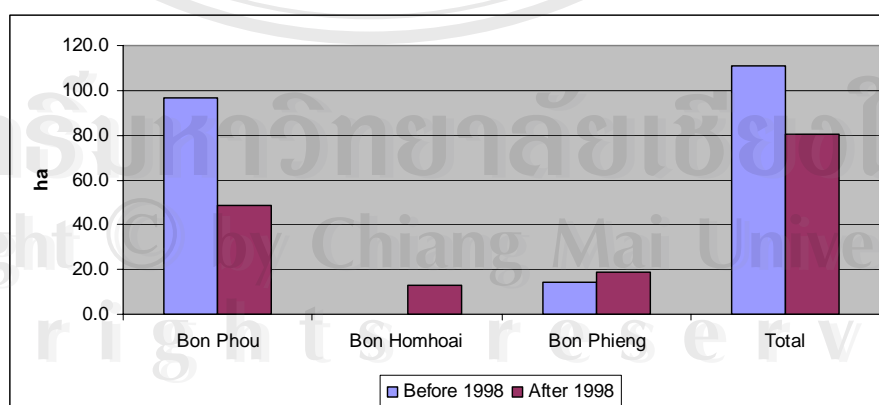
4.4.2 Change in land use and agricultural systems

Upland (Bon Phu) was greatly reduced by almost 50% after the completion of Theun-Hinboun Hydropower Project (Table 4.13). Area for upland rice in shifting cultivation was reduced by 2/3, but other new land use systems were developed to compensate the loss, e.g.: permanent rice fields, newly developed paddies and fruit tree gardens. It should be noted that river bank gardens were also reduced greatly due to the rise of water level after starting operation of the project. With assistance from THPC, the village relocated into the new area. Former village site was also located at lower elevation and prone to flooding due to heavy rain.

Table 4.13 Land use changes in Sobngouang

Agricultural Areas	Before 1998 (ha)	After 1998 (ha)	Difference (ha)	Remarks
1. Bon Phu	96.8	48.5	-48.3	48 ha has been transferred to forest land and Bon Homhuai
- Bush fallow fields	92.8	38.2		
- Gardens	4.0	1.6		
- Permanent upland fields		5.2		
- Tree plantation		1.4		
- Not use fields		2.1		
2. Bon Homhuai		12.9	12.9	
- Paddy fields		12.9		
3. Bon Phieng	14.1	19.0	5.0	
- Bush fallow fields	8.6	13.8		
- Gardens	2.7	0.2		
- River bank gardens	2.7	0.5		
- Annual mix perennial fields		2.6		
- Tree plantation		1.0		
- Not use fields		1.0		
Total	110.9	80.4	-30.5	

Source: Summarized from household questionnaires, 2005.



Source: Summarized from household questionnaires, 2005.

Figure 4.13 Land use change in Sobngouang Village before and after Theun-Hinboun Hydropower Project

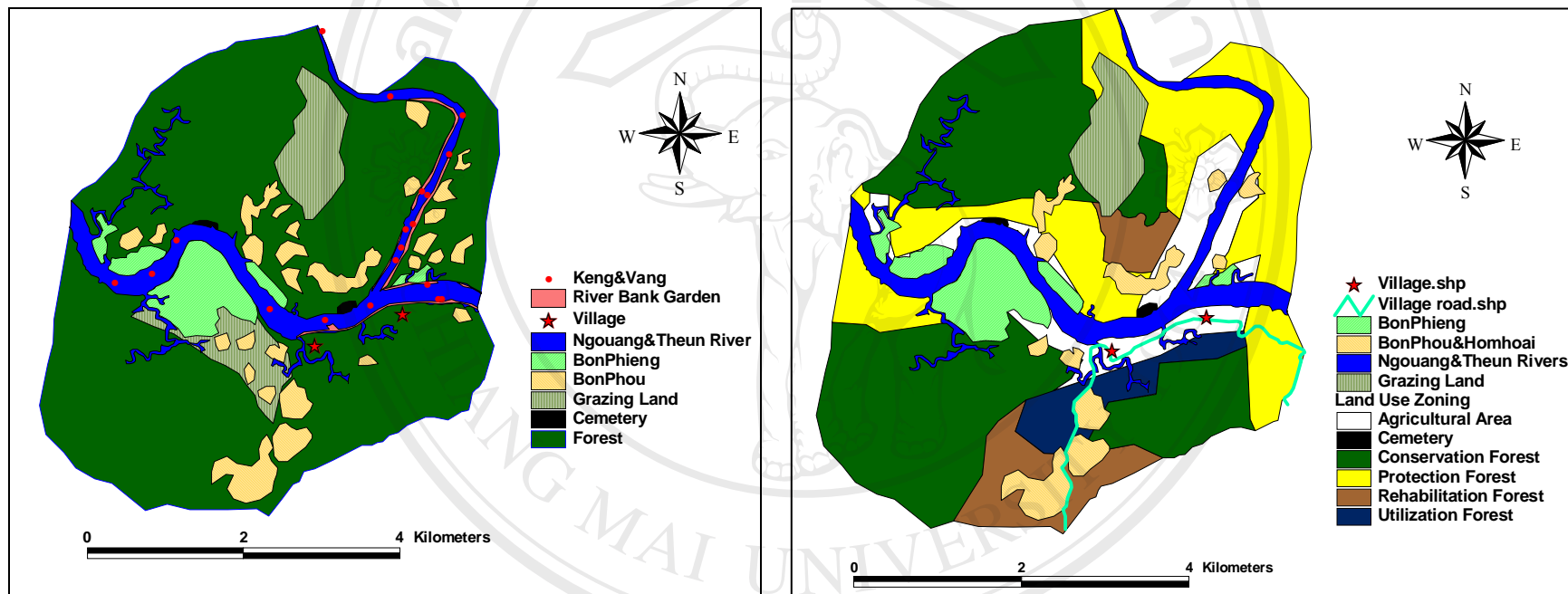
Table 4.14 Land use and crop changes in Sobngouang Village

Crops	Bon Phu ha (%)					Bon Phiang ha (%)							Bon Hom luai ha (%)	Total
	Bush fallows	Perma-nent upland	Tree plantatio-n	Home gardens	Not use fields	Bush fallows	Perma-nent upland	Annual mixture perennial fields	Tree planta-tion	Home gardens	River bank gardens	Not use fields		
Before 1998														
1) Rice	92.8 (83.7%)					8.6 (7.7%)								51.9 (91.5%)
2) Home garden crops				4 (3.6%)						2.72 (2.5%)				12.9 (6.1%)
3) River bank cash crops											2.72 (2.5%)			1.8 (2.5%)
Sub total	92.8 (83.7%)			4 (3.6%)		8.6 (7.7%)				2.72 (2.5%)	2.72 (2.5%)			110.9 (100%)
After 1998														
1) Upland Rice	38.18 (47.5%)	5.15 (6.4%)					8.54 (10.6%)							324.2 (64.5%)
Paddy rice													80.6 (16%)	80.6 (16.0%)
2) Home garden crops				1.6 (2.0%)						0.16 (0.2%)				11.0 (2.2%)
3) River bank cash crops											0.50 (0.6%)			3.1 (0.6%)
4) Annual mixture perennial								2.6 (3.3%)						16.3 (3.2%)
Annual mixture perennial*								5.2 (6.5%)						32.7 (6.5%)
5) Agar wood			1.41 (1.8%)						0.99 (1.2%)					15.0 (3.0%)
					2.13 (2.6%)							0.99 (1.2%)		19.5 (3.9%)
Sub total	38.18 (47.5%)	5.15 (6.4%)	1.41 (1.8%)	1.60 (2.0%)	2.13 (2.6%)		8.54 (10.6%)	7.8 (9.8%)	0.99 (1.2%)	0.16 (0.2%)	0.50 (0.6%)	0.99 (1.2%)	12.90 (16%)	80.38 (100%)
Changes	-54.62 (47.5%)	+5.15 (6.4%)	+1.41 (1.8%)	- (1.6%)	+2.13 (2.6%)		+8.54 (10.6%)	+7.8 (9.8%)	+0.99 (1.2%)	-2.56 (2.3%)	-2.22 (1.9%)	+0.99 (1.2%)	+12.90 (16%)	-30.48 (27.5%)

Source: Summarized from household questionnaires, 2005.

Land use before 1998

Land use after 1998



Source: Village participatory rural appraisal (PRA), 2005.

Figure 4.14 Land use changes in Sobngouang Village.

2) Agricultural systems

After resettlement in 1973 to 1998 when the project started, shifting cultivation is the dominant systems with upland rice and other subsistent crops such as maize, beans, cassava and other swidden crops. This form of practice occurs extensively in the upper part of country (Roder, 2001). In the past, this group of farmers could have practiced pioneer shifting cultivation. This was suggested by migration pattern discussed earlier in previous section. Farmers moved to new pieces of land when soil fertility was severely depleted and rice yield was very poor. Since 1973, no movement has been made, farmers used to rotate shifting cultivation field with fairly long cycle up to > 7 years. Farmers might own 5-7 pieces of land, depending on land and soil quality. Lower fields with relatively flat land were cropped intensively without fertilization for 5 years cycle. Upper fields with slopping land required longer cycles in order to build up vegetation for adequate biomass.

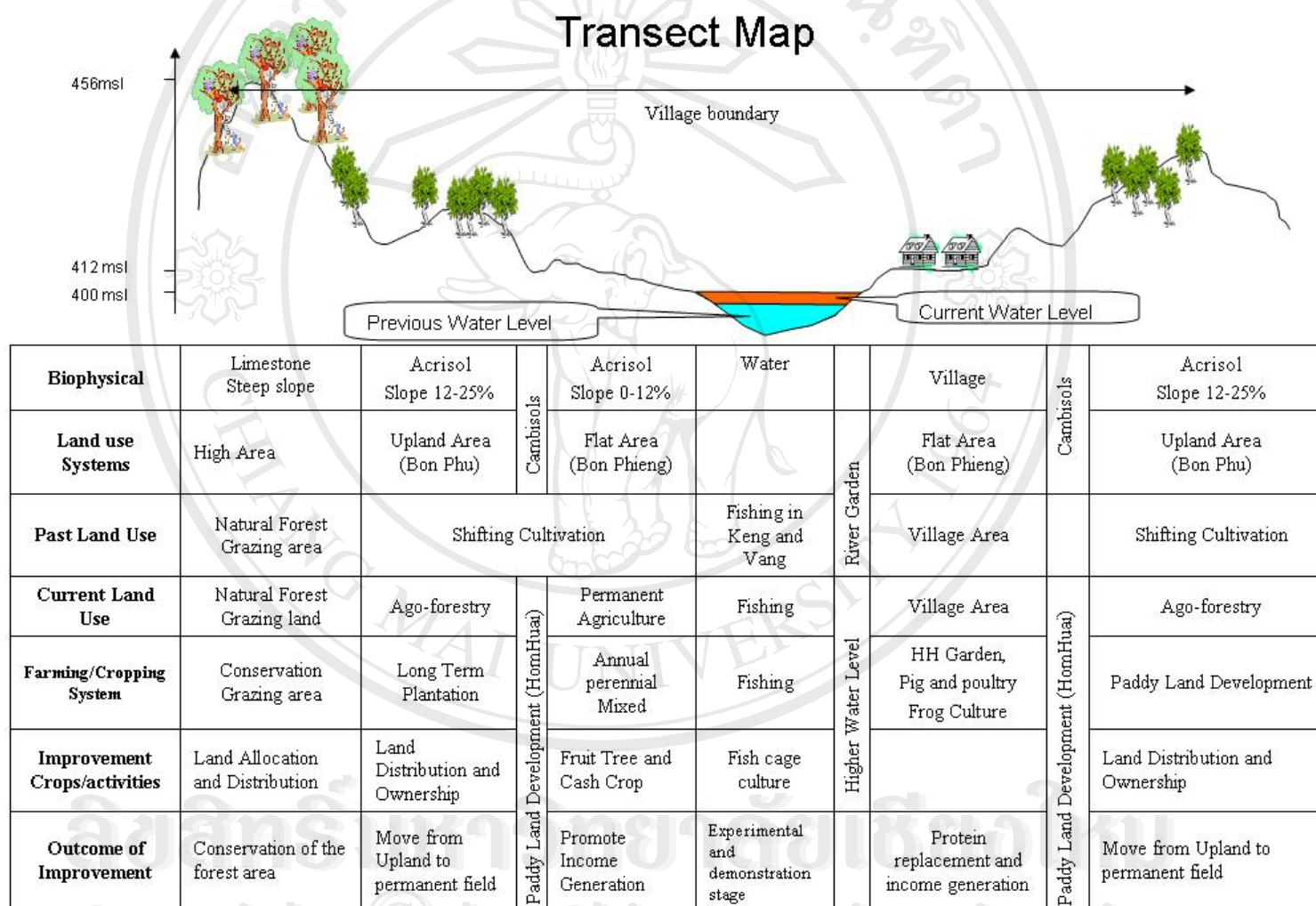
Growing Vegetable in small gardens along river bank is being used for another traditional agricultural system during the time periods of lower water level. The system is quite intensive with multi-species mixture of vegetables, beans, and other annual crops. Can watering was practiced and harvests could be made regularly throughout the long growing periods from December to February.

Livestocks were the major source of income with free grazing. With the implementation of stabilization of shifting cultivation, grazing land was fixed for cattle grazing. This system is still in existence even today.

After 1998, with development policy to support on upland management, shifting cultivation was suppressed with intensive land use of short rotation on fixed cultivation. Permanent upland field was developed with soil and water conservation measures to reduce soil erosion and prevent land degradation. Intensive mixtures of perennials and annuals including fruit trees were established in rich fertile soil of relative flat land. This was intended to replace river bank gardens which were wiped out by exceptional higher water level due to the dam. Starting with one Rai of flat land was allocated to each household for establishment and development of intensive mixture. Pumping irrigation was installed, farming and technical assistance have been also provided.

With infrastructure development and easy access to external market, farmers shifted their intensive production system towards a range of cash crops supported by the project. Chemicals utilization technology was introduced with improved seeds and modern crop varieties. However, income from cash crop is some what lagging behind expenditure for rice to meet household need. The importance of rice production has never been declined but productivity and planted area for upland rice reduced tremendously for the past recent years.

Among other component of agricultural systems, amount of fish catch in river was reduced by as much as 50% after the completion of the dam. Their habitats and breeding site were destroyed by higher water level in the river.



Source: Field data collection, 2005.

Figure 4.15: Transect of Sobngouang village landscapes and activities.

4.5 Analysis of push and pull factors

4.5.1 Push factors

1) Government policies

In Sobngouang, upland management policies have been implemented even before the commencement of Theun-Hinboun Hydropower Project. At least 4 major government policies, stabilizing of shifting cultivation, village consolidation, land and forest allocation and poverty eradication, have been fairly effective in the village.

The ideas of stopping or stabilizing slash and burn practice have been announced officially in the Sobngouang by the district officials who came into the village with notice from district or province authority and this documents was read to villagers in a village meeting. At that time, no actual measure or alternative of livelihood improvement were mentioned with this notice. The implementation of shifting cultivation stabilization practice remained ineffective until the development involvement of Theun-Hinboun Hydropower Project after 1998.

According to village consolidation policy, a minimum of 50 households should be required for establishing of a formal village. With village formality, access to government support and services are possible. At present, Sobngouang and Kapap communities are merged together and formed an official village with access to rural development program, road and electricity connection.

As mentioned earlier with respected to land and forest allocation policy, village land use plan has now completed with establishment of village committee.

Sobngouang is one of the target villages for poverty eradication of Khamkeuth District. According to interview Deputy Governor of Khamkeuth District, some 70 villages in the district were identified as poverty area with the following criteria to eradicate poverty:

1. Enough of rice for household consumption at the average of 350-370 kg/person/year.
2. Permanent housing for at least 5 years.
3. Primary education for children.
4. Living with hygienic conditions.
5. A minimum cash income of 700,000 Kip/person/year (equivalent to 70 dollars).

Khamkeuth District has appointed a committee for assessment of the poverty eradication. In Sobngouang, village are now total 29 out of 66 households received the eradicate poverty certificate. Sobngouang remains a poor village in district.

2) Implementation and achievement of government policies

a) Income generation activities

Agar wood (*Aquilaria agallocha*) was introduced to regenerate degraded fallows. It is now promoted extensively in the Headpond areas and other villages in the district. The idea of Agar wood may replace shifting cultivation on a long term

basis. However, the scale of adoption remains to be seen as upland rice cultivation is still significantly contributing to the farming households in the villages. In year 2005, there is only one household in the village invested to buy seedling of agar wood himself about 1,000 seeds in 1 ha area. But in year 2006, there are 48 households interested and planting of the agar wood in about 34 ha in Sobngouang. This is a promotion has been given thought a project called “Planting Agar wood garden at district level project” support by Ministry of Agriculture and Forestry and local authorities (Province and District). After selling benefit is expected to share 50% to villagers and other 50% for the project, with now there are a market for this wood from Brunei, India and Thailand. This project has invited representatives from each village to visit and study tour an area which already plant Agar wood in Hinheup District, Vientiane Province.

b) Infrastructure improvement

In the area, Road No.8 was constructed for the link to Vietnam border in very early year of 1980 from Laksao to NamTheun. The other new open of haft road No.8 in 1990 from NamTheun to Road No. 13 at BanLao and following with construction of NamTheun Bridge to accommodate crossing of river instead of using ferry boat.

Feasibility study of the Theun-Hinboun Hydropower Project was carried out in 1993 and construction works completed in 1998. So Theun-Hinboun now is commissioning for about 9 years. Development of Theun-Hinboun Hydropower Project has provided a benefit to national level as foreign exchange earning source for the government. In the same time at the local level, construction of the project have provided both direct and indirect benefits to local community for examples, better road for communication, electricity for local villages; improve livelihood of the villagers through project compensation and mitigation program by rural development.

Before hydropower project, villagers were using the natural resource as (i) Land use: the village with traditional of producing upland rice for consumption. Rice is the first priority of people who living in the villages in this area. Because when they have rice in the stock, it does means that they are secure for their food. The other things to eat with said they can find everywhere. (ii) Water use: most of villagers were fishing in the river for their food and growing vegetation in dry season at river bank garden for their consumption and if they need a surplus they could sell it for cash and become a source of fund for investment in the next coming year. (iii) Forest use: villagers were using forest as source of hunting area and harvesting of non-timber forest products.

After completion of the dam construction work in 1998 and starting operation now and then, impacts from operation of Theun-Hinboun to local village were pretty clear and more serious than the prediction during project environmental impact assessment (EIA). Those impacts were caused by of higher water level in Headpond area as (1) more difficult to fish in the river, (2) in dry season, river bank garden can not be practiced any more.

The other infrastructure development types being introduced into the area is not only seen as above physical type but also technology, education and health services.

Referred to Government Policy on the upland management, compensation policy of Theun-Hinboun Hydropower Project and the agreement with impacted villages, development assistance has been introducing in the Sobngouang. Based on the Logical Framework a few activities are now being implemented in the village as listed in the following:

- Community organized and assessed.
- Water supply for household and garden.
- Health and sanitation.
- Household garden and orchard.
- Improve livestock farming.
- Headpond conservation permanent farming.
- Saving and credit fund.

c) Improved production systems and sustainable land use

Similarly to people living in Southeast Asia, villagers who live in Sobngouang are also rice dependent culture. Firstly rice with rice store. Iren, et al. (1998) observed village in the same area (Katok Village) and mentioned that three meals a day are eaten in all households and every meal consists of rice of the sticky varieties. So all villagers will spend most of the time in the year to produce rice starting from March to December. The rest of the time they will be spending in the river to find fish and other aquatic life. For the time left will be spent in the forest for timber and non-timber products. Most of these products will be used for consumption. If they can find a lot they will distribute to their relatives and sell for some cash for saving.

Theun-Hinboun Hydropower Project had carried out an extensive study on the impacts of the social and environment. A few studies relation to Theun-Hinboun Hydropower Project was reviewed in more details during studying period. Those documents could be listed as following:

Environmental Impact Assessment (EIA) was carried out in the very early of the project planning. The EIA report identified some potential impacts from implementation of the Theun-Hinboun Hydropower Project by Norpower A.B in 1993. In relation to upland area the following table shows the proportions of land use.

Table 4.15 Proportions of various land use practices within the NamTheun and Namngouang catchments upstream the Dam Site

Land Use	Area (Km ²)	%
Paddy	122	1.4
Upland area	2,178	24.4
Forest	6,613	74.0
Clastic rocks	24	0.2
Total:	8,937	100

Source: Environmental Impact Assessment, 1993.

Norpower A.B. (1993) also indicated that about 436 Km² would be cleared each year in the NamTheun catchment upstream the dam site. Due to the suitable for paddy land only 1.4 % or 122 Km² was developed to paddy field in that time. The proportion of the upland field was quite high of 24.4 % or 2,178 Km². There was a

report on the impact by late start of the wet season, an early finish and drying winds at the crucial flowering stage of growth. Consequently, many villages had to face with rice shortage in their families. This means that upland rice is dependent to many factors especially the climatic conditions. It is interesting to see how the proportions of land use here have been changed over the time.

After found out that EIA was not comprehensive enough Government of Norway through NORAD had given a financial for Theun-Hinboun Impacts Study, Norplan A.S. (1995). The study was carried out for more than one year with following major components:

- Wildlife and vegetation.
- Rural Development and Land Use.
- Socio-economic.
- Hydrology, erosion and sedimentation.
- Fish and Aquatic life.

The results of the study above were given to Theun-Hinboun direction for implementation of the environmental mitigation measures. The Environmental Impacts Mitigation Measure Agreement between Lao Government and Theun-Hinboun Power Company was signed with 2.6 Million USD of budget.

The impact of Theun-Hinboun was over estimated of EIA or any studies. The impact was extended after operation of the project, (Visounnarath, 2002). According to recommendation by ADB review mission, Theun-Hinboun engaged a consultant firm to carry out the detail comprehensive study and prepare the Mitigation and Compensation Program (MCP) for 10 year starting from 2000-2010. Based on recommendation of the MCP, Environmental Management Division (EMD) under management of Theun-Hinboun was established.

To implement the above MCP, Environmental Management Division (EMD) has developed a Logistical Framework for working management and monitoring controls of compensation and mitigation activities.

Logistical Framework (Log Frame) identified that in the Headpond area there is a lack of suitable land to produce sufficient food with existing traditional technologies, and the lack of knowledge and funds to develop improved higher yielding farming systems. In some villages there are still insufficient lands, even with improved farm production systems, and therefore the creation of alternative income generation opportunities for both women and men is required. Therefore, Logistical Framework set a requirement of sustainability of the upland farmers who live in the Headpond area by supporting conservation agriculture in the six impacted villages of Theun-Hinboun.

Log Frame pays attention to supporting management of the upland agriculture in the Headpond area for sustainable land use.

To compensate and mitigate the above problems, Theun-Hinboun Hydropower Project has adopted the mitigation program with based on government policies as mentioned above. The program had been developed on the basis of how villagers still can have rice for their consumption (rice sufficiency) and sustainability rice production but in the meantime the forest area still being preserved. Firstly, Project

try to help villagers by reducing of shifting cultivation by land and forest allocation program is implemented in the village. Project has assisted and provided them with alternatives of (1) Paddy field development and upland field terracing: More strictly in the land use policies of the government; the villagers have to move from conventional land use as before they have 7-8 plots of land for rotation but now they have to move for practicing in permanent area. To do this with cooperation of district authority, land around 1 ha had been allocated to each family in the village. Project provided training assistant to develop those land to become paddy field and terracing filed and to help villagers feel confidence with those piece of land they developed a temporary land titling is given to each owner (2) Soil fertility and land improvement: To ensure this land still can produce good rice, project has provided training to villagers how to make organic and bio fertilizer to reduce the cost of the buying chemical fertilizer. (3) Intensive vegetable and orchard alternative garden: land approximately 1 rai (40x40 m) have been divided to household for growing vegetable and orchard garden as alternative garden this is for compensation of the loss from their dry season garden. Assistance had been given to provide water pump and water system to irrigation this garden. This process is now being implemented in Sobngouang. After preliminary visit this garden, villagers told use that they also plant rice in this area as well.

It is always a hope of upland people to have better livelihoods that if they convert their land to be upland paddy field because government believes that paddy field is more stable on the rice production and can produce better yield. But to convert to paddy land it needs a lot of energy, investment and need to intensify of agricultural practice on the field which are the conditions relatively difficult for this community to adapt.

Slash and burn rice production system is not required very much equipment and technology. There is nearly no any cost of investment except labor for clearing and weeding. The only need is a chopping knife and fire during slashing and burning period. So there has been seen as primitive way of agriculture which utilizes a lot of natural resources.

Based on observation the villagers are now have to depend on more other source of income to replace those lost and ensure that they still have rice for their households. Cash crop has been introduced to the area for example; contractual for growing maize. At the same time, it seems that villagers are now turning to forest for harvest more of non-timber forest products (NTFPs) for sell. This may be to replace of the lost of upland rice that they can not produce as before or access to market is more opened. The other thing is now happening in the village, there is also of stepping in of the market economy which world wide understand as source of natural resource utilization and degradation if not careful study and planning. The market economy is encouraged people to produce more, harvest more and this may lead to over exploited of natural resources. All of this will be reviewed and study.

According to project, above activities were with an idea of helping village is not really successful. Because Majority of villagers are dependent on shifting cultivation but their rice production decreased dramatically after 3 years of project implementation there may be (i) Yield of the villagers had declined (according to some initial discussion with villager before their yields in average around 1.5 t/ha. So

after move to permanent field in the first year still getting the same yield but second year yield reduce nearly half and the third year is even worst) (ii) Fallow periods have been disappeared due to changing land use from shifting cultivation to permanent field. (iii) Weeding and diseases build up. But the project and government considered the conventional producing of upland rice by clearing forest is creating significant affects to forest and soil degradation and will lead to unsustainable of the natural resources and impact to operation of the hydropower by soil erosion and sediment in the Headpond.

d) Increased access to external markets and credits

Opening of the access and construction of the infrastructure in this area, it seemed that Sobngouang Village now is moving in to market economy which is produce more products or harvest/exploit more of natural resources for sell. Middleman is coming in to the village easier than before. Village now is starting with contracting farming for example of maize of the last year crop. Situation has been changed from the sufficient economy in the past to market economy. This is due to more accessible of both directions to and from this village. From village observation there is a middle man come from Thabak village is coming into village each morning. This man is bringing all the consumption goods to local shop like soap, fish can, and some consuming products. Some products like cigarette, beer are also coming to village. Before the return, villagers will bring any thing that they want sell like garden products, fish, NTFPs to him. Today there are also Vietnamese bringing goods on the bicycle for sell in the village as well. But this is not means that before construction of the Theun-Hinboun is no any buy and sell in this village, but much smaller scale and not so often. Middle man will come to village just a few days a month. Most of villagers when they find things and want to sell it like big fish; they will bring to Thabak Village to sell there which 2-3 Km far away from their village.

Because of nearly no cash use in the village, the time before there was no system for cash loan or cash credit. Based on discussed with village, the villager may borrow some rice from their relatives for consumption if that year that household was short of rice and the coming year they would produce more rice to pay back to their relatives. The other form of loan and borrow is very little like borrow for their son or daughter weeding, during people in family is sickness.

Credit fund is set up in the village by EMD/THPC and called "Saving and Credit Fund". The proposes of the fund is to provide villagers with the access to fund that there need for agriculture extension for each household in the village and also village can save their money in this fund. Basis operation of this fund is instead of paying direct compensation money to each household. Money from Theun-Hinboun will be contributed to this fund and villagers contribute a small amount of money to this fund per month. Any villagers in village can borrow from this fund by agreement of the village development committee for their development activities. The other fund is the livestock raising fund and drug revolving is being implementing in the village.

4.5.2 Pull factors

1) The importance of rice

Rice is the main staple food crop and surplus could be easily sold or exchange within and outside the village. In table 4.16, all of the households in the village engage in rice production and this has never changed. However, only small proportion of farming households could produce adequate rice for all year round (Table 4.15). Majority, almost 90%, have to buy or barter. High proportion of member households in Sobngouang community was focused to do other jobs, e.g.: on-farm and off-farm, wage labor, livestock raising. These are landless or small land holders in the community.

Table 4.16 Households rice shortage of Sobngouang Village in year 2005

Farmers	Rice shortage	Households	Percentages (%)
Rice farmers	Rice enough for 12 months or more	7	10.6
	Rice enough for more than 6 months	13	19.7
	Enough less than 6 months	32	48.5
Non-rice farmers*		14	21.2
Total:		66	100

Source: EMD data, 2006.

Note: * non-rice farmers are the household in the village but engaged to other production system like livestock, garden or labor works and buy the rice for consumption.

2) Expansion of livelihood activities

According to the discussion with villagers, all of them are giving weight to rice production activities from the past and present as 100% (Table 4.16). After construction of the Theun-Hinboun the other income generation activities have been changed with some has increases dramatically more important compare to the time before 1998 (table 4.16). It is clearly show the cash crop production and NTFPs collection and sell are more important of income generation alternative. Fishing is the most affected and it has been reduced very much from 100% to only 20% of their income generation activities.

Table 4.17 Importance of livelihood generation activities of Sobngouang Village.

Activities	% Before 1998	% After 1998
1. Rice production	100	100
2. Cash crop	50	90
3. Livestock	90	95
4. NTFPs	50	95
5. Fishing	100	20
6. Others	25	50

Source: Village participatory rural appraisal (PRA), 2005.

3) Adjustment of technology to alternative production systems

Despite the introduction of new technology and modern practices, farmers are building alternative production systems with their local knowledge and wisdoms. Upland rice was transferred to interplant with fruit trees in young orchards. Local crops and vegetable previously planted along the river banks are now growing in many systems associated with paddy rice to find out the most suitable varieties, locally introduced from the near by villages at the lower elevation.

Technical for livestock raising is intensively supported by Environmental Management Division through small livestock like chicken, frog and pig. Improved livestock varieties are being provided to farmers. Experience show that frog is the most welcome and accepted by villagers because is easy and cheap to feed.

Without farmers' initiatives and incorporation of indigenous knowledge, Alternative systems may not well developed and expended widely among members household in the village.

4) Land security and tenure arrangement

Former land use in Sobngouang Village before land and forest allocation in 2003, there is no any land certificate for the household land ownership. The farmers would develop land and given notice to the other for their ownership. So the land occupation would rely much on labor available in their household. After land allocation at the village level, the land allocation committee would work with each household for recognizing and measurement of the ownership of land. Any plot of land is already identified by committee will be given a land use certificate and the owner have to pay land use tax to district. So in 2005, 50 households in Bon Phu received land use certificate, 24 households in Bon Homhuai and 50 households in Bon Phieng.

Table 4.18 Land ownership of each household in Sobngouang Village in year 2005

Agricultural Areas	Household with land ownership certificate
Bon Phu	50
Bon Homhuai	24
Bon Phieng	50

Source: Village questionnaires, 2005

5) Production strategy in transition

Former situation when villagers in Sobngouang Village were free from rice production. NamTheun and Namngouang is their source for fishing and produce of dry season river garden. The other time, they would come to forest around their village for collection of the Agriculture/Non-agriculture/Natural resources. At the time Theun-Hinboun has also try to help villagers to produce more supplement income especially for the women.

Rice production with the former traditional slash and burn practices is now transforming to permanent farming. This is still in the very beginning stage. Khamkeuth District and EMD has tried hard to provide a reasonable technical support to those villagers. Based on discussion with Khamkeuth authority and EMD

management, the critical issues of transforming of the rice production practice still need time to proceed because perception of villagers in Headpond area, they are still believe that the best rice production system for them is only slash and burn.

4.5 Conclusion

Many changes have been taken place after the completion of Theun-Hinboun Hydropower Project in 1998. Implementation of the government policy on upland management was possible with the commitment and support from the project. This appears to be sustained and productive despite certain losses in local production for subsistence, e.g. river bank garden and fisheries. In the next chapter the extent of Project commitment and support will be outlined and assessed in terms of rice production and regeneration of natural forests in the areas.

Socio-economic situation and living conditions of the villagers have been improved markedly with infrastructure development, i.e. road construction, and improvement, electricity and installation of water supply. Land security had been improved highly and supported alternative production systems for income earning. However, majority of households in the village are strictly for subsistence requirement. Rice appears in many types of landscapes and production systems, but production remains behind consumption requirement. The problems of declining productivity in upland rice on the uplands require further attention. Solution to enrich short fallows or sustainable practices for upland management has yet to be found. Alternative agroforest with dominant Agar wood may upset the ecology of natural environment. Rich biodiversity systems may offer environmental friendly to the environment and rehabilitation of degraded forests.

With maintaining alternative production systems and dominant strategy on subsistent rice production, the push and pull factors are operating to find on equilibrium point where farmers would optimize their production from external support and maintain subsistence requirement, as the equilibrium between push and pull factors changes over time, the dynamic of this equilibrium should be better understood in order to sustain the positive outcome of project implementation on a long run.