

CHAPTER III

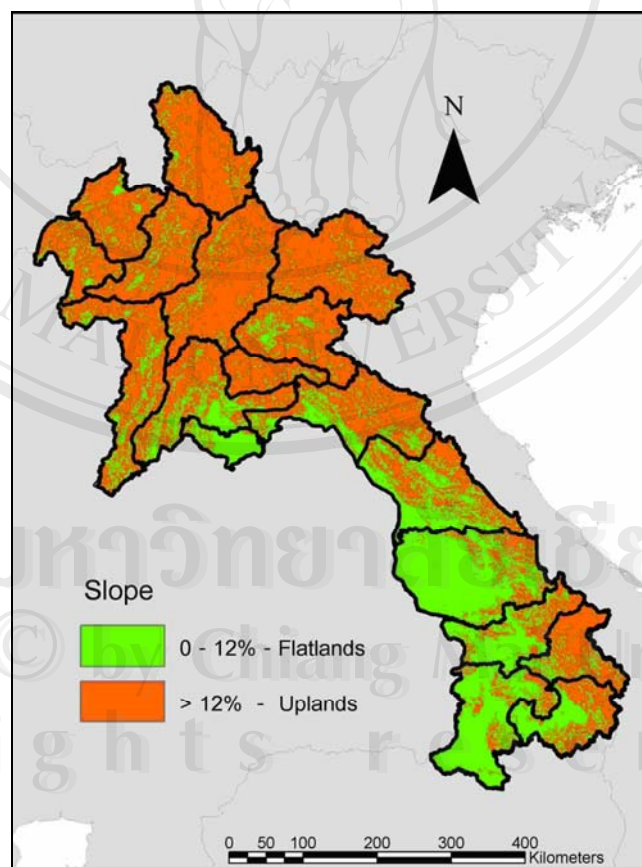
UPLAND CONDITIONS OF LAO PDR AND GOVERNMENT DEVELOPMENT POLICIES

3.1 Upland conditions of Lao PDR

3.1.1 Biophysical conditions

Lao PDR is the mountainous and land-locked country, bordering with China, Myanmar, Thailand, Vietnam and Cambodia. Based on the geographic conditions, in year 2000, about 39 percent of the total Lao population still depends on shifting cultivation covering 13 percent of the total land area of the country. (Thomas, et al. 2003). Comparing with its population, Lao PDR is a large country with 236,800 km² of total land area or 21 persons per square kilometer. However, the arable land for agriculture, especially for rice production was limited by hilly topography.

Lao PDR is also the poorest country in Southeast Asia, therefore Government has attempted to bring Lao PDR out from the list of under-developing country by 2020 through poverty reduction program.



Source: ICRAF, 2003.

Figure 3.1 Flatland and sloping land in Lao PDR

1) Topography

Topographically, Lao PDR consists of flat land (0-12% slopes) and sloping land or upland (12% slopes) (Figure 2.1). Flat land is limited around the Mekong river with estimate of about 1/3 of land area in the country. Majority of flat land occurs in Vientiane, Khammouane, Savanakheth and Champassack Provinces. The rest of the area with is about 2/3 of the country is representing with uplands.

2) Soils

Based on National Soil Survey and Classification Report (2001), Lao PDR soils were primarily derived from sedimentary rocks. Some 12 groups and 38 units of these soils have been identified according to FAO/UNESCO classification system.

Table 3.1 Distribution of different soil types in Lao PDR

Soil Groups	Area (ha)	%
Arenosols	233,154	1.43
Fluvisols	104,850	0.45
Gleysols	127,189	0.53
Leptosols	442,404	1.57
Regosols	515,279	2.18
Cambisols	2,353,222	9.94
Solonchacks	7,503	0.02
Solonetz	5,945	0.01
Alisols	4,444,215	18.77
Acrisols	11,973,672	48.9
Lixisols	385,550	1.63
Luvisols	2,999,305	12.67
Water and rock	87,172	1.9
Total:	23,680,000	100

Source: National Soil Survey and Classification Report, 2001.

From Table 2.1, Acrisols is the dominant soil group, covering almost 50% of total area throughout the country and further divided into 4 different soil units, i.e., Phinthite Acrisols, Ferric Acrisols, Gleyic Acrisols and Haplic Acrisols. These types of soil are also dominant in Bolikhamxay province where present field research has been undertaken.

3) Climate

Tropical monsoon is predominant climate in Lao PDR with two main distinct seasons of alternate wet and dry seasons. The rainy season starts from May to the beginning of November. Rainfall is highly variable with annual average between 1,270 to 2,290 mm. Cool dry season occurs during the end of November until the end of March, with average temperature between 5-10°C. Hot dry season (March to May) is characterized with high temperature of peak at 40°C maximum in April.

Accordingly to the above, the variation of climate in Lao PDR could be divided into 3 distinct zones and may be summarized as follows:

- Zone 1: Subtropical wet and dry climate, these include provinces in the northern part of Lao PDR: Phongsali, Luangnamtha, Bokeo, Oudomxai, Louang prabang, Huaphan, Xayabouri, Xieng Khouang provinces
- Zone 2: Tropical monsoon climates, these are provinces in the middle part of Lao PDR: Vientiane, Vientiane prefecture, Saysomboune, Borikhamsay, Khammouane, Savannakhet provinces
- Zone3: Tropical wet and dry, these are provinces in the southern part of Lao PDR: Saravan, Sekong, Champasak, Attapeu provinces

Again, Bolikhamxay Province in middle Lao PDR representing study site for present research is basically characterized as tropical monsoon climate.

4) Rivers and tributaries

Mekong River is the main river in Lao PDR. Forming the border with Thailand, in Lao PDR it flows for about 1,860 km, of which almost every part is navigable. The Mekong River basin covers 90 percent of the total area of the country or about 25 percent of the Mekong River basin is located in Lao PDR, which contributes 35 percent of the Mekong's total flow. The main tributaries of the Mekong River in Lao PDR are, from north to south, the Nam Ou (11% of the area of the country), Nam Ngun (6%), Nam Theun (7%), Xe Banghieng (9%) and Xe Kong (10%). The Lao part of the Mekong River basin is divided into 32 sub-basins for planning purposes. In addition to the Mekong, six small river basins drain from Lao PDR towards Viet Nam: the Tale, Nam Ma, Nam Mat and Nam Xa rivers, and two others, the Nam Luang and Nam Mô, meet in Viet Nam before reaching the sea. This richness of water resource has invited many opportunities for economic development in Lao PDR.

The total annual water flow in Lao PDR is estimated at 270,000 million cubic meters, equivalent to 35% of the average annual flow of the whole Mekong Basin. The monthly distribution of the flow of the rivers in Lao PDR closely follows the pattern of rainfall: about 80% during the rainy season (May-October) and 20% in the dry season, from November to April. For some rivers in the central and southern parts of the country the flow in the dry season is less: around 10 to 15% of the annual flow.

5) Irrigation, dams and reservoirs

With abundant water resource in Lao PDR, is widely recognized a potential for hydropower and irrigation for economic development. Government has given high priority to investment in the irrigation sub-sector since agriculture is the foundation of national economic development, necessary for food stabilization and about 85% of the population lives in rural areas. However, the water source development is still at a low level: irrigated area is only 20% of the national paddy area. A total irrigated area is 315,000 ha, the rainy season areas are 215,000 ha and the dry season about 5,000 ha is increased per year (Boualapha, 2005).

The hydropower potential of Lao PDR is enormous with comparison to other countries in the lower Mekong River Basin. This can be translated into large amount

of foreign earning. Unfortunately, only 2% of its potential 23,000 Mw has been utilized (Table 2.2).

Table 3.2 Existing dam and reservoir for hydroelectric in Lao PDR

No	Plants	Regions	Owners	Inst. Cap. (MW)	Average annual Energy (GWh)	Commissioning. years
01	Nam Ngum1	Central 1	EdL	150	998	1971,78, 84
02	Selabam	Southern	EdL	5	24	1970,1993
03	Xeset 1	Southern	EdL	45	180	11/1991
04	Nam Dong	Central 1	EdL	1	5	1970
05	Nam Phao	Central 1	Provincial	1.6	-	1995
06	Nam Ko	Northern	Provincial	1.5	-	1997
07	Theun-Hinboun	Central 1	IPP	210	1,620	4/1998
08	Houay Ho	Southern	IPP	150	617	9/1999
09	Nam Leuk	Central 1	EdL	60	230	4/2000

Source: Prathoumvan, et al. 2002.

3.1.2 Socio-economic characteristics

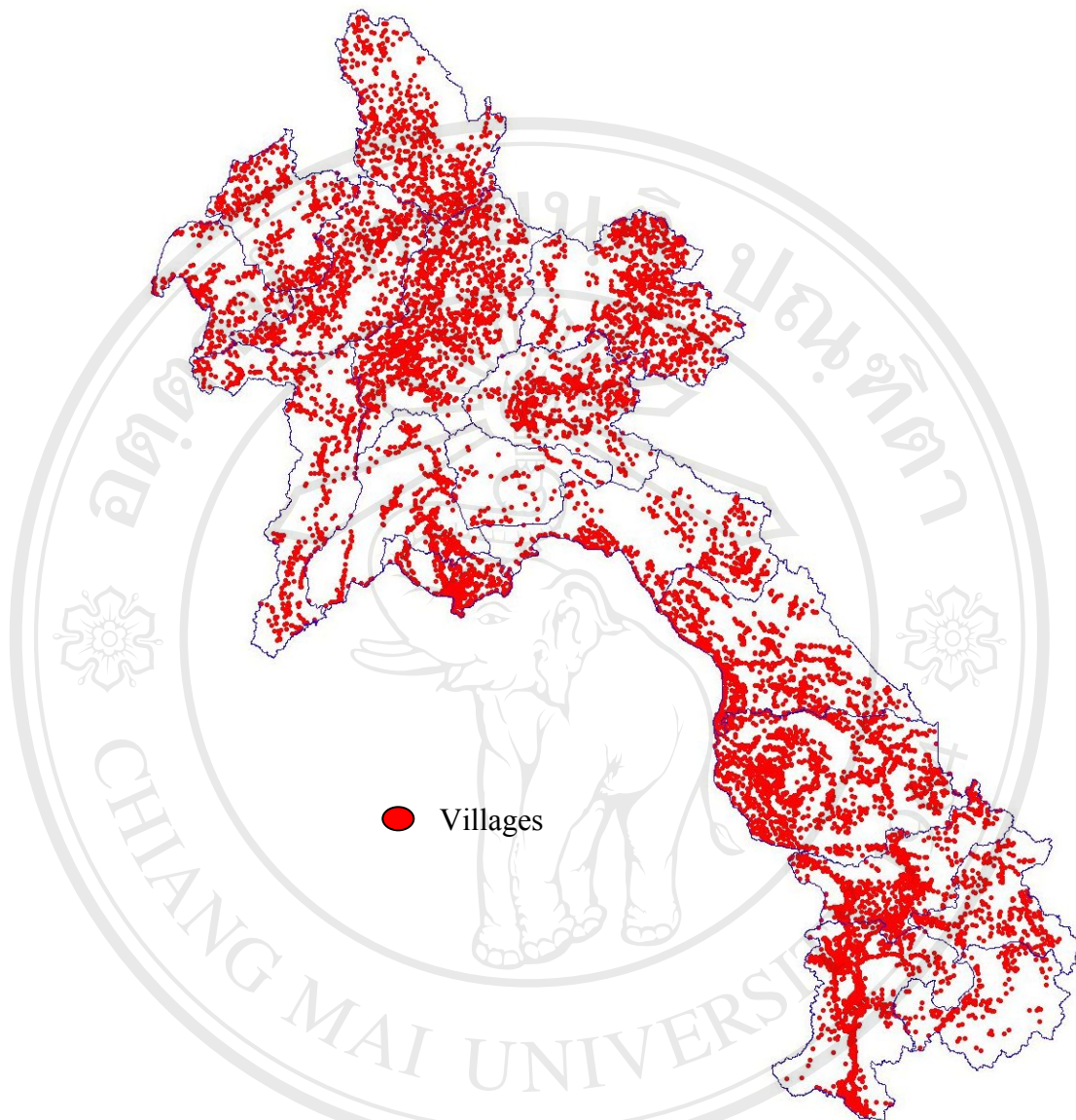
1) Population and ethnicity

By 2000, population in Lao PDR has reached over 5.2 million persons with growing population at 2.4% per annum. The average population density is 21 persons per square kilometer, the lowest population density in Asia. With current population growth rate the Lao population is predicted to increase to 6.8 million in 2010 and to 8.7 million in 2020 respectively, (Lao Government, 1999). Lao PDR remains to be the only country in Greater Mekong Sub-region with less population pressure, however.

Population of Lao PDR is also ethnically diverse with some 49 minorities (Department of Ethnics, 2005). The linguistic variation includes:

- The Lao-Tai family includes eight groups: Lao, Phouthai, Tai, Lue, Gnouane, Young, Saek, and Thai Neua.
- The Mone-Khmer family has 32 ethnic groups, which include Khmu, Pray, Singmou, Khom, Thene, Idou, Bid, Lamed, Samtao, Katang, Makong, Try, Trieng, Ta-oi, Yeh, Brao, Harak, Katou, Oi, Krieng, Yrou, Souai, Gnaheune, Lavy, Kabkae, Khmer, Toum, Ngouane, Meuang, and Kri.
- The Tibeto-Burmese family includes seven ethnic groups: Ahka, Singsali, Lahou, Sila, Hayi, Lolo and Hor.
- The Hmong-Ioumien category has two main tribes: Hmong and Ioumien (Yao).

The overall ethnic diversity of Lao population may be grouped into 3 major attitudinal zones as different type: 1) Lao Lum, people who live in a plain or settled close to river 2) Lao Theung, people who live at the mountain slope with attitude around 700 masl. and 3) Lao Sung, people who settle at the attitude more than 1,000 masl.



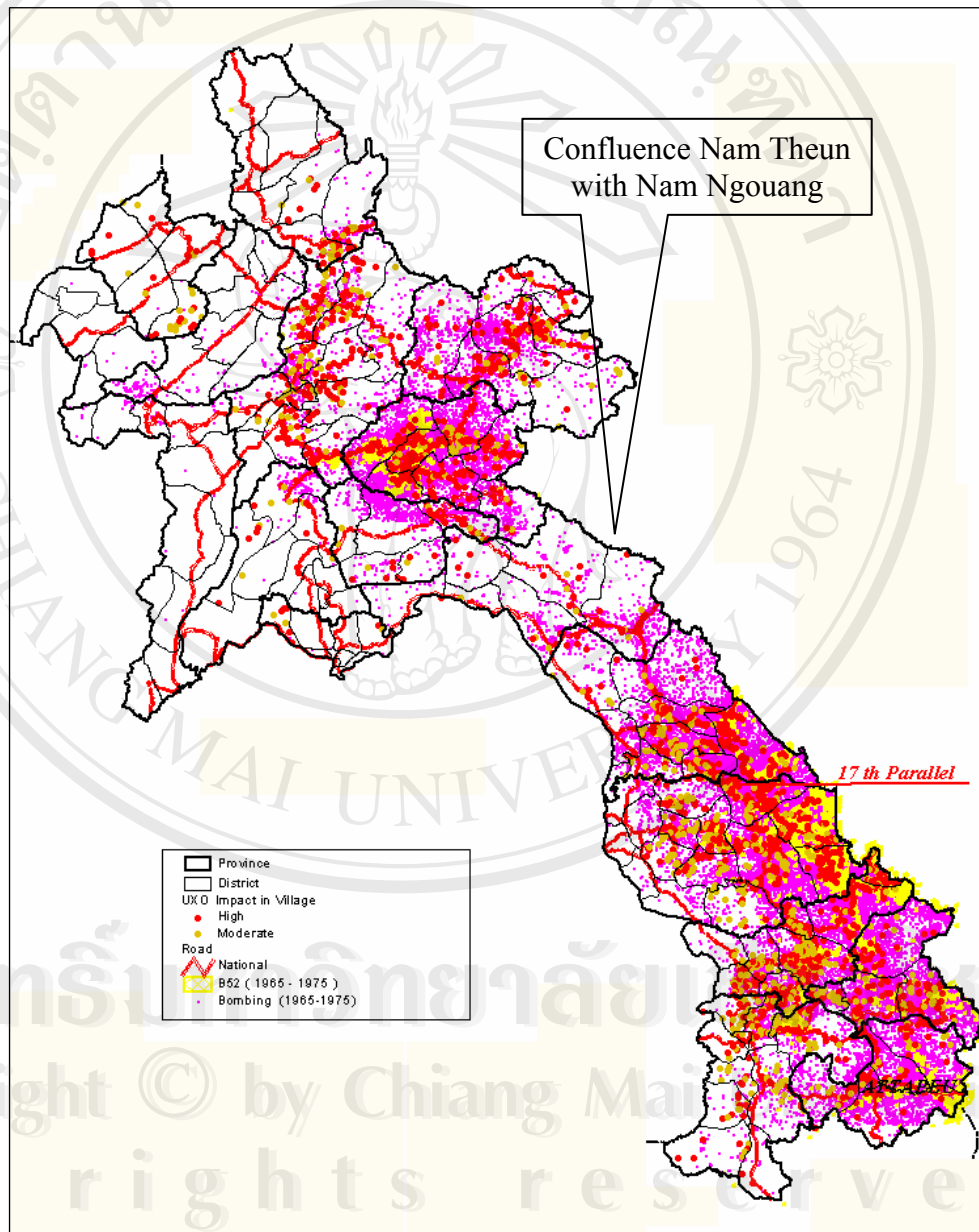
Source: Forestry Inventory and Planning Division.

Figure 3.2 Distribution of Lao villages over country

2) Migration and settlement

Patterns of migration and settlement in Lao PDR have been complicated by intensive wars and revolution over the few hundreds of years. Lao people had faced many wars, including the war against the French Empire from 1893 to 1954, the war against Japanese Fascists in the period of World War II, especially from 1941 to 1945, and the civil war, which resulted from American neo-colonialism from 1955 to 1975 (Phothisanh and Phummachanh, 2000). These wars have been considered as one of the main factors contributing to the delay in Lao socio-economic growth. Under serious situations of such warfare, the Lao government was always preoccupied with military programs rather than socio-economic development programs in order to conserve their political position within the government. As the result, more than 80%

of the population suffered severely. This population whose livelihood depend on rice farming systems have been virtually lifted out in political discussions. Although some may practice wet rice in permanent fields but majority were upland rice farming with slash and burn swidden systems (Institute of Social Science Research, 1989). Bombing during the Indochina war was recently estimated at more than two million tons of ordnance being dropped on Lao PDR (Landmine Monitor, 2003). See Figure 2.3



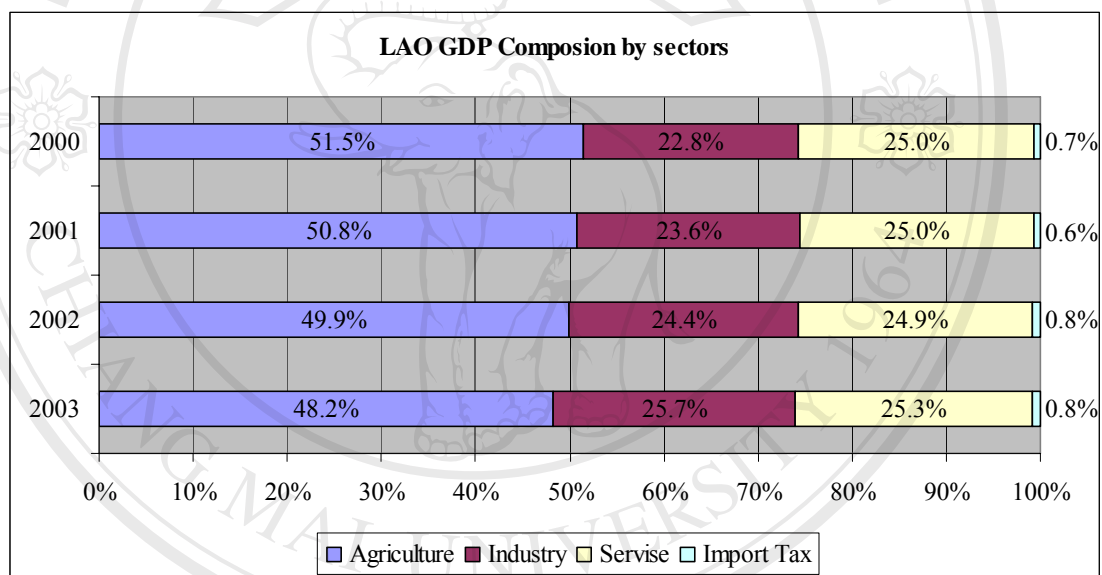
Source: JICA, 2002.

Figure 3.3 Bombing locations during 1965-1975 and the severity of impacts by unexploded ordnance

Bombing in Lao PDR covered all over and many unexploded ordnance (UXO) remain unexploded and still effective. This is a reason why Laotian people can not settle in such areas. Many rural people are still moving and searching for safe sites to settle. After the war and resent policy in economic development, people are beginning to settle permanently, regardless of the former settlers or new replacement of certain ethnic groups.

3) Income and livelihoods

Lao PDR is a poor country, with GDP per person in 2002 at US\$ 310, and total GDP of US\$ 1.7 billion. From 1991 to 2002 annual growth of GDP averaged 6.2 per cent per annum (Warr, 2005). Agriculture and Forestry is the major sector contributed to gross domestic products (GDP) in Lao PDR (Figure 2.4), (Ministry of Agriculture and Forestry, 2005).

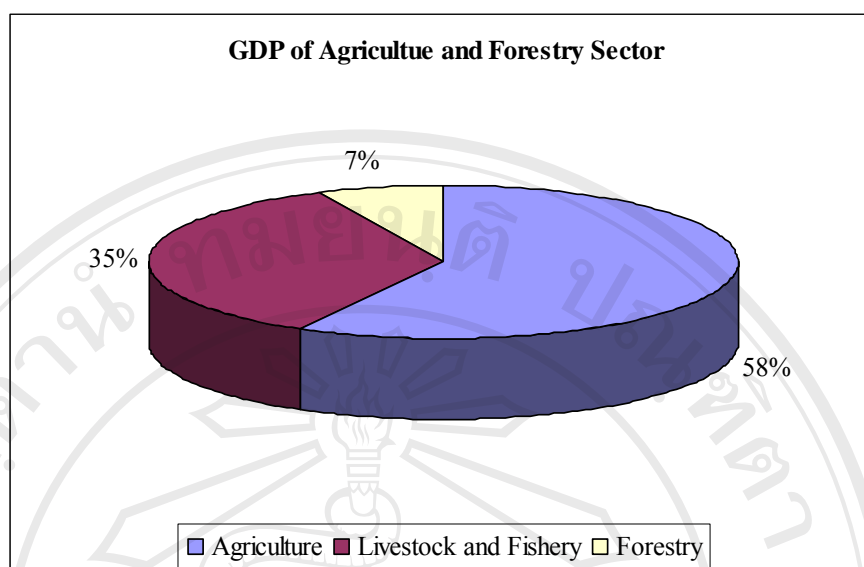


Source: Ministry of Agriculture and Forestry, 2004.

Figure 3.4 Percentage of Gross Domestic Products by sectors in Lao PDR

Above chart has been proven that the major occupations of Lao people are still depending on the agriculture. But in the year 2002 to 2003, GDP of agriculture sector has reduced in a few percentages. This may be due to the increase of the GDP in industry and service sectors due to government policy support on foreign investment on industry development.

If we look at more in the Agriculture and Forestry sector, we found that the agriculture is still the main part in the GDP of the Agriculture and forestry sectors which is covered 58%. Secondly is livestock and fishery sector is 35% and the other 7% is forestry part.



Source: Ministry Agriculture and Forestry, 2004.

Figure 3.5 Percentage of Gross Domestic Products in Agriculture and Forestry

Based on the above data agricultural sector is clearly reflects main occupation of Laotian people as still an agricultural base country.

The agriculture sector here are combining production of rice, roots and tubers crops, vegetables, fruits and livestock production (Table 2.3). In general all of these productions are increasing year by year.

Table 3.3 Food production in the year 2000 and 2003 of Lao PDR.

Food production	2000 (Ton)	2003 (Ton)	Percentages	Remarks
Agriculture				
- Wet season rice	1.55 Million	1.82 Million	Increased 19%	
- Dry season rice	390,150	341,730	Decreased 12%	*
- Upland rice	258,780	186,200	Decreased 28%	**
- Roots and tubers	117,500	150,438	Increased 28%	
- Other vegetables	636,000	663,677	Increased 4%	
- Fruits	55,000	61,750	Increased 12%	
Livestock				
- Meat, fish and eggs	187,600	223,000	Increased 19%	
- Milks	270	300	Increased 11%	

Source: Ministry of Agriculture and Forestry, 2004.

Remark: * This decreased amount was resulted from (i) Production area was reduced due to impact of the irrigation area by natural disaster; (ii) Drought in some areas (iii) Some areas have

changed from rice cultivation to other cash crops (iv) Supply of the fertilizer did not meet with demands.

** The upland areas have been reduced according to shifting cultivation stabilization policy resulting in upland rice production.

Over 80% of Lao people live in the rural area. Most of them are engaged in rice-based agriculture and harvesting of forest products as part of food security and upland rice is the major source for livelihood of the upland people. Nearly all of production is for their subsistence basis.

4) Upland rice production and consumption

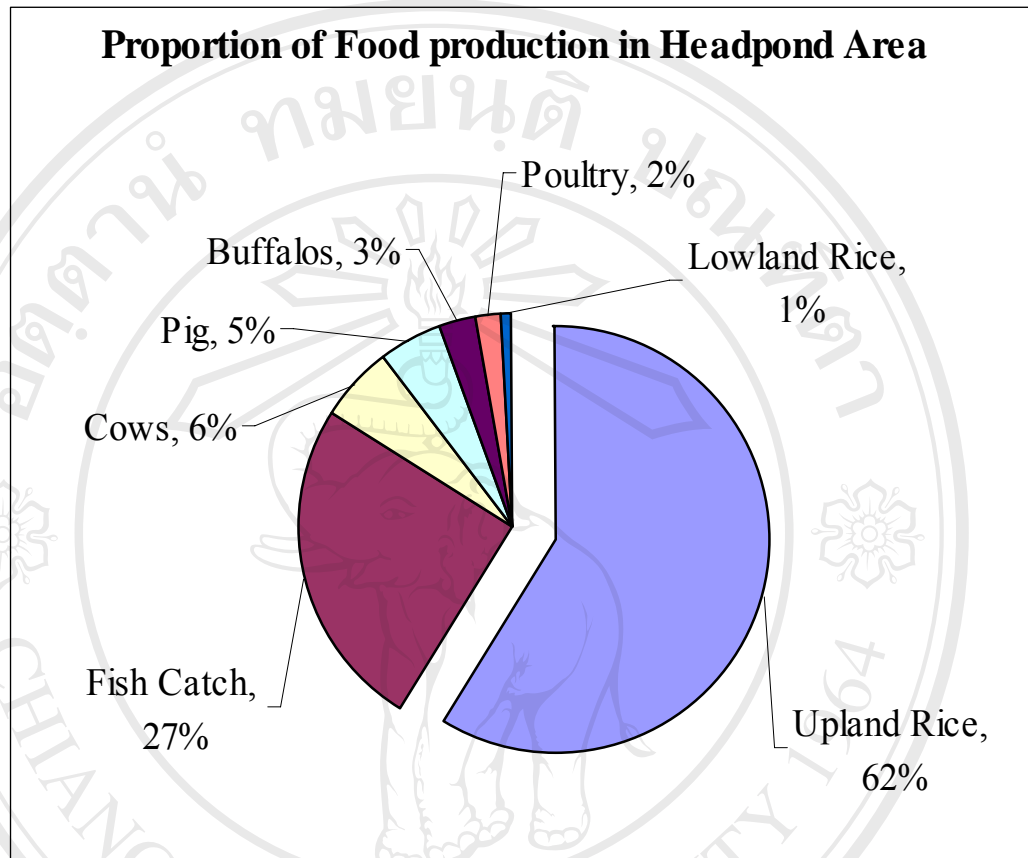
Rice is the most important crop in Lao PDR and account for about 70% of total calories intake across the nation (Maclean, et al. 2002). Rice is the staple food crop and 76% of the production is from rain-fed environment. Among the three rice growing environments, the rain-fed lowland rice occupies the largest areas accounting for 67% of total rice areas. This is followed by dry season irrigated rice, accounting for 21% and upland rice accounting for 12%. Production in these areas are 76%, 14% and 10%, respectively. Annual rice production greatly fluctuates due to its rain-fed based condition. To stabilize the production the government started expanding irrigation facilities to cover wider areas in 1996, resulting to an increase in irrigated areas. In 1999, 2000 and 2001 total rice production increased to 2.1, 2.2 and 2.4 Million tons, respectively.

Rice production is very important for the people in Lao PDR, particularly the people in the upland area where they spent more than half of their time in a year involving with rice production process. However, the rice production systems are based on traditional practice of slash and burn methods and these appeared to be destructive to national forest and environment in general. The Government of Lao PDR has introduced some alternatives to replace upland rice production by slash and burn to other practices which considering environmental conservation but still provide adequate production for consumption. The aim is to provide food according to international standard of 2,000 Kg Cal/person/day or 300-350 Kg of rice/person/year (un-husked rice). Based on Ministry of Agriculture and Forestry (2004) overall food production of Lao PDR has increased and developed into remarkable even, rice production of Lao PDR has increased from 2.2 Mil. Tons in 2000 to 2.3 Mil. Tons in 2003. Especially, the sticky rice export was increased by about 3 times from US\$ 156,000 in 2000 up to US\$ 429,200 in 2003.

While the overall rice production has increased, the upland rice has decreased about 28% (Ministry of Agriculture and Forestry, 2004). It is not cleared how the loss has been replaced/compensation by anything or alternatives for the upland people livelihood. The reduction of upland rice may not only directly link with the reduction of area but may concern with the reduction of fallow periods or increase intensity of land use for upland rice production, i.e., increasing cropping season in the cycle from one to > 1 year.

In the study area, Norplan A.S. (1995) has indicated that rice production in Headpond area is still dominated among other livelihood activities. Upland rice has contributed as much as 62 percentage of food production. Fish catch was the second

largest proportion contributed to food production to the village in the Headpond area covered 27%. The other proportion was the livestock raising which provided 16% (cow, pig, buffalos and poultry) of food production (Figure 2.6).



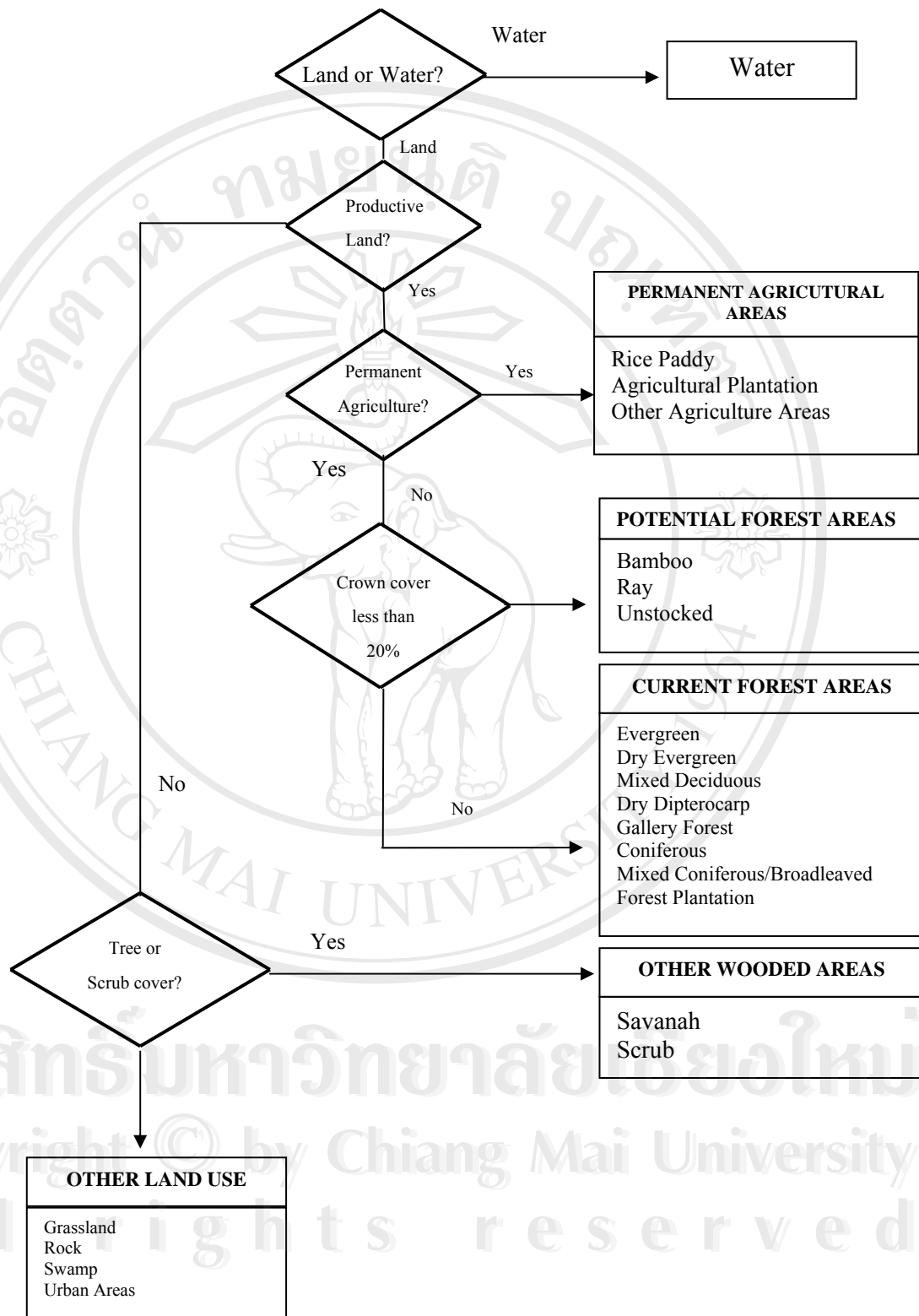
Source: Norplan A.S. 1995.

Figure 3.6 Percentage of food production in the Headpond area in 1995

Later, Schouten, et al. (2004) has reported from an Evaluation of Environmental and Social Impacts by Theun-Hinboun Hydropower Plant on Aquatic Life and Fisheries indicated that rice in Sobngouang Village is accounting for 51% of village income generation activities of each household. This support is the importance of upland rice in the study village.

3.1.3 Land use and agriculture

Ministry of Agriculture and Forestry is responsible for the land use and forest classification of the Lao PDR. Some criteria were developed and applied for land classification as illustrated in Figure 2.5.



Source: Ministry of Agriculture and Forestry, 2005.

Figure 3.7 Classification of land use and forest types in Lao PDR

1) Land use classification

According to the criteria, Ministry of Agriculture and Forestry has classified land into 5 major types:

a) Current Forest: The natural forests are classified into forest types which compose Upper and Lower Dry Evergreen Forests, Upper and Lower Mixed Deciduous Forests, Gallery Forest, Coniferous Forest, Mixed Broadleaved and Coniferous Forest, and Dry Dipterocarp.

b) Potential Forest: The potential forest includes Bamboo, Old shifting cultivation areas (young secondary forests) and Temporary Unstocked areas.

c) Other Wooded Areas: These areas included Savannah Forest, Heath, Stunted and Scrub forests.

d) Permanent Agricultural Areas: Paddy Rice, Agricultural Plantation, Other Agricultural Land Areas.

e) Other Non-Forest Areas: Barren Land, Rock, Grassland, Urban Areas, Swamps and Water

The land use for agriculture is further classified according to systems based in the area:

- Rainfed paddy-based system found mostly in flatland areas
- Irrigated paddy-based system found mostly in lowland areas
- Sloping land Farming Systems: (i) Mixed shifting cultivation and paddy systems, often found at middle altitudes and (ii) Exclusively shifting cultivation system, typically found at middle & high altitudes
- Plateau farming system found on sloping land plateaus, composed mainly of subsistence shifting cultivation mixed with tree crops
- Highland system characterized by subsistence shifting cultivation with some cash sales of opium and swine

2) Land use changes

In 1992, Department of Forestry, Ministry of Agriculture and Forestry (1992) carried out the forest cover and land use study and reported that the forest area of Lao PDR has reduced from 11.6 Million Hectare (49.1%) in 1982 to 11.2 Million Hectare (47.2%) in 1992. The loss of the forest cover was around 70,000 Hectare per year and it appeared that the forest cover loss has been happened in all parts of Lao PDR. In the Northern part, the loss was more significant than the other parts in the country.

Ministry of Agriculture and Forestry (2005) provides the information for formulation of the Forestry Strategy to the year 2020 and Department of Forestry, Ministry of Agriculture and Forestry undertook the study on assessment of forest cover and land use changes during the period of 1992-2002 for the whole country. This study has provided the information on these changes that happened in Lao PDR for the periods of 1982, 1992 and 2002.

The significant changes showed in the Table 2.4 below. The land use has categorized into 5 main groups: (i) Current forest, (ii) Potential forest area, (iii) Other

wooded areas, (iv) Permanent agriculture areas and (v) Other non-forest areas. The report also mentioned that the Shifting cultivation areas in all over the country were decreasing from 2.6% in 1992 to 2.2% in 2002. However, in the regional level the shifting cultivation in the Northern part was slightly increased from 3.7% in 1992 to 4.1% in 2002 but the other two parts of central and southern region had reduced respectively which central region was 2.1% in 1992 and 0.9% in 2002. Further to southern region it decreased from 1.6% in 1992 to 0.6% in 2002.

The current forest or forest cover has reduced from 49.1% in 1982 to 47.2% in 1992 and rapidly decreased to 41.5% in 2002. These changes has been resulted from the increasing of the percentage of potential forest area or the increase of the Unstocked forest from 6,499,700 Hectare in 1982 to 6,791,400 Hectare in 1992 and 10,096,300 Hectare in 2002.

Shifting cultivation area (“Ray” or “Hai”) increased from 1982 of 597,400 Hectare to 625,700 Hectare in 1992 and overall now has reduced again in 2002 to 516,900 Hectare (table 2.4). This is may be resulted from shifting cultivation stabilization policy and its implementation programme of the Lao government.

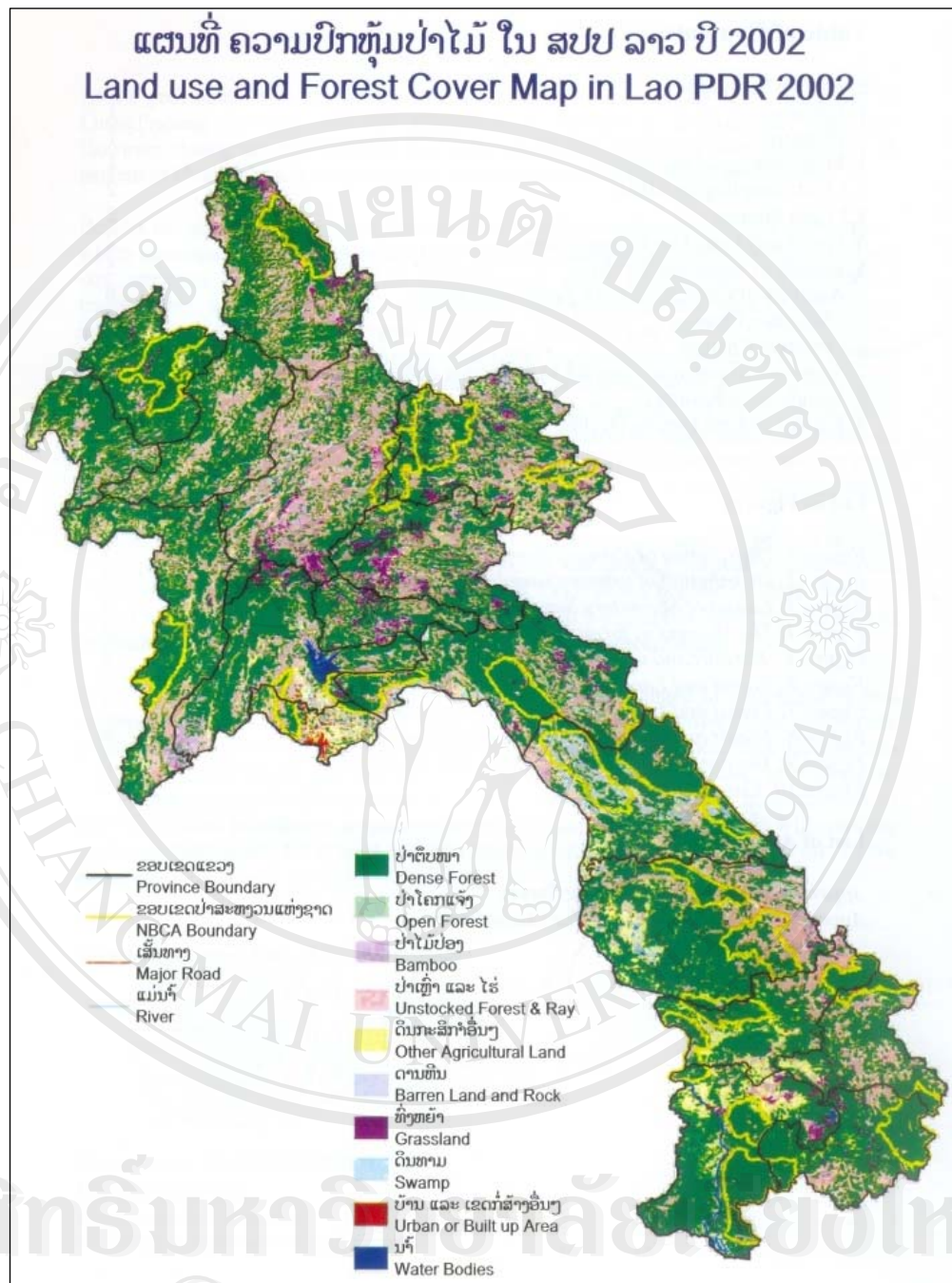
Beside the changes in the quantity, the forest quality has also declined. Forest degradation decreased in stocking densities, change in species composition and size structure. These changes are also affected to wildlife population.

According to the Summary Report of Forestry Department, Ministry of Agriculture and Forestry (2005), after implementation of upland policies, there are some of the reduction in number of families and area of shifting cultivation step by step as shown in table 2.4.

Table 3.4 Number of families and shifting cultivation area

Items	1996	1997	1998	1999	2000	2001	2002	2003
Families	267,274	126,110	196,782	131,700	174,036	134,443	108,169	104,136
Shifting cultivation area (ha)	176,605	158,843	196,900	118,050	118,900	93,900	73,900	71,145

Source: Ministry of Agriculture and Forestry, 2005



Source: Ministry of Agriculture and Forestry, 2005.

Figure 3.8 Land use and forest cover map in Lao PDR 2002.

Table 3.5 Comparison of the different Land Use and Vegetation Types in Lao PRD in 1982-1992-2002

Land Use Group		A R E A (1000 ha)						Changes (1000 ha)		
Land Use and Vegetation Type		1982	%	1992	%	2002	%	1982-92	1992-02	1982-02
1. Current Forest	CF	11,636.9	49.1	11,168.0	47.2	9,824.7	41.5	-468.9	-1,343.3	-1,812.2
Dry Dipterocarp	DD	1,235.1		1,206.4		1,317.2		-28.7	110.8	82.1
Lower Dry Evergreen	LDE	88.6		85.5		56.0		-3.1	-29.5	-32.6
Upper Dry Evergreen	UDE	1,105.8		1,061.0		1,387.9		-44.8	326.9	282.1
Lower Mixed Deciduous	LMD	893.0		864.5		881.0		-28.5	16.5	-12.0
Upper Mixed Deciduous*	UMD	7,792.2		7,450.5		5,499.5		-341.7	-1,951.0	-2,292.7
Gallery Forest	GE	90.7		87.5		28.2		-3.2	-59.3	-62.5
Coniferous	S	138.3		132.2		89.1		-6.1	-43.1	-49.2
Mixed Coniferous and Broadleaved	MS	293.2		280.4		525.8		-12.8	245.4	232.6
Wood Plantation*	P					40.0			40.0	40.0
2. Potential Forest Area	PF	8,554.1	36.1	8,949.0	37.8	11,152.2	47.1	394.9	2,203.2	2,598.1
Bamboo	B	1,457.0		1,531.9		539.0		74.9	-992.9	-918.0
Unstocked	T	6,499.7		6,791.4		10,096.3		291.7	3,304.9	3,596.6
Ray or Hai	RA	597.4		625.7		516.9		28.3	-108.8	-80.5
3. Other Wooded Area	OW	1,545.4	6.5	1,444.2	6.1	286.5	1.2	-101.2	-1,157.7	-1,258.9
Savannah/Open Woodlands	SH	974.0		912.5		94.4		-61.5	-818.1	-879.6
Heath, Scrub Forest	SR	571.4		531.7		192.1		-39.7	-339.6	-379.3
Sum of All Forest Area	TF	21736.4		21561.2		21263.4		-175.200	-297.800	-473.0
4. Permanent Agriculture Land	PA	708.7	3.0	849.4	3.6	1,200.0	5.1	140.7	350.6	491.3
Rice Paddy	RP	658.3		789.4		963.7		131.1	174.3	305.4
Agriculture Plantation	AP	14.9		17.7		216.8		2.8	199.1	201.9
Other Agriculture Land	OA	35.5		42.3		19.5		6.8	-22.8	-16.0
5. Other Non-Forest Area	NF	1,234.9	5.2	1,269.4	5.4	1,216.6	5.1	34.5	-52.8	-18.3
Barren Land, Rock	R	109.8		116.1		231.0		6.3	114.9	121.2
Grassland	G	804.4		822.8		579.3		18.4	-243.5	-225.1
Urban Area	U	82.2		84.2		135.3		2.0	51.1	53.1
Swamps	SW	34.1		35.3		51.0		1.2	15.7	16.9
Water	W	204.4		211.0		220.0		6.6	9.0	15.6
TOTAL		23,680.0	100.0	23,680.0	100.0	23,680.0	100.0	0.0	0.0	0.0

Source: Ministry of Agriculture and Forestry, 1992

According to forest law, 1996, forests in the Lao PDR are classified into five categories, the first three categories' related to function and the last two categories' related to the current situation:

- **Production Forests** are forests and forestlands used in regularly providing timber and other forest products on a sustainable basis for national economic and social development requirements and for people's livelihoods without significant negative environmental impacts.

- **Conservation Forests** are forests and forest lands classified for the purpose of protecting and conserving animal and plant species, natural habitats and various other entities of historical, cultural, tourism, environmental, educational or scientific value.

- **Protection Forests** are forests and forestland classified for the protection of watershed areas and prevention of soil erosion. They also include areas of forestland with national security significance, areas for protecting against natural disaster and areas for protection of the environment.

- **Regeneration Forests** are young or fallow areas of forest classified for regeneration and maintenance of forest cover with a view reaching a natural equilibrium as trees increase in maturity.

- **Degraded Forests** are forests that have been heavily damaged, to the extent they are without forest or barren, that are classified for tree planting and/or allocation to individuals or organizations for tree planting, permanent agriculture and livestock production or other purposes in accordance with national economic development plans.

Ministry of Agriculture and Forestry is issued a lot of regulation on management National Biodiversity Conservation Areas (NBCA). Conservation area is being established at national, province and district level with total area of more than 4.8 million hectare. Establishment and sustainable management of the production forest is also promoted in province and district with are 0.5 million hectare.

Table 3.6 Area of Production, Protection and Conservation forest in Lao PDR

Forest Category	Administrative Level	Number	Area (1,000 ha)
Production	National	106	3,207
Protection	Province	23	461
	District	52	56
	Total	75	517
Conservation	National	20 and 2 corridors	3,391
	Province	57	932
	District	144	504
	Total	223	4,826
Total			8,550

Source: Ministry of Agriculture and Forestry, 2005

Note: Regeneration and Degraded Forests have also been identified through the land and forest allocation process at the village level, however, no data are available.

3.2 Government policies and past development efforts

3.2.1 National issues

To boost up the economy, Lao government is encouraged development of the infrastructure projects e.g. road/highway development, hydropower development projects. These developments seem to be attractive at national level policy but they at the same time create both positive and negative changes to people who living in the area and the surrounding environment. In the remote area, there are also other government policies impinging on the rural people i.e. Poverty Eradication, Stabilization of Shifting Cultivation, Land and Forest Allocation, Elimination of Opium Production and Natural Resources Conservation. There was also declared of many national biodiversity conservation areas. These lead to land use changes in the Lao villages.

Economic development and modernization are the common goals of many governments. Mega Project has been seen as development that can contribute to improvement of country economic in both short and long terms from revenue graining. GDP has been used as indicator for country development. The word “development” may be defined as “Improvement” or “Modernize” So economic development is the changes of economic to a better of economic or modern from existing conditions (Phantasen, 1998). The concept of development is modernization which attempts to develop and follow the path of the country that identified as “Developed country”. This is a development goal for many countries. Production economy is one of the many concepts in whole development is based on. The concept is encouraged of increase production and more consuming in term of quality and quantity. Production has to develop and increase, so there are relationships between production process with input and output factors. So the input factors here are considered of capital like funding and labor and in agriculture land is considered as source of capital input.

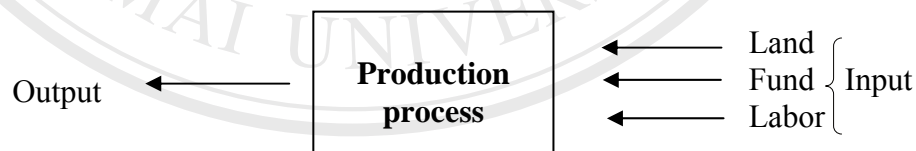


Figure 3.9 Relationship of production process

Lacking of input, especially funding is a classic problems of developing and under develop countries. Country development is required of infrastructure development and utilization of country natural resources which most of government is encourage of world monetary funds or private sectors to invest in their country. After 1975, Lao PDR which is a socialist economy, has received some external assistances from international organization, e.g. UNDP and other donor countries, e.g. Russia, Vietnam and many others, with many collaborative and bilateral project.

In the middle of 1980s, Lao PDR had decided to open the country with the New Economic Mechanism policy. Under Lao People Revolution Party, the reformation or renovation policy known as *Jin Ta Na Kan Mai* was introduced and it was considered as far-reaching reform beginning in 1986. The introduction of the New Economic Mechanism (NEM) or marketing economic mechanism system was

also aiming to achieve sustained economic growth (Phomvihanh, 1986, 1988). The main idea of the NEM is to reorient “a subsistence system to a market demands” (Bouapao, 2005). The country is moved from socialist economy to market economy which providing opportunity for foreign investment in mega projects. Currently World Bank (WB), Asian Development Bank (ADB) and Japan International Bank for Cooperation (JBIC) are major international monetary fund actively investing in form of grant, soft loan and credits to Lao PDR.

After Rio de Janeiro Declaration on Environment and Development in 1972, the world has paid much attention to environment. Any development projects have to take environment consideration into account. In respond to that, in 1992 Government of Laos has set up Science Technology and Environment Agency (STEA) with mandate to environment management and conservation in development projects.

With global trend of environmental conservation, Policy on natural resource management is influenced by international organization, like World Bank and Asian Development Bank. These two organizations are active in providing assistance on government’s policies reform.

As Vandergeest and Peluso, (1995) pointed out the coercive capacity of the state has improved, supported by international aid and legitimating, and the government has more capacity of implementing some of its strategies. Nowadays, increased integration into the global economy and the increased global involvement in nation-level environmental protection has facilitated the improvement of state power in control and management of natural resources.

Lao government has applied many policies regarding highland and upland management. But those policies were very loose of control and in implementing. However, those problems were not in the serious level and the most important problems related to the policy has been concerned and being implementation in provincial or district level such as the limitation on budget. Extensive review of government policies and efforts in implementation for upland agricultural development is given elsewhere (Thomas, et al. 2003). Since 1979 a national decree on forestry protection including provisions for prohibition of shifting cultivation in watershed area was enforced. There is also a world trend of more natural resource development. Lao government is with a policy of trying for international cooperation and asking for financing assistant. Before getting all kind of assistance, so there is a requirement of setting a policy on environmental conservation. The upland rice production has been considering as one source of environmental degradation that need to be controlled. Recently, Lao government set up an approach for upland agriculture development related to upland oriented policies as following.

3.2.2 Relevant policies and the impacts

According to Thomas, et al. (2003) a number of policies and implementing activities are involved in upland development and this includes:

- Shifting Cultivation Reduction
- Elimination of Opium Poppy
- Land and Forest Allocation
- Focal Site Strategy, and Village Relocation and Consolidation

Phanthanousy, (1994) has identified many constraints on policy implementation, level of growth rate of population, conflicting interest between government and shifting cultivators, insufficient suitable land for permanent agriculture and limitation of funds for intensive cultivation. Almost those policies were good but implementation has caused some impacts to household livelihoods, for example; shifting cultivation stabilization policy. Government tried to eliminate shifting cultivation, forest fallows have been seen as degraded rather than as systematic fallows in agricultural cycle (Thomas, et al. 2003). He also argued about limitation of the effective agricultural development in upland management are (i) Building synergy among projects: communication and cooperation among government, NGO and private sector projects were inadequate, (ii) Logistics and incentives: local staff at district and provincial levels who directly implement policies and project is low salary, limited training and information and inadequate logistics, (iii) Recognizing reality: All the measures have been developed in the upland required times; for example of perennial plant species, tree etc and development of marketing skill and experiences all need significant amount of time to adjust.

a) Shifting cultivation reduction and stabilization

In 2000, it was estimated that about 39 percent of the total Lao population still depended on shifting cultivation, which covered about 13 percent of the total land area of country. Lao Government was very concerned about stabilizing shifting cultivation because shifting cultivation destroying large area of forest each year. As well as Socio-Economic development plan associated with this issue have been put in and it is also stressed that shifting cultivation should not be stabilized by placing order and force, but rather by providing alternative crops or livelihoods to replace shifting cultivation practices.

The current strategic vision for the agricultural sector states that shifting cultivation is seen as an unsustainable practice by Government. The strategy to stabilize shifting cultivation is multi-dimensional: (1) sedentarization of agriculture in sloping land areas through farming system diversification and agro-forestry development, (2) opening market access through feeder road development and market information delivery, (3) land use zoning based on slope and land capability, (4) rural savings mobilization and credit extension and (5) land allocation and land use occupancy entitlement.

In 2001, National Assembly endorsed the 7th Party Congress development target for basic stabilization of pioneering shifting cultivation by 2005 and completing stabilization by 2010.

b) Elimination of opium poppy

There was a long history of Opium production of the highland people in Southeast Asia. Opium became one source of cash income that helped compensate for the usually lower productivity of rice cultivation in higher elevation zones. Suppression of opium is also associated with shifting cultivation policy as opium production is dependent on shifting cultivation system. Major area for opium production is on the upper part of the country, however.

To solve these problems or systematic efforts to control opium production, many local and international organizations and agencies have been involved. In Lao, Lao National Commission for Drug Control and Supervision (LCDC) has been established for central and provincial levels. United Nation Drug control Program (UNDCP) is a major organization that set up a pilot project on this together with several NGO like Norwegian Church Aid (NCA). GTZ is also active in Northern provinces of Lao PDR on these matters.

c) Land and forest allocation

In consistent with two above policies, government's vision on rural development is to settle community in the upland area and encourage permanent practices in agriculture on defined land parcels. Objectives of the land and forest allocation program are: (1) to promote crop production to replace shifting cultivation by allocating land and give land titling and (2) to protect the forest through classification and stabilization of shifting cultivation. Program has two main components of (i) allocation of degraded land to households (with a 3 years temporary land use certificate) for crop cultivation, trees planting or grazing. Land title will be granted after the improvement and development of that land, (ii) after land allocation, village forest land is classified according to use, protection, rehabilitation with signed agreement on rules and regulations for each forest types.

Under guidelines of Ministry of Agriculture and Forestry, the process of land use planning and land allocation is to involve local community in resource management through 8 steps in participatory land use planning. There is a Central Committee for land and Forest Allocation who set annual target of village land and forest allocation. Until 2002 land allocation was more than 50% of villages and for more than 60% of all agricultural households. While considerable achievement in terms of the quantitative target has been made, but there are so many problems with quality of results and thus the impact on local communities living in the mountain areas remains. Much of the forest land allocated has been classes with protected categories. As the National Participatory Poverty Assessment has indicated, upland population across the country is identifying the land allocation policy as a major factor behind their increasing hardship.

Table 3.7 Results of implementation of Land and Forest Allocation Program

Year	No. of village	No. Household	Area (ha)
1995-1995	1,242	82,206	879,594
1996-1997	1,327	40,158	329,580
1997-1998	1,232	95,659	3,244,576
1998-1999	1,009	90,886	855,527
1999-2000	555	21,789	823,460
2000-2001	508	29,361	673,992
2001-2002	315	19,231	1,358,978
2002-2003	322	22,027	495,627
2003-2004	320	19,538	474,105
Total	6,830	420,855	9,135,439

Source: Ministry of Agriculture and Forestry, 2005.

d) Focal site strategy and village relocation and consolidation

Focal site is one of the area-based approach that begins with strategically selected sub-set of locations where bundles of programs implementation a set of related policies in coordinated and presumably synergistic manner. The aim is to serve as pilot project as well as demonstration area for the other development area in Lao PDR. There are 3 basic criteria of (1) urgency for poverty alleviation (isolated, poor access, practicing slash and burn agriculture, not meeting basic human needs), (2) Potential for economic development (potential for settled agriculture, irrigation, NTFPs, tourism) and potential for local cross-border relations (good relations, trade, technology exchange, security) and (3) risk areas with opium, unexploded ordinance, or flood hazard.

By 1997, a total of 62 focal sites had been identified throughout the country, with average of 16 villages and 5,200 people per site. Set up of the focal site is allowed government to be more focused on development and through that focal site. The focal site has been fully supported in term of regulation, fund and development opportunities.

e) National development strategy 2020 and 2010

The Lao PDR is a 'Landlocked and Least Developed Country' (LLDC) and as such is considered by the international community to be one of the poorest countries in the world. The Lao Government's national development priorities are focused around lifting the country from the ranks of least developed nations by 2020. National development goals are sustainable and equitable growth. Lao Government is setting eight National Socio-Economic Priority Programs which is now being implementing in the country. Components of these programs are food security, natural resources conservation and human resources development. In 2003 the Government of the Lao PDR launched its Poverty Reduction Strategy Paper, known locally as the National Growth and Poverty Eradication Strategy (NGPES).

At the moment the major of the shifting cultivation reduction and stabilization has been linked to NGPES. The goal set in 1996 by the 6th Party Congress that Lao will leave the group of least developing countries by 2020. In March, 2001, the 7th Party Congress refined the 2002 vision by specifying poverty reduction target for 2005, 2020 and 2020 and highlighting industrialization and modernization.

NGPES Steering Committee (2004) has formulated NGPES with basically of dual objectives: promote sustainable growth and alleviate poverty, particularly in the 72 poorest districts (from which 47 are priority districts) within four main sectors (Agriculture, Health, Education and Infrastructure) of:

- Agriculture/Forestry Development sector is related to policy in improvement of household food security. This will include the enhancement market based farming, reduction in disparity between lowland and sloping farming communities, enforcement of sustainable forest and watershed.
- Education and Health sectors are given priority in the improvement of the infrastructure and increase access to services of all people in the grassroots level.
- Infrastructure Development is given priority to road construction and infrastructure networks of primary and rural road by increasing decentralized road

management and developing more rural road and all-weather road. Infrastructure is essential to increase access for farmers to improved services and market networks.

To facilitate to the above sectors development, NGPS is also emphasized on the developing of the following supporting and cross-sector priority of:

- Supporting Sectors: this is also called accompanying sectors that include rural electrification, tourism and industry development, trade promotion and development.

- Cross-sector Priorities: Environmental conservation and natural resource management are high priority government. In additionally attention is given to community based forest management, upgrading deteriorated ecological area, gender equality is encouraged by government and the other is addressed as important means to improve livelihood including cultural and national identity and cultural heritage.

Although the NGPES is clearly represented in the plans of the four main sectors, an appropriate budget is often missing. Further, there is a lack of strategic and transparent monitoring mechanisms for implementation. While efforts are underway to cost sector plans and finally sequence/prioritize them in accordance with available budget envelopes, further work is required to optimally implement the NGPES.

With assistance of Theun-Hinboun Hydropower Project, government policies on national growth and poverty eradication now is also being implemented in Sobngouang village and other villages in the Project area. This covers 10% of total villages in the districts.

f) Lao government policies on energy development

Hydropower is the most significant renewable and sustainable resource of the Lao PDR and is the most likely to provide significant export revenue and increase macro economic growth, and financing for the country. About 51% of current production is exported to Thailand. This represents an income of about US\$ 22 million per year and makes EDL the major contributor to the enhancement of economic and social development and improvement of the living standard of the Lao people. The Government of Lao PDR has given top priority in developing hydropower resources in order to boost the national economy and enhance social development. The Lao Government expects to develop some 7,000 MW installed hydro power capacity by the year 2020. Some 3,000 MW is targeted for export to Thailand by the year 2006 and another 1,500 MW to 2,000 MW for export to Vietnam by the year 2010 as part of the BOOT program (Build- Own-Operate-Transfer). To do this the Lao Government is relying on international consultants, investors and financial institutions to provide pre-studies, project management and financing (Prathoumvan and Visounnarath, 2002).

Theun-Hinboun Hydropower Project is the first hydroelectric joint venture project between Lao Government (GoL) and Foreign investors. GoL representative by Electricité Du Laos (EdL) a state own company is hold by 60% shares, Nordic Hydropower Company (NH) holds 20% and the 20% belongs to a Thai company called Greater Mekong Sub-region (GMS). Theun-Hinboun is located along border between Bolikhamxay and Khammouane Provinces. More than 95 percents of electricity is transmitted to Thailand for national income earning. The Project has

contributed significantly to gross national products (GNP) of the country and this, in turn, translates to one of the major source of government budget for infrastructure and other development activities.

The major benefit from the project to GoL and all shareholder companies are the dividend, royalty and tax. All of this information is shown in the table below:

Table:3.8 Dividend to each shareholders of Theun-Hinboun Hydropower Project.

Years	Month	EdL	NH	GMS	Total(US\$)
1998	September	5,700,000	1,900,000	1,900,000	9,500,000
1999	March	8,820,000	2,940,000	2,940,000	14,700,000
	September	7,800,000	2,600,000	2,600,000	13,000,000
2000	March	10,200,000	3,400,000	3,400,000	17,000,000
	September	8,280,000	2,760,000	2,760,000	13,800,000
2001	March	9,060,000	3,020,000	3,020,000	15,100,000
	September	6,180,000	2,060,000	2,060,000	10,300,000
2002	March	6,300,000	2,100,000	2,100,000	10,500,000
	September	5,760,000	1,920,000	1,920,000	9,600,000
Refinancing	June/2002	33,000,000	11,000,000	11,000,000	55,000,000
2003	March	9,720,000	3,240,000	3,240,000	16,200,000
	September	5,400,000	1,800,000	1,800,000	9,000,000
2004	March	10,200,000	3,400,000	3,400,000	17,000,000
	September	8,940,000	2,980,000	2,980,000	14,900,000
2005	March	8,094,000	2,698,000	2,698,000	13,490,000
Grand Total		143,454,000	47,8181,000	47,8181,000	239,090,00

Source: Electricité Du Laos, 2005.

This dividend is transferred to Electricité Du Laos for its implementation and investment to EdL's development projects. According to agreement between THPC and Lao Government. THPC is free from tax collection for the period of the first 5 years of its operation. However, THPC is paying of Royalty to Lao government right at the beginning of its operation. Since 2005 tax has been paid to Lao government, details of the royalty and tax paid by Theun-Hinboun Power Company can be found in the table below:

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Table 3.9 Royalty and Tax paid directly to Lao Government.

Years	Month	US\$	Thai Baht
1998	Mar-99	450,196	11,440,200
1999	Mar-00	1,684,795	42,668,463
2000	Mar-01	1,863,526	47,202,490
2001	Sep-01	752,823	19,065,948
2002	Mar-02	1,076,971	27,283,611
	Sep-02	714,752	18,101,154
2003	Mar-03	1,092,971	27,688,037
	Sep-03	720,309	18,162,335
2004	Mar-04	1,118,565	28,211,890
	Sep-04	824,370	20,734,870
2005	Mar-05	1,135,255	28,607,459
	Tax	3,440,000	
Grand Total		14,874,533	289,166,457

Source: Electricité Du Laos, 2005

Before construction of the project, Environmental Impact Assessment (EIA) was carried out and this was followed continuously with extensive environmental and social impact studies. Mitigation and Compensation Program (MCP) of the project was outlined with the direction for implementation of livelihood improvement activities for the impacted villages (Resource Management and Research (RMR). 2000). Beside many positive impacts there are some negative impacts that directly affected after the implementation of Theun-Hinboun Hydropower Project in 1998, specially, the issue of livelihood improvement of the rural community. This is because of raising water level in the river which causing more difficulty for fishing. Many household gardens along the river bank were also wiped out (Theun-Hinboun Power Company, 2002). With these negative impacts in mind, the Theun-Hinboun Hydropower Project has developed an Environmental Logistical Framework as a milestone to mitigate results and rehabilitate degraded forest area. An Environmental Management Division (EMD) was set up to implement Project environmental plan and monitor environmental conditions in project area.

This hydroelectric project utilizes the existing landscaping potential of two different watersheds to generate electricity. Theun-Hinboun has not only brought in so many benefits to Lao in general especially the income earning for development activities for the whole country such as; road development, rural development and so on but it also bring in many local benefits for social, economic, infrastructure development, electricity and livelihood improvement. There are, however, some unexpected negative impacts during these changes and livelihood improvement process are in the transition to several alternative development. Upland rice which is the major staple food crop is currently being suppressed by Government through the implementation of national policies, e.g., stabilize shifting cultivation and promotion of the forest conservation, infrastructure development, construction of road and highway, hydroelectric power, improvement in education, health development and economic generation activities. Many development programs, e.g. supports for paddy field development, construction of bench terraces as well improvement and access of

external markets, are coming in to village. All of these effects and their combination may be understood as **External Push factors**. **Internal Pull factors** are regarding to local activities and their responses to external push factors. In this thesis, the outcomes of the study are focusing on improving food security and additional income. The relative importance of rice sufficiency, supplementary cash income, indigenous knowledge and local wisdoms, and system of traditional land use and land tenure are also incorporating in this study.

3.2.3 Problems and changes

Since 1989, the first Forestry Conference our former president Mr. Kaison Phomvihan has given an address with following statement “Forest destruction in Lao PDR has reached a critical point; it is the time for us to change completely from indiscriminate logging and other form of deforestation to focusing mainly on tree planting and conservation” (Ministry of Agriculture and Forestry, 2005).

Department of Forestry, Ministry of Agriculture and Forestry with its mandate has issued the relevant policies, regulation, research and alternative to cope with deforestation in the past 20-30 years. These may be summarized as follow.

Shifting cultivation is known as “Hai” in Lao PDR. This basically consists of cutting natural vegetation, leaving it to dry and then burning for temporary cropping of the land. Burning of vegetation cover and soil organic matter accelerates decomposition and releases useful nutrients for crop production and other reasons, burning also kills weeds and pests. After that the field is to be abandon for a period of time for regrowth of vegetation which is called fallow period. So shifting cultivation can be divided into two phases of (i) the cropping phase and (ii) the fallow phase. (NAFRI, NAFES, NOUL. 2005(a)).

In Lao PDR, the major change or evolution of shifting cultivation system is Lao government policies on reducing and stabilizing of shifting cultivation. However, there are some of the factors that influence this system and practice for examples; population increase, growing market opportunities and change of attitude among shifting cultivators.

With those forces, shifting cultivation are now on the way to be more sedentary agriculture, introducing of the management of the fallow for a better land use, promotion of the conservation agriculture by terracing, promotion of the alternative of income generation activities and so on. These efforts have now speeding over to the Lao PDR as rural development program with budget for government, oversee grant assistance etc. In the case of Theun-Hinboun Hydropower Project, the adoption of this concept has been applied to project responsible villages especially in the Headpond.

The upland rice production in shifting cultivation has been seen as the root cause of deforestation and unsustainable way of natural resources utilization. Norkhounphon (2006) wrote in the Paxaxon newspaper, a daily newspaper in Lao PDR and discussed about the shifting cultivation that involve the primitive and very simple techniques of slashing and burning of the forest. At the same time it can provide very low yield comparing to other types of agricultural production. As the

results, it would give the negative impact to the shifting cultivation households. He went on and said that impact of deforestation and destruction of the natural resources could be expected at national level. This will make the life more difficult especially for the future generation. At the global level, the shifting cultivation has also created negative impact on climate change, etc. He encouraged the farmers who are practicing shifting cultivation to move to other production systems and better alternatives that can give better yields and income. He realized that the change away from shifting cultivation is rather difficult but stepwise learning and doing may help to scale up the alternatives from smaller to larger scale.

To shift to alternatives production systems, there are too many factors involved many external and internal forces will have to be dealt with. The proposed program or implementation plan may work in certain area but may not be applicable to the others. Site specificity will have to be overcome. Many farmers difficulties in shifting to alternatives production systems because of the constraints and limitation of the availability of flat land, family labor for intensified form of agriculture, technical know-how, ethnic traditions evolving around the rice cycle and so many other reasons (NAFRI, NAFES, NOUL, 2005(a)).

The main problem being faced at this transition period of stabilizing of slash and burn is reduction of the rice for consumption. Since limitation of the access to the land due to land and forest allocation policy, the fallow area is now being classified as potential forest or regeneration forest. The villagers have to intensify rice production in the same plot every year, in order to maintain production. However, the production process would require external inputs such as chemical fertilizers, labour and improved technologies. Some of the farmers can adjust and adopt to this change but other can not and have to find the other solution to rice production or move to other income generation activities for their rice security.

3.4 Conclusions

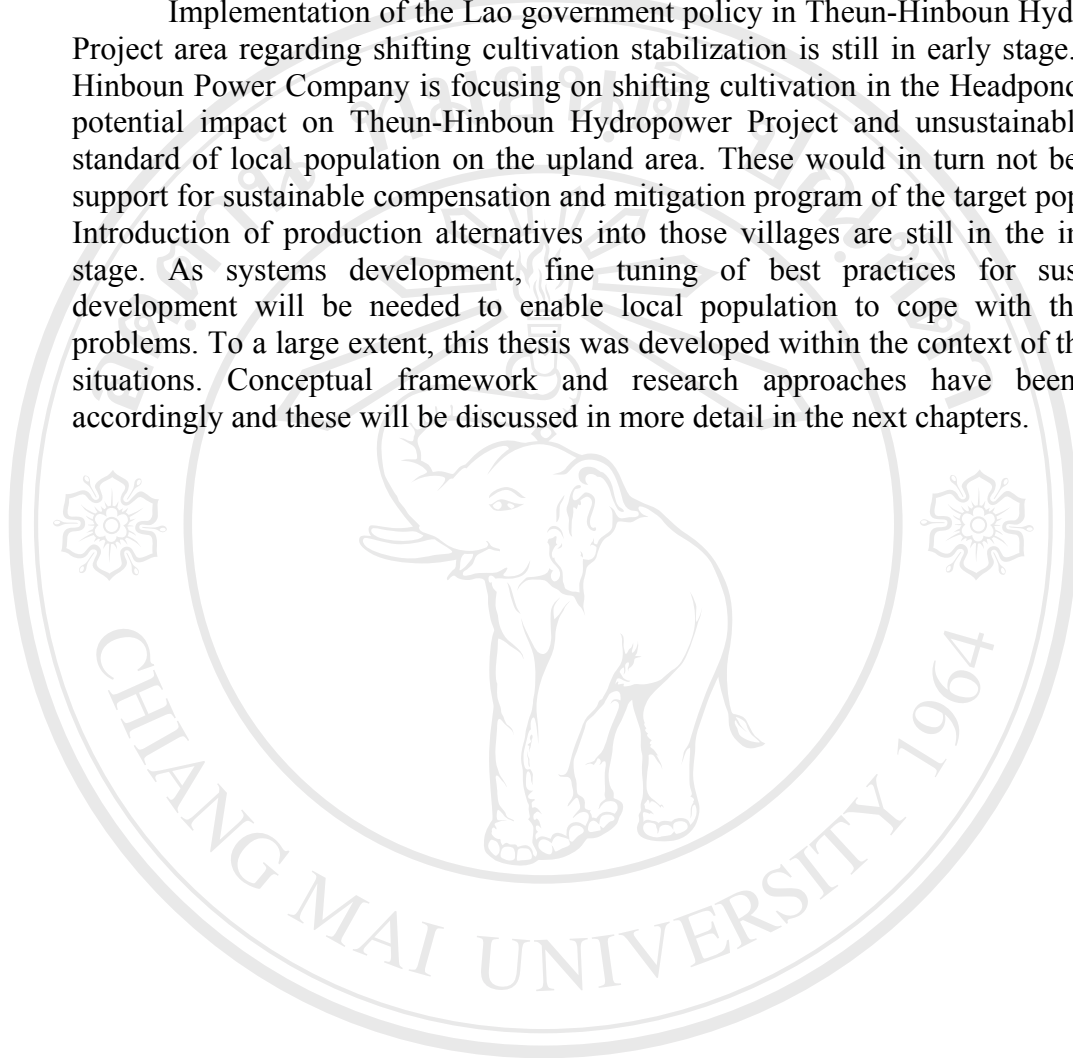
Based on Lao biophysical geography as well as cultural diversity, it is may be difficult to move out shifting cultivation or slash and burn rice production practice in a short time. With exception of opium, upland rice remains the primary source for food security and that gives shifting cultivation on top agenda of rural community.

On the contrary, Lao government views shifting cultivation as the major cause of resource natural resources degradation. Measures to stabilize shifting cultivation are now under way with assurance of law, policy, regulation and introduction of alternative production. Demonstration and research results in many areas especially in the northern part of Lao PDR have shown many uncertainty whether it will be successful. On the large scale Lao PDR is also formulating policies and regulations to transform from subsistence economy to commercial economy according to government development strategy of industrialization and modernization. With assistance from the outside donors and research funds, shifting cultivation management in Lao PDR remains problematic.

Theun-Hinboun Power Company has been brought in a lot of foreign income to Lao government up to date in forms of dividend, royalty and tax. This would allow big increase in government budget to be allowed to support economic development

policy. With its commitment, Project now is implementation the mitigation and compensation program for the improvement and sustainable living conditions of the impacted population within the Project area.

Implementation of the Lao government policy in Theun-Hinboun Hydropower Project area regarding shifting cultivation stabilization is still in early stage. Theun-Hinboun Power Company is focusing on shifting cultivation in the Headpond area as potential impact on Theun-Hinboun Hydropower Project and unsustainable living standard of local population on the upland area. These would in turn not be able to support for sustainable compensation and mitigation program of the target population. Introduction of production alternatives into those villages are still in the immature stage. As systems development, fine tuning of best practices for sustainable development will be needed to enable local population to cope with their own problems. To a large extent, this thesis was developed within the context of the above situations. Conceptual framework and research approaches have been drawn accordingly and these will be discussed in more detail in the next chapters.



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