Socio-economic Survey and Analysis to Identify Drivers of Forest Changes in Houay Khing and Sop Chia Village Clusters,

Phonxay District, Luang Prabang

January 2012

Vientiane, Lao PDR

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Abbreviation and Acronyms

CESVI	Cooperazione e Sviluppo (Cooperation and Development)
DAFO	District Agriculture and Forestry Office
GDP	Growth Domestic Product
GoL	Government of Lao PDR
GPAR	Governance and Public Administration Reforms
HH	Household
HK	Houay Khing
JICA	Japan International Cooperation Agency
MAF	Ministry of Agriculture and Forestry
MI	Mekong Institute (Thailand)
MoIC	Ministry of Industry and Commerce
MURC	Mitsubishi UFJ Research & Consulting
NGPES	National Growth and Poverty Eradication
NTFP	Non-Timber Forest Product
PADETC	Participatory Development Training Centre
PAFO	Provincial Agriculture and Forestry Office
PAREDD	Participatory Land and Forest Management Project for Reducing Deforestation
PDR	Peoples' Democratic Republic (Lao)
PICO	Provincial Industry and Commerce Office
REDD+	Reducing Emissions from Deforestation and Forest Degradation Plus
SC	Sop Chia
TABI	The Agrobiodiversity Initiative
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
VCA	Value Chain Analysis

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Chapter 1 Scope of the Survey

1.1. Background

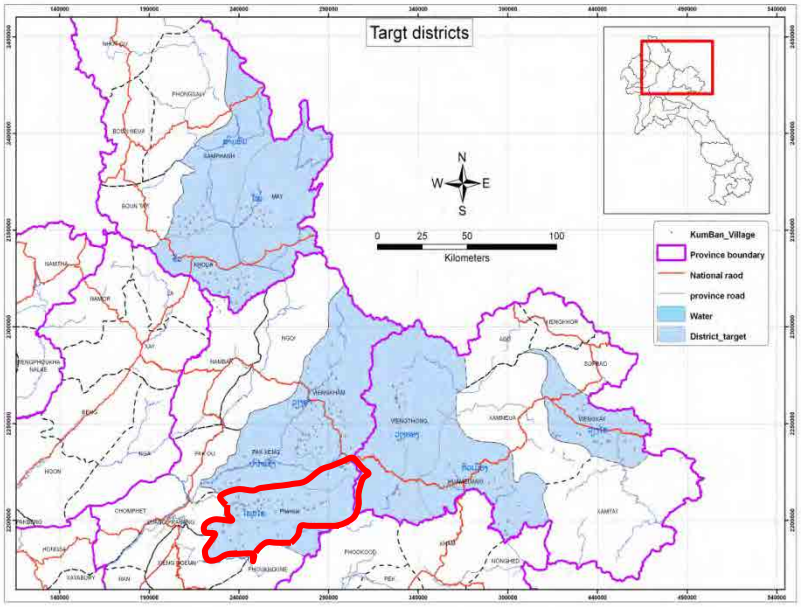
This study is part of the efforts of Japan International Cooperation Agency (JICA) to validate and register "Project on REDD+ through Participatory Land and Forest Management for Avoiding Deforestation in Lao PDR.

Lao People's Democratic Republic (Lao PDR) established a REDD taskforce in 2008 under the assistance of JICA and other organizations to initiate an approach to addressing potential and technical challenges towards implementing REDD+ (or Reducing Emissions from Deforestation and Forest Degradation Plus). REDD+, if effectively implemented in Lao PDR, it is expected not only to work as a global warming mitigation scheme but also to contribute to establishing a forest management system in the country's villages, and eventually to reducing poverty and conserving environment on a global scale.

To promote REDD+, JICA has been conducting a project called "Participatory Land and Forest Management Project for Reducing Deforestation" or "PAREDD" since 2009 and the Validation and Registration of REDD+ Project (called PAREDD+) is to have the Houay Khing Village Cluster (called "*kumban*" in Lao language) in Phonxay district of Lao PDR's Luang Prabang province validated and registered as a target area of the REDD+ project.[1]

The field surveys of PAREDD+ has just began in February 2012 and social-economic surveys in five villages of Houay Khing village cluster, and around five villages of Sop Chia village cluster as a Reference Area are to be implemented by an independent Subcontractor, Mitsubishi UFJ Research & Consulting (herein after referred to as "MURC") appointed by JICA, in tandem with a local partner, NewEra+, (herein after referred to as "Subcontractor") to identify the drivers of deforestation and forest degradation and develop suitable REDD+ activities by the methods of rural people participation. Furthermore, application for validation and registration as a REDD+ project will be prepared using data developed through the project.

Figure 1 Location of Phonxay Disatrict, Luang Prabang Province



Source: National Geographic Department

[1] Phonxay district is one of the 4 poorest districts in Luang Prabang province and one of the ten priority poorest districts in the whole country. It shares borders with Pakseng district in the north, Phoukhoun and Xieng Ngeun district, Viengthong (Huaphan province) and Phoukood (Xiengkuang province) in the east, Luang Prabang town and Pak Ou district in the west.

1.2. Objectives

The main objective of this survey is to conduct the socio-economic survey and analysis to contribute to the efforts in identifying drivers of deforestation and forest degradation, and developing suitable REDD+ activities of rural people participation.

1.3. Data and Methodology

The analysis presented in this report is based on primary data collected between October and December 2012 through a variety of methods. The secondary data, figures, and reports were collected and reviewed. Following a half-day orientation meeting organized at the district, the survey started from HK cluster of five target villages. Attending the orientation meeting were district officials from the agriculture and forestry, planning, commerce[2], the heads of Houay Khing (HK) and Sop Chia (SC) village clusters, target village chiefs and PAREDD project staff. The meeting also heard from the participants sharing the information about the socio-economic situation, problems, seasonal difficulties, and coping strategies of villagers.

The household interviews started by having an orientation meeting with the villagers and village authorities first[3]. The target and non-target household members were also present. This village-level meeting allowed the participating villagers to share their views about their seasonal livelihood patterns such as cropping, collecting forest products, and participating in other livelihood activities. The village's map of the natural resources and customary land use were also drawn, including the forest and land use activities that might suggest any indicative forest changes. The villagers also shared main challenges they were encountering and proposed alternative livelihoods believed to help eliminate slash and burn farming (See Annexes 1 and 2)

The surveys were conducted from 9 until 28 October 2012[4]. An additional survey was carried out between 4 and 24 December 2012 for the mapping of the agricultural plots of between 7 - 8 households in each of the target villages by using the GPS (Global Positioning System). Altogether, 359 plots of 77 households were GPS-mapped and recorded with the data including latitude, longitude and elevation or height above sea level. The satellite imagery will be evaluated by MURC's remote sensing team.

The household samples in HK cluster were the same samples used in the previous household survey conducted by PAREDD in early 2012. The selection criteria looked at the groups of ethnicity, gender, wealth ranking, etc. In consultation with MURC, the sample households in the Reference Area, or SC cluster, were selected from TABI's household data collected in July 2010, using the selection criteria similar to that of HK cluster. Five out of 8 villages in SC cluster were selected in consultation with MURC.

Agreed by MURC, three types of villages to be included in the study were one better-off village, two general or middle level and two poor villages[5]. This composition would help compare the pattern of the livelihoods and the way of living of the people in those three types of villages. The inclusion of the better-off village would be a reference for the middle and poor villages to learn from. The reference area villages are Hua Meuang as better-off, Phak Hok and Houay Si Yua as medium in terms of easy access when compared with the villages in Sop Chia cluster itself, and Tad Thong and

[2] The meeting was held on the 9th October 2012 and chaired by the District Governor of Phonxay. At the meeting a list of households to be interviewed was provided to each of the village chief to review and inform those households

[3] The village meeting was led by three village cluster officers and facilitated by the survey team.

[4] The survey began from the villages in Houay Khing Village Cluster first between 9 and 12 October 2012, and moved to Sop Chia Village Cluster from 13 until 28 October 2012. The Household Survey Questionnaire Form was designed by MURC and revised by the consultant in consultation with MURC.

[5] Based on the email exchange titled "Sop Chia Survey" dated on the 20th October 2012".

Houay Dong as very poor. The village cluster head provided necessary information to select the villages. By the Lao definition, ranking better off, medium, or poor villages is done based on the access to roads, food security (mainly rice), access to electricity, education (e.g. access to school), access to health service facilities, revenue of the village, and number of poor HHs (that is more than 50% of total households). With such a definition, Phak Hok, Houay Si Yua, Tad Thong and Houay Dong are regarded as poor villages and this claim is also indicatively supported by a report of the National Committee for Rural Development and Poverty Reduction (2011) [6].

Prior to the kickoff of the Household Survey, a Household Sample Questionnaires were tested at a village in Luang Prabang district. The household interview also included some female interviewees in each target village. Table 1 shows the household samples by clusters and villages.

Table 1 Sample Households in Houay Khing and Sop Chia Village Clusters

Village cluster	Village code	Village (economic status)	Total no. of households	No. of sample households (HH, % of total)	No. of female samples (HH)
1. Houay Khing	1-1	Houay Khing (medium)	220	41 (19%)	10
	1-2	Sa Kuan (poor)	123	36 (29%)	9
	1-3	Houay Ha (poor)	56	37 (66%)	10
	1-4	Houay Tho (poor)	58	38 (66%)	8
	1-5	Phak Bong (poor)	82	35 (44%)	10
2. Sop Chia	2-1	Pakhok (medium)	95	36 (42%)	9
	2-2	Hua Meuang (better-off)	83	35 (44%)	10
	2-3	Tad Thong (poor)	82	35 (47%)	9
	2-4	Houay Si Yua (medium)	93	38 (41%)	11
	2-5	Houay Dong (poor)	85	32 (34%)	16
		TOTAL	977	363	102

Source: Survey team

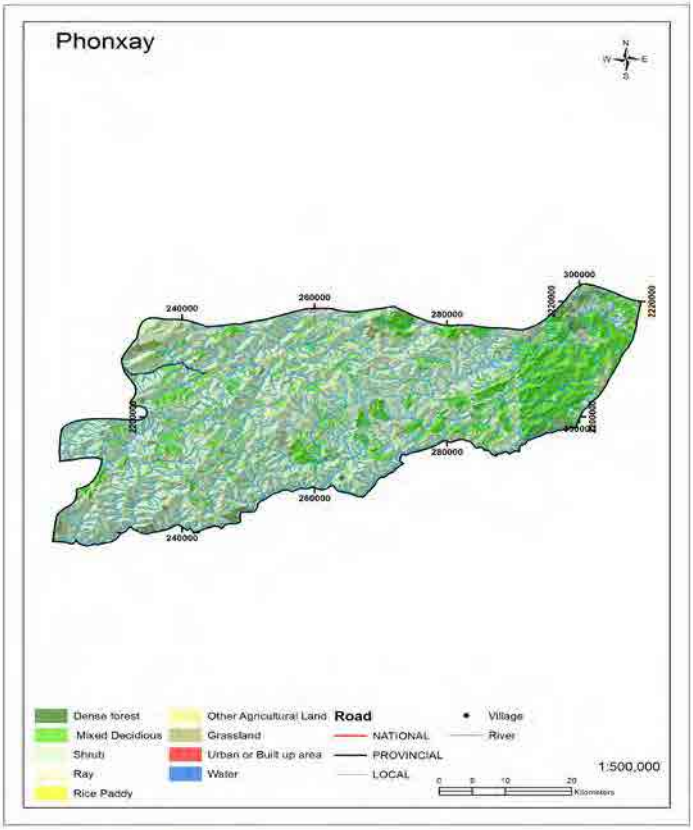
[6] National Committee for Rural Development and Poverty Reduction (2011). Review and Evaluation of Poverty and Development based on Decree No. 285/PM, reported by Provinces and Districts.

1.4. Study Area: Houay Khing and Sop Chia Village Clusters

1.4.1. Land and People

Houay Khing (HK) and Sop Chia (SC) village clusters share the borders with each other [7]. The combined total area of these clusters is 50,871 ha[8], accounting for 20.15% of the total land area in the district and generally characterized by rough terrains owing to the presence of mountains.

Figure 2 Map of Phonxay District



Source: National Geographic Department

HK cluster has a total land of 29,974 ha, of which 26,551 ha (89%) lies in the 5 target villages. Sop Chia village cluster has 20,896 ha, of which 16,166 ha (77%) belongs to another 5 target villages in SC cluster. Table 2 shows a breakdown of land types completed by the Phonxay District Land Management Office (2012) [9]. The land of the village clusters in question was classified into 8 types: (i) residential/housing area, (ii) forests, (iii) agriculture/production area, (iv) water, (v) public work, (vi) industrial area, (vii) cultural area and (viii) security area. In addition to the above-mentioned types of land, each village also has a "subtype" of lands or zones identified based on the village's geographic characteristics. For instance, they allocate areas for grazing activities (e.g. grazing land) and the forest type can be further demarcated into production, conservation, and protection forests (Annexes 1 and 2).

[7] Phonxay district has 10 village clusters including 1 central village served as the district capital. They are Phon Thong, Ka Tang Sa Leung, Nam Bo, Jom Jiang, Don Kham, Houay Khing, Sop Chia, Tha Khamh, Neun Soung, and Ban Yai (district capital).

[8] The breakdown of land areas by cluster and by village available from this report is sourced from the land management office of Phonxay District that was surveyed in the middle of 2012.

[9] The land use planning survey was conducted between May and June 2012 covering all 61 villages in Phonxay district.

Table 2 Land Areas in Survey Areas by Village

No	Village Cluster	Type of Land (ha)					
		Residential / Housing	Forests	Agriculture / Production	Water	Others	Total Area
	Houay Khing						
1-1	Ban Houay Khing	21	3,968	3,384	20	34	7,426
1-2	Ban Sa Kuan	8	1,722	2,332	15	38	4,115
1-3	Ban Houay Ha	4	3,362	4,128	-	3	7,498
1-4	Ban Houay Tho	8	936	1,779	-	9	2,732
1-5	Ban Phak Bong	3	1,620	3,146	-	12	4,781
	Total (A)	**44**	**11,608**	**14,768**	**35**	**96**	**26,551**
	Sop Chia						
2-1	Ban Phak Hok	7	1,797	1,763	-	20	3,586
2-2	Ban Hua Meuang	4	180	1,550	13	16	1,763
2-3	Ban Tad Thong	3	1,636	1,667	9	9	3,325
2-4	Ban Houay Si Yua	5	3,343	1,564	9	2	4,922
2-5	Ban Houay Dong	6	905	1,624	20	14	2,569
	Total (B)	**24**	**7,862**	**8,168**	**52**	**60**	**16,166**
	Total (A+B)	**67**	**19,469**	**22,937**	**87**	**157**	**42,717**
	District Total Area	**424**	**147,250**	**102,077**	**1,672**	**1,033**	**252,457**

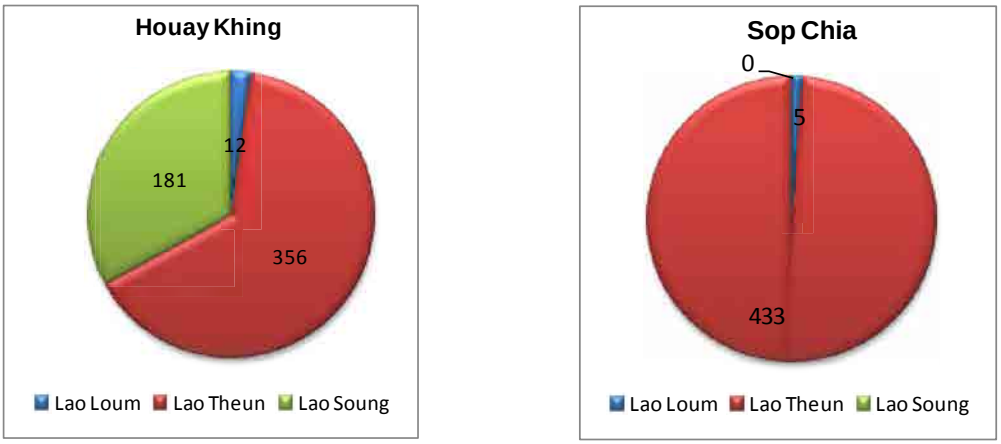
Source: Phonxay District Land Management Office, 2012.

At the time of the survey, the total population of the ten villages in the study area (five villages in each cluster of HK and SC) is 6,275 people (977 households), mostly Lao Theung (e.g. Khmu) and Lao Soung (e.g. Hmong). Lao Loum makes up the least proportion of the population in each village cluster. The majority of these people are engaged in subsistence upland agriculture usually associated with slash and burn farming and livestock as their supportive income generating activity.

In HK cluster, the total number of households in the five target villages is 539 (3,525 people). Khmu (Lao Theung) dominates the population in the HK cluster, which accounts for 65%, followed by Hmong (33%) and Lao Loum (2%) respectively. Following the government's policy on merging smaller villagers to larger ones, Ban Long Lath of HK cluster is subject to the mergence with other villages with better infrastructure and public service delivery. At the time of the survey, Long Lath had 42 households. It was reported that two clusters, namely Houay Khing and Phon Thong, would be new homes for Long Lath people. In HK cluster, Phak Bong and Houay Khing are targeted for the people to move in. However, discussions are ongoing as of this reporting.

In SC cluster, the total number of households in five target villages stands at 438 (2,677 people). SC cluster is dominated by Khmu population that accounts for 99% and the rest is Lao Loum. Figure 3 breaks down the population by ethnicity in 2 target clusters.

Figure 3 Number of Households in Target Village Clusters by Ethnicity

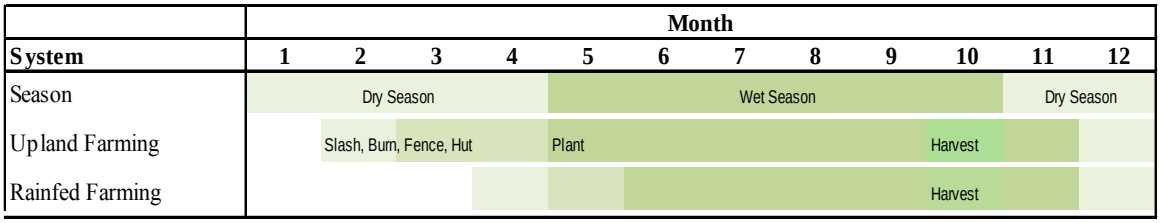


Source: Survey team

1.4.2. Livelihoods

The majority of the population is mainly engaged in upland rice farming (*khao hai* or *khao nuen soung*) usually associated with slash and burn activities. Cash-cropping and raising animals are the supportive activities. In general, people are dependent mainly to nature and forests for livelihoods. Figure 4 shows generic seasonal farming activities taking place at certain months in the two target clusters. As growing upland rice (*khao hai*) is widely observed in the areas, the villager also grow other crops such maize and cassava for animal feeds during the wet seasons.

Figure 4 Seasonal Farming in 2 Clusters



Source: Survey team

Farmers normally start clearing bushes/land in February and leave bushes dried until March before burning and removing obstacles, making fence and huts. By late May farmers begin to plant rice and some other crops. The first weeding is in July, the second is in September (the gap only one month). It is said that three years swidden fallow is two times of weeding for one production cycle, if swidden fallow is shorter than three years, the weeding would be 4-5 times and also the production is lower, this could be one reason that some farmers are tempted to clear big bushes and trees which is considered illegal. The harvesting starts from October to December. Basically later December of the year is a rice or crop transportation season from *hai* fields or locally called "*sanam*" to the village. All work requires intensive labor forces which farmers always have to rely on labors exchange in order to complete work on time. If *sanam* is a 2-3 hour walk farmers stay for a certain period of time in order to save time of traveling.

The use of forest mainly associated with the collection of non-timber forest products (NTFPs) is seen year round depending on forest products. Forest products are an important source of income for rural people and also ensure food security. Usually farmers collect forest products from forests near their *sanam* with a distance between 1 and 3 hour walking. The common forest products are for instance broom grass or *khem* (February-April), mulberry bark or *posa* (May-June), bamboo shoots (June-September or during the rainy season), *dou deua* roots (July-October), bamboo worm or *mae* (September-October), *peuak meuak* bark (all year), wild editable leaves, and so forth. The collection season of these forest products have not changed but are reported declining due to population growth associated with people seeking for more farming land by practicing slash and burn cultivation (also refer to Annex 4).

1.4.3. Road Access and Wage-labor

Generally roads can be accessed during the dry season to all target villages but, in the rainy season, can be extremely difficult or impossible to travel. This is instanced by Sa Kuan, Houay Ha, Houay Tho, Tad Thong and Houay Dong. Located on the main road, Ban Houay Khing is better equipped with health center, school (including the primary and secondary levels), gravity-fed water system (*nam lin*) and so forth, and also considered as the central entry to and the largest village of HK cluster in terms of the number of population, accounting for nearly 40% of the total population in 5 target villages. Sop Chia cluster, located closer to the district center, relies on public facilities available from the center. However, Houay Dong and Tat Thong with an 18-25 km distance from the district's center are more vulnerable and can be accessed in the dry season only.

Waged labors are uncommon and hardly seen in rural areas. In most cases, villagers exchange labors for farming activities such as bush clearance, planting rice, weeding, harvesting and so forth. They also help each other to build houses, the host is supposed to take care of his or her helper with food and drink. As a new house style introduced and built with cement and roofed with tile or zinc materials in recent years, labor is traded and waged for work done. Waged labor tends to be increasing as such a new house style construction has been widely observed for the past recent years. As a result, local workers or contractors have emerged and the pay or wage is made in form of cash, rice, cattle, or poultry.

Chapter 2 Household Samples and Survey Results

2.1. Characteristics of Interviewed Households/Members

A total of 363 households in 10 villages of 2 clusters were interviewed, 187 in HK cluster and 176 SC cluster. Additionally 102 wives of the interviewed household heads were included for interviews, making a total of 464 people interviewed.

The majority of the ethnicity people in the two clusters are Khmu ranging from over 60% to almost 100% (as shown in Tables 3 and 4). Of 363, 283 were Khmu households (110 in HK and 173 in SC) followed by 75 Hmong and 5 Lao Loum. In other words, HK cluster is the Khmu-Hmong community whereas SC cluster is the Khmu-dominated community.

Table 3 Characteristics of Samples in Houay Khing Cluster

	Houay Khing	Sa Kuan	Houay Ha	Houay Tho	Phak Bong
No. of samples	41 of 220 HHs 10 Female	36 of 123 HHs 9 Female	37 of 56 HHs 10 Female	38 of 58 HHs 8 Female	35 of 82 HH 10 Female
Gender	M35 : F16	M 25: F 20	M 28: F 19	M 27: F 19	M 22: F 23
Ethnicity	L3 : K24 : H24	L0 : K34: H11	L0 : K10 :H37	L0 :K26 :H20	L0 :K45 :H0
Main agri. activity	Upland Lowland	Upland	Upland Lowland	Upland	Upland
Land ownership	*samano theedin* is issued to individual households to certify their possession and use [10]	*samano theedin* is issued to individual households to certify their possession and use	*samano theedin* is issued to individual households to certify their possession and use	*samano theedin* is issued to individual households to certify their possession and use	*samano theedin* is issued to indivi. households to certify their possession and use
Main source of income	Rice (upland / lowland) Livestock	Rice (upland) Livestock	Rice (upland / lowland) Livestock	Rice (upland) Livestock	Rice (upland) Livestock
Economic status	Medium	Poor	Medium	Medium	Poor
Resettlement	4 villages (Houay Khing, Paed, Houay Tha & Houay Saak)	3 villages (Somboun Noi, Sa Kuan Noi, & Sa Kuan Yai)	2 villages (Houay Ha & Long Euang)	2 villages (Houay Tho & Jom Bang)	Only Phak Bong

Source: Survey team

Table 4 Characteristics of Samples in Sop Chia Cluster

	Phak Hok	Hua Meuang	Tad Thong	Houay Si Yua	Houay Dong
No. of samples	36 of 93 HHs 9 Female	35 of 83 HHs 10 Female	35 of 82 HHs 9 Female	38 of 93 HHs 11 Female	32 of 85 HHs 16 Female
Gender	M 34: F11	M35 : F 10	M34: F 10	M34 : F15	M32 : F16
Ethnicity	L1 :K44 :H0	L1:K44:H0	L2:K42:H0	L2:K47:H0	L0 :K 48:H0
Main agri. activity	Upland	Upland Lowland	Upland Lowland	Upland	Upland Lowland
Land ownership	*samano theedin* is issued to individual households to certify their possession and use	*samano theedin* is issued to individual households to certify their possession and use	*samano theedin* is issued to individual households to certify their possession and use	*samano theedin* is issued to individual households to certify their possession and use	*samano theedin* is issued to individual households to certify their possession and use
Main source of income	Rice (upland) Livestock	Rice (upland) Livestock	Rice(upland / lowland) Livestock	Rice (upland) Livestock	Rice(upland / lowland) Livestock
Economic status	Poor[11]	Medium[12]	Poor[13]	Poor[14]	Poor[15]
Resettlement	2 villages (Houay Sooi & Phak Hok)	1villages (Houay Meuang)	3 villages (Ban Phol, Tad Neua, & Tad Thong)	3 villages (Houay Si Yua, Houay Poo, Tad Thong)	2 villages (Houay Dong & Houay Kao)

Source: Survey team

[10] A book is issued to individual households to certify that they possess and use the plots. This logbook is called *samano theedin* and not considered land titling.

[11] Poor economically but medium in terms of infrastructure

[12] Medium economically and infrastructure

[13] Poor economically and infrastructure

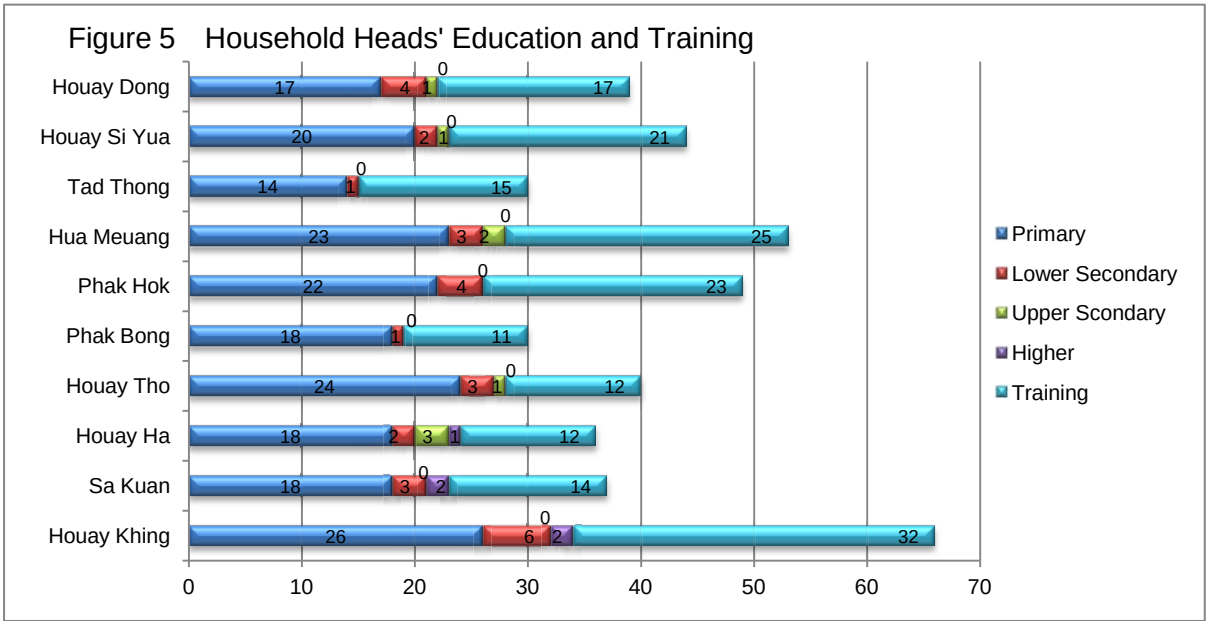
[14] Poor economically but medium in terms of infrastructure

[15] Poor economically and infrastructure

2.2. Education

130 of 187 households interviewed in HK cluster went to schools, mostly primary education level whereas 114 of 176 did in SC cluster (Figure 5). Roughly between 1% and 5% of the household head samples continued the secondary education level in both clusters. The training provision was also reported focusing more on improved techniques of cropping and raising livestock. Other trainings such as health, village management, and so forth were also reported.

Figure 5 Household Heads' Education and Training



Source: Survey team

Table 5 shows the labor structure, members under 15 years of age and members not living with the family. An average size of the household is about 7 persons in both clusters of which children under 15 years of age account for about a half. In every 133 working members there are 16-17 who left their own villages for reasons like studies, work, marriage, and so forth. The main reason the family members left the villages are studies, followed by work, marriage, and so forth respectively.

Table 5 Household Labor Force

Village	Family members	Female	Labor force	Children	Absentees
Houay Khing	294	144	163	124	22
Sa Kuan	255	127	122	117	9
Houay Ha	276	139	130	138	31
Houay Tho	260	125	130	118	20
Phak Bong	203	96	114	84	3
Total	**1,288**	**631**	**659**	**581**	**85**
%		**0.49**	**0.51**	**0.45**	**0.07**
Phak Hok	239	122	132	106	17
Hua Meuang	213	102	132	77	18
Tad Thong	222	113	125	94	17
Houay Si Yua	264	119	153	97	15
Houay Dong	218	106	123	89	13
Total	**1,156**	**562**	**665**	**463**	**80**
%		**0.49**	**0.58**	**0.40**	**0.07**
Grand Total	**1,156**	**562**	**666**	**463**	**80**

Source: Survey Team

2.3. Occupation

Table 6 shows the number of the sample households engaged in on-farm activities. The families living in the target villages are mainly engaged in subsistence upland farming associated with slash and burn practices. The similarity that both clusters share is that they have a majority of *saohai* or upland

farmers. In HK cluster, 86 % of 187 interviewed households are engaged in upland farming and another 5 %, all in Houay Khing village, are engaged in both upland farming and lowland rice farming. In SC cluster, 80 % of 176 households are engaged in upland rice farming only and another 14 %, mainly in Hua Meuang, Tad Thong and Houay Dong, are engaged in both upland and lowland rice farming. In other words, more than 90 % of interviewed households are engaged in some sorts of upland farming in both clusters. It should be noted that Lao farmers usually avoid economic risks by diversifying their income sources; therefore, many household heads are engaged in off-farm activities in addition to on-farm activities for additional incomes as discussed below.

Table 6 suggests that almost all upland and lowland paddy farmers grow crops on their own land. It was reported that farmers renting land were new members of the village where farming land is not available or if it is located too far and / or less fertile.

Table 6 Occupation (On-farm) of Household Heads

	HK (187 HH)		SC (176 HH)	
On-farm activities	**HH**	**%**	**HH**	**%**
a) On-farm: lowland paddy only				
Farming on own land	2	1	6	3
Farming on rented land	0	0	0	0
b) On-farm: upland farming only				
Farming on own land	160	86	140	80
Farming on rented land	2	1	2	1
c) Both a)lowland and b)upland farming				
Farming on own land	10	5	25	14
d) Not engaged in on-farm activities	13	7	3	2

Those not engaged in on-farm activities at all are only 7 % in HK and 2 % in SC clusters.

Table 7 Occupation (off-farm) of Household Heads

Off-farm occupations (*multiple choice)	HK (187 HH)	SC (176 HH)
Civil servant/teachers/etc	7	11
Short-term waged labor	26	49
Self-employed business	9	17
Others	133	151

**Some households hold multiple occupations and thus made more than one choice.*

Source: Survey team

The development or expansion of lowland paddy fields depends on water sources and necessary resources available to deliver water to the farming land. Compared with HK cluster, SC cluster has more water resources available from all the target villages. This creates enabling conditions or environments for developed and expanded lowland rice farming and farmers with lowland farms are able to grow rice in the dry season.

Apart from on-farm activities, the sample households are engaged in various off-farm activities or occupations. Table 7 summarizes all the off-farm activities the heads of sample households are engaged to earn incomes (some households hold multiple occupations). SC cluster is located closer to the district center and thus has better access to off-farm work opportunities available in town and even in Luang Prabang city. As a result, it has more households engaged in government work, wage labor, trading, and small shops than those in HK cluster. Those who chose “others” (i.e. 133 HH in HK cluster, 151 HH in SC cluster) mainly rely on forests for a living by collecting and selling forest resources. This suggests that the forests remain very important to rural those people.

2.4. Migration

The implementation of the government’s policy on transforming small villages into large ones was significant between 2001 and 2005. Among 363 sample households interviewed, 65% were not born in the village but migrated to settle down in their current villages with various reasons ranging from marriage, fleeing diseases outbreaks, seeking fertile land for agriculture to village relocation or merger. The most recorded reason is the merger of multiple villages in both clusters.

Table 8 summarizes the migration based on the interviews with sample household heads in both clusters. Of 238 migrants, 136 are in SC cluster, mostly Khmu, and 102 in HK cluster with the slightly higher number of Khmu than Hmong. Migration due to village relocation or merger ranks first in HK cluster, followed by the availability of agricultural land, access to better infrastructure (e.g. health service center, school, road, etc.), marriage and so forth. All the 5 villages in HK cluster witnessed the migration or population movement caused by village relocation or merger. The target villages of SC cluster witnessed a significantly high number of migration due to village relocation or merger at 105 cases out of 136, and about 97% were Khmu.

Table 8 Migration of Interviewed Households

	Ethnicity				Reasons					
Village	**K**	**H**	**L**	**Migrants**	**VM**	**MG**	**OB**	**LA**	**AI**	**OT**
Houay Khing	14	12	2	28	10	4	1	6	7	4
Sa Kuan	17	4	0	21	3	3	0	8	9	5
Houay Ha	6	15	0	21	11	4	0	3	3	2
Houay Tho	8	14	0	22	12	2	7	2	0	1
Phak Bong	10	0	0	10	6	2	0	0	0	2
Total	**55**	**45**	**2**	**102**	**42**	**15**	**8**	**19**	**19**	**14**
Phak Hok	25	0	1	26	16	5	0	0	3	2
Hua Meuang	13	0	1	14	3	6	0	0	0	6
Tad Thong	31	0	1	32	27	1	0	2	2	1
Houay Si Yua	32	0	1	33	32	0	0	0	0	1
Houay Dong	31	0	0	31	27	2	0	1	0	1
Total	**132**	**0**	**4**	**136**	**105**	**14**	**0**	**3**	**5**	**11**
Grand Total	**187**	**45**	**6**	**238**	**147**	**29**	**8**	**22**	**24**	**25**

Notes: K=Khmu, H=Hmong, Lao=Lao Loum, VM=village merger, MG=marriage
OB=outbreaks, LA=land availability, AI=access/infrastructure, OT=others

Source: Survey Team

Table 9 shows some of the villages which immigrating households moved from during the past decade. Not only did the two clusters experience the intra-cluster movement of people—merge of several villages into one, but also experienced the movement or migration of people from villages of other district(s) like Pak Seng.

Table 9 Villages from which immigrants came from

Village cluster	Current village	Villages that immigrants came from
Houay Khing	Houay Khing	(old) Houay Khing, Pak, Tha Phaa, Khok Hin
	Sa Kuan	Houay Pheung, (old) Sa Kuan (Pak Seng district), Sa Kuan Yai
	Houay Ha	Houay Ta Mang, Sa Kuan, Long Euang, Lang Kon (Pak Seng district), Mai Soung
	Houay Tho	Jom Piang, Sa Kuan
	Phak Bong	Houay Soi
Sop Chia	Phak Hok	Houay Soi, Mok La Hang, Mok Jong
	Hua Meuang	Mok La Hang
	Tad Thong	Long Euang, Tan Neua, Ngiew, Lang Kon (Pak Seng district)
	Houay Si Yua	(old) Houay Si Yua, Mok La Hang, Houay Phod
	Houay Dong	Houay Tao, Phak Xai, Houay Hoi, (old) Houay Dong, Jom Jiang

Chapter 3 Agricultural Land Use

This chapter looks at the land use in Houay Khing (HK) and Sop Chia (SC) clusters by focusing on agricultural land[16] of 363 sample households.

3.1. Historical Change in Land Size

The following figures (Figure 6 and 7) show the land use change in two clusters since 2003. Upland rice fields here include both upland fields planted with only rice and those with rice and other cash crops. "Others" include fallow land.

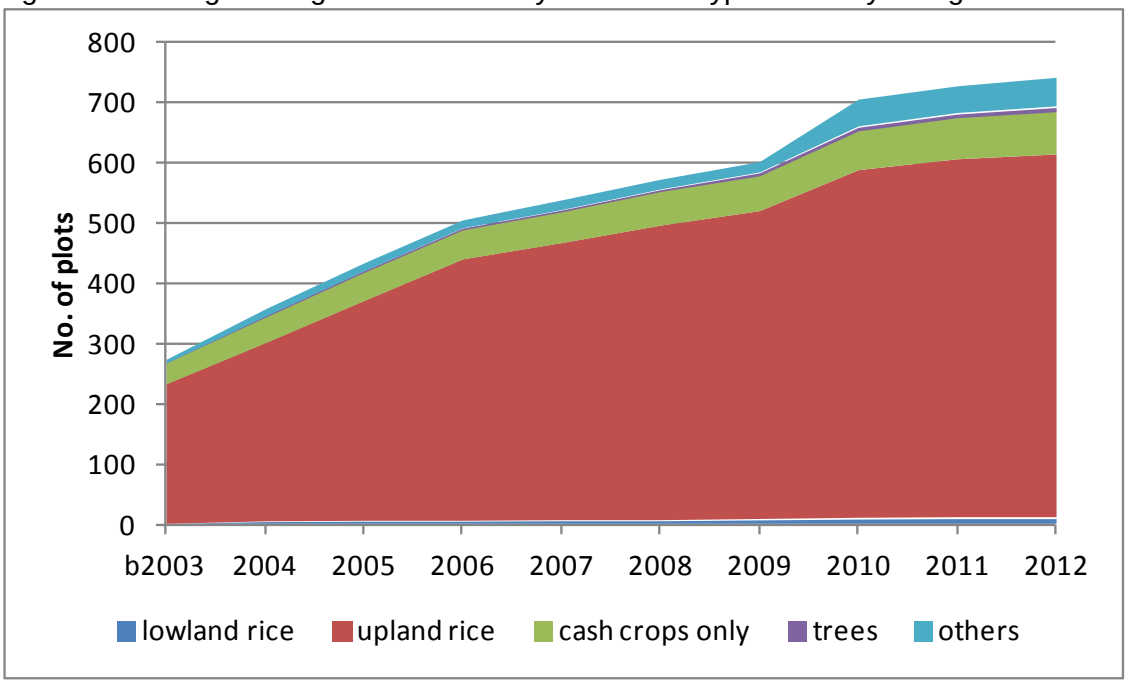
In both HK and SC clusters, upland rice fields have been on the constant rise since 2003 but the pace of increase varies. In HK cluster, the rate of increase is rather high up to 2006 and becomes moderate afterward. Instead, the cash-crops-only fields start to increase in 2006 onward. This increase in cash crop production may be due to the improvement of the road access to and from the district in 2005-2007.

On the other hand, SC cluster shows a high rate of increase in upland fields (rice and cash crops) up to 2008. The rate of increase in upland fields accelerated especially from 2004 to 2008. The rapid increase in upland fields in 2004-2008 can be explained partly by the newly settled village (Tad Thong) and partly by the improved road access. Another distinctive feature of SC cluster is that the cash-crops-only fields have not seen a significant increase yet unlike HK cluster. The difference may come from the fact that households in HK cluster grow cash crops in separate fields from upland rice fields, while households in SC cluster tend to grow cash crops on the same fields as upland rice (inter cropping with rice).

Another visible difference is that SC cluster has had more than 10 lowland rice fields in 2003 while there was none in HK cluster in 2003. The number of lowland rice fields has doubled in SC cluster since 2003 thanks to the availability of irrigation.

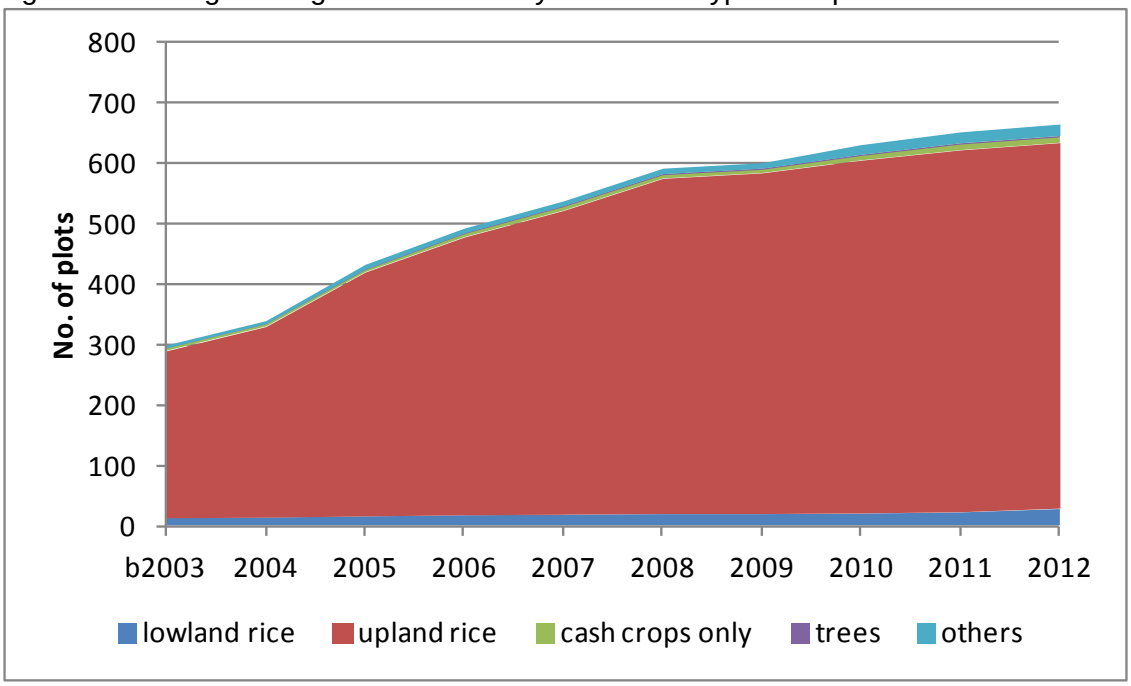
[16] Agricultural land here includes all the lands used for various agricultural activities: upland agricultural land, lowland paddy fields, crop fields and fruit orchards (*Suan* in Lao), livestock grazing land. Upland agricultural land can be either an active production area or a fallow land depending on the stage of rotations of shifting cultivation.

Figure 6 Changes in Agricultural Plots by Land Use Type in Houay Khing Cluster



Source: Survey team

Figure 7 Changes in Agricultural Plots by Land Use Type in Sop Chia Cluster



Source: Survey team

3.2. Land Size

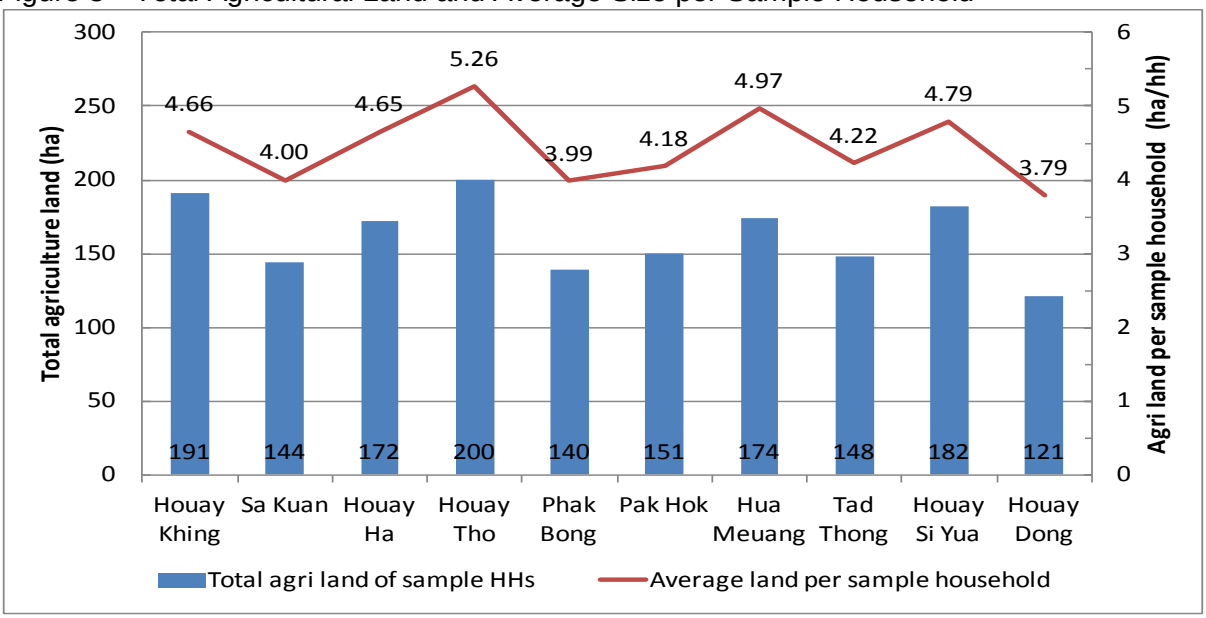
The total number of agricultural plots of 363 sample households was 1,399 (1,622.4 ha), 734 plots (846.6 ha) in HK cluster and 665 plots (775.8 ha) in SC cluster. Out of 363 households, 3 households (2 in Sa Kuan and 1 in Tad Thong) do not have their own agricultural land.

Out of 1,399 agricultural plots, 1,350 plots (705 in HK, 645 in SC) are used for certain agricultural activities at the time of the surveys while 49 plots (29 in HK, 20 in SC) are unused.

Figure 8 shows the total size of agricultural land of 363 sample households, both used and unused, and the average agricultural land per household in each village.

The total size of agricultural land ranges from 121 ha in Houay Dong to 200 ha in Houay Tho. The average size of agricultural land per household is 4.53 ha in HK cluster and 4.41 ha in SC cluster—no major difference between the two clusters. Looking at the average size by village, however, there are major differences. Hoauy Dong and Phak Bong have less than 4 ha of agricultural land per household, while Houay Tho has over 5 ha and the rest have more than 4 ha of agricultural land per household.

Figure 8 Total Agricultural Land and Average Size per Sample Household

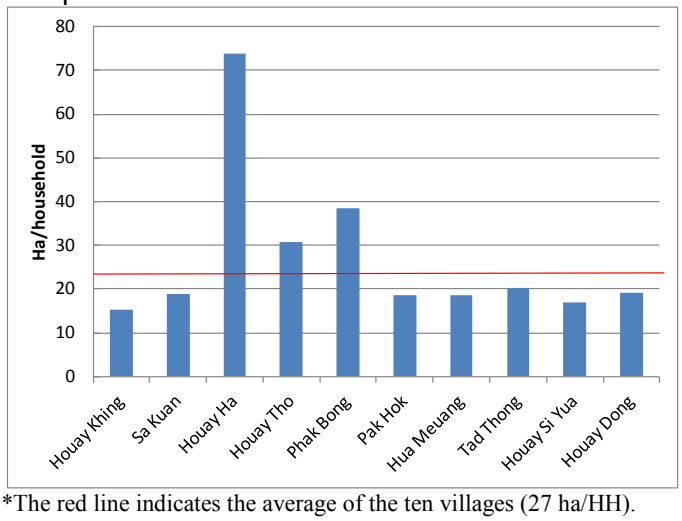


Source: Survey team

To compare the average agricultural land actually used and the availability of agricultural land in each village, Figure 9 shows the average agricultural land available to each of the whole households in each village (possible agricultural land per household, calculated by dividing the *total* agricultural land of the village by the *total* number of households). According to the survey results (Figure 6), Hoauy Dong and Phak Bong have the smallest agricultural land per household among the ten villages, with less than 4 ha. In terms of availability, however, Hoauy Dong and Phak Bong could provide relatively large agricultural land to each household. Therefore, it can be said that the small land size of two villages are not defined solely by land availability but there are other factors such as availability of labor force and type of main income sources (upland/lowland farming, livestock).

As mentioned earlier, there is no major difference in the average size of agricultural land per household between the two clusters. However, the

Figure 9 Average Possible Agricultural Land per Sample Household



*The red line indicates the average of the ten villages (27 ha/HH).

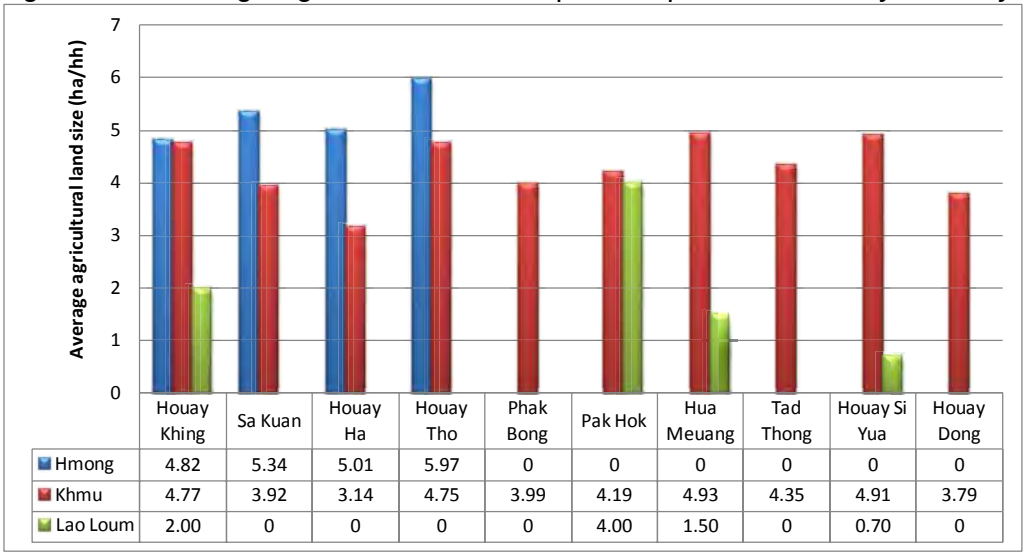
Source: Survey team

average sizes by ethnic group show a different picture (Figure 10). Overall, Hmong households tend to have larger agricultural land per household (5.28 ha/household) compared to Khmu (4.27 ha/household) and Lao Loum (2.05 ha/household), reflecting a larger family size of Hmong households and implying a larger impact on land.

In Houay Tho and Houay Khing, both Hmong and Khmu households have more than 4 ha of agricultural land per household, while Sa Kuan and Houay Ha present a significant difference in agricultural land size between Hmong and Khmu. Sa Kuan and Houay Ha are originally a Hmong village where Khmu have moved in and settled in recent years. Apart from a smaller family size of Khmu, the late settlement of the Khmu group may explain why they tend to have smaller agricultural land in these two villages. On the contrary, Houay Tho is an opposite case where Hmong have moved into an originally Khmu village in recent years but have larger agricultural land than the Khmu group. Average size of Hmong households in Houay Tho is 7.8 persons while that of Khmu is 5.8 persons, which may well explain the large difference in land size between Hmong and Khmu.

The sample size of Lao Loum households is too small to make general assessment, but in general Lao Loum has much smaller agricultural land in this area. This is partly because traditionally they are not used to upland farming and thus tend to engage in off-farm activities, and partly because their family size is relatively small.

Figure 10 Average Agricultural Plot Size per Sample Household by Ethnicity

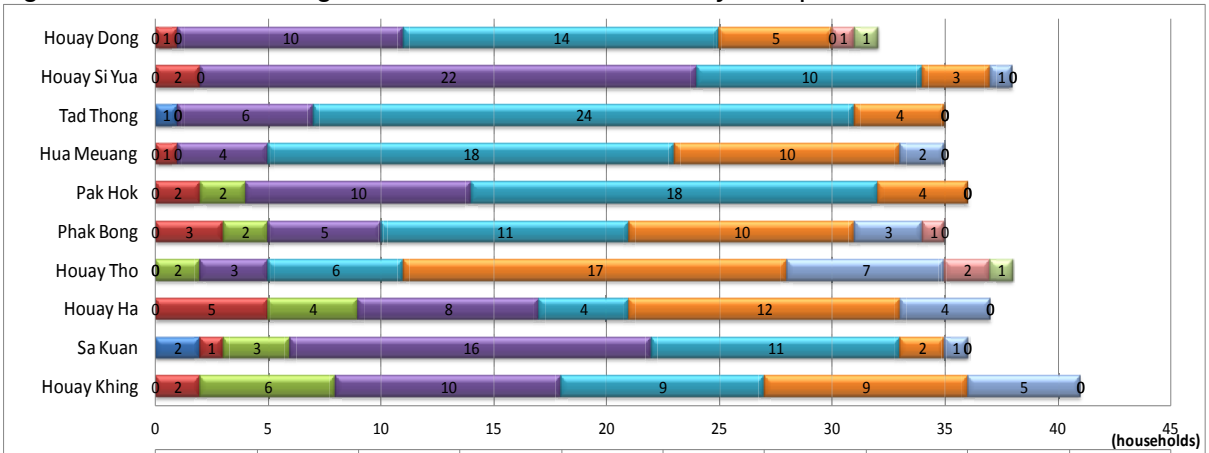


	Houay Khing	Sa Kuan	Houay Ha	Houay Tho	Phak Bong	Pak Hok	Hua Meuang	Tad Thong	Houay Si Yua	Houay Dong
Hmong	4.82	5.34	5.01	5.97	0	0	0	0	0	0
Khmu	4.77	3.92	3.14	4.75	3.99	4.19	4.93	4.35	4.91	3.79
Lao Loum	2.00	0	0	0	0	4.00	1.50	0	0.70	0

* In the table, 0 indicates that there is no household of the specific ethnicity in the village.
Source: Survey team

As mentioned earlier, the average size of agricultural land of the sample households is 4.53 ha in HK cluster and 4.41 ha in SC cluster. Farmers usually use several plots of land to grow different kinds of crops. Figure 11 summarizes the distribution of the sample households by the number of agricultural plots they have. Among the 363 sample households, there are three households that have no agricultural land and thus are not engaged in any agricultural activities. In Houay Tho, Hua Meuang, and Tad Thong, more than 80% of the households have 4 or more plots of agricultural land. In Houay Tho, in particular, 45% of the households have 5 plots and more than 25% have 6 or more plots. Then Phak Bong, Pak Hok and Houay Dong have more than 60% of households with 4 or more plots. On the other hand, in Sa Kuan and Houay Si Yua, more than 60% of households have only 3 or fewer plots of agricultural land. In Houay Khing and Houay Ha, about 20% of households have 2 or fewer plots.

Figure 11 Number of Agricultural Land Plots Owned by Sample Households



	Houay Khing	Sa Kuan	Houay Ha	Houay Tho	Phak Bong	Pak Hok	Hua Meuang	Tad Thong	Houay Si Yua	Houay Dong
0 plot	0	2	0	0	0	0	0	1	0	0
1plot	2	1	5	0	3	2	1	0	2	1
2 plots	6	3	4	2	2	2	0	0	0	0
3 plots	10	16	8	3	5	10	4	6	22	10
4 plots	9	11	4	6	11	18	18	24	10	14
5 plots	9	2	12	17	10	4	10	4	3	5
6 plots	5	1	4	7	3	0	2	0	1	0
7 plots	0	0	0	2	1	0	0	0	0	1
8 plots	0	0	0	1	0	0	0	0	0	1

Source: Survey team

3.3. Rotational Periods of Upland Agricultural Plots

In order to protect the forests and improve land use, the government adopted the policy to stabilize shifting cultivation in 1989. Since then, various support has been provided, both by the government and the donor community, to villages across the country to stabilize shifting cultivation. One of such measures was to allocate some plots of land for each household (usually 3 plots but 3 or more for larger families) to cultivate in rotation of around three-years.

In February 2009, Ministry of Agriculture and Forestry issued a new definition of shifting cultivation (MAF Announcement No. 0034), which clarified the types of shifting cultivation and categorized it into two types: rotational and pioneering (opening new forests for agricultural land without rotating). It was made clear that only the pioneering type was banned, because it could destroy forest resources17. Given such policy measure, villagers across the country have been striving to shift their agricultural practices away from the pioneering type to more sedentary types of cultivation (rotational or fixed) in allocated plots of land. It should be noted, however, that in both HK and SC villages, agricultural plots have not been allocated officially to each household by the authorities; rather, the land use planning in both clusters only registered agricultural plots that have been used by each household in the past. In other words, it was not government-led "allocation" of agricultural plots to households but rather a "confirmation and recording" of current land use by each household.

Among 1,399 agricultural plots in the HK and SC clusters, 1,239 plots are used in rotation (*Moon Vien* in Lao), 22 are pioneering plots (*Leuan Loi*), and 138 are fixed/sedentary plots (*Thavon*). As mentioned above, the pioneering type of shifting cultivation is banned but since official land allocation has not been conducted yet in the area, there still are some plots used for the pioneering

[17] Announcement of Minister of Agriculture and Forestry No. 0034 (February 4, 2009) on "Types and definition of shifting cultivation. "Rotational shifting cultivation" is called *Hai Moon Vien* in Lao and refers to the agricultural practice in which farmers produce rice and other crops by rotating three to five allocated plots of land. "Pioneering" type or *Hai Leuan Loi* refers to a practice in which farmers cut forests and open new land every year using environmentally destructive methods and mainly produce rice.

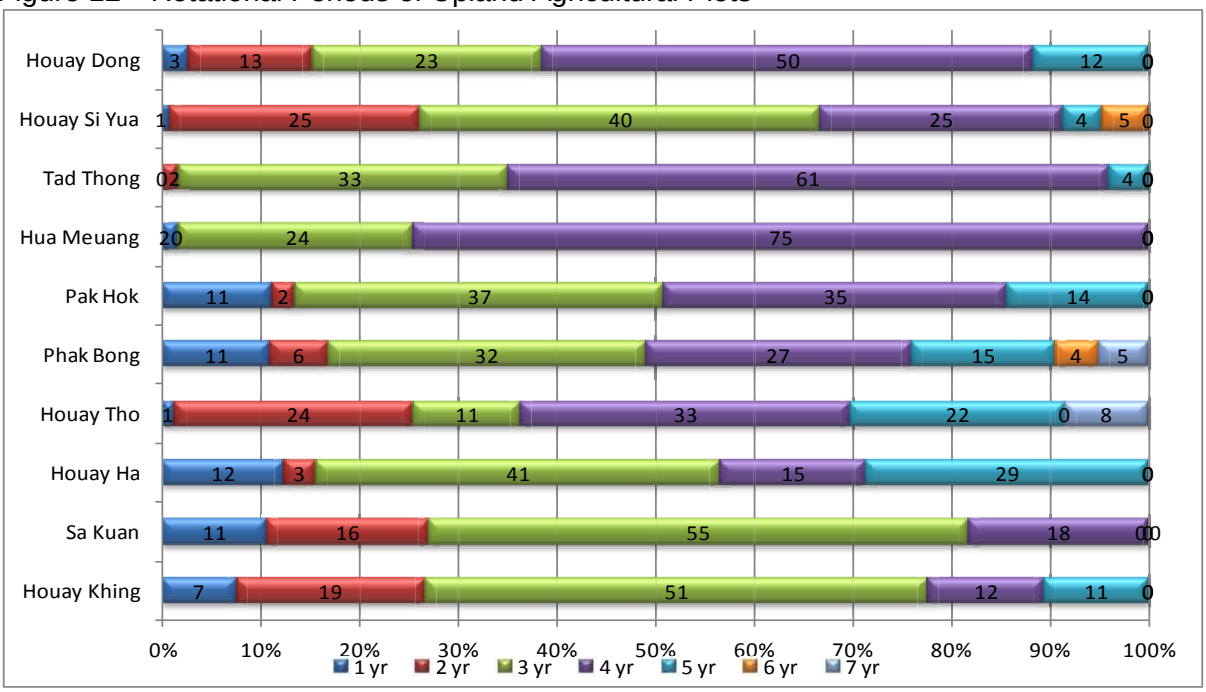
type. Among the 22 plots under pioneering cultivation, one half is in Houay Tho village and 3 plots are in Tad Thong village. Both villages are recently established when villagers re-settled from other areas (2005-2007); therefore, it is natural to assume that some newly settled villagers simply have no choice but open up new land for food production and these plots are counted as pioneering, rather than clear-cutting forests in a destructive manner.

Figure 12 shows the rotational periods of 1,243 plots used in rotations. The rotational periods are inevitably defined, more than any, by the total land size and the number of agricultural plots each household has, as shown in Figure 8 and Figure 11. Where majority of households have 4 or more plots such as Houay Tho, Hua Meuang, and Tad Thong, the average rotational periods are nearly 4 years (3.8, 3.7, 3.7 years respectively). It is worth mentioning that in Hua Meuang and Tad Thong, nearly all sample households rotate their agricultural plots in 4 year period or longer, thanks to the relatively large number of plots they have. Even in other villages such as Houay Ha, Phak Bong and Houay Dong, the rotational periods tend to be 4 years or longer.

On the other hand, the average rotational periods are 3 years or shorter in Houay Khing and Sa Kuan villages (3.0 and 2.8 years respectively). This is because the sample households in these villages have a relatively smaller number of plots (3 plots or fewer).

To sum up the results on land size and rotational periods (Figures 8, 11 and 12), the sample households in both Houay Tho and Hue Meuang have a relatively larger agricultural land (about 5 ha/household) and use them in a long rotation (nearly 4 years). On the other hand, Houay Dong and Phak Bong have a small agricultural land per household (less than 4 ha/household) which is divided into more than 4 plots, thus enabling the average rotation period of about 3.5 years despite the limited agricultural land. This is an ideal practice that can sustain soil fertility even in the face of limited land. Houay Khing and Houay Ha provide a relatively large agricultural land per household divided into a small number of plots, and thus households have to use it in a short rotation (3 year or shorter). This might have something to do with the fact that many of the households in these villages are Hmong, whose families tend to be big in size, requiring them to cultivate large plots to produce enough food each year. Although Houay Si Yua is not a Hmong village, it shows a similar tendency. As these villages tend to use agricultural land intensively in a short rotation, they can put pressure on land and decrease soil fertility unless proper land improvement measures are taken.

Figure 12 Rotational Periods of Upland Agricultural Plots



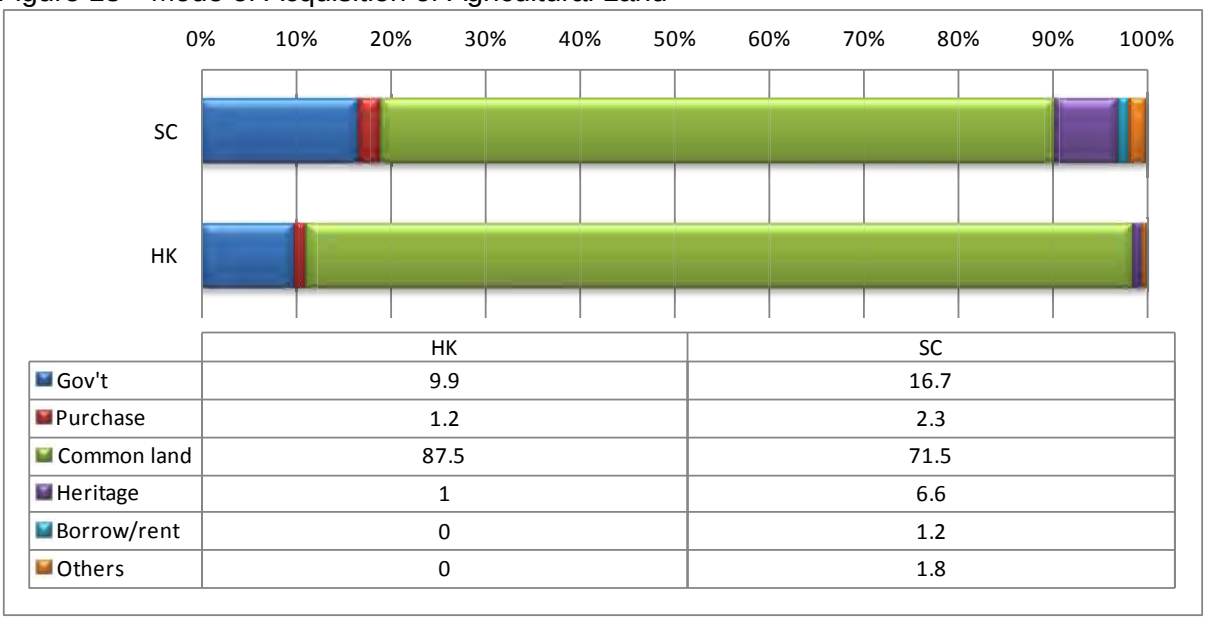
Source: Survey team

3.4. Acquisition and Ownership of Agricultural Land

In HK and SC clusters, land use planning has been done by the district authorities and land has been demarcated into forest areas, agricultural areas and residential areas and so forth. However, the agricultural areas have not been allocated to households for official land titling in these clusters yet. Rather, land ownership is *de facto,* or based on customs. Villagers claim the use right by clearing land, which is to be approved by the village authorities. During the land use planning, such *de facto* rights have been recorded by the land authorities and registered in a book called "*samano theedin"*. Official land titles have not been issued to those who use the land but with the registration they can claim their *de facto* ownership while they have the obligation to pay land taxes according to the size and type of the land.

Figure 13 summarizes the mode of acquisition of all the 1,399 agricultural plots in two clusters. Nearly 90% in HK cluster and 70% in SC cluster have been obtained by clearing common land and getting the use rights to those plots approved by the village authorities. 17% in SC and 10% in HK cluster have been given the land by the government at the time of their resettlement from other areas. In recent years, an increasing number of lands has been sold and bought among villagers. Such transactions are made more in SC cluster than in HK cluster. "Others" are the cases where land has been given by relatives for free.

Figure 13 Mode of Acquisition of Agricultural Land

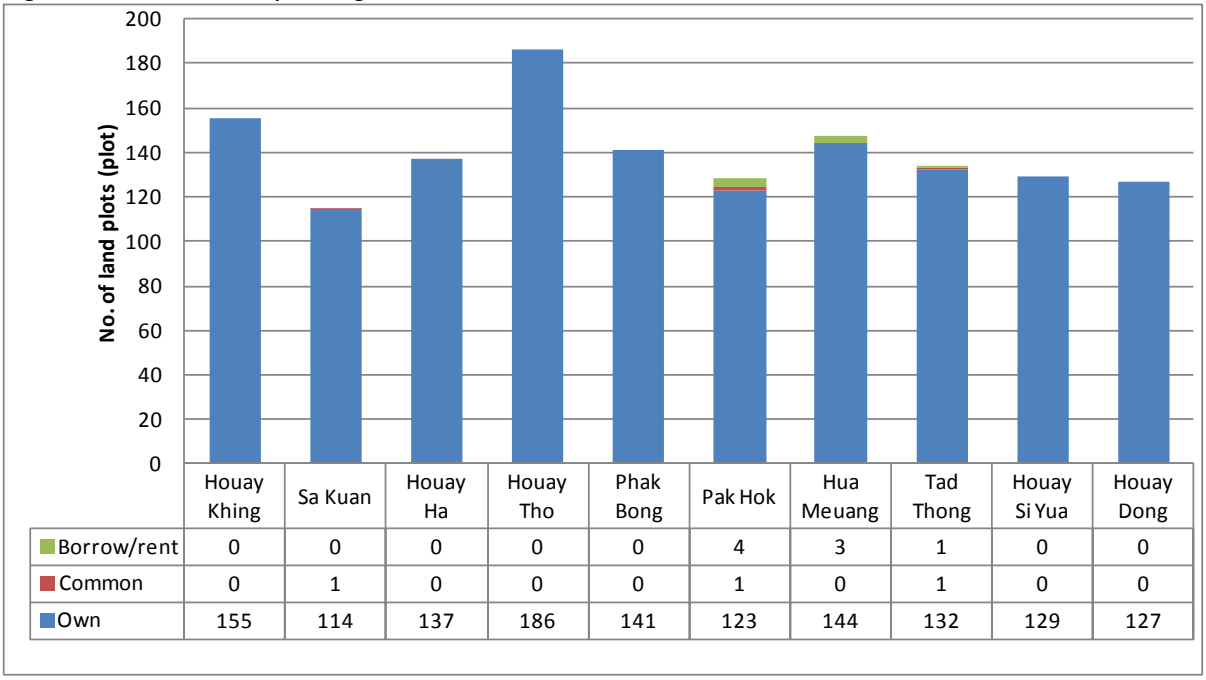


	HK	SC
Gov't	9.9	16.7
Purchase	1.2	2.3
Common land	87.5	71.5
Heritage	1	6.6
Borrow/rent	0	1.2
Others	0	1.8

Source: Survey team

Looking at the ownership of 1,399 plots of land, almost all are "owned" by the interviewed households. As mentioned earlier, such ownership is not legally granted ownership; rather it is the ownership recorded and registered with the land authorities, which do not entail the issuance of land title documents. Common ownership here refers to a use right to common land, which is approved by the village authorities for a specific purpose and period. It does not belong to any villager and is to be returned to the village after a specific period. As mentioned earlier, 2 sample households in Sa Kuan and 1 household in Tad Thong do not own any agricultural land; they do not borrow any land and thus not included in the figure below.

Figure 14 Ownership of Agricultural Land



	Houay Khing	Sa Kuan	Houay Ha	Houay Tho	Phak Bong	Pak Hok	Hua Meuang	Tad Thong	Houay Si Yua	Houay Dong
Borrow/rent	0	0	0	0	0	4	3	1	0	0
Common	0	1	0	0	0	1	0	1	0	0
Own	155	114	137	186	141	123	144	132	129	127

Source: Survey team

3.5. Purposes of Agricultural Land Use

Figure 15 shows the purposes of 1,399 agricultural plots used by the sample households. It highlights the heavy reliance of the villagers on upland rice farming in both clusters. Given the rapidly increasing cash crop farming in the northern part of Laos, it is rather surprising that the majority of farmers in the ten villages still grow only upland rice on most of their plots. This reflects the fact that the road access to and from those villages has been limited and thus such trend of cash crop farming has not influenced the areas as much as other areas with good road access.

However, the road access to the district center has improved in recent years, and so has the access to and from Vietnam. The impact of improved road access has started to show in some villages (Houay Tho, Phak Bong, and Hua Meuang) where about 20 % of the households grow cash crops (e.g. maize, cassava, and chili) and some industrial trees (oil trees, teak). Even among those growing cash crops, many grow maize and cassava for feeding their own livestock rather than selling at the market. With expected improvements to road access to the district center, the expansion of cash crop farming and livestock husbandry are expected and such changes are expected to affect the land use in the areas i.e. possible conversion of forests into agricultural land.

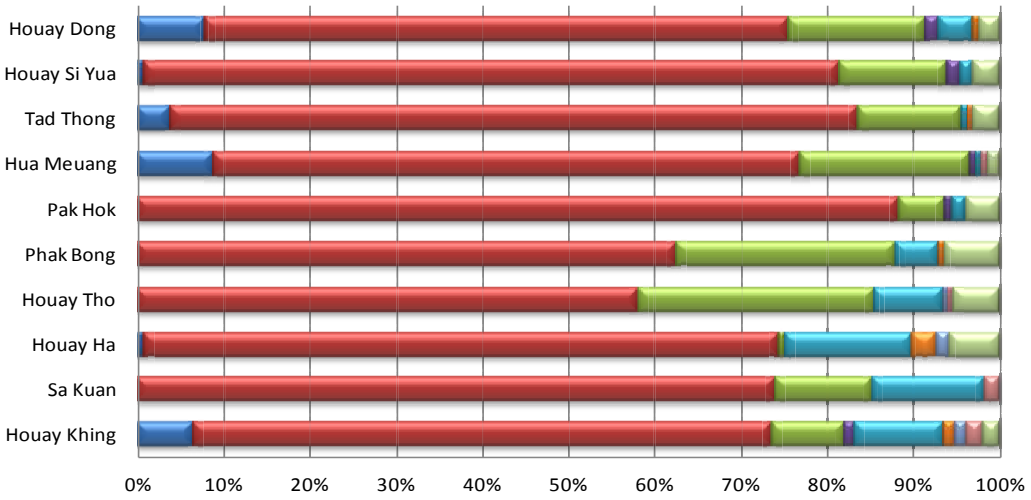
Another feature that is taking place in both clusters but not shown up in the survey result is the rapid expansion of industrial tree plantation. Although only a few sample households have industrial tree plantations, the village profiling reveals that industrial trees, especially *Jotropha* trees, are being promoted by the district authorities and an increasing number of industrial tree plantations are observed in both clusters. This is in line with the government policy to promote industrial tree plantations, which can contribute to both re-forestation and income generation for local communities. In reality, however, most plantations are not under any sort of purchase contracts and currently no market is assured. Therefore, it is not possible yet to conclude that industrial tree plantations are an effective land use in the area. But it is obvious that the government authorities should not only promote industrial tree plantations but also ensure the market for the trees so that those who have invested in the plantations will receive proper return on the investments.

Lowland paddy farming is observed only in 6 villages, 2 in HK cluster and 3 in SC cluster. Only Hua Meuang, Tad Thong and Houay Dong villages in SC cluster have irrigated lowland paddy fields besides rain-fed paddy fields. In HK cluster, an increasing number of lowland rice fields are developed, mainly by better-off households, but they are all rain-fed.

There are a few households that grow NTFPs in HK cluster. 2 households grow *Dou Deua* (a kind of devil's tongue) and 1 household grows broom grass.

Plots in the "Others" category are all fallow land, which is part of upland agriculture rotations and is to be used as agricultural land in coming years.

Figure 15 Purposes of Agricultural Land Use



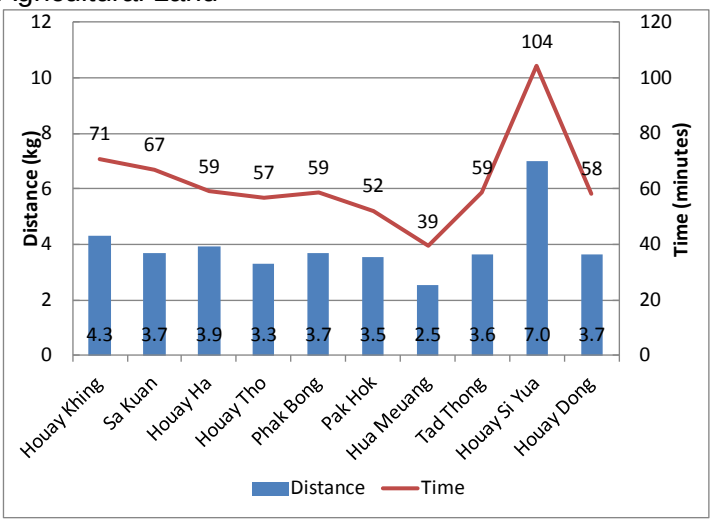
	Houay Khing	Sa Kuan	Houay Ha	Houay Tho	Phak Bong	Pak Hok	Hua Meuang	Tad Thong	Houay Si Yua	Houay Dong
paddy rice	6	0	1	0	0	0	9	4	1	8
upland rice	67	74	74	58	62	88	68	80	81	68
upland rice + other crops	8	11	1	27	26	5	20	12	12	16
upland rice + trees	1	0	0	0	0	1	1	0	2	2
cash crops	10	13	15	8	5	2	1	1	2	4
industrial trees	1	0	3	0	1	0	0	1	0	1
NTFP	1	0	1	1	0	0	0	0	0	0
livestock	2	2	0	1	0	0	1	0	0	0
others	2	0	6	5	6	4	1	3	3	2

Source: Survey team

3.6. Access to Agricultural Land

The average distance from the village to sample households' agricultural plots is less than 4 km in all villages but Houay Khing and Houay Si Yua. In terms of time required to access their land, villagers in all villages but Hua Meuang have to travel at least one hour just to reach their land.

Figure 16 Distance and Time Required to Access Agricultural Land



Source: Survey team

Houay Si Yua villagers have to travel an exceptionally long distance to their farming land because most of the villagers still cultivate agricultural land in old villages where they used to reside before resettling to the current village. This is partly because there is limited fertile land near the current village and partly because the farming land available nearby the current village is all taken making them to take the farming land located too far from their current village.

Chapter 4 People's Perceptions about Livelihoods and Land and Forest Use

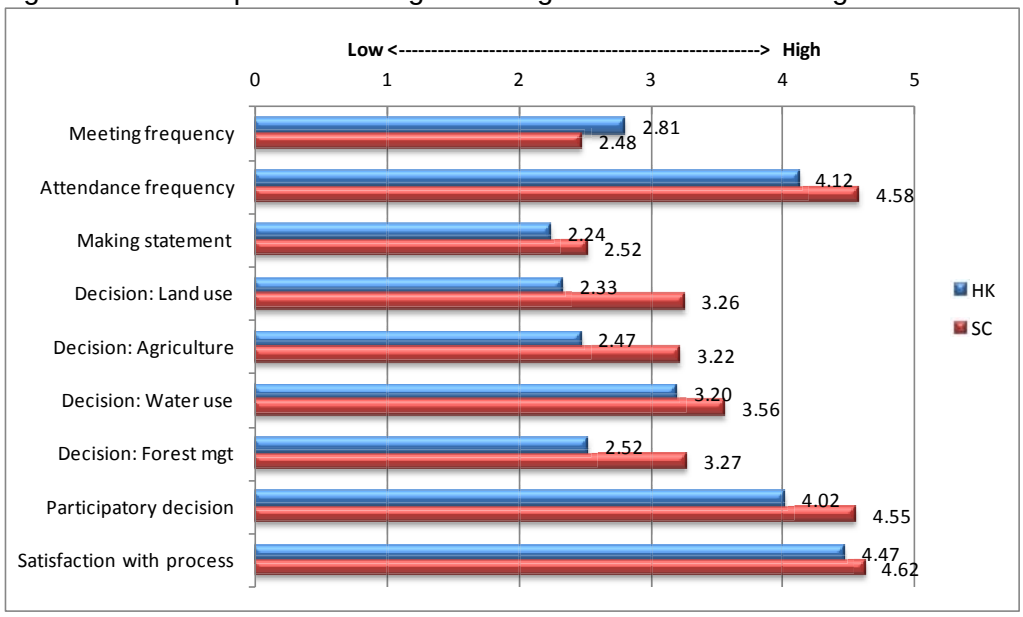
This chapter discusses the perceptions of the people about their livelihoods, resource use, especially land and forests as well as participation in group activities and their decision making based on the household surveys. The purpose is to assess the current level of participation in and capacities for collective action, which are important factors for managing common resources. Regarding people's resource use, the survey not only looked into their current resource use patterns but also their perceptions about the values of forests and forest resources, which help explain why people use or protect forests in certain patterns. The survey also looked into the level of satisfaction with their current livelihoods to assess the quality of life as perceived by villagers, and possible alternative options to improve livelihoods.

The samples (household and female samples) interviewed are the same as those used for the analysis of Chapters 2 and 3, and the total number of samples in two village clusters is 363 with 187 from HK cluster and 176 from SC cluster.

4.1 Perception about Participation in Decisions on Land and Forest Uses

Sample households were asked questions about level of people's participation in village meetings and decision making on important issues. Their responses were given in the scale of 1 to 5 with 5 being the highest unless otherwise noted.

Figure 17 Participation in Village Meetings and Decision Making



Source: Survey team

Figure 17 is the summary of the responses to those questions from sample households by cluster. Meeting frequency refers to the frequency of village meetings per month. Both clusters organize village meetings about twice per month on average.

Frequency of attendance at village meetings to discuss village regulations and activities is high in both clusters; however, if asked if they speak out at meetings, most households responded that they are not active participants and they do not speak out.

Village meetings are organized to discuss issues of importance to the community such as land use, agricultural production, water use and forest management. Asked if they have participated in village meetings to discuss such issues, sample households showed a high level of interest in issues on water use in both clusters, compared to other topics. This shows that water use is of the most importance to

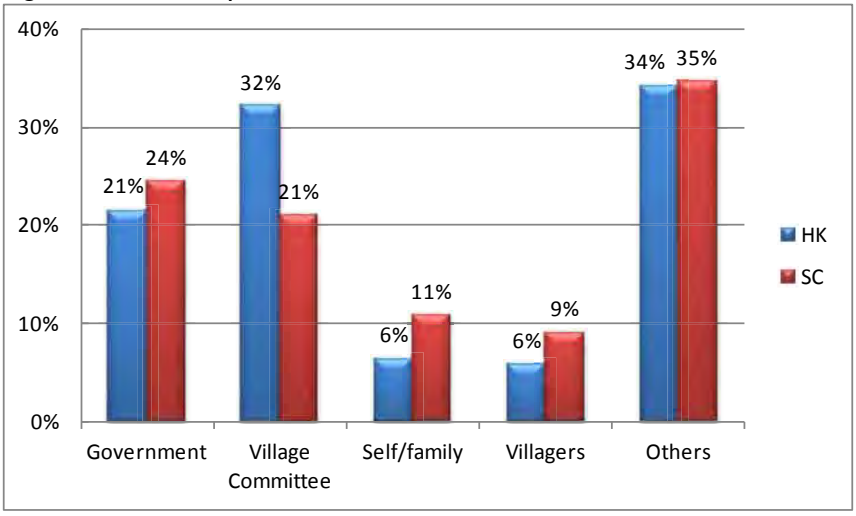
the community members. The issue of forest management was the second highest level of interest in both clusters, followed by agricultural production and land use. The survey results demonstrate that the community members do not have much interest in discussing land use and agricultural production as a common topic for the whole community. In general, however, SC cluster shows a higher interest in discussing these issues of community interest than HK cluster.

Sample households were then asked if it is necessary for all villagers to participate in the process of land use planning. Both clusters responded that participatory land use planning is essential; SC cluster showed a higher level of agreement to participatory process than HK cluster. This can be explained by the fact that land use planning was conducted in SC cluster several years earlier than in HK cluster, providing the villagers in SC cluster with the opportunity to gain experience in, and realize the importance of, participatory process in land use planning.

In order to confirm villagers' support for participatory land use planning, sample households were asked who should decide village land use plans for better land use in the future. Figure 18 shows their responses. Both clusters show a high level of support for decision making by multiple stakeholders, which is shown in "others" (34% in HK cluster, 35% in SC cluster), rather than decisions by a single actor. Among those who chose "others", a largest number favored the involvement of government authorities in land use planning through participatory process by Village Committee and villagers. It was followed by decision making by villagers with the support from Village Committee. A few households support joint decision making by Village Committee and government authority without participation of villagers.

It is worth mentioning that 32% of HK cluster's samples favor land use planning by Village Committee and 21% favor government authorities, meaning that more than half favors land use planning by village and government authorities. Only 6% responded that they want to decide land use either by themselves or by villagers' discussions. In SC cluster, the share of households favoring government and village authorities is slightly less. The households favoring decision by themselves in SC cluster is nearly twice those in HK cluster. A high tendency of HK cluster to reply on government and village authorities may be attributed to the fact that land use planning was conducted only recently in HK cluster and villagers do not have enough experience and confidence in making decisions on their own. Another reason is that HK cluster is more heterogeneous than SC cluster, which require a higher level of authority and support by Village Committee or government authorities in order to reach village consensus on important issues such as land use.

Figure 18 Perception on Main Decision Maker in Land Use Planning

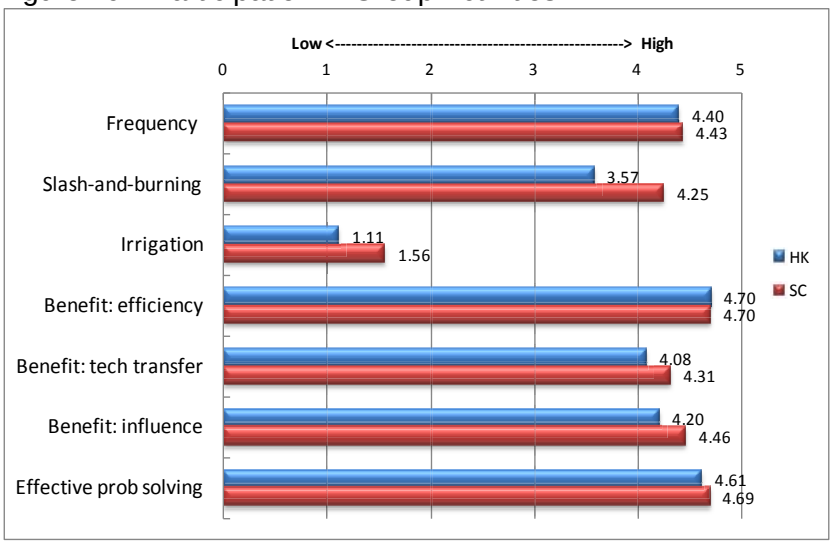


Source: Survey team

4.2 Perception about Participation in Group Activities

Figure 19 summarizes the level of participation in villagers' group activities by activity type and their perceptions about the benefits of group activities.

Figure 19 Participation in Group Activities



Source: Survey team

Households in both clusters responded that the overall level of participation in group activities is high and their levels are almost the same (4.40 in HK, 4.43 in SC). Looking at activity type, however, the sample households in SC cluster enjoy a higher level of group activities in slash-and-burning than in HK cluster. It is because there is still strong value of the community members to help other members when needed and this is regarded as labor exchange. On the other hand, the level of group activities in slash-and-burn in HK cluster is rather low because HK cluster has many villages with multiple ethnic groups and the cooperation among ethnic groups is limited. Participation in irrigation-related activities is low in both clusters because only Hua Meuang, Tad Thong and Houay Dong villages in SC cluster have irrigated lowland paddy fields besides rain-fed paddy fields. In HK cluster, an increasing number of lowland rice fields are developed but they are all rain-fed.

In order to identify the motivation for group activities and collective actions, the sample households were asked to rank various benefits of group activities: efficiency and technology transfer in agricultural production, enhanced influence in decision making, and effectiveness in problem solving. There is no significant difference in the responses from HK and SC clusters and both rated all the listed benefits high. This shows that villagers are actively participating in group activities not because they have to but because they are well aware of tangible benefits of collective actions.

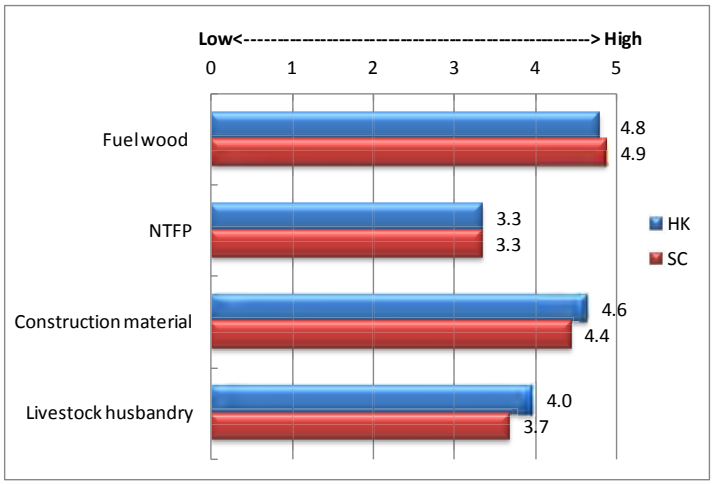
Among them, efficiency in agricultural activities and effective problem solving are rated especially high in both clusters. High level of appreciation of efficient agricultural activities reflects the fact that most households in the survey area exchange labor force and cooperate in agricultural production. As main agricultural activities in the area, upland farming and livestock raising (especially large animals), require intensive labor, it is common for farmers to help each other by forming a production group or working with relatives to increase the efficiency of work. Technical transfer and mutual learning of production skills are rated slightly lower than production efficiency; this shows that farmers regard working in a group as an important occasion to learn production skills and knowledge given that the chance to receive official technical training is limited in the survey area.

Villagers also recognize the benefits of group activities in terms of enhanced influence in decision making and problem solving. These benefits can serve as an incentive for villagers, especially those disadvantaged (i.e. ethnic minority, women) to actively participate in village meetings and get their voice, which is rather difficult if done individually. Such an incentive is a key to ensuring participatory decision making in village development. The high level of appreciation of such benefits in both clusters indicates that both of them have seen relatively successful cases of participatory decision making and problem solving. It can further indicate that both clusters have a certain level of potential and capacities to promote collective actions such as land use planning and agricultural production groups.

4.3 Perception About Forests and Forest Resource Use

Figure 20 summarizes the responses of sample households with regard to the frequency or intensity of forest use by purpose. It shows a similar tendency between HK and SC clusters; villagers use forest and forest resources mostly for obtaining fuelwood and construction materials. Fuel wood is a daily necessity in the area where gas is not the option for cooking or heating; therefore, it is rated highest in terms of the main purpose of forest use.

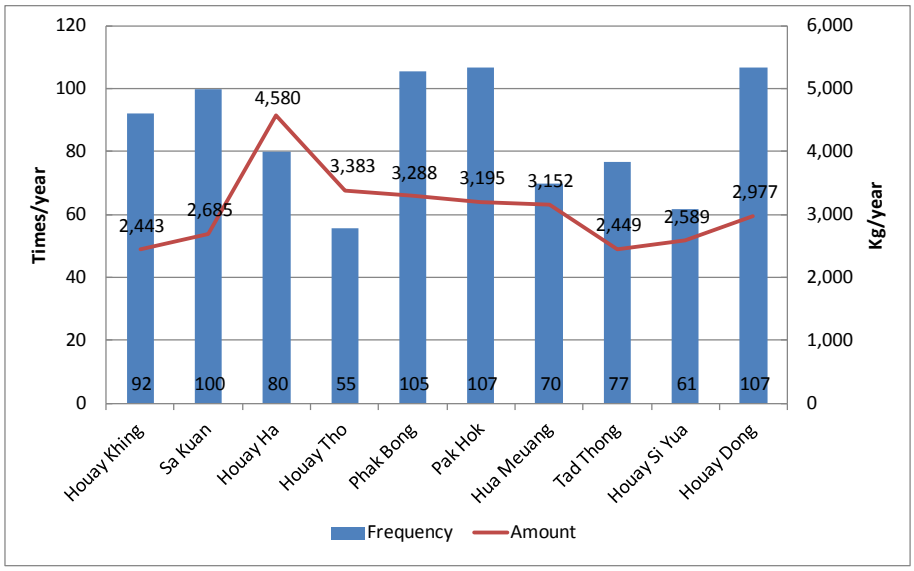
Figure 20 Frequency of Forest Use by Purpose



Source: Survey team

Looking at the detailed situations of fuel wood collection in each village (Figure 21), Houay Ha village uses the largest amount of fuel wood per year per household on average (4,580 kg/year/household), followed by Houay Tho, Phak Bong, Pak Hok and Hua Meuang. On the other hand, Houay Khing, Tad Thong and Houay Si Yua villages tend to use less fuel wood per year (less than 2,600 kg/year/household).

Figure 21 Frequency and Amount of Fuel Wood Collection Per Household



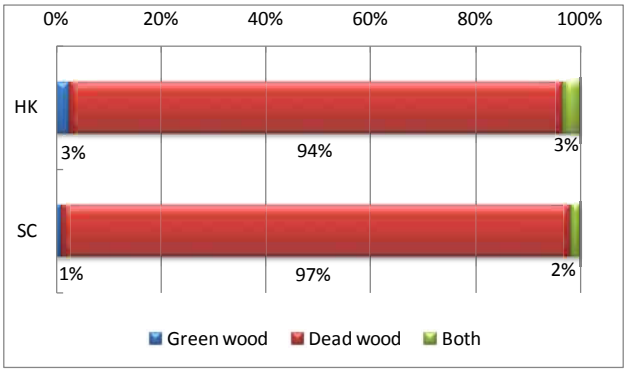
Source: Survey team

Almost all the households collect dead and dry wood and branches to be used as fuel wood (94% in HK, 97% in SC). Only 3% in HK and 1% in SC clusters collect green wood by cutting living trees (Figure 22).

In both clusters, about 60% of the households collect fuel wood in natural forest in common land areas. In HK cluster, 10% of the households collect fuel wood in plantation forests, while only 2% collect in plantations in SC cluster. More than 30% of households collect in the areas other than natural forest or plantations. In HK cluster, many collect in community forest areas which are allocated for villagers to use for various purposes. In SC cluster, on the other hand, villagers tend to collect fuel wood around their residential areas (Figure 23). In villages where regulations on forest use

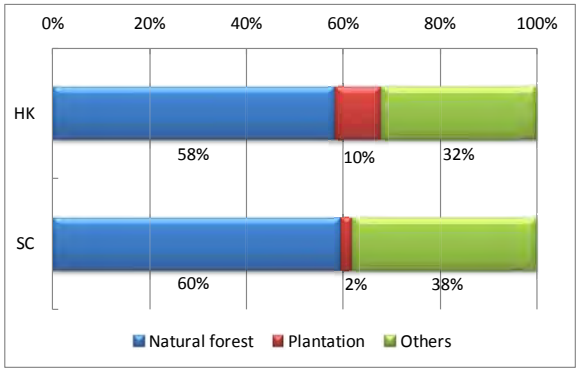
are established, villagers tend to follow the regulations and collect in production or use forests (e.g. Houay Khing, Tad Thong).

Figure 22 Type of Fuel wood



Source: Survey team

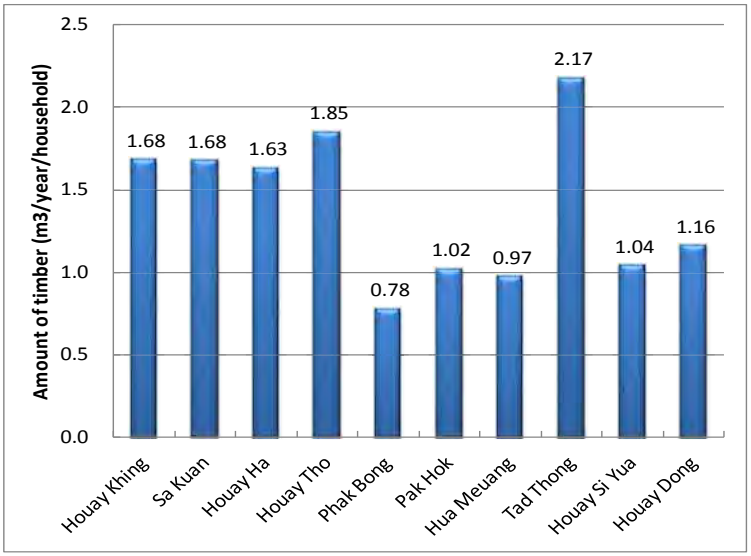
Figure 23 Location of Fuel Wood Collection



Source: Survey team

The pattern of timber use shows a different picture from that of fuelwood. Figure 24 shows households' responses to a question about the timber use. Households were asked how much timber on average they have collected and used in recent years. Villagers in Tad Thong village collected the largest amount of timber on average (2.17 m^3/year/household), followed by Houay Tho. The amount collected by Tad Thong villagers is almost twice as much as other villages in SC cluster. The large amount of timber collection and use in Tad Thong and Houay Tho villages is explained by the fact that both villages were established in recent years and residents have used a relatively large amount of timber for construction of houses[18]. Other than Tad Thong and Houay Tho villages, villages in SC cluster tend to use much less timber than those in HK cluster.

Figure 24 Average Amount of Timber Collected Per Year



Source: Survey team

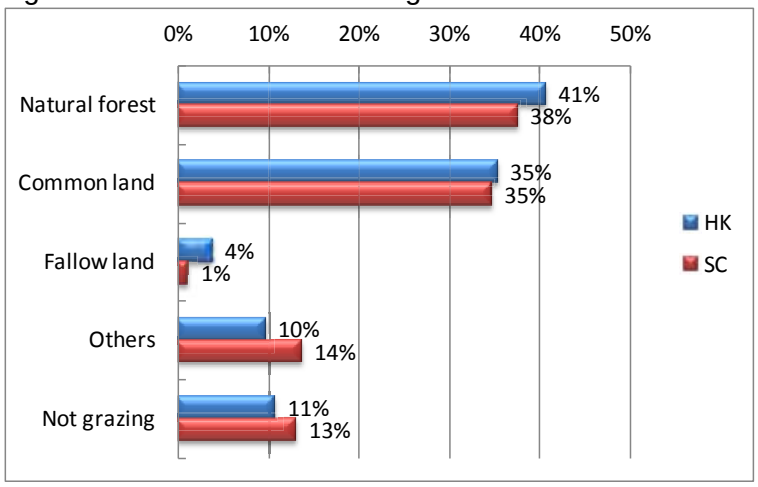
Most heavily used woods are hard wood (e.g. *mai doo*) and bamboo. There are many kinds of bamboo in the area and almost all sample households use them for various purposes in daily life. Industrial trees like teak wood are not commonly collected or used for their own use in the area.

Villagers use forests as grazing land as well. Around 40% of sample households in both clusters individually raise their livestock, mainly cow and buffalos, in natural forests. Another 35% of the households raise livestock in common land such as village's designated grazing area and common farming area (*sanam* in Lao) set up by groups of villagers. Animal husbandry in the area is free-range style but raising large animals in common land requires a watchman; therefore, villagers tend to form

[18] Tad Thong was established in 2005 with 82 households, while Houay Tho was re-established with 52 households (Houay Tho was first established in 1978 but was burnt down in 1988). 29 out of 35 sample households in Tad Thong and 22 out of 38 sample households moved into the village after 2004.

a livestock raising group of their own and take turn at guard duty or put their livestock in herdsman's charge. Very few households raise livestock in their fallow land as it does not provide enough pasture grass (Figure 25).

Figure 25 Locations of Grazing



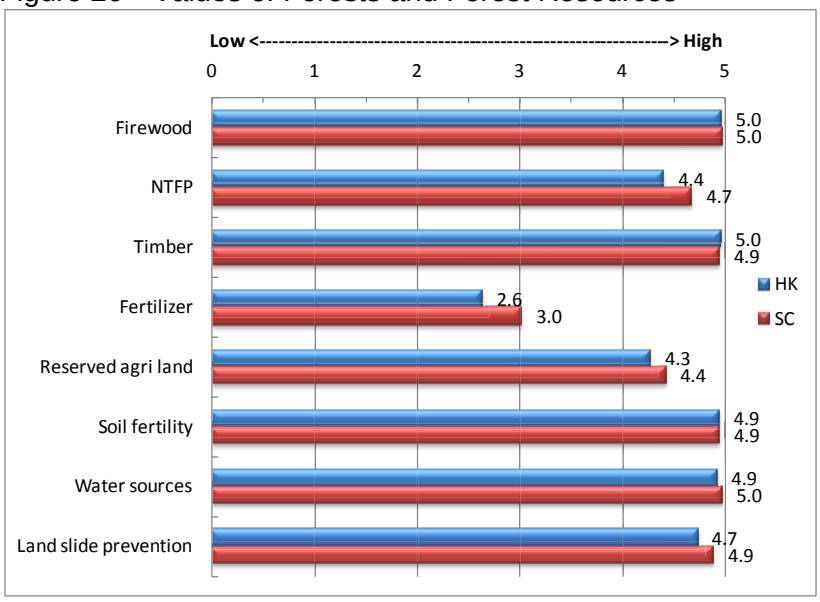
Source: Survey team

4.4. Perception About Values of Forest and Forest Resources

Figure 26 shows how much value the sample households place on forests and forest resources (e.g. firewood, NTFP, timber) and the services forests provide (e.g. water, soil fertility). Households in both clusters show a similar tendency. Almost all households place a high value on forests as a source of fuelwood and timber. Non-timber forest products are valued as well, but not as much as fuelwood or timber as the dependency on NTFP as food or a source of incomes varies from village to village. Households also recognize the importance of forests as a reserved agricultural land for future use. The survey results indicate that villagers value forests as they are, but at the same time they recognize forests as potential agricultural land. People in the area have practiced shifting cultivation for years; for them forest land is not permanent and can be transformed into agricultural land and then left to regenerate back to forests in the long term.

In terms of the services provided by forests, households in both clusters regard all the services, i.e. soil enrichment, water sources and land slide prevention, as highly important. From these results, it can be said that villagers are well aware of the importance of protecting the forests as forests provide them with both direct benefits (e.g. fuelwood, NTFP, timber) and indirect benefits (e.g. water, soil fertility, land slide prevention). Such awareness about the values forests and forest resources provide can serve as an incentive to use forests in a sustainable way.

Figure 26 Values of Forests and Forest Resources



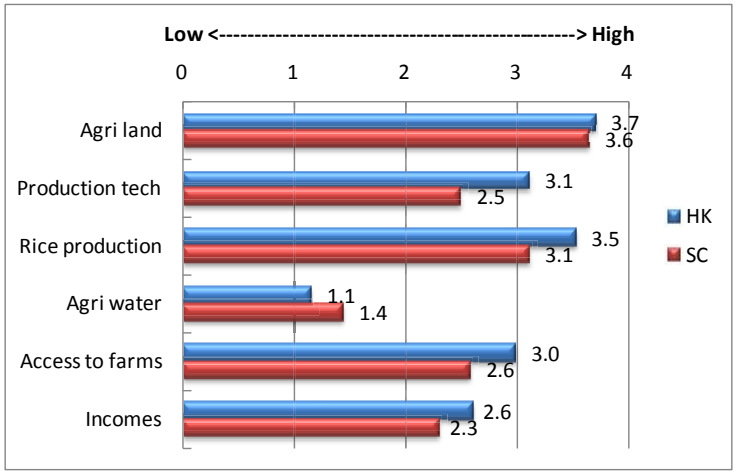
Source: Survey team

4.5. Perception About Livelihoods

In order to assess villagers' perception about their capacities for maintaining and improving livelihoods, the sample households were asked to rate the level of their asset (agricultural land[19]), farming skills (production techniques), food security (rice production), access to resources (agriculture water, agricultural land) and economy (incomes).

Rated more than 3 in both clusters were the size of agricultural land and the amount of rice production. This means that on average households tend to have enough agricultural land to cultivate, and they, especially those in HK cluster, are relatively food secure. The details are discussed below, which show some differences among villages. Production techniques, access to farm land, and incomes were rated 3 or less, indicating that households perceive they are at a moderate level on these three aspects and think they could be better. The difference between two clusters is relatively large in the rating of production techniques; households in HK cluster are more confident in farming skills as shown in Figure 27. Both clusters rated agriculture water just over 1, indicating a widespread problem of water shortage in agriculture.

Figure 27 Various Capabilities for Maintaining Livelihoods



Source: Survey team

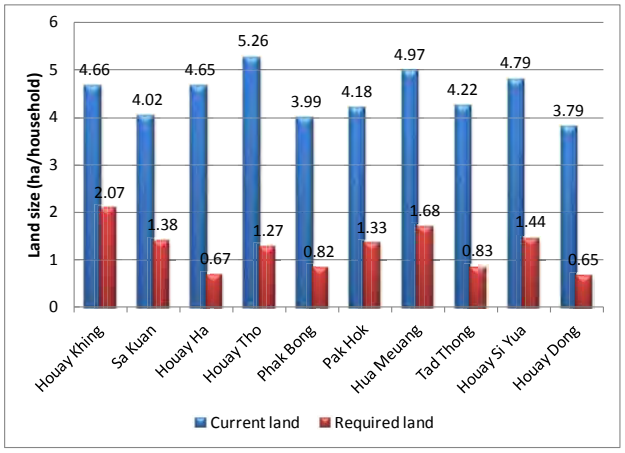
[19] Agricultural land here includes all the lands used for various agricultural activities: upland farms, lowland paddy fields, crop fields and fruit orchards (*Suan* in Lao), livestock grazing land.

Figure 28 shows the average size of current agricultural land per household and the average size of additional agricultural land a household would need to improve livelihoods. As mentioned earlier, households in both clusters are relatively satisfied with the size of their agricultural land. Looking at the average size of current agricultural land per household, all villages enjoy more than 4 ha or just less than 4 ha of farming land per household. Houay Tho tops the list with more than 5 ha per household on average, followed by Hua Meuang (4.97 ha/household), Houy Si Yua (4.79 ha/household) and Houay Khing (4.66 ha/household).

On the other hand, in these villages, except for Houay Ha, households perceive that they would need a relatively large plot of additional agricultural land (1.4 – 2.1 ha/household) if they were to improve their livelihoods. It is important to note this result requires careful interpretation. During the surveys many households responded that they would want more agricultural land but did not have enough labor force to cultivate additional land; hence they gave a realistic answer i.e. no additional land. Therefore, the figures on required additional land might have been underestimated. Two points can be made here. One is that there is a pressure to expand agricultural land in all the villages in the survey area. The other is that labor force is a major factor affecting their land size and consequently production level; limited labor force in the area is keeping the pressure for land expansion under control. Despite existing large plot of more than 4 ha per household, required additional land is relatively large in Houay Khing, Hua Meuang, Houay Si Yua and Sa Kuan because they either have enough labor (e.g. Houay Khing, Sa Kuan), economic resources to hire additional labor (e.g. Hua Meuang), or enough surplus agricultural land and labor force (e.g. Houay Si Yua).

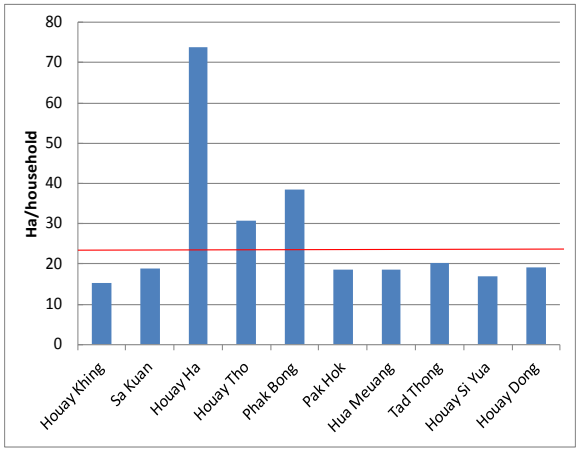
Figure 29 gives a rough picture of potential agricultural land size per household[20]. Houay Ha has an exceptionally large agricultural land per household because it has the largest agricultural land (4,128 ha) for the smallest number of households in the area (56 households). Phak Bong also has a relatively large agricultural land (3,146 ha) for just over 80 households. Figure 29 implies that all the villages have enough potential agricultural land to support their population if the land is efficiently developed and used. On the other hand, some pressure on land exists in Houay Khing, Sa Kuan and Hua Meuang where agricultural area is relatively small for their population size; therefore, land use in these villages should be carefully monitored and managed so rampant expansion of agricultural land does not occur.

Figure 28 Current and Required Farming Land Size



Source: Survey team

Figure 29 Agricultural Land Potential

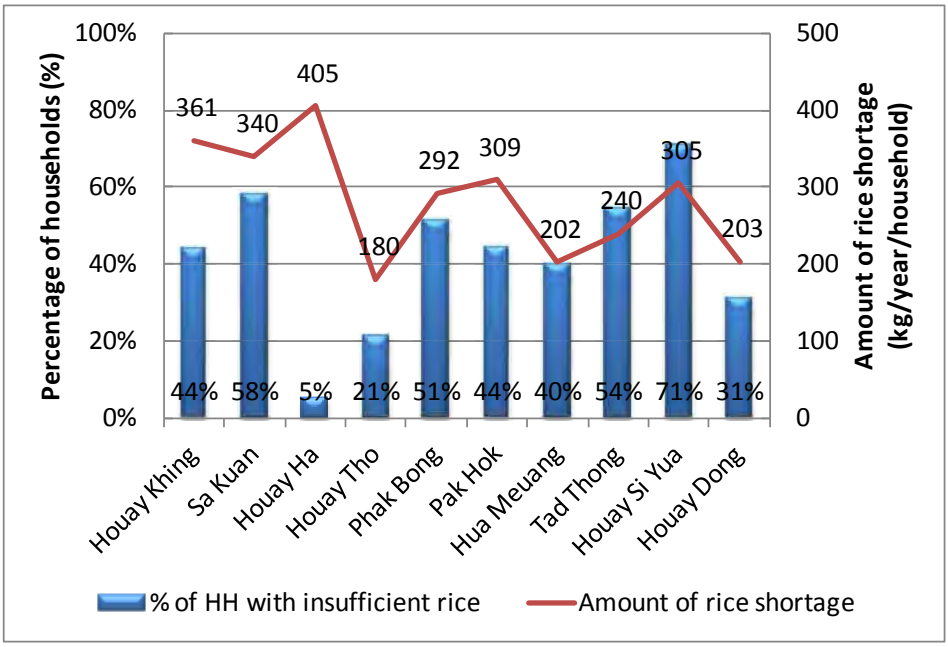


Source: Survey team based on the data from Phonxay District Land Management Authority

[20] It is calculated by dividing the total size of agricultural area (the data obtained from Phonxay District Land Management Office) by the number of households in each village.

As mentioned earlier, the households in both clusters rated the amount of rice production just over 3. However, looking at the situation in each village offers a different picture (Figure 30). In terms of the share of households suffering rice shortage, SC cluster tends to have a high rate ranging from 31 to 71 percent. HK cluster has a high rate in Sa Kuan, Phak Bong and Houay Khing, while the rate is very low in Houy Ha and Houay Tho. Houy Ha and Houay Tho share common characteristics of being a small village with a large Hmong population. Not only the small population to feed but also the strong sense of mutual help in production activities among Hmong kinship might be the important factor to help secure food security. It should be noted, however, that there are two households, or the poor, that lack a large amount of rice in Houay Ha. Besides Houay Ha, Houay Khing, Sa Kuan and Houay Si Yua suffer relatively severe rice shortage. This is why, in the earlier section, the households in these villages indicated that they would need a relatively large plot of additional agricultural land to secure enough food.

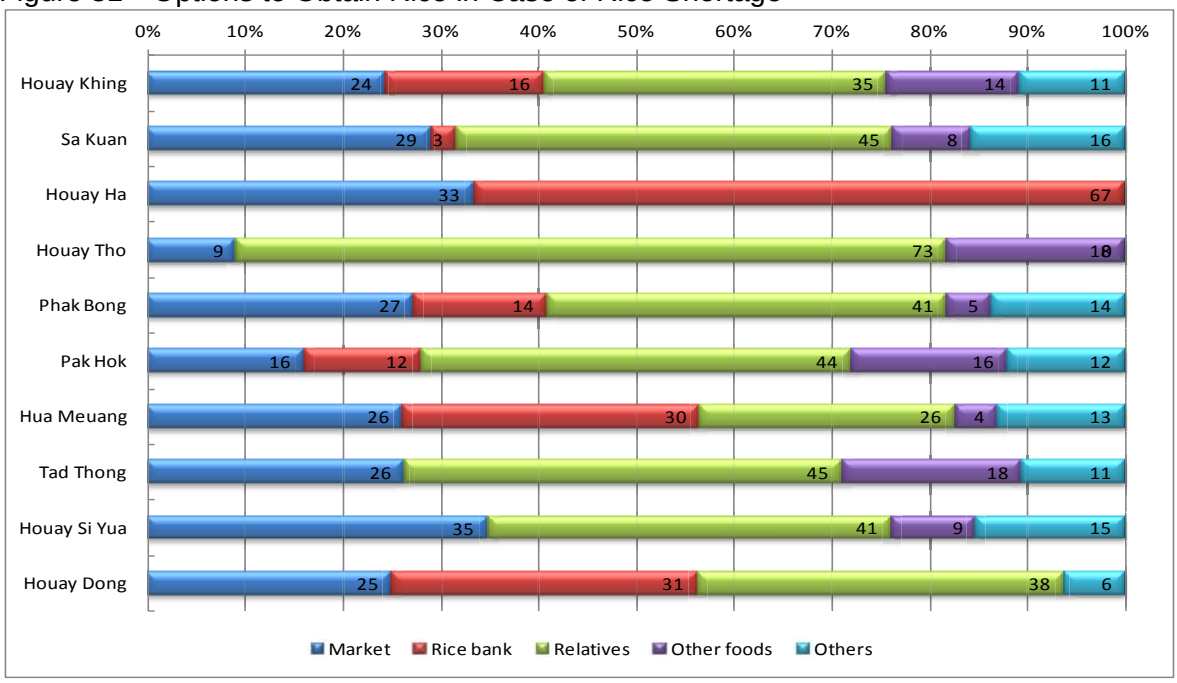
Figure 30 Households Suffering Rice Shortage and the Amount of Shortage



Source: Survey team

Figure 31 shows the responses of the sample households to the question about how they get rice in case of rice shortage. In all villages but Houay Ha, a large proportion of households reply on relatives for food. The rate is significantly high in Houay Tho with 71% partly due to the Hmong culture of mutual help as mentioned earlier and partly due to the lack of rice bank in this village. Nearly 30% of the households purchase rice from market in most villages. Seven out of ten target villages use some kind of the rice bank mechanism from which food-insecure households can borrow rice at interest to survive the period of rice shortage, usually from July to September. Another important survival option is to consume various NTFPs collected in their forest areas. Consumption of NTFP is significant in the villages where a rice bank does not exist (e.g. Houay Tho, Tad Thong); to put it in the other way around NTFP is not a popular option in the villages with a rice bank.

Figure 31 Options to Obtain Rice in Case of Rice Shortage



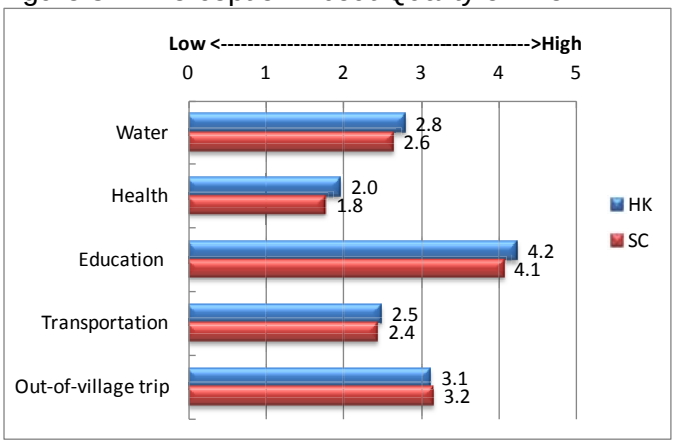
Source: Survey team

These results highlight the need for continued support for food production, especially to Houay Si Yua and Tad Thong in SC cluster and Sa Kuan and Phak Bong in HK cluster. As discussed earlier, limited labor is one of the main constraints in expanding production in the area; therefore, support for food production should focus on labor-saving techniques and more efficient use of land. In addition, support to a rice bank could offer an effective mechanism for food-insecure households, especially the poor, as a transitional measure.

4.6. Perception about Quality of Life

To assess the quality of life of villagers, the sample households were asked whether they were satisfied with the conditions of life such as access to water, health services, education and transportation.

Figure 32 Perception About Quality of Life



Source: Survey team

Both clusters show similar patterns of assessment on all aspects of life. Education is rated the highest at just over 4, followed by the frequency or easiness to travel outside the village at just over 3. Access to water and transportation were rated less than 3, indicating insufficient water supply systems and bad road access in the area. All the villages have a gravity-fed water supply system (*nam lin*) but as the population increases the water supply is becoming increasingly insufficient to support the population. It is said that the changes in weather are also affecting the amount of water available year by year. Regarding the transportation, the road conditions are relatively good for those villages on the main road from the district center; other villages away from the main road have to use a narrow, dirt access road to their villages, which is accessible only during the dry season. Even the main road from the district center to the clusters can be inaccessible in the rainy season as it crosses two streams without a bridge over them. Once heavy rains cause an increase the water levels, the access to the

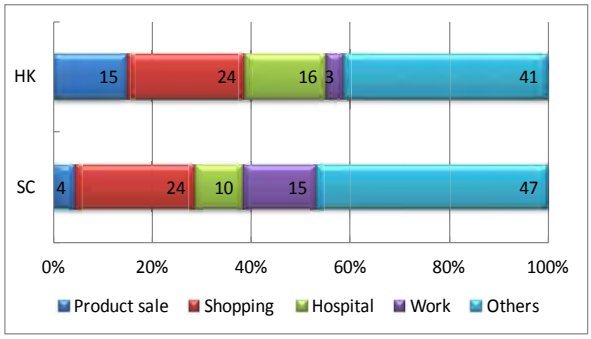
clusters from the district center is cut off. However, improvements in road conditions are expected as a segment from Sop Chia toward Hua Meuang village has been paved with the support from a JICA project in 2012 and the construction of a bridge over two streams is also underway with the support from the government.

Health services were rated the lowest at around 2, reflecting the fact that only Houay Khing village has a dispensary and there is no clinic in the area.

Figure 33 shows the purposes of travels to outside the village. More than 40% of the households in both clusters responded that they go out for the purposes other than selling their products, shopping or work. Many of them go out to visit their relatives and friends in other villages or the district center for various reasons. This kind of interactions with relatives and friends serves as a good opportunity for exchanging information about market prices and business opportunities. The second most cited response was shopping in the both clusters. The difference between the two clusters is that 15% of the households in HK cluster go out to see their products while the same percentage of households in SC cluster go out to other for work. This implies that more households are farmers in HK cluster while in SC cluster, which is closer to the district center, more households work as employers or traders.

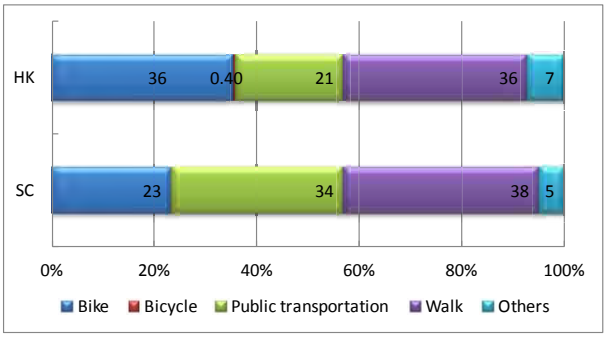
Figure 34 shows the mode of transportation the households use when going outside the village. In HK cluster, 36% of the households go out on foot. Another 36% uses a motorbike, which is more than those that use public transportation (21%). In SC cluster, on the other hand, more households use public transportation (34%) than motorbike (23%) because it is closer to the district center and more public transportation is available than in HK cluster. In both clusters, almost no households use bicycle to go outside of the village.

Figure 33 Purposes of out-of-village Travels



Source: Survey team

Figure 34 Mode of Travels



Source: Survey team

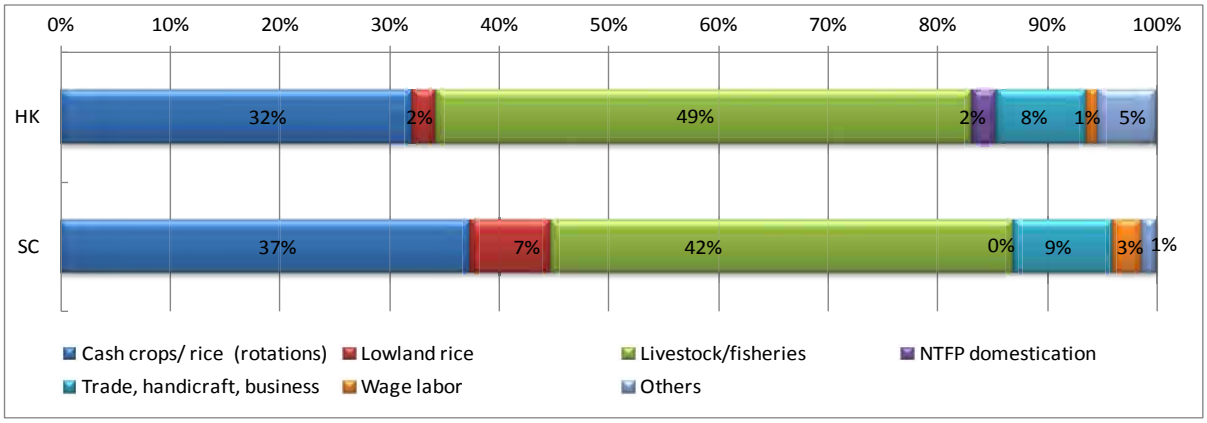
4.7. Alternative Livelihood Options

As mentioned earlier, the government adopted the policy to stabilize shifting cultivation in 1989 with the purpose of protecting the forests and improving land use. Since then, various support has been provided, both by the government and the donor community, to villages to stabilize shifting cultivation and create alternative livelihood options. Given such policy measure, villagers across the country have been striving to shift away from shifting cultivation to alternative livelihoods.

The sample households were asked what kind of alternative livelihoods they are interested in or they have already engaged in (Figure 35). In both clusters, more than 40% of households chose livestock raising (mainly animal husbandry, very few chose fisheries), while more than 30% chose cash crops or rice cultivation in upland areas. Given the lack of lowland paddy fields and irrigation in most villages in HK cluster, very few chose lowland rice cultivation. In SC cluster where three villages have some lowland fields, 7% of households chose lowland rice cultivation as an alternative livelihood option. 8 to 9% of households chose off-farm activities such as trading, handicraft and small-scale business. Only 1-3% chose wage labor as an alternative. NTFP domestication was chosen only in HK cluster where various NTFPs still play an important role in food security and livelihoods.

Livestock raising is a popular alternative not only because livestock is an important asset for villagers but also because Phonxay district specifically promotes livestock raising as a promising industry of the district. Recent improvement of road access to Vietnam and the rapidly increasing demand for meat in Vietnam are making livestock raising a highly promising business in Phonxay district, which has an access to Vietnam through Xiangkhouang province. It is reported that the purchase price of cattle for export to Vietnam is three times as high as that for domestic markets observed in Phonxai district[21].

Figure 35 Alternative Livelihoods to Shifting Cultivation



Source: Survey team

In order to assess more in detail the perceptions of the sample households about the activities they raised as alternatives to shifting cultivation, they were asked to choose 5 activities that they think are most effective as alternatives to shifting cultivation and put the order of 1 to 5 with 1 being the highest (Figure 36 – 37). Upland farming was divided into two separate production activities: commercial crop cultivation and rotational farming; the latter includes both upland rice and commercial crop cultivation in a rotational manner.

In Houay Khing cluster, more than 90% chose livestock as either the first (53%), second (21%) or third (19%) most effective alternative to shifting cultivation. In fact, Phonxay district promotes livestock raising (especially cattle and goats) as the most suitable economic activity for the district since most parts of the district lie on high lands with cool climate. As livestock raising requires a relatively large amount of initial investment, only wealthy households can afford to raise cattle and buffalos whereas the poor can only afford small animals if any. Therefore, the government and the donor community are increasing their support for the activity.

Among the two production activities on upland, households think of commercial crop cultivation as much more effective than rotational farming. This reflects the fact that commercial crop cultivation is largely for income generation, while rotational farming is partly for self-consumption and partly for commercial sale. If households continue to produce rice for self-consumption, potential incomes from rotational farming are not as much as intensive production of commercial crops. Just over a half of households chose lowland rice farming as either the first (12%), second (22%) or third (18%) most effective alternative to shifting cultivation. In fact, farmers generally think lowland rice farming as one of the most effective alternatives. In reality, however, it is an alternative only for the households with suitable conditions (i.e. plain lowland, water). Therefore, lowland rice farming is considered as effective, but it is not a realistic alternative for most farmers in HK cluster.

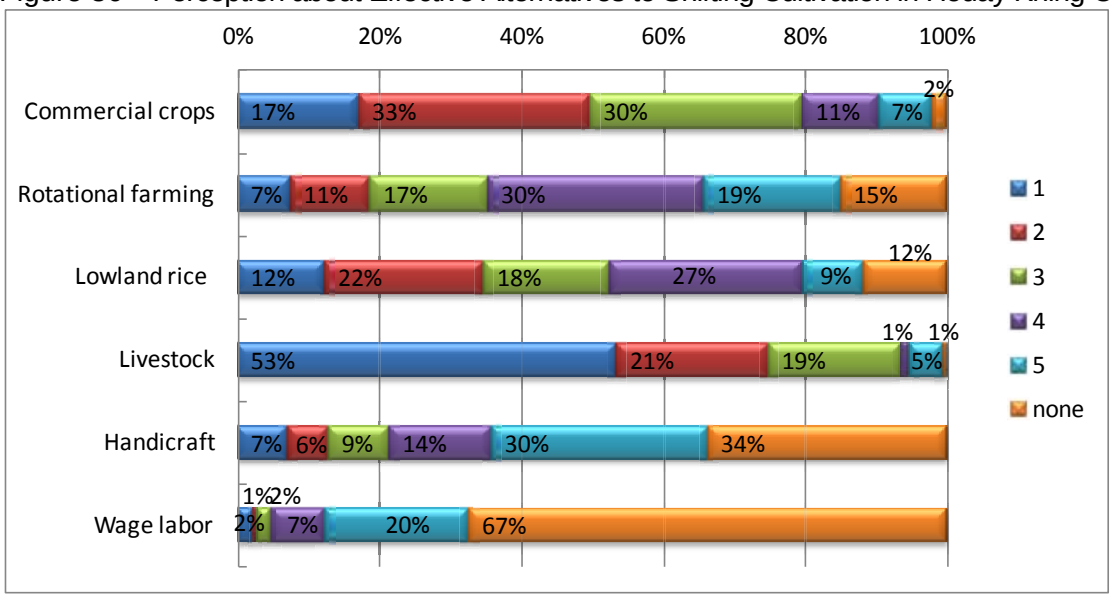
Sop Chia cluster shows very similar patterns. The only noticeable difference is that rotational farming is not regarded as an effective alternative as in SC cluster. This implies that farmers in SC cluster are

[21] NUDP-TABI workshop in Phonxai District of Luang Prabang Province (September 4, 2012). According to Dr. Phouang Parisak, Vice Minister of Agriculture and Forestry, who co-chaired the workshop, the demand for cattle in Vietnam is about 150,000 heads per year, and the current annual supply from Laos (primarily Xiangkhouang Province) is only 10,000 heads; thus, there is still much room for expansion of cattle export.

engaged more in commercial-based agriculture than in HK cluster where farmers still continue to produce their own rice and food. This shows that commercial-based agriculture is starting to spread to SC cluster at an earlier stage than HK cluster as SC cluster is closer to the district and have a better access to various markets. However, the experience in other parts of northern Laos demonstrate that agricultural commercialization spreads very quickly to areas with good road access and thus it is expected SC cluster, and even HK cluster, will see the same trend once the current improvement of road access is complete. This has an implication that land use in both cluster might change to more fixed, intensive one as the commercialization of agriculture progresses, as demonstrated in other areas of northern Laos where agricultural commercialization drastically changed land use, and in some cases, led to rapid deforestation due to land conversion.

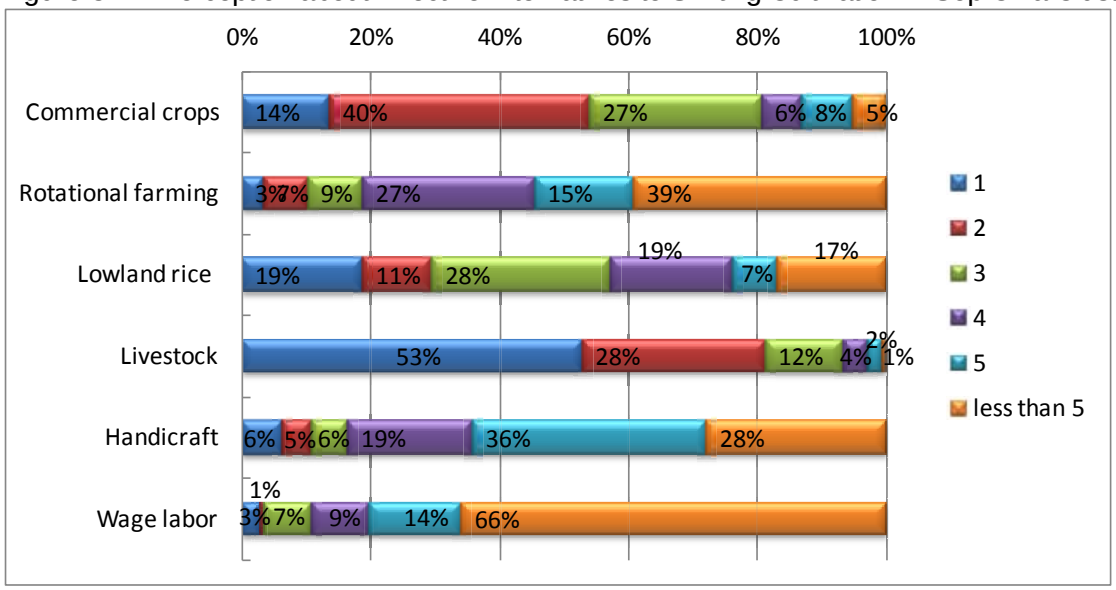
It should be also noted that wage labor is not considered as an effective alternative in both clusters. This can be a unique tendency of both clusters as wage labor, especially in dry season or off season, is usually a popular livelihood option in other parts of Luang Prabang province.

Figure 36 Perception about Effective Alternatives to Shifting Cultivation in Houay Khing Cluster



Source: Survey team

Figure 37 Perception about Effective Alternatives to Shifting Cultivation in Sop Chia Cluster



Source: Survey team

Chapter 5 Drivers of Deforestation and Forest Degradation

The main objective of this survey is to conduct the socio-economic survey and analysis to contribute to the efforts in identifying drivers of deforestation and forest degradation. This chapter aims to summarize main findings from the survey results and identify possible drivers of deforestation and forest degradation in Houay Khing (HK) cluster and Sop Chia (SC) cluster.

5.1. Socio-economic Situations

Population size is much larger in Houay Khing cluster (3,525 persons) than in Sop Chia cluster (2,677 persons). SC cluster is dominated by Khum ethnic group with no Hmong household, while HK cluster has multiple ethnic groups in most villages (Khum 66 %, Hmong 33 %, Lao Loum 1 %).

Among the 363 sample households in the two clusters, more than 90 % are engaged in upland farming (upland rice, cash crops and/or livestock raising). HK cluster especially is heavily reliant on upland farming as only Houay Khing village has some lowland paddy fields, while SC cluster has three villages with lowland paddy fields (Hua Meuang, Tad Thong and Houay Dong villages). In these three villages, 14 % of the sample households are engaged in both upland farming and lowland paddy farming. In both clusters, cash crops cultivation is spreading to wider areas, especially in SC cluster thanks to improved road and market access. In HK cluster, cash crops such as cassava and maize are increasingly grown but mainly produced for domestic uses i.e. feed for pigs, rather than for sale in market due to the limited market access.

In describing the economic activities of the villagers in the target area, it should be noted that almost all sample households are engaged in off-farm activities in addition to the above-mentioned farming activities. Only 7 % of the sample households in HK cluster and 2 % in SC cluster are not engaged in any kind of off-farm activities. This implies that the villagers do understand economic risks of concentrating on one economic activity and thus takes various measures to diversify risks. Among various off-farm activities, wage labor or seasonal employment is limited in the target areas despite the increasing trend of wage labor in other parts of northern Laos. This is due to bad road access and less exposure to information about employment opportunities than in other parts of Luang Prabang.

Another distinctive feature of the socio-economic situations in the target area is the magnitude of immigration in the past decade. On average, 66 % of the total sample households have migrated to the current location in the past, mainly due to village relocation (ordered by the government) or in search for better social infrastructure and road access. The magnitude of migration is especially significant in SC cluster as almost all the sample households in three villages (Tad Thong, Houay Si Yua, Houay Dong) have moved to the current village in the past decade due to the government's decision to resettle the whole villages. Immigration of such a magnitude has inevitably influenced the way land and forest resources are used as well as their livelihoods. In terms of economic status, all the three villages are considered poor because the villagers are still struggling to re-establish their own livelihoods but agricultural production is not enough yet. In terms of land and forest use, newly settled villagers tend to cut trees either to use for house construction or to open agricultural land; hence leading to a high rate of deforestation. The survey reveals that the agricultural area has rapidly increased up to 2008 in SC cluster and 2006 in HK cluster, partly due to the opening of forests as a result of migration and re-settlement. Also, the result shows the use of timber in some of the newly established villages (e.g. Tad Thong, Houay Tho) is significant.

5.2. Land Use

As described earlier, more than 90 % of 363 sample households are engaged in upland farming (upland rice, cash crops and/or livestock raising). Only 5 % in HK cluster and 14 % in SC cluster are engaged in both upland and lowland farming. Almost all farming households have and cultivate their own plots of land, while very few rent in some plots from relatives to supplement food production. Those who rent in agricultural land are mostly newly settled households as late comers tend to have

fewer land or less fertile land. Only 3 out of 363 sample households do not have their own agricultural land.

On average, the sample households have about 4 ha of agricultural land per household. However, in the four villages with Hmong ethnic group in HK cluster, the Hmong is reported to own and cultivate much larger agricultural land (1.3 – 1.6 times) than Khum ethnic group. To compare among the villages, larger agricultural land per household is reported in Houay Tho, Hua Meuang, Houay Si Yua villages where the number of plots per household is also large with more than 4 plots, while small plots are reported in Houay Dong and Phak Bong and Sa Kuan villages. Sample households in Houay Khing, Sa Kuan, Hua Meuang and Houay Si Yua responded that they would need a relatively large "additional" agricultural land if they are to produce enough rice and improve livelihood. In fact, these villages reported a high incidence of rice shortage. Also, they have about 3 or less plots of agricultural plot per household and use the agricultural plots in a short rotation except for Hua Meuang, attesting to the limited availability of agricultural land. In theory, all the ten villages in the target area have enough agricultural land (from 15 ha per household in Houay Khing village to 74 ha in Houay Ha) and reserved land that have been demarcated by the land use planning conducted in recent years. In reality, however, not all the agricultural land has been developed or can be utilized due to difficult access or shortage of labor; hence not enough land for each household. In fact, many sample households reported that they would like more agricultural land to improve livelihoods but (lack of) labor force is the main constraint.

5.3. Perceptions about Collective Actions, Forest Resources and Livelihoods

In order to identify potential drivers of deforestation and address them, it is important to understand not only how local people use their forests and forest resources but also how they perceive the values of forest resources and their capabilities to address issues of communal importance in a collective manner.

Capabilities to address common issues can be assessed by looking at their decision making process and the experience and willingness to participate in group activities. In both clusters, sample households regard participatory decision making on common issues (e.g. water, land and forest use) essential and do participate in village meetings. In reality, however, the survey result shows they are not able to speak out or express their opinions in village meetings. This is partly because many are not confident in speaking out in public and partly because many think important issues should be ultimately determined in line with the decisions by the village authority. Even so, when it comes to land use planning, they are found to prefer decision making by multiple stakeholders. In HK cluster where community members are heterogeneous, villagers prefer land use planning by the village and government authorities, while in SC cluster many prefer decision making without the involvement of the government authorities.

In terms of the experience and willingness to participate in group activities, both clusters show a high level of participation in group activities. The results reveal that villagers actively participate in group activities not because they have to but because they are well aware of tangible benefits of collective actions. Among them are efficiency in agricultural production, effectiveness in problem solving and enhanced influence in decision making. Such high level of collective actions is a good implication that they are willing to collaborate with each other and able to address common problems. In other words, their motivations for collective actions can be promoted and utilized to address issues of deforestation and forest degradation.

In terms of forest and forest resources use, the sample households use them mainly as a source of fuel wood and timber. Houay Ha is found to use an exceptionally large amount of fuel wood, while newly settled villages, e.g. Tad Thong and Houay Tho, use a large amount of timber per household mainly for house construction.

As such, almost all sample households place a high value on forests as a source of fuelwood and timber. They also recognize the importance of forests as potential agricultural land for future use.

Furthermore, both clusters regard all the services provided by forests, i.e. soil enrichment, water sources and land slide prevention, as highly important. From these results, it can be said that villagers are well aware of the importance of protecting the forests as forests provide them with both direct benefits (e.g. fuelwood, NTFP, timber) and indirect benefits (e.g. water, soil fertility, land slide prevention). Such awareness about the values forests and forest resources provide can serve as an incentive to use forests in a sustainable way.

In terms of their perceptions about their abilities to make living and sustain livelihood, sample households regard the size of agricultural land and the amount of rice production as moderate. However, they tend to be unsatisfied with the current level of production techniques, access to farm land and incomes, especially in SC cluster where the majority are newly settled villagers and thus their livelihoods are still unstable. More alarming issue in both clusters is reported to be the shortage of water for agricultural use.

As mentioned earlier, the only major difference in livelihood in HK and SC cluster is that HK cluster is more reliant on upland rice farming whereas SC cluster tend to have more options including lowland rice production and various off-farm opportunities. Villagers in both clusters perceive livestock raising as the most effective alternative to shifting cultivation, followed by cash crop cultivation. Lowland paddy farming is also considered effective, but the lack of irrigation or agricultural water makes it an unrealistic option for most villages.

5.4. Potential Drivers of Deforestation and Forest Degradation

Figure 38 shows possible drivers of deforestation and forest degradation identified from the overall survey results from HK and SC clusters. The main factors driving the deforestation and forest degradation in the target area are found to be 1) shifting cultivation or livelihood options, 2) demographic changes and 3) market forces.

The distinctive feature of the target areas is that there are two major “triggers” that are behind the demographic changes and market forces. The first trigger is the improvement of access roads and infrastructure thanks to the development support from the government and the donor community. This first trigger affected both demographic changes (by attracting people to move to areas with good access and infrastructure) and market forces (by increasing marketing opportunities for both producers and traders). The other trigger is the government policy to relocate remote villages to road side as part of rural development efforts. This inevitably resulted in the influx of people and the concentration of a large population in limited areas, which in turn affected the changes in land and forest use.

The following sections briefly look at each driver of deforestation and forest degradation.

5.4.1. Shifting cultivation/livelihood options

Shifting cultivation has long been practiced in the northern part of Laos and it can be sustainably practiced as long as rotational periods are long enough for soil fertility to recover. However, the survey result shows that the average rotational periods in the area are 3 – 4 years in the target area. With such short rotation periods, some sorts of technologies for soil improvement would be needed to sustain productivity. In reality, the farmers in the target area lack such technologies or knowledge and are not able to address decreasing soil fertility. Given decreased soil fertility, farmers are driven to look for new agricultural land usually by clear-cutting forest areas in order to secure enough food. The survey result shows that only 22 out of 363 sample households are engaged in the pioneering type of shifting cultivation but it is possible that much more households are actually opening up new plots of land for sustaining their livelihood.

Another case in which shifting cultivation can affect forests is when villagers continue to rely on shifting cultivation given no other promising livelihood options, not by choice. If they had other

options, e.g. lowland paddy farming, off-farm, that can earn enough incomes, they would chose to quit less productive upland farming and shift to other economic activities. In reality, the area does not have enough flat land or water for lowland paddies, whereas other economic activities such as employment opportunities are limited. Given the reality, farmers have no other choice but to increase reliance on shifting cultivation. In the face of need to produce more either for an increasing population or for sale, farmers are forced to open up new agricultural land or use the current plots more intensively by shortening rotational periods.

Based on the survey results, Houay Tho and Tad Thong villages have a higher incidence of pioneering type of shifting cultivation because the villagers are resettled only recently (2005-2007). Besides, Houay Khing, Houay Ha and Houay Si Yua villages are already using their land intensively in short rotation, putting pressure on land.

Also, the survey result clearly indicated the Hmong uses a much larger plot of agricultural land per household, thus potentially posing a threat to forest land in the form of forest conversion. This is partly because their family is large in size and partly because they tend to reply more on upland farming (rice, cash crop and livestock) than off-farm activities.

Looking at the years to come, there would be a high level of pressure to expand agricultural land in Houay Khing, Sa Kuan, Hua Meuang, and Houay Si Yua beside the two recently settled villages. Although there are four villages with the Hmong population in HK cluster (Houay Khing, Sa Kuan, Houay Ha, Houay Tho), Houay Ha and Houay Tho villages may not have as much impact on forests as Sa Kuan and Houy Khing as Houay Ha and Houay Tho villagers (especially Hmong) already have enough agricultural land in rather long rotation and produce sufficient rice. In addition, the two villages have large reserved land available for use in the future.

On the other hand, Khum and Lao Loum may not be much of a threat to forests. This is because Khum and Lao Loum are already in the process of shifting toward fixed-land farming (lowland rice farming, or cash crop farming on fixed plots) and off-farm activities. This trend is more significant for the Lao Loum community and for SC cluster which has better access to market and employment opportunities. For HK cluster, it might take some time for villagers to reduce reliance on upland farming but it is unlikely that it will pose a significant threat to forests as most households do not have much labor force to drastically expand their production. Yet, it is important for the government and the donor community to continue its efforts in creating alternative livelihoods for local communities and ultimately reduce shifting cultivation.

5.4.2. Demographic changes

The second driver observed in the target area is rapid changes in demography due to 1) village relocations, 2) voluntary resettlement, and 3) natural increase in population. The trigger for village relocations is the government policy to resettle remote villages (a “push” factor), while the trigger for voluntary resettlement is the improvement of road and infrastructure (a “pull” factor). It should be noted that the drastic demographic changes due to the push and pull factors have been the distinctive and most powerful driver in the target village in the past decade.

Village relocations have been induced by the government policy to relocate remote villages as part of rural development efforts since the early 2000s as the road and infrastructure in the area improves. Village relocations are reported to have brought about demographic changes of significant magnitude in the area. Almost all target villages in HK cluster and three villages in SC cluster are newly settled in the last decade. In addition to policy-induced relocations, there are some villagers who have immigrated into the target area in search of better road access and social infrastructure (water, education, health services). Together, this roughly translates into the migration of about 1,000 households or 6,000 people into new locations along the main road.

The consequence is the concentration of large population in limited areas along the road side, which has inevitably resulted in the opening of new agricultural land near the new settlements and the conversion of large area of forests into agricultural land in a short period of time. Yet another impact

on forests comes from the need for timber for house construction in newly settled villages. Furthermore, an increase in population leads to more use of fuel wood though this may not have as much impact as tree felling for timber.

As mentioned earlier, most villages in the target area are established in recent years due to village relocations. Among them, Houay Khing and Sa Kuan villages are under most pressure of land use as their population is large and they already use land intensively, implying limited land availability and possible pressure to further expand agricultural land.

Deforestation and forest degradation can be a problem also in Houay Tho and Tad Thong villages because their relocations are only recent and they are reported to use a large amount of timber.

5.4.3. Market forces

The third driver is market forces, which refer to increased demand for agricultural products of high market values and consequent increase in investment in marketable products (agricultural commercialization).

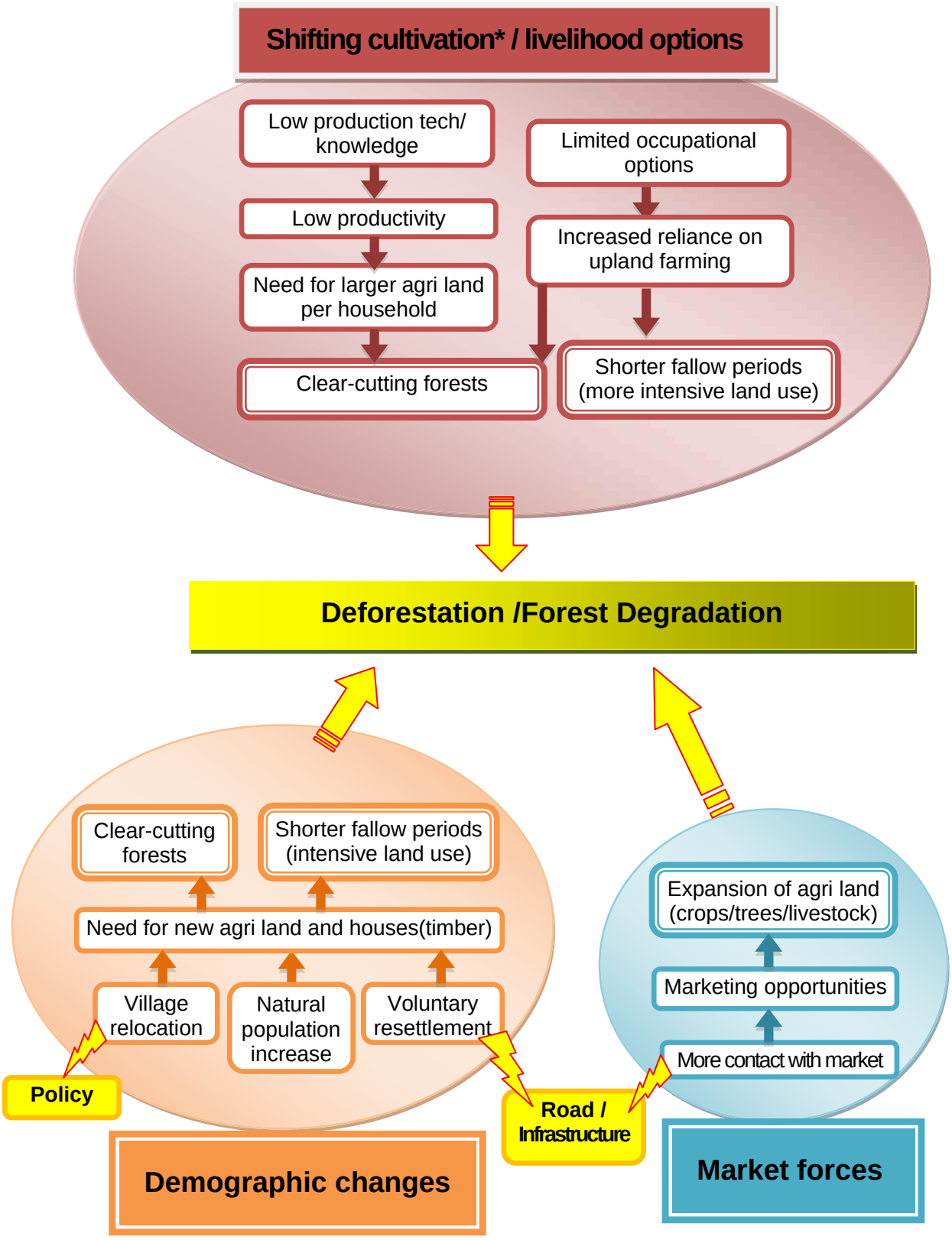
This is a general trend observed in many parts of Laos and thus not the trend only observed in the target area. Many parts of Luang Prabang province, including Phonxay district, had been isolated from market transactions in the past due to its difficult access. This situation has been rapidly changing thanks to the improvement in road access. As road conditions get better, so does market access. Better road access not only means better market access for producers but also more marketing opportunities for traders and investors. When the road conditions improved in the target area in the early 2000s, farmers got exposed to market information and market opportunities that were not available before. They learned what kind of crops were be in demand in market and how many buyers were out there ready to purchase their produce. In fact, Phonxay district was land locked before but with the better road access it has turned into a hub linking markets in Luang Prabang and Vietnam. An increasing number of cash crops are being introduced to the farmers in the target area, which was reflected in the land use change. Furthermore, Phonxay district promotes livestock raising as a promising economic activity for a dual goal of stabilizing shifting cultivation and improving livelihoods. In fact, the survey result reveals that many sample households perceive livestock raising as a good income generating activity and a more effective alternative to shifting cultivation than cash crop cultivation.

It should be noted that significant deforestation and forest degradation due to such market forces have not been observed in the target area yet because the area is still early stage of agricultural commercialization. In other words, such market forces are yet to be a serious driver of deforestation or forest degradation. However, empirical evidences suggest that market forces are usually so intense that they can drastically change local livelihood and land use. Good example is the rapid expansion of marketable products (e.g. maize, cassava, rubber) in northern Laos and consequent changes in land use including conversion of forest into agricultural land. Behind these market forces are the ever increasing demand for food and raw materials in neighboring countries: China, Vietnam and Thailand.

As both HK and SC clusters are located in between Luang Prabang and Vietnam, they will be inevitably influenced by the market forces from Vietnam as well as Luang Prabang. As the demand for livestock and cash crops in Vietnam is high, the existence of Vietnamese buyers is already increasing in the clusters. Therefore, the market forces should be regarded as a potentially strong driver for deforestation and forest degradation.

Another potential threat, though not significant, is the increasing number of industrial tree plantations. The survey reveals that industrial tree plantation is being promoted in all the target villages (e.g. *Jetropha*) either by the government or private companies. As long as trees are planted in fallow land, plantations do not pose any threat. However, it has been reported that some plantations are created by clearing forests. Therefore, close attention should be paid to the expansion of industrial tree plantations as well.

Figure 38 Drivers of Deforestation and Forest Degradation in Target Area



*Shifting cultivation here refers to both i) pioneering type and ii) highly intensive use of plots in rotation.
Source: Survey team

Chapter 6 Conclusions

This study aimed at investigating the relationship between the people's livelihoods and drivers to deforestation. To do so, it analyzed the socioeconomic situation of the HK and SC clusters by focusing on the survey in ten villages; identified drivers to forest degradation by looking at the degree of people's participation in land and forest use planning; and then provided recommendations to the development of suitable livelihood activities of rural people participation for REDD+. The main conclusions on the findings and issues discussed earlier chapters are provided below.

Understanding the socio-economic situation of HK and SC clusters was drawn from the findings of 363 interviewed households (187 in HK cluster and 176 in SC cluster). The interviews included a large number of Khmu and Hmong population, making a majority of samples in the study areas. In other words, HK cluster is Khmu-Hmong community whereas SC one is Khmu dominated one.

The main agricultural activity of the people in the HK and SC clusters is upland farming (mostly of rice, coupled with other crops), thus regarded as the main livelihood of the people in those clusters. Their upland farming is usually associated with slash and burn farming practices. More and more households are growing cash crops and raising livestock to seize the emerging marketing opportunities thanks to the improvements of road access to and from district center and Vietnam. The other important source of livelihood is the collection of forest products. Forests have been the main sources of livelihoods for many households.

The survey results show that local people are well aware of the importance of forests and forest resources in their livelihoods. Not only the forest resources but also the services they provide are highly valued by the local people. On the other hand, people's dependency on natural resources or forest resources (e.g. NTFPs, firewood, and timber) and their perception towards the forests as a reserved agricultural land for future use are potentially putting significant pressure on forests in both clusters. In fact, the search for fertile land for agricultural production by clearing and encroaching forest areas has been prompted by various factors such as relocation, migration and population growth.

Data on population growth and trend in the target villages were limited, making it difficult to fully understand a greater extent of a possible relation between population growth and declining forests through expansion of agricultural land in search for fertile land. However, agricultural land expansion due to the population growth was reported at the time of the survey. Expansion of agricultural land in search for fertile farming land was reported to be the main cause for the forest losses. The improvement of road access in recent years would mean greater potential for agricultural land expansion and conversion from forest land, putting pressure on forests.

Rural economic development cannot be driven and dictated by the government policy alone but requires people's participation. The study finding shows a high level of support for decision making by multiple stakeholders (e.g. government, village committee, and community members). Rural people's participation in issues related to communities and livelihoods is essential to sustainable development and natural resources management. It enhances collective values or a sense of collective actions in their community. At the community level, the majority of the people see the importance of the participation among the members, a kind of collective actions e.g. exchanging labor, helping each other build houses. This value is essential for group formation in forest protection, forest use, agricultural cropping or production, knowledge transfer to increase work productivity, problem solving and so forth and thus will enhance people's influences in decision making and negotiation power.

It is important and recommended that the local community be fully involved in land and forest use planning as well as decision making of important issues. More importantly, a sense of ownership of the community should be promoted in land and forest use and management. In order to help them effectively manage land and use in a sustainable manner, it is recommended that studies on the quality of existing production land be conducted to identify suitable crops or introduce production techniques and alternative livelihoods (e.g. livestock raising, potential cash crops).

Based on field visits, interviews and observations and by taking into account a realistic approach in the project implementation, the specific local context and potential challenges to overcome, the following table shows some main findings, recommendations and steps in association with the alternative livelihoods development, sustainable use of natural resources, and village development.

Main Findings, Recommendations, and Next Steps

Findings	Recommendations	Initial Steps
1. Existing Livestock raising system is not well functioning	Training program be provided to farmers on building livestock pens, feeding techniques and vaccination	• DAFO/project provides technical support on how to make appropriate livestock pens (animals, poultry), including techniques to take care of them • DAFO/project provides training on how to estimate food rate and specific types of feeds for respective livestock
2. Lack of networking among livestock actors	Rapid Market Survey and Value chain Assessment in livestock be conducted in Phonexay, Luang Prabang district and Xieng Kuang province (currently there are traders from Xeing Kuang buying livestock and poultry from HK cluster as it is not located too far from Xieng Khuang).	DAFO/Project/identified Local Capacity Builder/Non-Profit Association together work together on how to conduct the rapid market survey and then value chain analysis.
3. Ability to supply sufficient livestock limited	Livestock Production Groups (e.g. cattle, buffalo, pig, goat, poultry groups) be studied and established Other support funds (revolving funds, vaccination funds, etc) be strengthened where available and be established where unavailable	DAFO/project organize meetings at village level to initiate group formation and funds, including group / fund management mechanisms, rules and regulations
	Pig husbandry program be piloted for potential households in SC cluster (location close to Phonxay district center for a purpose of easy access to market)	• DAFO/Project/DOIC to work together to identify input suppliers in LP (piglet producers, pig feeds) and potential buyers or markets in Luang Prabang town • DAFO/Project/DOIC expand networks or contacts with producers (e.g. Thangon CP pig let producing factories) in technical exchange and support, even potential buyers • Project invests 10-30 piglets with potential households.
4. Current upland rice farming practices in associated with shifting cultivation / slash and	Systematic terrace farming be studied as one of the alternatives by drawing lessons from previous projects in the country and by learning lessons and experience from countries in the region	• Review lessons learnt from CESVI project to identify gaps • Exchange experience and lessons with region • Develop a new project that fits in the existing situation

Findings	Recommendations	Initial Steps
burn harmful to forests		
5. Farmers lacking business oriented knowledge and skills	Community based business training be provided to stakeholders (esp. farmers, production groups)	DAFO/Project/identified Local Capacity Builder/Non-Profit Association together provide training on basis business development and management, marketing
6. Absent food processing system	Small household business be surveyed to identify potential producers and supply chain be assessed	Supply chain and baseline study on small household businesses and their market linkage (e.g. linking to LPQ banana processors, food processing businesses, other concerned agencies, etc. that could provide training on food processing, marketing, etc.) (*At the initial stage, the project should support finance, related activities…*)
7. Food insecurity (rice) during the rainy season (farmers' coping strategy is to borrow money from local unofficial moneylenders to buy rice and repay with rice after harvest). Moneylenders also act as rice retailers selling rice to needy people at a higher price esp. during the rainy season)	Rice bank or group be established in target villages	• Consultation meeting with Phonexay district authority on the previous project (CESVI) that supported the same work – rice bank – to learn lessons and experience and applied to the existing rice banks • Study potential to set up rice bank committee in respective villages • For piloting, DAFO/Project considers to contribute rice as a revolving fund to start up the rice bank • Initiate consultation and cooperation with existing agencies working on rice bank development
8. Lack of sustainable NTFP collection	Value chain analysis be carried out to identify potential forest products and develop/domesticate them (if needed)	• Value chain analysis should be conducted in target villages • Forest products collection group formation be considered and established with rules and regulations
9. High rate of using fire wood in cold season	Clay house construction be considered as an alternative to conventional housing	• Pilot project should be started with 1 or 2 clay houses per cluster using local resources (clay, rice straw, etc.)

Findings	Recommendations	Initial Steps
because existing houses are made with local materials – wood and bamboo and thus cold air flows easily into houses		• Training on clay house construction be organized to interested villagers
10. High rate of using fire wood for cooking negatively associated with forest resources and wasting time	The use of stove be introduced to households replacing the conventional one	Stove making project be considered utilizing local makers in Luang Prabang town to provide training to villagers how to make stoves
11. Health services limited	Revolving drug funds for village medical kit center be expanded	Establish revolving drug funds in target villages which require the project's facilitation
12. High rate of illiteracy among women	Non-formal education program be started	Coordination with provincial and district office of education to seek for solutions
13. Sanitation not widely used	Sanitation facilities be provided to target villages that don't have	Govt/project to provide financial report
14. Gender balance issues in planning processes	Gender awareness training for Kumban officers and village authorities	Govt/project to provide financial report

APPENDIXES

Appendix 1: Village Profiles of HK Cluster

Description	Houay Khing	Sa Kuan	Houay Ha	Houay Tho	Phak Bong
Establishment Year	2003	2002	1960	1978-79	2001
Demographics					
Population	1,355	910	434	346	480
Female	663	449	205	173	273
Households	220	123	56	58	82
Poor households	55	53	36	6	4
Ethnic Group by Households:					
Lao Theung (*Khmu*)	124	101	6	34	81
Lao Loum	5	6	-	-	1
Lao Soung	91	16	50	24	-
Direction / Bordering					
North	Houay Tho	Kew Lai	Long Eaung	Long Lath	Long Lath
South	Sop Huad & Na Pheing	Long Eaung	Houay Khing	Na Phieng	Phak Hok
West	Houay Tho & Long Lath	Na Ngew	Long Lath & Phak Bong	Houay Chia & Houay Dong	Houay Chia
East	Kew Lai	Houay Ha	Sa Kuan	Houay Khing	Houay Ha
Land Use Planning					
Conservation forest (ha)	4	1.5	77.6		131.3
Protection forest (ha)	1,572	-	3,261		1,261
Production forest (ha)	59	250	-		705.8
Community forest (ha)	5	-	-		-
Grazing land (ha)	972	500	-		2,974
Cemetery forest (ha)	10	5	3	-	10.3
Residential area (ha)	394	124	6.8		3.9
Agriculture area (ha)	-	-	2,094		15.8
Total Land area (ha)	-	4,114.8	-		3,974.1
Occupation					
Main Occupation	Upland rice farming (*hai*)	Upland rice farming (*hai*)	Upland rice farming (*hai*)	Upland rice farming (*hai*)	Upland rice farming (*hai*)
Supportive Occupation	Cash cropping, livestock	Cash cropping, livestock	Cash cropping, livestock, NTFPs	Cash cropping, livestock, NTFPs	Livestock, NTFPs
Infrastructure					
Road accessibility	Both in dry/wet seasons (located on main road) (36km to district center)	Only in dry season (8km from main road) (46km to district center)	Only in dry season (6km from main road) (38km to district center)	Only in dry season (9km from main road) (39km to district center)	Both in dry/wet seasons (located on main road) (27km to district center)
Electricity	Not available	Few houses use solar panel	Not available	Not available	Few houses use solar panel
Primary School	1	1	1	1	1
Lower Secondary School	1	-	-	-	-
Dispensary	1	-	-	-	-
Gravity-fed water (*nam lin*)	1	2	1	1	1
Rice Bank	1	-	-	-	-
Gross Domestic Product	-	LAK 487,805/HH	-	-	LAK 5,475,609/HH
Village Forests Used	The forest is decreasing because of slash and burn farming	The forest is decreasing because of slash and burn farming	The forest is decreasing because of slash and burn farming and population growth	The forest is decreasing because of slash and burn farming	The forest is decreasing because of the population growth as people moved in for better road

Description	Houay Khing	Sa Kuan	Houay Ha	Houay Tho	Phak Bong
					access and available electricity

Source: Survey Team

Appendix 2: Village Profiles of SC Cluster

Description	Phak Hok	Hua Meuang	Tad Thong	Houay Si Yua	Houay Dong
Establishment Year	1975	1952	2005	2001	2000
Demographics					
Population	602	436	534	595	510
Female	317	224	269	293	255
Households	95	83	82	93	85
Poor households	41	12	13	31	12
Ethnic Group by Households:					-
Lao Theung (*Khmu*)	94	82	81	92	84
Lao Loum	1	1	1	1	1
Lao Soung	-	-	-	-	-
Direction / Bordering					
North	Phak Bong	Phak Hok	Thad Sang	Tad Thong	Houay Chai
South	Hua Meuang	Sop Chia	Houay Si Yua	Sop Chia	Houay Thone
West	Tad Thong	Kok Pho	Houay Thone	Pha Touap	Houay Lung Soung
East	Houay Tho	Sop Chia	Phak Hok	Hua Meuang	Chom Chieng & Houay Tho
Land Use Planning					
Conservation forest (ha)	1027 incl. protection forest	-	1011 incl. protection forest	1,294	233
Protection forest (ha)		69		-	
Production forest (ha)	1012	97	1627	2,705	1470
Community forest (ha)	-	9	-	279	-
Grazing land (ha)	1746	151	127 (& 666.5 for livestock)	764	210
Cemetery forest (ha)	22	9	13	1.8	12
Residential area (ha)	10	11	3	4	4
Agriculture area (ha)	*(it is included in production forest area)*	933	*(it is included in production forest area)*	2	-
Reforestation area (ha)	-	625	-	-	-
Upland farm area (ha)	-	781	-	-	-
Total Land area (ha)	3,817	2,685	3,446.5	5,130	1,929
Occupation					
Main Occupation	Upland rice farming	Upland rice farming	Upland rice farming	Upland rice farming	Upland & lowland rice farm
Supportive Occupation	Cash cropping, livestock	Cash cropping, livestock	Cash cropping, livestock	Cash cropping, livestock	Cash cropping, livestock
Others	-	-	-	-	-
Infrastructure					
Road Accessibility	Both in dry/wet seasons (located on the main road) (16km to district center)	Both in dry/wet seasons (located on the main road) (13km to district center)	Only in dry season (9km from main road) 25km to district center)	Both in dry/wet seasons (2km from the main road) (13km to district center)	Only in dry season (10km from the main road) (18km to district center)
Electricity	Some houses use solar panel	Not available	Not available	Some houses use solar panel	Not available
Primary School	1	1	1	1	1
Gravity-fed water (*nam lin*)	1	1	1	1	1

Description	Phak Hok	Hua Meuang	Tad Thong	Houay Si Yua	Houay Dong
Rice Bank	1	1	1	-	-
Gross Domestic Product	-	-	LAK 5,000,000	-	-
Village Forests Used	The forest is decreasing because of slash and burn farming	The forest is decreasing because of slash and burn farming	The forest is decreasing because of slash and burn farming	The forest is decreasing because of slash and burn farming	The forest is decreasing because of slash and burn farming and of logging business (by a company)

Source: Survey Team

Appendix 3: Historical Events Taking Place in HK and SC Clusters by Village

Houay Khing

Year	Situation
2003	3 villages merged together where
	Houay Khing became the focal
	Village and road constructed
2004	Car and motorbike available
2004-05	Disease spread
2004-05	Primary school established (grade 1-5)
2005	Drought
2004	gravity fed-water system established by World Vision
2004	Dig Lowland rice and fish pond for people by Cesvi of WorldVision
2006	Electricity available by France Project
2007	Dispensary established
2007-08	Secondary school established

Sa Kuan

Year	Situation
2002	Village established
2005	Disease spread
2005	Road construct- and motorbike available
2006	Drought-
2006	Grocery available-
2007	Electricity by solar
2008	Gravity fed-water system establish
2008	Primary school establish from Grade 1 -5-
2010	Village hall established

Houay Ha

Year	Situation
1960	Village established with 30 households

Houay Tho

Year	Situation
1978-79	Village established with 70 households
1988	Village burnt down leading to some people migrating to other places
2004	Increasing number of people moving in
2007	Village re-established with 52 households
2005	Primary school established offering 1-2 grade class
2007-08	Primary school starting a grade 3-4 class
2009	Primary school starting a grade-5 class
2010	Gravity fed-water system built

Phak Bong

Year	Situation
2000	Road constructed
2002	Village established
2003	Grocery shop installed
2005	Some houses built with zinc roofing and equipped with TV/ DVD and motorbikes
2006-07	Cars/trucks available
2002	Primary school built
2004	Gravity fed-water system built
2008	Mobile phone signal available

Phak Hok

Year	Situation
1975	Village established
1978	Primary school established
1983	Village officially established with its own stamp
2001	Drought
2002	Village road manmade
2002	Rice bank established by (Cesvi) WorldVision

Phak Hok (*continued*)

Year	Situation
2003	Gravity fed-water system established by World Vision
2004-05	Road upgraded and connected with other villages
2005	Cars/trucks available
2006	Grocery shop established
2008	-Flooding causing hardship / food shortage -Motorbikes available
2009	Kindergarten established
2010	Primary school established
2010	Disease outbreaks caused death of livestock
2010-11	Electricity (solar panel) available
2011	Toilet use campaigned
2012	Television & mobile phone signal

Hua Meuang

Year	Situation
1952	Village established
1986	Primary School established
1986	Drought
1988	Disease outbreaks
1992	Village officially established with its own stamp
2000	Road constructed
2002	Grocery shop
2005	Televisions available
2006	Motorbikes available
2007	Gravity fed-water system established by World Vision Mobile phone signal available Rice bank established by (Cesvi) WorldVision
2008	Flooding causing hardship / food shortage Toilets made available for people use

Houay Khing		Houay Tho		Phak Hok (*continued*)	
Year	**Situation**	**Year**	**Situation**	**Year**	**Situation**
2003-04	Road constructed	2003	Gravity fed-water system established by World Vision	2010	Cars/trucks available
2004	Bicycles available	2004-05	Road upgraded and connected with other villages	2011	Electricity made available
2009	Drought	2005	Cars/trucks available		Disease outbreaks
2010	Gravity fed-water system built by GAP project	2006	Grocery shop established		
2010	Mobile phone signal reached	2008	-Flooding causing hardship / food shortage -Motorbikes available		
2011	Flooding caused hardship / food shortage	2002	Rice bank established by (Cesvi) WorldVision		

Appendix 3: Historical Events Taking Place in HK and SC Clusters by Village (*continued*)

Tad Thong		Houay Si Yua		Houay Dong	
Year	**Situation**	**Year**	**Situation**	**Year**	**Situation**
2005	Village established	2001	Village established & village's hall established with less households moving in	2000	Village established
2006-07	Road constructed	2001	Village bridge constructed	2001	Primary school established
2006-07	Mobile signal reached	2002	Village officially established as having more households (as many as 82) & thus being eligible to have its own official stamp	2002-03	Houses built with permanent (zinc) roofing or tiles replacing typical huts
2007	Motorbikes available	2004	Road constructed and motorbikes available	2004	Televisions and tractors available
2008	Cars/trucks available	2006	Drought	2005	Gravity fed-water system established by World Vision Rice fields made available to 11 families by CESVI
2008	Had primary school	2007	Mobile phone signal available	2005	Water turbines (*nam yord*) available
2008	Community had television	2008	Rice bank established by (Cesvi) World Vision	2006	Drought
2008	Heavy raining made people were in difficult situation to find food.	2011	Gravity fed-water system established with WorldVision support	2007	Toilet use campaigned and built Motorbikes available Village hall constructed
2009	Drought	2012	Toilet use campaign and constructed		
2010	Gravity fed-water system established by World Vision				
2010	Disease outbreaks				
2012	Rice fields allocated with TABI support				
2012	Disease outbreaks				

Annex 4: Collection Time of Some Identified Crops and NTPFs in 10 Target Villages

Name of Crops and NT FPs	Month												Cluster Houay Khing					Cluster Sop Chia				
Crops	1	2	3	4	5	6	7	8	9	10	11	12	**HK**	**SK**	**HH**	**HT**	**PB**	**PH**	**HM**	**TT**	**HSY**	**HD**
Upland rice													3-12	4-11	2-12	2-12	3-12	3-11	3-12	3-12	3-11	3-11
Maize													3-12	3-8	2-10	2-10		6-9	3-12	6-12	3-12	6-9
Cassava													4-12	2-5	1	5-12			4-2	6-12		5-12
Banana															4-5	1-12		6-2	5-12	1-12	1-12	1-12
Jobs tear													3-12						3-9	2-12	1-12	
Ginger																		3-6	5-12	7-11	6-12	6-1
Sesame													3-10							5-9	3-12	6-12
Vegetables (mak kheau, mak ton…)															5	5		4-12	3-8	7-10	6-10	5-11
Vegetables (chilli, eggplants,…)																		3-6	2-9	6-12	5-10	5-7
Roots (taro, sweet potatos,…)														1-11						6-1	1-12	
Sugarcane																					4-10	
Pieapple																						1-12
Mak Nam Maan (e.g. jatropha)																		1-12	6-9	6-9	6	1-12
Teak																						1-12
Coffee																			3-6	1-12		
Forest Products (NT FPs)																						
Douk Deua													9-11	1-2				9-6	1-12		12-4	
Broom Grass													2-3	4-5				2-4	6-3		2-4	10-11
Bark *Peuak Meuak*													1-12	1-12				10-4	3-7		4-5	8-12
Bamboo Worms (*Mae*)													6-9	9-10				9-10	8-10		10-12	10-11
Bamboo Shoots													6-11					6-8	6-10		7-10	5-7
Paper Mulberry (*Posa*)														5-6				5-7	4-6			5-7
Wild Vegetable (*Pak Waan*)														1-12				5-8	1-12			5-7
Wild Vegetable (*Pak Nao*)																		3-7	3-7			5-7
Wild Mushrooms (*Hed Deng*)																		7-10	6-9		8-9	6-7
Wild Ginger													1-12									
Sugar Palm Seed (*Mak Tao*)																			1-12		10-12	1-12
Cardamon														9-10								8-9
Rattan																						6-12
Sakaan																			1-12			1-12

Source: Data obtained from the meetings held at the target villages in 2 clusters (October 2012)

Developing livelihood and capacity development strategies for Houaykhing Village, Luang Prabang Province, LAO PDR

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Summary

This report has been prepared based on recent socio-economic study carried out in Houaykhing village of Luang Prabang Province. The main objective of the study was to assess the current socio-economic situation of the village and to develop sustainable livelihood strategies. Participatory method was applied to gather information from the village. Formal and informal discussions were made with individuals from Hmong and Khmu ethnic communities, representing gender and individuals with or without paddy fields. A workshop was also carried out to explore their interests and assess their capacities. In the final stage of the study, discussions were made with specific interest groups who would be willing to adopt changes in their agricultural practices in the future.

The Project Cycle Management (PCM) tool was used to assess the present situation of the village. The study found that forest concession, shifting cultivation, forest encroachment for agricultural land expansion, uncontrolled livestock grazing in forests and fuel wood based energy for cooking and heating were the major drivers of deforestation. No forest management activity exists in the village except the recent zoning enforcement that has divided village forests into production, conservation and protection forests. The zoning regulation restricted villagers to access in the conservation and protection forests. However, some villagers said that the zoning regulations are not strictly followed as the majority of them don't have options but to expand their fallows for rice production which is the only or major livelihood option in the village.

Shifting cultivation is not an isolated problem but is the results of many other root problems exist in the village. It is a traditional and subsistence agricultural practice which doesn't involve any land management activity. Moreover, lack of enough labors and irrigation facilities have forced people to rely on shifting cultivation for their livelihoods. Similarly, lack of market system for agricultural products has discouraged people to produce fruits, vegetables and other cash crops in large scale, which have great market potentials.

After assessing the current situation, it is concluded that the complete abolishment of the current slash and burn practice is not a feasible option. A phase wise and gradual approach should be adopted. In the short run, the focus should be given to improve the livelihood

condition of people by improving the current agricultural practices and developing agricultural market system. In the long run, people should be encouraged to adopt permanent agriculture system with intensive farming by applying scientific land use and management practices. Similarly, the current shifting cultivation practice has to be gradually improved by improving cultivation practices such as soil management, fertilization, agro-forestry and integrated cropping. Villagers should be encouraged to cultivate market potential cash crops such as coffee, tobacco and mulberry trees in the old fallows to maximize income from their farmland. In the long run, agricultural re-zoning should also be applied to consolidate scattered lands with clear land tenure policy. Village market and credit systems should be developed to increase productivity and sales of the agricultural products.

1. Introduction

1.1 Background

Lao People's Democratic Republic (PDR) has the highest proportion of forest in Southeast Asia. Forests have been an essential part of the national economy and rural livelihoods in Lao PDR with wood exports accounted for 34%of national exports in 1998 (World Bank, 2001[1]). Forest is the source of food, shelter and energy for more than 90% rural people in the country. Non timber forest products have been the major source of household income in rural Laos accounting for almost 50% of annual rural household income (Duangsavanh et al. 2002[2]) and providing a source of food.

However, the forest cover has declined rapidly since last few decades from 49% coverage in 1982 to 41% in 2002. Shifting cultivation and forest concession are regarded as the main causes of forest degradation in the country. To combat the deforestation problem, the Lao government initiated policy reform in natural resource management in the early 1990s which was officially known as Forest Allocation (LFA) policy (Fujita and Phanvilay, 2009[3]). The main objective of the policy was to improve productive use of land in rural areas by minimizing environmental degradation and controlling the expansion of shifting cultivation in the upland areas. Demarcating village boundary with clear land use classification, transferring resource management responsibilities to a village committee and issuing temporary land use certificate to allocate agricultural and degraded forest lands to individuals were the major components of LFA policy (Fujita and Phanvilay, 2009).

With the emergence of REDD+ under the UNFCCC, Lao PDR established a REDD task force in 2008 under the assistance of JICA to develop its national strategies. REDD plus activities in Lao PDR are expected to reduce deforestation, promote forest management and contribute to mitigate global warming by reducing emissions from deforestation. In order to

[1] World Bank (2001). Lao PDR: Production forestry policy. Status and issues for dialogue, Vol. I. Main report.

[2] Duangsavanh, L.,Bouahom, B.and Raintree, J. (2002). Country review, Lao PDR. **In** X. Jianchu and S. Mikesell (eds.) Landscapes of diversity, the third Mountainous Mainland South East Asia (MMSEA) conference proceedings, pp79–100. Lijiang, China: Yunnan Science and Technology Press

[3] Fujita, Y. And Phanvilay, K (2009) land and forest allocation in Lao PDR. Comparison of case studies from community based natural resources management research. Soceity and Natural Resources, 21:120-133.

facilitate REDD plus, JICA has been implementing a project "Participatory Land and Forest Management Project for Reducing Deforestation (PAREDD)" project since 2009 including Validation and Registration on REDD plus project. Houaykhing village cluster of Phonsay District, Luang Prabang Province has been considered as a target area of the project.

1.2 Scope of the study

The PAREDD plus has identified socio-economic issue as a major component of the project as it has direct link with current land use practice and deforestation in the country. Within the framework of project scope, the main goal of the study was to assess the current socio-economic situation of the Houaykhing village and to develop alternative livelihood strategies to reduce deforestation and forest degradation. Specifically, the study aimed to achieve the following objectives;

(i) to identify the major drivers of deforestation in the target villages,
(ii) to assess the current socio-economic situations,
(iii) to identify the current land use practices and their links with socio-economic and deforestation in the study area,
(iv) to develop alternative livelihood strategies based on natural and human resources potential, and
(v) To identify key areas of short and long term project interventions.

Capability approach was applied to assess and develop the livelihood strategies. Specifically, the assessments were based on

(i) Natural resources potentials such as; (a) the current land use and productivity (what they have currently?) and (b) the potential land use and productivity (what they can have?).
(ii) Human resources potentials such as (a) what are they doing currently?, (b) what can they do more?, and (c) what are they actually interested to do?.

1.3 Methodology

Participatory method was applied to gather information from the village. The data collection involved villagers throughout the process. The information was collected in three steps i.e. Individual interview; workshop and group discussion. The first step was formal interviews with villagers. Individuals from Hmong and Khmu ethnic communities, representing gender and individuals with or without paddy fields were selected for interviews. Interviews were carried out using checklist in informal setting so as to provide villagers comfortable environment. The interviews were mostly focused on assessing current livelihood activities, problems related to current livelihood activities, forestry situation and suggestions for alternative livelihood options. Based on the interviews, a list of alternative livelihood options was prepared, which was evaluated during a workshop conducted in December 18 to 21, 2012. A total of 22 participants from four villages attended the workshop representing both gender and ethnicity. The workshop primarily focused on assessing the interests and capacities of the participants to adopt alternative livelihood options. The results of the workshop have been provided in Annex A. In the final stage of the study, group meetings were carried out with specific interest groups who were willing to adopt changes in their agricultural practices and livelihood options in the future.

A Project Cycle Management (PCM) tool was used for the analysis of the present situation of the village. PCM approach includes problem analysis, objective analysis and strategy development. PCM has been used frequently for situational analysis and project development by many development organizations including JICA and GTZ.

2. Current situations in the target village

2.1 Demography and general socio-economic condition

Table 1 provides the demography of Houaykhing village. The village has 223 households with the total population of 1477 and the average family size of 6.6. Khmu constitutes the highest number of HHs (116) with total population of 704 and average family size 6.10; followed by Hmong community with 96 HHs and 715 population and Lao Lorum with only 11 HHs and 49

populations (average family size 4.45). The total number of labors availability in Khmu, Hmong and Lao Lorum communities are 240, 180 and 17 respectively.

In terms of social activity and leadership, Khmu ethnic community holds the highest number of position in the village (53.8%) which includes position in village's various groups, employment in school etc. followed by Hmong community (25.6%) and Lao Lorum (20.6%).

The village has only eight business owners, of which four of them are from Hmong community. The average annual cash income is the highest among Lao Lorum community (8.5 million Kip) followed by Hmong (5.5 Million kip) and Khmu communities (3.75 million kip).

Table 1: Demographical structures of the Houaykhing village

Ethnic groups	**Total number of households**	**Total population**	**Average family size**	**Farm labor availability**	**Positions held in the village**	**Number of business owner**	**Average cash income (Million Kip)**
Hmong	96	715	7.5	180	10 (25.6%)	4	5.5
Khmu	116	704	6.1	240	21 (53.8%)	2	3.75
Lao Lorum	11	49	4.45	17	8 (20.6%)	2	8.5
Total	**223**	**1477**	**6.6**	**437**	**39**	**8**	**4.5**

2.2 Agricultural sector

2.2.1 Shifting cultivation

Slash and burn has been the predominant type of agricultural practice in the target villages. The average numbers of fallow owned by each family is about three and the size of each fallow is about one hectare. Currently there are 661 fallows owned by the villagers, occupying about 695 ha of land (Table 2). However, these figures were based on estimation provided by the villagers and may differ from actual possessions they have, as the villagers tend to reveal only the official figures to comply with the recent zoning rules of the village.

The study found that shifting cultivation is not an isolated problem but is associated with many social and economic development issues in the region. Traditional cultural practice, lack of knowledge on improved agricultural system and permanent agriculture, lack of irrigation facility,

lack of clear land tenure policy, and lack of technical inputs from concerned organization are found to be major reasons for such practice.

Table 2: Agricultural land and production in the village

	Hmong	Khmu	Lao	Total
Total number of fallows (by each ethnic group)	294	352	15	661
Average number of fallows (by each ethnic group)	3	3	1.4	2.97
Number of paddy field owners	31	16	1	48
Total size of paddy fields	24.1 ha	11 ha	0.5	35.6 ha
Number of families with rice sufficiency (12 months or more)	81 (84%)	51 (44%)	8 (73%)	140
Number of families with rice deficiency	8 (8.3%)	65 (56%)	3 (28%)	76
Number of families with rice deficiency more than three months	2 (2.1%)	47 (40%)	1 (9%)	50

The majority of villagers responded that slash and burn is a labor intensive and difficult practice and they are ready to switch to an improved agricultural system if appropriate technical and financial inputs are provided. The villagers also acknowledged the fact that the slash and burn is not a sustainable practice and they would not be able to sustain their livelihood with such practice in the long run as the practice involves extensive land use with intensive labor inputs and poor land productivity. Moreover, due to recent zoning enforcement, the villagers are required to limit the number of fallows to three, which means they have to rotate and re-cultivate the fallow once in three years. According to villagers, the productivity of the three years old fallow is significantly lower, sometime 50% lower than the newer fallows. Generally, villagers prefer five to seven years rotation to get the better productivity. Therefore, if the villagers follow the zoning rules strictly, their total rice production is going to be reduced significantly impacting their livelihood situation unless they switch to an alternative agricultural practice to maintain or raise their productivity and income.

Generally, shifting cultivation is considered as a destructive agricultural practice having significant environmental impacts which leads to the destruction of forests, soil erosion, loss of soil fertility and degradation of the overall natural environment. The problems are associated with the removal of vegetative cover and the continuous cultivation without adequate soil management in erosion prone landscape. Some of the features of slash and burn in Houaykhing village are;

- Highland rice variety is well known for its rich taste and has higher market price, which encourages people to produce highland rice in steep slope using slash and burn practice. Some farmers also grow vegetables, chilli and NTFPs in the fallows.
- The majority of villagers used to have more than five fallows with the fallow period ranging from 5 to 7 years. However, the recent zoning rules have restricted the total number of fallows to three which may significantly impact the majority of the villagers.
- The most of the fallows, especially those of Khmu families, are distant from their home. The majority of these fallows are inaccessible to motor vehicles and may require two to three hours walk to reach the plots.
- The most of the fallows are located in gentle to steep slope lands (with slope gradient more than 70%) and are highly vulnerable to soil erosion.
- As the fallows are distantly located and scattered, it is difficult to apply group farming system or to establish cooperation for labour exchange. It has also discouraged farmers to produce multiple crops due to difficulty in crop transportation.
- The agricultural practice is highly primitive and unscientific without any application of soil management, fertilizer and irrigation system. Therefore, the fallow period may or may not be sufficient to restore soil fertility since the minimum period required to restore the soil fertility varies by soil type, climate and land management.
- The fallows are generally not suitable to re-cultivate after three years unless proper soil management practices were applied to conserve soil and maintain the soil fertility. In such circumstances, villagers revealed that the only option they have either to expand the size of their fallows by encroaching the forests or to look for a new fallow in the production forests.
- Shifting cultivation prevails here as the practice does not need a high level of management or external inputs and the villagers think that it is the easiest way to cultivate rice in the hilly areas.

Some of the adverse environmental impacts of shifting cultivation noted during the field survey were;

- Quality and extent of forest are declining: The most of the villagers agreed the fact that the slash and burn practice has severely affected the extent and quality of forest in the village.
- The productivity of cultivated land is declining: According to elderly and experienced farmers, land productivity is declining even if the fallow periods are maintained. The recent trend to reduce the fallow period has accelerated the process of declining productivity.
- Soil erosion is common in fallow areas especially those located in steep slope.
- Some villagers also reported that water flows from the sources are declining compared to past few years.

2.2.2 Situation of paddy fields/permanent agricultural land

Beside slash and burn, a limited number of farmers own paddy field, especially those famers whose lands are located close to the permanent water sources. The sizes of these paddy fields are generally very small, ranging from 0.3 ha to 2 ha. However, they are not being managed and utilized to its full capacity. The most of the paddy fields are cultivated only during rainy season for rice production and are left without cultivation during the winter. As the most of the farmers get their rice production from slash and burn plots, they are reluctant to adopt improved agricultural practice in paddy fields.

One experienced farmer who has been practicing rice cultivation in his paddy field said that though the development of paddy field is difficult and labour intensive initially as one needs to develop terrace and irrigation system, it is much easier and less labor intensive than the slash and burn practice once the paddy field is developed. Another farmer (Mr Buichunga) who has been cultivating highland rice in the paddy field told that his rice productivity is almost same every year from his paddy field. He also told that the highland rice cultivated in paddy field is equally tasty as that of cultivated in slash and burn fields.

2.2.3 Rice sufficiency

Despite considerable size of land holding, more than 50% of villagers indicated they don't have enough rice for 12 months and majority of them are from Khmu community (56%) (Table 2). These people fulfill their daily needs by borrowing rice from rice bank, or from relatives and friends. They generate income from off-farm employment and selling their livestock. Rice deficiency is expected higher in the coming years due to increasing family size and zoning law enforcement.

2.2.1 Production of other cash crops

Based direct observation in the agricultural field and discussion with people, it can be inferred that both climatic and edaphic factors of the village are suitable to grow a variety of cash crops such as vegetables, fruit trees and NTFPs. Villagers are currently growing banana, mango, jack fruit, papaya, mango, tobacco, coffee and many types of vegetables in their home gardens for their personal use, which indicates that these cash crops could potentially be grown commercially to generate cash income for villagers.

In summary, the noted issues in agriculture sector are;

- Lack of knowledge on farm management: The majority of the villagers said that they lack knowledge on improved farm management system such as terrace making, maintaining soil fertility, water harvesting and irrigation, agro-forestry etc. As a result, they continue farming in steep slope without any soil management which would contribute to soil erosion and loss of moisture readily making fallow unsuitable to cultivate in the next season.
- Less intensive and less integrated farming system: Mono-cropping is a common practice in the village. People cultivate rice and leave fallow uncultivated in the winter season. In addition, livestock is not a part of farming system which would provide compost manure that could be used to maintain soil fertility. Similarly, agricultural land is not optimized

for cultivation such as some of the leguminous crops which could be integrated with rice have not been practiced.

- Limited water resources for irrigation: Some villagers who were interested to develop paddy field told that they were not able to do so due to lack of water sources or lack of infrastructure for irrigation system. Only a few numbers of farmers have access to irrigation facility which was initially developed by CESVI.
- Labor availability: Lack of labour is said to be one of the reasons for not practicing intensive farming. The village doesn't have group farming or labour exchange system and mainly depend upon family members for agriculture labor. Moreover, the distant fallows consume considerable time of family members for farm production.
- People's mindset: It is also said that people's mindset is also one of the important factors influencing agricultural practice in the village. As subsistence agriculture with slash and burn system has been the practice from their ancestor in the village, people feel comfortable and convenient following the tradition. Generally they would not like to risk the uncertainty by applying new technique unless they are convinced that it would benefit them significantly.
- Lack of technical inputs: There are no agricultural inputs from concerned institutions. Farmers hardly get any technical and material supports for the improved agriculture practice.

2.3 Livestock

Livestock is an important part of economy of the village which has a promising existing market with growing market price. About 43 % of villagers own large size cattle (cow and buffalo), 60 % of them own pig and goat and more than 80% of them own chicken and ducks (Table 3). Hmong people have higher average number of livestock than Khmu communities. However, livestock raising technique is very primitive and unscientific. Large size cattle (cow and buffalo) are raised freely in the forest contributing significantly to forest degradation. Uncontrolled and free grazing in the forest has also caused higher mortality of cattle due to possible contamination with the diseased wild animals.

Table 3: livestock in the Houaykhing village

Livestock possessions by villagers	Hmong	Khmu	Lao	Total
Number of families with cow and buffalos	69	28	0	97 (43%)
Average number of cow/buffalo per family	6	3.4	0	5.24
Number of families with pig and goat	62	67	3	132 (59%)
Average number of pig and goat per family	10.7	3.5	12	7
Number of families with Chicken/ducks	88	87	7	182 (82%)
Average number of chicken and ducks/family	32	14.6	22.3	23.5

2.4 Forestry sector

Forest management activity doesn't exist in the village. Villagers have free access to forest to collect forest products as they require. Beside slash and burn practice, forest encroachment is also common in the village to expand agricultural lands.

Recently forest zoning system has been applied and implemented in the village. According to zoning regulations, forests are divided into three categories i.e. utilization forest (2487.24 ha and 10 areas), protection forest (2358.6 ha and 6 areas) and conservation forest (4.4 ha and 2 areas). According to zoning regulations, villagers are allowed to collect necessary forest products freely from production forests except for restricted trees and non timber forest products specified by PAFO or DAFO, which, however, are not clearly stated in the regulation. The main objective of conservation forest is to protect wildlife, local ecosystem and biodiversity. Except for unrestricted NTFPs, villagers are not allowed to do other activities in these areas. Protection forests are allocated to prevent soil erosion and to protect water resources in the village. Villagers are allowed to collect unrestricted NTFPs and cut softwood and small trees to build their houses from protection forests.

During the survey, the majority of villagers indicated that they have heard about the zoning enforcement in the village. However, the most of the respondents implicitly said that zoning regulations are not followed strictly as forest products are still being collected from other forests and slash and burn practices are still continuing in utilization and other forests. People who have followed the zoning regulations have suffered severely as they are restricted to three fallows causing increasing months of rice deficiency. Khmu people are mostly suffered from zoning enforcement than Hmong or Lao Lorum.

Non timber forest products (NTFPs): The forest has rich NTFP resources. The local people collect many species of NTFPs both for domestic consumption and for sale. The common NTFPs are bamboo, dukduwa (elephant yam), wild mushroom, rattan and many types of wild herbs. NTFPs have good market in the nearby cities with their ultimate destination to China, Thailand and Vietnam.

2.5 Market sector

The one of the obvious constrains for income generation in the Houaykhing village is the lack of market system for agriculture and forestry products. Although the village has very high potential to commercially produce vegetables, livestock, fruits, NTFPs and many other cash crops, there is no existing market or direct linkage with market system to sell these products. Villagers largely depend upon middlemen to sell their products, who control both demand and price of the products. The market uncertainty has also discouraged people to grow cash crops in large quantity. Similarly, villagers had experiences of middlemen who asked villagers to produce some crop in large quantity (such as zinger) and bought just once and never showed up again. Therefore, villagers are also very cautious about producing any products in large quantity.

We carried out market study in Luang Prabang city for NTFPs and agricultural products. We found that chopstia, corn, dukduwa, mulberry paper, coffee, tobacco and bamboo products have good market potential. The fresh fruits and vegetables can also be sold through appropriate market channel. However, the market price of these products seems to be controlled by Chinese buyers. For example, the price of chopstia was 4000 kip/kilo two years ago and decreased to 2000 kip/kilo recently.

Beside price uncertainty, the steady supply of good quality products can be a challenge for the villagers. A bamboo entrepreneur who sells bamboo furniture and handicrafts in Luang Prabang city told us that there is a good demand for bamboo handicrafts both from tourist and local hotels. However, the issue remains on the supply of both quality and quantity of the products, when there is a demand for large quantity. Due to poor quality control, they hardly get uniform sizes and dimensions of the products which have hurt their business. The entrepreneurs

suggested developing quality control system for locally developed products to promote both local and international markets.

2.6 Access to finance

The most of the villagers indicated that they don't have easy access to finance to invest in business or agriculture sector. However, according to policy bank located in Phonsay district, the bank has a clear policy to provide short or long term loan to the poor farmers for investing in livestock and business. The bank aims to contribute to poverty reduction in the rural areas and provides loan to 47 districts focusing on the agricultural productivity especially to support agriculture, forestry, handicraft and industries. Bank provides loan to both individual and small group of farmers. However, individual burrower requires collateral for the loan. Similarly, the bank has certain criteria that the interested burrowers need to meet to be eligible for the loan such as bank statement for the last two years, collateral etc, which may not be practical for poor families. The annual interest rate varies from 7% for short term (1 year) to 10% for medium to long term.

2.7 Housing and energy

Bamboo and wood are the common traditional building materials in the village. About 90% of the villagers live in poorly made bamboo houses. As villagers don't have knowledge on building higher quality and permanent bamboo house, their houses need to be maintained regularly, at least once in two to three years. Their housing condition draws serious concern on poor living condition, health as well as pressure on bamboo forests.

Similarly, wood is the only energy source for cooking and heating in the village. Although, firewood collection is free in production forest and is easily available so far, the use of fire wood is not sustainable option as it is energy inefficient, unhealthy and will contribute to deforestation in the long run. Development and promotion of efficient sustainable energy option is highly recommended.

2.8 Local knowledge and expertise

In spite of various issues and problems in agriculture and natural resources sector, many useful knowledge and expertise exist in the village. It was observed that the most of the villagers have traditional knowledge on growing fruits and vegetables, though mostly they do for domestic consumption. The majority of Khmu people are adept in bamboo crafting and weaving (Table 4). Hmong people are skillful in embroidering, sewing and iron works. Some of them have knowledge on coffee plantation, traditional medicine, terrace making etc. Such local knowledge could be promoted and transferred locally through proper extension education activities.

Table 4: Available expertises and skills in the village

	Khmu	**Hmong**	**Lao**	**Total**
Bamboo crafts/ weaving	28	4	1	33
Construction	13	0	0	13
Fishnet	1	0	0	1
Iron works (smith)	5	8	0	13
Mechanics	1	6	2	9
Wood works	1	0	1	2
Embroidering	0	14	0	14
Nursing	1	0	1	2
Traditional medicine	1	0	0	1
Driving	1	8	0	9
Sewing	0	6	0	6
Terracing/paddy field making	0	2	0	2
Coffee plantation	0	1	0	1
Other	0	2	0	2
Total	**52**	**50**	**5**	**108**

2.9 Strengths, Weaknesses, Opportunities and Threats (SWOT) of socio-economic and natural resources situation of the village

Based on above analysis on socio-economic and natural resources situations of the Houaykhing village, a synthesis has been prepared using SWOT tool, which is provided in table 5.

Table 5: SWOT analysis of livelihood development options at Houaykhing village cluster

Strengths	**Weaknesses**
• Many high value fruits, vegetable and cash crops can be grown in the village	• Unscientific agricultural practices such as rice cultivation without terrace in steep slopes. Such

which could potentially be cultivated commercially in large scale. Many villagers have already grown many of these high value crops for domestic use. • Some seasonal and year around streams are available in the village that could be used for developing irrigation system. • Regulations for land zoning has been developed and approved by authorities that divides forest lands into three categories: utilization, conservation and protection forests. • According to new zoning rule, each village member has got at least three plots equivalent to at least 1 ha/plot that could potentially be used for permanent agriculture and producing cash crops. • Good existing market for livestock, chilli, dukduwa, coffee, bamboo etc. • Road under construction that would facilitate the marketing of agriculture products in the near future. • Rich forest resources with a lot of high value NTFPs that could potentially be managed and produced commercially (such as dukduwa, bamboo, wild mushroom and several varieties of local herbs)	practice would increase soil erosion and would reduce soil fertility and moisture. • Mono cropping and less optimization of agricultural lands. Villagers cultivate one season only which could potentially be used also for winter farming for some legume or other cash crop species to generate cash income, which would also enhance soil fertility. • Lack of irrigation facility to develop paddy field. • Free livestock grazing in forests has not only contributed to forest degradation but also cattle mortality. • Lack of market system. Villagers are unable to sale many of their high value crops. • Lack of easy credit facility to initiate agro business. • Existence road condition is not good enough for regular transportation. • Lack of forest management plan and activity leading to forest degradation. • Lack of local knowledge on forest resources management. • Lack of enough labor availability for intensive agriculture as they depend upon family members for agricultural labor. • Peoples' cultural mindset that rice is only the crop to sustain their livelihood and the slash and burn is the easiest way for rice production. • Scattered agricultural lands making difficulty for irrigation and to implement land development plan. • Land zoning regulations are not strictly followed by villagers. • Wood based energy system may lead to more forest destruction in the future.
Opportunities • Developing markets for existing agricultural crops (fruits, vegetable and other cash crops) through market promotion strategies which would encourage people to grow alternative crops for cash earning and would discourage slash and burn practice. • Enhancing existing livestock market by introducing improved livestock raising system. • The area is suitable for growing some high value cash crops that have existing market in Luang Prabang such as cassava, coffee, tobacco, bamboo furniture and handicrafts. • The forests of Phonsay district and surrounding areas have rich bamboo forests with several species suitable for construction, weaving, furniture and food. The bamboo forest has not been managed currently but has potential to be managed	**Threats** • Increasing village population may lead to higher demand for lands for agriculture causing more slash and burn in the future. • The promotion of livestock may lead to more forest degradation by allowing cattle free grazing in the forest as villagers don't have culture to confine the cattle in shed or their farm land. • Good market of products may also encourage people to seek more land to make more money for luxury. • Price fluctuations of the products such as chopstia's price went down from 4000 kip/Kg to 2000 Kip/Kg recently. Market prices are generally controlled by the foreign buyers.

and used for livelihood development in the region. • The existing streams can be developed for water storage and irrigation system to develop paddy fields for permanent agriculture. • Policy bank located in Phonsay district is willing to support poor farmers to raise livestock in the rural areas. • Bamboo briquette could be developed to substitute fuel wood, which would provide energy efficient cooking facility and the briquette may have good markets in the city areas as well.	

3. PCM for livelihood development

3.1 Problem analysis

Figure 1 provides the detailed cause and effect relationship among the problems that exist in the village. Forest concession, shifting cultivation, forest encroachment for agricultural land expansion, open access grazing and wood based energy for cooking and heating are found to be the major causes of deforestation in the village. Forest management activity doesn't exist in the village. Although, the recent zoning of the forest has restricted villagers to expand slash and burn plots in the conservation and protection forests, they are still free to collection NTFPs from these forests. However, villagers also said that the zoning rules are not strictly followed as villagers don't have option but to expand their agricultural field for rice production which is the only livelihood option so far in the village.

Shifting cultivation is not a problem itself but was found to be the results of many other root problems that the village have. It is a traditional approach and knowledge that villagers have acquired from their ancestors. Therefore, the majority of them have not been exposed to improved agricultural techniques such as permanent agricultural using rice terrace, integrated cropping, water harvesting and irrigation etc. Similarly, there are no technical inputs from concerned government and non governmental agencies on improved agricultural system.

Villagers also indicated that lack of permanent water sources or irrigation facilities have forced them to depend on upland rice production. The subsistence agricultural practice without land management has significantly reduced the productivity of land, forcing people to look for new land every year for subsistence rice production. Moreover, villagers also fear to take risk switching to new techniques until they are sure that it will benefit them significantly.

Villagers indicated that unavailability of enough labors restricts them to apply intensive agricultural technique, as they largely depend upon family labors. Group farming or labor exchange system has not been the part of their traditional agricultural system. As the community is new, such system has not been established yet. Moreover, the distant and scattered agricultural fields or plots make them difficult to cooperate for the agricultural labor exchange.

Similarly lack of market system for agricultural products has discouraged people to produce fruits, vegetables and other cash crops in commercial scale. Villagers mostly depend upon middlemen to sell their product, which, according to villagers, has not been a reliable system so far.

Livestock is an important source of income in the village and it has a good market so far. However, the livestock raising technique is very primitive and unscientific. Villagers raise livestock freely in the forest without proper care and management. By such practice, villagers are not only losing valuable compost manures that could be sued to fertilize their agricultural land but also are making their livestock prone to various diseases that could be contaminated through wild animals. Villagers have already experienced increasing cattle mortality in the forest.

Figure 1: Problem Analysis

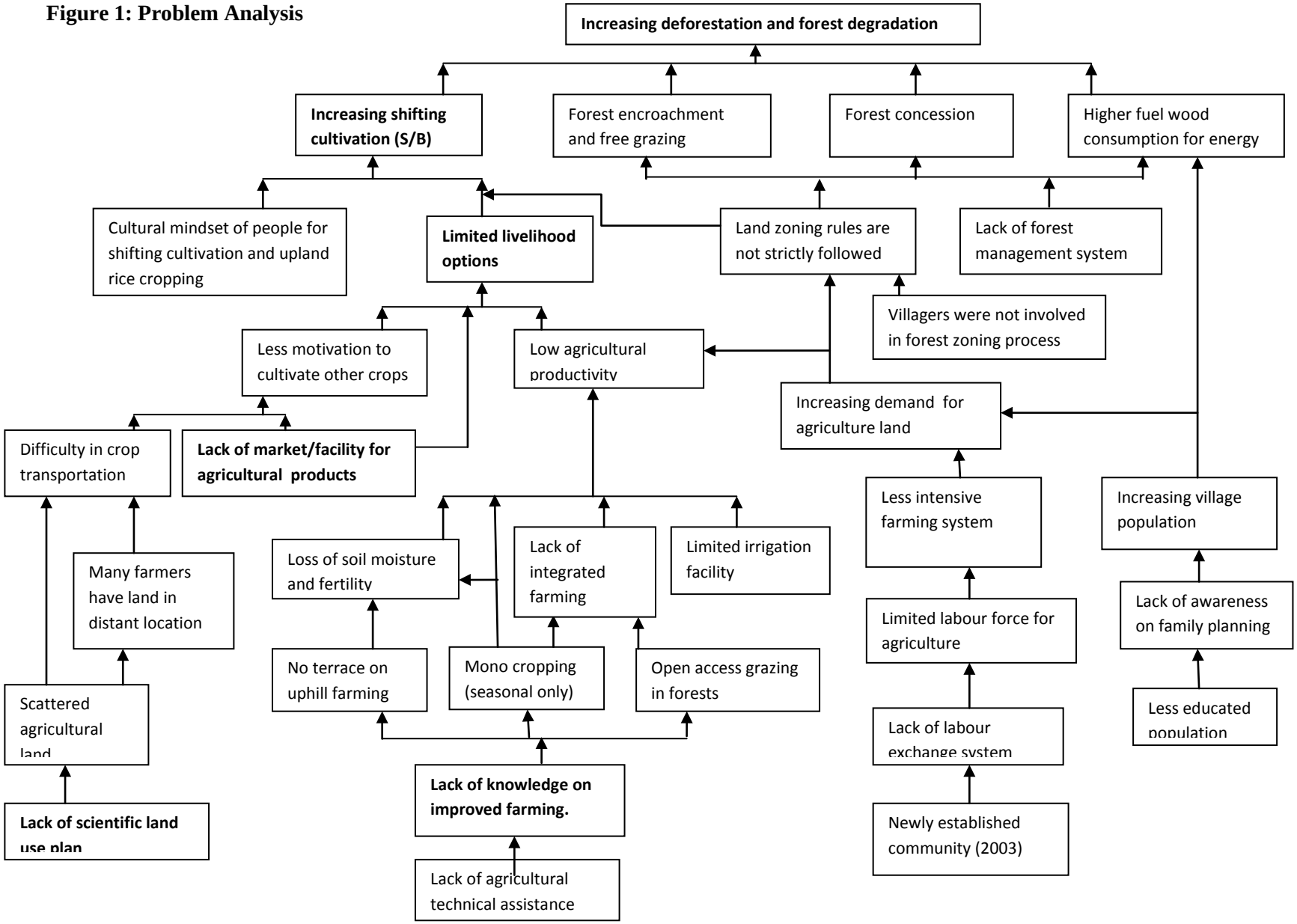
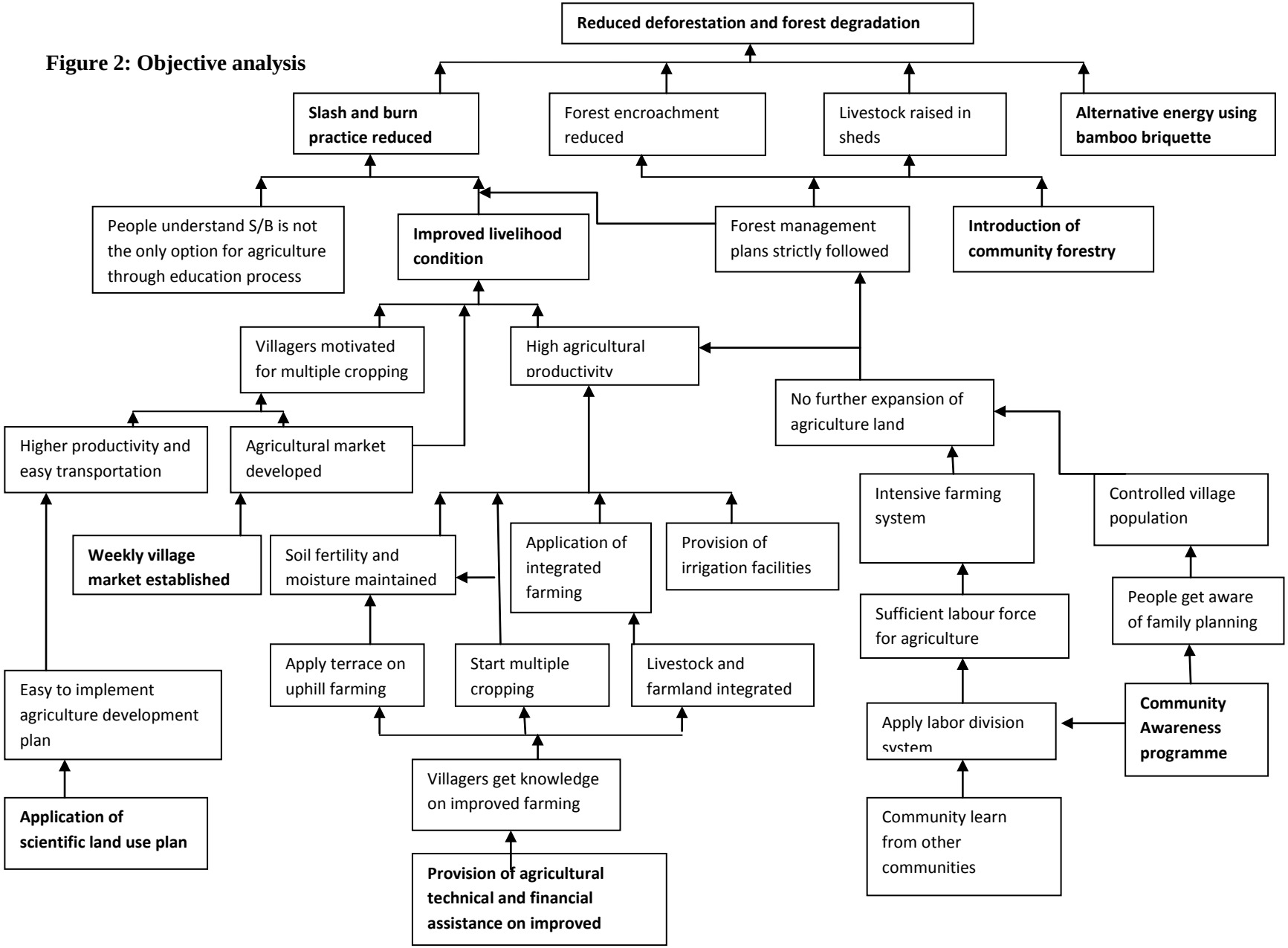


Figure 2: Objective analysis



3.2 Strategies for alternative livelihood

The objective analysis (Figure 2) has indicated some of the important interventions (highlighted in bold) that are suggested to be implemented to reduce deforestation and forest degradation in the village. The analysis showed that scientific re-zoning of land with clear land tenure system, development of agricultural market system, provision of technical and financial assistance on improved agricultural system, community awareness programmes, provision of alternative energy and introduction of community forestry for the better management of forest are crucial both for providing better livelihood options and to reduce the deforestation and forest degradation. During the survey, villagers also indicated their interests in various options that they would like to adopt to improve their livelihood, which are listed in Table 6. The suggested interventions are discussed in details in the following sections. The demonstration livelihood activities were evaluated during the workshop and the final results are provided in Annex A-2. The names of the interested farmers for demonstration livelihood development activities are provided in Annex B.

Table 6: Number of families Interested in different types of livelihood development options

	Khmu	Hmong	Lao	Total
Interests in livestock				
Chicken/ducks	38	24	4	66
Pig and goats	40	13	2	55
Buffalo and cow	16	25	1	42
Introduction of improved livestock raising	6	8	0	14
Interests in improved agriculture				
Paddy field development (Terracing)	8	20	0	28
Development of irrigation system	8	9	0	17
Coffee plantation	16	17	0	33
Bamboo plantation	3	3	0	6
Corn cultivation	2	1	0	3
Cassava	3	1	0	4
Fruit tree plantation	8	6	0	14
Fisheries	0	2	0	2
Other interests				
Weaving	16	13	0	29
Construction training	3	1	0	4
Cooking training	1	0	0	1
NTFP promotion	3	2	1	6
Furniture business	3	0	0	3
Mechanical works	1	7	1	9
Business development	2	10	3	15
Iron works	0	1	0	1
Other	0	2	1	3

3.2.1 Agriculture sector development

After assessing the current situation, it is concluded that the immediate abolishment of the current slash and burn practice is not a feasible option. A phase wise and gradual approach should be adopted. In the short run, the focus should be given to improve the livelihood condition of people by improving the current agricultural practices and by developing agricultural market system. In the long run, people should be encouraged to adopt permanent agriculture and intensive farming system by applying scientific land use and management practices.

While the majority of the villagers have realized that slash and burn is not a sustainable agricultural practice, they have serious concern on immediate abolishment of the practice. They clearly indicated that as shifting cultivation has been the traditional practice and is one of the major sources of livelihood, they cannot imagine their livelihood without it unless they are sure about the alternative livelihoods. They, however, are ready to change the practices towards improved system and gradual phasing out of slash and burn once they are assured that the alternatives will benefit them positively.

The current shifting cultivation practice has to be gradually improved by improving cultivation practices such as soil management, fertilization, agro-forestry and integrated cropping. Such approach will provide adequate time to progressively phase out shifting cultivation through the creation of alternatives such as off-farm employment and increasing production from permanent cultivation. The use of improved soil management to improve soil fertility would permit farmers to increase the period of cultivation and decrease the fallow period, and the introduction of tree crops and new crop varieties would increase the productivity per unit area.

3.2.2 Improved system for livestock raising

Villagers should be encouraged to raise their cattle in shed or confined area either individually or in a group. Especially, they should be encouraged to confine their livestock closer to their rice fields in order to use dung as compost manure to fertilize agriculture land. Stall feeding or grazing in confined areas should be encouraged to avoid forest destruction and cattle mortality.

3.2.3 Commercial farming of cash crops

As aforementioned, several kinds of NTFPs could be produced commercially and marketed for income generation. However, the commercial potential of these products have not been tapped yet. Cash crops should be cultivated as agro-forestry practice to maximize land productivity. The some of the cash crops that have readily available market in the city and could generate significant income to the villagers are discussed below.

(i) Coffee

Coffee is one of the potential cash crops that could be introduced in the village for the large scale commercial production. A few villagers have already planted coffee for their domestic consumption. Coffee plantation would not only provide lucrative income to the villagers annually, would also help reforestation of old fallows as coffee requires shading for its better productivity. More than 60 villagers have shown interests in coffee plantation and 33 of them are already interested to participate in the demonstration coffee plantation.

We discussed with successful coffee entrepreneur Mr David Dale, director of Saffron coffee in Luang Prabang, for the possibility of collaboration to introduce coffee in the Houaykhing village. Mr Dale was highly positive for the possible collaboration to introduce coffee in Houaykhing village. He suggested introducing coffee Arabica, with proper shading and organic fertilization. According to Mr Dale, he purchased fresh coffee at the rate of 4000 Kip/Kilo this year and the price is expected to grow steadily due to growing international market. He also assured that he would be able to buy all the coffee produced by the villagers. According to him, one hectare land could yield 3000 to 10000 kilos of coffee annually. The first harvest starts 2.5 years after the plantation.

3300 seedlings per hectare are required for plantation. Currently, one coffee seedling costs 1000 Kip. Therefore, establishment of village level nursery has been suggested to produce coffee seedlings in large scale. The nursery could also be used for other useful species such as bamboo and fruit trees. TABI has already introduced coffee in few villages in Phonsay district and has a plan to introduce small scale coffee plantation in Houaykhing village. TABI is interested to

collaborate to introduce coffee in the village and to establish a coffee nursery. Similarly, Saffron is also interested to train villagers on organic coffee plantation.

(ii) Tobacco

Tobacco is one of the common crops that many villagers have planted in their backyard for their personal consumption. Tobacco has a well established market in Luang Prabang. We discussed with a tobacco company in Luang Prabang that currently buys tobacco from several villages. They have growing demand for raw tobacco and are highly interested to collaborate with villagers for the commercial cultivation.

The company informed that tobacco has several advantages. This crop can be planted after rice harvesting, making use of land during winter season, would enhance soil fertility, and would contribute to enhance rice productivity. It takes only three months from plantation to final harvesting. One hectare land can yield 6000 Kg tobacco. The current market price varies from 500 to 1000 Kip/Kilo, hence would provide net benefit of 3 to 6 million Kip per hectare. The company said that at least 30 hectare land should be available in the village for the tobacco cultivation and to establish small drying factory at village, which would also provide employment to the villagers. The company provides seeds, technical knowledge and fertilizer to villagers. The villagers would have to provide land and labor contribution only.

(iii) Mulberry plantation, silk production and weaving

The survey indicated that many village women are skillful in weaving works, especially those from Khmu community. 30 women showed interests in building their capacity on high quality weaving works and requested for training and necessary supports for the purpose.

We discussed with Mrs Kommaly Chanthavong, director of Mulberries Company in Phonesavanh city. She is a renowned development practitioner who has dedicated more than 20 years to develop mulberry plantation, silk production and community weaving program and is currently working with more than 600 villagers. She also provides training to villagers for high quality weaving. According to Mrs Kommaly, beside capacity building on high quality weaving, it would be better to introduce Mulberry plantation and silk production in the village as there is a high demand for silk and silk products both in national and international markets. Her company

is also ready to provide necessary training to villagers for both mulberry plantation and silk production and is also interested to buy those products from the villagers.

(iv) Bamboo

Participants of the bamboo workshop reported that there are 13 species of bamboo in Houaykhing village. Of which, Mai Xang, Mai Hok, Mai Por, Mai Bong and Mai Lor are abundantly available in the forests, whereas, Mai Xod, Mai Hia, Mai Pok, Mai Lai, Mai Nor wan, Mai Nor Kom, Mai Nor Lan and Mai Kao Lam are rarely available. Due to lack of management, bamboo resources have been dwindling rapidly since the last few years. Participants also reported that currently they have to travel at least one hour to collect bamboo culms from the forest which used to be less than 15 minutes 10 years back. Bamboo has been locally used for making houses, mat, hat, baskets, fence and trays. About 90% of the houses in the village are made of up bamboo. The results of bamboo workshop have been provided in Annex A.

Bamboo is easy to cultivate and grows profusely and has a very short rotation (3 to 6 years). Villagers should be encouraged to plant bamboo in their homestead gardens and agricultural fields as agro-forestry. Bamboo has a very good market both locally for making houses and small handicrafts and also in Luang Prabang for furniture industries and housing.

The interested villagers should be trained in bamboo cultivation, furniture making and housing. A small to medium size bamboo industry should be promoted locally to commercialize bamboo resource and to provide employment to the villagers. The potential bamboo factories that could be promoted in the village are bamboo furniture, bamboo toothpick, bamboo housing, bamboo mats, bamboo chopstick and bamboo charcoal.

(v) Other crops

Dukduwa, chopstia and cassava are some of the important crops that villagers would like to cultivate in large scale in their fallows. However, market prices of these crops are mostly controlled by foreign buyers and are likely to fluctuate depending upon market demand in China. For example, the price of chopstia dropped from 4000 Kip/Kilo two years ago to 2000 Kip/Kilo this year due to oversupply in the market. However, the price of dukduwa is still steady, about 12000 Kip/Kilo an average.

3.2.4 Forestry sector development

Community forestry should be introduced to initiate forest management activities in the village by decentralizing responsibilities and ownership of forest management to the villagers. Local communities should be involved fully in the preparation of forest management plan, rules and regulations. A local institution such as forest management committee should be established to look after overall forest management activities and to enforce forest management rules and regulations.

The current land and forest management regulations have focused only on rules and restrictions for forest utilization but have nothing about technical aspect of forest management. A thorough capacity building and awareness raising activities are required to build local capacity on technical aspects of forest management such as to prepare and implement a forest management plan systematically to achieve long term goal of forest management.

However, the implementation of forest management plan may affect some villagers negatively especially those who fully depend on forests for their livelihood. For example, the enforcement of the current zoning regulations has impacted some people's livelihood severely. Alternative options should be guaranteed for these people before implementing forest management plan or enforcing forest zoning regulations.

3.2.5 Access to market: establishment of weekly village market

Lack of market was found to be one of the discouraging factors for villager to grow potential cash crops in large quantity. The villagers currently depend upon middlemen to sell their livestock and agricultural products. In order to promote agricultural products, a weekly village market is recommended. Such system has been practised in many countries to promote market for local products. In this system, a particular routine day once a week (generally weekend) in a particular location is set for village market, where all the villagers bring their products for sale. Such system would facilitate direct linkage between villagers and city businessmen, as they

would know when they should come to village for business. Such system would also slowly discourage barter system and would increase cash flow in the village.

Similarly a market information system should be established to provide villagers information on potential saleable products and market prices. This would also facilitate them to choose the right crop to cultivate. In addition, villagers would be benefitted if a truck can be donated to them to transport their products from village to nearby cities as per the market demand.

3.2.6 Developing saving credit mechanism

The most of the villager said they don't have access to credit or financial resources to start new venture, though there is a policy bank that could provide loan for small farmers. They either don't have information about the bank loan or there might be a lengthy administrative process involved to get accepted for the loan. Therefore, a village level saving credit or micro credit scheme would benefit villagers to get easy access to small credits. The mechanism of saving credit scheme varies according place to place and largely depends upon members' decision. However, the mechanism should provide easy access to credit to all the villagers as they require. A saving credit or cooperative board should be formed representing various sector of the village including school, village leaders, ethnic groups, business enterprise, local bank etc. A clear manual and policy should be developed to regulate the saving and credit mechanism. The learning from other micro-credit schemes would be an asset.

3.2.7 Alternative energy using bamboo/wood waste briquette

As an alternative to current energy system which is largely fuel wood based, development of bamboo or wood waste briquette system would be an option. Such system uses any wood or bamboo waste and other waste materials to make briquette. The briquette system is energy efficient, healthy and has also good market potential in nearby city such as Phonsay or Luang Prabang where many restaurants depend on wood charcoal for cooking. Training and installation

of one full carbonized-grinder briquette making system, that produces about 1 ton/hour, would cost about USD 25000.

3.2.8 Local capacity building through skill development training and community awareness programme

Beside improving agricultural system and establishing village market, the project should also enhance local skills by providing various hands-on training and capacity building activities. Some of the training needs identified during the survey are provided below.

- Building improved bamboo house (completed)
- Bamboo furniture and crafting
- Bamboo/wood briquette making
- Weaving
- Improved and intensive farming system
- Improved livestock raising system
- Community forestry/forest management

Similarly, public awareness campaigns and conservation education activities should be conducted to sensitize the rural community to the adverse impact of uncontrolled shifting cultivation and to adopt appropriate alternatives. Various awareness and education programme on forest management and REDD+, family planning and population control, social harmony for group agriculture etc should also be initiated for the overall development of the village.

4. Project Implementation Strategies

Gradual process with active community participation is vital for the successful implementation project activities, especially while working with community whose livelihoods are fully dependent on subsistence agriculture. Phase approach is recommended for the gradual changes in the current practices, to improve local livelihood and to curb deforestation in Houaykhing village

cluster. The development phase should focus on appropriate land use practices for sustainable production which should be complemented by the improvement of existing shifting cultivation practices, integrated livestock farming, horticulture development and small-scale income generation schemes. The following three phases approach should be applied to abolish slash and burn practice in village and to enhance livelihood options.

(I) Phase I: demonstration activities

Based on farmers' interests and needs, a few demonstration activities should immediately be implemented in order to assess their effectiveness in the long term development plan. The demonstration activities would also encourage and motivate farmers to actively participate in the project plans and activities. The list of farmers who are interested in one or more demonstration activities are provided in Annex B. The following demonstration activities are recommended which are based on the interests and suggestions from villagers.

- Manage and improve the cultivation practice in the existing fallows to maintain soil quality and to increase land productivity through agro-forestry, terracing in slope lands, multiple cropping and intercropping with legume crops etc.
- Provide necessary supports to existing paddy fields or interested farmers who would like to develop paddy fields during the demonstration stage. For example, support for constructing small dams in the existing water sources which could potentially irrigate a few paddy fields.
- Encourage to apply improved livestock raising system (in sheds or confined areas). Provide necessary inputs and supports to construct shed or fencing system and to cultivate improved grass variety.
- Increase labour efficiency in agricultural activities by encouraging villagers to initiate group farming or establishing cooperation for labor exchange.
- Encourage and build capacity on the cultivation of cash crops and NTFPs. Provide necessary inputs and techniques such as seeds and fertilizer for the cultivation of such crops. Currently, coffee, tobacco, mulberry, bamboo handicrafts and dukduwa have potential market opportunities which could be grown and pre-processed at village level,

providing employment opportunities for the farmers. The concerned entrepreneurs in Luang Prabang are interested to cooperate with villagers to promote those cash crops.

- Specific capacity building activities should be conducted for participating farmer groups in the specific demonstration activity. For example, the coffee group should be provided training on coffee plantation and pre-processing.
- Develop market for agricultural products. A weekly village market should be initiated to promote market for village products and to develop linkage with city market. A necessary supports (such as infrastructure and vehicle) should be provided to village to establish weekly market.

(II) Phase II: evaluation of demonstration activities

The demonstration activities should be evaluated once a year to assess their overall effectiveness on land productivity, people's livelihood and forestry sector. Evaluation should be based on capability approach to assess people's capacity to adapt new practices and their responses towards the outcome of the demonstration activities. The evaluation process should closely involve participating farmers in order to get real and clear pictures of impacts of demonstration activities. The long term plan should be developed or revised based on the evaluation report of demonstration activities.

(III) Phase III; Long term activities

Based on the evaluation of demonstration activities, the long term strategy should be developed or revised and implemented in agriculture sector to abolish slash and burn practices. However, the following actions are suggested to consider in the long term strategies'

- Scientific zoning of agriculture land should be done in order to consolidate scattered fallows. This would make easier to implement agricultural development activities such as establishment of irrigation system, to make easy access to all the farm lands and to increase labour efficiency. The upland farms in steep slope should be moved to lower to middle land to reduce soil erosion and labour requirement.

- The strategic agricultural development activities should be implemented such as development of irrigation system, development of agricultural sub-zoning to categorize land for different crops etc.
- Land tenure policy should be clear and legalised to provide clear land title and ownership to farmers. There should be clear and legal mechanisms for land ownership transfer. All the agriculture lands should be registered with the local and district authorities with exact size, location and title information.
- Once villagers learn the improved agricultural practice and start increasing their land productivity through demonstration activities, they should be encouraged to practise permanent agriculture system. Initially, villagers may apply combined practises of both slash and burn and permanent agriculture. Once they are ensured that permanent agriculture can sustain their livelihood, they should be discouraged to cultivate rice in old fallows. In addition, there should be both legal and incentive measures to motive farmers to improve and maintain physical qualities of their land.
- Intensive farming system should be adopted in permanent agricultural land. Farmers should be encouraged to diversify crop production to satisfy cash income needs from permanently cultivated land and while they may continue to get subsistence needs from shifting cultivation until their needs are not fully met from permanent lands. A package training on agro-forestry, multi cropping and two season farming (such as legumes crops followed by rice) to maintain the soil fertilization and increase the land productivity. Similarly, marginal land should be planted with cash crops such as bean which would fix nitrogen in the soil and would increase the total productivity.
- Sufficient technical supports should be provided to help farmers to increase production on marginal land for cash crop or pasture development and should encourage them to adopt conservation practices on such lands for sustainable.
- In order to supply enough labour for intensive farming, villagers should be encouraged to establish a smaller group by their interests, or ethnicity or by other criteria to develop cooperation for labor exchange or group farming. This would solve the problem of labor requirement for initial farm preparation such as terrace making in the village.

- Scientific forest management practice should be initiated to improve the quality and quantity of forest through community forestry approach by decentralizing ownership and management responsibilities to the communities.
- As an alternative to current energy system, which is largely wood based, development of bamboo or wood waste briquette system should be developed.
- A village level saving credit or micro credit scheme should be developed for villagers to get easy access to small credits for agricultural and business development.

5. Conclusion

Based on thorough assessment of natural and human resources, it can be concluded that Houaykhing cluster village has ample of opportunities and potentials for developing long term sustainable livelihood options. However, it is important to change the perception and attitudes of people to switch from current practice to improved techniques. Gradual process is required which should include demonstration of proven techniques, motivation of farmers through incentives such as technical and financial supports. Based on the evaluation of the demonstration activities, a long term development strategy should be developed which should include not limited to both policy and practices of current agricultural and forest management and develop market for high value agricultural products.

Annex A: Workshop results

Annex A-1: Evaluation of livelihood improvement strategies

Livelihood improvement options	Very important	Important	Less important
Development of terrace for permanent agriculture	18	3	0
Multi-cropping/two season cropping	16	5	0
Applying labour exchange system for providing required labor for intensive farming	14	7	0
Raising cattle in shed/confined areas	15	5	1
Commercial cultivation of cash crops	19	1	1
Alternative energy using bamboo/wood charcoal to make briquette for energy	15	2	4
Developing market for agriculture products	19	1	1
Cooperative saving credit scheme	15	6	0

Annex A-2: Evaluation of livelihood strategies by groups (3 Hmong and 3 Khmu groups)

Table A-2-1: Perceptions of workshop participants regarding development of terracing

Questions regarding terracing	Responses	Khmu	Hmong	Total
Heard about terrace?	Yes	2	2	4
	No	1	1	2
Have you made terrace?	Yes	2	0	2
	No	1	3	4
Do you know how to make terrace?	Yes			0
	No	3	3	6
Do you believe it will improve rice plantation?	Yes	3	3	6
	No			0
Would you apply it if you know how to do terrace?	Yes	3	3	6
	No			0
Why would you apply terrace?	To learn its application	3	2	5
	Prefer terrace compared to upland	1	0	1
	To do permanent agriculture	0	1	1
	To improve	1	0	1
	To encourage new generation to stop slash and burn	0	1	1
Advantages of terracing	Soil conservation	3	3	6
	Permanent rice cultivation	3	2	5
	Maintain soil nutrient	3	1	4
	Maintain soil moisture	2	1	3
	Improve productivity	0	1	1
	Reduce slash and burn	0	1	1
What is the major difficulty and disadvantages of terrace?	Difficult to dig land make terrace in upland	1	2	3
	If no rain, difficult to cultivate in terrace	1	1	2
	Labor intensive and may be difficult	1	2	3

Table A-2-2: Perceptions of workshop participants regarding raising cattle in shed or confined areas

Questions about raising cattle in shed or	Responses	Khmu	Hmong	Total

confined areas				
Heard about cattle shed?	Yes	3	3	6
	No	0	0	0
Do you have cattle shed?	Yes	1	1	2
	No	2	2	4
Do you know how to raise cattle in shed?	Yes	1	0	1
	No	2	3	5
Is it a better practice?	Yes	3	3	6
	No	0	0	0
If you get necessary supports, would you practice it?	Yes	3	3	6
	No	0	0	0
Main advantages?	It is safe	0	1	1
	Easy to take care of cattle	1	1	2
	Less chance of disease contamination	2	3	5
	Prevent forest degradation	1	2	3
	Better care of cattle	1	2	3
	Cow dung can be used for manure	2	1	3
	Less chance of stealing	1	2	3
Main disadvantages?	Difficult to make shed	1	2	3
	More labor requirements	1	1	2
	Need to find food for cattle	1	0	1

Table A-2-3: Perceptions of workshop participants regarding development and promotion of alternative energy

Questions regarding alternative energy	**Responses**	**Khmu**	**Hmong**	**Total**
Have you heard about charcoal briquette?	Yes	3	1	4
	No	0	2	2
Do you know how to make wood charcoal?	Yes	0	0	0
	No	3	3	6
Do you believe alternative energy would prevent deforestation?	Yes	3	3	6
	No	0	0	0
If you know how to make briquette, would you use it for cooking?	Yes	3	3	6
	No	0	0	0
What would be the reason to change from wood to briquette?	Easier to use	1	0	1
	Would save labor for collecting fire wood	1	1	2
What do you think the major benefit of using alternative energy?	Save time	1	2	3
	Prevent deforestation	3	3	6
	Easy to use	2	2	4
	Healthier than wood	1	1	2
Main disadvantages of briquette as an alternative energy?	No disadvantages	2	2	4
	Process may be difficult	1	1	2

Table A-2-4: Perceptions of workshop participants regarding development of village market system

Questions about village market system	**Responses**	**Khmu**	**Hmong**	**Total**

Developing market system is important?	Yes	3	3	6
	No	0	0	0
Heard about weekly village market?	Yes	3	3	6
	No	0	0	0
Weekly market will encourage you to produce more crops?	Yes	3	3	6
	No	0	0	0
Main advantages?	Easy to buy products	1	2	3
	More focus on cash crops than upland rice	1	1	2
	Would improve villagers livelihood	0	1	1
	Easy to sell products to city buyer	2	0	2
	Generate more income	2	1	3
	Villagers know when to sell products	1	1	2
	Easy to link with major markets	1	0	1
Main disadvantages?	More thieves	1	3	4
	More garbage	1	0	1
	More expenses	0	1	1
	Low price for the products	1	0	1

Table A-2-5: Perceptions of workshop participants regarding cultivation and promotion of cash crops

Questions about cash crops	**Responses**	**Khmu**	**Hmong**	**Total**
Do you cultivate cash crop	Yes	1	1	2
	No	2	2	4
How much extra income do you have from cash crops		200000 Kip	500000 Kip	
Do cash crops improve your total income?	Yes	3	3	6
	No	0	0	0
Are you interested to plant cash crop in large scale if you get support?	Yes	2	3	5
	No	1	0	1
Main advantages of cash crops?	More income	2	2	4
	Prevent deforestation	1	2	3
	Improve livelihood	2	2	4
Main disadvantages?	Livestock may destroy crops	1	1	2
	If no market then wastage of time	0	1	1
	No market	1	2	3
	More labours	0	1	1

Table A-2-6: Perceptions of workshop participants regarding establishing labour exchange system or group farming

Questions about labor exchange or group farming system	**Responses**	**Khmu**	**Hmong**	**Total**

Heard about labour exchange system?	Yes	3	3	6
	No	0	0	0
Would it help agriculture improvement?	Yes	3	3	6
	No	0	0	0
Are you interested to apply such practice?	Yes	3	3	6
	No	0	0	0
Main advantages?	Can finish work earlier	2	3	5
	Bring social harmony	1	1	2
	People can exchange knowledge	1	1	2
Main difficulties?	Some people are lazy and not interested	1	1	2
	It is more hard work	0	1	1
	No difficulties	1	1	2

Annex A-3: Summary of bamboo availability and uses in Houaykhing cluster

Questions regarding bamboo	Houaykhing Village	Phakbong Village	Houayha Village	Houaythor Village
Bamboo species and availability	- Mai Xang – abundant - Mai Hok – abundant - Mai Por abundant - Mai Bong – abundant - Mai Lor – abundant - Mai Xod – rare - Mai Hia – rare - Mai Pok – rare - Mai Lai – scare - Mai Nor wan – scare - Mai Nor Kom – scare - Mai Nor Lan – scare - Mai Kao Lam – rare	- Mai Hok - abundant - Mai Xod - abundant - Mai Hae - abundant - Mai Norlan - abundant - Mai Hia - scare - Mai Xang - scare - Mai Nor wan – scare	- Mai Xang – abundant - Mai Hae – abundant - Mai Por – abundant - Mai Hia – abundant - Mai Lan – abundant - Mai Nor Kkom – abundant - Mai Hok – scarce - Mai Xod – rare - Mai Bong – rare - Mai KaoLam – rare - Mai Pok – rare - Mai Lor – rare	- Mai Xang – abundant - Mai Hia – abundant - Mai Xod – abundant - Mai norLan – abundant - Mai Lai – scarce - Mai Bong – rare - Mai Kao Lam – rare - Mai Norwan – scare - Mai Hok – scare
Current uses of bamboo	Mats, baskets, straws, hats, trays, fence, etc	Walls, mats, baskets, fence livestock huts, roof	baskets, huts, houses, paper, for sale, wall, brooms, fence, chairs, doors, beds	Baskets, wall, houses, beds and food
Resource availability compared to 10 years ago	Less available	More available	Less available compared to 10 years ago	Very low due to over harvesting
Travel time to collect bamboo 10 years ago	15 Minutes walk	30 minute walk	1 hour walk	2 hours walk (20 minute drive)
Travel time to collect bamboo now	1 hour walk	20 minute walk	2 hours walk	3-5 hours walk (40 minute drive)
Average yearly income per family	500,000 Kip	150,000 Kip	500,000 kip	500,000 Kip

Annex A-4: Overall evaluation of workshop

Criteria	Indicators	Number of respondents (Total 22)
Relevancy of the workshop content	Relevant	22
	Not relevant	0
Meeting the expectations from the workshop	Fully met	11
	Partially met	11
	Not met	0
Understanding of the contents	Fully understood	6
	Partially understood	16
	Not understood	0
Major learning during the workshop	building bamboo house	19
	Making terrace and multi-cropping	9
	Making bamboo wall	9
	Treating bamboo	6
	Selecting bamboo for construction	6
	Bamboo harvesting techniques	5
	Knowing bamboo species	5
	Cement plastering of bamboo house	4
	Making durable bamboo joints	4
	Making traditional bamboo wall	4
	Bamboo utilization	2
	Important of cash crops	2
	Raising cattle in sheds	2
	Importance of bamboo for livelihood	1
	Learnt how to work in group	1
Suggestions for the content and topics of future training and workshop	Cultivating cash crops	12
	how to do terracing	10
	How to take care livestock	10
	Multi-cropping	7
	How to make bamboo briquette	3
	How to plant bamboo	3
	Construction	3
	How to do and use compost manure	2
	Two season cropping	2
	Steps of planting café and other crops.	1
	How to Construct 2 floors bamboo house	1
	how to do a small irrigation	1
How to improve future workshop?	More longer time	9
	More clearer explanation	9
	More slower explanation	5
	More practice	4
	More picture show	4
	More practice	4
	teach Lao language	1

Annex B: Interest groups for demonstration project activities

Annex B-1: Weaving group (29 women are interested, 13 and 16 women from Hmong Khmu communities respectively. The majority of Khmu women have experiences in weaving. This group will also be introduced to Mulberry plantation for silk production)

SN	Name	Ethnicity	SN	Name	Ethnicity
1	Ms. Daodee	Hmong	16	Ms. Siew	Khmu
2	Ms. Lia Ya	Hmong	17	Ms.Sen	Khmu
3	Ms. Ye Xong	Hmong	18	Ms.Sa	Khmu
4	Ms. Buavone	Hmong	19	Ms.San	Khmu
5	Ms. Sengchan	Hmong	20	Ms.Da	Khmu
6	Ms. Mai Neg	Hmong	21	Ms.Song	Khmu
7	Douangmany	Hmong	22	Ms. Bua	Khmu
8	Ms. Sondavan	Hmong	23	Ms. Mot	Khmu
9	Ms. Mai Lee	Hmong	24	Ms. Nom	Khmu
10	Ms. Sua ya	Hmong	25	Ms. Ui	Khmu
11	Ms. Sua Hur	Hmong	26	Ms. Lieng	Khmu
12	Ms. Dao	Hmong	27	Ms.Khamkeo	Khmu
13	Ms. Sengmany	Hmong	28	Ms. Vandy	Khmu
14	Ms. Phim	Khmu	29	Ms. Duang	Khmu

Annex B-2: Horticulture group (14 families are interested to cultivate various types of fruits in their fallows, with total land availability equivalent to 9 ha)

SN	Name	Ethnicity	land size (ha)
1	Mr. Noyi Hur	Hmong	1
2	Mr. Yia Tua Hur	Hmong	1
3	Mr.Vanthong	Khmu	0.5
4	Mr. Kham Oun Dok	Khmu	1
5	Mr. Chantha	Khmu	0.5
6	Mr. Jatu Lee	Hmong	0.5
7	Mr. Bounlieng	Khmu	0.5
8	Mr. Sommee	Khmu	1
9	Mr. Vanlay	Khmu	0.5
10	Mr. Jue Kong Ya	Hmong	0.5
11	Mr. Nor Tu Lee	Hmong	0.5
12	Mr. Somechit Ya	Hmong	0.5
13	Mr. Sesavanh	Khmu	0.5
14	Mr. Thongphat	Khmu	0.5

Annex B-3: Terrace group (28 farmers are interested to develop paddy fields for permanent agriculture. The majority of them are from Hmong community)

SN	Name	Ethnicity	land size (ha)	SN	Name	Ethnicity	land size (ha)
1	Mr. Thongpan Ya	Hmong	2	14	Jupoya	Hmong	0.5
2	Mr. Jer wawa	Hmong	2	15	Jatu Lee	Hmong	1
3	Mr. Mua Hur	Hmong	1	16	Buajong Ya	Hmong	1
4	Mr. Jongwa Hur	Hmong	1	17	Po Hur	Hmong	1
5	Mr. Thongthip Hur	Hmong	1	18	Xeng Ya	Hmong	1
6	Bounthavee Hur	Hmong	1	19	Jusua Hur	Hmong	0.5
7	Bounthan Hur	Hmong	1	20	Mr. Phonsy	Khmu	1
8	Vathai Hur	Hmong	0.6	21	Thongsing	Khmu	1
9	Nengpha Ya	Hmong	1.5	22	Thongpat	Khmu	1
10	Sayphone Hur	Hmong	1	23	Mr. Khamdy	Khmu	1
11	Bounlert Ya	Hmong	1.5	24	Singkeo	Khmu	1
12	Yia Thongya	Hmong	1.5	25	Soi	Khmu	1
13	Vatua Hur	Hmong	1.5	26	Chanthy sot	Khmu	1
14	Jupoya	Hmong	0.5	27	Bounhueng	Khmu	0.5
15	Jatu Lee	Hmong	1	28	Vilaysak	Khmu	0.5

Annex B-3: Livestock group (14 farmers are interested to confine their livestock either in shed or confined areas using fencing, and are interested to integrate agriculture and livestock)

	Name	Ethnicity
1	Singkeo	Khmu
2	Phonesy	Khmu
3	Rhongthip Hur	Hmong
4	Nengphaya	Hmong
5	Chanthy sack	Khmu
6	Jerwawa	Hmong
7	Bounlert ya	Hmong
8	Bounthan hur	Hmong
9	Sayphone Hur	Hmong
10	Vilaysack	Khmu
11	Thongpat	Khmu
12	Thongsing	Khmu
13	Vwatua hur	Hmong
14	Wathau hur	Hmong

Annex B-4: Coffee group (33 farmers are interested to introduce coffee plantation. Approximately 30 ha land is available for coffee plantation, which is the minimum requirement to attract the buyers)

SN	Name	Ethnicity	Land size (ha)	Shading	Location
1	Thongphanya	Hmong	1	yes	Nam Mat
2	Mr. Jongwa Hur	Hmong	0.5	yes	Nam Mat
3	Yaku Hur	Hmong	1	no	Nam Mat
4	Jaxeng Hur	Hmong	1	yes	hoi song
5	Saidua hur	Hmong	1	no	Nam Mat
6	Pajai Hur	Hmong	1	no	Nam Mat
7	Bouanthan Hur	Hmong	1	yes	Nam Mat
8	Xenglao Thor	Hmong	1	no	Nam Mat
9	Jerwawa	Hmong	1	no	Hoijik
10	Buajong Ya	Hmong	3	no	Nam Mat
11	Yia Tho ya	Hmong	1	no	Nam Mat
12	sayphone Hur	Hmong	0.2	no	Nabon
13	Wathai hur	Hmong	1	yes	
14	watua hur	Hmong	1	no	Nam Mat
15	Xengya	Hmong	1	no	Nam Mat
16	Bounlert Ya	Hmong	0.2	yes	Near Village
17	Nengpgaya	Hmong	0.5	no	Nam Mat
18	Mr. Phonsy	Khmu	1	yes	Nam Mat
19	Mr. Sisavanh	Khmu	1	yes	Near Village
20	Somdy	Khmu	0.5	yes	Hoi Jik
21	Mr. Chandy	Khmu	1	no	Phoukong
22	Vilaysacl	Khmu	1	yes	Hoitalo
23	Bounhuang	Khmu	1	yes	Near Village
24	Setsavanh	Khmu	1	no	Hoi Yung
25	Bounleng	Khmu	1	no	Near Village
26	Bounpheng	Khmu	0.5	yes	Near Village
27	Chantha	Khmu	0.5	no	Hoi Yung
28	Mr.Soi	Khmu	1	no	Near Village
29	Chanthy sack	Khmu	0.5	yes	Near Village
30	Bounsiew	Khmu	1	yes	Hoitalo
31	Khampheng phoun	Khmu	1	yes	Near Village
32	Chanthy sot	Khmu	1	no	hoi bon
33	Mr Oi	Khmu	1	yes	Near Village

Annex B-4: Irrigation group (17 farmers are interested to develop irrigation system , half of them are from Khmu community.

Name of the water sources	beneficiaries	Ethnicity	Total areas to be irrigated	Total cost (USD)
Unknown	Mr. Noyi Hur	Hmong	4ha	1000
	Mr. Buajong Ya	Hmong		
	Mr. Pajai Hur	Hmong		
	Mr. Kham Oun Dok	khmu		
Hoi Pha	Mr. Bounlieng	khmu	0.5 ha	250
	Mr. Bounsiew	khmu		
Hoi Mat	Yia Lao Hur	Hmong	3.5 ha	750
	Mr. Singkeo	khmu		
	Mr. Wakuwa	Hmong		
Hoi Yung	Mr. Setsavanh	khmu	1 ha	625
	Mr. Vilay sack	khmu		
Hoi Yung	Mr. Vanthong	khmu	0.5 ha	250
Hoi Mat	Mr. Jatu Lee	Hmong	3 ha	1875
	Mr. Jupo Ya	Hmong		
	Mr. Phonesy	khmu		
Hoi Mat	Mr. Paji Hur	Hmong	2 ha	625
	Mr. Kauju Hur	Hmong		

Annex C: Tentative schedule, budget and partners/collaborators for capacity building and demonstration activities.

Activities		Estimated cost (USD)	2013												2014			Partners and consultants
			Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct	Nov	Dec	Jan	Feb	Mar	
Activities: 1 Grouping Activities	1.1 Establishment of a village nursery (for coffee and fruit trees)	11000																TABI/DAFO
	1.2 Development of terrace in upland farms of interested farmers	9600																TBD (local)
	1.3 Improvement of irrigation system of existing paddy fields	5500																TBD (local)
	1.4 Introduction of improved livestock raising system	7000																TBD (local)
Activities 2: Livelihood improvements	2.1 Coffee plantation (including shade trees)	14500																Saffron
	2.2 Fruit tree plantation	2000																TABI/DAFO
	2.3 Bamboo plantation	1500																TBD (local)
	2.5 Establishment of cooperative weaving facility	9000																Mrs Kommaly
	25 Village market development	15000																TBD
Activities 3: Capacity building	3.1 Capacity building on weaving	9000																Mrs Kommaly
	3.2 Mulberry plantation and silk production	5000																Mrs Kommaly
	3.3 Improved stove/bamboo briquette for energy	10000																International
	3.4 improved bamboo products development (high quality handicrafts/furniture)	9000																Eldot
	3.5 Community forestry study tour to Nepal to demonstrate the show case of success of community forestry	15000																TBD
	Total Budget	**112100**																