SOCIO-ECONOMIC PROFILE

OF 6 VILLAGES IN MONDULKIRI PROVINCE

A Focus on the Incomes and Livelihoods of Engaged Communities in the Cambodia Supporting Forests and Biodiversity (SFB) Project

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Socio-economic Profile of 6 Villages in Mondulkiri Province:

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List of Acronyms

- CF = Community Forest
- CPA = Community Protected Area
- SL = Sustainable Livelihood Framework
- NTFPs = Non-Timber Forest Products
- TFPs = Timber Forest Products
- SFB = Cambodia Supporting Forests and Biodiversity
- WWF = World Wide Fund for Nature

  PA law = Protected Area Laws

Executive Summary

This socio-economic profile is focused on the incomes and livelihood of select villages in Mondulkiri province, with the intention of linking these villages in the future to potential private sector partnerships under the Cambodia Sustainaing Forests and Biodiversity (SFB) Project in cooperation with WWF Cambodia and the Non-Timber Forest Products Exchange Programme for South and Southeast Asia. Future livelihood support under the project aims to increase local income from certified community forest products and help communities receive equitable economic benefits from sustainable forest management. It is essential to have a proper socio-economic profile of the communities and to have adequate knowledge and awareness about their natural resource management practices; traditional harvesting knowledge and practice; the relevant laws and regulations on community forestry (CF) and community protected areas (CPA) that impact on the local communities, and their engagements with local and provincial authorities, the Forestry Administration (FA), NGOs, traders and with other relevant stakeholders. By having this information, the sites' potentials and challenges can be transformed into future possibilities and opportunities for the development of community-based forest and NTFP enterprises. In return, this is hoped to result in better socio-economic conditions of the project's target communities.

The main findings of the study are:

❖ **Socio Demographic Status**

- The population and the number of villages in Mondulkiri province have increased. In 2005 there were 90 villages; in 2011 there are 99 villages. Among the five districts, Keo Seima is the most populated district at 30 percent, followed by Khos Nheak at 26 percent. The least populated district is Ou Reang with only 6 percent of the total provincial population.
- The average household size in the selected villages is 5.60 persons per household. 53.46 percent of respondents have households of 5 to 8 people; 11.31 percent have households with 9 to 12 people. Household size can determine the living standard of the family, influence family spending, and influence the number of children that are sent to or withdrawn from school.

- The study indicates that most of the people who migrate to the target areas are Khmer who come from Kompong Cham, Siem Reap, Prey Veng, Pursat, Battambong and Kratie provinces and from Phnom Penh.
- Households are composed of 46.17 percent females and 53.83 percent males.
- The dominant group in the study areas is Khmer (49.55%) who mostly reside in Meanchey and Ou Boun Leu. Phnong people make up 40.33 percent of the total population in the study areas, and were mainly found in Lao Ka, Toul and Sre Ktong villages. Kraol made up 14.17 percent of the respondents and were mainly found in in Rovak.
- In all selected villages, a primary school is the only educational facility in the village. Schools are dilapidated and in need of repair, and do not have enough facilities to accommodate the large number of children that should be enrolled in class.
- In the educational system, there is no meeting point between supply and demand .The number of classrooms and teachers do not meet the needs of the children. For example, usually more than one grade occupies a single class, and only one teacher is responsible for the combined grades. This lowers educational quality, resulting in poor human capital in the selected villages.
- 93.8 percent of respondents do not have a toilet. Poor sanitation facilities cause common and easily-transmitted diseases among the people in the study areas.

❖ **Economic Status**

- The main livelihood strategy of the respondents' households is subsistence agriculture; they farm mostly in their *chamkar* using low agricultural technology. They do not use fertilizers, chemicals or modern mechanisms. This results in insufficient yield and leads to hunger for a few months every year. To meet the food demand, people rely on the trade of non-timber forest products or *NTFPs*.
- On average, a Cambodian consumes 160kg of rice per year. In the selected villages, the average household size is 6 people per family; thus the amount of rice needed for yearly consumption is around 960 kg. However, respondents reported that they can only produce around 1,258kg of rice in their *chamkar*. This is equivalent to about 838 kg of milled rice, and so more rice is needed to satisfy the hunger of the respondents. In fact, 61.22 percent of respondents mentioned that rice production was not enough to meet the hunger of their family.

- Common livestock raised are chicken (raised by about 91.54 percent of households) and buffalo (about 23.08 percent).
- All selected villages have fishing spots. People mostly fish in the dry season because it is too risky to fish in the rainy season, due to the large volume of water and fast flowing currents. Some villager fish almost year round; but the catch is consumed rather than sold, as it usually amounts to only 0.5 kg. per day.

❖ **Key Threats:**

- Unsustainable or inefficient methods of agriculture and natural resource harvesting can lead to loss of resources, and future insufficient food supply. External threats like economic land concessions and land clearance by outsiders also affect food supply.
- A few Vietnamese and Chinese companies which were granted economic land concessions have destroyed the resin trees of the villagers. Currently, the villagers have filed complaints with those companies.
- Dilapidated and inadequate infrastructure, educational barriers for the younger generation, illiteracy in the elderly, and fraud in the financial sector have led to poor human capital in the selected villages.
- Students typically drop out of school when they are in grades 4 to 6; the major reason for doing so is their families' need for extra income, which the children assist with by collecting and selling solid resin. New options for improving the villagers' livelihoods need to be explored, since the resin trees may not last much longer.
- Road conditions are the main barrier to better economic and human capital development. It takes many hours and a lot of money to access some of the villages, which leads to difficulties with trade, and affects the quality and increases the prices of goods that leave and enter the villages. On the other hand, illegal logging incidents also tend to follow where there are improvements in road conditions and access to villages and forests.

❖ **Recommendations**

- Strengthen law enforcement by the FA and local authorities against illegal trading and transport of timber and non-timber products, by setting up and monitoring at check points placed at the entrance of the villages so that trucks that go in and out of the village are properly monitored.

- Create community conservation activity such as patrolling within their resource use areas. The patrolling activity can happen simultaneously once the villagers collect NTFPs, for example harvest of NTFPs such as liquid resin, that tend to be traded in volumes because they fetch better prices, can be tracked.
- Communities should be organized for the purpose of protecting their resources, particularly the resin and *sleng* trees. Sustainable methods of harvesting should be introduced to the villages, so that their resources and livelihood will be protected.
- The solution to the threat from companies is to assist communities to protect their resources because in some villagers, the individuals have no voice to deal with the problem. Strengthening the community organization could be the key to address the problems.
- Technical support on sustainable methods of liquid resin harvesting should be provided to the villages. Some villages have already organized small groups to collect the liquid resin, but some still harvest in unsustainable methods or harvest only during the dry season through traditional methods at limited harvest capacity.
- Government and NGOs should provide more assistance in health care and education. More classrooms need to be built and more teachers need to be provided to raise the standard of education in each village. There should also be health care centers and pharmacies in each village.
- Parents should be encouraged to keep their children in school, and alternative livelihood schemes can be offered so that children can stay in school, rather than have to collect NTFPs.
- Local authorities and central government, perhaps with the help of NGOs, should improve the road conditions in the province, and possibly employ the residents to help in road construction, in order to provide them with extra income.
- Community Based Organizations should be established, to strengthen the bargaining power of the villagers, and help them deal with the issues affecting them.

1. Overview of the Study Area

Mondulkiri is situated in the Southeastern plateau of Cambodia. It has a forested area of 14,680 km^2 covering a wide range of landscapes. It borders Vietnam to the East and South, Ratanakiri to the North, and Kratie to the West. Because of its enormous territory, which contains a wide range of fauna and flora, it is of core interest in terms of biodiversity, inhabitants' livelihood, its unique and fascinating cultural profile and political characteristics.

The province is filled with a huge variety of flora and fauna, especially globally threatened and endangered species including *gaur*, *banteng*, tiger, wild Asian elephant, leopard and various species of deer and birds. Mondulkiri is the genetic resource of plants and wildlife which is why many communities have been established there for the sake of conservation and sustainable utilization. Thus, Mondulkiri is a protected zone comprising many wildlife sanctuaries under regulation and monitoring of the FA, the provincial Department of Environment and communities.

Because of the enormous variety of flora, fauna and river tributaries, the ecological system has not only always played an important role in biodiversity but also in providing economic and social benefits for the communities in the province. People in Mondulkiri can utilize both timber and non-timber forest products for their daily consumption. People rely heavily on utilizing natural resources for their basic needs--such as shelter and food—and for earning cash income. Mondulkiri inhabitants can earn a living from and are dependent upon natural resource and from cultivating the fertile soil with crops such as rice, rubber, banana, cashew nuts, avocado and vegetables. In addition to cash crops, there are plenty of NTFPs such as solid and liquid resin, rattan cane, honey, herbs and bamboo shoots that are available for small trade and consumption.

Apart from swidden farming, fishing and livestock raising have also been major activities, mostly conducted in traditional ways, although new technology has been introduced by newcomers to the area. Due to the economic benefits, the fertile soil and the beauty of nature, a large number of migrants move to Mondulkiri every year, with both positive and negative impacts on ecological niches. This study focuses more deeply on the level of community awareness of natural resource management and sustainable use as well as existing

regulations to identify the future potential of development in Mondulkiri and its communities, based on small local entrepreneurship.

It is undeniable that development and changing patterns of livelihood affect both cultural and political institutions of indigenous people. Traditional and cultural practices have almost been forgotten due to the demand for better life styles as well as shifting patterns of occupation among the indigenous peoples. For instance, firewood, which was necessary for subsistence, used to be taken only in small amounts and conscientiously. However, this practice is no longer followed today, since economic stability and financial security are now the controlling factors. There are also political factors that render the communities vulnerable to assimilative policies and negative consequences to indigenous lifestyle and traditions. The cultural assimilation of the indigenous peoples in Mondulkiri also contribute to losses and destruction of their natural resources; for example, economic developments on indigenous territory contribute to the devastation of spiritual forests that are sacred and important to indigenous peoples. As a matter of fact, the spiritual forest that have been conserved and respected for years without interfering is being cut down dramatically. The utilization and conservation of natural resources is perishing under powerful political forces and deteriorating traditional political institutions.

2. Research Design

Mondulkiri is an upland province in northeast Cambodia where the potential for development of crop industries exists within the whole territory, along with abundant biodiversity, forest, wildlife, minerals and precious metals, and the like. Many indigenous groups have been dwelling in harmony with nature for centuries, as their belief in animism says that nature is their life.

This study focuses on six villages (Toul, Khtong, Rovak, Ou Buon Leu, Meanchey, Lao Kar) in three districts - Saen Monourom, Kaoh Nheaek and Kaev Seima. These villages are in the working areas of WWF and NTFP-EP in the fields of natural resource conservation and livelihood improvement via non-timber forest products.

2.1 Purpose of the Study

The results of this study will be used to gain an understanding of the situation of livelihoods activities and natural resource use in the study areas. It will provide recommendations about the opportunities available to communities and the improvement of communities' incomes while supporting sustainable management of forests.

The data will aid NTFP-EP and WWF by establishing a baseline, which will lead to a better understanding of non-timber forest product activities, natural resource use, forest resources, existing wildlife, demographic trends, the educational system and primary livelihood activities of the selected areas. This information will form the basis of developing an ppropriate Community Based Resource Management (CBRM) framework based on NTFPs.

It will also serve as a general assessment of the situation in the selected area; and the findings will be used to identity further research opportunities.

Finally, the data will be used as a baseline and guide in the development of community based NTFPs enterprises (CBNEs), the improvement of the socio-economic conditions of communities and sustainable forest management by the communities, which currently depend on natural resources for their subsistence.

2.2 Objectives of the study

The objectives of the study are to gather sufficient knowledge, awareness and understanding about:

- Natural resource access, management and practices;
- Traditional harvesting knowledge; and
- Relevant laws and regulations on community forestry and community protected areas on the part of local communities, local and provincial authorizes, FA, NGOs, traders and other relevant stakeholders.

The knowledge gathered will be used to forge private sector partnerships and increase local income from certified forest products with equitable economic benefits from sustainable forest management. At the same time, the sites' potentials and challenges will be transformed into future possibilities and opportunities for the development of community based forest/ NTFP enterprises to improve the socio-economic condition in target communities.

2.2.1 Overall Objective

The overall objective of this study is to gather and compile current information about the socio-economic profile focused on incomes and livelihoods of engaged communities in Mondulkiri province, and to recommend the approaches and focus to working with these selected communities.

2.2.2 Specific Objective

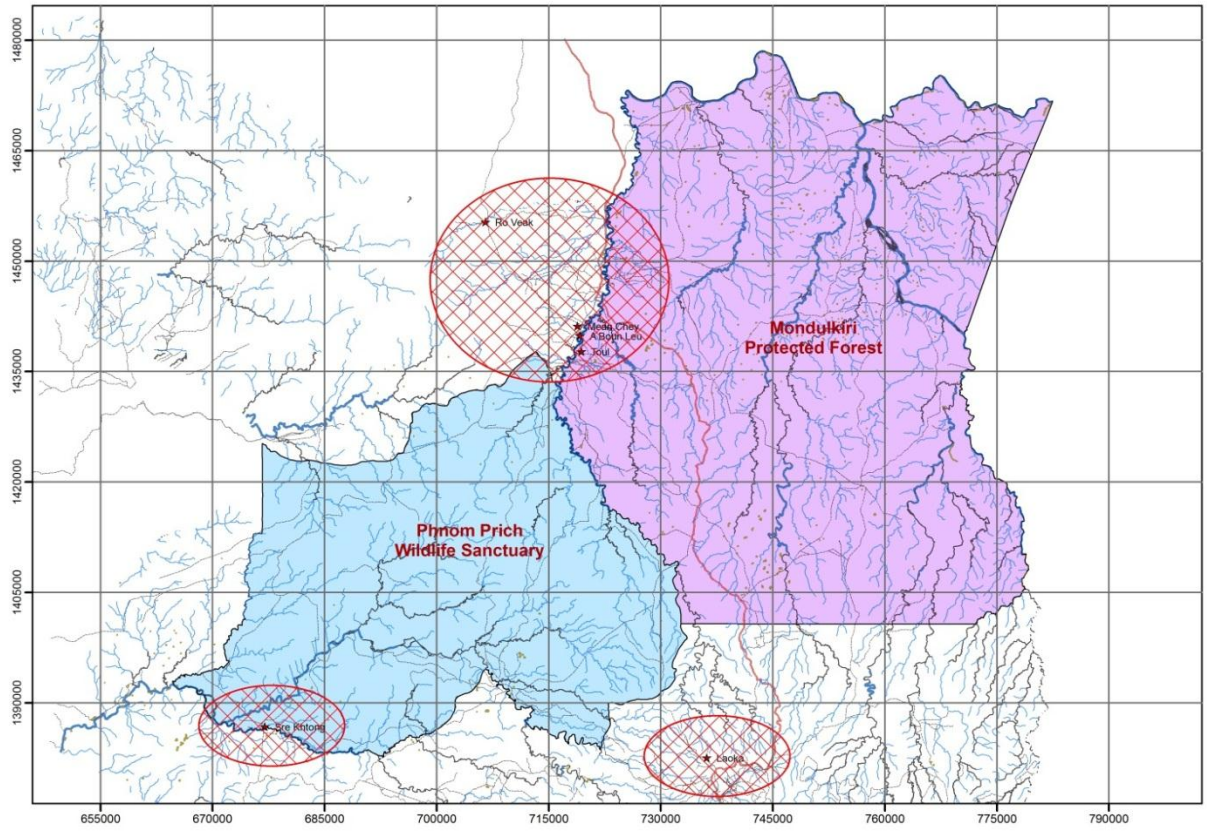
To increase equitable economic benefits from sustainable management of natural resources.

2.3 Methodology

2.3.1 Scope of the Study

The study was conducted in Mondulkiri province, specifically in six selected villages; Khtong, Ou Buon Leu, Rovak, Meanchey and Lao Kar. In addition, 345 household samples were selected to represent 40% of each village. The period of study was 3 months, from June to August 2013. The following is a map of selected areas for the study.

Figure 1: Map of Selected Villages for Study



The findings presented in this report are the result of qualitative and quantitative methods of primary data collection and inquiry. Quantitative data was collected from secondary data and from conducting interview with households and key informants (for example, commune chiefs, village chiefs and the like). Qualitative data was obtained through semi-structured interviews and group discussions with 15 to 20 persons per village. Group discussions used several tools:

- **Vision Mapping**: Villagers were asked to draw and describe a picture of their community/village before (past 10 years) giving extra consideration to the following aspects: (refer to data matrix for specific data needed and pointers)
  - Village/commune history (origin, original settlers and their origins)
  - Different land uses
  - Forest conditions
  - Wildlife sightings
  - Farm areas and practices
  - Fishing conditions
  - River conditions

- Traditional or political boundaries
- Resource use
- Settlement Characteristics
- Population
- Benefits you are getting from natural resources

❖ **Time Line**: Villagers were asked to describe the situation that happened in the past until now (past 10 years). The time line will be focused on:

- NTFPs;
- Newcomer/Migration; and
- Challenges related to using natural resources.

❖ **Venn diagram**: Villagers were asked to describe the institutions that they have relationships with, have worked with, supported and/or challenged the community.

❖ **Resource Mapping**

Table 2.1 Profile of respondents by village

District, Commune	Villages Studies	No. of Households (2011)	No. of Respondent Households	% Over total no. of households
Kaoh Nheaek				
Ou Boun Leu	Ou Boun Leu	156	62	39.74
Roya	Rovak	78	31	39.74
Srae Sangkum	Meanchey	142	56	39.43
Kaev Seima				
Memong	Toul	123	49	39.84
Srae Chhuk	Khtong	169	67	39.64
Monourom				
Sokh Dom	Lao Ka	202	80	39.60

Source: Ministry of Planning Statistics, 2011

3. Presentation of Findings

3.1 Respondents' Profiles

About 345 households representing 40% of the total population in six selected villages were interviewed for this study. Of the total sample, 56 percent are between the ages of 31 to 40 years old; most (around 81.9%) were male, and married. The educational level of 48.3% of respondents was primary school. The total respondents comprised three ethnicities: Phnong (55.08 percent), Kraol (8.98 percent) and Khmer (35.94 percent). In terms of religious beliefs, 63.55 % believe in animism, while 36.45% are Buddhist. Male respondents dominated the study because female respondents were more likely to be conservative, lacked confidence in expressing their opinions, and lacked willingness to participate (primarily because they were busy at the time interviews were conducted) not only in the study but also in some other development programs.

3.2 Socio-Demographic Profile

3.2.1 Population Size

With 5 districts, 21 communes and 90 villages, Mondulkiri is the largest province by area but also the lowest in population density. Statistics from SEILA 2005 pegged the population of Mondulkiri at 49,612; while statistics from the Ministry of Planning (MoP) in 2011 said there were now at 59,309 people. These figures indicate 23% population growth; translated in numbers of individuals, there was an increase of about 9,697 persons or an increase of 1,385 individuals per year.

Table 3.1: Population Distribution by District, 2005

Districts	Population (2005)	% of Total Provincial Population	No. of families	Total No. of Communes	Total No. of Villages
Senmonorom	9,205	19	1,965	4	14
Khos Nheak	13,211	27	2,735	6	26
Keo Seima	14,623	29	3,042	5	25
Pech Chenda	8,414	17	1,775	4	18
Ou Reang	4,159	8	834	2	7
Total	49,612		4,415	21	90

Source: SEILA database, 2005

Table 3.2: Population Distribution by District, 2011

District	2011 Population	% of total Provincial population	No. of families 2011	Total Number of Communes	Total Number of villages
Senmonorom	12,315	21	2,359	4	14
Khos Nheak	15,165	26	3,047	6	28
Keo Seima	17,535	30	3,478	5	31
Pech Chenda	10,366	17	2,205	4	19
Ou Reang	3,928	6	850	2	7
Total	59,309		11,939	21	99

Source: MoP Statistics, 2011

Table 3.2 is based on statistics from MoP (2011) and shows that the total population in five districts is 59,309 consisting of 11,939 families. However, not only the population has increased but also the number of villages; in 2005 there were 90 villages, but in 2011 there were 99 villages which mean that 9 new villages have been established within the administrative boundaries of the province. Among the five districts, Keo Seima is the most populated district with 30 percent, followed by Khos Nheak (26 percent) while the least populated district is Ou Reang (6 percent of the total provincial population). In 2011, 6 more villages were established in Keo Seima.

Table 3.3: Population Distribution in Study area, 2011

Province, Village	Total Population (2011)	% over provincial population	No. of family	No. of Females	% of females in the village
Mondulkiri	59,309		11,939		
Ou Boun Leu	752	1.2	156	365	49
Loa Kar	965	1.6	202	487	50
Meanchey	724	1.2	142	342	47
Toul	684	1.1	123	347	51
Khtong	865	1.5	169	410	47
Rovak	355	0.6	78	191	54

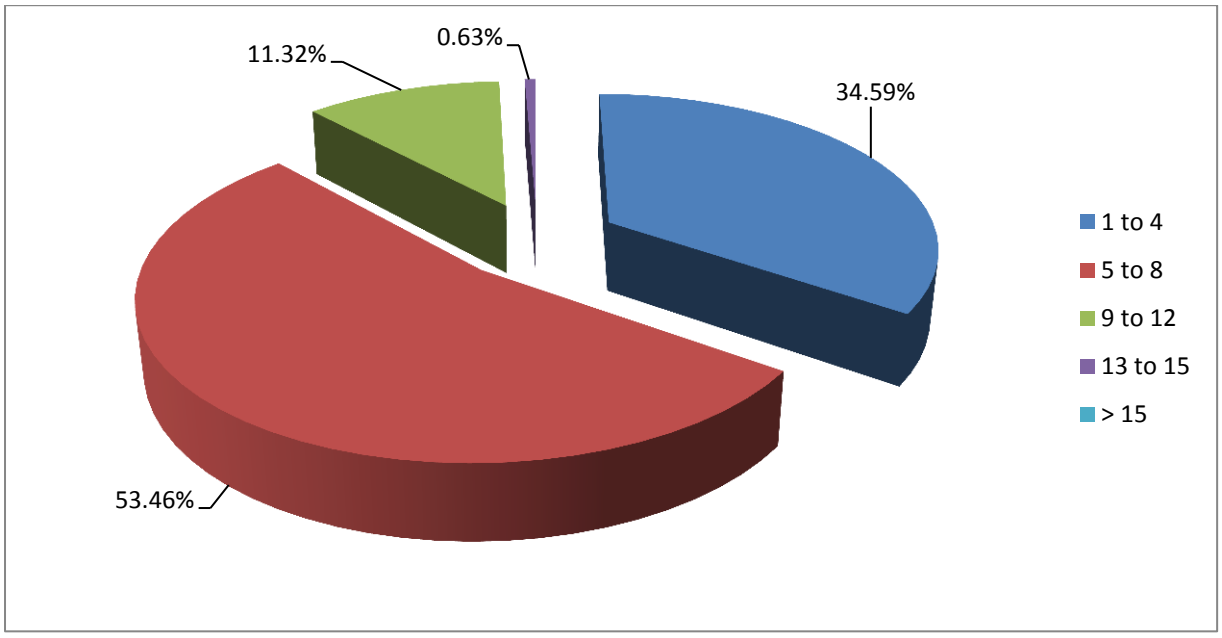
Source: MoP Statistics, 2011

Table 3.3 describes population distribution by selected villages. Among the six selected villages, the most populated is Lao Kar (1.6% of provincial population or 965 individuals), followed by Khtong (1.5% or 865 individuals), while Rovak is the least populated village (0.6% or 355 individuals), although the percentage of females in Rovak is the highest (54%) compared to the other five villages.

3.2.2 Household size

Mondulkiri has the lowest population density of all the provinces in Cambodia. The population density of the province is 3 persons/km2 compared to the average Cambodian population density of 75 person/km2. However, according to the general population Census of 2008, the national average household size is 4.7 persons. In the study area, the average household size in the selected villages is 5.6 persons per household. 53.46 percent of household size contains 5 to 8 persons per household; 11.31 percent contain 9 to 12 persons per household while there were no families with more than 15 people per household. Household size determines the living standard of the family, which influences family spending and the number of children sent to school or withdrawn from school. This study found some issues related to the number of persons in the household. For example, most children from bigger families in the study area dropped out of school. There were also effects on the level of food insufficiency. Both these issues will be discussed in the next sections.

Figure 2: Household Size



3.2.3 Population Growth

According to a World Bank report published in 2012, in 2011 the annual population growth in Cambodia was 1.17 percent; and the fertility rate was 2.5 percent. Mondulkiri population growth is the same as the national level; population has increased in the last few years due to migration and natural growth.

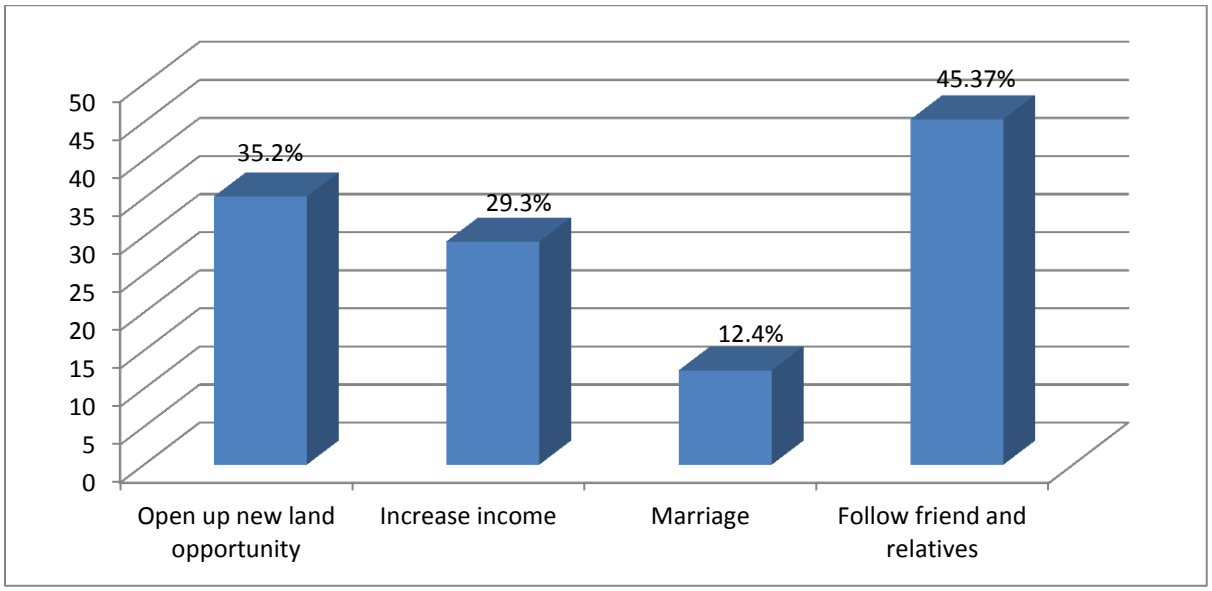
3.2.3.1 Origin of Migrants in the Study Area

The study found that most of the people who migrated to the selected areas are Khmers from Kompong Cham, Siem Reap, Prey Veng, Pursat, Battambang, Kratie and Phnom Penh. A small number of indigenous groups (Phnong and Kraol) have moved within the province from one district to another. Although Khmer migrants are not indigenous people, their livelihood strategies are quite similar to indigenous groups that first settled in the area, and their occupations are the same. This is due to geographical indicators and available resources. It is common for the migrants to also work on swidden farming and collect NTFPs such as bamboo shoots, rattan buds, and wild vegetables during the rainy season, and collect solid resin, honey, liquid resin, and cut trees for wages during the dry season.

3.2.3.2 Pull Factor

In all selected villages, economic reasons are the major pulling factor for the increasing number of migrants. Besides the fact that Mondulkiri has a low population density, it provides the best opportunity not only for farming but also for opening up new business (both legal and illegal). 35.20 percent of migrant respondents mentioned that searching for land to acquire was their motivation to migrate, while 29.30 percent migrated for the prospective increase of income from more business opportunities. 12.4 percent of migrant respondents settled in the province because of marriage, and 45.37 percent followed friends and relatives to the study areas. The movement of migrants into the selected areas has both positive and negative impacts. Most of the negative impacts are on the previous residents' natural resource utilization and management. According to interviews with respondents, natural resource degradation began when the newcomers (migrants) arrived, and nothing could be done to deal with this issue.

Figure 3: Pull Factors of Migration

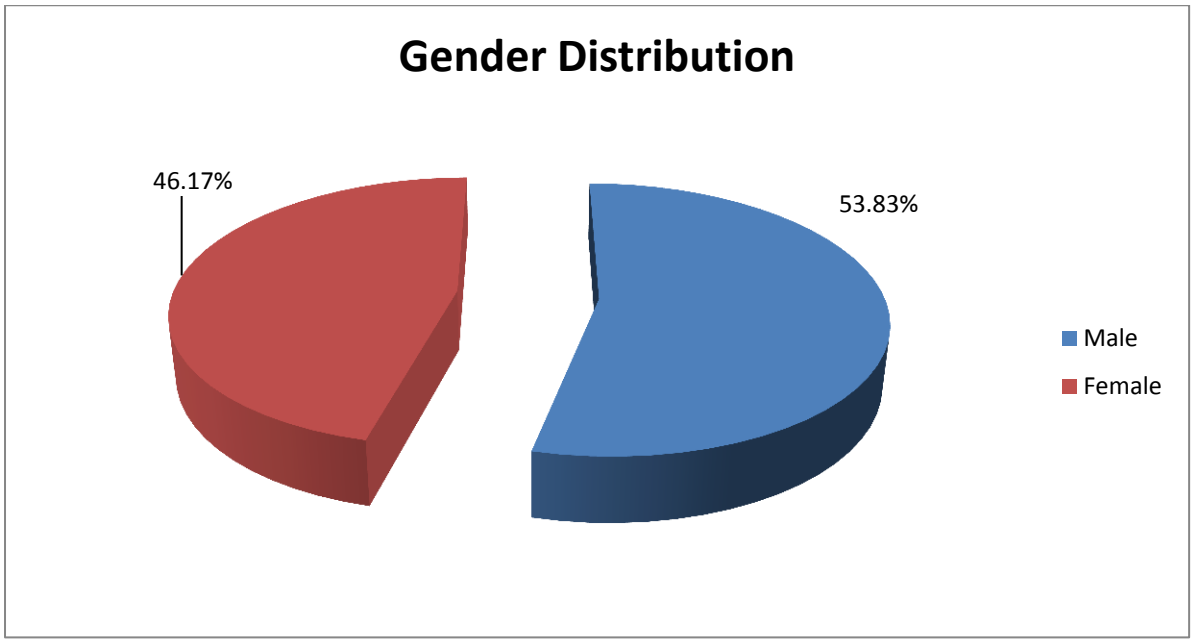


3.2.4 Population Composition

3.2.4.1 Gender Distribution

Based on the WWF household survey conducted in 2006, the gender distribution of households around the Mondulkiri Protected Forest (MPF) is 50.6 percent female and 49.4 percent male. There has been no significant change in gender distribution in the last few years. This study found that households in the selected areas are composed of 46.17 percent female and 53.83 percent male, only slightly higher than the ratio of females. It should be noted that the sex ratios at birth need to be studied, as it has recently emerged as an indicator of certain kinds of sex discrimination in some countries. For instance, high sex ratios of males at birth in some Asian countries are now attributed to sex-selective abortion and infanticide due to a strong preference for sons. The higher ratio of males in the study area is presumably due to the need for more labor in agricultural work, as the main occupation of the people is rice production and other NTFPs which demand high labor supply, yet require small amounts of income to sustain family livelihoods.

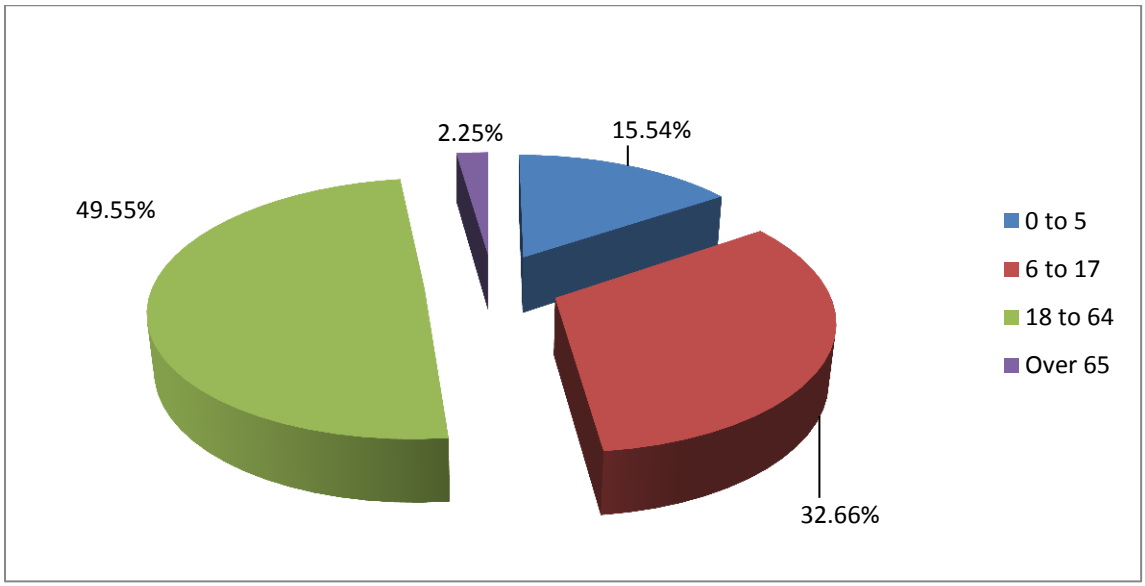
Figure 4: Gender Distribution in the Study Area



3.2.4.2 Age Distribution

The age structure of a population affects a nation's key socio-economic issues. Countries with young populations (high percentage under age 15) need to invest more in schools, while countries with older populations (high percentage of ages 65 and over) need to invest more in the health sector. The age structure can also be used to help predict potential political issues. For example, the rapid growth of a young adult population unable to find employment can lead to unrest (CIA World Factbook, 2013). This study found that 32.66 percent of the population is from 6 to 17 years old, which indicates a need for more school facilities and teachers. This is completely contradictory to the reality in the village, where the status of school facilities is below the average standard to meet the demands of children who are supposed to attend school (this will be discussed later). 49.55 per cent of the active labor force is between 18 to 64 years old. This large number of persons in the active labor force is a positive sign of better development - if these persons have the necessary skills in improving their livelihood strategy. However, the data on educational attainment of the respondents indicates that this is not so, and human capital assets are quite low.

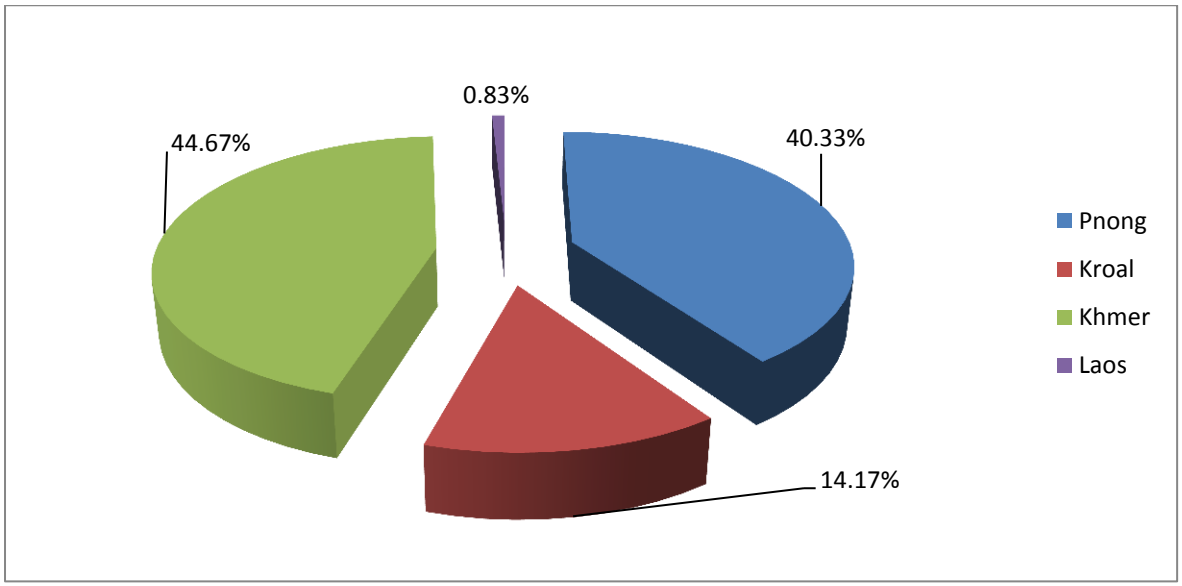
Figure 5: Age Distribution in the Study Area



3.2.4.3 Ethnicity and Language

A number of highland indigenous ethnic groups form the majority of the population in sparsely populated Mondulkiri. Pnong people appear to have lived in the province for about 2000 years, and are the major ethnic group. Other indigenous groups are the as Kroal, Tmoun, Jarai, Stieng, Tampoun and Krueng. Five ethnic groups are present in the six selected villages. The dominant group in our selected sites is Khmer (49.55%) due to their large numbers in Meanchey and Ou Boun Leu. Pnoung people make up 40.33 percent of the total population in the study areas, with majority located in Lao Kar, Toul and Sre Ktong. Kroal make up 14.17 percent of the respondents, and were the dominant ethnicity in Rovak. In recent years, and as discussed above, more Khmer have moved to the area. In the selected areas, the number of languages spoken depends on the composition of the indigenous groups in the area, although the official language is Khmer. It was initially assumed before conducting the study that language would be a concern in communicating with the local people. However, respondents spoke and understood the Khmer language, presumably due to migrants and social developments which made people interact with outsiders for better livelihood opportunities, such as trade of agricultural and non-timber forest products in the local market. The medium of teaching from primary school onwards is also in Khmer thus, for those who attend school they are more likely to be bilingual; they communicate in Khmer language with outsiders and newcomers, and they speak in their own language with their parents, relatives and neighbors who are also indigenous in their everyday life. On the whole, there are several villagers who frequently use Khmer language.

Figure 6: Ethnicity of the Study Area

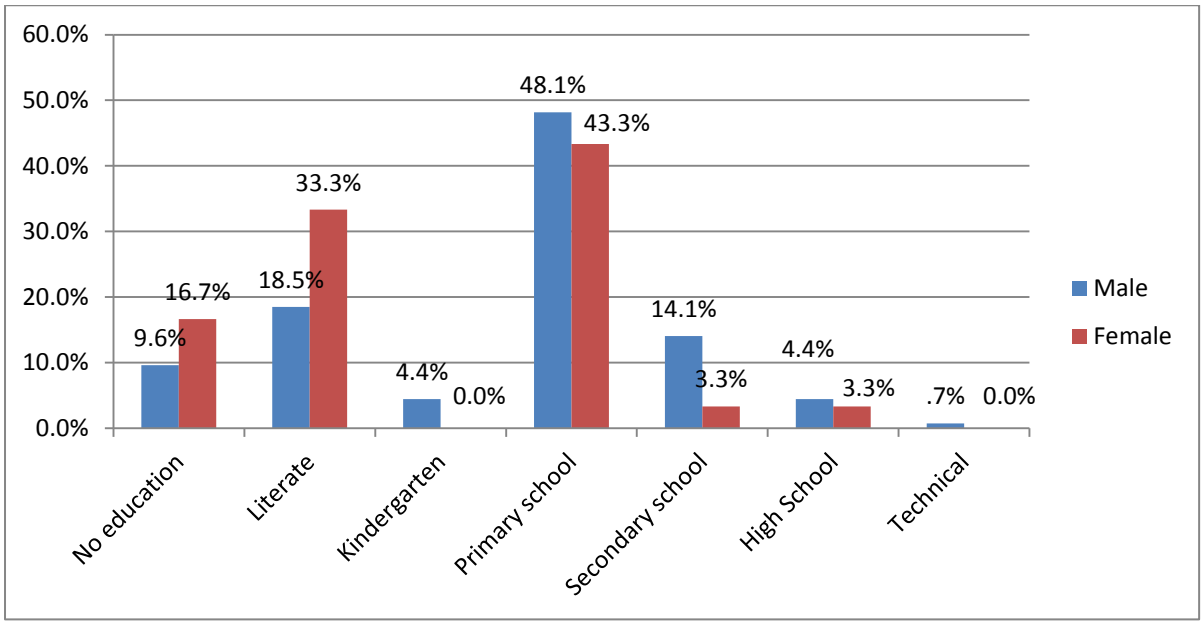


3.2.5 Educational Sector

3.2.5.1 Literacy and Educational Attainment

Illiteracy among the indigenous is fairly high due to remote and unfavorable geographical conditions, lack of school facilities and their conservative perception toward new possibilities. It should be noted that female residents in the study areas considered themselves ignorant and refused to participate in this survey, as well as other development programs and social activities which could have brought better perspectives about society. Indigenous culture is also often not understood by government, which is predominantly Khmer. Indigenous peoples are not encouraged to follow their culture and traditions; they are taught in Khmer, and encouraged to follow non-traditional behavior.

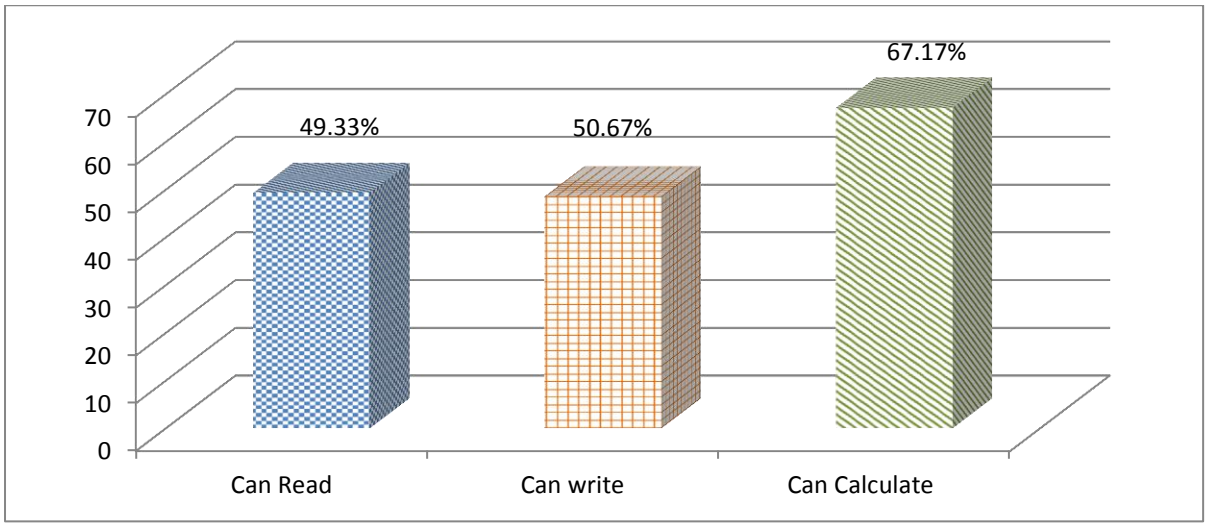
Figure 7: Respondents' literacy in relation to gender



Source: RUA & NTFP-EP survey. 2013

The study found that male respondents have much higher levels of education compared to female respondents. In fact, male participation increased as the level of education became higher Figure 7 shows that at the primary school level, 48.1 percent of male respondents had attended school compared to 43.3 percent of female respondents. In secondary school, 14.1 percent of males and 3.3 percent of females attended school; the number of males were nearly 5 times more than females. This resulted in a large number of females with a low degree of education in the study areas. This in turn results in a lack of participation of females in decision making; not only in the household but also in the community, which could explain why gender inequality has always been a problem in the remote areas of rural Cambodia. Moreover, only males had technical skills. In addition, 16.7 percent of females have never attended school, compared to 9.6 of males. In many developing countries, gender bias is quite common, especially in terms of education. Females are supposed to be involved in household chores and tend have more responsibilities within the family, and are therefore less likely to be sent to attend school.

Figure 8: Literacy Indicators in the Study Area



The figure above illustrates the indicators of the respondents' literacy level such as ability to read, write and calculate. The respondents' ability to read is at 49.33 percent, their ability to write is at 50.67 percent, and their ability to calculate is at 48.59 percent. The three indicators of literacy levels are quite important for development programs and livelihood improvement of the people in the study areas. The findings show a relatively positive number of literate people, although the distribution of literacy is far from equal in the different villages. For example, in Lao Ka, literacy in reading and writing is quite low, yet respondents have a high ability to calculate. This is probably because their everyday life involves marketing their crops even in very small amounts for extra cash, to compensate for food shortages. In Meanchey and Ou Boun Leu, however, all three indicators are quite high. The possible reason for this is that these two villages are close to Khos Nheak, and most of the residents in these villages are Khmer, who may have had better opportunities than indigenous peoples. It is likely, however, that these indicators may be lower in the next generation, since the percentage of children dropping out of school continues to increase.

3.2.5.2 Reasons for not attending school

Table 3.4: Reasons for not attending school

Don't want to study	14.56%
No suitable school available/school is too far	75.34%
No teacher/supplies	88.81%
High cost of schooling/No money	44.47%
Must contribute to household income	86.06%

Must help with household chores	59.96%
Other	9.27%

Source: RUA &NTFP's Survey, 2013

Poverty levels in remote areas of Cambodia are considerably high, seriously constraining the educational opportunities of rural children. Cambodia, like any other developing country, has a low human development index rank (138) compared to its neighboring countries. Its average school enrollment is only 5.8 years (UNDP 2013). This study found that a major reason for children dropping out of school (cited by 88.81 percent of respondents) is infrastructure dilapidation in rural areas, such as a lack of adequate school facilities and teachers. School facilities will be discussed in the following section. Another reason given by 59.96 percent of respondents for being out of school is their having to assist with household chores. However, 86.06 percent of respondents who dropped out of school and whose children also left school said their reason for dropping out was their having to contribute to earning money to supplement household income by rice farming and going to the forest to collect NTFPs for cash. Given that most households depend on agriculture, the demand for labor for rice and crop production is vital in rural households in Cambodia. Families tend to have many chidren (around 7), believing that having more children would contribute more to the parents' agricultural work. They ignore the long term consequence that their children will suffer from more severe poverty in the future. In Meanchey, respondents do not want to study. This percentage is very high compared to the other villages. Semi-structured interviews with key informants reveal that the main reason behind not wanting to study involves cash obtained from solid resin collecting. Children in Meanchey village used to collect solid resin every weekend, but later decided to stop studying altogether and instead collect solid resin for cash.

3.2.5.3 Status of School Facilities

In all target villages, a primary school is the only existing educational facility, greatly affecting the literacy level and educational attainment of villagers. Schools in these villages are generally dilapidated and need repair, and do not have adequate facilities to accommodate the large number of children supposed to be enrolled in the schools. There are large numbers of children who should be in school, but do not go for the reasons mentioned earlier. Using the economic model to find a meeting point between supply and demand sides in the educational sector, the study could not find any meeting point, particularly from the supply

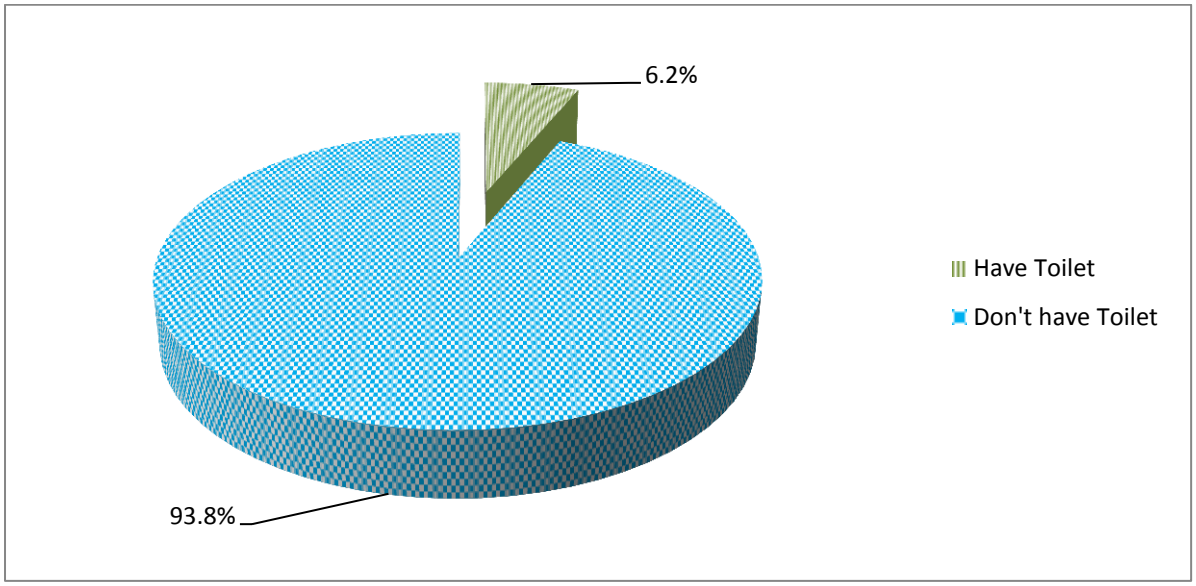
side – specifically in classroom and teacher availability. Different grades study in a single classroom, which is overseen by only one teacher, responsible for educating the combined grades. This lowers the standards of educational quality, resulting in poor human capital for the selected villages.

3.2.6 Health and Sanitation

Health and sanitation in the selected villages is quite low due to the lack of vital sanitation facilities, clean water and villagers' awareness of proper sanitation. In all selected villages, 93.8 percent of villagers do not have toilets. This is a very high figure, and indicates the lack of proper sanitation facilities, resulting in common transmitted diseases among the people in the study areas.

3.2.6.1 Sanitation Facility

Figure 9: Toilets Ownership



Source: RUA & NTFP's Survey, 2013

Some of the respondents stated that they prefer to not use toilets because they are used to the traditional practice of using bushes which they believed caused no harm. Other reasons mentioned are: lack of money to build toilets as well as lack of knowledge of how to build toilets. The assumption that can be drawn from the high percentage of lack of toilets is that sanitation is still low and there is an equally low awareness of the harm that lack of sanitation causes. Respondents ignore or do not realize that there are plentiful resources around the gates of their home that can be used to build a toilet with very little cost. This lack of knowledge or initiative could explain why development remains slow in rural areas.

3.2.6.2 Common Illnesses

Common ailments suffered by respondents include flu, cough, diarrhea, stomach ache, fever, dengue fever and malaria. Traditional and herbal treatments are rarely used by villagers in the selected sites; they prefer to use modern medicine and visits to the hospital, even if there is no health care center or medical practitioner in their village. This indicates a lifestyle change on the part of indigenous groups in remote areas as to how they respond to ailments.

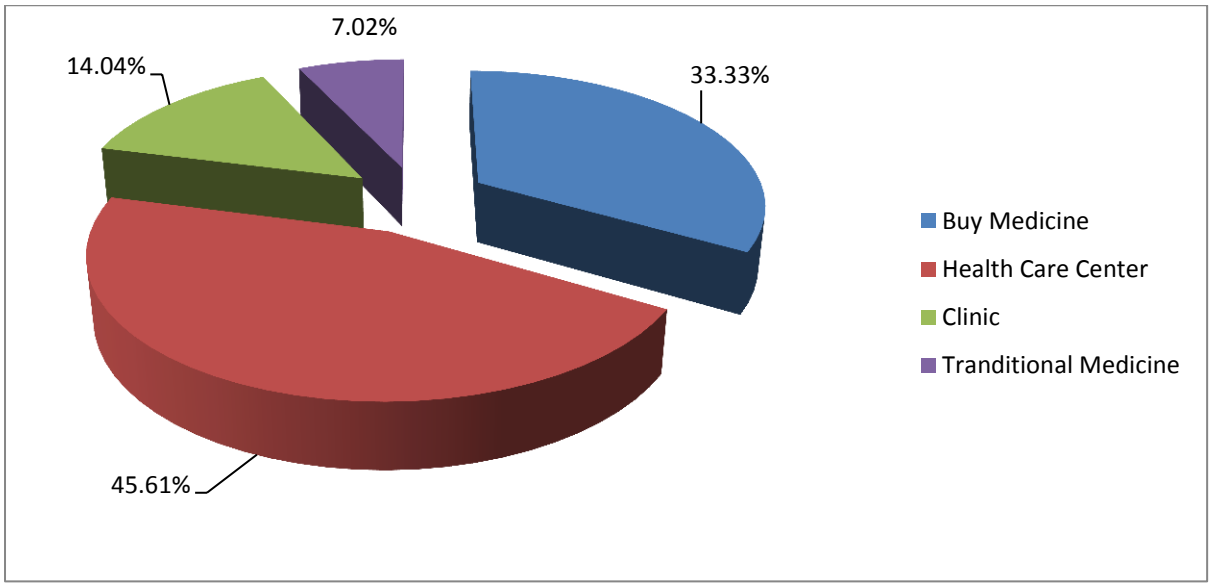
Table 3.5: Common ailments in the Study Area

Type of Ailment	Number of Cases
Malaria	115
Fever	60
Flu	75
Diarrhea	15
Stomach Ache	5
Asthma	10
Dengue fever	10
High blood pressure	5
Typhoid fever	40
Arthritis	10
Thyroid	1
Kidney stone	1

The table above indicates that malaria is a major concern, despite the existence of programs to combat malaria in the study areas. Since livelihoods depend on the forest, where mosquitos which transmit malaria reside, it is nearly impossible to remain completely free from malaria. Another health concern is typhoid fever; 40 cases were reported in interview with respondents. Low sanitation, such as lack of toilet facilities and access to clean water seems to be the root cause of this disease. However, respondents did not have adequate knowledge about this health threat, its causes and its prevention.

3.2.6.3 Treatment for Illnesses

Figure 10: Treatment for Illnesses



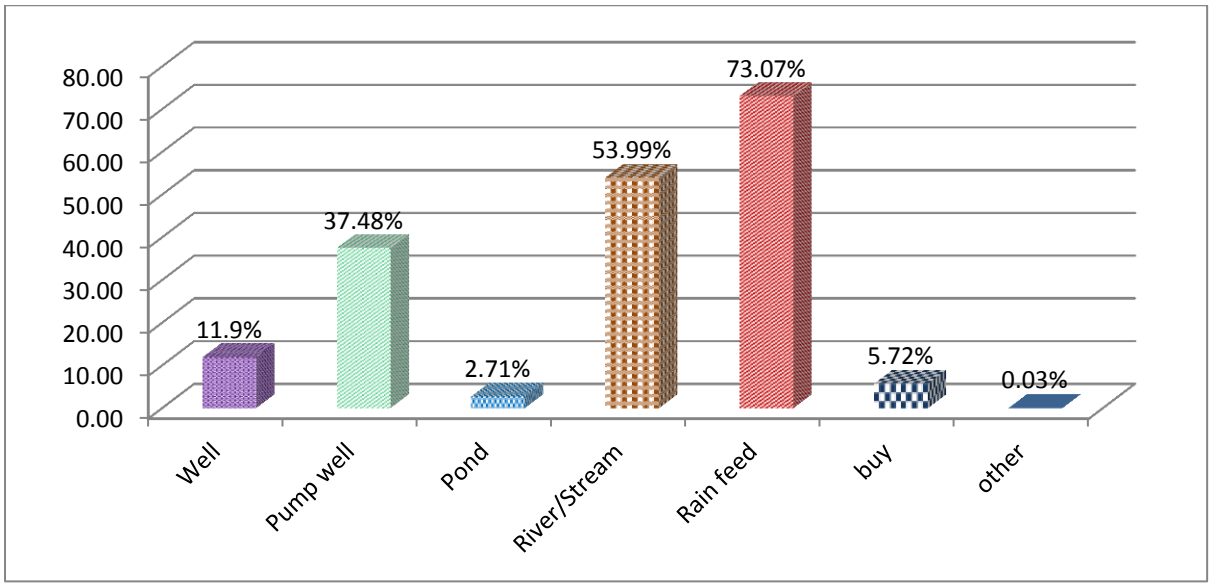
Of the six villages, only Toul Village has a health care center. Since there are no health care centers or pharmacies in Roveak, Toul, Meanchey, Ou Boun Leu and Khtong, when people get sick they go to the nearest place where they can obtain treatment. Those from Roveak, Meanchey and Ou Boun Leu go to the health care center in Bram Boun village, which has hospitals in the district level, pharmacies and some medical practitioners. For Roveak and Khtong, however, becoming sick in the rainy season is likely to lead to tragedy, as roads become flooded and impassable. Villagers in Roveak and Khtong are cut off from other villages, and have no possibility of receiving medical treatment. Data gathered in this study shows that 45.61 percent of respondents go to the health care center regardless of the distance, while 33.33 percent either buy medicine to keep at home or directly go to the pharmacy whenever they need treatment. Traditional treatment still exists within the study areas, but is used by a very low number of respondents (7.02 percent), and is often used in combination with modern drugs. Those that use purely traditional treatment do so because they are too poor to afford other types of medical care.

3.2.6.4 Access to Clean Water

- **Sources of Water**

Water is the most important aspect of livelihood that can determine many aspects of livelihood such as health, livelihood strategies, agricultural practices and even the level of living standards.

Figure 11: Sources of Water for Consumption



Source: RUA & NTFP's Survey, 2013

The above figure shows that in the six villages, rain is the most common and important source of water for the villagers' daily life. In Toul, the stream is the most important source of water, followed by rain and pump wells. There are no ponds, and no one buys water, mainly because road conditions are bad for transporting water, leading to prohibitive prices. O Te is the nearest and main source of water in Toul village. This stream comes from Kratie; it is not a steady source of water because it depends on rainfall. During the rainy season the stream level gets higher, but the water is often dirty with rotten leaves and pieces of wood from the top of the mountain. During the dry season, the stream dries up, so people use leftover collected rain water, which is not enough for consumption. Villagers from Toul also use some pump wells. Although the quality of the water from the pump well is safe for comsuption- free from dirt and rot leaves fine, some villagers don't like the taste of the water and prefer to use stream water. Every morning, small children spend around 1 hour getting the water from stream before going to school.

Stream water is used for multiple purposes such as cooking and washing; which is generally not good for health. In Khtong, the main sources of water are the stream, pump well, and rainfall. Due to its remoteness and difficult road conditions, villagers cannot afford to buy from the provincial town, the big jars to keep water, and therefore only use rain water. Usually, Khmers use jars to store rain water so they can use it even during the dry season. This happens only in Meanchey and Ou Boun Leu villages, which are quite close to Khos

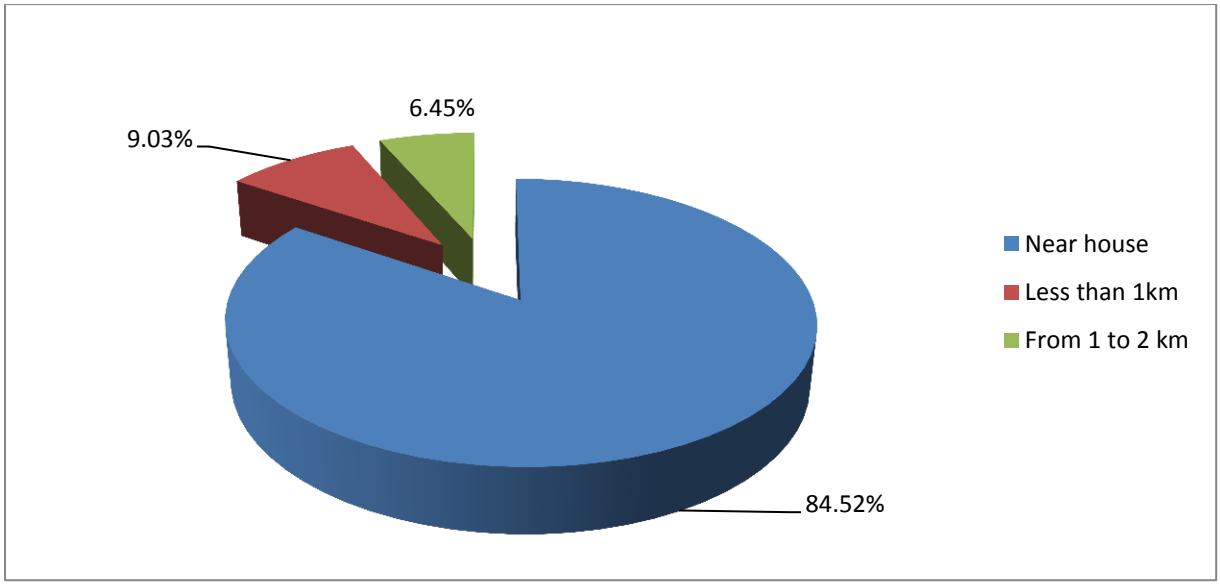
Nheak, and would have more access to jars for storing rain water. However, in all selected villages, there is no access to water that is sterilized and safer for people to drink. Villagers rarely use water filters, due to lack of awareness on health and sanitation, to ensure that the water that they drink is safe, which could also help explain why health conditions – or frequency of illness associated with unsafe water consumption.

Table 3.6: Number of Wells in the villages

District, Commune	Village	Household Number (2011)	No. of Wells
Kaev Seima District			
Srae Chhuk	Khtong	169	4
Memong	Toul	123	3
Kaoh Nheaek District			
A Boun Leu	Ou Boun Leu	156	5
Srae Sangkum	Meanchey	142	6
Roya	Rovak	78	2
Senmonorom District			
Sokh Dom	Lao Ka	202	23

- **Distance from Water Source**

Figure 12: Distance from water source

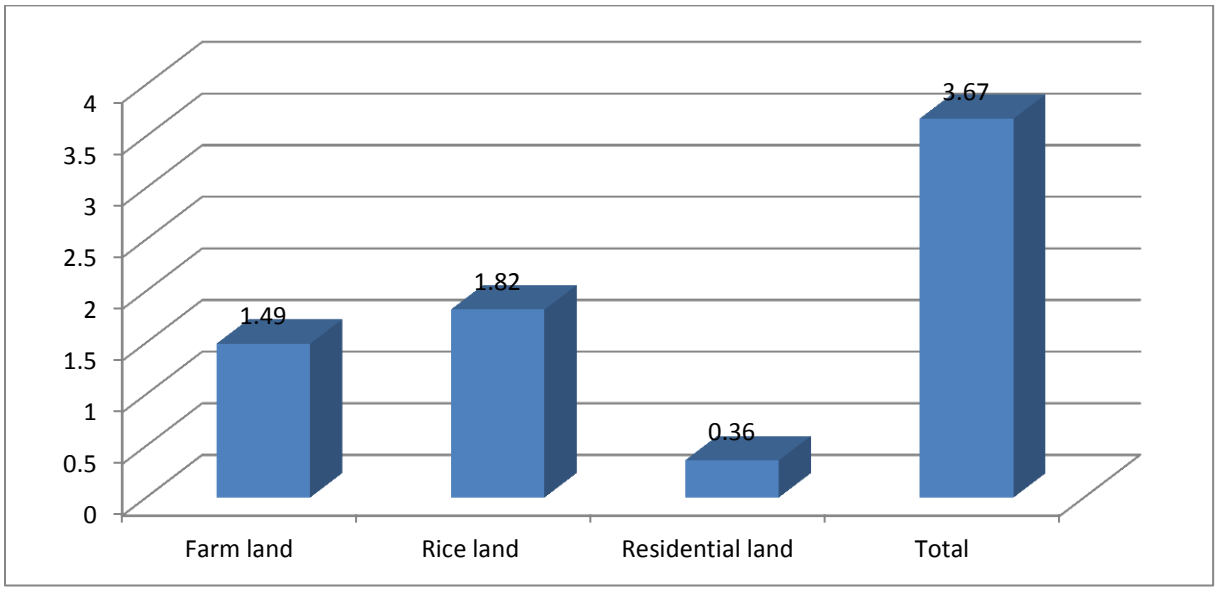


Based on the resource mapping done during Focus Group Discussions (FGD), most of the respondents settled near sources of water, particularly rivers and streams. Thus, 84.52 percent of respondents claimed their source of water is near their home. In Tuol, it usually takes an hour to transport water from the stream to villagers' homes because a large number of villagers use the stream at the same time, and there is only a small harbor. It also takes a while to get water from pump wells, because villagers have to line up to get water. Villagers consume water that is often simultaneously used for different purposes. For example, a stream is used for washing animals, laundry, bathing and swimming. Wash water released from the top of the stream flows to the lower part. Thus, water is constantly polluted. This indicates poor water management and utilization, which leads to lack of safe and clean water, even if it is used sustainably.

4. Economic Profile

4.1 Property and Land

Figure 13: Average Land holding size per household



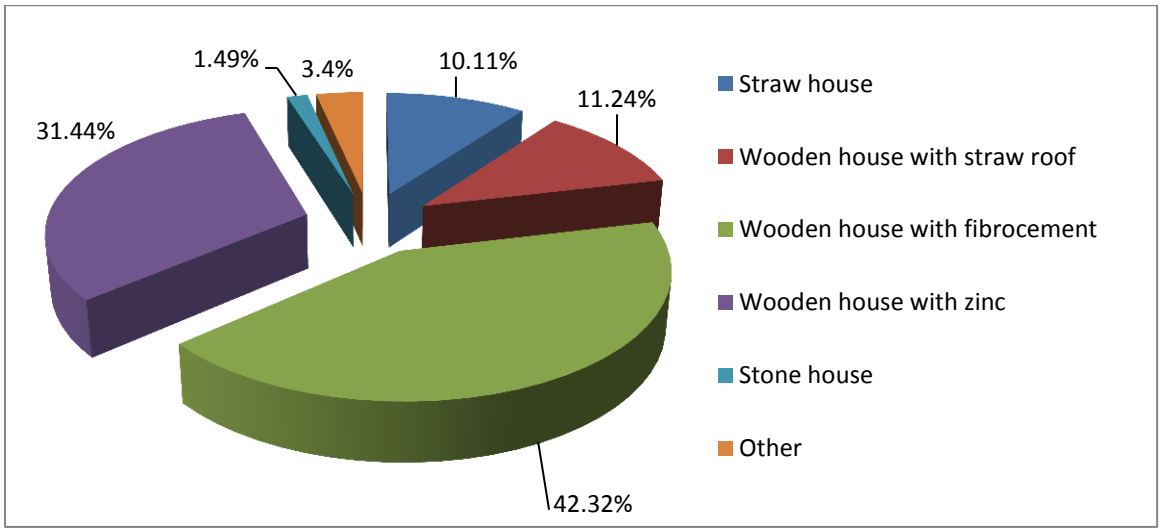
The above figure shows the types of land ownership, categorized by three types of land--residential land, rice fields and swidden fields or Chamkar of each village. On average, a household possesses about 3.67 ha of land. Chamkar make up 1.49 ha, rice fields about 1.82 ha and residential land around 0.36 ha. In all selected villages, all families owned land, particularly residential land. Newlyweds also had land because the commune specifically reserved land to share with the newly married. Those who have resided in Mondulkiri for the

last 30 years or so, tend to have a lot of land compared to other provinces or with those who have just settled in Mondulkiri. In the past, land could be freely occupied if one took the effort to clear the land and claim possession. However, possession is not considered the same as legal ownership, because under the Land Law; ownership is only legal when a land title is issued by the Cadastral Office. Lao Ka is the best example of land distribution and implementation of the Land Law. According to semi-structured interviews with key informants, 450 acres of rice field were given to 270 households in 2013. Each household received 1.5 acres for rice production. Shifting cultivation is no longer permitted under provisions of private land certificates and titles granted to some families and where boundaries of such private property have been delineated.delineating the boundaries of the property. It should be noted that tthis goes against the traditional practices and culture of indigenous perrsons and communal ownership.

4.2 Housing Material

Shelter is a basic need that is generally used as an indicator of the standard of living or the level of development in a community. [1] People build their shelters based on what materials they have in their locality and their cultural profile. Mondulkiri is dominated by a large number of indigenous persons; it also has abundant forests. The better the material used for housing, the better the living standard, yet in all selected villages there are differences from village to village in the housing material used, due to the varying living standards and infrastructure conditions affecting transport of materials for construction.

Figure 14: Material for Housing Construction



Source: RUA & NTFP's Survey, 2013

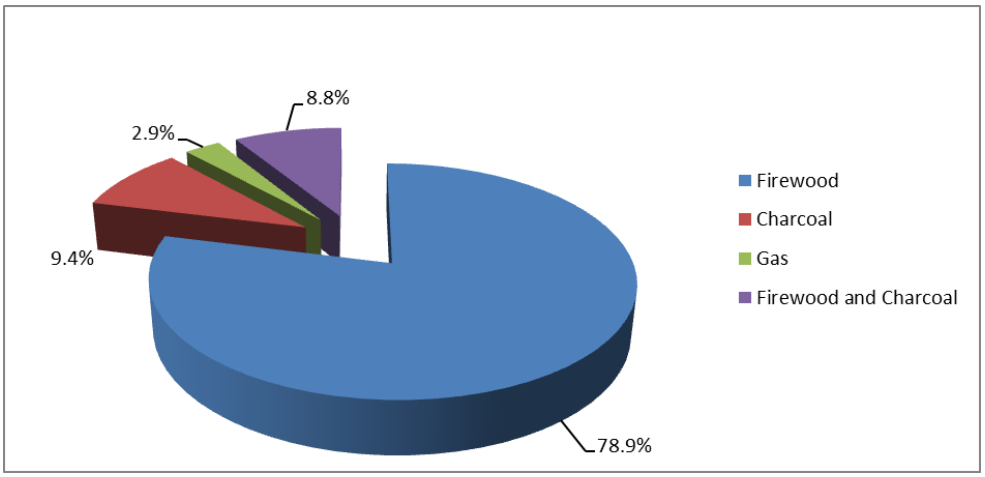
The above figure illustrates the materials used for housing in the selected study areas. The study found that 42.32 percent live in wooden houses with fibrocement roofs, while 31.44 percent live in wooden houses with zinc. The housing materials are mostly found in Meanchey and Ou Boun Leu, which is located close to Khos Nheak, so contruction materials are much more available and easier to transport, compared to remote villages such as Khtong and Rovak. In these remote villages, straw houses are the typical housing shelters for the villagers.

4.3 Cooking and Lighting Materials

In 2004, firewood was the most commonly used fuel for cooking purposes, used by 83.9 percent of Cambodian households. Charcoal was used in 5.5 percent of households, followed by LPG (liquefied petroleum gas) at 4.2 percent, Kerosene (0.6 percent), and electricity and other fuels (0.9 percent). Approximately 70.4 percent of urban households and 92.6 percent of rural households used firewood and charcoal. This continued extensive use of solid fuels has significant environmental implications for air quality and Cambodia's forests (NIS, 2005). In 2004, approximately 70.4 percent of urban households and 92.6 percent of rural households used firewood and charcoal.

Besides local users, the big firewood and charcoal consumers are bakeries, restaurants, and other food processing enterprises in the towns and cities. These put great pressure on forest resources without careful, immediate forest management. Firewood and charcoal supply chains come from at the least five provinces: Kratie, Kampong Thom, Kampong Speu, Pursat, and Kampong Chhnang (FAO, 1998).

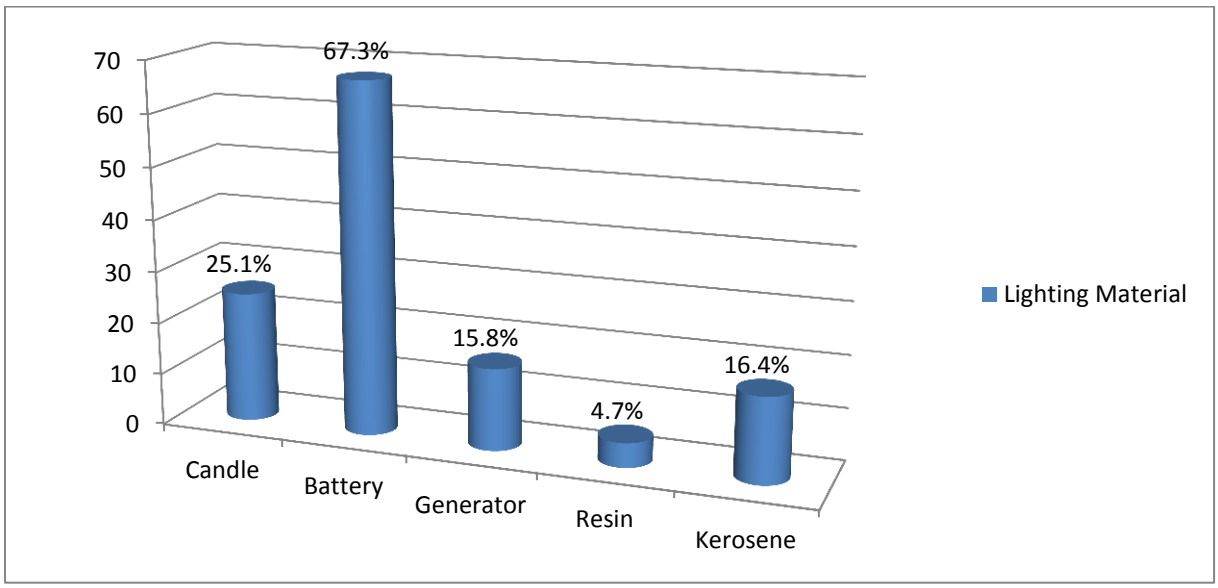
Figure 15: Type of Fuel for Cooking



Source: RUA & NTFP's Survey, 2013

The study shows that firewood is still the most common cooking material in every target village. 78.9 percent of respondents use firewood which can be found almost everywhere around their house and even outside their gate. Firewood in rural areas is free of charge as long as people are willing to go and collect and chop the wood and bring it home. The combination of firewood and charcoal is at 8.8 percent, while the utilization of charcoal alone is 9.4 percent. The type of cooking material used can also be connected with housing amenities. If one's house is made of concrete, and the living standard is high, the owner generally would prefer to use charcoal, which does not emit smoke that can stain the house. Finally, only 2.9 percent of the total households interviewed use gas as their cooking material.

Figure 17: Lighting Materials



Source: RUA & NTFP's, Survey, 2013

The study found that 67.3 percent of households in all six villages utilize both alkaline batteries and chargeable batteries (once in 2-3 days at a time) for lighting their homes and for going to the swidden at night or hunting. However, batteries alone are not enough for lighting, so villagers also use other materials. 25.1 percent of the total households use candles if they do not possess a torch, or as back-up when they run out of battery power. 16.4 percent use kerosene for lighting, particularly when the family living standard is below average, as kerosene is more affordable and lasts longer. The 15.8 percent who use generators are mostly from Toul and Lao Kar. In Toul, households residing close to the market (or manage their own small stores from their houses) have better living standards and can afford to buy

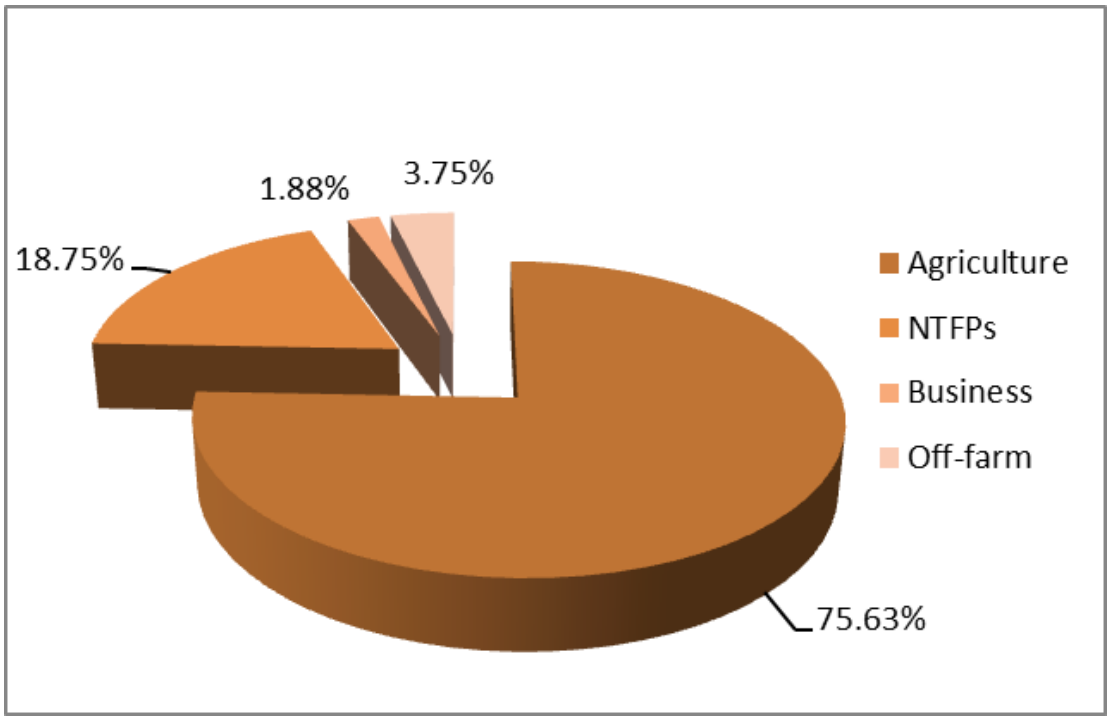
generators. They offer the use of the generator to others, and earn extra profits by doing so. Those from Lao Ka have access to electricity from Electricite du Cambodge (EDC), as this village is only 7 km away from the provincial town of Senmonorom. Finally those who reside in Rovak and Khtong tend to use resin as their source of lighting; the study found that 4.7 percent of households utilize resin as a source of lighting, though it is not the only lighting material used.

4.4 Livelihood Activities

- **Main Occupations**

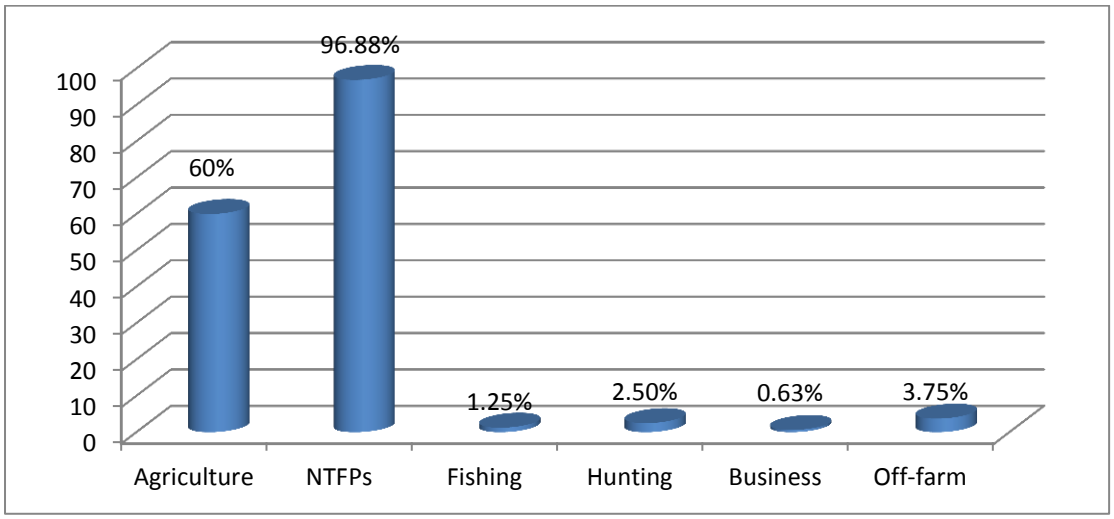
Interviews with 345 respondents from six selected villages revealed that agriculture is the main occupation (75.63 percent). Most villagers possess both Chamkar and rice fields where they can cultivate rice mainly for consumption; there is often barely any surplus which they can sell. Respondents identified it as the main livelihood strategy because this it takes up the most amount of their time. However, 18.75 percent of the respondents claimed that non-timber forest product extraction is their main livelihood activity; this includes honey gathering, solid and liquid resin collecting, bamboo shoot and rattan collecting.

Figure 18: Main Occupation in Selected Area



❖ **Sub Occupations**

Figure 19: Sub Occupation in Selected Area

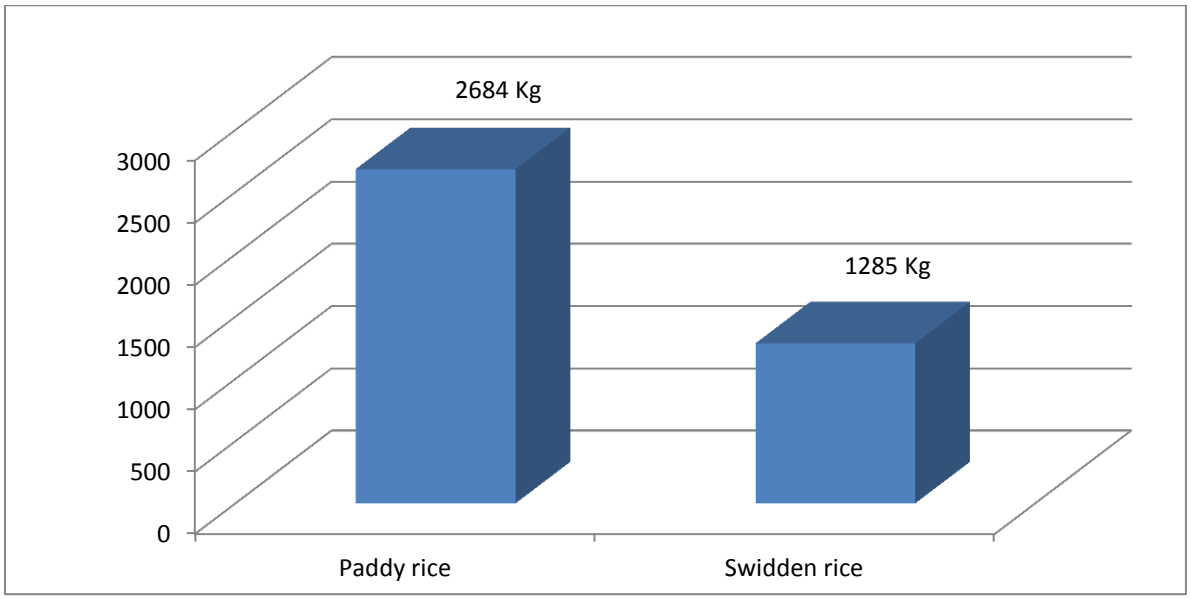


4.4.1 Agriculture

4.4.1.1 Yield of Rice Production

Although villagers claim rice production is their main occupation, actual rice production is barely sufficient. The study showed that the yield level differs due to land type; one ha of rice field yields about 2,689 kg while swidden or Chamkar yields around 1,285 kg per ha. The yield is also based on other reasons such as soil fertility, mechanized equipment, as well as weeding and cropping techniques. Mechanized equipment cannot be used in Chamkar because of geographical considerations; Chamkar are usually in forests which are inaccessible by hand tractors. There are also difficulties with weeding and animal destruction.

Figure 20: Yield of Rice per ha



4.4.1.2 Rice Production Sufficiency

An average Cambodian consumes 160 kg of rice per year. In the target villages, the average household size is 6 people per family; which requires 960 kg of rice per year. The study found that the average yield of swidden farmed rice is 1,258 kg or 2,684 kg of paddy farmed rice. This is equal to about 838 kg of milled rice, below the required 960 kg per family. In fact, 61.22 percent of respondents said that rice production was insufficient to meet the needs of their families.

Figure 21: Rice yield sufficiency

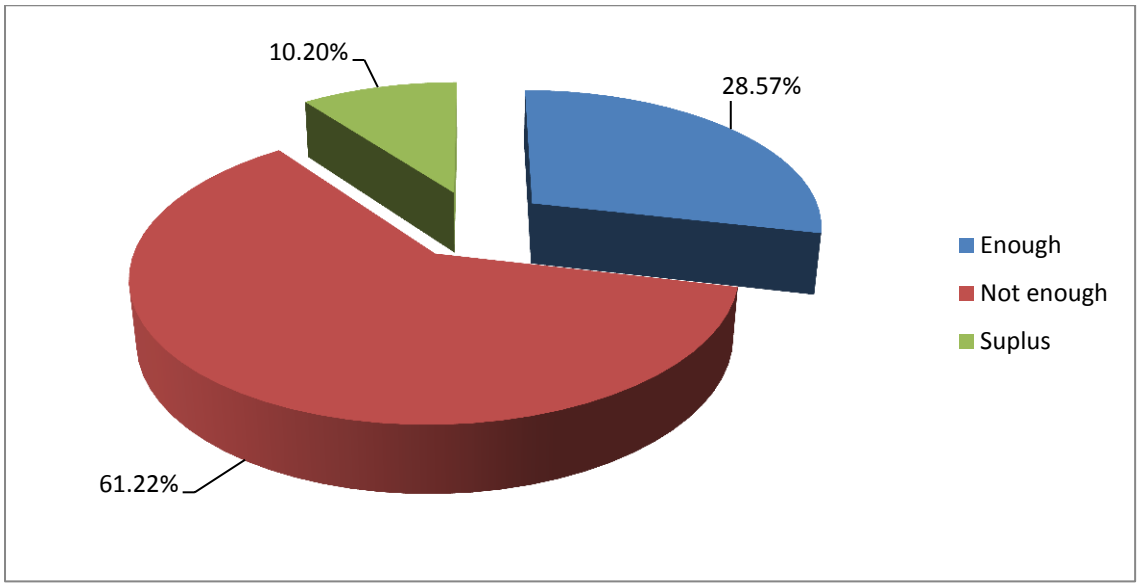
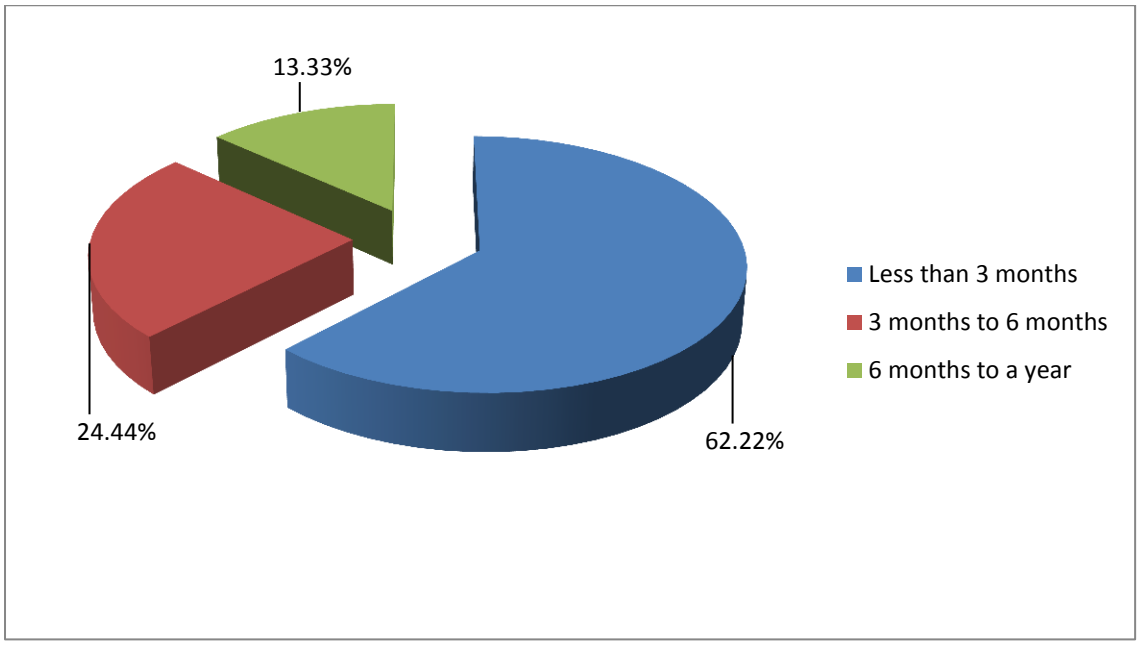


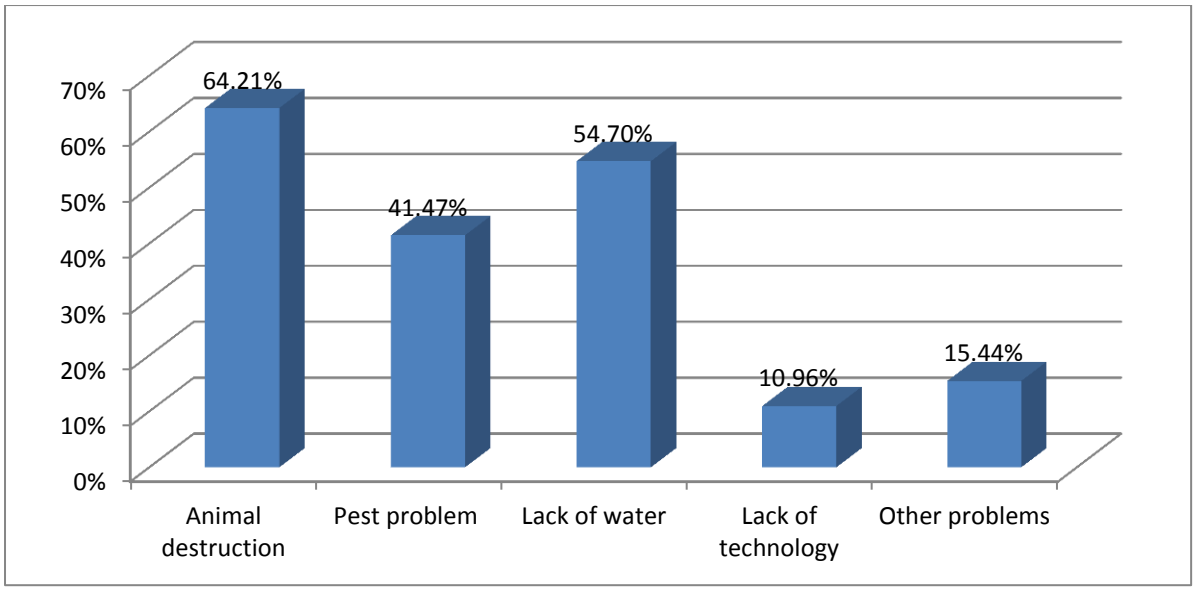
Figure 22: Periods of Food Shortage



4.4.1.3 Challenges for Rice Production

Agricultural production is insufficient to meet the needs of the respondents also because of destruction of crops by wildlife, particularly wild boar, rats, squirrels and peacocks. This leads to villagers hunting wildlife hunting for the purpose of protecting their crops. Farmers use traps around their fields from July to December of each year. November and December are the peak times that farmers can trap wild boar, because it is close to harvest time.

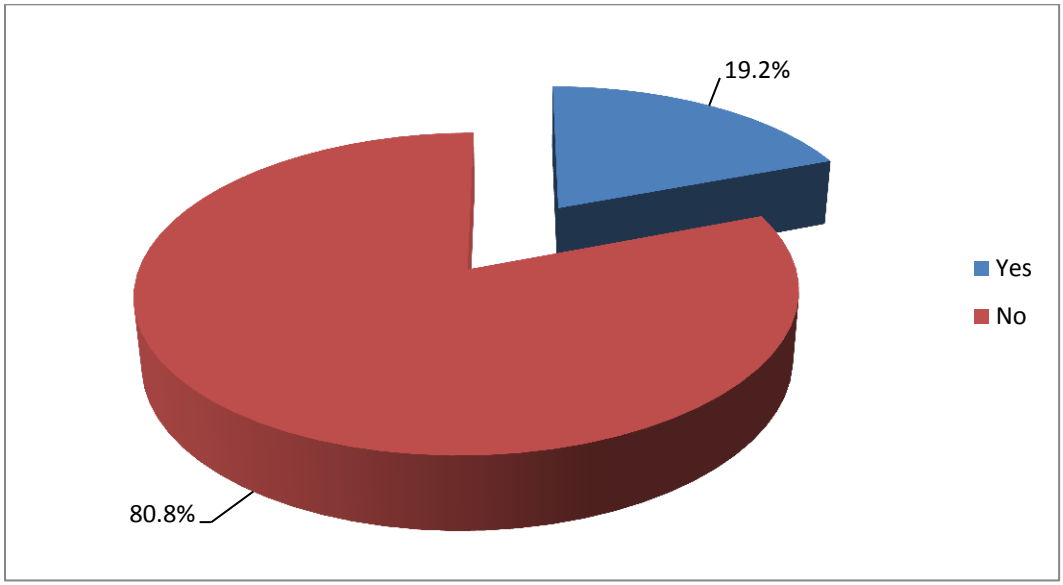
Figure 23: Challenges of Rice Production



4.4.1.4 Use of chemicals fertilizer or pesticide

Aside from rain based agricultural practices, farmers from the target villages prefer organic crop and rice production. Lao Ka, Rovak and Khtong do not use any chemical fertilizers in their rice and swidden fields, while Meanchey and Ou Boun Leu use the most amounts of chemical fertilizer. Around 80.8 percent of agricultural production does not use any chemical fertilizer or pesticide, as it is in Chamkars in the forest. The remaining 19.2 percent that use chemical and pesticide use it in rice fields where people can apply chemicals and pesticide.

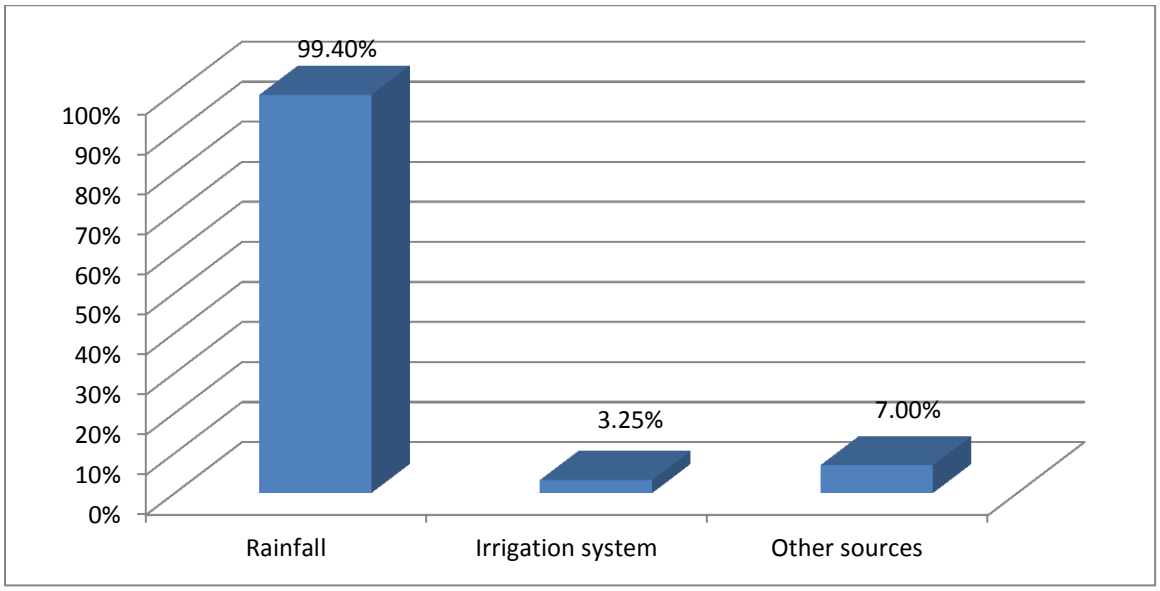
Figure 24: Chemical Utilization in Agriculture



4.4.1.5 Sources of water for farming

Agricultural practices in all target villages uses rain based cultivation, so rice is cultivated only once a year. Lao Ka, Toul, Khtong and Rovak depend 100 percent on rainfall for their agriculture, especially rice cultivation. Ou Buon Leu and Meanchey depend partially on irrigation, but still mostly rely on rainfall.

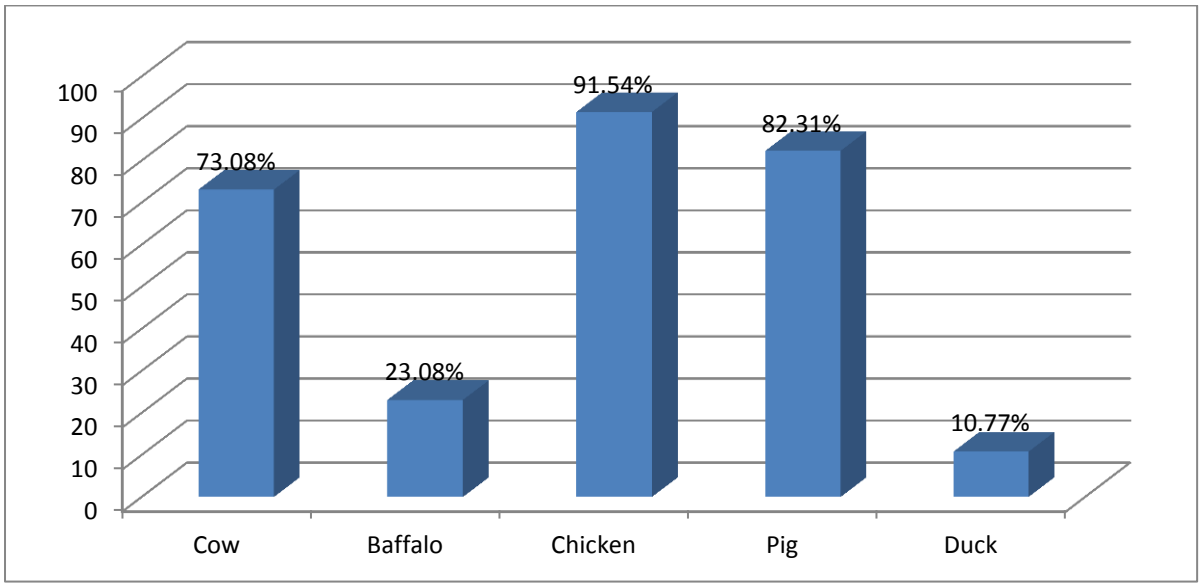
Figure 25: Water Source for Agriculture Cultivation



4.4.2 Livestock

The data gathered shows that 91.54 percent of households raise chickens, while 23.08 percent raise buffalos.

Figure 26: Family who raises livestock



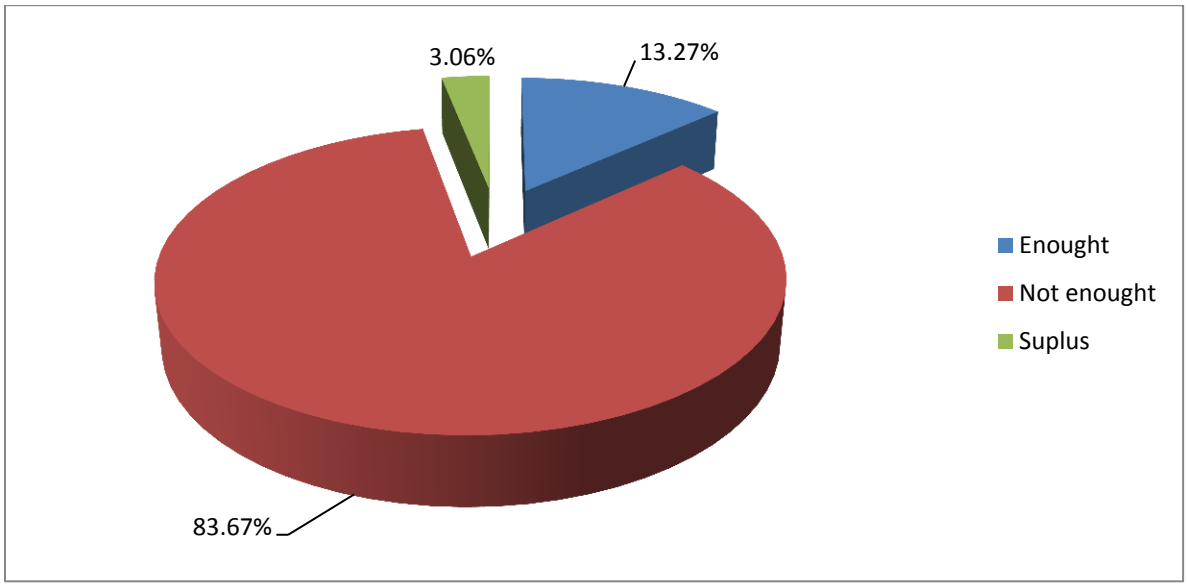
4.4.3 Fishing

Cambodia ranks fourth in the world in terms of inland fish production, after China, India and Bangladesh. Cambodians consume an average of 37.5 kilograms of fish a year, well over

twice the global consumption average of 15.8 kilograms a year. Fish is a major source of nutrition in the Cambodian diet, and accounts for more than 75 percent of total animal proteins consumed.

Nao Thuok, chief of of the Fisheries Administration, told the Phnom Penh Post that during the fishing season in late 2007 and early 2008, the national catch totaled about 473,760 tons of fresh water, marine and aquaculture fish.

Figure 27: Sufficiency of Fish Catch

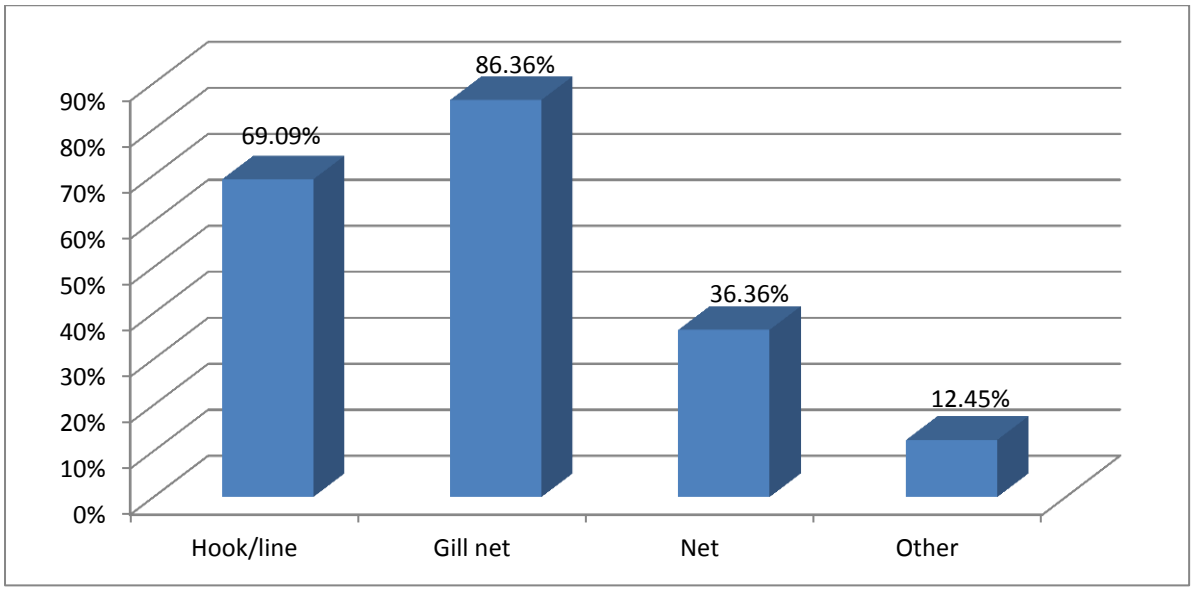


- **Fishing Area**

The common fishing spots in Lao Kar are O Hong Ro A, O Cheu, O Ropa, O Ngorka and, O Treatra, which are about 3 km. from the residential sites. In Rovak, the fishing spots are O Roha, O Teng reng and O Rovak, O Toun, O Peay; Meanchey has O Chbar, O Yes and the dam. Toul people fish in O Te, O Pong To and O Ka lok. People mostly fish in the dry season because it is more difficult and slightly dangerous during the rainy season because of fast currents and high volume of water.

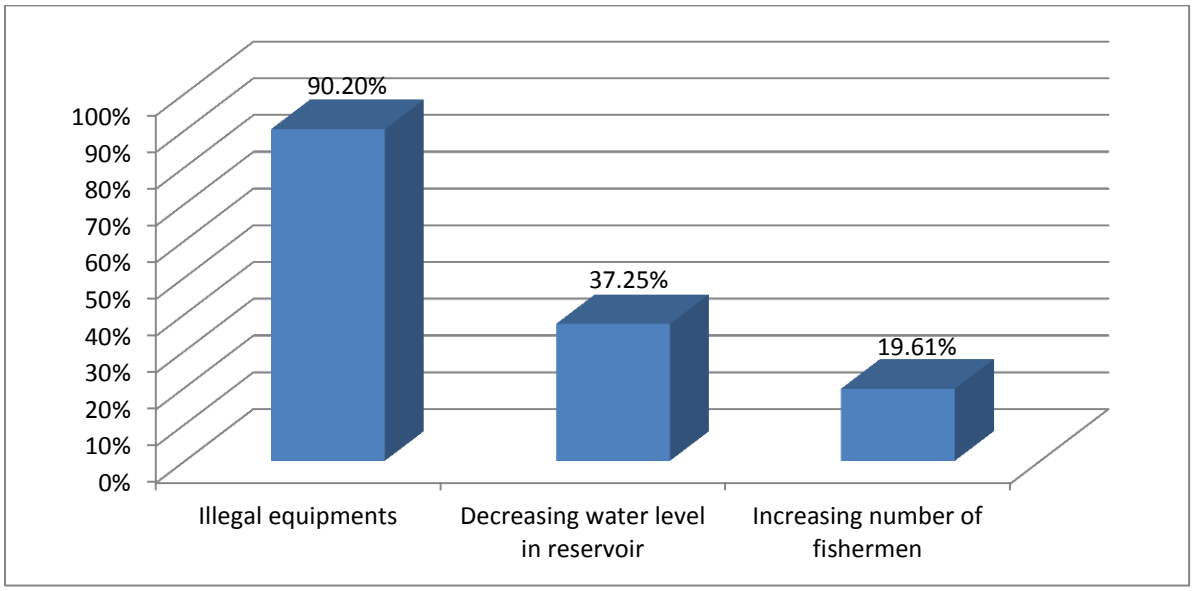
- **Fishing Equipment**

Figure 28: Fishing Equipments



❖ **Reason for Fish Decline**

Figure 29: Reasons for Fish Decline



Some villagers go fishing almost year round, but only for subsistence. They catch around 0.5 kg of fish per day, an amount which is too little to be traded. The most common fishing time is during the dry season because respondents claim that the rainy season is not good for fishing as they fear floods and destruction of their fishing equipment due to fast water currents.

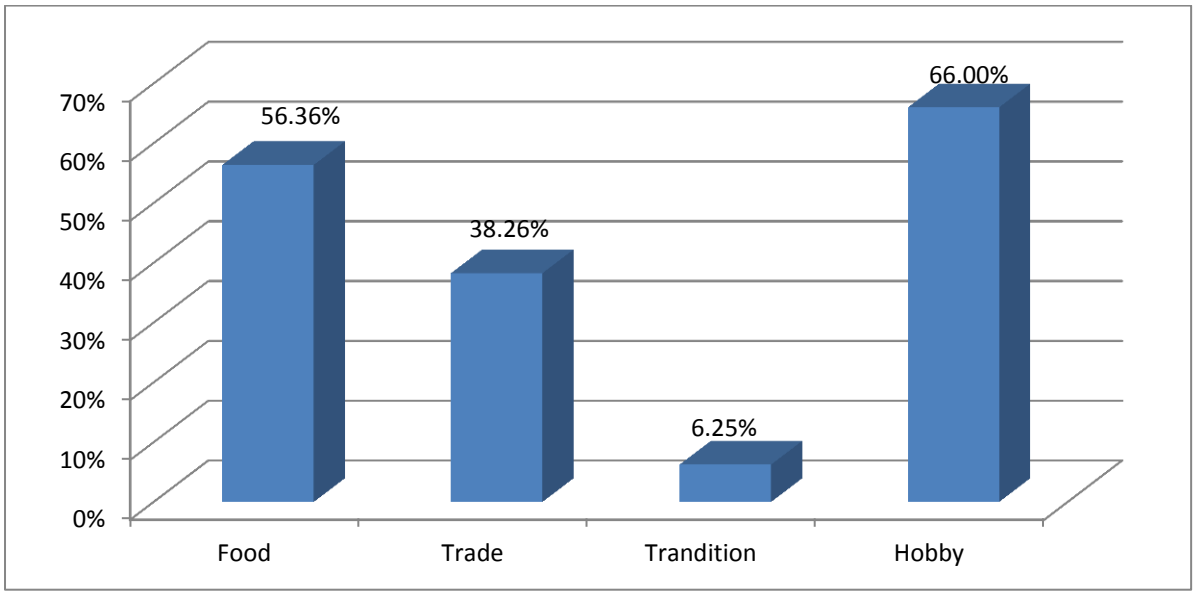
4.4.4 Livelihood Based on Wildlife

Commonly spotted wildlife include wild buffalo, *kouprey*, gaur, tiger, deer, monitor lizards, wild oxen, wild dogs, leopards, wild boar, gibbons, elephants and some birds. Hunting used to be a traditional practice but now villagers hunt for trade purposes and food. They hunt in both community forests and protected forests.

In Toul, most hunting is for trade, and only a small amount of animals caught are for food. Trakuot, wild boar and turtle are the most hunted species. Villagers and outsiders hunt, but indigenous people mostly hunt in groups, and use dogs for hunting. Wildlife numbers have been gradually decreasing due to the loss of forest from economic land concessions granted to companies and extreme illegal hunting by both villagers and outsiders.

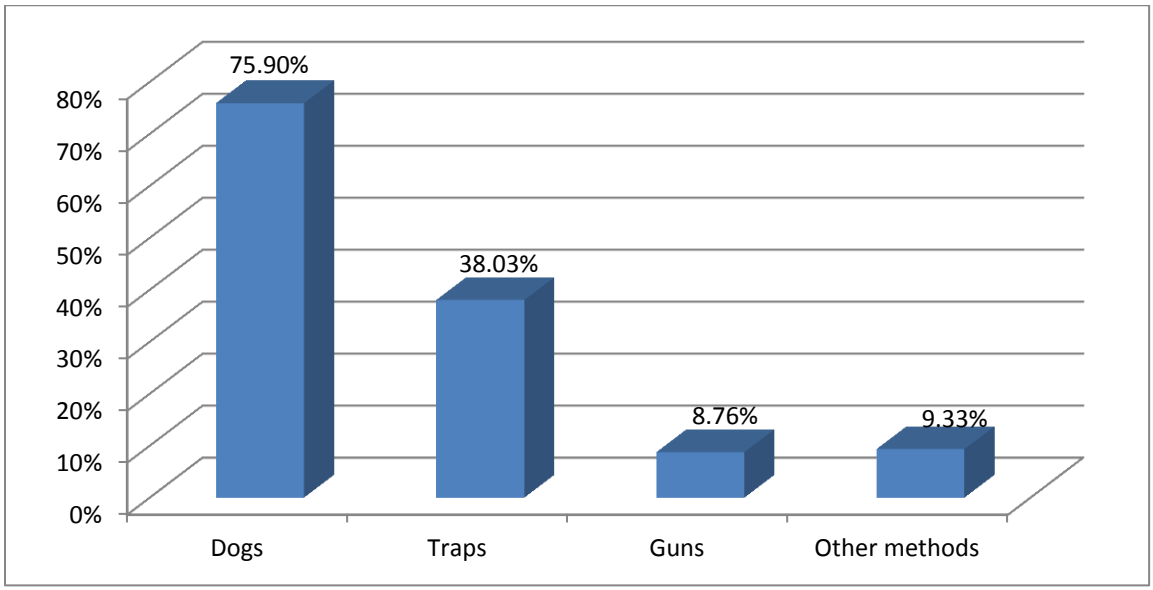
4.4.4.1 Reasons for Hunting

Figure 30: Reasons for Hunting



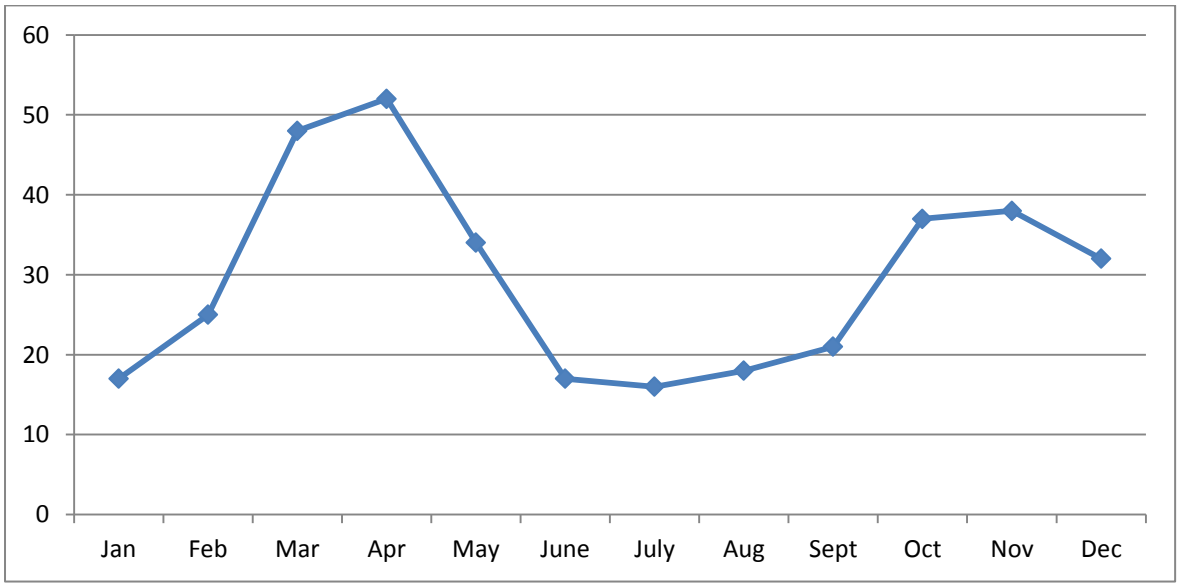
4.4.4.2 Hunting Method

Figure 31: Method in Hunting



4.4.4.3 Hunting Calendar

Figure 32: Hunting Calendar



4.4.4.4 Animals Being Hunted

Table 3.7: Animals being hunted

Turtle/tortoise	**33.70%**
Civet	24.40%

Snake	7.40%
Muntjac	2.70%
Wild boar	87.43%
***Trakuot*/Lizard**	5.80%
Porcupine	41.80%
***Sambar* deer**	1.20%
Char bar	5.60%

4.4.5 Livelihoods Based on NTFPs

4.4.5.1 Liquid Resin

Liquid resin is one of the important NTFPs collected by rural communities whose living depends on natural resources in Cambodia. It is extracted from the dipterocarpus alarums roxb (Chheuteal toek) and dipterocarps intricate dyer (Trach) trees. Liquid resin is used as a raw material in the manufacture of varnish, cheap soap, sealing wax and in leather making. Locally, it is commonly used for caulking boats or in torches for lighting houses in the village (WWF, 2007).

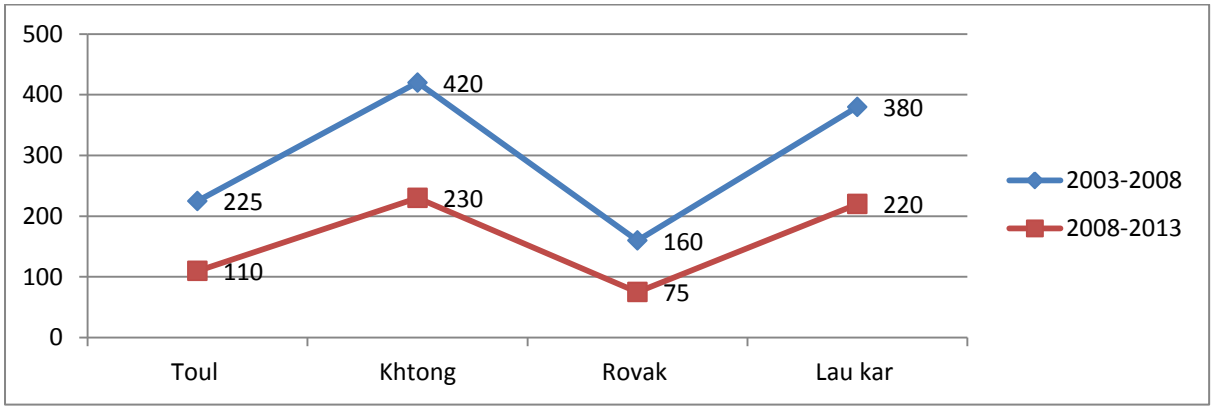
Four of the six target villages have liquid resin trees. The two villages without liquid resin trees are those located near the town and far from the forest (Ou Boun Leu and Meanchey). The four villages with resin trees (Toul, Rovak, Lao ka and Khtong) are near the forest; where most villagers depend on natural resources, and their main source of income is based on NTFPs collection.

The liquid resin trees are not located in the village; residents need to go out of the village to harvest the liquid resin. For Toul and Rovak villages, the liquid resin trees are around 5-15 km. away from the village, which makes them easy to harvest. For Lao Kar and Khtong villages, the liquid resin zones are between from 20 to 45 km away so villagers have to go farther and spend more time harvesting the liquid resin.

❖ **Liquid resin trees**

Focus group discussions with the villagers revealed that liquid resin trees have been steadily decreasing each year. The figure below shows how the number of liquid resin trees has changed over the years.

Figure 33: Number of Liquid Resin Tree



Source: RUA &NTFP-EP Survey, 2013

The figure above shows that from 2003-2008 and from 2008-2013, the number of liquid resin trees decreased dramatically. Khtong village in 2003-2008 had around 420 liquid resin trees per group; and from 2008-2013 they have around 230 liquid resin trees per group (unlike in other villages, the residents of Khtong village harvest by groups). Lao Ka is near the town and its liquid resin trees are far from the village. The number of their liquid resin trees also decreased from 380 in 2003-2008 to 220 in 2008-2013.

All four villages which have liquid resin trees reported a decrease in their number. The reasons for the decrease vary. The main reason for the decrease is that government has granted economic land concessions to companies, which then cut all the trees so they can plant industrial crops. The trees cut by the companies include liquid resin trees. In addition, sometimes outsiders cut the liquid resin trees to sell the wood. Some improper harvesting techniques of the villagers also cause loss of trees; sometimes villagers set fire to the trees to get the liquid resin, which leads to forest fires. If government, stakeholders, and owners of liquid resin trees fail to take action to protect the trees and properly manage this resource, the number of trees will continue to decrease.

- **Liquid resin market**

Access to markets and the best prices are essential to improve the livelihoods of those selling liquid resin. The liquid resin harvesters in remote villages like Khtong and Toul have difficulty accessing the markets in Senmonorom, not only due to the distance, but also because of the poor conditions of the roads. Moreover, local authorities state that those who want to be the middlemen for selling NTFPs must be licensed by the Forestry Administration. In Toul, there is only one middleman who buys liquid resin in Memong commune. Due to closed market conditions, liquid resin harvesters are not satisfied with the current price set by the sole middleman, so they secretly sell their product to others. In Rovak, liquid resin harvesters can sell their products in the village or they can take it to sell at Kaoh Nheaek district. However, the poor road conditions from Rovak to Kaoh Nheaek mean that villagers need to spend more money and time. Lao Kar is the only village near Senmonorom city, thus liquid resin harvesters from Lao Ka have easier access to the market and can more easily find good prices to sell their products.

It is essential that resin producers have relevant and accurate price information, so they can find buyers willing to pay the best prices. In the target areas, liquid resin harvesters have only limited price information, they are aware only of prices from the middleman and their neighbors, so they sometimes cannot sell their products at a good price.

Most prices of products change on the basis of supply and demand. In contrast, changes in the price of liquid resin depend on the season. Liquid resin can only be harvested in the dry season, and despite the greater quantity of liquid resin, the price increases during this time. During the rainy season, when resin is not harvested, the prices go down.

The challenges for liquid resin marketing are: difficult road conditions; free market restrictions due to some middlemen controlling the local market; lack of access to price information except from middlemen and neighbors.

- **Methods of harvesting**

Proper techniques for harvesting liquid resin could ensure that harvesting can take place throughout the year. In target villages, traditional harvesting methods are still used, and villagers are not aware of new techniques. There are no institutions or NGOs that teach them

these techniques. Thus, villagers only can harvest liquid resin in the dry season; during the rainy season, the rain mixes with the liquid resin, reducing its quality and lowering its price.

4.4.5.2 Solid Resin

Solid resin is collected from trees belonging to the species group *Shorea*, *Vatica* and *Hopea*. Villagers rely on solid resin as a source of income. All villagers in the target areas collect solid resin during the dry season. Each village organizes groups to collect the resin; each group contains 3 to 8 persons, who spend 1 to 5 nights in the forest. The group does not only look for and collect solid resin, but also other NTFPs, such as *Chor Ong*, *Sleng* seed and the like. Almost all NTFP collectors are children, with one of two elderly men. Collectors can sell solid resin in their villages at the price of around 2,000 Riel per kilogram. The yield of solid resin decreases every year, since the trees that provide solid resin need to be cut during harvest.

4.4.5.3 Rattan

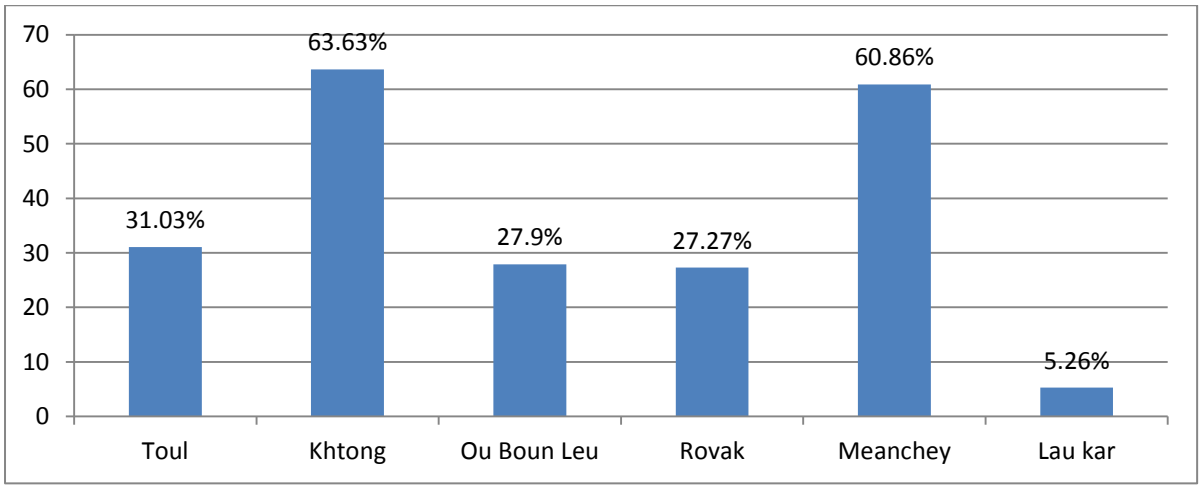
Rattan grows along the streams in the villages, but only a few families cut rattan to sell. It is generally used as a raw material that needs to be refined to be useful. Of the six target areas, only Toul and Lao Ka villages have a few households that harvest rattan. Toul village has three families who harvest rattan; they form groups of around 3 people who spend 2 to 3 days in the forest to harvest one cart of rattan. They can sell the rattan for 100,000 riel per cart, and they sell this in the village. Only one family in Lao Ka village harvests rattan, but unlike the families in Toul Village, this family does not sell rattan as a raw material. It sells processed rattan in the Senmonorom market.

4.4.5.4 Sleng Seed

Sleng trees (scientific name *Strychnos nux-vomica*) mainly grow in the mountainous areas and plateaus of Mondulkiri province. These 12-13 meter trees give seeds that can be harvested and utilized in strychnine production. The nuts can be used in many ways, such as making poisons, tonics, bitter flavoring for medicinal purposes and as a muscle relaxant in medicines (de Beer, 1993).

Commercial *Sleng* seed collection in Mondulkiri began in 2004 by western and northern communities (WWF, 2007). At first, the price of *Sleng* seeds was cheap at 500 riel per kilogram. The price has since increased to 2,000 riel per kilogram. Those who harvest the Sleng seeds can sell it in the villages and to middlemen who live in the villages and in other areas.

Figure 34: Percentage of Sleng Seed Commercing

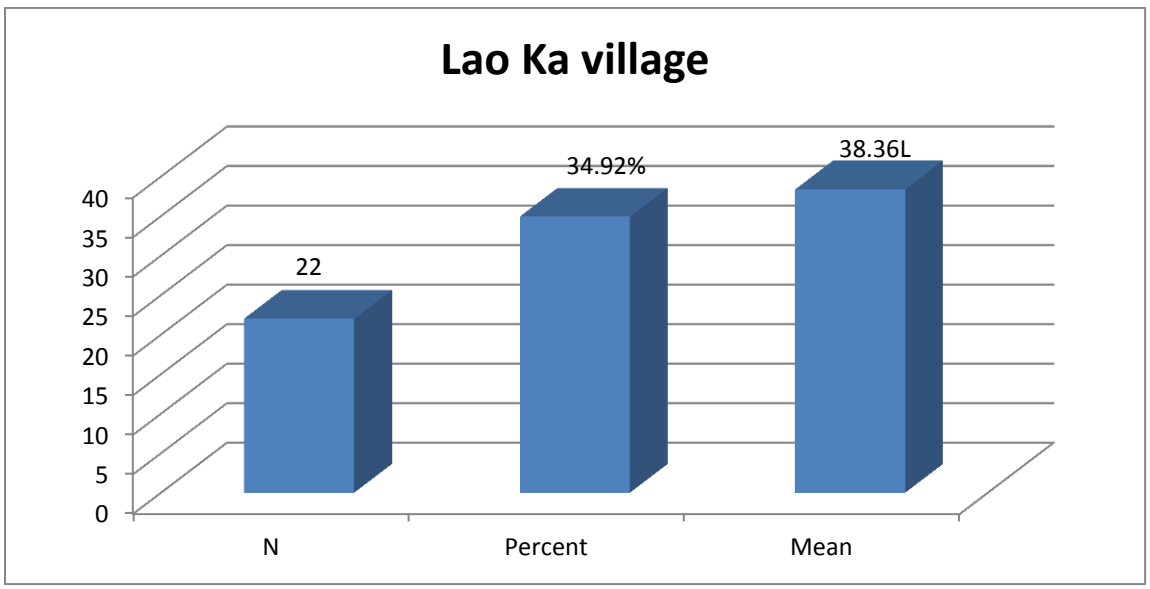


Source: RUA & NTFP's Survey, 2013

Residents in all the target villages collect Sleng seeds from January to April of each year. Figures show that Khtong and Meanchey villages have the most number of households that collect Sleng seeds. 63.3% of the households in Khtong village and 60.86 percent of households in Meanchey village collect Sleng seeds. In contrast, only 5.26 percent of households in Lao Ka village collect Sleng seeds.

4.4.5.5 Honey

Cambodians use honey as medicine for various ailments. This is also true of the selected areas, where honey is greatly valued as medicine. It is only in Lao Ka village that villagers collect honey for commercial purposes.



Source: RUA & NTFP-EP Survey, 2013

Data gathered shows that 22 respondents in Lao Ka find and collect honey, and on average they harvest 38.36 liters of honey per year. The maximum amount of honey harvested is 120 liters per year. Villagers use sustainable methods of collecting honey. They collect only 80 percent of the honey comb. The collectors were assisted and trained on sustainable harvesting by an NGO in 2006, and to this day they practice sustainable harvesting.

4.4.5.6 Economics Based Seasonal Calendar

Table 3.8: Seasonal Calendar of NTFP-based Livelihoods

NTFPs	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Liquid Resin	→	→	→	→	→	→				→	→	→
Solid Resin	→	→	→	→	→	→				→	→	→
Rattan										→	→	→
Bamboo shoot					→	→	→	→	→			
Sleak Preach		→	→	→	→							
Wild Vegetables						→	→	→	→	→	→	→
Sleng Seed	→	→	→	→								
Honey	→	→	→	→								

People's livelihoods in the target villages differ between the two seasons. Agriculture plays a crucial role during the rainy season, since rice production depends heavily on water availability. Among the six villages, only Meanchey village has an irrigation system, which reportedly does not work properly and causes floods in some areas while other areas face droughts.

In Lao Ka, rice production is from July to December, following the trend of rain dependency due to the lack of an irrigation system and very traditional practices of rice and crop cultivation. During the rainy season, every member in the family works together on one or two plots for agricultural production. During the dry season, NTFPs are the major livelihood interest for Lao Ka residents.

From January to April, honey collecting is a common livelihood activity for almost everybody in the selected villages. Without rain, the quality of honey is said to very high; it is also much easier to find and lay claim to the tree and the honeycomb for harvesting. People can make quite a fair amount of money from honey collection. On average, a collector can harvest about 90 liters of honey during the three month harvesting period.

Liquid resin is harvested from January to June and from October to December each year, as it is during this time that the resin has the best quality, and brings higher prices in the market. During the rainy season, rattan buds, bamboo shoots and other wild vegetables are collected for extra income and to deal with the period of food insufficiency for a few months.

4.4.5.7 Unsustainable Practice of Natural Resource Harvesting

People's livelihood depends on agriculture and natural resource harvesting, yet they still use unsustainable methods of cultivation and harvesting which do not help in addressing insufficient food supply. They also face external threats such as economic land concessions and land clearance by outsiders.

These unsustainable methods of natural resource harvesting can be seen in all six villages. In Meanchey and Khtong, Sleng seeds are collected in a wasteful manner, by cutting down the tree and ignoring that fact that the tree takes 5 to 10 years to yield seeds. During the FGD with villagers said that the Sleng trees would be cut down by economic land concession companies anyway, so it was pointless for them to change this way of harvesting.

In Toul, liquid resin trees are the main source of livelihood, but villagers still use improper harvesting techniques, such as lighting the liquid, which can result in burning down the entire tree. However, the biggest challenge for natural resources is the granting of economic land

concessions. A few companies that were granted land concessions have cut down the resin trees of the villagers. Currently, the villagers have filed a complaint with the companies that destroyed their resin trees, since it takes nearly a hundred years for the trees to be fully harvested.

5. Institutional and Political Profile

5.1 Governance System

The social order within the study areas is governed by an official leader who is elected according to Cambodian law. The term Mei Kantrin (the person who has power and be the leader of the trib) no longer exist in the selected villages due to social development and reform imposed by the Cambodian political system. The local governance hierarchy is now village chief, commune chief, district chief and then the provincial governor. However, older villagers who are respected by the community still have influence on informal decision making within the community, even if decision making or conflict resolution is based on the law and political hierarchy.

5.2 Social Structures Related to Natural Resource Management

Article 43 o f Cambodia's 2001 Administration Law describes the Commune Council's role in protecting and preserving the environment and natural resources. It also has a role in classifying and setting boundaries for all forests in its area of jurisdiction, in coordination with the Ministry of Agriculture, Fisheries and Forestry (Forestry Law 2002, Article 10).

5.3 Indigenous Knowledge Systems and Practices Related to Natural Resource Management

In Focus Group Discussions and resource mapping activities, respondents mentioned spirit forests which cannot be harmed or touched and no activities may be conducted in these spirit forests. The idea of possessing the spirit forest hides the concept of forestry conservation. As a male respondent said in a FGD "In the past although we did shifting cultivation, we never wanted to harm or occupy the forest and land. Now the trend of newcomers and foreign investment such as economic land concessions has changed our perception toward the forest and resources that we have--the outsiders clear our forest, conduct illegal hunting and grab the land for economic land concessions which strongly impact our livelihood; they ruin even the sacred places that we respect, our spirit forests. Now, we have no courage to conserve the forest and the resources that we have conserved for years".

5.4 Key Players in Community Development

The provincial department of the Fisheries Administration conserves the fish in the commune reservoir and releases fish to the reservoir.

There are some NGOs that work with the villages on different issues. These include:

- Health Poverty Action (HPA), which works on clean water and sanitation, constructing 6 wells for the villagers and providing technical assistance to local authorities.
- CEDAC assists with agricultural technique and offered 250$ for buying seeds and seedlings. As villagers were not interested in this offer, the money was transferred to the villages' savings groups instead.
- WWF has projects on growing trees, protecting wildlife, and improving basic knowledge on regulations by distributing posters and T-shirts to school children.
- Medecins Sans Frontieres (Doctors without Borders) has projects on healthcare savings groups in which the members who save 100$ per month have free healthcare services (mainly for treating malaria and for maternal care).
- ACLEDA and AMK are the leading microfinance institutions in Meanchey; they offer interest rates from 2.5 percent to 3 percent for loans. The savings groups initiated by CEDAC have also been very successful. There are three savings groups that offer interest rates of 3 percent for members and 5 percent for non-members. One savings group has 46 members; the purpose of saving is for emergencies and a convenient way of borrowing money.
- We Challenge has projects on community organizing, human rights awareness, land concessions issues, protected forest communities, creating awareness of sending children to school and working against domestic violence.
- ACF supports the supply of clean water to villagers by constructing wells. This project stopped operating many years ago
- WCS supports awareness of regulations on wildlife protection and forest conservation.

6. Community Aspirations

As mentioned in the previous section, the villagers are aware of the current threats to their resources which they know will be lost. However, because of poverty and situations beyond their control (e.g. economic land concessions, clearing of land by high ranking officials and

land grabbing by outsiders) they have no option except to keep harvesting what they can, even if the methods they use are unsustainable. The villagers are also aware of their own mistakes related to natural resource utilization as well as the issues caused by outsiders.

During the FGD in Meanchey village, one man asked for help from the study team in creating a community protected forest. He said, "We cannot stand the current situation where our forests and resources are being destroyed gradually; sooner or later there will be no more resources for the next generation; we acknowledge that there are some NGOs that are currently dealing with the issue of conservation, but we see little impact on the resources that we have."

7. Conclusions and Recommendations

- **Unsustainable harvesting**

The common NTFPs that respondents rely on for survival are liquid resin, solid resin, honey, *Sleng* seeds, bamboo shoots, wild vegetables and rattan buds, yet these NTFPs are being harvested in an unsustainable manner; particularly Sleng seeds, honey and liquid resin.

Sleng seeds are actively harvested in some villages in a very unsustainable way. The trees themselves are cut down by the collectors, which will eventually result in the complete loss of this NTFP. This will also negatively affect the people's livelihood, as they will lose part of their income.

Honey is commercially gathered only in Lao Kar; the other villages collect it for medicinal purposes. Respondents from Lao Kar apply sustainable methods of gathering honey for their trade, while the other villages do not consciously practice sustainable harvesting since they only harvest for family consumption and medicinal uses only.

Liquid resin is the main source of income in some villages, but it can only be harvested in the dry season to ensure better quality. Although the method of harvesting does not harm the resin trees, the owners do not get the maximum benefit from the trees, and this negatively affects their livelihood.. If the owners could learn better harvesting techniques, they can harvest all year round, thus gradually improving their livelihood while still conserving the forest.

Recommendations

- Encourage sustainable resource use so that products can be harvested without destroying the resource. This entails making an inventory of the different harvesting methods and assessing whether these are sustainable. Then, a discussion can be held with the community to determine how these practices can be improved without loss to their livelihood and while conserving the resource.
- Develop a transitional plan with the resource users in the protected areas before implementing a non-use policy. Alternative livelihoods should be offered to affected community members.
- Establish market links for other NTFPs.
- Assist with product development for other NTFPs.
- Provide cross-sector cooperation between communities, NGOs and the private sector to push trade in the local and international markets so villagers will get higher prices while using sustainable NTFP extraction.
- Villagers should be organized so they can protect their resources, particularly the Sleng trees. This organized groups could also be taught more efficient and sustainable techniques for harvesting which will not harm the resources on which they depend..
- Technical support on sustainable methods of liquid resin harvesting should be provided to the villages. Some villages have already organized small groups to collect the liquid resin, but they still harvest in the traditional method, only during the dry season.

- **Factors affecting Poor Human Capital**

Human capital is the component of the sustainable livelihood framework which focuses on health, nutrition, education, knowledge and skills, capacity to work and capacity to adapt. Human capital is low in each village. Infrastructure is dilapidated and inadequate, there are educational barriers for the younger generation, illiteracy in the elderly, and fraud in the financial sector.

There are little or no health care services in the villages as well as a poor understanding of sanitation among the villagers. This results in the villagers' health being below standard. Some common diseases are still major concerns for villagers. Once a community member gets sick, a portion of their income is set aside for treatment, which has major consequences on their children's schooling and on the family's level of nutrition.

The study found that a majority of respondents feel they do not have a sufficient amount of rice to satisfy their needs each year. On average, households in four of the villages face hunger about 5 to 6 months of every year (the exceptions are Meanchey and Ou Boun Leu villages).. An average person in Cambodia consumes 152kg of rice per year (World Rice Statistics, 2013) while the average number of members per household in the target villages is 6. , A family of 7 should therefore need 912 kg of rice per year. Households cannot meet nutritional needs with rice alone, so a portion of the harvest must be sold to buy food which contains necessary vitamins and protein. Children are most affected by malnutrition; it stunts their human capital development in the long run.

Inadequate school facilities and irregular schooling are the main challenges for human capital in the selected villages. Only primary schools exists in all the target villages, and these primary schools have a combined class system—for example, Grade 1 is combined with Grade 2 in the same classroom and there is only one teacher for both grades. Thus, classes do not run smoothly, and the environment is not conducive to real learning. Aside from poor facilities, children and even teachers are often absent from school during the rainy season, as they are asked to help in agricultural work. Rovak is the best example of this. Even if primary school is the highest level of education that the children can attain in the village, the rate of children dropping out of school is shockingly high (Meanchey illustrates this situation). A village chief reported that students typically drop out of school between grades 4 and 6; mainly because they are needed by their families to earn extra income either by working in the fields, or collecting and selling NTFPs. These issues need to be dealt with to increase human capital in the villages, eventually improve the economic situation of the families and break the cycle of poverty.

Recommendations

- Government and NGOs should construct better educational facilities in the villages. More classrooms and a greater number of teachers are needed to meet the demands of the students.
- There should be programs that offer extra cash to teachers so they will not have to focus on feeding their families and instead be more motivated to do their jobs.
- WFP has a program that offers food to children if they attend school. The purpose of this program is to encourage students to study and at the same time provide them with nutritional food. A similar program should be implemented in the study sites.

- Parents should be encouraged to keep their children in school, and alternative livelihood schemes can be offered so that children can stay in school, rather than have to collect NTFPs, since education is a long term investment which brings about a better life in the future and better development for the community. Education can help break the cycle of poverty.

- **Poor healthcare services**

Only one village in the six target villages has a health care center. This indicates that inadequacy of health care in the area. The lack of sanitation is equally serious. Clean water consumption is almost non-existent and nearly all of the respondents do not possess a toilet. These factors result in common and easily transmitted diseases, such as diarrhea, cough, fever, flu, and so on.

Recommendations

- The government and NGOs should consider assisting healthcare by building a health care center and pharmacy in each village, and providing doctors and nurses.
- Offer subsidized toilet construction to villagers, so that 50 percent is provided by government and NGOs, and the other 50 percent is contributed by the villagers.
- Offer clean water supplies to the villagers such as wells, filters and knowledge of better hygiene in their residences.

- **Constraints from dilapidated infrastructure**

Road conditions are the main barrier to better economic and human capital development. It takes a lot of time and money to access the villages, which negatively impacts on trade and affects the quality and increases the prices of goods that leave and enter the villages Moreover, roads are almost inaccessible during the rainy season. These bad roads often prevent development programs from reaching the target sites and their residents. It isolates residents, and denies them services, networks and the like. It affects the trade of goods produced by and also needed by the villagers, who find it difficult to bring to market what they produce. The products cannot be sold at a good price, and the delay in reaching the market sometimes causes the quality of goods to decrease, leading to a bad reputation on the part of the producers. The small local markets do not lend stability to the flow of money or expand the financial market of the products. Once infrastructure is improved, the investment of service and networks should follow, thus improving the people's livelihoods.

Recommendations

- Local authorities and central government, perhaps with the help of NGOs, should improve the road conditions in the province, and possibly employ the residents to help in construction, to provide them with extra income.
- Community Based Organizations should be established, to strengthen the bargaining power of the villagers, and help them deal with the issues affecting them.
- The local markets should be expanded by offering a bigger variety of products to be traded.

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Appendix 1: Guide Questions and Outline for Focus Group Discussions

Focus Group Discussions (FGD)

I. Vision Mapping: Draw and describe a picture of your community/village before (past 10 years) giving extra consideration to the following aspects: (refer to data matrix for specific data needed and pointers)

a. Village/commune history (origin, original settlers and their origins)

b. Different land uses

c. Forest conditions

d. Wildlife sightings

e. Farm areas and practices

f. Fishing conditions

g. River conditions

h. Traditional or political boundaries

i. Resource uses

j. Settlement Characteristics

k. Population

l. Benefits you gett from natural resources

II. Time Line: Describe what has happened in the past 10 years. The time line will focus on:

a. NTFP

b. Newcomer/Migration

c. Challenges related to using natural resources

III. Venn diagram: describe the institutions that have relationships with, work with, support and challenge the community.

IV. Household visioning for livelihood strategy

- To help understand the context of people's livelihood systems.
- To understand the livelihood activities, visioning and their strategy.
- To help identify opportunities for cooperation and support.

Guide guestions

Characteristics	**Pointers**
Settlement characteristics	• Location of the houses/resettlement area before • How many houses
Population	• Describe the population composition, ethnicity, origins • How many families are original settlers? • When did they start settling in the area?
Forest Conditions	• Location/ areas of forest before • Size • Distance from the residential areas • Types of trees
Wildlife sightings	• Show areas where wildlife was seen before • How frequently are wildlife seen?

	• What types of wildlife are sighted?
Farm area and practice	• Where were the farms before? • What are the types of farms? • What are the conditions of farms before? • What is the size of farm owned by each household? • Type of crops planted
River/ Water conditions	• How many rivers are there in the village? • Identify if rivers are permanent or intermittent • Water quantity and quality
Traditional or political boundaries	• What are the traditionally recognized natural markers?
Resource use	• What are the other natural resources used before? • Where did you gather resource before? • Distance from settlement area • Number of days spent in the area and time spent in gathering resoucrs • Volume of resources gathered • Species gathered and purpose for gathering, whether for trade or household consumption
Benefits obtained from natural resources	• Describe previous benefits from natural resource

Village/commune assessment

Characteristics	**Past**	**Present**	**Vision/Dreams**
Settlement Characteristics			
Population			
Forest conditions			
Wildlife sightings			
Farm area and practices			
River and water conditions			
Fishing			
Traditional or political boundaries			

Resource uses			
Benefits obtained from natural resources			

Timeline of resources (NTFPs)

Time	Type of Resource	Resin possession	Reason	How to harvest	Price	Market	Mean of transportation	Cost of transportation	Utilization of resource
2003 - 2008 2008 - 2013	Solid Resin Liquid Resin Rattan Honey	- Number of resin trees in average. - Max - Min	Reason behind the changes: Inherited Distributed to children Land reform Selling Buying Economic land concession	- Traditional harvesting - Sustainable harvesting	Price per unit How do they grade?	- Local Market - Provincial market - District market	- Motor - Car - Cart - Pedestrian (We can evaluate the livelihood improvement based on this information)	- How much does it cost from village to the market place?	- Torch - Raw material - Final Product

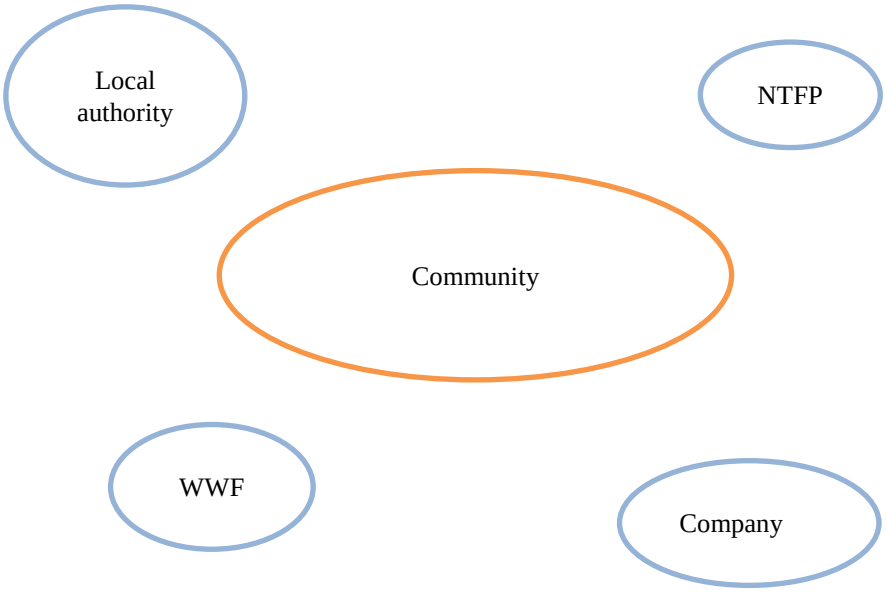
Newcomer/Migration

Time	Pull Factor	Push Factor	Problem	Solution
2003-				

2008 2008- 2013				

Venn Diagram

Describe the institutions that have relationships with, work with, support and challenge with community.



Household visioning for livelihood strategy procedure

- Focus Groups formed (8-10 people per group)
    - Liquid resin collectors 03
    - Honey gatherers 02
    - Other NTFPs collectors 03
    - Ordinary villagers 04
- 2 Stages
    - Visioning
    - Strategy Identification
- Total time = 0.5 to 1 day

Guide Question: Household Visioning

Imagine how you want your household to be in 3-5 years.

Please draw a picture of your household in the future, showing key changes (HH goals).

… (After 15-20 minutes):

Please attach your picture to the wall and describe your HH to the group

Guide Question:

Strategy Identification (1) -- ***Livelihoods Inventory (existing)***

Look at your household now. What are the livelihood activities that your household is now engaged in to meet your needs?

(Draw activities on cards; attach cards to picture of HH goals.)

Guide Question:

Strategy Identification (2) -- ***Livelihoods Inventory (new)***

Look at your household goals. What other livelihood activities would help your household reach your goals?

(Draw new activities on cards; attach next to your HH goals.)

Guide Question:

Strategy Identification (3) -- Livelihoods Ranking

Now look at all of your livelihoods activity cards. Pick the 3 livelihoods that you feel are most important in helping you reach your HH goals.

(Rank cards showing these livelihoods in order of importance: 1^{st}, 2^{n}, 3^{rd}).

❖ **Livelihoods Strategy Priorities: Focus Groups in five villages**

Groups	**Village**
Ordinary Villager	
People benefiting from NTFPs	
Overall	

Appendix 2: Questionnaire for Household Interviews

Questionnaire

Social Rural Economics in Seinmonorom District, Kousnhak District and Keovseyma District of Mondukiri Province

Ordinal Number of Questionnaire……

A. To be completed by interviewer before interview				
Province				
District				
Commune				
Village				
B. To be completed by interviewer				
Name of household head			Phone	
Interviewer's name			Interviewer's signature	
Date of survey		Day	Month	Year
C. To be completed by supervisor after checking completed questionnaire thoroughly				
Supervisor's name				
Date checked by supervisor		Day	Month	Year
Supervisor's signature				

Socio Demographic

How many members are there in your family? .....

How many females are there in your family? .....

ID No.	Name	(a)Sex 1 = Male 2 = Female	(b) Age	(c) Relationship with the household head (Enter Code)	(d) Ethnicity (Enter Code)	(e) Marital Status (Enter Code)	(f) Occupation (Enter Code)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
01							
02							
03							
04							
05							
06							
07							
08							
09							
10							

Relationship codes (Col 5)	1 = Household Head 2 = Spouse 3 = Son/daughter 4 = Adopted child/foster child 5 = Parent 6 = Brother/Sister 7 = Grandchild 8 = Niece/nephew 9 = Son/daughter-in-law 10 = Brother/Sister-in-law 11 = Parent-in-law 12 = Other relative 13 = Other non-relative
Ethnicity code (Col 6)	1 = Khmer 2 = Islam 3 = Indigenous group 4 = Chinese 5= Vietnamese 6 = Thai, 7= Lao 8 = Other (specify)
Marital status code (Col 7)	1 = Married 2 = Widower 3 = Widow, 4 = Live Together 5 = Never Married
Occupation code (Col 8)	1 = Civil servant 2 = Teacher 3 = Policeman 4 = Soldier 5 = Farmer 6 = Seller 7 = Employee 8 = Company 9 = Garment worker 10 = Other (specify)

EDUCATION AND LITERACY

(For respondents only)

ID No.	Can you read a simple message in any language? 1 = Yes 2 = No	Can you write a simple message in any language? 1 = Yes 2 = No	Can you do simple calculation? 1 = Yes 2 = No	Have you ever attended school? 1 = Yes 2 = No	What is the highest level have you successfully completed? (Enter completed number of years)	Do you still attend school? 1 = Yes 2 = No	What grade are you in now? (Enter code)	If below 18 years old: Why don't you attend school?	If below 18 years old: Why did you drop out of school?

Level of education Code (Col.6)	0 = Never enrolled 1 = Literacy 2 = Kindergarten 3= Primary school, 4 = Secondary school 5 = High school 6 = Bachelor degree 7 = Masters degree 8 = Doctorate degree (PhD) 9 = Technical/Vocational training.
Current grade (Col.8)	0 = Never enrolled 1 = Literacy 2 = Kindergarten 3 = Primary school 4 = Secondary school 5 = High school 6 = Bachelor degree 7 = Masters degree, 8 = Doctorate degree (PhD) 9 = Technical/Vocational training.
Reasons	1 = Don't want to study 2 = No suitable school available/school is too far

don't attend school (Col.10)	3 = No teacher/Supplies 4 = High cost of schooling/No money 5 = Must contribute to household income 6 = Must help with household chores 7 = Due to disability/illness 8 = Other (specify)
Reasons for dropping out of school (Col.11)	1 = Don't want to study 2 = No suitable school available/school is too far 3 = No teacher/Supplies 4 = High cost of schooling/No money 5 = Must contribute to household income 6 = Must help with household chores 7 = Due to disability/illness 8= Other (specify)

Q.1.11 Do you have any other skills or vocational training knowledge (handicraft, traditional treatment ……)? What are they?

.....

Q.1.12 How did you get those skills? 1 = Family, 2 = Training

Health

What are the common ailments experienced by your family?

.....

How do you treat these ailments?

.....

In case of serious ailments where do you go for treatment?

.....

Is there any health care center in your region? 1 = Yes 2 = No

If there is, have you ever taken your family member to the health care center? 1 = Yes 2 = No

Q.3.5

Reason.....

IV. Loans and Savings

Loans

Have you borrowed any money? 1 = Yes 2 = No

If yes, how much did you borrow? .....($/Riel)

Loan number	(a) How long ago did you borrow the money?	(2) Who did you borrow it from?	(3) Why did you borrow the money? (Enter Code)	(4) How much money did you borrow? (Enter Code)	(5) If there is interest, what percent per month?
(1)	(2)	(3)	(4)	(5)	(6)
(loan1)					
(loan2)					
(loan3)					
(loan4)					
(loan5)					
(loan6)					

Loan Source	1=Relative 2= Relative abroad 3=Neighbor 4=Local lender 5=Seller 6= Landlord 7=Bank 8=NGOs 9= Other (specify)
Purpose of loan	1=Agriculture 2=Non-agriculture 3=Daily household consumption 4= Ailments 5= Emergency 6=Marriage 7=Ceremon, 8=buying goods 9=Repair/Construction 10= Other (specify)

Savings

Do you have any savings? 1= Yes 2= No

If you want to save, how do you save?

1=Keep at home 2= In savings group 3= At the bank, 4=Other…….

Is there any savings group in your village? 1= Yes 2= No

If there is one, are you a member of the group? 1=Yes 2=No

Why? .....

If there is no savings group, do you want one to be established?

1=Yes 2=No

Why? .....

Property Ownership and Living Conditions

Living Conditions

	(Enter code) And Other answers
What sort of home do you live in? Cottage Wooden house with straw roof Wooden house with galvanized iron/zinc Wooden house with fibrocement Concrete house Other (specify...)	
What is the main source of water? Drainage wells Pumping wells Ponds Rivers Rain Purchased water Other (specify)	
How far is the water source from your house?.....m	
Do you have a toilet? 1=Yes, 2=No	
Why don't you have a toilet?	

Land ownership

How many land plots do you have? ……..

Land plots	(a) What kind of land?	(b) How many square meters or	(c) In what way did you become the	(d) Do you have land

	(Enter code)	hectares?	land owner?	certificates?
(1)	(2)	(3)	(4)	(5)
1				
2				
3				
4				
5				
6				
7				

Code number for Type of land owned (2)	1=Land for crop 2=Rice field 3=Residential site 4= Abandoned land 5= Abandoned Swidden 6= Swidden 7= Other (specify)
Code number for Method of getting land(5)	1=From Government or Local authorities, 2= Inherited land, 3=Buying, 4=Deforestation 5= Provided by friends, 6=lease, 7= Other (specify…)

Consumption and Energy costs

What are the energy sources of your household?

	(a) Advantage	(b) Purpose of consumption	(c) Cost per months
	1=Yes 2=No	1= Lighting 2=Cooking 3=Clean water 4= Pump 5=Washing 6= Clothes 7=Business Consumption 8= Other (specify)	Riel
Candles			
Firewood			
Charcoal			
Kerosene			
Gas			
Alkaline Battery			

Battery			
Owned generator			
Purchased Electricity from neighbor			
Purchased Electricity EDC			
Torch			

Income and Expenditure

Income

Income from agriculture sector

Income from crop

ID No		Unit	Quantity of consumption	Quantity of Sale	Price	Total
	Q.7.1	Q.7.2	Q.7.3	Q.7.4	Q.7.5	Q.7.6
1	Paddy rice					
2	Dry season rice					
3	Corn					
4	Cassava					
5	Beans					
6	Vegetable					
7	Tobacco					
8	Cashew nut					
9	Coffee					
10	Winter melon					
11	Eggplant					
12	Chili					
13	Pumpkin					

Q.7.7 What are the main crops of your rice field and Swidden?

Rice field:

……..

Swidden:

…….

Q.7.8 Why do you choose these crops as your main crop?

……

Q.7.9 Does the yield meet food self-sufficiency?

1= Yes 2= No 3= Surplus

Q.7.11 If it is not enough, how do you deal with it?

……

Q.7.12 How many months do you suffer from hunger?

……

Q.7.13 What do you do with the surplus?

……

Q.7.14Where would you sell the surplus? .....

Farming Practice and Technology

Q.7.15 How many times do you plant rice in a year?

1=Once 2=Twice 3= Thrice

Q.7.16 Do you grow any other crops while cultivating rice? What are they?

……

Q.7.17 Do you grow any other crops after harvesting the rice?

……

Q.7.18 What is the source of water for your farm?

= Rain fall 2 = Irrigation, 3 = Other (specify)

Q.7.19 Do you use any chemical fertilizer or pesticide? 1=Yes 2=No

Q.7.20 What kind of agricultural equipment do you use?

……

Q.7.21 Do you practice shifting cultivation? 1=Yes 2=No

Q.7.22 If practice, why?

…….....

Q.7.23 How has your agricultural output changed in the last few years?

1=Increase, 2=Decrease, 3=The same

Q.7.24 Why? .....

Q.7.25 What are the challenge in your agricultural production?

1=Animal destruction 2= Pests 3= Drought 4=Lack of seeds 5= Other (please specify)

Time spent fishing

Q.7.26 Does any member of your family go fishing? 1=Yes 2=No

Q.7.27 Is it your main source of income? 1= Yes 2= No

Q.7.28 Where do you go fishing? .....

Q.7.29 What are your methods in fishing?

1 = Outfit 2 = Gillnet 3 = Hook and line 4 = Seine net 5 = Electro fishing 6 = Others.....

Q.7.30 How many months in a year do you go fishing? .....

Q.7.31 How many weeks in a month do you go fishing? .....

Q.7.32 How many days in a week do you go fishing? .....

Q.7.33 When do you go fishing? 1 = In the morning 2 = In the afternoon

Q.7.34 Do you sell the fish that you catch? 1 = Yes 2 = No (why?.....)

Q.7.35 Is your catch sufficient for household consumption?

= Yes 2 = No 3 = Surplus

Q.7.36 What do you do with the surplus? .....

Q.7.38 Is there any change with the amount of fish that you caught?

1= Increase 2= Decrease 3 = No change

Q.7.39 Why? .....

Q.7.40 What are your challenges in fishing ?

……
…

Q.7.41 How many kilograms can you catch per day?.....kilo

Natural Resource based Livelihood

Hunting

Q.7.42 Do you hunt wildlife? 1 = Yes 2= No

Q.7.43 What kind of animals did you hunted?

1=Wild boar 2=Musk deer 3=Sun bear 4= Other……

Q.7.44 What methods do you use in hunting?

1 = Dog 2 = Traps 3 = Guns, 4 = Bow and arrow 5 = Pit 6 =Other.....

Q.7.45 Who are the hunters? 1= Insiders 2= Outsiders

Q.7.46 Where do you usually hunt? 1= Community forest 2= Protected area

Q.7.47 What are the purposes of hunting?

1 = Food 2 = Trade 3 = Hobby 4 = Pet 5 = Traditional practice

6 = Other……..

How many wildlife do you sell per year?

Type	Number	Price	Total
Q. 7.48 Wild boar			
Q. 7.49 Musk deer			
Q. 7.50 Sun bear			
Q. 7.52 Other			

Q.7.53 What challenges do you face while hunting?

……

……

Q.7.54 Is there any change in your hunting? 1= Increase 2= Decrease 3= The same

Q.7.55 Why? .....

Q.7.56 What do you think about the laws on and regulation of hunting?

.....

.....

Q.7.57 When did you start hunting? From..... to.....?

.....

.....

Income from forestry

ID No		Number	Quantity of consumption	Quantity of Sale	Price	Total
	Q.7.58	Q.7.59	Q.7.60	Q.7.61	Q.7.62	Q.7.63
1	Liquid Resin					
2	Solid Resin					
3	Rattan/cane					

4	Honey					
5	Wild mushrooms					
6	Wild vegetable					
7	Bamboo shoot					
8	Bamboo					
9	Sleng seed					
10	Herbs					

Q.7.64 How many liquid resin trees do you have? .....

Q.7.65 How many kilometers away from your house do you get the liquid resin? .....

Q.7.66 Where do you find the liquid resin? 1= In community zone 2= Out of community zone

Q.7.67 Where do you sell?

1= At home 2= Local Market 3= Provincial Market

Q.7.68 How do you sell those liquid resin?

1=in Group 2=Individual

What are your final products?

No	Type	Price/Unit	Total amount/year	Target customer
	Q.7.69	Q.7.70	Q.7.71	Q.7.72
1				
2				
3				

Q.7.73 How do you know about the price of resin?

1=Neighbor, 2=Media, 3= Middlemen 4= other ……..

Q.7.74 What challenges do you encounter withselling liquid resin?

…….

Q.7.75 Do middlemen give grades to the liquid resin? 1=Yes, 2=No

Q.7.76 How do they grade? .....

Q.7.77 How do you protect your liquid resin from rain during the rainy season?

……

Q.7.78 How do you get the liquid resin?

……..

Q.7.79 Does the price change? 1=Yes 2=No

Q.7.80 When does it change? Why? .....

Q.7.81 How has your liquid resin change in the past few years?

1= Increase 2= Decrease, 3= The same

Q.7.82 Why?……..

Solid Resin

Q.7.83 How many kilometers away from your house do you get the solid resin? .....

Q.7.84 Where do you find the solid resin? 1= In community zone 2= Out of community zone

Q.7.85 Where do you sell?

1= At home 2= Local Market 3= Provincial Market

Q.7.86 How do you sell the solid resin?

1=Group 2=Individual

Q.7.87 How much can you earn from solid resin?

No	Type	Price/Unit	Total amount/year	Target customer
	Q.7.88	Q.7.89	Q.7.90	Q.7.91
1				

Q.7.92 How do you know about the price of solid resin?

1=Neighbor, 2=Media, 3= middlemen 4=other ……..

Q.7.93 What challenge do you encounter within selling solid resin?

…….

Q.7.94 Do middlemen give grade to the solid resin? 1=Yes 2=No

Q.7.95 How do they grade? .....

Q.7.96 How do you get the solid resin?

……..

Q.7.97 Does the price change? 1=Yes 2=No

Q.7.98 When does it change? Why? .....

Q.7.99 How has your solid resin change in the past few years?

1= Increase 2= Decrease, 3= The same

Q.7.100 Why?……..

Rattan

Q.7.101 How many kilometers away from your house do you get the rattan?

.....

Q.7.102 Where do you find the rattan? 1= In community zone 2= Out of community zone

Q.7.103 Where do you sell?

1= At home 2= Local Market 3= Provincial Market

Q.7.104 How do you sell the rattan?

1=Group 2=Individual

Q.7.105 In what way do you sell the rattan? 1 = Raw material 2 = Final product

Q.7.106 What are your final products?

.....

No	Type	Price/Unit	Total amount/year	Target customer
	Q.7.107	Q.7.108	Q.7.109	Q.7.110
1				
2				
3				

Q.7.111 How do you know how to make your final products?

1 = Ancestor 2 = Neighbor 3 = Training course (who.....)

Q.7.112 How do you know about the price of rattan?

1=Neighbor, 2=Media, 3= Middlemen 4=Other ……..

Q.7.113 What challenges do you encounter with selling rattan?

…….

Q.7.114 Do middlemen give grades to the rattan? 1=Yes, 2=No

Q.7.115 How do they grade? .....

Q.7.116 How do you get the rattan?

……..

Q.7.117 Does the price change? 1=Yes 2=No

Q.7.118 When does it change? Why? .....

Q.7.119 How has rattan changed in the past few years?

1= Increase 2= Decrease, 3= The same

Q.7.120 Why?……..

Honey

Q.7.121 Where do you gather honey? 1= In community zone 2= Out of community zone

Q.7.122 Do you gather honey? 1=Group 2=Individual

Q.7.123 What methods do you use to find and gather honey?

.....

.....

Q.7.124 How do you know how to find and gather honey?

1 = Ancestor 2 = Neighbor 3 = Training course (who.....)

Q.7.125 What did you learn from the training course?

.....

Q.7.126 Where do you sell?

1= At home 2= Local Market 3= Provincial Market

Q.7.127 How do you sell the honey?

1=Group 2=Individual

Q.7.128 In what way do you sell honey? 1 = Raw material 2 = Final product

Q.7.129 What are your final products?

No	Type	Price/Unit	Total amount/year	Target customer
	Q.7.130	Q.7.131	Q.7.132	Q.7.133
1				
2				
3				

Q.7.134 How do you know how to make your final products?

1 = Ancestor 2 = Neighbor 3 = Training course (who.....)

Q.7.135 How do you know about the price of honey?

1=Neighbor, 2=Media, 3= Middlemen 4=other ……..

Q.7.136 What challenges do you encounter with selling honey?

……

Q.7.137 Do middlemen give grades to the honey? 1=Yes, 2=No

Q.7.138 How do they grade? .....

Q.7.139 Does the price change? 1=Yes 2=No

Q.7.140 When does it change? Why? .....

Q.7.141 How has the honey changed in the past few years?

1= Increase 2= Decrease, 3= The same

Q.7.142 Why?……..

a. Income from Livestock Raising

ID No	type of animal	Yields	Quantity of consumption	Quantity of Sale	Price	Total
	Q.7.143	Q.7.144	Q.7.145	Q.7.146	Q.7.147	Q.7.148
1	Cow					
2	Buffalo					
3	Pig					
4	Chicken					
5	Duck					
6	Other					
7	Total					

b. Income from off-farm

ID No	Income source	Days	Price	Price per year	Other
	Q.7.149	Q.7.150	Q.7.151	Q.7.152	Q.7.153
1	Off-farm jobs				
Total					

Income from non-farming activities

ID No	Type of employment	Months	Price	Total	Place
	Q.7.154	Q.7.155	Q.7.156	Q.7.157	Q.7.158
1	Tailor				
2	Civil Servant				
3	Seller				

4	Garment factory worker				
5	Construction worker				
6	Other				
7	Total				

Q.7.159 Which is the most important source of income for your family? Why?

……

…….

Q.7.160 What challenges do you encounter in earning a living?

……

……

Q.7.161 Do you want to run a business or a start up enterprise?

1=Yes 2=No

Q.7.162 Why?……

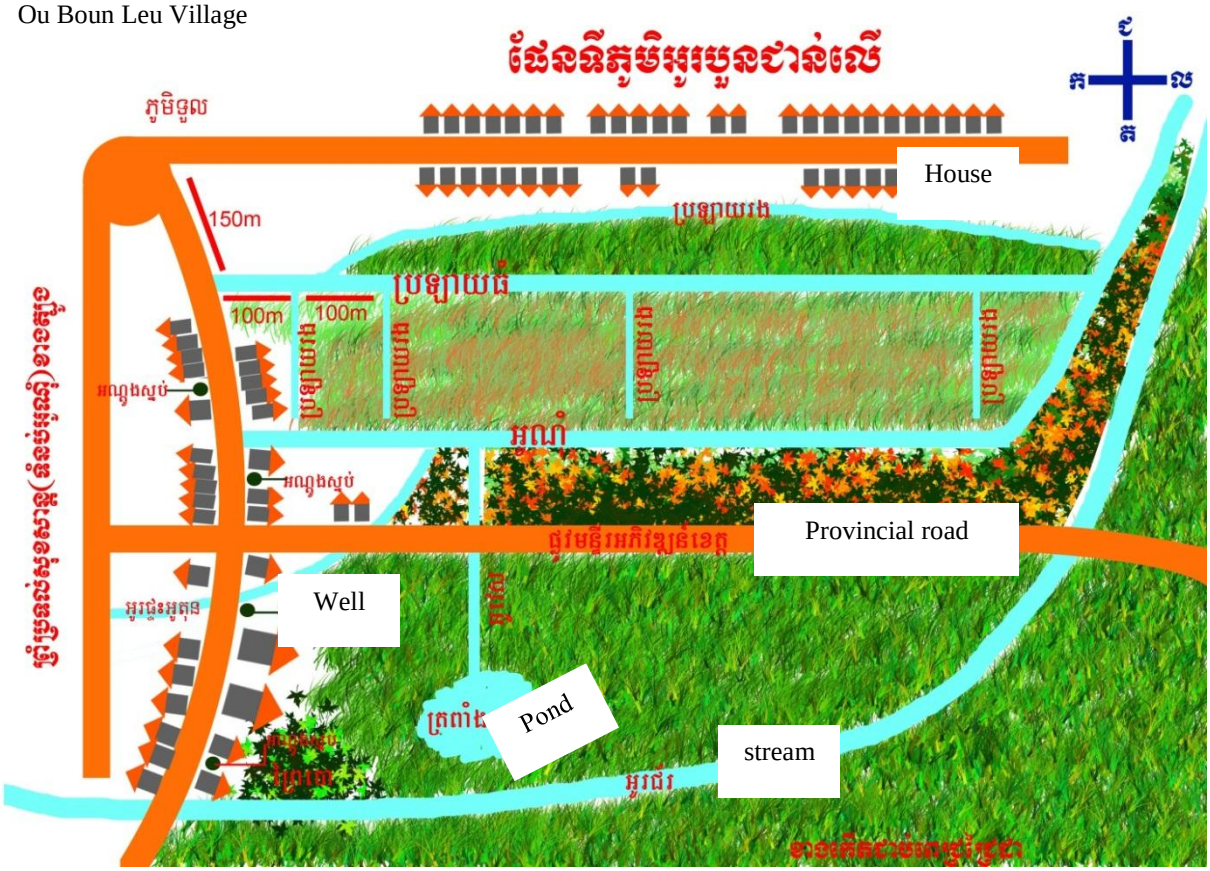
Expenditures

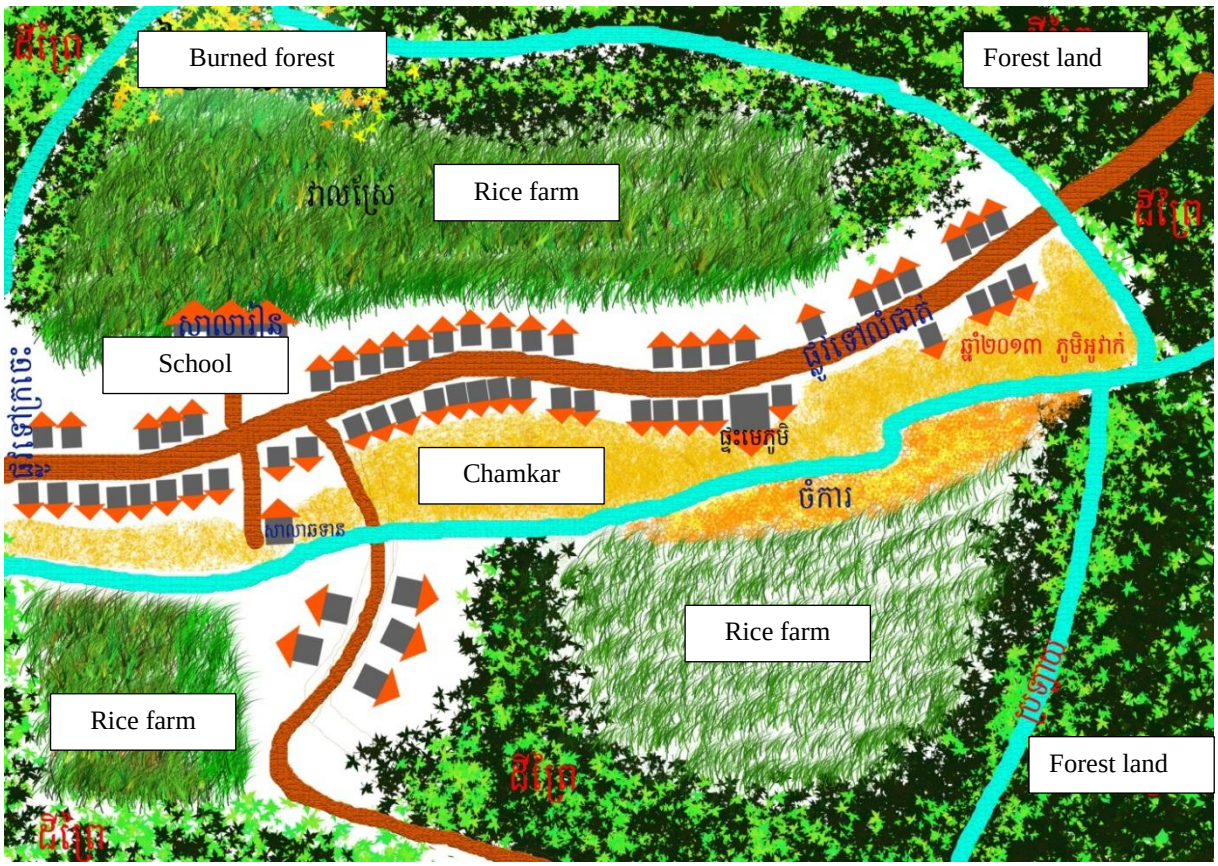
ID No	Type	Number(Unit)	Price	Total
Q.7.163 (1)	Cultivation			
Q.7.164 (2)	Livestock raising			
Q.7.165 (3)	NTFPs collecting equipment			
Q.7.166 (4)	Foods			
Q.7.167 (5)	Clothes			
Q.7.168 (6)	Energy source			
Q.7.169 (7)	Transportation			
Q.7.170 (8)	Education			
Q.7.171 (9)	Celebrate festival/ Ceremony			
Q.7.172 (10)	Wedding Ceremony			
Q.7.173	Medicine			

(11)				

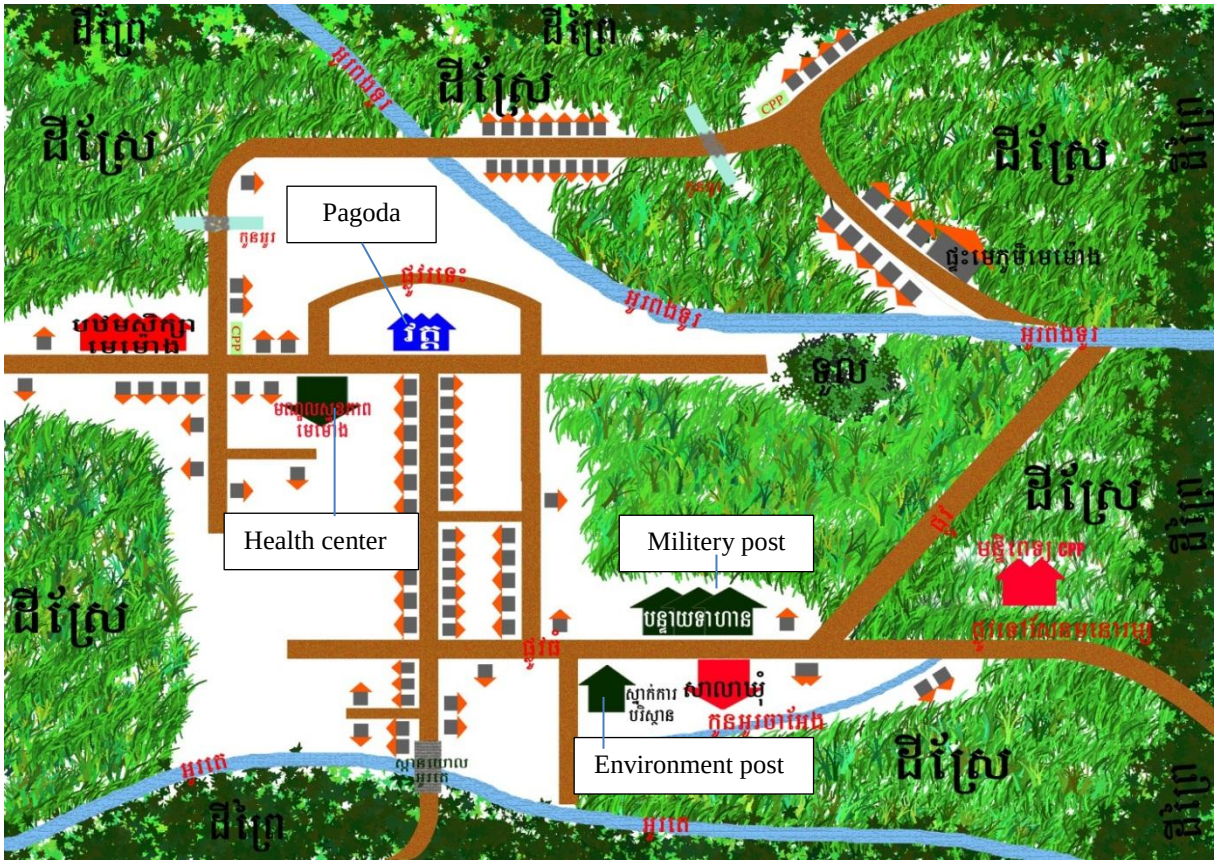
Appendix 3: All Village Resource Maps

Ou Boun Leu Village




Burned forest
Forest land
Rice farm
School
Chamkar
Rice farm
Rice farm
Forest land

Toul Village




Lao Ka Village
Mountain


Well
Canal
Well
Forest for NTFPs (SLENG SEED)