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Sustainable Livelihoods Assessment & Product Scanning

In Srae Huy, Srae Thom,
Lao Ka and Toul,

Koh Nheak, Sen Monorom and Keo Seima District
Mondulhiri Province, Cambodia

Submitted to:



Submitted by:



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December 2013

Sustainable Livelihoods Assessment & Product Scanning Report For Srae Huy, Srae Thom, Lao Ka and Toul

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Executive Summary

The study was carried out under **Cambodia Supporting Forests and Biodiversity (SFB)**, a project of a consortium of Winrock International, WWF Cambodia, East-West Management Institute (EWMI), Wildlife Conservation Society (WCS) and the Center for People and Forests (RECOFTC), funded by the USAID, that aims to address the drivers of deforestation and biodiversity loss in Cambodia's two largest intact forest landscapes; the Eastern Plains Landscape (EPL) and Prey Lang Landscape (PLL) both located in the north of Cambodia. The study forms part of the activities for the objective to increase equitable economic benefits from sustainable forest management.

The study assessed the sustainability of community livelihoods in four villages found within or along the borders of the MPF and the PPWS (Srae Huy, Srae Thom, Lao Ka and Toul) and identified potential enterprises that enhance community livelihoods and promote sustainable forest resource management. The study was conducted through community workshops, FGD, key informants interview and desk research. Main tool used was CLAPS (Community Livelihoods Assessment and Product Scanning), a tool synthesized and adapted by NTFP-EP from the Sustainable Livelihoods Analysis of DFID, UNCTAD BioTrade Product Selection Tool and Value Chain Approach, and NTFP-EP's community based enterprise development and sustainable and community based NTFP management.

Livelihood Priorities and Conditions

Accessibility and availability of forest or land resources, distance to markets and livelihood assets available to each village, alternative opportunities (i.e. labor in companies) influenced each village's livelihood priorities. However, overall, there is still an overarching need for improved food security and increased income, which is also seen to contribute to the former. Food security and income needs were partly addressed in Srae Huy/Srae Thom in 2009 by the improved rice farming technology introduced by CEDAC. However, there is only a slight increase in household income in six years (2007), from 1.57–2.48 USD per day to 2.27-3.02 USD / day per household. Incomes still barely meet household expenditure needs. With an average of 5 members per household, each lives on 0.45 – 0.60 US\$ / day. This is still below the 0,96 USD (3871 riel) national poverty line (UNDP Cambodia Website accessed December 2013). But it is more or less on the 2009 rural poverty line of 2,367 riel/day/person. (JICA 2010)

Table 1. Livelihood Priorities per village

| Sustainable Livelihood Indicator | Srae Huy/ Srae Thom | Lao Ka | Toul (Memong) |
|---|----------------------------|-----------------|----------------------|
| Improved food security | 2 nd | 1 st | 4 th |
| More income | 4 th | 2 nd | 1 st |
| More sustainable use of NR Base | 1 st | 4 th | 2 nd |
| Increased well-being | 5 th | 3 rd | 3 rd |
| Reduced vulnerability | 3 rd | 5 th | 5 th |

Internal (Livelihood Assets) and External (Vulnerability Context, Transforming Structures & Processes) Factors and Livelihoods

Communities have natural resources (forest, farm lands) however, limited human assets (skills, knowledge, health), physical assets (roads, government services, equipment) and in some cases, social assets (community solidarity, relationship with local authorities) prevent them from protecting, accessing and/or maximizing benefits from these resources.

Communities face impacts of climate change such as flash floods, droughts, insect infestation and their impacts such as livestock diseases, crop failures and water-borne illnesses, which all further weaken their livelihood assets.

The communities, predominantly from the indigenous community, the Bunongs, find themselves in the middle of a fast developing province, whose rich natural assets are eyed for national economic development through agro-industrial lands, to mining, to hydropower on one hand and a tourism destination product on the other. On one hand, they are faced with declining resources, land competition from commercial farming, migrants and economic land concessions and other land uses. And on the other, these offer them improved roads, immediate sources of cash income, either through land selling, or employment in these companies. The development in the area has opened up markets for the communities, opening up new opportunities for them and the products they cultivate or collect from the forest. Links with NGOs and government agencies help address weaknesses in livelihood assets through skills training, policies for forest/land access, and roads and market centers construction.

However, with the current human and social assets, weak physical assets, villagers are not able to address threats on their own or take advantage of some of the opportunities brought by the changing environment. This keeps livelihoods always at minimum, if not below, and unsustainable.

Livelihood Strategies & Sustainability

Communities depend on a mix of livelihood activities to meet their subsistence and income needs. Agriculture (rice and cash crops) and NTFP collection are the main sources of livelihood supplemented by livestock raising, labor renting to households with bigger farms, or to ELCs in the area and vegetable gardening. Some are also reported to engage in logging and game hunting.

NTFP collecting and selling, before a safety net, has become a major part of the households' livelihoods, contributing between 15 to 30%. The increase of market demand for NTFPs, the variety of products they can trade, and dependence on cash to meet household needs have increased the importance of NTFPs in the livelihood strategy. However, turning to labor renting as a safety net demonstrates that main livelihood strategies are still not enough to meet the needs of the villagers. Most sell the NTFPs they collect raw with limited or no processing at all. The only NTFP they sell processed is bamboo shoots, which they sell salted or dried.

Women provide complementary and some lead role in livelihood activities of a household. Women complement their husbands or the male members of the household in most activities: agriculture, livestock raising and in NTFPs collection (solid resin, sleng seeds, mushrooms). Women mostly lead in the collection of wild food, tending of vegetable gardens, which they use for subsistence and for cash income. For NTFP collection requiring specialized skills (i.e. honey,

liquid resin), women usually take part, not in the collection, but in the packaging, financial management, talking to traders or selling in the market.

Sustainable livelihoods have not been reached. Compared to the 2007 SLA, it is understandable that villagers feel that they have reached some level of food security and enough income these recent years. But looking at the needs, based on expenditures and looking at the income generated by existing livelihoods, there is still much to be desired. The discussions and the ranking of priorities, where “enhanced food security” and “more income” are still the higher priority and concern for sustainable resources because of their important contribution to the first two priorities, indicate that there is still a level of impoverishment that food security and increased income to meet basic needs are still the main preoccupation of the people.

According to the definition of DFID, livelihoods are sustainable when they:

- are resilient in the face of external shocks and stresses;
- are not dependent upon external support (or if they are, this support itself should be economically and institutionally sustainable);
- maintain the long-term productivity of natural resources; and
- do not undermine the livelihoods of, or compromise the livelihood options open to, others

The resilience of the livelihoods of the villagers to short-term threats is based on having a diversified one. The diversified livelihood offers security when calamities strike. However, resilience to medium to long-term threats, such as climate change, declining productivity of land, and insecurity of access and availability of forest resources is still a concern.

When it comes to independence of livelihoods, villagers at this stage are not able to secure their resources on their own. They are vulnerable to other actors that are stronger than them, financially and/or politically. Given limited experience and knowledge, they do not have enough skills to manage and compete in the fast-paced development in the region. However, there are already some experience and knowledge to build on. With income still focused on basic needs, they are unable to generate their own capital to start or for continuous operation and expansion of their livelihoods.

Need for cash income has led to unsustainable use of resources, both NTFPs and agricultural lands. As minimum benefits are derived from yields, there is a need to produce or harvest more in order to meet their needs. Also, there is also a lack of understanding of the long-term impacts of the current methods to the sustainability of their livelihood. With limited power to protect the forest resources, competition and uncontrolled used by outsiders lead some community members to resort to unsustainable harvesting methods too.

Products, Markets and Enterprise Opportunities

Households farm rice mainly for household consumption. For few families who have them, surpluses are sold for supplementary income. NTFPs harvested include liquid and solid resin, honey and beeswax, lac, mushrooms, sleng seeds, rattan and rattan shoots, bamboo and bamboo shoots, orchids, wild vegetables. Except for bamboo, most products are collected for selling. Only about 5-10% of wild food are kept for household consumption. Even wild vegetables and wild honey that were traditionally for household use are now sold in the market. Some households also cultivate cash crops like corn, cassava, vegetables, fishing, banana, pineapple, and cane.

Bamboo, wild vegetables/mushrooms, honey, and resins are most abundant and accessible. In terms of reach in number of households benefited, sleng seeds, wild vegetables/mushrooms, solid resin and bamboo shoots are most important. For income, honey, sleng seeds, wild/vegetables mushrooms, and resins contribute the most. In terms of market demand, the most important NTFPs are wild honey, resins (liquid, solid, lac), sleng seeds, bamboo and wild vegetables/mushrooms.

Based on the accounts of communities there had been an increase demand in some NTFPs that they collect, in the last 5 years. These NTFPs include sleng seeds, resin (liquid and solid), mushroom, wild vegetables, wild honey. Existing uses of the NTFPs in various industries as well as the emergence of new technologies and market needs, generate continued demand for them.

The main factors that influence the increase in price and demand are as the following:

- Steady demand but declining supplies may be one of the reasons for this.
- Growing economies of main, traditional markets for the products, such as China and Vietnam, Thailand may also be driving the increase in demand and prices of these products.
- The general trend in the global market leaning towards natural and sustainable products is also contributing.

Other developments that can open up further opportunities for NTFPs are:

- Development of processing technologies which allow extracts from NTFPs or new application to be developed
- Growing organic markets is requiring organic feeds, fertilizers and bio-pesticides, on which NTFPs and their extracts can be used for.
- Demand for sustainably and legally sourced materials, though still a niche market, are driving companies to look for direct contact with community suppliers, which encourage communities to harvest sustainably while increasing their benefits. (NTFP-EP 2012 forthcoming)
- Processing and packaging technology can allow community suppliers to reach new markets for perishable products that are usually traded in the local market and are season-based.

In spite of these developments, communities have not increased the income they generate from NTFPs. This is because most of the current market of community collectors had been focused on trade of raw materials.

Leading market demand trends include:

- Exotic and health/organic foods for domestic and international markets
- Growing tourism industry and health & well-being industries
- Increasing purchasing power of urban-based Cambodians
- Dependence on biomass for energy in Cambodia
- Sustainable raw materials for construction, furniture, etc.
- Local boating and fishing industries
- Global market for bamboo

Given these opportunities the following potential community enterprises have been identified:

- Food Processing and Distribution Center
- Cambodian Authentic Food and Crafts and NTFP Forest Food Foraging Tours
- Non-Food NTFP Consolidation, Packaging, and Distribution Center and Packed Resin Caulking Materials

- Sustainable Multi-Bamboo Product Processing Center: Semi-processed culms, bamboo char, and bamboo shoots

Overall recommendation for enterprise development:

- Enterprise development can start from market linking for existing products, providing market information and consolidating supplies to increase bargaining power.
- Next stage would be value addition.
- The different products or opportunities given can be combined in one enterprise, i.e. the food processing and distribution enterprise can serve both eco-tourism market but also the wild organic market nationally.
- In all potential enterprises, it is important to plan how communities will derive more benefit through value addition and through participation in an enterprise, going beyond just deriving benefits from labor of gathering resources or access fee/royalty rights to the resources but deriving benefit from the added value of the business and towards being real managers of their resources.

Recommendations

Given the livelihood conditions, resources and market opportunities, the following strategies were proposed to contribute towards the sustainability of livelihoods in the communities.

The communities already practice a diversified livelihood source that provides them safety nets when other livelihoods are temporarily disabled. Spreading out their income needs on different sources and efficiently using them will ease the pressure on all the resources they use.

STRATEGY 1: Reinforce the community's diversified livelihood for resiliency and sustainable natural resource use.

Strengthen each livelihood (agriculture, NTFP collection, livestock raising/fishing, labor and home garden) by up-scaling community's skills, knowledge, and methodologies to efficiently use the resources and to adapt to the changing environment. Maximize income from products through value-addition and increased productivity through use of appropriate technology. Incorporate Disaster and Risk Reduction (DRR) and climate change adaptation in livelihoods development to address medium – long-term threats.

Communities have natural resources that have market demand. However, they are traded raw and without sufficient knowledge of real market value and demand. Increased benefits can be generated through entrepreneurial approach.

STRATEGY 2: Enhance trading practice and move towards enterprise development for independence from external support and resilience / Development of Community Based NTFP Enterprises (CBNE)

Having multiple benefits (income from labor/products and equity) from an enterprise will ideally contribute to capital build up that can be used by communities for eventual independence from external support and for savings for resilience in times of shocks and stresses. Higher benefit is derived when the products are processed and consolidated.

At the micro level, focus on capacity building and market links. At the meso level, focus on partnership development. At the macro level, engage both public and private sector to promote the strengthening of the NTFP sector / value chain through enabling trade conditions, development of the NTFP manufacturing and export sector. In partnerships, ensure a “Sustainable Rights-based Approach” (Elson 2012), wherein business links go beyond payment for access to resources, employment creation or corporate social responsibility but lead towards true partnerships, where rights-holders have full control of their resources, are equal business partners and are able to derive multiple benefits both from the natural resources, their value-addition and the enterprise. In capacity building, take particular attention to building both soft skills (communication, confidence, management) and hard skills (processing skills, tools use, etc.). Consciously integrate women in all these activities. Focus on value addition and develop the competitive advantage of having (a) access to forests and (b) its rich, diverse products specifically NTFPs. Villagers have this advantage as both are declining across the country. The forest ecosystem is creating high-value products that are in demand in the local, but more so in the international market.

Communities have an access to a variety of NTFPs that have market value. Instead of focusing the enterprise on just one product, limiting potential income based on the seasonality of the product, explore a multi-NTFP product, just as villagers are doing now to meet income needs throughout the year. Build on the experience and the existing consolidation hubs and distribution system of the CBHE, Wild Honey Federation of Cambodia to market other NTFPs that are also collected by the communities. Enhance supplies for stronger economic impact, sustainable resource management but also through enrichment or domestication.

Build on the current awareness and interest in sustainable resource management for livelihoods (Srae Huy, Srae Thom, Toul) or the need for livelihoods (Lao Ka) to promote participation in programs that provide secure access to resources, specifically, the CF/CPA and to introduce sustainable resource management.

STRATEGY 3: Anchor enterprise development activities to the community forestry / community protected area program for sustainable NR use.

Secure resources through sustainable use and programs providing land tenure rights (CF/CPA). Establish the link between livelihoods and sustainable resource management by creating a clear flow of benefit and of responsibilities. Incorporate SRM in the business plan of community-based enterprises, for supplies management as well as in profit sharing.

To secure continued support for the land tenure programs at the national and provincial level, demonstrate national benefits of CF/CPA through high-impact enterprises such as bamboo enterprise.

STRATEGY 3.1. CBNE Scale Enterprise for Independence and Sustainable NR use / Community-based Bamboo Enterprise

In the medium to long term, develop scale community enterprises in order to increase benefits but also to promote the protection of forest resources specifically NTFPs, through the validation of its potential to contribute not just to poverty alleviation but also to national economic development. Engage the provincial level to develop sustainable economic development strategies, focusing on large-scale industry that can also provide local employment as well as contribute to national economic development through exports. Market studies demonstrate

high demand for bamboo and various organizations in the country have shown interest to support it.

STRATEGY 4: Build synergistic partnerships with different sectors and different levels to upscale livelihoods assets of target communities for independence.

Weak livelihood assets prevent community members from participating in the development in the province and are often taken advantage by others and the system. Upscale livelihood assets (human, physical, natural, social and financial) through various NGO support. Where possible, build synergistic cooperation in order to develop and implement complementary projects that address different areas to bridge the community benefit from the existing economic developments in the region.

1. CEDAC has been successfully working on agriculture, livestock raising and savings groups in the region.
2. NTFP-EP works on NTFP Community Enterprises and market links, specifically for honey and resin.
3. NOMAD and NTFP-EP work on Food from the forest to enhance food security and adaptive livelihoods.
4. ICC works on non-formal education and skills development that can be adapted to practical skills for enterprise development and management.
5. CANDO has started to develop their program on financial literacy for rural areas.

Finally, mobilize an under-recognized resource of communities.

STRATEGY 5: Empowering Women and Strengthening Livelihoods

Women almost equal the men in number in the selected villages. Playing complementary and some lead roles the livelihood activities of a household, the women are an important human asset of the household. Their empowerment and development will surely contribute to a sustainable livelihood for the whole household.

Introduction

i. Project Background

Cambodia Supporting Forests and Biodiversity (SFB), a four-year project approved by the USAID in October 2012, aims to address the drivers of deforestation and biodiversity loss in Cambodia's two largest intact forest landscapes; the Eastern Plains Landscape (EPL) and Prey Lang Landscape (PLL) both located in the north of Cambodia. The project aims to improve conservation and governance of the EPL and PLL to mitigate climate change and conserve biodiversity. This consortium project is an initiative of Winrock International, WWF Cambodia, East-West Management Institute (EWMI), Wildlife Conservation Society (WCS) and the Center for People and Forests (RECOFTC), in partnership with the Forestry Administration in the Ministry of Agriculture, Forestry and Fisheries and the Ministry of Environment. The project emphasizes community participation and building capacities of local communities and government officials at national and sub-national level to effectively manage the country's natural resources, focusing on the following general objectives:

- a. Enhance effectiveness of government and key natural resource managers at national and sub-national levels to sustainably manage forests and biodiversity;
- b. Improve constructive dialogue on forest management and economic development at the national and sub-national levels; and
- c. Increase equitable economic benefits from the sustainable forest management

As part of the activities for the third goal, WWF Cambodia engaged the Non-Timber Forest Products – Exchange Programme (NTFP-EP) Cambodia to provide support in sustainable livelihoods assessment, enterprise identification and trainings on enterprise development in four villages in the EPL, namely, Srae Huy, Srae Thom, Lao Ka and Toul.

ii. The Study

This study was undertaken to assess the sustainability of livelihoods in the four target sites and to identify potential enterprises that can enhance community livelihoods and promote sustainable forest resource management.

Four target sites identified by the WWF are found within or along the borders of two protected and conservation areas in the province, Mondulhiri Protected Forest (MPF) and the Phnom Prich Wildlife Sanctuary (PPWS)

- Srae Huy Village in Srae Huy Commune (Western Cluster) Koh Nheak District
- Srae Thom Village in Sok San Commune (Western Cluster, Koh Nheak District
- Lao Ka Village in Sokhdom Commune, Sen Monorum District
- Toul Village in Memong Commune, Keo Seima District

The first part of the study covers sustainable livelihood assessment. It describes the livelihood situation of the communities based on the perspectives of the community participants, using the DFID sustainable livelihoods indicators and an overview of the households' income and expenses. The chapter also looked at livelihood assets, internal and external factors that influence them and how they impact each other. Livelihood strategies that result from these conditions are then presented, giving a special attention to livelihood activities of women. The

chapter ends with the assessment of the sustainability of each livelihood strategy and overall community livelihoods.

Part II takes up products, markets and potential enterprises. The study focused on NTFP resources for community-based enterprises. After an overview of the products found in the target sites, the chapter surveyed trends, market situation for each product and looked at market pulls from which opportunities and potential enterprises were identified. Priority products, potential enterprises were then highlighted. Potential enterprises were rapidly assessed based on enabling conditions and impacts on food security, gender and climate change adaptation/mitigation and biodiversity.

The final chapter provides a synthesis of livelihood conditions and recommendations on strategies to strengthen communities' livelihoods assets towards contribution to sustainability of livelihoods.

iii. Methodology

The main tool used for the study is the CLAPS (Community Livelihoods Assessment and Product Selection), a tool synthesized and adapted by NTFP-EP from various tools, mainly the Sustainable Livelihoods Analysis (SLA) developed by the DFID, Product Selection Matrix adapted from the UNCTAD BioTrade Product Selection Tool, and Value Chain.

Through a community workshop, the process ensured a participatory approach in the assessment of livelihoods. Through this workshop, communities were exposed to the process on analyzing their livelihoods and the internal and external factors that have impact on them. Fieldwork was scheduled for July 2013, however, due to the national elections scheduled the same month, organizations were not allowed to conduct community meetings. The workshops were then scheduled for August 2013. Three workshops were held (Lao Ka, Toul, combined Srae Huy/Srae Thom).

| Participants | Men | Women | Total |
|----------------------|-----|-------|-------|
| Srae Huy / Srae Thom | 26 | 4 | 30 |
| Lao Ka | 3 | 12 | 15 |
| Toul | 14 | 16 | 30 |

Aside from the workshops, focused-group discussions were held with community members in each village. NGOs active in the Mondulkiri area were also invited for an FGD. Key informants interviews were also conducted with the members of the commune council, community forest management committee officers, relevant local government agencies (FA, MoE). Secondary sources were also reviewed to have an understanding of the provincial context and the markets. Finally, a quick market scan was conducted for some products through a combination of key informants interview, secondary sources review and desk research. Meetings with organizations and private companies were held to identify potential partners for the development of identified opportunities.

PART I: Sustainable Livelihoods Assessment

1. State of the people's livelihoods

Villagers of Srae Huy and Srae Thom that participated in the PRA state that they are food secure due to their rice production that is now able to feed them the whole year. Also, they feel that

they have enough income from selling their rice surplus, which is up to 25% of rice production, and from the collection of NTFPs. The difference from the SLA carried out in 2007 (Aquino 2007), where the average yield of un-milled rice in 2007 was 1,250 KG/ha, which was not enough for own consumption, to the present situation may be partly attributed to the CEDAC intervention in 2009 that provided new variety of rice and rice-planting technology. This has resulted in increased output of rice harvests. The new rice variety that is acceptable to the market also opened up a new income stream for the households. In addition to solid and liquid resin, market demand for NTFPs that were not traditionally traded such as sleng seeds (*nux-vomica*), orchids, honey and wild vegetables are also providing additional seasonal income streams to the community.

In Lao Ka, where most of household food (meat, fish and vegetables) is purchased from the market, and rice harvests can only last for 2-3 months, and income from harvests from farms for 6-9 months, food security and increased income are still the main priority. There is a sense of decreased income as they lost resin trees to ELCs. But because of job opportunities provided by companies and logging activities are available to them, they have alternative sources of income. However, the sustainability food and income sources are still uncertain.

In Toul, more income is the priority as the living conditions of the people characterized by seasonal food shortages, heighten the need for more income. The inaccessibility of the market and lack of market knowledge drives low prices, trader monopoly and high transaction costs, limiting the income of the villagers. The community believes that in increasing their income, they will also improve their food security, and increase their wellbeing in terms of health, and household assets.

In terms of ranking livelihood outcome, the communities under this study have slightly varying priorities. Table No. 1.1 shows the present ranking of livelihood outcome of the community, where 1 is the top priority and 5, the least.

Table 1.1 Sustainable Livelihoods Indicators Ranking per community

| Sustainable Livelihood Indicator | Srae Huy/ Srae Thom | Lao Ka | Toul (Memong) |
|----------------------------------|------------------------|-----------------|-----------------|
| Improved food security | 2 nd | 1 st | 4 th |
| More income | 4 th | 2 nd | 1 st |
| More sustainable use of NR Base | 1 st | 4 th | 2 nd |
| Increased well-being | 5 th | 3 rd | 3 rd |
| Reduced vulnerability | 3 rd | 5 th | 5 th |

Having reached some level of food security and enough income these recent years, the need to secure this condition is of utmost importance to the Srae Huy/ Srae Thom villagers. This means protecting their forest resources, and reducing vulnerability. For Lao Ka villagers, the degenerating forests and loss of NTFP resources have had them turn to agricultural crops.

Recognizing the important contribution of NTFPs and the forest resources to their household income and subsistence, the communities are now conscious of the need to ensure the long term supplies of these resources. Sustainable natural resource base use is a top priority specifically for Srae Huy, Srae Thom and Toul. This is a change from the 2007 SLA in Srae Thom, where this indicator was least of the priorities. In Toul, the villagers noted that their forest and NTFP resources are still abundant and accessible to the community. However, they are aware of the existing threats to these resources and there is a desire to protect them and to ensure their

sustainable use. The villagers' goal is to increase their well-being through sustainable use of their forest resources. Consequently, the village chief would like to propose the protection of the areas where they collect the NTFPs.

In contrast, for Lao Ka, sustainable use of natural resource base is the least priority at the moment as there is a sense of frustration or hopelessness in protecting forests, given that an ELC has cut their resin and other trees, community members and/or non-members are harvesting resources unsustainably and there is no benefit felt by the communities in protecting the forests. There were also reports that some community members are hired by companies to cut trees or they themselves also engage in illegal logging.

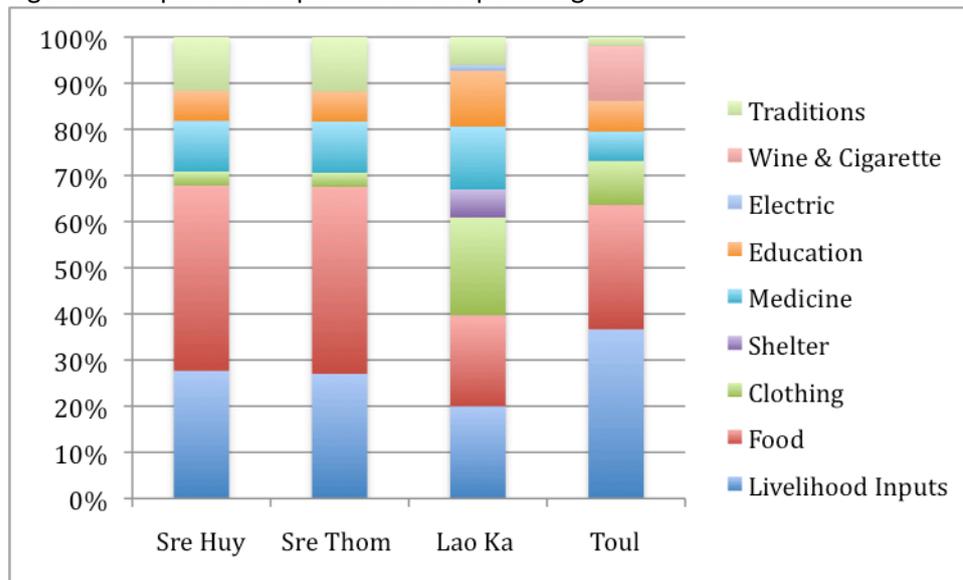
Increased well-being, defined as happiness, education, good health by the communities, savings and for Bunong communities, the continued practice of traditional rites, comes after food security and increased income, placing 3rd in Lao Ka/Toul and 5th priority in Srae Huy/Srae Thom. In Srae Huy and Srae Thom, households are able to carry on their traditional ceremonies through their savings in the form of livestock. Education of children is not a priority as current access to land resources presents a livelihood guarantee to the households. The needs-focus of the villages that are nearer town centers that have more access to labor-based income opportunities, (Toul, Lao Ka – ranked 3rd), places education of their children in higher priority. In Toul, there is a market and trading place and there are also mining activities near the village, which offers labor based income source. There is also the hope that children will find employment outside the village. Younger generations also prefer to learn new skills for other occupation.

Except for Srae Huy/Srae Thom, where villages have experienced floods or droughts several occasions, "reduced vulnerability" is the least priority for now. For Lao Ka villagers, they are still able to access the forests and they see other income options such as selling labor to ELCs or cut timber. Also, Lao Ka hasn't reported any important threat, such as floods or other threats to their livelihoods. Toul on the other hand, has recent 2012 / 2013 experience of livestock diseases, flood and drought. However, these are not yet seen as long-term threats. Increased income is also seen to address and assure from such vulnerabilities.

1.1. Household Income and Expenses

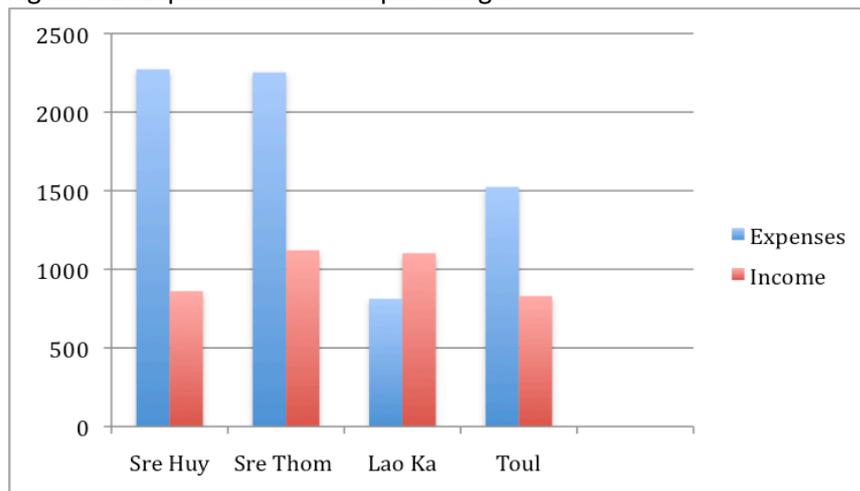
Overall expenses are still focused on basic needs such as food, clothing, shelter, education, and health. But the predominance of food as expenditure is evident. Meat, fish and vegetables are usually bought from the market. While households have some vegetable gardens, lack in water sources require them to purchase vegetables during dry season. Even the costs for livelihood inputs are to ensure food production for the household. Transportation, ranging 4 – 8% of expenditures is partly part of the livelihood expense and partly for household needs such as going to the market, to school or to health centers. Only one village brought up non-basic needs, such as cigarettes and wine. However, based on observation, some households now have DVDs, motorbikes, cellular phone, and other home appliances. Even though they were not mentioned during the PRA, it is assumed that some part of the household income is now going to these new needs or wants. Housing of villagers in Toul and Lao Ka are mostly wooden houses with fibrocement. The former has about 17% living in houses with simpler materials. It is also important to note that despite being hard on cash, people still put aside money to spend on traditional ceremonies that average 7% of household income. In Lao Ka, some households are able to save about 37-50 USD a year. In the 2007 SLA, the average savings was about the same. About 5 - 13% of income is reinvested to livelihood assets through expenses in education and in livestock.

Figure 1.1 Expenditures per household per village



Medicine is another important expenditure, ranging from 6 – 13% of expenses. Lowest expense on medicine is in Toul, where there is the organization, CARE that provides support to address hygiene and diseases such as HIV and malaria. Lao Ka, posted the highest expense on medicine. Having the provincial capital more accessible, community members go there to seek treatment instead of turning first to traditional medicine, compared to other who do not have access to community centers or those who still have access to forest resources.

Figure 1.2. Expenses & Income per Village



Expenditures are way over the income generated by the households. The expenses on food in Srae Huy/Srae Thom, which is to buy meat, vegetables, and seasonings (i.e. salt, MSG), are much higher than in Lao Ka and Toul. Srae Huy/Srae Thom villagers purchase goods and seasoning in Koh Nheak where costs are higher. They also have to spend on transportation to reach the market. There is informal borrowing among village members to cope with cash shortages. Also, there might be other income sources that have not been mentioned. According to an organization working in the area, there may be some households engaged in logging and hunting. Srae Thom has higher income than Srae Huy as there are households that have resin trees.

Lao Ka is the only village that demonstrated higher cash income over expenses among the areas studied. The distribution of expenses of Lao Ka can be noticed is more equal on different categories. Food is still a preoccupation, but cosmetics and clothes are also of equal importance to the families. Since it was mostly women who partook in the workshop in Lao Ka, we can also see the expenses that are important also to women.

The SLA carried out in 2007 (Aquino) in the same region indicated that households subsisted on 1.57 – 2.48 USD per day. Current survey indicated that households subsists on 2.27 - 3.02 USD / day, a slight increase from 6 years ago. With an average of 5 members per household, each lives on 0.45 – 0.60 US\$ / day. This is still below the 0,96 USD (3871 riel) national poverty line (UNDP Cambodia Website accessed December 2013). But it is more or less on the 2009 rural poverty line of 2,367 riel/day/person. (JICA 2010)

In Lao Ka, expenses for food, primary level education, and transportation are met through earnings from sales of crops, labor work and logging. However, this income is not enough to support students at high school level in the provincial capital, nor is it enough to seek medical treatment or purchase medications. In Toul, villagers turn to selling labor to meet expense shortages. Expenses were not all met before, as they didn't have all the livelihood options as now. Based on the PRA, one generation before, 90-95% was dependent on agriculture and livestock. Due to the isolation from outside market, NTFP collection was mainly for household consumption. However, when a trading market was established, market demand for NTFPs provided an alternative source of cash income for the community. The mining concession also provided additional opportunities for cash income.

2. Livelihoods Assets

Table 1.2 Overview of valued community livelihood assets within the study area

| | |
|-------------------------|--|
| Natural Assets | Forest resources, agricultural fields, rivers/streams, NTFPs (bamboo, honey, vegetable, fruits, mushrooms, resin (liquid/solid), crops, CF/CPA, vegetable garden |
| Physical Assets | Roads to market (Lao Ka, Srae Huy, Srae Thom), motorized hand tractors, basic government service centers (i.e. primary schools, health centers), mobile phones, motorbikes |
| Financial Assets | Traditional savings in the form of livestock or gold, access to microfinance institutions, savings group, household savings, solidarity lending |
| Social Assets | Strong traditional community solidarity, links with/support from NGOs, links with traders |
| Human Assets | <ul style="list-style-type: none"> • Traditional knowledge and skills on farming, forest product collection, basket weaving, carpentry and livestock raising and traditional medicine. • Some trading skills and negotiating skills • Experience in collective marketing, through the establishment of the Sleng Seed Collection Group and the Honey Group • Some agricultural/NTFP knowledge from NGO trainings |

2.1 Human assets

There is traditional knowledge and skills on farming, forest product collection, basket weaving, carpentry and livestock raising and traditional medicine. There is also some sign of trading skills and negotiating skills, where community NTFP collectors now check first prices of crops and NTFP before delivering products to buyers or traders. In Srae Huy/Srae Thom, there is an

experience of collective marketing through the establishment of the Sleng Seed Collection Group and the Honey Group. Capacity building, seed capital and monitoring were provided to the group. However, lack of access to markets and low selling price decreased the interest of some members to participate. In Lao Ka, being near the provincial market, there is a lot of experience in trading. Men and women either sell to traders or go directly to the market to sell their produce. Also, a resin group and a basket-weaving group were organized by a local NGO but the project only lasted for 2 months and 6 months, respectively.

Capacity to turn physical asset, such as farm fields and forest resources into productive assets depend on the labor available to the household. Families have at least 5 – 6 members. Additional labor is provided through traditional solidarity. For households with bigger lands, labor-for-rent has become an option to increase human resource. The higher number of household members also allow for more livelihood strategies to be engaged. Labor-intensive livelihoods depend highly on strong and healthy bodies of village members. In Toul, villagers report that there is big human resource and health is generally good.

In the 2007 SLA in Srae Thom literacy was at 7%. (Aquino 2007) In Toul, literacy (read, write, calculate) is high, at more than 66%. In Lao Ka, although reading and writing skills are low at around 45%, computation skills are high at 67%. (Duk 2013)

2.2. Social Assets

Mostly indigenous communities, most villagers continue their tradition of solidarity, especially during planting and harvesting seasons. Villagers also go in groups when going to the forest to collect NTFPs. They continue to partake in customary rites, festivals, and ceremonies. Even in mixed-ethnic areas, common days of festivals are agreed upon by the members and are celebrated jointly. These festivities and mutual labor exchange build the relationship and the social capital among the community.

In Srae Huy/Srae Thom, various networks are addressing different needs of the community. There is a political village chief that deal with local development. There is an elders' group that serves as traditional court in the village, solving issues related to the traditions and culture of the Bunong people; the IP Network that builds IP solidarity, tradition and culture protection; the CPA and CCF committees that are responsible for natural resource management. There are also NTFP collection and savings groups that focus on livelihoods and enterprise management. There is also a good relationship with the commune council, village development committees, and the Forest Administration.

In Toul, villagers are able to borrow from each other and especially from one trader in the village. Communication among the villagers is very strong. On the other hand, communication with the commune, the police and the PPWS ranger is weak. Decision making in the community is participatory. The village chief always asks the members before a decision is made. Only a few families do not participate or join in village events. There is a willingness among the villagers to work together to improve their livelihoods.

Trading and participating in projects also build the social capital of the community, creating links with various groups and institutions beyond their villages. From these links they get new information such as market information, new technology, hygiene and health practices, sustainable resource management, land tenure rights, etc. Information is also accessed through mobile phones for most and through television for at least 2/3 of households.

The table below shows the different NGOs and communes providing support in the four villages:

Table 1.3. Organizations Active in Selected Villages

| Organization / Institution | Overall | Srae Huy/Srae Thom | Lao Ka | Toul |
|----------------------------|---|--|---|---|
| CARE | | | | Health information on Malaria and HIV |
| CEDAC | | Agriculture program, rice, home garden, livestock raising, savings group | Agriculture program, rice, home garden, livestock raising, savings group | |
| Commune | | Water irrigation in Srae Huy | Water supply and health issues | |
| DPA | | | Community Livelihood, Farms, Garden | |
| Health Unlimited | | Health / hygiene | | |
| ICC | NTFP Research | Non-formal Education Khmer & Bunong Languages | Non-formal Education Khmer & Bunong Languages | Non-formal Education Khmer & Bunong Languages |
| Krei Kuruna, IRAM | | IP Network | | |
| MVI | | IP Rights, Land Tenure | CPA committees, Livelihoods (Resin, Basket Weaving) IP right and IP livelihood NRM (CF, CPA) Land titling (IP) Good governance Advocacy | Livelihoods (Resin, Basket Weaving) IP right and IP livelihood NRM (CF, CPA) Land titling (IP) Good governance Advocacy |
| NOMAD | Health, traditional medicine, food security (wild food), ecotourism | Health, traditional medicine, food security (wild food), ecotourism | IP products market stall in Sen Monorom | |
| Tosanak Thmey | | | | Forest and fish protection |
| WWF | | Community Forestry, IP community, Enterprise | | Community Forestry, IP community, Enterprise |

Other organizations active in the province are: (Source: Try 2009)

| | |
|-----------------|--|
| Red Cross | Water and Sanitation, Wells |
| My Village | Rice Bank, Community forest, home gardening |
| Caritas | Multi-purpose farming |
| CEDAC | System of rice intensification |
| NTFP-EP | Wild honey, NTFP Enterprise |
| CRDT | New varieties of rice |
| DPA | Water and Sanitation, Wells, Community forest, Resin cooperative |
| JICA | Irrigation, Agricultural support |
| Oxfam Australia | Agricultural inputs |
| WCS | Conservation, Land use planning |

2.3. Natural Assets

Most households have access to farmlands and *swidden* areas, ranging from 0.5 to 10 ha. Average size of farmlands is 3 – 5 ha per household. Srae Huy/Srae Thom villagers mostly cultivate rice. Lao Ka villagers have converted to cash crops such as cassava, banana, cane, corn but households found along the slope and the foot of the hill have set aside a small portion of their fields for rice. In Lao Ka, through the intervention of the provincial government and the Ministry of Environment, 452 hectares were allocated for farmlands of the villagers, with each family having at least 3 ha. However, there are no land registrations yet. They will have to use the land continuously for 3 years to get a title for it. Unutilized land will be taken back by the government. In Lao Ka, the soil quality has degenerated and farm lots are smaller as some lands were sold to migrants.

There are 3 rivers that spread out into streams across the province. However, agriculture is mainly rain-fed. Main water sources in Toul are streams, pump wells, and wells. Rain is the most important source of water for the village, along with Lao Ka, Srae Huy and Srae Thom. For Khmer villagers, they make use of big jars to store rain fed water. While those without jars, turn to other sources during dry season. O Te stream is the nearest and the main source of water in Toul. When it rains, the stream level goes up but the water is silted due to soil erosion from cleared lands and agriculture farms, and vegetable gardens along the riverbanks. During the dry season, the stream dries up and villagers make use of water collected from the rain, which is usually not enough. Then, they source from the pump well. Although, the quality of water from pump well is fine, some villagers are not used to the taste of the water and prefer to use stream water. (Duk 2013)

Households also have access to forest resources. In Lao Ka the forest is 25 – 30 km from the village. According to villagers, the resources have decreased by 60% in the last two years due to farms expansions, conversion to commercial uses, and ELCs for rubber plantation. Toul on the other hand is 5-10 Km from the forest. Srae Huy and Srae Thom are 15-20 km from the forest. The forest provides products that households use for subsistence and for cash income. In Lao Ka, there are resin trees (liquid and solid), wild vegetables, bamboo, and rattan. Most households are able to gather solid resin, sleng seeds wild vegetables, mushrooms and even wild animals, bamboo shoots, cashew, fish. Bamboo is also abundant in all the villages, however they are mainly used for household needs.

2.4. Physical assets

Structures of basic government services such as health centers, water irrigation, schools, markets, roads are found in the studied villages. However, in most areas the conditions and accessibility of these structures are too limited to provide the services they were intended for. In Toul, the school and the markets are only accessible during the dry season as the students and the villagers would need to cross the river during the rainy season to reach them. In Srae Thom, the schools can only accommodate 10% of the children while the health centers can only attend to minor ailments.

In Srae Huy / Srae Thom, there is the Koh Nheak Market, some irrigation system, hospital, pagoda, bridges, primary school, commune center, community center, some roads to markets and to forests that allow for easy transport of products. A road now connects Koh Nheak to Sen Monorum and another that connects it to Lom Phat and Ratanakiri is under construction. Traveling between Toul and Sen Monorum and Kratie is very difficult. The village chief already submitted a request to the district chief for its construction so they hope this road would be built in the coming year. In Lao Ka, the roads allow villagers to access the provincial market, health center and school, commune office and province easily. In Toul, there is also a military

post, a secondary school and wells. Some dikes are still found in some streams running through or near villages in Mondulkiri. But most if not all are broken or require maintenance and upgrading. Communities in the Sok San commune noted that dikes in water sources around their villages were in need of maintenance or rebuilding assistance, some even requiring extensive work. Few communes have supplementary irrigation resources, which are stored in a reservoir during the wet season. One of these irrigations schemes is found in Srae Huy commune. However, the system is only able to serve a limited number of paddy fields, and villagers have to pump water into the rice fields before they can be irrigated. Some households own these pumps and rent them out to other households. (Try 2009) In Memong Commune, majority of paddy fields lack irrigation schemes to store water for rice farming.

Villagers in Lao Ka have access to electricity while some villagers from Srae Thom / Srae Huy are making use of generators, batteries and some even have solar panels installed (World Bank support). Lao Ka has telecommunication signals while in Srae Huy / Srae Thom, only some areas are reached. Many households also now have cellular phones. For livelihoods equipment, plowing machine / hand tractor, water pumps for agricultural lands are now used by some households. They are available for purchase or even for rent to villagers. In Lao Ka, some households have their own chainsaws. Households also have TV VCD player phone, radio.

Transport range from bicycles, motorbikes, scooters, and motorized hand tractors that are hitched to makeshift wagons that can carry both people and produce. This facilitates the transport of bigger volumes of products and help in trade for those who have them. Otherwise, transportation can be expensive. Public transportation in form of motorcycles, vans traveling between towns and cities, is also limited and is mainly owned by private individuals or companies. The conditions of roads that connect Toul to Sen Monorom and other villages make it difficult to reach the town. It is only within the village that the roads are easy to pass through.

2.5. Financial Assets

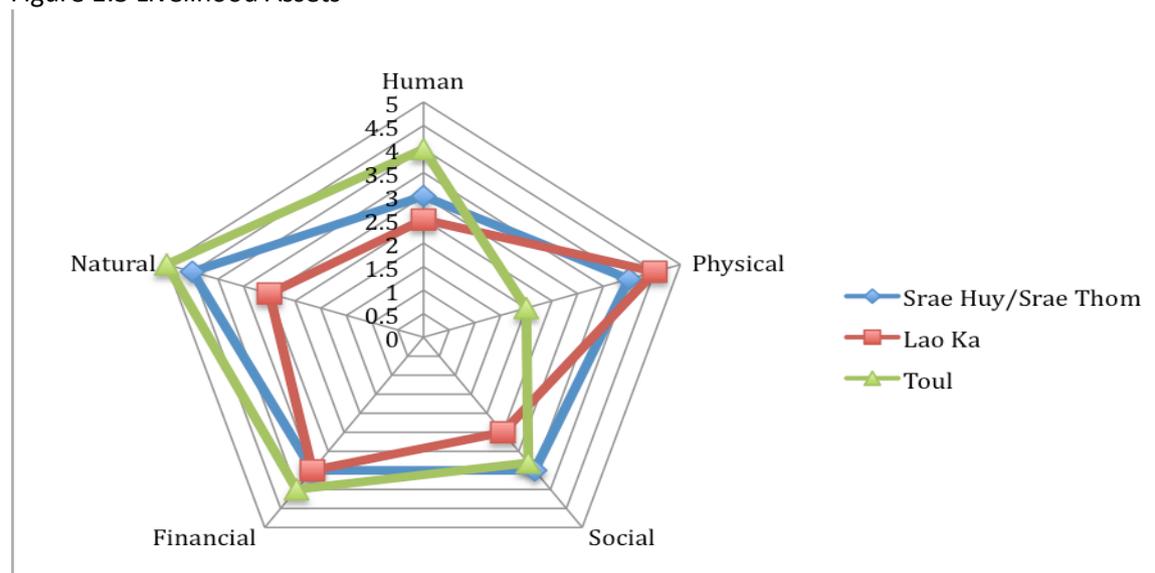
Livestock raising serves as a traditional way of saving for Bunong families. Selling of livestock is rare unless the household needs to buy farming equipment, renovate or build a new house, marry off a child or celebrate an important traditional ceremony. Toul villagers purchase gold as a way of savings. In Lao Ka, through the income from various activities, villagers are able to save 37.5 – 100 US\$ year. According to the socio-economic baseline survey carried out this year, about 22% of households, in Toul and 33% in Lao Ka are putting aside some savings. Majority of these households just keep their savings at home. A few families keep them in banks or in saving groups. (Duk 2013)

Taking small, interest-free loans from relatives or neighbors is part of coping mechanism during food shortage or emergencies. For expenses related to livelihoods, traders usually lend money to the farmer / collector for the required inputs. In Srae Huy/Srae Thom, a savings group was organized by CEDAC to provide low-interest rate and easily accessible loans to villagers while increasing the income of the members. The group however faces challenges as payments are delayed and participation is low. There are also various micro-finance institutions in the villages but requirements are not easy for villagers to comply with. In Lao Ka, many families take many of these loans. In Toul, some villagers receive advance payment from traders for supply of solid and liquid resin.

2.6. Factors affecting the livelihoods' assets

The diagram demonstrates the strong and weak points in the villages' livelihood assets.

Figure 1.3 Livelihood Assets



The villages are rich in natural resources. Villagers have products and crops that through physical assets such as roads to market, they are able to sell in markets that generate financial assets. Like in Lao Ka, the village is just 3-4 km from Sen Monorom. There they sell wild vegetables, cash crops, solid resins and even sawn timber. In Srae Huy/Srae Thom, telecommunication lines allow them to contact buyers for their products in advance and to reach buyers outside their local milieu. It also allows them to know of products that buyers want.

Their tradition of saving, though minimal, provides for their customary festivities, a safety net when illness strikes or for livelihood investments. Savings are used to acquire some physical assets, such as hand tractors, motors, water pump, which make it easy to cultivate their lands or to reach both forests and markets. Social assets in the form of relationships in the community are drawn upon during these difficult times, where neighbors provide loans with no interests; or when labor is shared to make use of natural assets such as farming and harvesting or NTFP collection. Social assets in the form of networks, specifically relations with NGOs and the market are also providing villagers new skills that enhance their human assets, which are used to make use of and protect the natural assets available in the community and to protect them from diseases. This is of most importance now as weak human assets prevent the effective and efficient use of the natural resources. Most of the knowledge on livelihoods is limited or outdated. Unlike in the case of Srae Huy and Srae Thom, which have adopted the new technology and rice variety introduced by CEDAC in 2009. This had a strong impact on food security and increased income. However in other livelihoods, limited knowledge still remain. In Toul, livestock raising is based on outdated practice that is not prepared for new diseases or pests. The villagers had a hard time dealing with new diseases contracted by their cattle in 2013. Limited vaccine provided through the support of commune council saved some but many households lost their animals. In Lao Ka, uninformed choices hamper the sustainability of their livelihoods. Chemicals are used to kill weeds in their farms and unsustainable farming methods diminish the productivity of their lands in the long-term. Threats to their forest resources are making them focus just on their farms while taking what they can from the forest for now, without thinking of its conservation for long-term use.

This is compounded by the degraded conditions of physical assets such as roads, dikes, irrigations and insufficient services provided by the government for education and health. Financial assets going to medicine to improve health and schooling of young children as investments to livelihood do not really contribute to improving the assets of the villages but in the end are wasted. Inadequate waterworks, lack of hygiene provisions, weak healthcare lead to recurring illness and even death. This limits the capacity of individuals and households to make use of natural assets and engage in livelihood activities. Inaccessible schools due to lack of bridges or roads, irregular schooling as teachers are from out of town and are not always present, and inappropriate methodologies weaken learning interest and capacity of the students. Some students are only able to finish primary school, if they go to school at all and literacy remains low. Bad roads also increase transport costs for the villagers to access the market and other basic services. It also has an impact on the cost of the goods sold or bought by the villagers. Higher transport costs takes from the potential income of the household while it increases the prices of commodities needed by the households. In the end, it has negative impacts on the financial assets of the families.

In Toul, the bad roads to Sen Monorom and to other villages and the lack of bridges seasonally isolate the community from basic services such as health and schools. It also isolates them from market opportunities for their NTFPs and crops. It affects trade, as traders are able to monopolize and dictate the prices of products. The costs and low benefits deter villagers from running businesses. The inaccessibility of the village hinders long-term support coming from NGOs. It also led a MFI to stop their operations in the area. Villagers were left to go to local lenders that usually have higher interest rates. Villagers also borrow from the trader, which contributes to the monopoly of this trader in their village, weakening further the social asset of the village.

Weak links with the commune or local authorities such as forest rangers, MoE staff, local political parties, etc. are also preventing access to projects that support livelihood or improve physical assets such as roads, bridges, irrigation, etc. and limit access to natural assets. This is also affecting relationship among community members. In Lao Ka, the lack of trust for local authorities translate to lack of trust and solidarity with other members of the community who are seen to support or benefit from the preferential treatment of some local authorities. Frustration from unsuccessful projects and hopelessness has weakened the social asset of the community that allows them to work together towards improving their livelihoods and protecting their forest. There is a weak solidarity and interest to participate in collective initiatives in the village that while the Lao Ka CPA had been declared, there is still no active management committee.

Financial assets are also affecting social assets. Whereas before farming tools, equipment or animals were communal, now new assets such as water pumps, tractors are individually owned. They are now rented out to neighbors and fellow villagers. This changes relationships and may diminish the sense of solidarity or social cohesion within the community, especially between different ethnic groups. (Try 2009) Loans from traders while is helpful during emergencies weakens the bargaining power of community collectors and their potential income.

On the other hand, roads also allow for outsiders to access the forest. This has put a strain on the resources that the villagers depend their livelihoods on and having negative impacts on the natural assets of the village. This also made it easy for migration to villages and nearby forests, which also created competition for land and resources.

3. External Factors: Vulnerability Context and Transforming Structures and Processes

3.1. Vulnerability Context

Vulnerability Context constitutes external factors that communities do not usually have control over. These factors are grouped according to Trends, Shocks and Seasonality. Trends are changes that are happening in the long term and that can be observed. Shocks are events that happen without warning while seasonality happens periodically and so can be anticipated.

3.1.1. Changes and trends

Natural and man-made changes are happening in Monduliri. As the development in Monduliri accelerates, so do the changes in the villages.

3.1.1.1. Monduliri Landscape Development

Monduliri is rich in natural assets that are eyed as a resource for national economic development through agro-industrial lands, to mining, to hydropower on one hand and a tourism destination product on the other. Its location makes it interesting for exports to Vietnam but on the other hand, may be too far to serve the growing Phnom Penh urban market and the Siem Reap tourism market. Monduliri has one of the biggest land areas in the country, making it an interesting destination for migrants looking for land and for economic land concessions. The land area is also haven to a rich and important biodiversity in Southeast Asia that features a wide variety of flora and fauna. (WWF 2012). It is home to the cultural community, the Bunong that depend heavily on the forest resources of the province. Evaluated as the poorest province in the country and declared chronically food insecure by the FAO in 2009, economic development is a priority in the landscape. Land use will have to balance all these different users and their goals for the province.

3.1.1.2. ELC, Mining & Other land uses

ELCs are mostly converting lands and forests to rubber plantations or for other commercial crops. In the PRA workshop in Lao Ka, it was reported that a rubber plantation is expanding from 728 ha to 1000 ha, overlapping with some resin trees and farms of the villagers and has entered the PPWS. This has resulted in the loss of livelihoods for villagers who are depending on NTFPs, i.e. liquid resin, honey, for household income. Forest clearing was also identified to drive insect infestations, leaving crops vulnerable to more frequent and severe attacks. Chemical pesticides used by plantations and industrial farms to control these pests further degrade water sources causing more loss of crops. (Schweithelm and Heng 2007)

In, Toul, a mining company has already built its headquarters in the forest. They are planning to start building the road from the village to their headquarters. Mining is expected to bring in migrants looking to work in the mines. Aside from forest clearing, it is also predicted to affect sources of drinking water, polluting them with chemical substances used for mining. In other mining areas, it had been reported to have led to a further decline in fish resources, decreased water quality due to mine tailings. Hydropower plants / dams are also expected to affect water sources of the province, changing water flows in rivers and streams. Though the design is proposed to keep to normal flows as possible, unpredictable weather, irregular rainfall and frequent droughts and floods, may have uncontrollable impacts to the villages.

Zoning of forests and allocation of specific areas for farming, as well as the increase of

population is also making it hard for traditional rotational planting or to move rice plots at risk to less vulnerable areas.

3.1.1.3. Migration and Culture, way of life change

Economic development, opportunities for employment in mining and ELCs and cheaper lands in Mondulkiri are bringing in people from all over the country. Road development has allowed easy access to the province. People are moving in from the outside to claim land and clear the forests to make way for plantation crops like rubber. (Schweithelm and Heng 2007)

Migration to the villages is bringing in new practices and ways of life, new market opportunities, more demand for forested areas for residential land, agricultural land and for livelihood. These are putting more pressure on both natural resources and physical assets (government services). It is also influencing the way of life of indigenous communities in the following ways:

- pressure to sell land or convert lands to cash crops
- new needs
- Cash-based needs
- Private ownership of land and assets
- Trading and the use of cash
- Increased income needs

Migration has also resulted in land grabbing in forest areas. This was especially rampant when the Lao Ka CPA was not yet declared. This also had impacts on access levels to traditionally utilized and already vulnerable resources, limiting traditional crop rotational practices and generating competition for NTFPs (i.e. sleng seeds, honey) and fish.

On the other hand, in-migration is also introducing new technologies to improve existing livelihoods and way of life. Technology for farming like tractors is also adopted from outsiders. The use of hand tractors and farming of cash crops was said to have been introduced by the Chams in 2000. This has increased productivity of farmlands. (Try 2009) Another example is housing. Many Bunongs now prefer to have wooden houses like that of the Khmer population. This improves shelter and in some cases hygiene for the families. The increased population is also creating market demand for food and creating new opportunities of livelihoods such as labor renting or job opportunities.

3.1.1.4. Natural threats and climate change

The EPL, where these villages are found, is also considered as one of the landscapes in the region that are most vulnerable to climate change. (Yusuf and Francisco 2009) Increasing temperature, with days exceeding 35°C to rise from 5% to 25% on annual basis, will have an impact on outdoor livelihoods. (Sawdon and Wyrwoll 2012) The study, "Mapping of Hazards in Mondulkiri in 2009, indicated high levels of vulnerability of floods and drought in the province. Aside from seasonal, slow-onset floods, there is also the risk of flash floods. These calamities are now occurring more frequently and more intensely. These affect the agricultural outputs of communities, health of both villagers and animals and water sources. Floods especially destroy physical assets such as roads, bridges, small power generators, rice barns and financial assets, livestock, among others. There is also the risk of household displacement and abandonment of farms. Villages in Koh Nheak District experienced the highest number of consecutive droughts from 2002 to 2008. In Lao Ka, the last drought was in 2010.

Climate change is also altering the duration and the schedule of the seasons. Irregular rainfall, either in duration or in volume of rain is another blow to villagers who are dependent on

agriculture and wild vegetables. This impacts cultivation calendar/season of farming as majority of farmers in most rain-fed areas grow only one crop a year. It impacts as well the availability of NTFPs, such as mushrooms and wild vegetables, ground water for drinking both for households and livestock, the soil moisture of cultivated lands, and is a constraint to improving rice productivity. It also risks to increase annual insect infestations. Traditional warning signs watched out for natural calamities no longer apply. (Try 2009)

Srae Huy reported to have their homes and farms in upper ground and had not been reached by the water. However, the villagers take note of forecasts and have identified evacuation areas. Some villages, especially those found along streams and the river banks of Srae Pok, based on traditional knowledge have planted or protect bamboo clumps along the banks to decrease soil erosion, to prevent or lessen overflows during rainy season and to prevent debris carried by the flood to damage their farms and infrastructures. (Try 2009)

3.1.1.5. Markets

The roads have opened up the province and its products to the national market. The growing population in Mondulkiri in addition to the developing tourism industry is creating local demand for food products.

There is also a growing market for natural products, both timber and NTFPs. NTFPs that are used for medicine such as mushrooms, sleng seeds (nux – vomica) are in demand. There is also a demand for resins and gums such as gurjun balsam, lac, and damar that are used for various industries. Wild food such as edible mushrooms, vegetables are also now being sold in the market. Aside from forest products, there is also a local and national market for agricultural crops such as rice, banana, cane, cassava, cashew, among others.

Finally, there is also a demand for land for agriculture. Large companies or migrants are buying. There are villagers selling plots of land to outsiders, limiting their ability to shift their rice plots to new areas.

3.1.2. Shocks and stresses

Traditional and new factors are applying stress to the villagers: seasonal floods and droughts, food shortages, etc. These result in shocks such as illnesses of both adults and children due to water-borne diseases such as diarrhea, stomachaches and typhoid, malaria and diseases of livestock. While seasonal, these stresses are observed to be intensifying and becoming more frequent due to the trends mentioned above. Keo Seima (villages in Memong) and Koh Nheak districts were identified as being prone to flash flooding and droughts. In Lao Ka, the last drought was in 2010. Toul was flooded in 2011, experienced a drought in 2012 and lost their livestock to diseases in 2013. Flash floods and droughts destroy paddy fields, home gardens, leaving the communities vulnerable to recurring crop failures, livestock losses, and resulting in food and income shortages. Floods also damage infrastructure that causes isolation of villages from markets and other services.

Table 1.4 Overview of Calamities in the selected areas

| | 92 | 93 | 94 | 95 | '96 | '97 | '98 | '99 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 |
|-----------|----|----|----|----|-----|-----|-----|-----|----|----|----|----|-----|----|-----|-----|-----|----|
| Keo Seima | | | | | | | D | D | FI | FI | FI | FI | FI | DF | DFI | DFI | DFI | |
| Koh Nheak | F | F | F | | D | | D | D | | | FD | FD | FDI | D | FD | FDI | FDI | F |

*F – Flood, D- Drought I- Insect Infestation L- Livestock Disease

Source: Try 2009

Other natural events that impacts livelihoods and assets are the cyclical flowering of plants. In 2012, there were suddenly no sleng seeds. In Keo Seima, for four years there were no more mature bamboo and now, it is a waiting period for bamboo to mature.

Conversion of lands to other uses is also providing shocks and stresses to villagers. Some villagers have lost their resin trees or access to NTFP collection sites to ELCs. In Lao Ka, many of their trees were cut down. In Memong, immigrant miners were reported to have been using explosives in fishing in the streams where other villagers also fish for their livelihoods. (Schweithelm and Heng 2007) Wild life and fish are decreasing in the last five years. Illegal logging has increased and timber is transported from Koh Nheak to the provincial town.

3.1.3. Seasonality

Different sources of livelihoods are seasonal. Food shortage is also seasonal for households, mainly those depending on rain-fed agriculture. Household labor allocation is anchored on the priority livelihood source, which is agriculture. The table below shows the seasons, the time of food/cash surplus and shortage and the seasonality of their livelihoods.

Table 1.5 Seasons & Livelihoods

| | J | F | M | A | My | Ju | Jy | Au | S | O | N | D |
|---|-----|---|---|---|----|----|-----|----|---|---|---|---|
| Dry / Rain | Dry | | | | | | Wet | | | | | |
| Dry / Rain (SH/ST) | | | | | | | | | | | | |
| SH/ST | | | | | | | | | | | | |
| Wild Mushroom | * | * | * | * | * | | | | | | | |
| Sell Labor | | | | * | * | * | * | * | * | * | | |
| Rice Farming | | | | | | * | * | * | * | * | * | * |
| Fishing | | | | | | | | | * | * | * | |
| Honey Collection | | | * | * | * | | | | | | | |
| Sleng Seeds | * | * | * | * | * | * | | | | | | |
| Solid Resin | * | * | * | | | | | | | | | |
| Livestock | * | * | * | * | * | * | * | * | * | * | * | * |
| Home Garden | * | * | * | * | | | | | | | * | * |
| Toul | | | | | | | | | | | | |
| Fields | | | * | * | * | * | * | * | * | * | * | * |
| Resin tapping | * | * | * | * | * | | | | | | | |
| Solid Resin | * | * | * | * | * | | | | * | * | * | * |
| Lac Collection | * | * | * | * | * | | | | * | * | * | * |
| Sleng | | | * | * | * | | | | | | | |
| Orchids | * | * | * | * | * | * | * | * | * | * | * | * |
| Bamboo Shoots | | | * | * | * | | | | | | | |
| Wild Vegetables | * | * | | | | | | | | | | |
| Rattan Shoots | * | * | * | * | * | * | * | * | * | * | * | * |
| Lao Ka | | | | | | | | | | | | |
| Honey | | | * | * | * | | | | | | | |
| Solid Resin | * | * | * | * | * | * | * | * | * | * | * | * |
| Liquid Resin | * | * | * | * | * | | | | | * | * | * |
| Bamboo Shoots | | | | | | | * | * | | | | |
| Mushrooms (May-June) / Wild Vegetables / Rattan Shoots (June- | * | * | * | * | * | * | * | * | * | * | * | * |

| | | | | | | | | | | | | | |
|----------------------|--|--|--|--|--|--|---|---|---|---|---|---|---|
| Sep) | | | | | | | | | | | | | |
| Fishing *2-3x / year | | | | | | | * | * | * | * | * | * | * |

Legend

| | | |
|--|--------------------|---|
| | Dry Season | The seasons are changing and becoming more unpredictable for the villagers. Dry season has become longer in the last 10 years. |
| | Wet Season | |
| | Floods | Seasonal floods are now intensifying and are becoming more unpredictable. It overlaps with the time of food shortage in Srae Huy/Srae Thom. |
| | Surplus Cash/food | This is just after the harvest season of farm produce so they have food and income. Plus, people have time to collect and sell NTFPs. Srae Thom, Srae Huy and Toul have longer months of cash/food surplus because of their rice production. |
| | Just enough | During this period, there is labor opportunity to prepare rice seedlings and prepare for the planting season. |
| | Shortage Cash/Food | There are about 2-4 months of food/cash shortage. It is longer for Lao Ka and shortest in Toul. Unlike in other villages, Lao Ka rice production is lower. To bridge this gap, some family sell their rice or labor to purchase food. It is the time for planting and so there is limited time for NTFP collection. |

Seasonality of products and the short shelf life of some of the products prevent communities from reaching markets outside their local village. Some NTFPs in season during rice planting and harvesting are not collected as household labor is allocated to the priority livelihood, which is agriculture.

Seasonal stresses are also important to take note of. Two types of drought are faced by the province: (1) hydrological nature, experienced yearly during dry season; here, water sources become shallow or dry up, resulting in shortage of ground water and water becomes unsuitable for drinking and (2) agricultural drought, occurring during the wet season. A short dry spell of about one to three weeks happens in the middle of the rainy season. Sometimes, it last up to months, between May and June, or July – August or November to December, resulting in agricultural drought. Droughts affect family home vegetable gardens, worsening the impacts of recurrent food shortages. (Try 2009) The water shortages also propagate health problems, especially water-borne diseases and cause livestock disease. (Sawdon and Wyrwoll 2012)

Flooding is another seasonal threats in the province. Koh Nheak District’s topography is marked by different streams and water resources from the Srae Pok River and is comprised of lowland areas, making it prone to seasonal flooding that usually lasts from one to three weeks. (Try 2009) Aside from water-borne diseases due to contaminated water during floods post flood stagnant water pools provide breeding grounds for insects. It also causes the destruction and flooding of roads, cutting off communities from markets and other services (Sawdon and Wyrwoll 2012)

Forest fires, natural and manmade also put additional stress on the villagers and their natural resources. (Personal communication Maling 2013) This was specifically highlighted in the workshop in Lao Ka. It affects NTFP collection, including solid resin, wild vegetables and honey during dry season. It sometimes affects their farms but they usually have prevention mechanisms, using forest line or forest barriers.

Insect infestation is a seasonal stress in the province. Insects attack rice plants, the anchor of food security of most villages. They are commonly found in upland and rain-fed environment and not usually in irrigated rice and appear during rainy season. However, the scale of infestation was observed to be increasing. The last reported severe attack was in 2008 in Keo

Seima and in 2008 in Koh Niek, affecting both rice and cash crops. It is believed that the severe infestations were caused by long periods of drought, or longer wet season, degradation of the insects' natural habitat due to deforestation and changes in the environment, and increased use of chemical fertilizers in the village. About 92% of villages surveyed in Mondulkiri in 2009 are high in risk of insect infestation (Try 2009).

3.1.4. Impacts of vulnerability context on livelihood assets

All villagers depend on their agricultural land and their forest for their food and their income. These natural assets are most vulnerable to calamities described above. Besides the natural assets, the calamities also impact the physical, human and financial assets of the communities. Bridges, roads, dikes, barns, and water sources are destroyed or contaminated by floods and droughts. They are causing diseases to the people, their livestock and their crops. This affects productivity of the households as main livelihoods require strong and able-bodies and livestock or equipment. These threats aggravate further the impacts of degraded conditions or absence of physical assets on the community. In Toul, seasonal flooding prevents villagers from reaching markets and schools. Dirt roads become impassable to transportation isolating the village further. Death of livestock, a saving mechanism, strains villagers' financial assets.

Climate change impacts exacerbate vulnerabilities caused by seasonal natural calamities and the already low-yield production of rain-fed farmlands. Irregular rains and dry seasons affect the availability of NTFPs and the yields of crops. Failed crops, in addition to seasonal food shortages, add more pressure to households to purchase food, reducing further their financial assets.

Development in the province is providing both opportunities and threats. The provincial and national priority for cash crops (peanuts, cassava, soybeans, rubber, etc.) is creating competition to land for food sources and between village farmers and commercial companies. In-migration and changing culture or way of life is impacting social, financial and natural assets. Forests or farmlands are converted to agro-industrial mono-crop farms, which further creates cash dependency among villagers. But logging and conversion of forests are destroying ecosystems in which thrive the high-value NTFPs that communities depend on for their cash income. Increased population and competing land use is adding stress on natural assets and limiting traditional access level and resources available for use to the community livelihood. This means that there is a need to maximize income from limited resources.

The need for more income to meet cash-based needs along with the market demand for NTFPs and crops, is also putting more pressure on natural resources, either through unsustainable harvesting or using chemical fertilizers or pesticides to increase crop yields. For example in Srae Huy/Srae Thom, the increased prices of sleng this year has driven unsustainable harvesting of the seeds. Farmers have turned to conversion of rice farms to cash crops. Some cash crops, like cassava are more resistant to drought although more vulnerable to market price fluctuations. The focus on cash crops, with limited access to lands forces farmers to continuously use their land, abandoning the traditional practice of rotating crops and leaving lands to fallow for some years. Need for cash is also diminishing traditional solidarity as labor or equipment for farming now need to be rented.

On the other hand, ELCs are also opening up new livelihood opportunities not based on lands but on labor, especially for the youth. However, this is also affects social cohesion in the community. Resentment against some fellow villagers who are believed to have cut their resin tress as hired laborers by an ELC is a factor in lower solidarity among villagers in Lao Ka, hindering them from working together.

Recurring threats and their impacts are diminishing the livelihoods assets of communities, keeping livelihoods always at minimum, if not below, and unsustainable. On the other hand, trends are also bringing in opportunities with them. However, with the current human and social assets, villagers are not able to address threats on their own or take advantage of some of the opportunities brought by the changing environment. The case of Lao Ka, where their resin trees were cut and their lack of power to address continued threats to their NTFP resources have made them turn to crops and to labor in ELCs for their livelihoods. While there is an approved CPA, they have less interest to protect the forests, feeling helpless to do anything. This further weakens their natural and human assets. They do not realize that they lose more in the long term. Focusing on labor now may provide immediate income and food security, but the seasonality and the maximum benefit it can provide limit the security and sustainability of livelihoods. It also takes away the security and the potential long-term benefits of investing on their natural assets instead.

3.2. Transforming Structures & Processes (Institutions, Organizations and Policies)

Transforming Structures and processes are institutions and organizations and their corresponding regulations that shape and are also influenced by livelihood assets of a community. The main institutions and organizations that are present in the villages are the national government, local government, from provincial level to village level, Ministries of Environment, the Forestry Administration, and their local offices, non-government organization, and market and culture.

3.2.1. National government

It is the national government's aim to increase the contribution of forestry and mining and industries to national economy. It is also a priority to allocate around 2 Million ha to community forestry to support livelihood enhancement and poverty reduction in rural areas. Both are in support of the government's goal of sustainable forest management. However, these two programs sometimes conflict as ELCs and mining companies usually overlap with forest areas on which villagers draw livelihoods from. Such is the case in Lao Ka and Srae Huy, Toul. The operation of the former also has environmental impacts on the villagers' natural assets, degrading NTFP resources and contaminating water sources.

National and local government's industry prioritizes products that have high contribution to economic development, specifically exports. Such products are cash crops: cassava, cashew, peanuts, soybean, mungbeans and on rubber trees. As there are no clear impacts yet of CF or NTFPs on national economy and poverty alleviation for the government, this influences the priority of allocating ELCs over CF. Being evaluated as one of the poorest provinces in the country, Monduliri's priority is on investments with large-scale economic returns. The ability of ELCs to comply with the application process faster than communities for the CF also contributes to the speed of its approvals.

The government declaration on farmland titling, *Prakas* 001, secures agricultural land ownership of villagers but at the same time limits their rights to extend cultivation or to use other lands. The *prakas* aims to provide for livelihood but also to prevent land grabbing in the PPWS and Lao Ka CPA from villagers and outsiders. The regulation is that only cultivated land can be registered. This gives advantage to bigger households as well as those with financial capability to pay for hired labor. About 50% of land titling has been carried out in Lao Ka. In Toul, the aim is to title off at least 70% of lands.

National roads development, those that links Mondulkiri to the capital and other more developed provinces open up opportunity for trade and also for incoming tourism.

3.2.2. Local governance / political structures

Local authorities have a role in implementing national programs, one of which is processing applications for Community forestry (umbrella term for different kinds of CF) and Community Protected Area. While clear laws provide for the protection of forest resources and wildlife and traditional access rights of local communities, lack of local authorities' capacity in terms of human resource, skills and budget, or sometimes will in the implementation and control of the agreements with ELCs, leave the latter in some cases un-checked to encroach on protected areas and on the traditional rights and livelihood sources of communities. The limited forest control jeopardizes the natural assets in the village. In Lao Ka, resin trees were cut by the ELC as was in Srae Huy. In Toul, the lack of response by local authorities on reports of illegal activities, including logging and wildlife hunting, engendered mistrust and weak links between the villagers and the authorities, an impact on social assets.

Local governments are also in charge of infrastructure and socio-economic development in the districts and communes. As described in the livelihood assets, the government is providing the basic services of health centers, primary schools, and livelihood support. For livelihoods, local government has the "One Village, One Product" Program. They also provide some assistance for agriculture and livestock. However, the quality of the services is not able to address all the needs of the communities. Much hasn't changed from the 2007 SLA. Health center are only able to treat minor ailments. For grave illnesses, villagers need to go to provincial hospitals. Aside from transportation and travel costs, mostly, households would have to pay for the services too. Schools are irregular as teachers, coming from out of town most of the time travel to their hometowns. And so, students do not learn much and literacy and student participation interest are low. Most villages have animal health workers, but they do not have sufficient training or medicine to treat the animals. Animal vaccination has to be paid for. Limited supplies are allotted for those who can pay for them. Irrigation is scarce and is not able to service all households, especially during dry seasons and droughts. Households depending on home vegetable gardens will have to purchase vegetables instead. Water pump machines and crops seeds that were provided were limited and expensive to use. In Kohn Nheak communes have received water pump machines from the Provincial Department of Agriculture, but this was not enough to irrigate all rice fields, as there was no canal to distribute the water. (Try 2009)

Different local dynamics and governance and its policies, informal or informal have an impact on livelihoods. In Lao Ka, all activities of the NGOs and the community have to be reported or need to secure permission first. Any person advocating about forest and land will be accused of being against the party.

One of the important development initiative provided by the local government is road construction. The Lao Ka commune plans to extend by 300meters an existing road. This means that more households will be connected to the road and improve access to markets and services. In Srae Huy / Srae Thom construction of roads is taking a long time. Except for some roads connecting main districts to Sen Monorom and Phnom Penh, roads are still generally bad making it hard to travel between the village and the provincial capital and to other towns. This affects transportation costs, which have impacts on their product costs too. This also prevents access to markets and market information, which makes the villages prone to monopoly of some traders, like in Toul. The quality of most roads also makes them defenseless to floods.

3.2.3. NGO support

Non-government Organizations tackle services that government agencies are not able to provide the communities. Health care, non-formal education, micro-finance, livelihoods provisions are some examples of support. Some of these projects were listed under “Social Assets”. NGOs are also instrumental in bridging local communities to “processes” and support programs of the government. This includes raising awareness and understanding of laws and rights, for example, Indigenous Peoples Rights, land tenure, community forestry. NGOs also support government agencies in order to fulfill their mandates. One of which is the program on Corridor Biodiversity Conservation Project a project of the ADB with the Ministry of Environment and Forestry Administration, cooperating with Mekong Think Tank supports the establishment of the CPA and livelihood development in Lao Ka and in Toul. 2296 ha has been declared as Lao Ka CPA. It aims to develop NTFP livelihoods in 2014.

While NGOs also bring their own agendas to the table, for example, biodiversity conservation, their strategies now engage local actors’ participation and consider other land uses, especially communities’ livelihoods. For communities, to get support for their livelihood, they will have to participate in achieving those missions too. It is important for them to understand and see what benefit they get out of it. In some cases, in order to just get support, communities just accept all kinds of training, i.e. chicken raising, pig raising, etc, without understanding how it can contribute to the sustainability of their livelihoods. Short-term projects however can cause project fatigue on villagers. This is the case in Lao Ka. Short-term support given in the past and not seeing results or benefits has diminished the interest of the community to participate in projects.

It should be noted that many organizations work in the area. There are some whose missions overlap though applying varying strategies and some are interconnected. It would be beneficial to establish partnerships and create synergies to appropriate limited budgets towards more strategic interventions and longer-term impacts. This would especially be useful for sustainable livelihoods. The non-formal education given by ICC, for example will be useful for enterprise development and community organizing. The same way that training on hygienic practices given by CARE can also be applied to livelihoods development, specifically food-focused enterprises. Strategies can be shared, while implementations can be divided to different NGOs.

3.2.4. Market

Access to markets provides livelihood opportunities for the villagers. The establishment of the Memong market created a demand for NTFPs, providing a supplementary income source to Toul villagers. Having market knowledge, traders can dictate the prices of the NTFPs bought from villagers.

Underdeveloped, information about the sector of NTFPs’ and its market is limited. Absence or lack of manufacturing or processing industries for the NTFPs harvested by villagers limit the local demand. Main markets are abroad where they are processed into higher value products. Traders solely transport or export them raw or semi-processed. This means that minimum benefit is derived from the resources by the collector and the country. Scarce market information means that value chains are mostly monopolized by a few traders.

For markets of cash crops, the prices are seasonal, highly competitive and subject to unpredictable fluctuations. Increasing supplies mean lower prices. Lao Ka has direct access to the market. However, due to strong competition, prices of their products are low and derived

income is still small. Demand is also subject to trends. To succeed in the market economy, villagers need to have market knowledge, have competitive advantage, product knowledge, value addition, negotiating skills to stay on top of the game, instead of being controlled by it and be subject to its caprice. The market is technically free for all to participate. However, policies both formal and informal of other market actors, private sector, government, influence the barriers to entry in certain industries.

3.2.5. Private Sector

Private companies have the capital and the market knowledge to make use of natural assets in the villages and its surrounding areas. They also have the capacity to comply with all requirements to operate a business and to transport the products to their target markets, either domestically or internationally. They are important to villagers who lack market information and distribution capacity to access markets outside their locality. They also support development activities, specifically roads construction in the villages. In Toul, a road near the border between Toul village and Lao Ka village has also been built by a mining company. In Lao Ka, an ELC is constructing around 9Km of roads that connects the village to its company in the forest. In both areas, the roads will be useful too for the communities as Toul will easily connect to Sen Monorom and to Kratie and Lao Ka will have an easy access to the forest. On the other hand, this will also open up easier access to other forest users and bigger transports, whether legal or illegal. In both cases, forests will be cleared for the operations of the companies. The same company also provided employment to villagers to cut down trees for a rubber plantation.

It is also part of traditional business that maximum profit be derived. This means lowering most costs, including acquisition costs. For villagers with weak bargaining power, this means lower benefits. In Toul, there is one sole trader that takes all timber and NTFPs from the village for her business and transports them in her big truck. Because of bad roads and because of the power of the trader, no other traders can enter the village. Being the sole trader, she mainly dictates the price. There is also a system of traders providing advance payment. While this is beneficial to the collector, the collector has no choice but to sell his/her product according to the conditions of the trader.

3.2.6. Culture & community dynamics

Cultural communities have their own way of doing things. This applies to their livelihoods: farming, livestock-raising, NTFP collection. It is not always easy to change systems that have been applied for years. The experience of CEDAC in introducing the new rice variety and the alternative process had not been easy. It is the same way with introducing sustainable harvesting methods. CEDAC however started with a small number of farmers from whom other household just copied and learned from.

It is also tradition that a plot of land is allocated to a child who is starting his/her own family. Before, land was just cleared or asked from neighbors. However, with the new land use plans and land titling, this is not possible any more. The titled land will be the only one partitioned among the heirs of the parents. There will come a time when the land will not be enough to feed the household. Main dependence on finite agricultural land limits the sustainability of household's livelihoods.

Villagers traditionally travel and collect NTFPs in group. Collection is divided among the group. It is also part of tradition that villagers participate in local festivities, contribution food and livestock for communal meals. This can put a strain on the financial assets of the households as they tend to take loans if they do not have enough resources to fill this need.

3.2.7. TSP on VC and Livelihood Assets

Institutions and their regulations address, cause or aggravate the vulnerability context of communities and either strengthen or weaken their livelihood assets.

The programs and projects of government and NGOs on sustainable forest management, community forest, Prakas 001 has started to address the need and security for natural assets of the villagers. Roads are being built to access both the resources and the market, both for villagers and big companies. For natural calamities and There is a Provincial Committee for Disaster Management (PCDM). However, the inadequate implementation in the local level is counteracting their objectives. The deficient forest control and absence of functional sustainable management systems are leaving forests to degrade fast, jeopardizing the natural assets in the village. For villagers in Lao Ka, they need to spend more time and money to access the forest and to transport their collections from there back to village or to the market. With limited capacity and resources for controlling forests by local authorities, physical assets, such as roads become a threat to the resources themselves as it makes access free for all.

As of 2009, there were no formal program on DRR in the province, and risk reduction is not included in development planning at the provincial, district or commune level. Past efforts in disaster management focused solely on emergency relief and response activities. Also, provincial line departments had limited resources to build programming beyond the already-partial support mechanisms developed. (Try 2009) Relevant government agencies should be consulted for updated plans in relation to DRR.

With limited budget, programs, such as the Community Forestry program rely highly on communities' social assets, participation and ability to work together. Lack of response from local authorities on reports made by villagers lessen the confidence in the institutions and diminishes the interest of the community to participate. This, in the end, affects both natural assets and social assets of the community. Unsuccessful projects prevent NGOs to provide continuous support in critical areas.

Economic development initiatives in the province, while communities are supposed to benefit from it are impacting livelihoods of villagers. Villagers believe that dam operations had changed the hydrology of rivers, and that increased dam use, combined with forest clearing activities along main roads and streams within the province, increased the vulnerability levels of villages to both slow and fast onset events. (Try 2009) Decline of fish supply is blamed on outsiders who make use of illegal fishing gears and on chemical pollution of river water from gold mining and dam construction could also affect fisheries in the future. (Schweithelm and Heng 2007)

On the part of the villagers, their capacity/human assets and their limited social links with local authorities prevent them from making use of these programs for their purpose or riding on the province's development. There is the threat that when companies see the commercial value of NTFPS, communities will not be able to compete.

Programs on livelihoods development of NGOs, with some through partnerships with local governments, are providing updated skills (human and physical assets) to adapt to the natural conditions of floods and drought. Some examples are the raised vegetables patch, new rice variety and rotational cropping promoted by CEDAC in Srae Huy and Srae Thom. However, the limited market knowledge and links that NGOs can provide has led to frustration for villagers participating in livelihood programs.

The growing market for cash crops and NTFPs are providing income that households need but without consideration for the sustainability of the resources, the sustainability of livelihoods are threatened. Sparse investment in the NTFP sector limits benefits derived from them. Insufficient research and technology leave collectors subject to the seasonality of the products and to their short life span. This reduces the market potential of the communities' products.

Erosion of social cohesion during droughts has been noted among ethnic minority groups living close to the district centers and provincial town, who tended to have more individual and family-based coping strategies to drought, with assistance being limited to family members and relatives. While those in more remote areas, villagers were observed to have stronger solidarity. (Try 2009) The work of NGOs on conserving cultural traditions, one of the bases of social cohesion is addressing the fast changing way of life. Indigenous communities traditionally have elder councils that lead in the decision making in villages. However, the evolution of political governance, where the identification of village chiefs is made by political parties, has lessened the use of these traditional leadership system. But support for IP rights and networks are strengthening these traditional social links.

Non-formal education, Khmer language lessons are providing villagers with skills that can allow them to negotiate better their livelihoods and engage with the migrants and new developments in the environment. Rediscovery and conservation of traditional knowledge on medicine is providing communities with cash-less alternatives.

3.2.8. Livelihood Assets influence on TSP

The limited skills and knowledge of the community prevent them from partaking in the development that is happening in Mondulkiri as well as the programs, specifically the Community Forestry in securing their livelihoods. In some community, social assets, such as solidarity among villagers and support from NGOs allow villagers to address this lack of knowledge and request for services or to access these programs.

The inaccessibility of Toul, make it prone to the monopoly of one trader. With micro-finance organizations withdrawing from the area due to its inaccessibility, villagers are forced to take loans from the trader. In exchange, they are forced to sell exclusively to the trader. The trader also threatens the villagers when they sell to others. She claims that she has already made arrangements with the village chief and has paid fees to get exclusive rights to the collections. Selling to just one trader limits the markets of the villagers as well as limits the benefits they get. Lack of knowledge of the market and lack of bargaining power, the trader determines the prices, usually low.

Traditional knowledge/livelihoods of communities in some cases conflict with the conservation goals of protected areas. Resin tapping is one of the traditional livelihoods of villagers. Tappers usually travel by oxcart to the forest. This brings the risk of spreading disease to wild cattle populations. Dry resin collection involves burning off grass and bamboo therefore its collection prohibited in the Strict Protected Zone (SPZ) of the MPF. The seeds of the *sleng* tree are collected usually by felling the tree, which is banned throughout the MPF. (Schweithelm and Heng 2007) Traditional knowledge also sometimes conflict with technologies that are more updated to present conditions. This slows down the adaptation of some members of the community. On the other hand, application of new technology or systems with no understanding of its impacts on the sustainability of resources cause damage in the long-term.

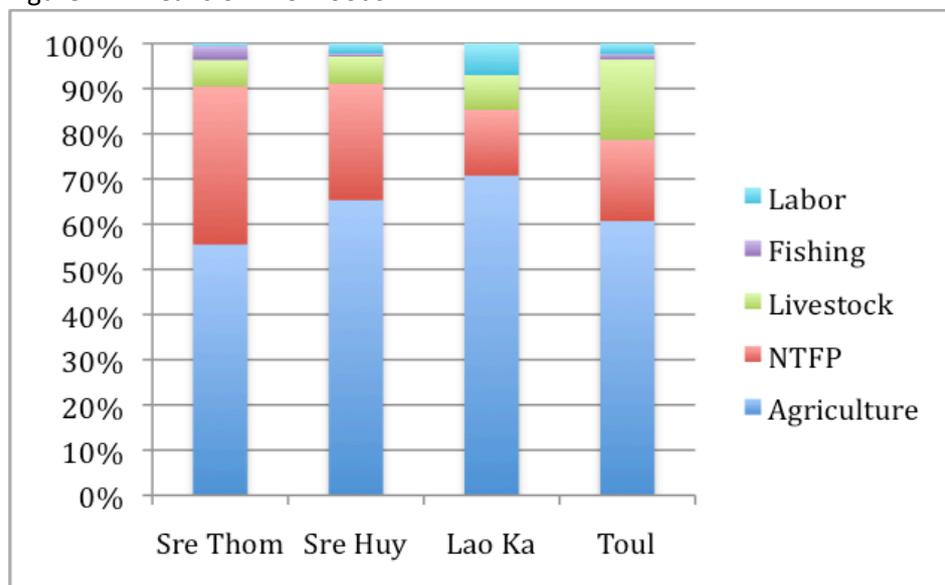
4. Livelihood strategies

Livelihood strategies are ways communities manage with and make use of their livelihood assets and in context of the external factors described above.

Agriculture remains to be the most important source of livelihood, in terms of contribution to livelihoods and in terms of priority of the villagers. For Srae Huy/Srae Thom, mostly producing rice for household consumption, it is the anchor of food security for the villagers. In Toul, about 90% have their own rice fields with an average size of 50m x 150m per household though producing a yield that is sometimes not even enough for household consumption. In Srae Huy, Srae Thom most households have from 3 – 5 hectares each while villagers in Lao Ka, till smaller lands, ranging from 0.5 – 3 hectares of agricultural land.

Aside from providing food, agriculture has also become a source of income to the households. Lao Ka are cultivating cash crops (corn, pineapple, cane, cassava, etc.) that they sell to traders or at the provincial market. Srae Huy and Srae Thom are also earning from their rice surplus. In 2007, Srae Thom villagers were also cultivating cash crops. But based on PRA, farms are now focused on rice growing.

Figure 1.4 Means of Livelihoods



The chart above shows the contribution of each source to the total livelihood of each household in the 4 villages.

Collecting and selling of various NTFPs, before a safety net, has become a major part of the households' livelihoods, contributing a range of 15 - 30%. In Toul, most villagers are forest dwellers and depend on NTFP collection both for subsistence and cash income. Seasonal liquid resin collection and year-round solid resin collection provide up to 40% and 20%, respectively, of their cash income. In Lao Ka, aside from NTFP, they have more labor opportunities. Income from NTFP declined for some households lost their resin trees. Wild vegetables that were before only used for household are now sold in the market. Type of NTFP and market accessibility influence the importance / amount of contribution of NTFPs to household livelihood. For villages with liquid resin and sleng, like Srae Thom, NTFP contribution is much higher.

Livestock raising and labor-renting form an important part of livelihood strategy. Livestock are used in the farms as draught animals and as part of savings.

Labor selling has only been adopted recently. Selling labor has become a safety net for some families. Before, households helped each other in tilling lands as part of community solidarity. However now, some households have bigger lands than others and households need income. Newly established industries, ELCs and mining industries are also providing opportunities for labor. The going labor rate is 5\$/day. Others provide food in exchange for labor. Labor for rent in plantations and mining companies provided 0.03% in 2007 and the preceding ten years but was clearly increasing. The income that it provides now is around 10%. In Toul, selling of labor for rice planting or harvesting is also an important part of the livelihood strategy of 50% of the village. 1 out of 3 families in Toul fare better than the rest of their co-villagers as they have alternative jobs and micro-business that provide additional income. Though very minimal, there are some young household members who have gone to work abroad or in urban areas.

To complete the livelihood strategy, each family has a home garden from which they harvest vegetables for household use during dry season and when wild vegetables are not available. Some also sell their harvests, which contributes 2-3% of household income. Wild vegetable collection is mainly done during the rainy season. Children and young members of the community help collect bamboo shoots, leaves of plants, and rhizomes, which they sell in the village market, contributing around 5% to the family income.

There are also household in Srae Huy and Lao Ka who are engaged in logging and wildlife hunting.

In 2005, fishing played an important part of the livelihoods in Mondulkiri. However, during that time, they were already noticing the decrease in fish catch, which was attributed to increase in population, unsustainable fishing practices, and decreasing water levels. (Maling 2007) In Srae Thom, Srae Huy, fishing provided 22% of the livelihood for the previous generation. It went down to 10% ten years ago and now, it's down to less than 1%. The contribution is very minimal, mainly for household food, that during initial discussion on livelihoods in Srae Thom, fishing was no longer mentioned as an important part of livelihood. Toul mentioned that fishing and wild animal commercialization have just started this year to contribute to the household's livelihood.

Cash generating livelihoods are important in Lao Ka and in Toul where harvest from farms can feed the households for 6-9 months, while, rice harvest can feed them for 2-3 months. The Khmer population in Lao Ka mainly does farm crops for selling that feed them the whole year and allow them to save for other uses and to expand their farm business.

Figure 1.5 Income Sources

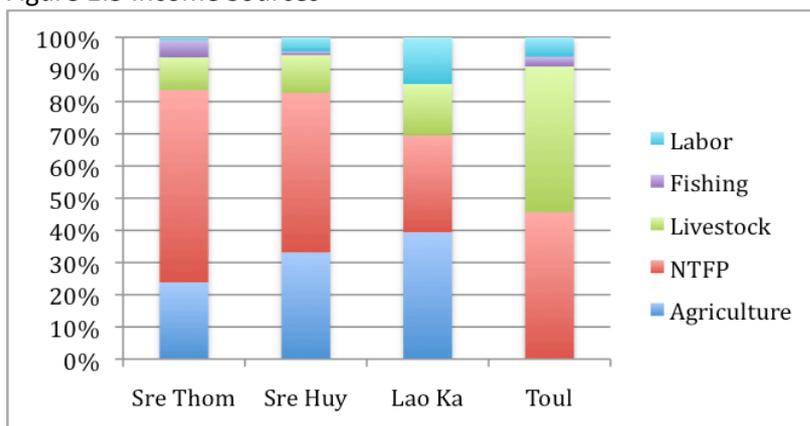


Figure 1.5 shows each activity's contribution to the total household income. NTFP and livestock play important roles in the income generation of households. Labor serves as the safety net in times of shortages.

In Srae Huy, Srae Thom, Toul NTFPs are the main source of cash income. In Lao Ka, where households grow cash crops, agriculture is the main contributor but NTFPs also contribute substantially to the total cash income.

Agriculture, the foundation of the villagers' livelihoods, has traditionally low yields. A diversified livelihood therefore is important. The conversion of large forest areas into plantations and industrial farms has impacted the access of villagers to complementary livelihood sources such as the collection of non-timber forest products. For Lao Ka villagers, the uncertainty of the sustainability of income from forest resources, degradation of the forest and the loss of their resin trees to ELCs have them turning to cash crops for the future of their livelihoods. In Toul, some villagers also cultivate cashew. In Srae Huy / Srae Thom, the traditional livelihoods equally supported by fishing and agriculture is now mainly dominated by rice farming as fish resources declined and improved and new technology of rice farming are applied. The increase of market demand for NTFPs, the variety of products they can trade, and dependence on cash to meet household needs have increased the importance of NTFPs in the livelihood strategy of households. However, turning to labor renting as a safety net demonstrates that main livelihood strategies are still not enough to meet the needs of the villagers.

5. Women and Livelihoods

Women provide complementary and some lead role in livelihood activities of a household. Women complement their husbands or the male members of the household in most activities: agriculture, livestock-raising and in NTFPs collection. In agriculture, women work alongside the men in the preparation and planting of the field and in the harvesting of the crops. The women collect alongside their husbands for NTFPs when specialized skills are not required, such as solid resin and sleng seeds. For liquid resin tapping, honey and game hunting, where skills and knowledge are usually passed to the male members of the household, women's role are considered secondary. For example, where collection or hunting would take 2-3 or more days stay in the forest, some women would join the group to prepare and cook food for them. This role is seen as secondary so women don't usually take a share when the harvest is divided. However, they play a more important part during post-collection as they also sometimes participate in the processing or selling of these products, talking to traders or selling them in the market.

Women mostly lead in the collection of wild food, tending of vegetable gardening, which they use for subsistence and for cash income. However, as the market demand for these produce increase, women are more and more selling these products instead of using them for household consumption. Some women have also started micro stores in front of their homes. This means they are getting more involved in commercialization activities. This experience is especially strong for women in Lao Ka, Srae Huy/Srae Thom.

Previous livelihood studies have also shown that NTFP collection is an important livelihood to women living in or adjacent to forests and they have always been involved in collection and marketing of wild yams, mushrooms, orchids, fruits and other wild food. (Sloth et al 2005) In honey, while they don't participate in the collection itself, they are involved in the post-processing, quality control, packaging, marketing, retailing of honey, specifically in the local or village market, dealing with traders and finances. (Bradley & McNaughton 2007). Minimal

participation of women in some NTFP collection may be due to the physical requirement of these activities, but it can also be because the skills have traditionally been passed on to the men in the family while women are trained in other skills. However, it is not impossible for women to do some of these activities. There are some instances among women-headed households that women harvest resin accompanied by male members of the family for protection. (Blomley et al 2010) Unlike honey and liquid resin, income from NTFPs that women collect are usually minimal. To increase their value and/or to find markets for them, some women process them (i.e. pickled or dried bamboo shoots, basket weaving) but their knowledge on processing is still limited.

An equally important role, aside from doing their part in the livelihoods mix of the household, the women are also in charge of managing the household. As part of household finance management, some women put side money or some invest in gold (Toul) or in livestock. They make sure that all the needs, such as food, clothing, education and medicine are met by managing household budget and finding supplementary income when needed. The mix of livelihood activities they participate in as well as the savings allow them to bridge their families in these times.

5.1. Women's Livelihoods and External Factors

Being responsible of making sure that there's food on the table and children's needs are met (i.e. education, clothing, health), women are stressed by factors affecting household's food security and wellbeing. During food or cash shortages, they are equally, if not more, pressured to find alternative sources.

Resources, which women use to contribute to the livelihoods of their households are declining. Livelihoods they lead in, such as vegetable gardening, wild food collection, are all highly vulnerable to the impacts of climate change such as extreme weather, drought and flooding. Alternative livelihood they can do is limited by culture or traditions and the trainings / knowledge they have access to. For example, labor opportunities now available in the region such as logging, mining are occupation usually taken up by men. Tradition, if not physical capacity, would prevent women, by their own choice or by the male members of the household, from doing these jobs. In any case, they would not have the skills for them either. The same way that skills for driving a tractor or a motorbike are skills usually learned by men, affecting the mobility of women who usually go to the forest or the market on foot.

With the market becoming more important for women and their households' livelihoods, the experience of women in commercialization, no matter how limited, becomes an important asset, both for the women and the households, that can be further developed through training and market accessibility.

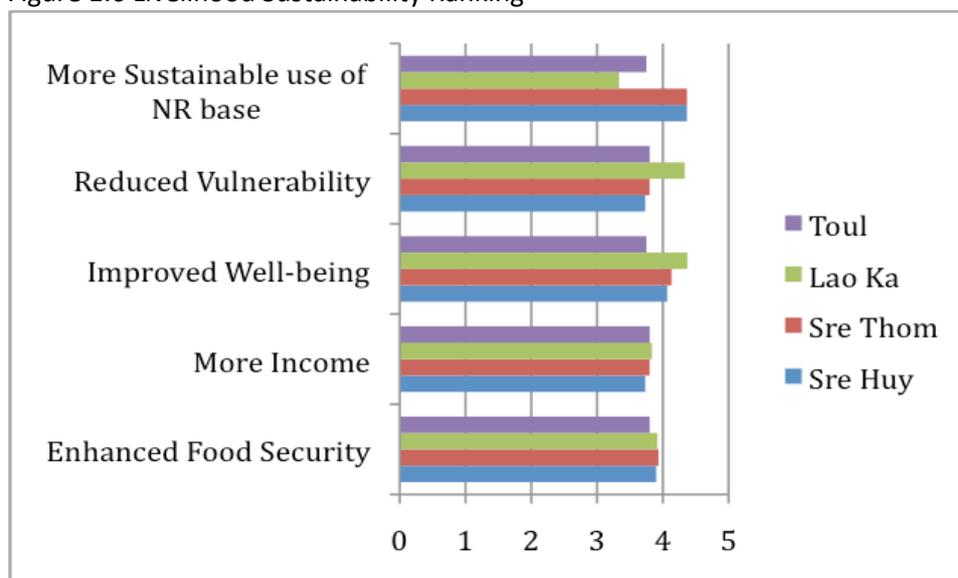
Traditionally, men are the ones active in the social and political spheres of the community. They are the ones who attend meetings with government and organizations and participate in trainings. For livelihood support needs, it was usually their perspectives that were considered. Previous support on livelihoods had been focused on high-value NTFPs that are in most cases led by men (i.e. rattan, liquid resin). Fortunately, this has slowly been changing as NGOs and concerned government agencies are actively involving women's perspectives. Support for the community honey enterprise, for example, while traditionally led by men, women were proactively integrated in the organization and in the operations. Vegetable gardening training was provided by CEDAC to women and helped organize a savings group. There are also government agencies such as Ministry of Women's Affairs that are also advancing women's

issues. Based on the experience of other villages in Mondulkiri where there had been interventions on community honey enterprise, there had been a sense of improvement in income and self-confidence among women in Mondulkiri Province. Access to market and improved prices have contributed to the increase in income. Involvements in meetings, trainings and in community forestry and enterprise development activities have contributed to uplifting self-confidence of the women. (Kusakabe et al 2012)

6. Livelihoods Outcome: Sustainability of Livelihoods

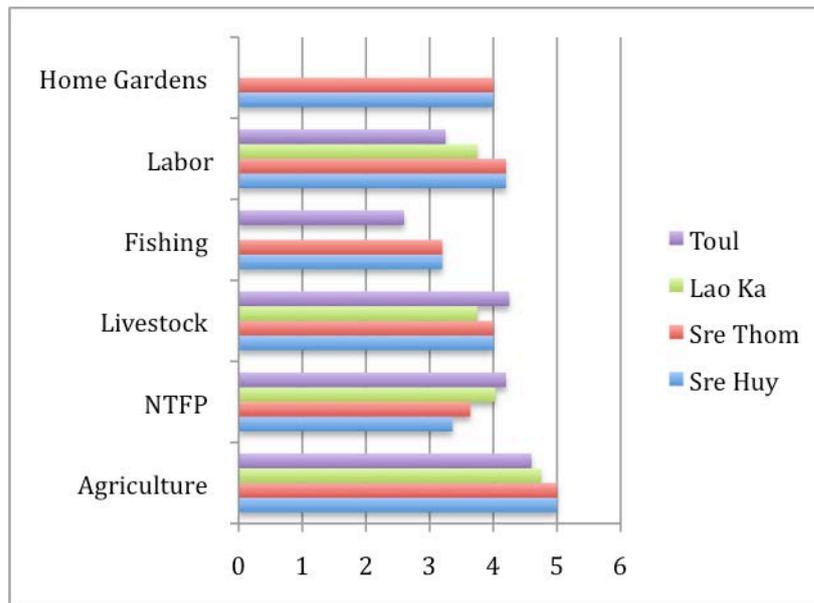
The ideal situation of a sustainable livelihood is that all scores are 5. To get an overall idea of the outcome of existing livelihood strategies, the scores for different strategies were averaged. Based on the assessment of the villagers, their current livelihood strategy, the combination all of their livelihood sources are contributing at varying degrees to the different indicators of a sustainable livelihood. Most scores are above 3.5 and even some above 4. This is a big change from the 2007 SLA as scores then were mostly under 3.5.

Figure 1.6 Livelihood Sustainability Ranking



The differences are based on the different context in each village. In Srae Huy/Srae Thom, there is an increased awareness about sustainable resource management, specifically NTFPs, through the intervention of WWF and sustainable farming through the assistance of CEDAC. It should be noted however that “Labor” is considered by the villagers to contribute to sustainable use of N.R. base since it doesn’t make use of any resource. Villagers of Lao Ka regard the open access to forest resources and labor opportunities in ELCs and other companies in and near their village to contribute the security of food and income. While for Srae Thom villagers, as they are not yet using the totality of the 5 ha of their fields, they have a sense of security that they can still extend their cultivation when needed.

Figure 1.7 Contribution of each activity to sustainability of livelihoods.



For most villages, agriculture is considered to contribute most to a sustainable livelihood. In Lao Ka, however, where rice farming is rain-fed and main crops are cash crops, agriculture contributes but inconsistently to food security. In Toul, villagers recognize some limitations of agriculture in reducing their vulnerability and to the sustainable use of NR base. This is why they also see the importance of protecting their NTFP resources. NTFPs are also recognized for their contribution however, the threats to the access to NTFPs and its degrading resources cause inconsistencies to its contribution.

Looking at the tables, we can say that sustainable livelihoods have not been reached, though there is some level reached approaching to it. Compared to the 2007 SLA, it is understandable that villagers feel that they have reached some level of food security and enough income these recent years. But looking at the needs, based on expenditures and looking at the income generated by existing livelihoods, there is still much to be desired. The discussions and the ranking of priorities, where enhanced food security and more income are still the higher priority and concern for sustainable resources because of their important contribution to the first two priorities, indicate that there is still a level of impoverishment that food security and increased income to meet basic needs are still the main preoccupation of the people. In Toul, incomes are low. As such, the ability to be able to set aside and invest back to their assets in order to improve their situation is still weak. The inadequate services of health and education make the investments made in schooling and medicine, though minimal, futile. Also, the security of the foundation of this sense of food security and income need to be considered, given the external factors discussed above.

Aside from contributing to the given indicators, according to the definition of DFID, livelihoods are sustainable when they:

- are resilient in the face of external shocks and stresses;
- are not dependent upon external support (or if they are, this support itself should be economically and institutionally sustainable);
- maintain the long-term productivity of natural resources; and
- do not undermine the livelihoods of, or compromise the livelihood options open to, others

Resilience

The resilience of the livelihoods of the villagers to short-term threats is based on having a diversified one. The diversified livelihood offers security as such that when natural calamities

reduce rice yields, there is income from NTFPs that bridge the household. (Sawdon and Wyrwoll 2012) Income from cash crops in Lao Ka and Toul, provide cash needed to bridge food shortage season as rice yields are not enough for the whole year. Resilience also means that resources are able to regenerate. The diversified livelihood spreads out the pressure on different sources, allowing for the resilience of resources. Livestock, as a form of savings, and labor-selling are there when the first two resources are not able to provide. However, livestock is also vulnerable to the same calamities the other natural assets are. Therefore, savings in other forms, such as gold, as Toul villagers do or as cash kept in savings groups or at home as some villagers do in Srae Huy/Srae Thom, Lao Ka are also important.

However, resilience to medium to long-term threats is still a concern. The community faces threats to the security of access to the resources and its productivity. Land for agriculture is finite and will become smaller over the years. Some crops planted are more resilient to the impacts of climate change but conscious planning for this is not yet done. Dependence on only a few types of products (i.e. rice or cassava) for food security limits the resilience of households in times of food shortages. NTFPs sources are vulnerable to the uncontrolled use and access to forests. Savings beyond livestock is still not enough and just at the level of the safety net, if any. It is not yet on the level that it can be of substantial investment back to the livelihood assets to improve the household situation.

Understanding of vulnerabilities may also help ensure resilience of livelihoods. In Lao Ka and Toul, reduced vulnerability is currently the least priority as the current free access to forest and labor in ELCs / mining offer them a sense of security.

Independent of external support

Villagers at this stage are not able to secure their resources on their own. They are vulnerable to other actors that are stronger than them, politically or financially. Given limited experience and knowledge, they do not have enough skills to manage and compete in the fast-paced development in the region. However, there are already some experience and knowledge to build on. With income still focused on basic needs, they are unable to generate their own capital to start or for continuous operation and expansion of their livelihood. Unlike big companies, they do not have the capital to create their own roads to the market or to comply with the requirements of starting an enterprise. The services and the enabling condition provided by the government will be key to their independence. There are already basic services and most need maintenance, repair, but at least there are something to start off with. Development of financial management skills, such as savings and livelihood investments will also be useful for livelihood independence.

Sustainability of Resources

As discussed above, the need for cash income has led to unsustainable use of resources, both NTFPs and agricultural lands. As minimum benefits are derived from yields, there is a need to produce or harvest more in order to meet their needs. Also, there is also a lack of understanding of the long-term impacts of the current methods to the sustainability of their livelihood. In Srae Huy/Srae Thom, however, there is already a consciousness for the need to manage their resources sustainably. However, when there are opportunities, like with the increased prices of *sleng* this year, and presence of external factors, like competition and uncontrolled used by outsiders, some resorted back to unsustainable harvesting methods.

Does not undermine the livelihoods of, or compromise the livelihood options open to, others

Ensuring the sustainability of resources is in a way making sure not to undermine the livelihoods or compromise the livelihood options open to others. Theoretically, community forestry does

not limit the use of forests to others who need it but provide a system of control and management to ensure that resources are used sustainably. Under this system, opportunities for others are not compromised but are protected for longer-term benefits.

But shortage in food and income is leading some villagers to harvest unsustainably and to maximize productivity of their lands through chemicals and unsustainable methods. Some villagers have also resorted to logging and illegal activities.

Given these indicators, and under present conditions, clearly, the current livelihood of the communities is still precarious.

PART II: Scanning Products, Markets and Potential Enterprises

1. Overview of NTFPs and other crops found in the selected villages.

1.1. Currently Used/Traded

Table No. 2.1 Community Products

| Resources | Srea Huy/Srea Thom | Lao Ka | Toul |
|------------------|--|---|-------------|
| Liquid Resin | | S | S |
| Solid Resin | S | S | S |
| Lac | | | S |
| Wild honey | S | 90%S-10%H | |
| Mushrooms | S | S | |
| Sleng Seeds | S | | |
| Rattan | | S | |
| Rattan Shoot | | S | |
| Bamboo | H | H | |
| Bamboo Shoots | S/H | S | H |
| Orchids | | | S |
| Wild vegetables | S/H | 80%S - 20%H | 90%S – 10%H |
| Wildlife | S/H | H | |
| Baskets | H/S | H | |
| Beeswax | | H (Traditional ceremony) | |
| Household Crops | Rice | Rice | Rice |
| Commercial Crops | Rice, corn, cassava, vegetables, fish, livestock | Corn, cassava, vegetables, fishing, banana, pineapple, cane | |

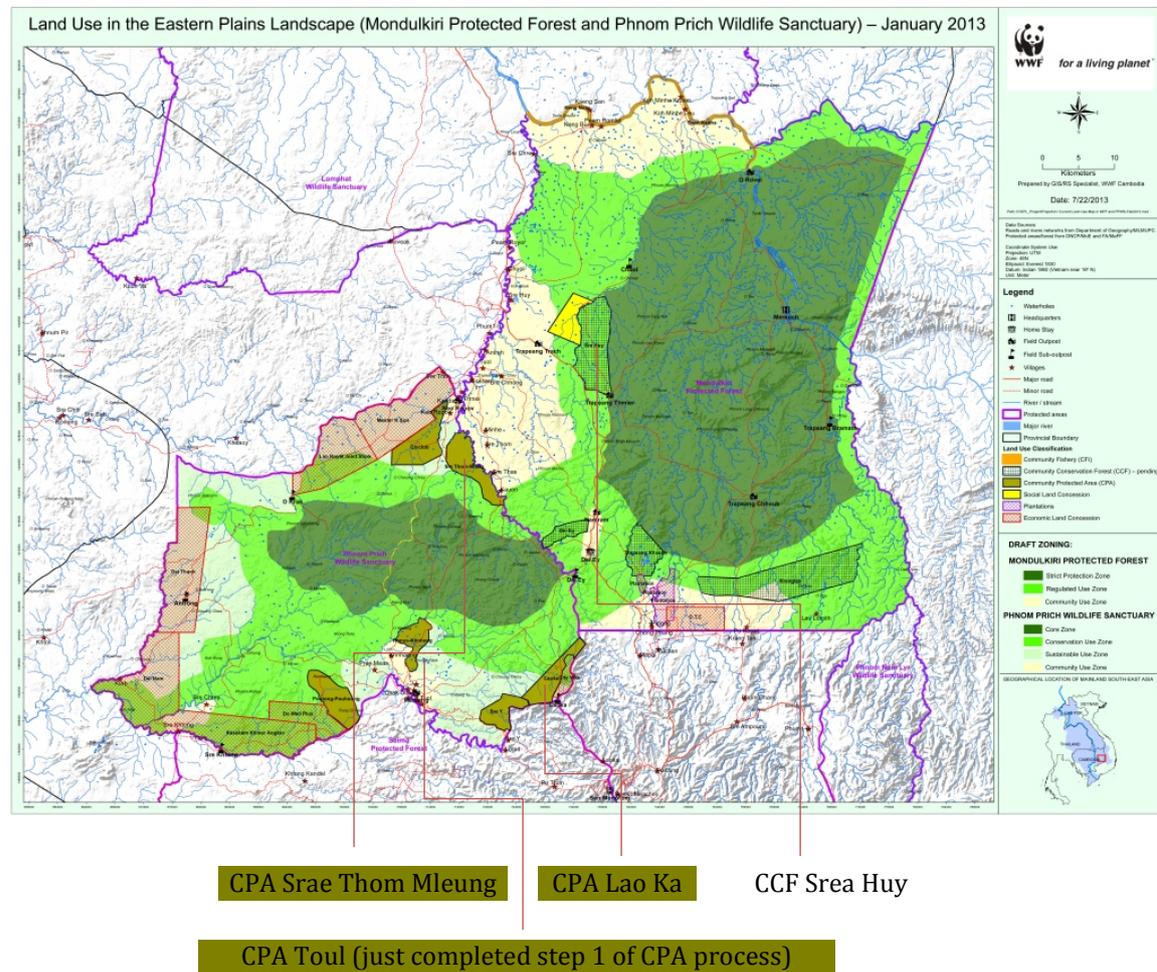
S: Selling H: Household use

Except for bamboo, most products are collected to sell. Only about 5-10% of wild food are kept for household consumption. Even wild vegetables and wild honey that were traditionally for household use are now sold in the market.

1.2. Collection sites / seasons (Village Map and Calendar)

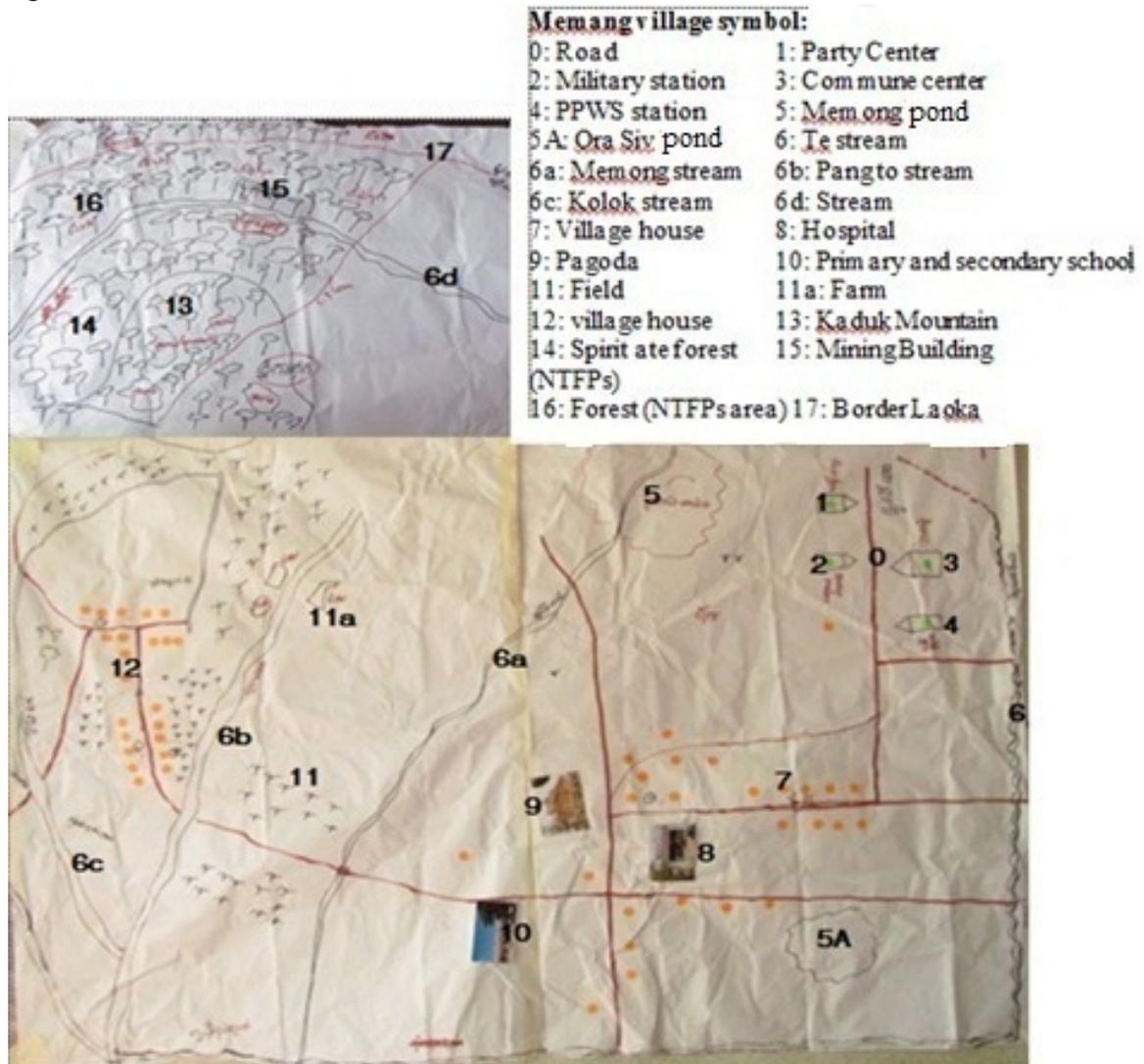
Srea Huy/Srea Thom villagers collect their NTFPs from the CCF Srea Huy, CPA Srea Thom, MPF and the PPWS. In Toul, villagers harvest from Phnom Ka Dok and Prey O Ronus. In Lao Ka, villagers harvest wild vegetables (mushrooms, rattan shoots) near their farms, around the village and near the ELC, O-Yus and O-Cher. Honey is collected in Srae-M-El and O Cher. Solid Resin is collected in Srae-ME El. Liquid resin is collected in Srae-Me El and some within ELCs. Bamboo shoots are gathered near the village, the farm and in Srae-Me El.

Figure 2.1. Collection Sites of the four villages in CCF and CPAs



Source: WWF-Monduliri, Jan. 2013

Figure 2.2 Toul Collection Sites



Village houses (x) are found near the pagoda and the hospital. They also line the roads to the forest, leading to the sacred forest (11), which is an important area of conservation area for the community for its cultural value. Main collection site for NTFPs (lac, solid resin, liquid resin, bamboo shoot, rattan) is the Kdok Mountain, approximately 4- 5 km from village.

Figure 2.3 Collection site in Lao Ka



NTFPs such as honey, liquid resin, solid resin, wild fruit, and bamboo are collected from the Lao Ka CPA, which is adjacent to a rubber plantation company and the farming zone of villagers. Bamboo shoots are collected around the village and along streams in the forest.

Figure 2.4 Collection site in Srea Thom

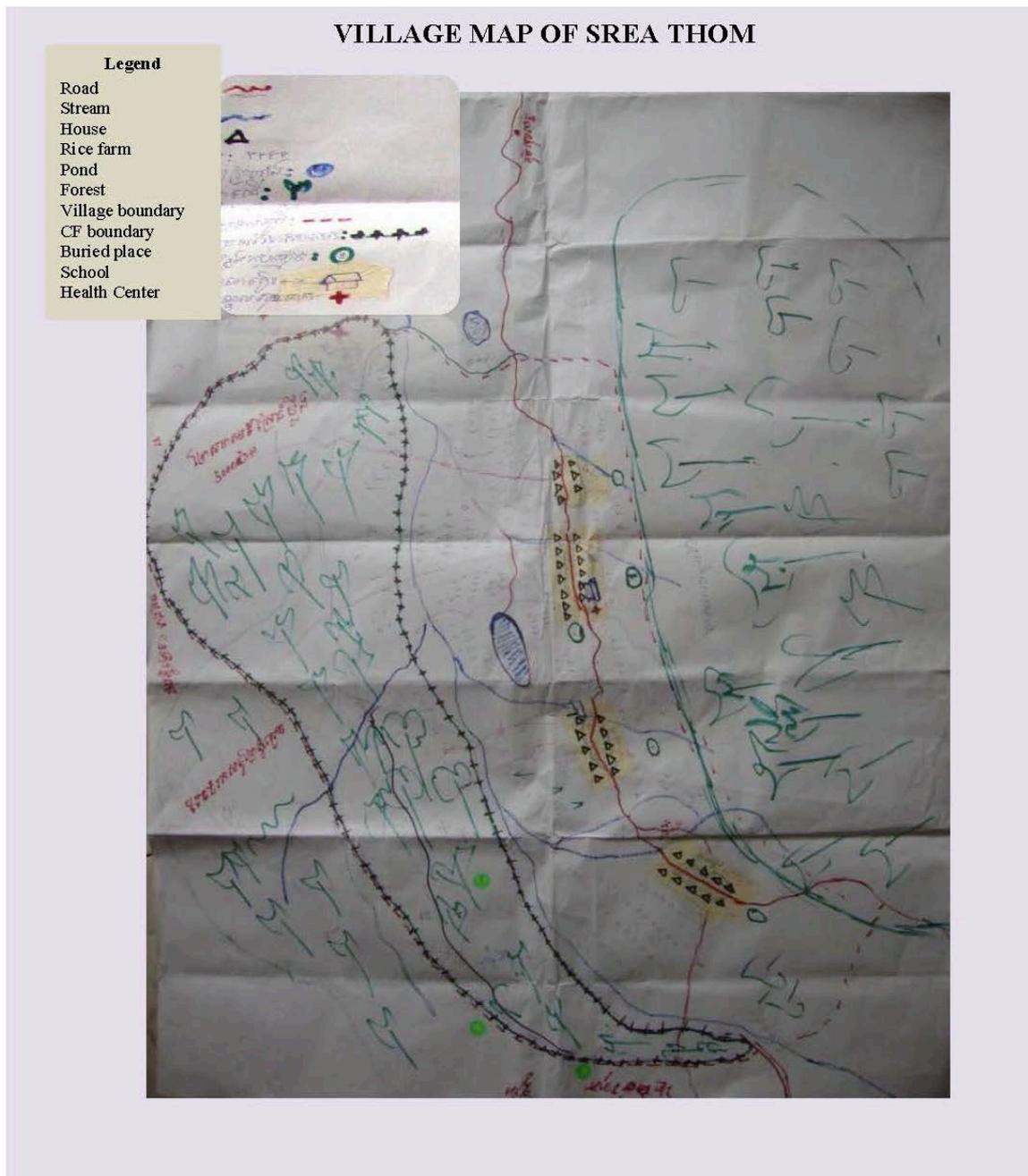
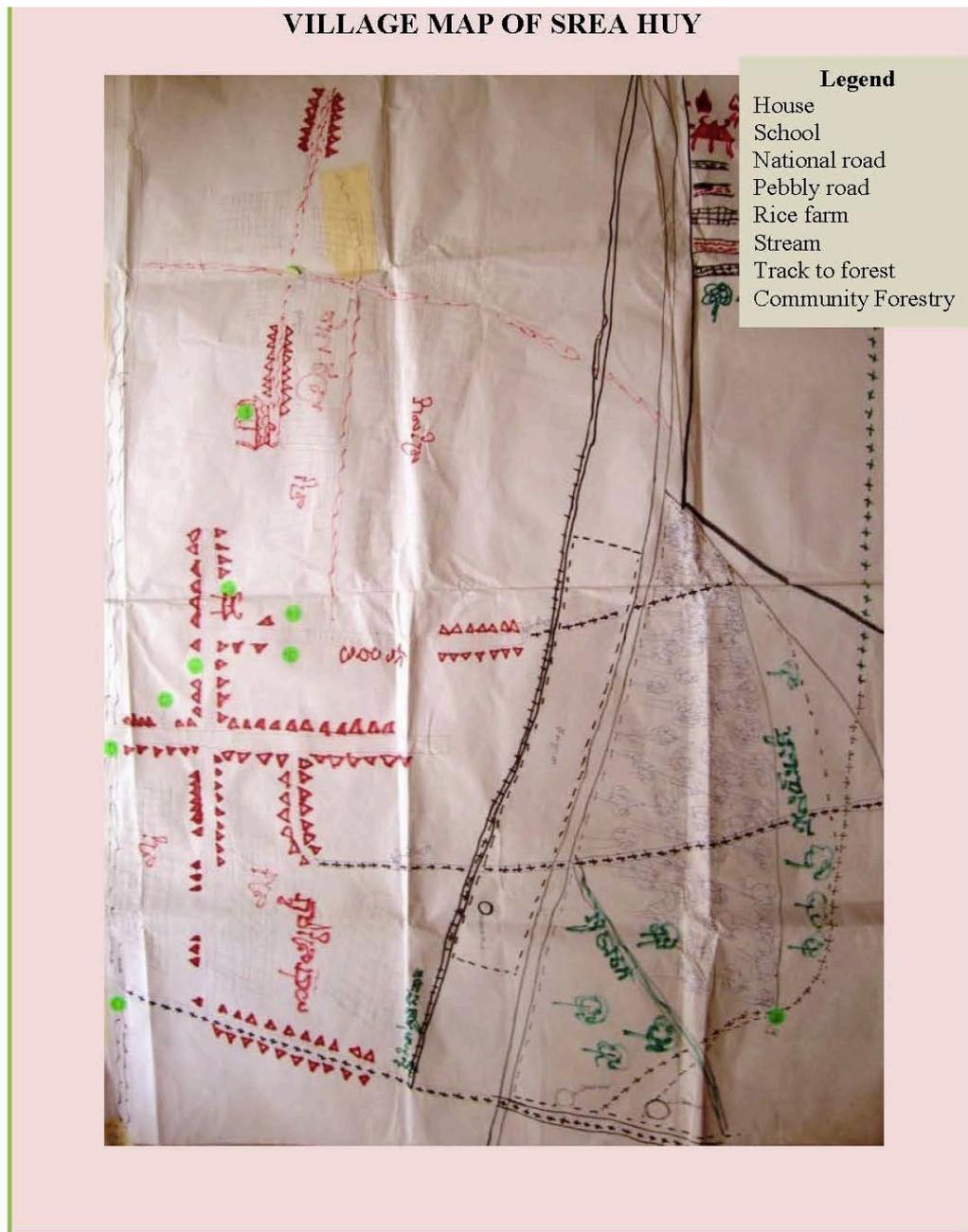


Figure 2.5 Collection site in Srea Huy



The different NTFPs are collected over the year as follows:

Table No. 2.2 Collection Calendar

| | J | F | M | A | My | Ju | Jy | Au | S | O | N | D |
|------------------------------|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|
| Wild Mushroom / Vegetables / | STL | STL | SL | SL | SL | L | L | L | L | L | L | L |
| Honey Collection | | | SL | SL | SL | | | | | | | |
| Sleng Seeds | S | S | ST | ST | ST | S | | | | | | |
| Solid Resin | STL | STL | STL | TL | TL | L | L | L | TL | TL | TL | TL |
| Resin tapping | STL | STL | STL | STL | STL | | | | | SL | SL | SL |
| Lac Collection | T | T | T | T | T | | | | T | T | T | T |
| Orchids | T | T | T | T | T | T | T | T | T | T | T | T |

| | | | | | | | | | | | | |
|---------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Bamboo Shoots | | | T | T | T | | L | L | | | | |
| Rattan Shoots | T | T | T | T | T | T | T | T | T | T | T | T |

DRY WET

S – Srea Huy / Srea Thom

L – Lao Ka

T - Toul

Bamboo shoots are mainly harvested at the start of the wet season, the same time as the planting season. Wild honey and liquid resin collection are best done during the dry season, when moisture content is low.

1.3. Abundance / Accessibility

Based on accessibility and abundance, top products in the different villages are:

Table 2.3 Abundant/Accessible Products

| Srea Huy / Srea Thom | Lao Ka | Toul |
|--|--|---|
| Sleng Bamboo /Bamboo Shoot Honey Liquid/Solid resin | Bamboo/Bamboo Shoots Wild Vegetables/Mushroom Honey Solid Resin | Bamboo/Bamboo Shoot Wild Vegetables Liquid Resin Lac |

1.4. Reach

In terms of reach or number of participating households, top NTFPs are as follows in each village. Figure 2.6, shows the overall reach of each NTFP for the four villages, with *sleng*, mushrooms/wild vegetables, solid resin and bamboo shoots with the bigger reach.

Table 2.4 Household Reach

| Srea Huy | Srea Thom | Lao Ka | Toul |
|--|--------------------------------------|---|--|
| Sleng Solid Resin Mushroom/Wild Vegetables Honey | Sleng Mushrooms/WV Solid Resin | Bamboo/Bamboo Shoots Wild Vegetables/Mushroom Solid Resin Honey | Liquid Resin Wild Vegetables / Mushrooms Lac Solid resin |

Figure 2.6 No. of Households reached by each product

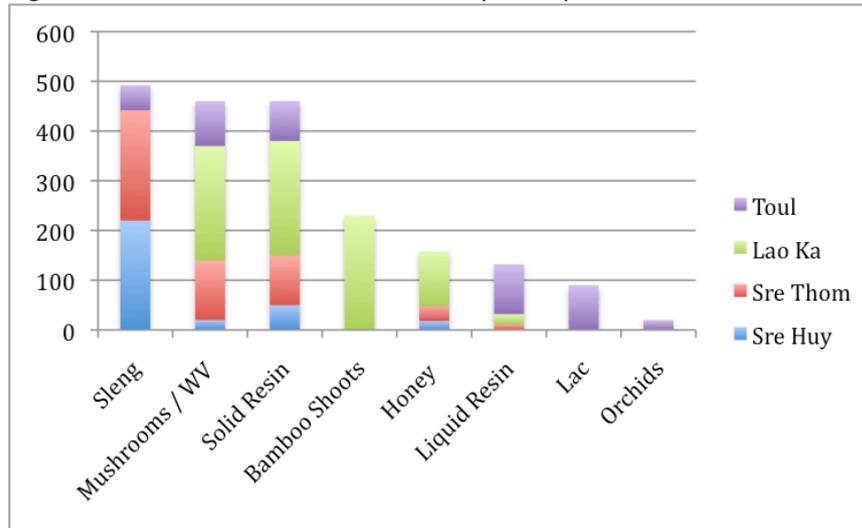


Table 2.5. No. of Households Per Village / Per Product

| REACH | Srae Huy | Srae Thom | Lao Ka | Toul | Total |
|----------------------------|----------------------|-----------|--------|------|-------|
| | Number of households | | | | |
| Sleng Seeds | 220 | 222 | 0 | 50 | 492 |
| Wild Mushroom / Vegetables | 20 | 120 | 230 | 90 | 460 |
| Solid Resin | 50 | 100 | 230 | 80 | 460 |
| Bamboo Shoots | | | 230 | | 230 |
| Honey Collection | 18 | 30 | 110 | 0 | 158 |
| Resin tapping | 0 | 12 | 20 | 100 | 132 |
| Lac Collection | 0 | 0 | 0 | 90 | 90 |
| Orchids | 0 | 0 | 0 | 20 | 20 |

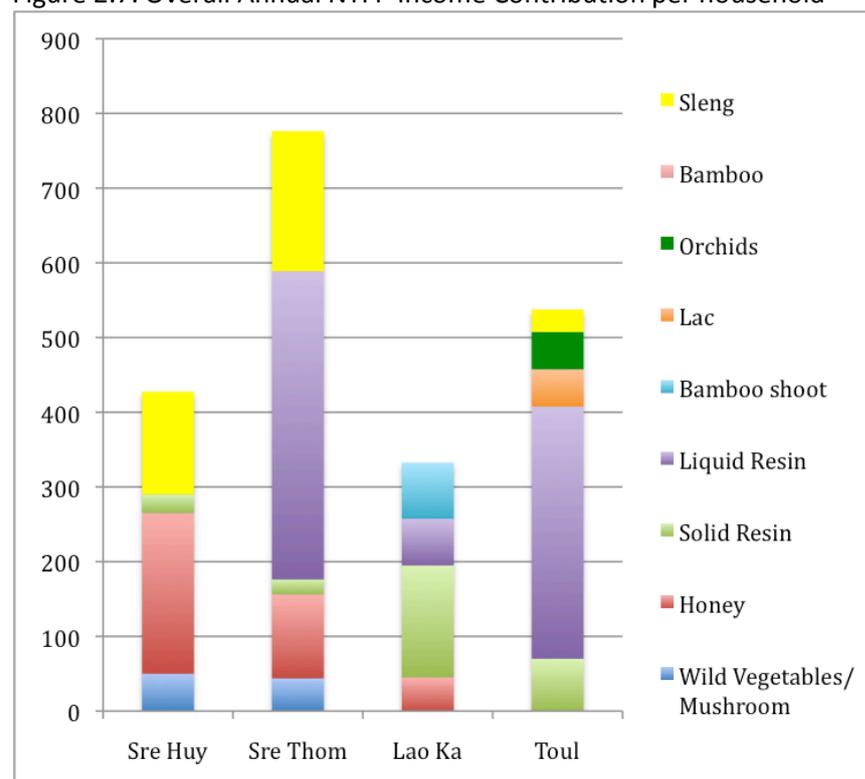
1.5. Household Income Contribution

In terms of contribution to household income, the top NTFPs per village are as follows:

Table 2.6. Top contributing products

| Srea Huy | Srea Thom | Lao Ka | Toul |
|-------------|--------------|---------------|--------------|
| Honey | Liquid Resin | Solid Resin | Liquid Resin |
| Sleng | Sleng | Bamboo Shoots | Solid resin |
| Mushroom/WV | Honey | Liquid Resin | Orchids |
| Solid Resin | Mushrooms/WV | Honey | Sleng |

Figure 2.7. Overall Annual NTFP Income Contribution per household



Separately, each NTFP do not amount to much, but together, their contribution is substantial to the household. Households do not go to the forest to collect one specific product only. But usually, they go and collect all the NTFPs that they make use of.

Table 2.7 Volume and Market Value of Traded NTFPs

| NTFP | Volume harvested / sold | Price / Unit |
|---------------|-----------------------------|--|
| Liquid Resin | 83 – 2200 KG / Year | 0.35 – 0.53\$ / KG (interview 2013) |
| Solid resin | 1851 – 8300 KG / year | 0.375 - 0.65 \$ / KG (interview 2013) |
| Mushroom | 800 Kg – 4200 KG / year | 1.25 – 1.75\$ / KG (interview 2013) |
| Sleng | 20000 – 62,160 KG / season | 3500-4000 riels/kg (interview 2013) |
| Lac | Data not available | 0.125 \$ / KG (interview 2013) |
| Honey | 1500 Liters / season (LK) | 3.75 – 5 / Liter (interview 2013) |
| Orchids | 660 KG / year | 1.5 USD / KG (interview 2013) |
| Bamboo Shoots | 100KG | 800riel/KG (interview 2013) |
| Bamboo Poles | Currently for household use | 8000-10000riel / Culm in domestic trade in 2010 (ITTO 2010) |

2. Market Trends

Based on the accounts of communities there had been an increase in demand for some NTFPs that they collect in the last 5 years. These NTFPs include sleng seeds, resin (liquid and solid), mushroom, wild vegetables, wild honey.

There is a sustained demand for certain NTFPs as reflected on the continued trade and harvest of key NTFP products. Existing uses of the NTFPs in various industries as well as the emergence of new technologies and market needs, generate continued demand for them. However, most of the current market of community collectors had been focused on trade of raw materials.

This chapter on market prospects looks at different trends in both the domestic and the regional/international markets that have an impact on the demand and provide opportunities for the NTFPs harvested in the communities. It discusses briefly specific products or enterprises that can be of interest.

The main factors that influence the increase in price and demand are the following:

- Steady demand but declining supplies may be one of the reasons for this.
- Growing economies of main, traditional markets for the products, such as China and Vietnam, Thailand may also be driving the increase in demand and prices of these products.
- The general trend in the global market leaning towards natural and sustainable products is also contributing.

Other developments that can open up further opportunities for NTFPs are:

- Development of processing technologies which allow extracts from NTFPs or new application to be developed
- Growing organic markets is requiring organic feeds, fertilizers and bio-pesticides, on which NTFPs and their extracts can be used for.
- Demand for sustainably and legally sourced materials, though still a niche market, are driving companies to look for direct contact with community suppliers, which encourages communities to harvest sustainably while increasing their benefits. (NTFP-EP 2012 forthcoming)
- Processing and packaging technology can allow community suppliers to reach new markets for perishable products that are usually traded in the local market and are season-based.

In the domestic market, some relevant trends are:

- Growing tourism industry and health & well-being industries
- Increasing purchasing power of urban-based Cambodians
- Dependence on biomass for energy

In the region, international market:

- Growing markets of neighboring countries: Vietnam, Thailand, Laos and the opening up of markets through the ASEAN 15
- Demand for sustainable and traceable natural materials / products in key markets, EU and USA.
- Wild and organic products, Japan, EU and North America
- For food and cosmetic products, sustainability of the products and their sources is of key importance.
- Emerging and growing markets
 - sustainable / green energy sources
 - Tourism
 - health and wellness
- Conscious Consumers: Natural, Sustainable and Fair trade

3. Overview and Markets of Key NTFPs

**The consultant co-wrote an overview of the different markets for NTFPs found in Mondulhiri as part of a paper submitted to FAO on assessment of forest sub-sectors, specifically NTFPs in the Eastern Plains in February 2013. As the data are still current and most are relevant for this study,*

the information and the text below are mostly drawn from that report. Other data were collected through interviews with collectors, market actors and desk research.

3.1. Oleoresin / liquid resin

Oleoresin is one of the most traded NTFP in Cambodia. In 2009, Prom estimated the annual resin market value (export and domestic) at 4 to 7.6 Million USD. (PROM 2009) Domestic market is the fishing industry, which absorbs 20-30% of the total annual national resin collection, estimated at 11,000-18,000 tons. But the main market of this resin is exports, primarily to Vietnam, Thailand and Lao PDR, where it is processed and re-exported to other countries such as Germany and France where they are further re-exported or processed for different industries, such as the essential oil and perfume industries. A niche market for natural paints and varnishes in Europe, albeit small for now, is providing opportunities for natural resins. *“Technological development that allows for discovery of new uses for NTFPs and their components is also opening up new industries for resin. For example, biotechnology advancement and organic markets offer an opportunity for essential oil extracted from dipterocarp oleoresin to be used as bio-pesticide. (NTFP-EP 2011) However, taking advantage of these niches will require further research and product development support as well as capacity building both at the community and national level.”* (Pinto et al 2013) For oleoresin, mostly, traders finance collection trips of tappers under the condition that the latter sells exclusively to them. Tappers sell individually to the traders, who provide the function of transporting the product to the wholesaler / exporters at the provincial capital, Sen Monorom town. There, three wholesaler / exporters buy resin from them. The resin is repackaged by the wholesaler into large sacks and transported to the Vietnamese border through Dak Dam (Monduliri) or through Memot (Kampong Cham). It is then bought by a similar sized wholesaler on the Vietnamese side of the border, who will transport it to Ho Chi Minh City for processing and re-export. (Pinto et al 2013)

3.2. Solid resin (*chor chong*)

Solid or hard resin falls from the branches of *chor chong* (*Shorea vulgaris*) tree and *phchok* (*Shorea obtusa*) (FAO Website Accessed September 2013) trees found in deciduous forests. An injury to the tree (e.g., broken branches) causes exudates to form. Most families in the surveyed areas collect solid resins throughout the year, mainly sold in pieces or in powdered form. Locally, it is used to make torches by mixing it with the leaves or bark of a preal mangrove trees. It is also used for caulking boats and baskets. Annual production averaged about 125 tons, although there were wide variations from 25 tons to 923 tons (the highest amount in 1968). It is estimated that about 10 tons of resin were extracted in 1994. In Cambodia, resin is sold in raw form, either filtered to improve quality if for export or mixed with different materials (e.g., solid resin, kerosene, preal leaves) to make boat caulking and sealant materials of different consistencies, and torches for the local market. (NTFP-EP 2011) Aside from local use, the product is also exported to Vietnam and neighboring countries. (PROM/NTFP-EP 2009)

In some studies, they were said to be found in small quantities and fetch a lower price than liquid resin. However, based on current prices of 0.37 – 0.5\$/KG compared to the price of liquid resin at the 0,35\$ - 0.53\$/KG, there is not much difference. Market links can also influence the price. In areas where there are established market links, the market value ranged from 0.37\$ to 0.56 \$ / kg in 2008 with an estimated collection volume ranged from 6,000 kg – 40,000 kg with estimated value of 2,000 USD to 15,000 USD in 2008. In contrast, where oleoresin tapping was the main activity such as the villages bordering the MPF, the market demand and the market value in 2007 of 500 riel/kg for solid resins were lower than that of oleoresin. We can also note that there wasn't much increase in price from 2008 to present.

The difference of interest between solid and liquid would be the ease of collection and the volume collected at a time. Unlike tapping for liquid resin, *shorea* trees are not induced by communities to exude sap. So the volume is lower and the collection is harder. Only natural exudations are collected, either on the ground, where they have fallen or through climbing the tree, or the use of sticks, or slingshot. Therefore it usually takes a long time to search, harvesting only 1-5 KG/day. Collectors are generally not aware of the marketing chain or the end use of the resin. They mainly sell to local, regional traders/wholesalers, who in turn sell to end-users in Cambodia and in Vietnam. There is an increase in market demand for dry resin but poor quality of resin; old age of trees are the main threats to the supply. To increase supply of solid resin, it might be useful to research for sustainable process of inducing exudation like what is done with liquid resin tapping.

China and Europe are the main markets for resins. Within the EU, Germany is the largest market for resins. Damar, solid resin from *shorea* spp. can be used for a range of products such as anti-inflammatory, antiseptic, mouthwashes, gargles, gastrointestinal disorder treatment, varnish, lacquer or varnish for artworks. Resins are often fractionated to extract different components that are usually used for different industries. Importation is mostly done by traders or agents. Processing is often done by specialized traders or by the end-users themselves. Main ports of entry are Germany and France. Except for big companies that have their own processing centers and therefore prefer direct link with suppliers, direct trade with small end-users in the food, pharmaceutical and cosmetics industries is not possible as many end-users do not have the means to import the products themselves (quality control, logistics, Customs). (CBI 2008)

3.3. Strychnine seeds (*Strychnos nux-vomica*),

Locally known as *sleng*, they are mainly exported to Vietnam for medicinal purposes. Other known markets are India, Sri Lanka and China. They are used to make poison, tonics, bitter flavoring for medicinal purpose, and used in muscle relaxant drugs. (Maling 2007) Other purposes include rodenticide, homeopathic medicine for nervous and paralytic disorders. Its major market is the USA. Based on the study of WWF, the commercial collection of the seeds in the area started in 2004, where non-community members who had knowledge of the market demand had initiated the collection. High market demand for the seeds has turned it into a major source of cash income for villagers and outsiders who collect this NTFP. Price has increased from 300-500 riel/kg in 2004 to 2,500-3,800 riel/kg in 2009 at village level. Now, the price is at 3500-4000 riel/KG. This demand has put great pressure on this NTFP as harvesting has been mostly done unsustainably, where the trees are cut to collect the seeds. (WWF 2011) The WWF has established a Sleng Group in Srae Huy/Srae Thom who now practices sustainable harvesting methods. However, when competition is high, like this year, as there were no fruits last year, unsustainable harvesting couldn't be helped. Market actors include collectors, village traders, traders and wholesalers/exporters.

3.4. Wild honey

Up to now, only a rough indication of the Cambodian wild honey market is available. CBHE (wild honey national federation) alone had an annual sales turnover of 44,000 USD (including beeswax) in 2012 (NTFP-EP 2012 forthcoming). They aim to more than double this by 2015. (CBHE 2012) Collection is said to have decreased due to the conversion of lands by individuals and land concessions companies but the price trend is increasing due to limited supplies and increased demand. The first collection of the dry season has the highest demand and prices are raised by traders during that time, reaching up to 70,000 riel/liter. Due to this high demand,

there is some adulteration that is happening, which also drives further the demand and the price for pure and good quality honey. Known market can absorb up to 8,000 liters/year. But the main player, SKC is for now just supplying 50%. (SKC Personal Interview 2012) Demand is forecasted to increase as household use will increase from 72% to 86%, consuming 2 liters to 2.6 liters per year. In addition to this, commercial users in Cambodia such as restaurants, hotels, spas/massage centers, and salons are steadily growing. The latter is also influenced by the growing tourism industry in the country and the region. Current supplies of wild honey in Cambodia is said to be not enough to meet the domestic market. There is still enough market to expand locally. The CBHE provides a system and network to process and to distribute wild honey to reach the main market in Phnom Penh.

3.5. Lac

Lac resin, locally called *Chor Ong* or *Chor Sa-ong* is produced by an insect called *Sa-Ong*, (*Laccifera lacca*) on branches or within trunks of trees, including Sangke (*Combretum quadrangularis*), Pou (*Ficus religiosa*), Pongror (*Schleichera oleosa*), Reang Phnom (*Shorea siamensis*) and Snoul (*Dalbergia nigrescens*). Known farming of lac was in the southern part of Phnom Penh. The resin used to be extracted at two-year intervals from insects on *sangke* trees planted along rice field dikes. (Hang 1995)

The properties of lac make it a versatile natural resinous material for a variety of applications in plastics, electrical industry, adhesive, leather and footwear industry, wood finishing, hat manufacturing, printing ink, shellac for pharmaceutical, confectionary glazes, fruit coatings, cosmetic industry, rubber, paint, grinding wheels, paper varnish, art, dental moldings and sealants. Lac films are known to be resilient, have a high scratch resistance, good adhesion, and electrical insulation. The resin is mainly fractioned for both soft and hard components. It is mainly traded in the form of seedlac, shellac and buttonlac. Although some raw lac and refuse lac are also traded. Processing can be done both by hand or by machine. (Pratihar 2006, Rao no date)

3.6. Bamboo Shoots

The OXFAM study of 2006 found the Cambodian bamboo shoot industry to be under-developed. Interviews carried out in September 2013 also showed no increase in demand. A bamboo-shoot processing industry (canning, pickling, drying) can be found in Kampong Cham, Kampong Thom, Banteay Meanchay, and other places. (Oxfam/IFC 2006) However, its processing limitations and low market demand resulted in over-supply and low prices. In 2006, local demand for canned bamboo shoots was 30,000 cans per year while production capacity was 60,000 cans per year. Many fresh bamboo shoots remain annually with price at only 200 Riel per kilogram. This low demand led some communities to change from bamboo shoots production to cashew nut, cassava and rubber plantation. (OXFAM/IFC 2006) In other parts of the country, Pursat and Preah Vihear, the FA reported that thousands of tons of bamboo shoots are harvested annually and sold to middlemen who transport the shoots to depots in Phnom Penh or Kampong Speu. (WINROCK 2007)

There is a market for bamboo shoots among the city population, including Khmer, Chinese and Vietnamese and Asian restaurants. While preference is for fresh ones, bamboo shoots are also consumed pickled, dried or from cans. They are especially popular in Phnom Penh and the rest of the country during festival seasons. But the fresh shoots are only available during the rainy season from June – October. Techniques are needed to improve processing based on the

diverse preferences of consumers (whether dried fermented or canned, or fresh). (WINROCK 2007)

Based on feedback from retailers, preference is for Chinese bamboo shoots. Khmer bamboo species are smaller and bitter. Main suppliers of bamboo shoots are plantations planted in the 70s – 80s. They also say that the market is steady, with some slight decrease from the previous year. But while domestic prospects are still weak, the international market shows more potential. There was a potential partnership with Japanese company for the production of canned bamboo shoots in Cambodia. But Cambodian entrepreneurs could not meet the quality and quantity required. There is also a demand from neighboring countries, Thailand and Vietnam. It was reported that bamboo shoots are exported to Longkur market, Thailand. (WINROCK 2007) Finally, Oxfam recommends that with right production, processing and marketing strategies, based on the experience of Vietnam, the bamboo shoots sector can be a profitable enterprise. (OXFAM/IFC 2006)

Based on the interview with local producers in Keo Seima, about 40KG per season/year are processed per household. Fresh bamboo shoots sell for 700-1000riel/kilo, depending on the buyer. Semi-processed shoots (cut, boiled, salted, dried) sell for 20,000riel/kilo in Srae Pre Market in Keo Seima. Drying is not traditional but pickling is. They are sold in the local market or are transported to Kampong Cham and Snoul. Main markets for bamboo shoots are Vietnam, Sung, Kampong Cham, Snoul District, Kratie province. From there, the villagers are not aware where the products go next.

3.7. Bamboo Culms and Sticks

Kratie Province is the main actor in the bamboo sector in Cambodia for both domestic and exports. A substantial portion of bamboo coming from Kratie go mainly to fishing industry (fish traps) and construction industry in the country. Price increase in the industry is mostly related to costs incurred for value addition and profitability is also believed to be limited among middlemen. The study also states that profitability in the bamboo sector is lower compared to other sectors, which limits participation and investment in the sector. (WINROCK 2007)

According to an interview with key informants in O'Rana, Keo Seima, from 1997-2003/4, bamboo poles were harvested for the Vietnam market or transported to Snoul, Kampong Cham and Phnom Penh. Mainly to be used for paper, chopsticks and others. Vietnamese traders would come and order the poles, specifying sizes and lengths.

Usually, individual households/ famers get the orders from local traders. Cutting and delivery are done individually, per household. Each transports by his own means (ox-cart, raft during rainy season). Each individual can harvest roughly 30-40 culms / day. They are usually paid in advance by the wholesaler through arrangements with local traders. (WINROCK 2007)

However, for now, the trading has stopped as the bamboo sources are far away and they have been waiting for the bamboo to mature in the last six year. Buying price in 1997 was 500riel/pole. In 2003-2004, it was at 1000riel/pole. Now collectors are asking for 5000riel/pole as the sources are too far away. 500-600 poles can be transported in a truck. The trader usually provides an advance payment of 5\$ to cover the food of the team of 4-5 persons. The trip usually takes 2-3 nights. The poles are cut, peeled and prepared to be transported through the river. Harvesting is best done during the rainy season when streams/rivers (i.e. Chlong and Opam) can be used to float the poles to collection points nearer the road. (i.e. bridge near Srea Preah market)

While the national market for bamboo sticks is quite large, the technology and the manufacturing sector that are required to respond to the market's required standards are lacking. Bamboo stick products have no, or have limited production in Cambodia. The country relies mostly on imports from Vietnam. Kraite has started their trial run of chopstick production. Their machinery is imported from China or Vietnam but is second hand and of poor quality. Other chopstick operations established in the last ten years failed due to inadequate storage techniques and difficulties in assuring quality and competitiveness. (WINROCK 2007)

Incense sticks are widely used in Cambodia, especially in Chinese new year (February) and khmer new year (April). There is a preference for Chinese-made incense as Cambodian-made incenses burn fast and just turn into ash, which is not a good omen for locals. The Chinese incense burns slower and curls as it burns, which is a sign of good luck / abundance for Cambodians. The market price of locally made incense is at 15,000 riel / bunch but Chinese incense is more expensive. An average of 3 incense sticks are used daily by a household.

Bamboo incense sticks were first produced in Keo Seima in 2007 when a buyer came to introduce the product to the villagers. They make use of a species locally called "Ngort" or Rock Bamboo. It is wild and doesn't grow in the village. It is tight and strong, mainly used for basket weaving, house construction (wall, floor), chicken coop, gate/fence and gardens. It also provides delicious bamboo shoots. They usually harvest the bamboo when it is 1 year old. Collection is done after harvest season (November – December) and after planting season (July – August). But if there is a buyer, collectors will also go and harvest bamboo. For each trip, 5 bamboo sacks are collected. Collectors would go 3-4 times per season. A household can earn 100US\$ per year. But a big household or a group of households working together can earn 750US\$ per year. A sack of 1m-sized bamboo is equal to 1 ½ bundles of big incense. In 2010, a bundle cost between 7000-10,000riel/bundle. In 2012, it rose to 20,000riel/bundle. In 2013, it went down to 12,000riel/bundle. The incense trader sells from 10,000 – 18,000riel per bunch. Average, he earns 1\$ / bunch. From harvesters in Keo Seima village, the poles are bought and consolidated by traders from the Keo Seima district, who semi-processes and transports them to Snoul (64km) Kampong Cham (130km) where they are processed and finished. From Snoul, Sla, Memot district, Kampong Cham, the incense goes to Toul Svay Prey, Phnom Penh (300km).

There are some buyers, though lesser now. But villagers do not want to go and collect as the source is too far in the forest and they are busy with their farms. Production has dwindled down. Equipment for cutting bamboo into sticks are now being used in Snoul, Kampong Cham making it cheaper for them to just order bamboo slats instead of finished sticks. And so, the incense industry in Keo Seima has declined.

Main constraint to bamboo collection is that many households do not have time to harvest. They prefer to focus on their farms as the income from bamboo is small and there is less demand. Some traders have lost interest too as some buyers place orders but do not claim the orders. Labor is now 5\$/day and it is more secure than becoming an entrepreneur. The declining resource is also a problem. The collection sites are getting farther and farther from their village. Animals are also disturbed when harvesting is done so they were prohibited by the MoE to access some areas. (Personal Interview 2013)

3.8 Orchids, Mushrooms, Medicinal Plants

High value but low in volume, mushrooms (medicinal and edible), orchids, medicinal plants, wild vegetables, continue to be traded in traditional markets locally and for some, across borders.

Value chains are very short due to the high perishability of the products. The traditional markets of these NTFPs, Vietnam and China, are growing economies which drive demand for these products. As trade is mostly informal, there is not much information about their local value chain. Also, the volumes of production are usually low. Resource enrichment, markets and processing should be researched further to increase the benefits that are already being derived from them. The growing eco-tourism/nature-based tourism industry in Cambodia and the region may also offer a new opportunity for these products. (Pinto et al 2013)

Each sector's market is rated accordingly: 3 – established/high demand, 2 – steady/growing, 1- supply over demand/needs to be developed, 0-no demand

Table 2.8 Market Ranking

| Resources | Market |
|-----------------------------|--------|
| Liquid Resin | 3 |
| Wild honey | 3 |
| Sleng Seeds | 3 |
| Lac | 2 |
| Mushrooms / Wild Vegetables | 2 |
| Bamboo | 2 |
| Orchids | 2 |
| Bamboo Shoots | 1 |
| Solid Resin | 1 |

4. Market Pull

In this chapter, instead of looking at the resources, we look at the market, the trends that affect consumers and the opportunities, and from there see what products can be developed out of the resources. Both domestic and international markets were scanned.

In the domestic market, the main areas explored are:

- Organic Food
- Tourism / Eco-tourism in Mondulkiri
- Green energy
- Boating industry

For exports, main potential industries are:

- Wild / Organic Food / Mushrooms
- Bamboo industries

4.1.A. Wild / Organic Food for domestic and international markets

There is a small, but thriving organic market in Cambodia. It's been mostly initiated by the private sector. The turnover of COrAA¹ certified products in for the last 12 months was at USD 690,000.00. (Personal Interview September 2013) Main organic products are vegetables and rice. Vegetables are very high in demand. Main markets for organic market in Cambodia are expats, 80% and upper-income Cambodians, 20%. According to an organic shop owner, Natural Garden, there is a 20% increase per year of sales. There might be an opportunity for wild vegetables as clients are open to try out new things. There is still a small supply of organic product from Cambodia. Some of the organic products they sell are imported. They are looking

¹ COrAA is a membership organization that certified organic products for the local market.

for sources of agricultural products such as pineapple, onion, asparagus and potatoes but also are open to new kinds of products. There is an interest in wild mushrooms, especially, Shitake. The company delivers everyday to at least 100 clients, mostly restaurants in Phnom Penh and Siem Reap. (Personal Interview September 2013)

Some consumers look for the organic mark, specifically the foreigners. Cambodians do not pay much attention to the mark but the quality and the credibility of the source, the shop, in this case. There is still a need for more awareness among consumers about organic food. The price is about 15-20% higher. For some vegetables, prices can be 80%-200% higher. But price difference depends mainly on the product. For rice, there is about 700riel difference. (Personal Interview September 2013)

Locally, supply is less than demand so there is still space for new entrants. Local entrepreneurs are also looking to exports. One company is preparing to export organic products to Singapore. SKC just shipped 500 liters of wild honey to Japan.

Main requirements of the “Wild Organic” label are that “harvesting of products from wild or common land areas is undertaken sustainably, does not use prohibited inputs or practices and ensures products are not contaminated.” The standards cover plant (including mushroom) production, collection of wild products including the processing and labeling of products derived from these activities.

According to the study, “Overview of World Production and Marketing of Organic Wild Collected Products of UNCTAD/WTO in 2007, there is a thriving sector for organic products harvested from the wild in the global market. Majority of organic wild collected products is sold in the organic food market. Global sales of organic food products are in the range of EUR 25 - 30 billion. Bamboo shoots (*Bambusum vulgaris*) and mushrooms, especially white mushroom (*Agaricus hortensis*) and king bolete (*Boletus edulis*), are part of the top 10 wild products harvested in large quantities for the organic market. China is the country with largest reported harvesting of organic wild collected products in terms of volume. Asia shows the widest variety of collected products (approximately 241). Products such as bamboo shoots, walnuts, tea seeds, seaweed, berries and mushrooms are collected in large quantities. These products make up more than 80% of the total harvest.

Europe is identified as the leading market, with most of the reported organic wild products certified according to the EU Regulation for organic agriculture. About 43% of the respondents indicated Europe as target market. North America accounted for 31% and Asia for 26%. Specific target countries are United States and Germany, while in Asia, Japan, Taiwan and Korea are main destinations for organic wild collected products. When asked for preferences, many companies chose wild products if available in sufficient quantities, because of the lower prices compared to cultivated plants. Wild collection also encourages traders to accept more irregular product quality and seasonal variations. Some companies support wild collection for its social impacts. They also encourage domestication to ensure long-term supplies. For example, Weleda from Germany has a strategy of supporting domestication of wild collected products in order to promote their conservation.

“Wild” is rarely used in product labels of organic food retail markets, except for single-ingredient products, such as Brazil nuts, wild rice, wild fish or edible mushrooms. However, a lot of fresh and frozen berries used in foodstuffs originate from wild collection. The term is more used in market segments of remedies and food supplements. (UNCTAD/WTO 2007)

The demand for organic wild collected products is significant, especially for products for direct food consumption, such as berries, nuts, mushrooms and herbs. There is also a growing interest for wild organic products in the body care and medicinal herb sectors. (UNCTAD/WTO 2007)

The global market for organic food & drink is recovering from the financial crisis. Mainstreaming of organic products, where organic products are distributed by mainstream retailers, is helping to bring back the sector to its feet. The European market for organic food & drink has been most affected by the financial crisis. Declining consumer spending power and rationalization of organic product ranges by food retailers caused the UK market to decrease in 2009. The German market, the largest in Europe, showed no growth. In contrast, the organic products market in some countries - including France and Sweden - showed resilience, expanding by over 15 percent. Healthy growth is continuing in the North American market, which has overtaken the European market to become the world's largest this year. Supply continues to fall short in many organic product categories, leading to imports from various countries. Latin America has become a major source of organic fruits, vegetables, meats, seeds, nuts and ingredients. (Sahota 2011)

Exotic or ethnic foods and flavors continue to be a sector of growth in North America, providing interest even for small food budgets. Sustainability connected foods, which includes natural, organic, local and antibiotic-and-hormone-free ingredients will also have greater demand. (ITC 2012)

Main market requirements for new natural ingredients are exciting/new functionality and also certified to be fair trade and sustainable, with emphasis on 3rd party certification. Main interests are sustainable growing and ethical food and non-food products. Fair trade combined with organic certifications is an area of high market growth. (ITC 2012)

Other segments targeting the organic market are as follows. Due to limitation of time, they will not be discussed. However, for future market studies, it would be good to learn more about these market segments.

- Organic Animal NTFP fodder (i.e. bamboo leaves)
- Organic pesticides (i.e. extracts from dipterocarp oleoresin)
- Organic wax (i.e. beeswax)

There is a demand for organic waxes from suppliers with organic certification. Due to the limited availability of organic substitutes for most products, premiums for organic products are sometimes high. (CBI 2008)

4.1.B. Mushrooms

Mushroom supports a thriving export trade in many countries. Most popular mushrooms can be found in dry dipterocarp and oak forests. Growing and collecting wild / semi-wild mushroom is a significant use of forestlands in Thailand. Supply of Morels in the international market is mainly from the Asia-Pacific region, even if they do grow in many European countries, USA and Canada. France, Switzerland and Germany are the main markets of dried morels from Pakistan and India. (Sial 1995)

A wide assortment of mushrooms is eaten in Southeast Asia and around the world. Champignon and field mushrooms are popular in Europe; Shitake Mushrooms are consumed mostly in China and Japan, while Thai people prefer Yanagi Mushrooms or Straw Mushrooms. Lao PDR consumes 15,000 tons mushrooms / year, a rate of 2.5KG/year per capital. This is partly from wild mushroom harvested but mainly from mushrooms that are imported fresh from Thailand and

dried from China (80%). In Southeast Asia, they see the tourism industry to increase demand for mushrooms in restaurants. In Vietnam, mushrooms are a big export industry, exporting more than 40% of its production.

Japan has one of the highest mushroom consumption in the world, making it very attractive for mushroom exporters worldwide. (Haiwei Sun 2010) Japan imports mushrooms in three forms: fresh, chilled and dried. Main competitors in the Japanese international mushroom market are China, North Korea and South Korea. The South Korea mushroom are lower priced and have good quality, offering also new active species. Button Mushrooms are the second highest priced mushrooms in Japan sold at around 10 USD / kg. They are mainly produced in Indonesia. Taiwan, Japan, India, Korea and Thailand have the highest global export rates of mushrooms. (Freeland Foundation 2012)

China is the top producer and exporter of processed / canned mushroom in the world. But in spite of the great variety of mushrooms, its main production and exports focus on Shiitake, Jew's ear, Matsutake and Oyster. Top importers of mushrooms from China in 2008 are Japan, North Korea, Singapore, Hong Kong, South Korea, USA, Germany, and Vietnam. Problems on detection of chemical additives from other vegetable imports from China affected the credibility of Chinese mushrooms among Japanese consumers, which decreased demand for Chinese mushrooms in 2008. (Haiwei Sun 2010)

Mushrooms are usually traded in dried form in international markets, especially in Europe, where demand for gourmet or specialty foods are higher than local/ regional supplies and where prices are higher. However, lately fresh mushrooms are being preferred over preserved ones in EU and American countries. This is influenced by recent medical research and culinary practices. Fresh common and specialty mushrooms meet the needs of health-conscious consumers for fat- and cholesterol-free, low-sodium foods. They contain several important nutrients and antioxidants and are excellent alternatives for vegetarian-style meals.

Increase in demand for specialty mushroom is also driven by consumer preferences for unique tastes, colors, and textures of specialty mushrooms. Tastes are evolving and chefs are introducing varieties of mushrooms to new markets. Demand for organic produce is also growing globally. Demand for organic produce is rising steadily in most countries. There is opportunity for exotic mushrooms and wild organic mushrooms.

Opportunities for wild food (mushrooms, vegetables, honey, bamboo shoots) and employment

4.1.1. Food Processing and Distribution Center

A multi-food processing and distribution center, will take advantage of the multi-product harvests of communities. There is already an experience and system established for wild honey packaging. There is also a proposed processing center to be established in Sen Monorom. The service of this center can be expanded to cover other key forest foods products, increasing income streams and spreading overhead costs to various products. Also, offering a variety of products to the same target group will be economical in terms of transaction for both the center and the buyers. The center can also provide employment for some members of the community. The center can target the local tourism market (to be discussed more below) as well as the national food and organic market.

Processing and packaging technology will need to be acquired and distribution logistics will need

to be set up. Transportation cost has always been the main issue for competitiveness of products from villages. Innovative solutions, such as transport cooperatives, etc. should be explored. Finally, enrichment and domestication of the food products should also be studied to ensure sustainability of supplies and natural resources. Partnership with SKC and COrAA members that have a network of buyers may provide the distribution system that the communities need in order to access the market.

4.2. Eco/Tourism at Local and National Levels

Tourism is one of the main industries promoted by the government. About 3.5 Million international tourists arrived in Cambodia in 2012. Around 3.3 Million arrived by October 2013, 14% higher than the arrivals of the same month in 2012. As of October 2013, main markets of inbound tourism were: Vietnam 21%, China 11.1%, Republic of Korea 10.2%, Lao PDR 10%, Thailand 5.5%, Japan 4.9%, United States of America 4.3%, Australia 3%, Malaysia 3%, France 3%. Lao PDR and China showed the greatest increase in number of tourists. (Cambodia MoT Website accessed September 2013)

Eco-tourism is the specific tourism promoted in Mondul Kiri. It is also supported by some organizations working in the province.

Around 90,000 tourists were estimated to have visited Mondul Kiri in 2012. Average growth rate of tourism in the province in the last five years is 35%. For international tourists, the average growth rate in the past 5 years is 20%. 90% of the tourists visiting Mondul Kiri that seek services from tour agencies are European. 89% percent of tourists are domestic tourists. They come to visit during Khmer New Year, King's birthday, Water festival and the International New Year. Wild honey and fruits are some of the main purchases of tourists for own consumption and as gifts for family and friends. (Lang 2013)

Opportunities for wild food (processed and fresh), wild honey, crafts and employment:

4.2.1. Cambodian Authentic Food and Crafts

Domestic market caters to the tourism industry that requires authentic Cambodian and/or exotic food products. Fresh and processed wild vegetables in traditional recipes can be packaged and sold to tourists or distributed to local restaurants and hotels in Mondul Kiri or in other tourist destinations. Festivals can be organized to promote traditional cuisine. NTFP-EP and NOMAD have a project on food from the forest that can be a good jump off point. Partnership with the Ministry of Tourism and restaurant associations in Cambodia can help promote the food tours as one of the tourism products of the country. Other traditional crafts can be sold alongside the packaged food products or used as packaging or serving trays. Packed food can also be promoted as souvenirs. This can also be part of the Food Processing and Distribution Center discussed above.

4.2.2. NTFP Forest Food Foraging Tours

More tourism products need to be developed in order to promote eco-tourism in Mondul Kiri. Srae Huy and Srae Thom villagers indicated during the PRA that they could guide tourists in the forest as one of their skills. Traditional culture and forest ecology can be combined with eco-adventure tourism through Food Foraging Tours, like the "mushroom hunting" tours done in other countries. After collecting the ingredients, meals can be cooked and shared in the forest. Just like what villagers do when they go into the forest, they cook their meal in bamboo poles. This provides market for the wild food but also employment for both women and men of the village.

4.3. Boating and Fishing Industry

The boating industry is the main consumer of solid (*shorea spp.*) and liquid (*dipterocarp spp.*) resins in the country. Boat owners use a thicker resin material composed mainly of resin waste materials and solid resin is used for boat caulking. Other materials, such as jute fiber, powders, and higher quality resin, may be added in small amounts. The mixture is usually heated for about three hours to create a black, sticky caulk. Based on interviews, boat owners paint their boats with resin every 6-12 months, to seal and protect the wood, using about 10-20 kg depending on the size of the boat. Retailers indicate that most resin for sealing boats is sold during the early wet season from June until September. Boat owners tend to prefer unprocessed resin for boat sealing because it is cheaper (about R1500-2000/kg) than filtered resin.

Kampong Thom is said to be the main source that is supplying many domestic markets around the Great Lake and around the country through distributors in Phnom Penh. But research indicates that much of the resin coming from Kampong Thom has lower quality compared to other provinces. The study also indicated that some local processors in Phnom Penh and Kampong Thom use waste resin products, after filtering to mix with solid resin to make materials for sealing boats.

An estimate of 4,000 to 6,000 tons of resin is used for boat caulking 250,000 to 300,000 boats in Cambodia among which over 6,000 are sea boats. About 150 tons of resin are used to caulk these sea boats each year, using materials mainly imported from Thailand that are sold at almost 2 USD/kg (NatureWild 2011).

Market price are as follows: (NatureWild 2011)

- Average retail price for low quality resin: 0.9 USD/kg –cost attributed to tappers: 0.49 USD/kg
- Average retail price for high quality resin: 2 USD/kg –cost attributed to tappers, filtering, transportation, tax and informal fee (0.45 + 0.07 + 0.38): 0.9 USD/kg
- Price at the factory gate of big resin traders in Ho Chi Minh, Vietnam: 1.2 USD/kg

According to a study done in 2011 by NTFP-EP, there is an increasing demand for good quality resin and varnish for tourist boats. There is also possibility of export to Vietnam, Thailand and Laos.

Fishermen also make use of resin torches. Based on an interview with Kampong Thom fishermen, local fishing communities use torches at night instead of batteries, particularly during fishing activities. Torches are more economical for locals as one kilogram of resin torch costs approximately R1,500 and can be used for three nights. Batteries, on the other hand, cost the same but only lasts for one night. In addition, floating villages are often far away from the market, and it would be time consuming for fishermen to recharge their batteries. Some fishermen also say that the torchlight repels mosquitoes. (PROM/NTFP-EP 2009)

Opportunities for solid resin, liquid resin, waste liquid resin after filtering

4.3.1. Non-Food NTFP Consolidation, Packaging, and Distribution Center:

Many of the products coming from the villagers are resin materials that are usually bought by same traders, wholesalers, processors or exporters. Some villagers have resources but do not have access to the market, which lowers prices of products. Working as a network, in the model of the CBHE, it might be beneficial to consolidate also non-food products to increase bargaining power, to reach markets or to access bigger buyers. It will be key for this enterprise to have information about the end uses and market prices of the different resins and other products.

Here, basic value-addition of grading, filtering packaging can also be done. These activities are also carried out by some traders and wholesalers so it would be good to provide a venue for dialogue to discuss how each can benefit better. Processing and storage goes beyond traditional barter, based on an interpretation of the Forestry Law. These require permits and additional costs. It would be good to study the costs and benefits of consolidating, semi-processing and/or packaging products.

4.3.1.A. Packed Resin Caulking Materials

Processing, such as liquid resin filtering or powdering of solid resin do not require high technology. They can also be simply packaged in recycled materials. This would also find economic use for waste resin (after filter) or low quality resin. Direct links with associations of users, such as Boatmen Association in Cambodia may provide mutual benefits for both consumers and suppliers. Market testing can be carried out.

4.4. Bamboo Industries & Sustainable Materials and Products

Here we take look at the growing international bamboo market. We also consider the market for sustainable materials as a niche within this giant of an industry to explore potential areas where small producers are able to participate and generate higher benefits.

4.4.A. Bamboo Poles

The growing demand for green materials increased interest for the fast-growing bamboo species. The global market is estimated to reach 15 billion USD in 2017. Main product groups are handicrafts, processed bamboo shoots for food and industrial materials. As an industrial material, bamboo is now being used for different kinds of products from construction materials (i.e. plyboo) to furniture to fashion accessories and even thread and garments, etc. In the international market, some categories of bamboo products are covered by the FLEGT and the US LACEY ACT. This means that sustainable and traceable sourcing would be important for bamboo product manufacturers.

In Cambodia, wild bamboo is used mainly for fishing contraptions and construction activities in the country. These two demands consume more than 80-90% of total bamboo harvested within the country and do not require much treatment for processing of the raw materials. However, bamboo treatment is a prerequisite to access global markets and for improvements in the bamboo industry. Some pilots however showed that technology has not yet been well adapted to the bamboo species in Kratie. Furthermore, for an efficient bamboo sector, issues on allocation of different parts of the bamboo to profitable end products should also be considered. (WINROCK 2007)

There had been reports of exports of unprocessed bamboo to Vietnam and Thailand. (Oxfam 2006) Studies of Oxfam (2006) and WINROCK (2007) showed that bamboo resources are declining in the key provinces that supply bamboo. This is both a threat and an opportunity for bamboo suppliers in Mondulkiri. (OXFAM/IFC 2006) Product certification, green labeling and similar market-based incentives may have potentials to facilitate collaboration and cooperation in the sector. (WINROCK 2007)

4.4.B. Organic & Exotic Bamboo Shoots

Bamboo shoots is a high-demand food product in the international market, either fresh or preserved (steamed shoot, deep-frozen and dry shoot), whose world export value rose from 190 Million USD in 2009 to over 250 Million USD in 2011. Bamboo shoots represent 18% of the global

bamboo market and one of the three important product groups in the growing global bamboo industry. (Jonkhart 2012) Bamboo shoots are also a source of many nutrients and active materials that are extracted for pharmaceutical and food processing industries. These can be processed into different products such as beverages, medicine, additives and health foods. (Choudhury et al 2010)

As a commercial product, it is considered as a high value food that can be grown in parallel with the production of culms used for handicraft production or construction materials. However, it has high seasonal variations in production and demand cycles, and high price volatility. (Marsh and Smith 2007)

For now, Cambodian bamboo shoots have not been tested in the international market. It is not yet known whether it will be interesting to international consumers. However, the demand for organic and exotic food products as described above may provide it a niche. It is recommended to do further market research, market testing, and where possible product development. Due to the perishability of the product, appropriate technology for processing, packaging and storage will be required.

4.4.C. Green Energy: Bamboo Char for Charcoal Briquettes

80-85% of national energy consumption, 94% of rural household and 27% in Phnom Penh still rely on wood and charcoal. Families in rural areas are mostly burning fuel wood and urban families are mostly burning charcoal. (Baskoro 2006) Daily, an average rural household uses up to 3.135 KG of firewood, an urban household consumes 3.11 KG of charcoal and 2.1 KG of firewood, a palm sugar industry consumes daily 104 KG of firewood, a rice wine distillery 42.5 KG of firewood.

It is projected that wood-derived fuels will remain the main source of cooking energy in rural areas until 2030 (UNDP 2008, Johnsen and Munford 2012) From 500,000 households in 2008, it is estimated that over 1 Million households will be using charcoal as an energy source in 2015, as projected by the Cambodian Ministry of Industries, Mines and Energy, the UNDP and GERES, a non-profit organization, promoting sustainable energy worldwide. The report estimates the annual market for charcoal in Phnom Penh alone at 90,000-100,000 tons a year, valued at 25 Million USD in 2009. (Baskoro 2006) Urban demand for charcoal is expected to triple in the next two decades. A charcoal merchant in Phnom Penh sells roughly 1,300 pounds of charcoal to households and small businesses in a single morning. According to this merchant, demand in the city is strong. (Marks 2009) Demand is increasing in the capital and exponentially in other urban centers of the country and rural middle class households.

Aside from households, many small and medium-sized enterprises, such as palm-sugar producers, noodle factories and brick and tile industries and the growing manufacturing, garment industries in Phnom Penh and Kampong Cham are also dependent on charcoal for their energy source, according to the Technical Working Group on Forestry and Environment (TWG-F&E). A usual brick and tile factory uses about 500m³ of firewood per month and currently pays \$15/m³. (Blackett 2008) And according to the report of the Economic Institute of Cambodia (August 2012), coal-fired plants have been the focused priority for Cambodia's power-development plan. (Thust 2013) This offers opportunities for alternative energy as current supplies diminish and the industry is forced to accept higher prices.

Seeing opportunities in the domestic market, various companies are offering greener alternatives and new players have entered the market. One of these is, Mong Rithy Group. The

private company is supplying 250-1000 tons of Acacia charcoal to the domestic market each month at the price of 1,200 riels (US\$0.30) per kilogram. The company established acacia plantation specifically for the charcoal market. The Acacia charcoal is said to be greener as it is cleaner compared to normal charcoal, burning at a high heat and does not produce as much smoke as the others.

Sustainable Green Fuel Enterprise, a factory of biomass *charbriquette* for stoves also opened in Phnom Penh in 2010, with the support of two organizations, GERES and For a Child's Smile. The company makes use of waste biomass like coconut husks, broken charcoal, recycled firewood char, among others that are burned for an hour in brick kilns, or until the material is carbonized. The heat from the burning process is then recaptured in a funnel and used to dry the waste biomass so that the burning process becomes more energy efficient. The end product, known as char, is crushed and mixed with water and cassava residue to form individual briquettes of fuel. This briquette is said to produce less smoke and pose less of a threat to human health and the environment. (Marks 2010) Current production is 30 ton a month.

Now, privately owned, the company has a positive net profit this year and plans to continue to expand its market. It has an established distribution system, selling to distributors/retailers that sells to restaurants and households. They are searching for suppliers of raw materials to be used for the *charbriquettes*, with an estimate buying price estimate of 75\$/ton of char, transportation cost to their warehouse in Phnom Penh included. On its own, bamboo charcoal is not efficient. But mixed with other raw materials, it will be a good product. See: <http://www.sgfe-cambodia.com/>

Another company taking advantage of this opportunity, Khmer Clean Charcoal company (KCC). Like SGFE, KCC makes use of discarded coconut shells and rice husks. They need 100 metric ton a month of the said waste materials that come from all over the country to make 30 tons of clean charcoal. The company of 50 workers produces between 40 and 50 tons of charcoal monthly and sells over 20 tons/month. The company targets 100 to 200 tons of clean charcoal per month. Main clients of the company come from the major population areas: Phnom Penh, Siem Reap, Takeo, Sihanoukville and Kampong Cham. The company sells directly to restaurants, clubs, shops and hotels. Their clients pay 1.5 million riels (\$375) per ton for the charcoal or US\$ 0.37/KG. The company also targets to sell charcoal in the supermarkets. (Soeun 2009)

Aside from Phnom Penh, the strategy to promote briquette was successful in some northern provinces of Cambodia. Current green charcoal production only partially meets the demand of Phnom Penh. There is still some room for new entrants. With the price of ordinary charcoal going up, greener alternatives are becoming more competitive.

Table 2.9 Charcoal Market Supply & Demand

| Company | Charcoal | Production /Sales in 2013 | Target Production / Sales 2016 | Production Capacity Annual | Price / KG |
|------------|--|---------------------------|--------------------------------|----------------------------|----------------------------|
| Mong Rithy | Acacia charcoal | | | 3000 - 24,000 tons | USD 0.30/KG |
| SGF | Biomass Waste Briquettes / Char-briquettes | 28 - 40 tons / month | 80 tons / month | 960 tons | 1,200 riel / USD 0.30 / KG |

| | | | | | |
|----------------------|--------------------------|--|--|--------------------|-------------|
| KCC | Biomass Waste Briquettes | | | 1200 – 2400 tons | USD 0.37/KG |
| Total | | | | 5160 – 27,360 tons | |
| Total demand | | | | 100,000 tons | |
| Potential Market Gap | | | | 70,640 tons | |

Table 2.10 Price comparison of charcoal

| | 1996 | 2006 | 2012 | 2013 |
|------------------------------|--------------|--|---------------|----------------------|
| Charcoal Price in Phnom Penh | 500 KHR / KG | 600 - 700 KHR / KG (1 USD = 4000 KHR) | 1000 KHR / KG | 800 – 1,200 KHR / KG |

The regional and export market may also be interesting markets. A study's calculations show that substantial quantities of firewood and charcoal in the EU market are actually imported from illegal sources, specifically Nigeria, where 90% are illegal charcoal. Main importers are Belgium, the Netherlands and Germany and some in Italy. Illegal charcoal from Malaysia has also entered France, though in much smaller volume. There could be an opportunity for sustainable and traceable charcoal in these markets.

Opportunities for bamboo, employment

4.4.1. Sustainable Multi-Bamboo Product Processing Center: Semi-processed culms, bamboo char, and bamboo shoots

For now, the value-addition that community members can participate in is the collection and semi-processing of bamboo. Going beyond the model of communities just being suppliers or laborers, this center provides the opportunity for community members to derive benefit not just for their labor or access to resources but also from the profit that result from value-addition. It also recognizes the value-addition of community members managing the bamboo resources.

Based on the recommendations of previous studies, to have an efficient bamboo sector, it is important to allocate different parts of the bamboo to profitable end products. This processing center can do that. It can start as a processing center of semi-processed bamboo for different industries in the country and if possible, abroad. And later on, with appropriate capital, human resource, technology, it can expand to full production of finished products. The production center can also explore the niche of sustainable bamboo products, from sustainable construction materials, to organic/sustainable chopsticks (i.e. reusable chopsticks and other).

The study also said that bamboo treatment is prerequisite for it to meet global standards. Therefore, semi-processing can include treatment of bamboo, aside from cutting into different sizes and distribution to different industries. A case study by FAO Technologies and Practices for Small Agricultural Producers demonstrates that a village bamboo preservation unit can range from a few dollars up to 5,000 to 9,000 USD for a pressure treatment plant. Non-pressure methods are much cheaper to establish. Preservation is an intermediary stage in the processing of bamboo into useable end products. It is important first to have knowledge of market requirements. (FAO TECA accessed 2013, INBAR Website)

More details about bamboo treatment can be seen here:

<http://www.inbar.int/wp-content/uploads/2013/08/Bamboo-processing-Bamboo-Preservation-PDF.pdf?7c424b>

Parts that are not suitable for other industries or shavings from cuttings can be turned into Bamboo char. Bamboo charcoal itself is not the best. But as char and combined with other materials, it would be a high quality charcoal. (Personal Interview 2013) Bamboo char is not intended as a stand-alone enterprise but is combined with other bamboo product processing. Waste bamboo, that includes shavings, trimmings, and parts that do not fit other uses for other high-value industries can be set aside for bamboo char. The OXFAM study of 2006 recommended that one option of reusing waste materials from existing operations of fish-pen producers is to turn them into charcoal, using technology introduced by Cambodia Fuel wood Savings Project. (OXFAM 2006) There is a pilot production of green charcoal making use of the “yoshimura kiln” that has a similar volume capacity of traditional kilns but requires less wood. Some pilot improved kilns (T-LUD, Yoshimura) are run by GERES Cambodia. The organization, GERES may be able to provide technical support to develop appropriate kilns and opportunities for partnerships. A project on charcoal production will require sustainable raw materials. One of these products is bamboo char.

High transportation to reach target markets will affect competitiveness of prices. There will be a need to explore innovative solutions to lower costs. I.e. maximize travel by bringing other products that will also be delivered to the same areas. Invest in transportation or establish a transport cooperative that can provide lower costs to the community enterprise.

5. Rapid Assessment of Enabling Conditions and Impacts of Potential Enterprises

To facilitate assessment, analysis of enabling conditions and integrated impacts focused on each potential enterprise instead of per product. The enterprise can focus either on just one product or a group of products that have the same general market. For conditions, the following were considered: sustainable natural resource management practice, availability/accessibility of technology, market links, potential for value addition for communities, policies, and support of organizations. For integrated impacts, the following areas were assessed: food security, gender, climate change adaptation/mitigation and biodiversity impacts.

Conditions

| Food Processing & Distribution | | |
|---|---|---|
| Sustainable NRM | 1 | Most mushroom/vegetables are harvested in the wild with no clear sustainable harvesting methods or management plan. There are also no enrichment or domestication activities for the resources’ regeneration. However, management systems can be learned and enrichment plans can be developed by the communities. |
| Technology | 1 | The technology for processing and packaging is not yet available in the community but they can be acquired. A consultant can be approached to provide technical support in developing the product, systems and technology adaptation. Logistics management also needs to be developed to ensure to cost-effectively reach the market. |
| Market Links | 2 | Existing network provides potential distribution of products to markets beyond Mondulkiri. There is also an indication of interest for the products. But the distance |

| | | |
|---------------------------------|------|---|
| | | might prove challenging for highly perishable products. If logistics or technology (i.e. packaging, shelf-life extension, transportation, etc) is found then the distance to the market will not be a problem. Market for honey is also highly established and the demand is clear. |
| Value Addition Potential | 2 | Packaging and processing as well as other additional products (Tours, souvenirs, etc.) provide value addition potentials. |
| Enabling Policies | 2 | Trade of food products is much easier than non-food NTFPs. The volume of the product allows it to be transported in smaller transportation, which may minimize unofficial fees. There are also no specified royalty fees for food products. |
| Support Organizations | 1 | NTFP-EP and the CBHE have the experience in processing / distributing honey. This experience can be applied to other food products. Other technical support and technology providers need to be approached. There is also COAA that can support in the organic certification / standards setting of products. |
| Total | 9/12 | |

Non-Food Processing & Distribution

| | | |
|---------------------------------|------|--|
| Sustainable NRM | 1 | Most are resin and seed products that have clear sustainable harvesting methods. However, not all villagers practice them. There is also limited practice on enrichment or domestication of the resources. |
| Technology | 2 | Main technology required is either filtering, powdering, drying or grading. Most of the NTFPs are processed, fractioned abroad. Technology for these processing can be acquired. |
| Market Links | 1 | There are existing links with traders. However, there is no strong relationship is not yet strong for cooperation. There is also not clear knowledge of end-markets. |
| Value Addition Potential | 1 | Value addition is limited to grading, filtering and packaging. However, these processes already add some value, though minimal. Cost-benefit analysis need to be done to assess what processes would be viable for communities to do. |
| Enabling Policies | 1 | Different royalty fees and permits cover the different products. But to advance from just selling to traders to doing some processing and traders will require additional permits. However, if these are done within the CF/CPA program, then the fees may be waived, depending on the decision of relevant local authorities. |
| Support Organizations | 1 | NTFP-EP/NatureWild can provide support in finding market links but experience in this area is limited. Potential partner for resin trade had been identified but needs to be developed. |
| Total | 7/12 | |

Bamboo Processing Center

| | | |
|---------------------------------|------|--|
| Sustainable NRM | 1 | For now, there are no sustainable harvesting methods applied on bamboo resources. In fact, they are not conserved, as they do not have any economic value for communities now. However, sustainable management systems can be applied. |
| Technology | 1 | The technology is not yet available in the community. However, it can be acquired from outside sources. Investments required can be high, but more affordable alternatives can also be researched/developed. |
| Market Links | 1 | <p>SGFE is a social enterprise that has indicated interest in potential sourcing of bamboo char from Mondulkiri. Transportation cost will be the main concern. SGFE has existing operations to produce and distribute products in Cambodia. The market of green charbriquette is still in development stage.</p> <p>BAMBUSA is a private company that aims to invest and establish a bamboo-processing center in Koh Nheak. According to discussion, there might be an interest to propose a joint venture with local communities, wherein the bamboo-processing center is co-owned by the community. BAMBUSA has market knowledge, design capacity and links in the international market. The company is in its development stage and has no actual operations at the moment. They do not have market links in the domestic market. The main market of BAMBUSA is exports. For now, the exports papers are still being processed.</p> |
| Value Addition Potential | 2 | Semi-processing and later on for finishing can provide benefits from value-addition, enterprise profit, and employment. |
| Enabling Policies | 1 | The enterprise will be based on scale of harvest and production. Main market is abroad. Bamboo royalties are lower though compared to other NTFPs. However, this will still require permits for processing, storage, transport and exports. These permits are not always easy to acquire. As transport will require trucks, this might attract unofficial fees. Export permits may also be difficult and costly to acquire. |
| Support Organizations | 2 | <p>GERES may be able to provide technical support and enterprise development support on energy related enterprises such as bamboo char.</p> <p>BAMBUSA can provide technical support on processing center development and management.</p> <p>There are also other organizations that can provide support, though there are no links for now: INBAR, OXFAM, WINROCK, etc. The provincial governor also indicated interest to support / invest in the enterprise.</p> |
| Total | 8/12 | |

2 – Yes
1 – Some

0 – No

Integrated Impacts

| | Wild Food Processing & Distribution | |
|---|--|---|
| Food Security | 2 | Same products can be eaten by the households. Income from then will also add to income that can support food security. |
| Gender | 2 | Different processes will provide opportunities to both men and women. It focuses on NTFPs that mostly women gather, process and are already marketing. |
| Climate Change Adaptation / Mitigation | 1 | Food sources will be diversified that supports community's adaptation to climate change. Extraction that has low impact on forests keeps forest cover intact, contributing to climate change mitigation. |
| Biodiversity Impacts | 1 | Collection for commercialization with no appropriate enrichment or management plan will surely have an impact on the resource base of wild food, that affects the species itself as well as the wildlife that also depend on them for nourishment. However with appropriate planning, the new commercial importance of the wild food species may also encourage the enrichment and protection of these resources, contributing to the protection of the biodiversity. |
| | 6/8 | |
| | Non-Food Processing & Distribution | |
| Food Security | 2 | Income from the products can support food security. The source of the NTFPs does not pose any conflict or competition for the resources used for food cultivation. |
| Gender | 2 | Women are also involved in the collection of solid resin. They can also be provided opportunities in the processing / packaging / operations of the enterprise. |
| Climate Change Adaptation / Mitigation | 1 | Ensuring the conservation of the resources will contribute to keeping the forest cover. However, there is the danger of harvesting unsustainably, especially the sleng seeds. |
| Biodiversity Impacts | 1 | Sustainable gathering can protect the resin species. Their collection does not pose food competition or harm on wildlife in the forest. |
| | 6/8 | |
| | Bamboo Processing Center | |
| Food Security | 2 | Some of the bamboo shoots can provide food for households. Income from the enterprise will also support food security. |
| Gender | 2 | Opportunities are both for men and women. Different processing activities can be delegated to both men and women. |

| | | |
|---|-----|---|
| Climate Change Adaptation / Mitigation | 1 | Bamboo is fast growing and contributes to carbon storage and sequestration (INBAR). Unmanaged harvest of natural bamboo may cause villages to lose its natural protection: bamboo along riverbanks serve as barriers for river overflows, floods/flashfloods. Bamboo's resilience to increased temperatures in the long term needs to be studied further. |
| Biodiversity Impacts | 1 | Natural bamboo forests serve as a habitat for some animals. Protecting this ecosystem from being converted to other use contributes to biodiversity protection. Bamboo clumps are usually seen as pests and are burnt to expand cultivation lands. Providing a commercial value to bamboo will protect the bamboo species. However, unmanaged harvesting may impact these animals as well as the bamboo species themselves. Enrichment without consideration of biodiversity may also affect the balance of the ecosystem. |
| | 6/8 | |

- 2 – likely to contribute
- 1 – likely contribute some
- 0 – does not contribute

6. Product Ranking

6.1. Product Ranking in the Community

In the community, ranking was done using a simple product selection tool that NTFP-EP based on an UNCTAD BioTrade Product Selection Tool. The criteria that the community looked at were Technology, Market and Natural Resources. Each criteria was graded as 1 (no/not present at all times), 2 (yes/present), 3 (yes/present all times)

Below is the result of the community selection:

Table 2.11 Product Ranking Result

| SRE HUY / SRE THOM | LAO KA | TOUL |
|---------------------------|--------------------|--------------------|
| Bamboo Shoots 21/27 | Bamboo Shoot 22/27 | Lac 22/27 |
| Bamboo Poles 19/27 | Honey 19/27 | Liquid Resin 20/27 |
| Sleng Seeds 15/27 | Solid Resin 17/27 | Solid Resin 20/27 |

In Toul, main technology and sustainable harvesting methods are based on traditional knowledge. This includes the use of fire barriers to protect trees from forest fires. The community stresses its importance by giving recognition to villagers who practice it. There is no knowledge of processing. There is a demand for all products from one trader that monopolizes trade in the village. All resources are abundant and accessible except for liquid resin where they are not able to access the trees in other villages.

In Lao Ka, harvesting methods are based on traditional knowledge. Some villagers know how to process bamboo shoots through pickling or drying. Someone from the village provides them assistance in the processing. Honey is filtered and processed in the forest in the traditional way of using bamboo knife and no hand gloves. Solid resin is not processed as elders do not share

their knowledge on it. The main market for their products is Sen Monorom. For the food products, they sell to traders or in the IP market themselves. For solid resin, they sell to traders in the provincial capital. Solid resin's price fluctuates depending on the trader. Solid resin is highly abundant and accessible. They are not forbidden by the ELC to collect. However, only a few households gather solid resin because it's difficult to collect. There is also less demand for solid resin. Bamboo shoots/poles are abundant in the village. They have the support from the MoE to set up the Lao Ka CPA to collect bamboo shoots in the community. However, the bamboo shoot season is very short, lasting only two months. Some honey collection areas overlap with ELC. But they can collect near the company and their farms. They see the volume has decreased over the last 2 years after the ELC was established.

In Srae Thom, Srae Huy, bamboo and bamboo shoots and sleng products are all abundant and accessible. Sustainable harvesting training had been provided on bamboo shoots and sleng. Bamboo collection is mainly done traditionally. Villagers do not have any processing skills for any of the products but there is a strong interest to learn. Villagers see that the technology can be sourced from outside. Technology for sleng processing is however difficult to find. Market demand is high for sleng, some market for bamboo shoots in Sen Monorom and in Phnom Penh. Bamboo and bamboo shoots are still abundant in the village but a decrease in sleng production has been observed. The villagers have requested for a CCF from the FA. However, not all collectors ask permission from the CCF committee when they collect resources.

6.2 Product prioritization per village

Considering the different factors such as abundance, accessibility, reach or number of households that benefit from the resource, the value contributed to income, the potential / ready market, we can prioritize or rank the different resources per village. We give a bar for each time the product comes out in the top 3 or 4 of each given factor. Please refer to the overview of NTFP products and the market overview.

Table 2.12 Priority Product Per Village

| Resources | Srea Huy | Srea Thom | Lao Ka | Toul |
|-----------------------------|----------|-----------|--------|------|
| Liquid Resin | | III | II | IIII |
| Solid Resin | III | III | III | III |
| Lac | | | | IIII |
| Wild honey | IIII | IIII | IIII | |
| Mushrooms / Wild Vegetables | III | III | III | III |
| Sleng Seeds | IIII | IIII | | II |
| Rattan | | | | |
| Rattan Shoot | | | | |
| Bamboo | III | II | III | II |
| Bamboo Shoots | II | II | III | I |
| Orchids | | | | II |

Potential products in each village or across the region are highlighted in blue. Where possible to group together products to distribute to the same market will provide communities better benefit.

Table 2.13 shows a summary of the livelihood assets relevant to potential enterprise.

Table 2.13 Livelihood Assets Per Village

| | Human | Physical | Natural | Social | Financial |
|----------------------|--|---|---|---|--|
| Srae Huy / Srae Thom | Tour guide skills, Trading skills, | Access to forest, motor, tractor | Bamboo, accessible forests, resin, solid resin, sleng | Experience in working together on CCF | Some experience in savings group |
| Lao Ka | Trading skills, food processing skills, labor skills | Nearest Sen Monorom, Provincial Capital, motor, tractor | Crops, Wild vegetables, Honey, bamboo, solid resin. sleng | Weak cooperation, link with traders | Experience in loans, experience in bank savings, savings group |
| Toul | Good health, NTFP collection skills | inaccessible during the wet season, lack of roads/bridges to market, motor/tractors | Lac, liquid resin, wild vegetables, bamboo, sleng | Strong community ties, ability to work together | Tradition to save, invest in gold |

Overall recommendation for enterprise development:

- Enterprise development can start from market linking for existing products, providing market information and consolidating supplies to increase bargaining power.
- Next stage would be value addition.
- the different products or opportunities given can be combined in one enterprise, i.e. the food processing and distribution enterprise can serve both eco-tourism market but also the wild organic market nationally.
- In all potential enterprises, it is important to plan how communities will derive more benefit through value addition and through participation in an enterprise, going beyond just deriving benefits from labor of gathering resources or access fee/royalty rights to the resources but deriving benefit from the added value of the business and towards being real managers of their resources.

The proposed enterprises will require different levels of investment and time of development. Below, their development period is projected.

| | Short Term (1-3 years) | Medium Term (3-5 years) | Long Term (5 – 10 years) |
|---|-------------------------------|--------------------------------|---------------------------------|
| Supply consolidation, Packaging and Market Links and Distribution (i.e. Honey, Resin (Liquid, Solid, Lacquer) | | | |
| Food & Tours | | | |
| Bamboo semi-processing Pilot Testing | | | |
| Bamboo Resource enrichment | | | |
| Bamboo Enterprise Processing / Finished Product | | | |

PART III: RECOMMENDATIONS

Recommendations are discussed according to the livelihood assets and the given indicators of resilience independence from external support, sustainable NR use. SWOT is also done to rapidly synthesize the given conditions. They are then cross-analyzed to develop the general program strategy recommendations for a sustainable livelihood of the communities. Under each strategy, some action points at different levels are also proposed.

| Internal | External |
|--|--|
| Strengths | Opportunities |
| | Context on Assets |
| <p>Human</p> <ul style="list-style-type: none"> Some experience in trade and group harvesting and marketing Interest of communities in livelihoods programs and sustainable resource management (Srae Huy, Srae Thom, Toul) Practice of diversified livelihood Application of new technology for agriculture and sustainable harvesting methods for some NTFPs <p>Physical</p> <ul style="list-style-type: none"> Use of tractors, mobile phones, livestock <p>Natural</p> <ul style="list-style-type: none"> Access to farm lands and to a diversity of NTFPs that meet both food security and income needs Forest resources <p>Social</p> <ul style="list-style-type: none"> Links with traders Participation in informal and formal groups <p>Financial</p> <ul style="list-style-type: none"> Tradition of savings (Livestock, gold) Initiation in groups cash savings Agricultural surplus and NTFPs are important sources of cash income. | <ul style="list-style-type: none"> Market for NTFPs and crops Crops that are drought resilient Development of social entrepreneurship NGOs/government providing support for agriculture, livestock and NTFPs, traditional medicine, health, land tenure, culture and traditions, etc. |
| | Transforming Structures and Processes on Assets & Vulnerability Context |
| | <ul style="list-style-type: none"> CPA Lao Ka / CCF Roads to regional and national markets Telecommunication / Roads Communes can support local development initiatives Government and NGO cooperation for sustainable landscape development and management of Mondulkiri Laws and policies that secure agricultural land and forest access to villagers. Government support for forest enterprises that have national economic impact and some interest in NTFPs Functional network and experience on consolidated and value-added NTFP processing for honey of CBNEs |
| Weaknesses | Threats |
| | Context on Assets |
| <p>Human</p> <ul style="list-style-type: none"> Traditional knowledge and technology on livelihoods are not adapted to changing environment (declining resources, market demand, diseases, climate change, etc.) Lack of bargaining power Weak capacity of people to access information, knowledge and technology Poor health <p>Physical</p> <ul style="list-style-type: none"> Isolation from markets <p>Natural</p> <ul style="list-style-type: none"> Insecure natural assets Livelihoods are not DRR ready Weak capacity to engage markets knowledge of NTFPS and crops | <ul style="list-style-type: none"> Increasing need for cash income Natural calamities/climate change impacts that affect crops, livestock, NTFPs, Natural calamities Competition for resources (land, NTFPs) Wasted market opportunity due to seasonality and short shelf-lifespan of products High demand on products without consideration of sustainable yields |
| | Transforming Structure and Processes on Assets & Vulnerability Context |
| | <ul style="list-style-type: none"> Weak social services provided by the government. Weak physical assets cause the propagation of diseases Lack of appropriate services for agriculture, |

| | |
|--|--|
| <ul style="list-style-type: none"> • Inefficient and unsustainable use of resources <p>Social</p> <ul style="list-style-type: none"> • Project fatigue and lack of participation, cooperation in Lao Ka • Weak links with local authorities in Toul and in Lao Ka <p>Financial</p> <ul style="list-style-type: none"> • Inability to meet expense needs • Lack income and skill to generate capital for livelihoods investment and to improve conditions. | <p>livestock and NTFPs livelihoods Weak NTFP sector value chains</p> <ul style="list-style-type: none"> • Lack of local authorities' capacity and/or will to implement the programs, policies and protect resources, which destroys the potential source of long term income. • Preferential treatments for services and support and misappropriation of policies for access to resources • Weak infrastructure to efficiently access markets. • Lack of NGOs capacity to provide or sustain market links. |
|--|--|

Communities already practice a diversified livelihood source that provides them safety nets when other livelihoods are temporarily disabled. Spreading out their income needs on different sources and efficiently using them will ease the pressure on all the resources they use.

STRATEGY 1: Reinforce the community's diversified livelihood for resiliency and sustainable natural resource use.

Strengthen each livelihood (agriculture, NTFP collection, livestock raising/fishing, labor and home garden). Upscale community's skills, knowledge, and methodologies to efficiently use the resources and to adapt to the changing environment. Efficient use of natural resources for optimum benefits can be done through:

- Application of sustainable methods of use,
- Sustainable enhancement of resources (i.e. domestication or enrichment, forest farming, etc.)
- Use of appropriate technology, and
- Value addition.

Incorporate Disaster and Risk Reduction (DRR) and climate change adaptation in livelihoods development. Research and apply sustainable and climate change adaptive farming as well as NTFP resource enrichment, such as Forest Farming, domestication, etc. For example, some villages are already using crops that are more resilient to climate change impacts, like cassava. Cassava, in some areas are part of the diet too. In others, they are used as animal feed. However, if done as a mono-crop, its long-term effects on soil fertility negate its potential contribution. But if sustainable cassava farming can be applied, the crop might be more beneficial. FAO has some experience in sustainable cassava farming. (UN Website Accessed September 2013)

The report, "Mapping Vulnerability to Natural Hazards in Monduliri" of 2009 offers various recommendations on DRR. Where possible, with a landscape approach, at meso level, develop multi-village livelihood plans to ensure mutual reinforcements in times of crisis. ² Adaptive

² *Multi-village planning based on vulnerability to floods or droughts can be incorporated to livelihood planning. Diversity of livelihood activities among villages will be crucial for protecting households and assets during periods of natural calamities. For example, Cassava and cashew are more resistant to drought than most food crops, as they are not water-intensive and are harvested during the dry season and although rice and corn are heavily affected by insect infestations, these crops are more insect resistant and farmers generally have successful harvests in the upland farms, even in periods of severe insect infestation. This way, villages can support each other in terms of bridging rice supply gaps. (Try 2009)*

livelihoods also mean including climate change resilient crops in the diet and in the livelihood of communities. The project of NOMAD and NTFP-EP on forest foods would contribute to this objective.

Plan to ensure complementarity of different livelihoods. This way, there is no conflict of human resource but is used most efficiently. Explore also how each livelihood can support the others. For example, NTFPs can also serve as fodder to livestock.

There already has been a successful experience of adopting new technology in rice farming in Srae Huy/Srae Thom, which can serve as good jump off points to introduce new sustainable and adaptive methods for livelihoods. These experiences can also be adapted to other target areas.

Communities have natural resources that have market demand. And they are already trading these products. However, the benefit derived from them is still not enough to meet needs. Products are traded raw and without sufficient knowledge of real market value and demand. Increased benefits can be generated through entrepreneurial approach, market links, and value addition.

STRATEGY 2: Enhance trading practice towards enterprise development for independence from external support and resilience.

Having multiple benefits from an enterprise will ideally contribute to capital build up that can be used by communities for eventual independence from external support and to savings for resilience in times of shocks and stresses.

Build the community's capacity (micro level) and promote for enabling conditions for community-based enterprise through partnership with both the private and the public sector (meso level). Capacity building can cover: management, marketing, negotiations, community dynamics and people management, benefit sharing, cooperatives, financial management, value addition, etc.). Aside from technical skills, be sure to develop soft skills such as analytical skills, leadership skills, innovation, teamwork, etc. These soft skills will also be important in creating a system for sustained market information collection and social links. Through leadership building and dialogues, bridge communities to local authorities / local governments and their policies. Provide platforms for discussion with traders for mutual benefits.

NGOs, however, are not able sustain market links for community enterprises. Search for market-based solutions to address gaps in physical assets and conditions for community enterprise. It would however be important to find the appropriate partner to ensure a fair and genuine partnership in the utilization of the communities' resources. In partnerships, ensure a "Sustainable Rights-based Approach" (Elson 2012), wherein business links go beyond payment for access to resources, employment creation or corporate social responsibility but lead towards true partnerships, where rights-holders have full control of their resources, are equal business partners and are able to derive multiple benefits both from the natural resources, their value-addition and the enterprise. The excerpt below explains further this idea:

"Resource-led paradigm in which capital seeks natural resources and as a side effect, needs some labour..." But job creation may be limited for local rights-holders – indeed, such projects often

attract migrant labour. In this paradigm, undeveloped land is empty and has no value, and any informal customary rights over the land are subordinate to the wider national interest... In the Rights-based system, local control is at the heart of the process, rights-holders seeking investors and partnerships for managing their natural resource assets. This approach recognizes local people's autonomy and their rights to determine the land's destiny and gain income from its effective management. "Over-emphasizing the inherent rights of rights holders, such as indigenous peoples, focuses attention on the distribution of natural resource rents, (or royalties), rather than on the added value of the business venture. Focusing solely on either resources or rights diminishes the importance of labour, skills, markets, capital and institutions. Ironically, by emphasizing rights to the natural resource rents, local people may trap themselves in the resource-led paradigm, where investors are happy to negotiate compensation for access, and add some corporate social responsibility initiatives but never engage in building a true business partnership. In contrast, a rights-based system lets rights-holders both profit from natural resources and drive the deal, deriving multiple benefits from the enterprise." - (Elson 2012)

To find appropriate partners, promote Social Entrepreneurship and provide a venue to link social entrepreneurs in the country or globally with community based enterprises. (meso/macro level)

Focus on value addition and develop the competitive advantage of having (a) access to forests and (b) its rich, diverse products, specifically NTFPs. Villagers have this advantage as both are declining across the country. The forest ecosystem is creating high-value products that are in demand in the domestic, but more so in the international market.

STRATEGY 2.1. Development of Community Based NTFP Enterprises (CBNE)

With the current condition of NTFP collectors (individual trading of small volumes) and the industry in general (lack of knowledge on end-market uses, lack of processing skills/technology), market opportunities are not yet taken advantage of. However, the CBHE, a federation of community-based wild honey collectors in Cambodia is now able to take advantage of the high demand for authentic wild honey through an established system of sustainable collection and market distribution. In the short term, organizing and linking honey collectors from Lao Ka, Srae Huy, Srae Thom to this system can serve as the jump off point of organizing villagers into a more organized CBNE.

Learn more about the market of NTFPs and technologies for value addition. Ensure sustainability of resources and/or enhance supplies for stronger economic impact, sustainable resource management but also through enrichment or domestication. Forest Farming can be applied to enhance the production of high-value products that only thrive in the forest ecosystem. This can either be done by ensuring that ecosystem is maintained according to conditions needed or are enhanced to recreate the required condition.

At the macro level, engage both public and private sector to promote the strengthening of the NTFP sector / value chain through enabling trade conditions, development of the NTFP manufacturing and export sector.

Communities have an access to a variety of NTFPs that have market value. Instead of focusing the enterprise on just one product, limiting potential income based on the seasonality of the product, explore a multi-NTFP product, just as villagers are doing now to meet income needs throughout the year.

STRATEGY 2.1.1. Community-based NTFP Processing and Distribution Center

Enterprise Potentials

NTFP (simple) Processing Enterprise

Focus on “minor” but high-value products such as wild honey, mushroom, bamboo shoots may be feasible in the short term, in consideration of enabling conditions

- wild honey (filtering / packaging)
- resin for boat caulking (filtering / packaging)
- Wild Food (Mushroom / Bamboo shoots) (processing / packaging) for tourism Markets and provincial market

This can make use of the same facilities, transportation and distribution links.

Tourism & Wild Food Harvesting

Combine NTFP enterprise with other promoted livelihoods in the region such as **EcoTourism**. Tourists are guided to hunt for edible mushrooms, wild fruits/vegetables/nuts or join wild honey collection. The tourists then can enjoy a meal cooked in the forest with the harvests that they themselves made.

Most benefit is derived when the products are processed and consolidated. Explore how the experience as well as the existing consolidation hubs and distribution system of the CBHE, Wild Honey Federation of Cambodia can be applied to other NTFPs that are also collected by the communities. Systems developed and market links can be optimized with multi products. The potential income from multiple products instead of just one can provide a more substantial amount not just for household income but also to support the community forestry management. NTFPs can be divided accordingly: WILD FOOD (mushroom, vegetables, bamboo shoots, wild honey etc.) and NON-FOOD (liquid resin, solid resin, lac, bamboo, rattan, etc.). The former can be targeted for domestic food and eco/tourism market while the latter can be targeted for both domestic and international markets.

Build on the current awareness and interest in sustainable resource management for livelihoods (Srae Huy, Srae Thom, Toul) or the need for livelihoods (Lao Ka) to promote participation in programs that provide secure access to resources, specifically, the CF/CPA and to introduce sustainable resource management.

STRATEGY 3: Anchor enterprise development activities to the community forestry / community protected area program for sustainable NR use.

Secure resources through sustainable use and programs providing land tenure rights (CF/CPA). Establish the link between livelihoods and sustainable resource management by creating a clear flow of benefit and of responsibilities. Incorporate SRM in the business plan of community-based enterprises, for supplies management as well as in profit sharing.

To secure continued support for the land tenure programs from the national and provincial government levels, demonstrate national benefits of CF/CPA through high-impact enterprises such as bamboo enterprise by a partnership of CBNEs/private and public sector.

STRATEGY 3.1. CBNE Scale Enterprise for Independence and Sustainable NR use

In the medium to long term, develop scale community enterprises in order to increase benefits but also to promote the protection of forest resources specifically NTFPs, through the validation of its potential to contribute not just for poverty alleviation but also to national economic development.

Engage the provincial level to develop sustainable economic development strategies. One of these can be NTFP industry development, focusing on large-scale industry that can also provide local employment as well as contribute to national economic development through exports. One

such industry is the bamboo industry. Market studies demonstrate high demand and various organizations in the country have shown interest to support it.

STRATEGY 3.1.1. Community-based Bamboo Enterprise

Bamboo is one of the most abundant but underused and under-protected resources in the villages surveyed. However, it is also one of the NTFPs now that have high market potential, globally. Various products can be developed from this fast growing grass: bamboo shoots, bamboo char and processed culms for domestic and international markets. The resource and the market size of bamboo make it ideal for a scale NTFP enterprise. However, it will require a longer time for development and more investment due to the present weak conditions of manufacturing, design, trade environment.

Potential partners: Provincial Government (Processed products, Development/investment, Public Sector), Bambusa (Culms, Market, Private Sector), GERES (Bamboo Charcoal, sustainable energy, development, Support Services/NGO), SFGE (Bamboo Charcoal, market, private sector).

Weak livelihood assets prevent villagers from participating in the development in the province and are often taken advantage by other and the system. There are already various organizations working on different thematic areas that can strengthen the livelihood assets of the villagers and various joint projects of government and NGOs are in the area.

STRATEGY 4: Build synergistic partnerships with different sectors and different levels to upscale livelihoods assets of target communities for independence.

Upscale livelihood assets (human, physical, natural, social and financial) through the various NGO support. Where possible, build synergistic cooperation in order to develop and implement complementary projects that address different areas to bridge the community to benefit from the existing economic developments in the region.

POTENTIAL PARTNERSHIPS on Development Initiatives

6. Agriculture and livestock are already being addressed in the region by CEDAC, which has competency in sustainable farming and husbandry. It would be beneficial to the program if a partnership were developed with the organization to provide holistic support. It is important that a joint plan is created in order to have complementary actions instead of conflicting ones and competing for the precious time of the beneficiaries.
7. NTFP-EP works on NTFP Community Enterprises and market links, specifically for honey and resin.
8. NOMAD and NTFP-EP work on Food from the forest to enhance food security and adaptive livelihoods.
9. ICC works on non-formal education and skills development that can be adapted to practical skills for enterprise development and management.
10. CANDO has started to develop their program on financial literacy for rural areas.

Refer to Social Assets (Part I) for the list of other organizations working in the region.

STRATEGY 5: Empowering Women and Strengthening Livelihoods

Women almost equal the men in number in the selected villages. Playing complementary and some lead roles the livelihood activities of a household, the women are an important human asset of the household. Their empowerment and development will surely contribute to a sustainable livelihood for the whole household.

In all the proposed strategies, there are opportunities for women to participate. What is important is the conscious integration of women in all these strategies. Since it has been a way of life for both men and women that men lead, it will not be easy for men to consider women's role nor for women to proactively participate in livelihood development activities.

Start with the activities that they traditionally and already do in household livelihoods, like vegetable and fruit gardening, NTFP collection, selling and financial management. Build on their experience in commercialization, though limited, through training and market accessibility. Then through trainings and skills development and mentoring support, expand to new roles that they can carry out in the community enterprise: quality control, packaging, documentation or record keeping, storage management, human resource management, marketing and many more.

Think too of expanding women's hard skills such as tools / equipment use and improvisation to go beyond culture-based male and female roles. This will be especially useful to women-led households. Consider also women's mobility both for market access and for participation in trainings.

Income from the NTFPs they collect are still minimal, requiring the women a variety of sources to meet basic income needs. Value-addition will benefit them as they will be able to optimize income generation from a fewer key livelihood activities.

As the women are the ones responsible to manage household budget and they are the ones pressured to bridge the gap during times of food or cash shortages, target them for trainings on financial management and on savings (household or individual).

Finally, deliberate empowerment of women through livelihood development would mean that gender indicators are included in the monitoring of the livelihoods development and the involvement of women in evaluation.

Below, the strategies are broken down to address different livelihoods assets and where they contribute to the different indicators of sustainable livelihoods of resilience, independence and sustainability.

| | Resilience | Independence from external Support | Sustainable NR Use |
|--------------|---|--|---|
| Human | <ul style="list-style-type: none"> • Incorporation of DRR awareness and readiness in livelihoods planning • Maximize human resources by empowering women • Technology (processes, systems) | <ul style="list-style-type: none"> • Upscale skills for livelihoods (i.e. technology) • Sustained market information sourcing • Adapted education practical to forest product enterprise management • Understanding of Market System | <ul style="list-style-type: none"> • Sustainable Resource Management / Harvesting Methods • Value Addition skills • improve knowledge on sustainable farming, updated technology |

| | | | |
|------------------|--|---|---|
| | | <ul style="list-style-type: none"> • Develop entrepreneurial skills and savvy • Knowledge of end markets for NTFPs | |
| | • Sustainable livelihoods & DRRS awareness and skills | | |
| Physical | <ul style="list-style-type: none"> • Technology (processing tools and equipment) | <ul style="list-style-type: none"> • improve irrigation, storage of rain water • roads / bridges • collective transportation of products | |
| Natural | <ul style="list-style-type: none"> • Improve capacity of villagers to protect their resources <ul style="list-style-type: none"> <input type="checkbox"/> Sustainable management <input type="checkbox"/> Land titling <input type="checkbox"/> CPA / CF application and management • Skills for planning and management for an efficient use of natural resources (Farming & NTFPs) • Enrichment / Domestication and Regeneration of natural resources • Knowledge of climate change resistant crops and products | | |
| Social | <ul style="list-style-type: none"> • Strengthen traditional and inter-ethnic ties through cultural and social activities • Planning for sustainable livelihoods. | <ul style="list-style-type: none"> • Create venues for dialogue with value chain stakeholders • Development of Partnership with Social Entrepreneurs | <ul style="list-style-type: none"> • Strengthen group cooperation to apply for CF/CPA and to actively participate in its management • Network or venues for meetings of Community Forestry Management Committees to exchange experiences on forest management and livelihoods |
| | <ul style="list-style-type: none"> • Multi-village planning based on vulnerabilities for support system. (i.e. Cooperative network) | <ul style="list-style-type: none"> • Improve skills to negotiate and create networks | |
| | <ul style="list-style-type: none"> • Mobilize social asset, social capital to bridge gaps in physical assets: collective / cooperative transportation; water irrigation and storage, cooperative transportation | | |
| Financial | | <ul style="list-style-type: none"> • Build on custom of savings and development and protection of livestock that serves as savings (information, services, skills) | |
| | <ul style="list-style-type: none"> • Improve financial literacy, especially for women • Group savings systems – for capital generation, microfinance to protect community from abusive traders/lenders | | |
| | • Benefit sharing – support for the community forestry management | | |

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