

## CHAPTER 6

### Conclusion and recommendation

#### 6.1 Conclusion

The rubber farming has widely expanded to traditionally agricultural land practices, especially in upland areas. The declining of agricultural land creates greater impact and high vulnerability to food insecurity and loss diversity access to natural resources. Although, the replacing of shifting cultivation change to rubber farming. It has to consider the impact and sustainable food crop production. Farmers need better coping strategy and coping capacity to secure their food crop production.

Traditional cultivation and shifting cultivation were remaining an important upland rice farming practices for many households in Oudomxay province. Upland rice and fallow land were replacing by rubber plantation about 4,530 plants (20,000 ha) in Oudomxay province alone that large areas of rubber plantation was found in Namor and Xay district.

This study also found that 31-50 year olds was highest percent about UR 46.7%, URRP 58.3% and RP 55%. Gender issue had done by women for UP 47.4%, URRP 50% and 40.1% as respectively. However, despite of farmer's education was shown slightly high education in RP 86.7% and URRP 80%. Lower level of education found in UR 55%.

The other importance, agriculture accounted for over 32% of total GDP in 2008 and for over 36% of Oudomxay province in 2008. Over 80% of the labor force is employed in the sector. There is a large variety of agro-climatic conditions with two seasons: wet and dry. Agriculture accounted for over 36% total GDP in 2008 of Oudomxay province. The major agricultural production in these provinces is rice.

The risk of agricultural farming systems is influences by several factors (seasonal, drought, flooding and damaged from pest and disease occurring) which affects to rural livelihood and insufficiency on food security. The ranking on problems of rural

livelihood and farming systems found that highest to lowest concerned is affected from drought and flooding. The land holding of three farm types showed differences of farm size, which the largest farm size was upland rice with rubber plantation (URRP) 1.60 ha/household, upland rice with other crops (UR) 1.43 ha/household and smallest farm size was rubber plantation alone (RP) 1.08 ha/household.

Shifting cultivation practice was upland rice and paddy rice with other crops. Upland rice yield has very low when compared with paddy rice. Another upland cropping system likes cash crops production (maize, job's tear and vegetable) and raising livestock. Firstly, upland rice and paddy rice was cultivated during the rainy season period, while half of the farm's land was occupied by rice production. This rice production was only for feeding their families' households. Secondary crops as maize was main source income and their earn money for purchasing food, rice and clothes. Third crop as job's tear was cultivated due to demand from market available and pricing of this crop which many farmers had best benefit in some fiscal years. Vegetables and non-timber forest products, vegetable was grown in dry season during the cold weather and low humidity, and many local bamboo shoots also sprouted in this period of time.

The results from group discussion and household in dept-interview were shown significant information on upland agriculture practices from past to present that it has been changing into positively and negatively way on food security in this region. Upland rice and paddy rice were main sources of food and secure for many households that before the rubber plantation was established. Other crop such maize, job's tear and non-timber products were second sources of household income and saved money for used in case of emergency as sickness, pay for children go to school, household expenditure and buy rice when upland rice produced insufficiencies for their households.

The household livelihood assets determined the potential of farmers to solve the periods of food shortage. Household livelihood assets were regarding into five livelihood capital such as human capital, natural capital, financial capital, physical capital and social capital which had slightly different between three farm types. The upland rice substances farming (UR) had household expenditures on foods 11.50\*100,000Kip less than upland rice with rubber plantation (URRP) 12.48\*100,000Kip, and rubber

plantation farming (RP) 33.94\*100,000Kip. From these outcomes of household livelihood assets such as rice production, livestock, home-garden vegetable, maize and job's tear were their potentials to cope to risk of future food insecurity.

Food available is a most important for household consumption. Upland rice and paddy rice were grown in hill land during the wet season periods that was primary food available for farmers' households. Farmers' households had enough rice for their consumption on eight to nine months. Cash crops (maize, job's tear and etc.), and NTFPs (Bamboo shoot and wild vegetables) were secondary food source, while farmers collected and sold them for buying the rice during rice shortage period and also for their households' incomes. Pig and poultry were raised for daily household consumption.

Drought was one of household vulnerability for food production as rice production. This problem was also caused to cultivating other crop (Maize and job's tear) with low production or damaging to yields. This vulnerability context relied on farmer's knowledge and skilled that had ability to cope to their risk of farm production.

The agriculture farming system had been changing a rapidly the transition from subsistence farming systems to commercial farming systems. Therefore, this goal was improving agricultural production to meet regional demand needs at domestic market and export

The risk context of upland rice farming system had seemed on the soil fertility declinable very year, soil erosion and serious of upland weeding in land. Upland rice system had cultivated only wet-season. Some farmers had not grown rice which following next seasonal year. Rubber plantation planted as well as mono-cropping system when rubber plant had fully growth.

Food accessibility referred to ability to crop cultivation such as rice production, livestock and non-forest products were greatly food sources. Market in the district and retailers shops was necessary place to collect or buy food for farmers' households and their communities. From this survey, every villages (Xay district: Phonhome and Koi-noi village; Namor district: Naveantay and Navean village) had twice times for opening traditional local market in their villages for selling and buying form another villages, districts and provinces. Food selling in the market had rice, livestock (pig, poultry and

finish), NTFPs (bamboo shoot, mushroom and wild vegetables), and vegetables (cucumber, pumpkin, melon, mustard leaf, and etc.).

In term of food security was relatively to household food stock as well as the domestic food production (the domestic food production with referring to crop production and ability to earn income to buy a food for households). Upland rice with other crops (UP), upland rice with rubber plantation (URRP) and rubber plantation showed similar characteristic of household food insecurity which caused by ability of farmers to grow and resolved the food insecurity period for their household.

The examination of these three farm types were used the livelihood asset category (Five capitals: Human capital, Natural capital, Financial capital, Physical capital and Social capital) to understand real situation of food insecurity in this region. According to this survey and in-depth interview of farmer household could explain the food insecurity among different types. Many people were poor and low household income, which livelihood depends on collected non-timber forest and cultivated upland rice. This resulting was shown in food insecurity for their household. In contrast, RP farming type was good for long term to recover the fallow lands and expand green land in the district as well as recover the forestry areas. NTFPs such as bamboo shoot and wild vegetables were secondary food source for buying the rice during rice their household food consumption. NTPFs were used as well as for household food availability in the villages.

From household focus group discussion food security and household asset had good link between food security categories (food availability, food access, food utilization and stability) and livelihood asset category (five capitals: human capital, natural capital, financial capital, physical capital and social capital). Base on household livelihood asset five categories could explain whether differences farm types that had different the way of coping strategies and asset availabilities in each farm types.

The coping strategies were relatively to enable the ability of household to cultivate crop production in the farm field and off-farm income. The ability of farmers cultivated and expanded with larger fields and more cropping pattern in the seasonal.

1. *The upland rice subsistence farming (UR)* had greater coping strategy. In this case, farmers had multiple alternatives to produce other crops that provided good sources of income for purchase or buy food when farmers produce not enough rice for household consumption. Livestock was part of their assets such as pig, chicken and duck which were found around in the villages. In terms of natural resources, non-timber forest products play a good role for the village communities for providing food and cash income. The maize and job's tear were supported crops for household income and sold production for buying rice and food for household during the period of rice shortage throughout the year.
2. *The upland rice with rubber plantation (URRP)* had slightly better coping strategy than rubber plantation alone, which rice field and other crops (job's tear and maize) provided the sources of income for buying food for household. Rice production was an important food crop for all farming to meet the household food consumption needs. The disadvantage of this farm type was small scale of crop production as well as small holder rubber plantation farming when compared to two other farm types: upland rice subsistence farming and larger rubber plantation farming system.
3. *Rubber plantation farming* had given yield from above 5-6 years after planting. For this reason, farmers needed good coping strategies to meet household needs on food security before tapping rubber trees. These solutions could help farmers to get better coping strategies on their farm production and investment in the future. During the focus group discussion, the most of rubber farmers were unable to cultivate rice and other crops in their farms. A greater outcome per hectare of rubber plantation referred to the relationship between labour from family and farm size. This farm type was exposed to vulnerability to food insecurity as well as lack of food availability, food access and food utilization in these areas.

Conclude that changing traditional upland rice subsistence farming to rubber farming that it has also changed in farmer's livelihood, economic and social welfare, declining opportunity to grow food crop and high risk of long cultivation period. The solution, it should be considered the land management and supporting the new cultivation technology for increase food availability and food access in this region. Paddy rice field will play an important role to meet household needs on food security in the future.

## **6.2 Recommendation**

The policy of government attempts to resolve this problem and also reduces poverty in the rural areas. The policy of rubber plantation is one alternative to transformation land use for long term sustainable agricultural practice and increase better income for farmers' household. Although, the rubber plantation need more time to bring the profits to farmer's household and recover forest areas. This policy had involved with social, economic, environment, technical supported and farmer's willingness.

Vulnerability context is an important key in the food insecurity which has shock, trend and seasoning. There leads to household livelihood strategies and the ability to coping strategies in the farm production. According from this survey, we could recommend that farmer should consider in the shock situation occurring due to drought and flooding.

1. Shock situation refer to drought stress periods could lead to loss or decrease rice yield, maize yield, job's tear yield in the farm fields. Other problem lead to increase food price. Food shortage periods that caused by drought. Therefore in some households could not effort to buy rice for their household consumption needs during the deficit of rice periods. Flooding periods could bring both impacts (positive and negative impact) into the agricultural land. The negative impact is directly damaging to food crop production in the farm those losses of crop production, and lead to soil erosion. The positive impact of flooding is increasing the soil fertility. Because of crop residual has composed during the flooding period.
2. Trend of upland rice is upland farming systems should concerned by local policies on land allocation, and land area development. The

agriculture farming system had been changing a rapidly the transition from subsistence farming systems to commercial farming systems. Therefore, rice production areas are also decreasing over time due to introducing of rubber plantation.

3. Seasonal, cropping pattern refer to manage proper time for cultivation that could refer to rainfall and temperature. The soil fertility and soil erosion is facing the problems for many farmers. Seasonally for upland rice farming system that farmers had grown usually two crops such upland rice, paddy rice and other crops (maize, job's tear and other crops). Some farmers had not grown rice which following next seasonal year. Rubber plantation plants as well as mono-cropping system when rubber plant had fully growth. However, many farmers have relied also in non-timber forest products (NTFPs).

Reducing of risk to food insecurity depend on the biophysical diversity as seem in differences of weather condition (seasonal), soil fertility, socio-economic diversity and market variety. Crop rotation with other crops is necessary for sustainable agriculture farming systems. Upland rice had to shift the cultivating land about 2-3 years, because of soil fertility declined and also decreased rice yield. Maize and job's tear were selected by most of farmers to rotation with upland rice.

The household livelihood assets determine the potential of farmers to solve the periods of food shortage. However, the five livelihood capital such as human capital, natural capital, financial capital, physical capital and social capital that is slightly different between three farm types. From this survey found that each farm types were facing in differences way to cope to risk of food security. The household livelihood strategies had to maintain their food crop production and reduce risk from their farms investment and good profits for their households.

The last recommendation for this study will consider the ability to cope with food shortage periods. Livestock is part of their assets such as pig, chicken and duck which found surround in the villages. In term of natural resources, non-timber forest products play a good role for the village communities to provide food and cash income. Even through, farmer had to shift their farm field or crop rotation to maintain the soil fertility

and good yield. The maize and job's tear are supported cash income for household and buy food for household during the period of rice shortage through year. Rubber plantation leads to risk of food insecurity during the first year to fourth year of planting.

### **6.3 Further research**

According for this study found that household livelihood assets had good link between food security categories (food availability, food access, food utilization and stability) and livelihood asset category (five capitals: human capital, natural capital, financial capital, physical capital and social capital).

Therefore these links will explain the farmer decision making for their future crop production that can get greater benefit from farm. Because this study is initial step of explore the food insecurity in differences farm household type. Nevertheless, these links could improve the food insecurity situation in this region.



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