CHAPTER 1

Introduction

1.1 Background

The Lao People's Democratic Republic (Lao PDR) is a landlocked country with generally rugged terrain, limited infrastructure, narrow human capital, and emerging socio-economic. Lao PDR is a Southeast Asia country, bordered with Cambodia, China, Myanmar, Thailand and Vietnam.

Oudomxay is a province in the northern part of Lao PDR with diverse agricultural production system, socio-economic development and rural development imposes. Agricultural sector plays an important role in the sustainable rural development and food security aspect, especially in poverty reduction throughout the country. There has been significantly change in livelihood strategies associated with land use change over the past 10 years. Since 1997, upland rice cultivation and animal husbandry have been considered as keys features of the rural livelihood and food security. The historical of land used in rice production has been changed from year 2003 to 2012 (from 680,000 ha to 700,000 ha) throughout the country. Many farmers have changed their traditional agricultural production from upland rice to low land paddy rice and other cash crops such as maize; as well as industrial crops especially rubber plantation throughout the province. The historical of rubber plantation has begun from year 2003 to 2012 (from 906 ha to 261,042 ha respectively) nationwide of the Lao PDR. Trend of rice production and rubber plantation are shown in figure 2.1 and figure 2.2 (MAF, 2012 and PAFO, 2012). However, livelihood transitions are diverse and not occurring at the same rate or in the same direction among rural areas. Adopting inequalities of certain livelihood strategies are obviously between wealth categories. One of the noticeable changed is in the access to land use due to the new land allocation polices that enforced by national and local governments (Leek, 2007).

In 1998/99, the average land holding size in Oudomxay is 1.87 ha, that is close to the average size of the national land holding size, which is about 1.62 ha. The average farm size is 0.77 ha per household. It was found that 45% of the total land holdings in Oudomxay is operated under smallholder farming and contract farming with the rubber plantation investor.

The proportions of rice growing areas, fallow land and others (forest, graze and other crops) are 60, 28 and 12 percent respectively (FAO, 2001). The upland rice yield was low as of 1.66 ton per ha due to had low rainfall variability and degraded soil fertility. For this reason, number of farmers had switched from upland rice to paddy rice farming system to get greater yield per hectare (Schiller *et al.*, 2001).

The key of household food security in the Lao PDR was referred from the sufficiency of rice consumption in the year round. Rice production has supplied widely for many households throughout the country. Upland rice and paddy rice production have been cultivating and supplying of foodstuffs for nationwide. According to the FAO (2006) definition said that all people have an adequate all-time food diet, food quality and nutrient. Therefore, the rice production and food crop production played an important role for food security in the Lao PDR.

1.2 Rational

Upland rice is the most important staple food. It is about 41% of total rice production in northern of Laos (Lao-IRRI, 2000). The historical of rice production in northern part of Laos showed that Oudomxay had limitation of rice production with lower yield due to utilizing the indigenous varieties and non-farm input such as fertilizer or/and organic manure for improved soil fertility condition. Upland rice is commonly produced in slash-and-burn systems. The present government policies give high priority to reducing the area under slash-and-burn that is resulted in limiting farmers' access to their fallowed land and/or access to forest land. In addition, drought was one of the main constraints to upland rice production.

Upland rice production is also depended on the biophysical characteristics such as climate condition, soil fertility, and also socio-economic and market. Government agencies promoted the sustainable upland farming with multiple cropping systems

(upland rice with pigeon pea, rice with mulberry and rice with rattan). Rotation with other crops is an alternative practice to recover soil fertility of shortens fallowed land in order to maintain the yield (Linquist *et al.,* 2006). Although the upland rice production practices were diverse among farmers, it played an important role for food subsistence as well as in improving their livelihoods (Pandey *et al.,* 2005).

Food insecurity and nutrition statute were reported as measured by proportion of households with rice insufficiency over the previous 12 months remained at 55 percent between years 2006-2009. However, there is also evidence that food security was significantly increased the proportion of households' hungry season increased from 11 percent to 36 percent. The duration of households' hunger is between 3-5 months that is 57- 69 percent. In Lao PDR, the national average rice requirement per capita is 350 kg which is proportion of rice sufficiency in the household in 2003/2004 (IFAD, 2011). The estimated of capacity rice production in Namo district at Oudomxay province, rice consumption is range from 194g to 308g per capital (person) which is rice sufficiency 55 percent to 88 percent. The rice deficit is a round 4.9 months. The rice deficit was reported by the combined information from paddy rice and upland rice in each village of Namor district (Douangsavanh *et al.,* 2005; Douangsavanh *et al., 2006*).

The problems of upland rice farming system have seen as declining of soil fertility over time, soil erosion and serious weed infestation. First things, farmers have favoured on rice based upland cropping with the rotational followed period ranged from 2 to 10 years. This is so called the shifting cultivation system. Upland rice is under rainfed cropping system that can be grown only once in wet-season. In the past, this upland rice shifting cultivation practice could maintain soil fertility, prevent soil erosion, suppress weeds and stabilize the upland system. When the number of population increased, it had pressure to land availability. Occasionally, farmers had grown two successive rice crops on one site before moving to another. Some farmers grew a non-rice crop following in the second year. Upland rice is truly mono-cropping in this region. But other crops were planted such as vegetable and grain crops for home consumption by most farmers. However, many farmers have been facing insufficient rice production to meet their immediate household need (Schiller *et al.,* 2001).

The upland rice production system is based on family labor which is only input needed. Upland farmers are usually poor and inability for better operated quality farm-land. There is diversification of socio-economic situation and income opportunities Farmers are not able to hire labors and buy fertilizer and/or organic manure for their farm-input. Terrain characteristic and water availability are main determinants for cultivating paddy rice. In addition, the household livelihood strategies in upland are based on integrated household-asset, upland cropping and low-land cropping. Hence, improving crops productivities through new variety and better management should be considered in order to improve the household livelihood in this area (Pandey *et al.,* 2005).

According to the MAF (2011), government put a lot of effort to reduce the rural poverty and to promote better land use management supporting the sustainable rural livelihood and food security in the northern of Laos. Promoting of the sustainability agriculture and commercial agriculture production (such as paddy rice, maize and cash crops) is undergoing, improving the rural livelihood and increasing socio-economic. The subsistent agriculture has changed more rural household engage in market economic. The goal of policies is also for reducing the shifting agriculture practices and recovering more green forest areas. Since 1993 to 2001 in Oudomxay, land use has been changing with increasing the green shrub tree and grazing land. The result showed that shifting agricultural land decreased significantly more than 1.5 million ha to 652,429 ha in between 1993 and 1997 in four northern provinces of Laos (Thongmanivong and Fujita, 2006).

Rubber plantation has been significantly promoting, once of policies try to recover green forest which is popularly in northern of Laos. The trend of rubber plantation has more benefit on improving the rural social-wealth and sustainable agriculture practice. The rapid undergoing rubber plantation development has been considered between private investors from foreigners' countries (China, Thailand and Vietnam) and domestic companies. There are two types of rubber plantation in Oudomxay: 1) small-holder farmer within small scale of rubber farm and 2) larger scale of rubber farm as well as contract farming with foreigners companies (Vongkhamor *et al.,* 2007). Especially, the investment from Chinese company has begun implementing on rubber plantation from year 2003 to 2008 in Oudomxay province. The planted area of rubber tree was 4,766 ha with investment fund about 12.9 million US Dollar from foreigner

investor and 3.15 million US Dollar from domestic investor. There are two types of cooperative contract farming investment model in Oudomxay: 1) “two-plus-three” (means to “provide” land and labor) and 2)“one-plus-four” (refers to villagers’ labor: in this system, companies are responsible for capital inputs, technical advice and markets), there are shorthand terms that government staff uses in order to refer to the two commonly recognized forms of “cooperative” investment. The land allocation and land tenure has been rising every year from the impacts of private sector agribusiness investment on rural livelihoods and rural social-economic (Thongmanivong *et al.,* 2009).

Transforming the traditional upland cropping system into rubber plantation raises the question on its consequences to food insecurity risk issues. While the farmers are concerning only their own wealthier farm using high labors intensive and high investment cost. Thus, the impact of rubber farming has affected on rural household livelihood, whereas many farmers are depending on upland cropping system and collecting non-timber forest products for their food security and for income to support households. The food insecurity occurred during the earlier years of rubber planting that famers had relatively less option to ensure their food security due to declining of upland land rice areas (Thanthathep *et al.*, 2008).

According to previous study shows that food security is the main issue of concern in household livelihood and also shifting cultivation pattern in Northern part of Lao PDR. Upland rice farming systems (Upland subsistence farming) and livestock husbandry are consisting for long time which is support food security in many households. Cash crop and rubber plantation have been promoting for new alternative to increase the farmer’s income and high profitable for household that could provide good sources for buy food in case of food insufficiency before new harvesting rice production in their farms. Even through, rubber plantation is new incoming crop for farmer and also new challenger on food security in this province. To observe the food security on rubber farming and farmer’s livelihood that differs from another previous study (food and nutrition for family in the Northern part region).

This study is concerning the key indicators of food security on transition from upland cropping systems to mono-cropping as rubber farming system could assess the impacts

of food security and rural household livelihood and local natural resource. In addition, it may help identify key issues or factors that would lead to vulnerability on food security in upland cropping systems. The risk context of food security could be an important observation in this transition farming systems. Other key issue likes food security such as food availability, food access, food utilization and stability that could support long term sustainable agriculture practices.

Objectives of this study

1) To assess impact of cropping system changes on food insecurity
2) To compare livelihood assets and food insecurity among different household types
3) To identify the future coping strategies for food security