

Rubber Expansion in Lao PDR

Catch-Up Program, 2010
Agriculture and Forestry Policy Research Center, NAFRI, Vientiane

Summary

The government policy related to rubber aims at reducing rural poverty by create the permanent job for local farmers. Together with increasing forest cover while avoiding negative impacts on deforestation. The government of Laos promote the foreign investment to develop of tree plantation was considered as a win-win solution. Increase sources income for rural households and government as exported commodity. The rubber has been seen as a miracle crop, liable to transform the landscapes and rural livelihoods. Within the few year, the rubber industry has become an important sector in Lao economy and an important subject of debates even before the most recent plantations have entered into production. The factor to push farmers into rubber because rubber plantation was successful in some areas, farmers learn new lesson and access to information from neighboring country and rubber world market higher demand.

This research on the “Dynamics of Rubber Expansion in Laos” was partly funded by the Lao Agriculture and Forestry Fund (LARF). The research was designed to provide knowledge that is relevant for policy making in the current context of rubber expansion in Lao PDR including following objectives: To characterize rubber-based production systems and to understand the conditions of emergence of different types of rubber regimes (smallholder, contract farming and concession) based on study sites were selected seven villages in three districts are namely Sangthong district, Nalae district and Thakek district.

The methodology was used with purpose of determine the relevance of hypotheses is based on a multiplicity of sources. Review of the rubber boom process started with a review of literature, followed by string of meeting with key stakeholder and setting up the semi-structured questionnaire. The analysis allowed to draw the conceptual model from field work, draw a series of observations about the current process. The analysis has determined taking of decision-making choices relating to rubber was marked by a strong uncertainty.

The results of this study, is essential aspects of agrarian transition are management of agricultural diversity and the information available to the various stakeholders. The uncertainty local farmers face the management risk, give full consideration to the integrated planning of resources currently being developed and more globally to the complexity of rubber system. Analysis developed along this research is identify the information provided to the decision-makers should be improved, management of information should be the subject of a strong emphasis and the agrarian transition should be monitor in depth.

Content

1. Background
 - 1.1. Rubber history in Laos
 - Northern in Laos
 - Centre of Laos
 - Southern of Laos
 - 1.2. Rubber situation in Laos
2. Methodology
 - 2.1. Objective
 - 2.2. Hypothesis
 - 2.3. Data collection
 - 2.3.1. Literature review
 - 2.3.2. Key informants interviews
 - 2.3.3. Selection of study sites
 - 2.3.4. A multi-scale survey, questionnaires
 - 2.3.5. Localization of the study sites
 - 2.4. Data analysis
3. Results
 - 3.1. Roles of rubber plantation in Laos
 - 3.2. The driving forces behind process
 - 3.3. Cross border influences on the Laos rubber trajectories
 - 3.3.1. Rubber influences from China
 - 3.3.2. Rubber influences from Thailand
 - 3.3.3. Rubber influences from Vietnam
 - 3.4. Actors of rubber plantation
 - 3.4.1. The government
 - 3.4.2. The company/industry
 - 3.4.3. The farmer
 - 3.5. Emergence of large a rang of rubber regimes from multi-scale negotiation
 - 3.5.1. Five factors determining the rubber regimes
 - 3.5.2. Three main of rubber regimes
 - Smallholder
 - Contract farming
 - Concession
 - 3.6. Rubber management
 - 3.6.1. Planting techniques
 - 3.6.2. The alternative from rubber plantation
 - 3.7. Perception on rubber plantation
 - 3.8. Decision-making into rubber plantation
 - 3.9. Rubber challenge
 - 3.9.1. Land management
 - 3.9.2. Labour management
 - 3.9.3. Routine change
 - 3.9.4. Food security
 - 3.9.5. Number of livestock decreased
4. Conclusion
- Reference
- Annex
- Annex1: Village history of study sites

1. Background

In the recent decades the uplands of Southeast Asia have experienced major changes due to economic development of the Montane Mainland South East Asia region. In the Northern Laos there is a transition under way from subsistence production based on shifting cultivation to commercial production. This change results both from an increasing integration with the regional economies of Southeast Asia, particularly Southern China and from government policies directed towards upland development (*Thongmanivong and Fujita, 2006*). Lao agriculture is in transition from traditional to intensify and even to commercial production in some areas. The production systems are changing and the farmers are becoming organized into market groups. The production of hybrid maize, rubber, sugar cane and large ruminants is increasing. This suggests that the government policy of the promoting commercial production is working on the ground.

Lao PDR is the one country, which based on agriculture as the main factor of economic system. Agriculture is one of the most important sectoral of the economy of Lao PDR. In order to reduce deforestation and rural poverty in the uplands, the GoL has promoted a land allocation reform, a ban of shifting cultivation and the resettlement of people from uplands to the valleys. In the recent years, rubber industry has become an important sector due to a growing market demand for natural rubber. This fast growing industry is spreading out of control, which does have propelled the government for a moratorium, to take the time to understand the dynamics of rubber plantations in the Laotian context and its impacts.

Agriculture and forestry sector strategy four goals are including:

- Goal 1: Food Production
- Goal 2: Commodity Production
- Goal 3: Stop Slash and Burn Cultivation
- Goal 4: Sustainable Forest Management and Balance between Exploitation, Utilization and Protection/Conservation.

The government policy related to rubber aims at reducing rural poverty, create the permanent jobs for local farmers. Together with increasing forest cover while avoiding negative impacts on deforestation. The government of Laos promoted the foreign investment to develop of tree plantation was considered as win-win solution. Especially, rubber, teak, agar wood and eucalyptus plantation. To generate sources of households income for farmers in rural areas and government as exported commodity. The rubber has been seen as a miracle crop, liable to transform the landscapes and rural livelihoods. Within the few year, the rubber industry has become an important sector in Lao economy. The factor to push and pull farmers into rubber plantation in different reasons including rubber plantation was successful in some areas, farmers learn new lesson and access to information from neighboring country (especially, China and Thailand), rubber world market higher demand and rubber is also a crop which generate households.

1.1. Rubber history in Laos

Starting 2004, many foreign companies investing in rubber plantation have been coming into Lao PDR, either directly or indirectly transacting business with the government. For instance, in the Northern part of country, Chinese Companies are prominent. The central region was dominated by Thailand and in the south are Vietnamese (*Rubber planting status in Lao PDR, Ketphanh S*).

– Northern of Laos

In 1994, Ban Hadyao Luangnamtha district Luangnamtha province is the first village rubber plantation in the Northern of Laos. Which's 473 ha rubber plantation areas by their own farmers. Until 2001, attractive many foreigner investors especially, in China. Until nowadays, the rubber plantation areas in the northern are rapidly expansion approximately 16,534 ha.

The first rubber plantation in the Northern Laos was planted since 1994 at Ban Hadyao Luangnamtha province. The objectives of the rubber plantation project to be a solution to the problems of the upland farmers. At the village population started to burgeon with these newcomers, with limited hope for paddy rice land, they explored various other alternatives to enhance their livelihoods. They went to Xishuangbanna, China to explore various alternatives, including fruit tree and vegetable cultivation, livestock rearing, aquaculture and rubber plantation. With the new comer's experience with rubber trees they decided that rubber production was the most promising of the alternatives.

– Centre of Laos

In 1993, rubber were planted in Thakeak district Khammouan province in 80 ha supported by the Upland Development Company, but at that time nobody paid attention to rubber plantation. In 1997, Santhong district Vientiane Municipality was rubber plantation in 118 ha. In the next period, Bolikhamxay district also planted 1,026 ha. The totally of rubber plantation areas in 2,846 ha.

– Southern of Laos

In 1930, Ban Lak 10 Champasack province is the one province were initiative rubber plantation by France. The rubber plantation is still alive up to now. But the local people around plantation previously tapped the resin just for fun. So far, nobody paid attention to these trees and considered them as a less significant compared some local trees species. Until 1995, the Dao Py Company invested rubber plantation around 74 ha in Ban Houay Tong, Bajieng district, Champhasack province. In 2006, the rubber plantation areas were increasing. Because a lot of rubber companies came to promote rubber in Southern of Laos are namely Ho Chi Minh Company and Cao Su Dak Lak Company in Vietnam invested, at the same time Dao Su Dak Lak Company planted 141,808 ha in Saravan province.

Table 1: Rubber plantation in Lao in 2007

Region	Areas (ha)	Plan 2010 (ha)
Northern	16,547	121,000
Centre	2,846	10,000
Southern	8,737.8	52,840
Total	28,131	183,840

Source: Forestry Research Centre (NAFRI), 2007.

1.2. Rubber situation in Lao PDR

In the past few year, rubber plantation has spread rapidly throughout northern Laos, especially in Luangnamtha province that sharing border with China. The impetus for this boom has come partly from the spiraling demand for rubber in China (now the world's largest rubber consumer), the high world prices for rubber and China's promotion of overseas investment through its opium replacement policy. These economic factors have converged with the desperate need of impoverished highlanders in northern Laos to replace opium as a cash crop as a consequence of a

recent opium eradication campaign and inadequate alternative development. The rubber boom in northern Laos represents a fundamental clash between Western drug-oriented alternative development on the one hand and China's national economic strategies abroad and investment policy.

The current growth rubber production in the northern regions is largely driven by the influence of Yunnan and Chinese businesses seeking lucrative opportunities in Lao PDR (*Alton et al., 2005*). However, in Southern Laos the influences of Vietnamese and Thai investors are clearly evident. Although the Chinese market will continue to drive demand for the rubber, it is also argued that China may see rubber production in Lao PDR from a more strategic perspective due to an abundance of natural resources, favorable climate and cheap labour (*Alton et al., 2005*). Depend on the fifth conference of the provincial committee party had been chosen rubber planting to be priority to solve the poverty of people in upland and has plan to plant rubber to 20,000 ha in year 2010, at present, Luangnumtha province had been planted rubber 10,000 ha (*province governor of Luangnamtha, 2006*).

The most extensive and rapid change in the uplands of Northern Laos is the expansion of smallholder rubber plantation. This has been made possible due to robust global demand for rubber. While rubber provides an attractive investment opportunity for foreign investors, the government of Lao envisages it as a way of stabilizing shifting cultivation and generating income for upland farmers. However, with a rapidly increasing area planted with rubber while only limited area is in production, there is little information currently available on the potential economic returns to smallholder producers that can be used as a basis for the promotion of the crop by the government (*Manivong and Cramb, 2007*).

2. Methodology

2.1. Objective

The main research objectives is to understand the impacts of rubber in the context of Lao PDR and the sub research axis are defined. The first, a comprehensive analysis of rubber-based production systems and their evolution. Secondly, an analysis of their ecological, economical and social impact on farmer's strategies for securing their livelihoods.

2.2. Hypothesis

With regard to this review of literature, preliminary hypotheses were drawn. They were used as a basis for a semi-structured interview guide and the site selection for the field work. In fact, these hypotheses had to be tested through the fieldwork, and were to be consistent with the set of hypotheses defined here.

Cross border influence of neighbouring countries (Thailand, China and Vietnam) in the regional pathways of change. The first hypothesis is to be tested the existence of a distinct Chinese and Thai influence linked to different rubber arrangements (this would later on lead to the concept of rubber regimes). The situation was quite documented for the North and the special links with China.

Various rubber regimes emerged according to differentiated management of land, labour, capital, market and information. The second hypothesis was that there were three mains plantation

“regimes”, each associated with distinct networks of diffusion and investment (smallholder, contract farming and concession).

The complex process of innovation largely differs from place to place as it relies to a large extent on local social networks, leadership and institutional frameworks. The third hypothesis relates to multi-scale innovation. It is the existence of transnational and external effects of the industry.

2.3. Data collection

2.3.1. Literature review

Literature review based on rubber studies reports in Lao PDR mainly in the Northern of Laos. The literature review can be classified into three categories. The first, there were all references related to the rubber, concentrating on micro-economic aspects of rubber production. The second category included studies on land use change and landscape transformations, with reference to ecology. The third category related to the economics of rubber commodity and plantation. In Laos, where several types of plantation exist, the most studies ones are smallholders and to a lesser extent, contract farming.

2.3.2. Key informants interviews

Key informant interviews, using the semi-structured questionnaires. A flexible, semi-structured, questionnaire was prepared, to test the hypotheses with the resource persons identified through the literature review. The main objective was to systematize data collection, while preserving the informality of discussion and informant’s peculiarities.

The interviewees were divided in two categories. The first group was made up of specialists working with development projects in a foreign governmental agency, in collaboration with the Laotian government. They were involved in several kinds of projects; related to land management, extension, and/or research. The second group included government officials from district to provincial level. They were working in Provincial Agriculture and Forestry Office (PAFO), District Agriculture and Forestry Extension Office (DAFEO), Provincial Department of Planning and Investment (DPI) and Land Management Authority (LMA).

The guidelines were divided into four parts. The first one was the history of expansion of rubber. The second one was the social networks around the rubber development. The third one was the land management, and the last one concerned the technical aspects of rubber cultivation.

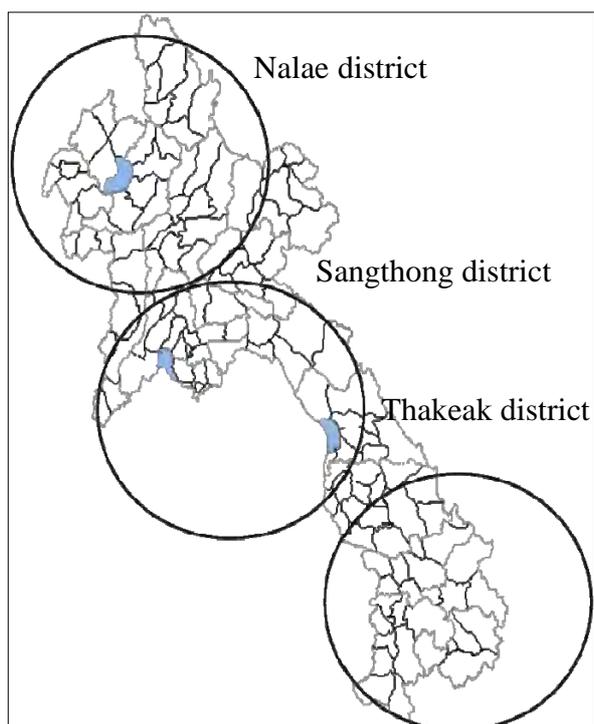
2.3.3. Selection of study sites

Process of study site selection were identify of contrasted situations: high diversity of situation described in the literature review and with informant requires incorporating a diversity of well selected sites into a comparative analysis. In addition, adapt questionnaires, methods to specificity of each site and develop a framework for comparative analysis.

Table 2: Number of households were interview

No	Site study		Number of households		
	Village	District	Who planted	Who no planted	Total
1	Ban Nasa	Sangthong	5	6	11
2	Ban Nasaonang	Sangthong	7	5	12
3	Ban Phovieng	Nalae	15	0	15
4	Ban Phavi	Nalae	14	0	14
5	Ban Vad	Nalae	12	0	12
6	Ban Nakhoum	Thakeak	1	8	9
7	Ban Khamboun	Thakeak	6	9	15
Total			60	28	88

Figure 1: study sites



2.3.4. A multi-scale survey, questionnaires

Data were collected at three complementary scales, ranging from local households to higher administrative levels. At the local level, the reference unit was the household, with the head of household as a respondent. At the higher levels, there was first the village headman and village committees, then the district and province authorities. A stratified sampling of households was based on the three variables: rubber plantation (presence/absence), wealth of the household (poor, average, and superior) and age of the head of household (inferior to 30 years old, between 31 and 48, and superior to 49).

The questionnaires was structured in two parts, (1) focusing on demography and livelihood, production systems including rubber, and perception of landscape changes, (2) depended on the type of respondents: rubber cultivators, other cultivators or workers in a concession. After the first round of field surveys, knowledge gaps and incoherencies were detected and corrected for the subsequent surveys.

In order to understand the general characteristics of farmers that rubber plantation and not rubber plantation as selected sampling. Farmer's level was collected through a semi-structured questionnaire.

2.3.5. Localization of the study sites

There were seven villages of three districts in three provinces are namely Sangthong district in Vientiane municipality, Nalae district in Luangnamtha and Thakeak district in Khammouan province.

Table 3: Rubber plantation areas in study site

Site (district)	Plantation areas (ha)		Areas (ha)
	Smallholder	Contract farming	
Sangthong	59 ¹	72 ²	130 ³
Nalae	187	1,327	1,515 ⁴
Thakeak	255	450	1,664 ⁵

Source: Based on the data collection in field work.

– Sangthong district

Sangthong district is around 60 km far from Vientiane municipality, upstream on the Mekong, sharing border with Sangkhom district Nongkai province in Thailand. The Sang River is the main river which plays an important role in the standard of living of local people not only for communication but also for other purpose. The Sang River flows year-round through the village. It is also a tributary of the Mekong River. There are 26,035 inhabitants (12,843 female), with 19,000 households.

Table 4: Land use in Sangthong district, Vientiane municipality

Land use	Areas (ha)	Land use	Areas (ha)
Land agriculture	38,673	Rubber plantation areas	130
Forest	41,117	Total areas	80,000

Source: DAFO in Sangthong district reported, 2008.

Food security in Sangthong district is the one sufficient. Regarding to the Department of Agriculture, under the Ministry of Agriculture and Forestry promote organic rice. Rice production is the main source income for local farmers and rice production is the most popular which namely "Kao Hom Sangthong". Starting 2007, maize became the main cash crop with totally of 1,500 ha. Normally, farmers have contract farming with CP Company since 2007. At the same time, the Lao-

¹ This is only rubber plantation areas in Ban Nasa and Ban Nasaonang, but there are seven villages are smallholders (DAFO did not estimate the rubber plantation areas).

² There are six villages have contract farming, estimate in each village have plant less than 30 ha.

³ Sangthong DAFO reported, 2008.

⁴ The Jai Xuang Company reported, 2007.

⁵ Summary Rubber Plantation Project in Khammouan province, PAFO, July 2007 and rubber concession areas approximately 959 ha were planting (the total concession areas approximately 1,300 ha).

Indo-China Company promoted cassava cultivation. In 2008, related to the business plan of company, they would like to increase cassava areas approximately 1,500 ha (at the moment farmers available to cultivate in 700 ha). In addition, this company also promotes farmers who are lack of agriculture land, but they want to realize on farming systems. Then the company brought them access to the Agriculture Promotion Bank (APB distribute loan around 300,000-500,000 Kip/ha/household).

The rubber foreign companies invest at Sangthong district are namely: (1) The Yunnan Lilieng Company is a one company promote rubber plantation at the end of 2007 and start planting at the 1 June 2008 (National Plantation Day). (2) The Semuong Group Company plan to promote rubber plantation in Sangthong district in the next few year. They are running documents and business plan preparation to inform DAFO and PAFO authority. However, before this company promote, there are some of villagers started smallholder rubber plantation.

Two villages were selected in Sangthong district are namely Ban Nasa and Ban Nasaonang. Ban Nasa is the first imitative rubber plantation of district since 1997. The second village, Ban Nasaonang was began rubber plantation by contract farming in 2008. Local farmers and village headman were more interested in traditional teak plantation. Therefore, they did not promote rubber production and villagers lacked of information about this crop.

Table 5: Village profile and land use

Ban Nasa	Ban Nasaonang
947 Inhabitants (485 female)	404 Inhabitants (203 female)
31 households	82 households
Rubber plantation	Paddy field 195 ha
	Grazing areas 106 ha
	Rubber plantation 34 ha (26 ha by contract farming and 8 ha by smallholder)
	Production forest 30 ha
	Garden 28 ha
	Teak plantation 22 ha
	Sacred 2.5 ha

Source: Village land allocation map in Ban Nasa and Ban Nasaonang.

– Nalae district

Nalae district is a one poorest district in Luangnamtha province, 98% mountainous district. The totally areas in 162,400 ha, with 22,264 inhabitants (11,651 female), 72 villages and 3,779 households (13 village clusters and seven of Agriculture Develop Zones). The district is along to Tha River as important sources for local communication and surviving in Nalae district.

Table 6: Land use in Nalae district

Land use	Areas (ha)	Land use	Areas (ha)
Rainy paddy field	390	Forest	67,019
Irrigate paddy field	77	Rubber plantation	1,755
Upland rice	2,500	Other	90,900

Source: The DAFO reported, September 2007-January 2008.

Nalae district is the second location which is more recent and fast growing implementation of the rubber plantation. The rubber industry is thought have an important impact on the rubber plantation

dynamic. The position near the Chinese border might have an impact on the commerce. According to the fifth years DAFO strategy there are six priorities as the rubber plantation is the fifth priority. Nowadays, the rubber plantation becomes the first priority in Nalae district. In 2003-2007, the rubber plantation areas from 1,515 ha (1,328 ha by contract farming and 187 ha by smallholder).

There are two rubber plantation companies are namely the Jia Xuang Company and the Xia Ma Company. The Jia Xuang Company is the big company invests in Nalae district. This company also promoted rubber plantation by contract farming since 2006. The company has more experience on rubber implementation from Xishuangbanna, China in long time ago. At the first year of established company in Nalae district, 25 villages began rubber plantation by contract farming. In 2007-2008, several villages are interested in rubber plantation which is dramatic increasing 32 villages. The seedling were import from Sing district because seedling in Nalae district is not enough for local farmers demand.

Three villages had previously been chosen for the fieldwork, based on literature review are namely Ban Phouvieng, Ban Phavi and Ban Vad. As known well, Ban Phouvieng is the first rubber plantation of district since 2004. This was an initiative of collaboration with the Agriculture Promotion Bank offered a special credit for farmer into rubber plantation. Ban Phavi is a village where a first company, the Xia Ma Company began operations since 2005. Following the administrative problems, this company have to stopped working in late 2005. Ban Vad was not part of the first 25 villages allocated to the company by district. However, after having learned about the arrival of company in the neighboring village of Ban Hadte. The village headman of Ban Vad asked the DAFO for the official permission to invite the company to work in the village. As the company had not yet reached it goal with the 25 first villages, an extension was allowed, and the company was able to work in Ban Vad, even though the village does not have road access yet.

Table 7: Village profile and land use

Ban Phouvieng⁶	Ban Phavi	Ban Vad
123 Inhabitant (56 female)	196 Inhabitant (122 female)	223 inhabitants (107 female)
23 households	36 households	40 households
Land allocation is incomplete	Agriculture Land 376 ha	Agriculture Land 306 ha
Paddy field 4 ha	Fallow 42 ha	Protection forest 68 ha
Rubber plantation 25 ha (10 ha by contract farming and 15 ha by credit)	Using forest 20 ha	Using forest 61 ha
	Protection forest 37 ha	Conservation forest 28 ha
	Paddy field 5 ha	Building areas 4 ha
	Building areas 2,5 ha	Sacred 3 ha
	Sacred 1,5 ha	Other areas 205 ha
	Rubber plantation 35.6 ha (34 ha by contract farming and 1.6 ha by smallholder)	Rubber plantation 55 ha by contract farming (no smallholder)

Source: Village land allocation map in Ban Phavi and Ban Vad.

– Thakeak district

Thakeak district located along Route 13 (South) there are 84,331 inhabitants (43,338 female), with 92 villages and 15,192 households. Thakeak district is the one district oldest rubber implementation since 1993 within 82 ha (in two villages). The rubber was planting by the Phatthana Ketphoudoi Group Company. The seedlings were imported from Thailand.

⁶ Village headmen reported. Land allocation is incomplete.

Table 6: Land use in Thakeak district

Land use	Areas (ha)	Land use	Areas (ha)
Eucalyptus and acacia	563	Fruit trees	10
Rubber	705	Trees (incense)	7
Agar wood	15	Conservation forest	6,014

Source: The DAFO reported, 2006.

A lot of rubbers companies invest in Thakeak district are namely the Lao-Thai Hua Rubber Company, The Jong Ji Hong Ching Company and the Thai-Vietnamese Plantation Company.

(1) The Lao-Thai Hua Rubber Company is officially working in Thakeak district since 2006. They are working under two schemes in the province as concession and contract farming. There are two villages rubber concession in Ban Nasaard Thakeak district and Ban Noy Xebangfay district of Khammouan province. The company began concession in Ban Nasaard within 1,300 ha. The company planted rubber the property of 664 ha (in 2007) and 295 ha (in 2008) it is not reach to goal. The Company is working in five provinces as Vientiane, Bolikhamxay, Khammouan, Savanaket and Saravan provinces. In 1996, the Prime Minister agrees to provide protection forest as protected areas in Thakeak district to the Army Provincial under control by the Ministry of Defense. According to the government's policy is to provide land for army generates income. However, there is none of households cultivate and plantation. In 2006, this Company makes the request letter for land concession with the Army Provincial. The end of 2006, they are both had signed agreement together. Which's the company informed to the Department of Planning and Investment and PAFO. At the beginning of land allocate is not clear and was confused between the village boundaries. So, the company asked the Land Authority helps them to survey and allocate the village boundaries supported by the company (peridium and other materials). Until nowadays, everything is almost clear already and the company got the Land Use Right Certificate.

(2) The Jong Ji Hong Ching Company is working on rubber concession scale since the end of 2006 in Ban Khamboun. The company lent farmer's land for seedling nursery within 2 ha (2,000,000 Kip/ha/year). The company only sold seedlings to farmers, who are interested to rubber plantation, especially farmers in Xebangfay and Nongbok district, Khammouan province. In 2008, the company started rubber plantation approximately 3 ha beside of concession areas in 82 ha.

(3) The Thai-Vietnamese Plantation Company is still working on the obtaining of legal authorization to promote plantation in Ban Koktong since 2004 (which is sharing border with Ban Khamboun). This company also promoted fruit tree and industrial plantation (Jatropha and rubber plantation).

Two villages had previously been chosen for the fieldwork, based on literature review are namely Ban Nakhoum and Ban Khamboun. Ban Nakhoum is none active into rubber plantation because they lack of rubber information. There is no any rubber companies promote rubber plantation. Event though, the rubber concession nearest village. However, there is only one households began rubber plantation with associate relatives, but unfortunately he planted is not on season. Finally, his plantation was failed. Ban Khamboun is the village where present smallholder from outsider villagers and contract farming. Due to a lot of companies promoted rubber plantation and other plantation, so local farmers are considering those plantation.

Table 8: Village profile and land use

Ban Nakoum	Ban Khamboun
486 inhabitants (324 female)	794 inhabitants (421 female)
Fallow 500.53 ha	Paddy field 114.44 ha
Rubber plantation 2 ha (smallholder, but not success)	Rubber plantation 50 ha (29 ha by contract farming and 22 ha by smallholders)
Agriculture Land 322.67 ha	Regeneration forest 675 ha
Army land 264.50 ha	Using forest 635 ha
Using forest 207.5 ha	Protection forest 421 ha
Migration land 131 ha	Sacred 52 ha
Regeneration forest 104 ha	Other plantation 22 ha
Conservation forest 104 ha	Other land 17 ha
Building areas 4.24 ha	
Sacred 3.5 ha	

Source: Village land allocation map in Ban Nakhoun and Ban Khamboun.

2.4. Data analysis

Management of qualitative and quantitative data. The qualitative data were analyzed first by using an analysis similar to the coding analysis.

A database was developed to enter all the data collected. Some data had to be estimated due to knowledge gaps (for example, the area in hectares was not always known for upland rice and maize, a calculation had to be done with the amount of planted seeds). Some information weren't known by the farmers. Some informal data were written down under the form of networks, first on the field, and were updated after the review of all the information collected.

- Statistical analysis. The quantitative data was entered in a database and analysis using descriptive and frequency statistic.
- Systems approach and scenario analysis.

3. Results

3.1. Roles of rubber plantation in Laos

In Lao PDR, rubber expansion is emblematic of the fundamental changes in agriculture and rural development patterns that the country is undergoing. Since the opening of the country to the global economy at the end of the 1980s, Lao PDR is undergoing a profound transition from subsistence agriculture to commercial agriculture. In order to reduce the negative impact of this transition on deforestation and rural poverty in the uplands, since the 1990s, the Government of Laos (GoL) has actively promoted a series of regulations and policies, such as a land reforms, a ban on shifting cultivation, and eradication of opium cultivation. The GoL has also promoted the resettlement of remote villages in “focus development areas” that is meant (1) to improve people access to public services and infrastructures, (2) to eradicate the cultivation of poppy through an increased control over agricultural areas, and (3) to favour the regeneration of natural forests that were traditionally managed under shifting cultivation systems. By allocating less land to farming households than would be necessary for a sustainable management of shifting cultivation systems the GoL aims to eradicate shifting cultivation by 2010. However, in the absence of alternative livelihood systems, these land allocation and resettlement policies have turned to be very stressful for subsistence

farmers and led to increased poverty in remote areas. To mitigate this negative effect the GoL actively promoted foreign investment in the agricultural sector as a way to intensify and diversify cropping patterns.

Following the success of the first plantation at the ends of the 1990s, then encouraged by a strong demand from the regional and international market, rubber has been seen as a miracle crop, liable to transform the landscapes and livelihoods of rural Laos so as to meet at once all the policy targets of the GoL, i.e. to eradicate poverty, opium, and shifting cultivation. The development of tree plantations was considered as a win-win solution: source of income to the rural poor, source of income for the government as exported commodity and trees contributing to the afforestation scheme of GoL towards an ambitious target of 70% forest cover while the current areas is approximately 40%. Since 2005, rubber fever seems to have contaminated the country. Within a few years, the rubber industry has become an important sector in the Lao economy and an important subject of debates even before the most recent plantations have entered into production.

Overwhelmed by the uncontrolled expansion of rubber plantation, the GoL began to worry about the consequences of such an unplanned spread. In May 2007, the Prime Minister signed a moratorium on land concessions that limited further investment in rubber, thus giving time to better understand the situation on the ground. Some feedback from the research community was needed by policy makers, while the rubber expansion continued to feed the public debate. The potentially negative impact of rubber expansion is to be balanced with the expected results, i.e. direct income for the government and benefits for the local communities. Rubber tree plantations require important investments on the long run, which prompt investors to request guarantees on land. Since the early 2000s, foreign investors are engaged into a race to land concessions. As a result of local agreements with officials and communities, different types of institutional and legal arrangements for access to land have emerged in a mix of foreign company owned concessions, contract farming, and smallholders. Beside land management, people migrations induced by rubber expansion could potentially have a huge impact in the future on socioeconomic development of the uplands.

3.2. *The driving forces behind the process*

As seen previously, rubber plantation are crossroad of forces of change. This transition process is influenced by different forces of change which favour the catalyst role of rubber. As mentioned in several key interviews: “rubber is a part of much bigger picture that is going on”. These driving forces form a complex network where different sectors and actors interact.

To simplify the situation, a classification using the classic push and pull factors between external and internal pressures has been completed. Within this classification, several global themes can be found. The first one, implicit in all the work, is the agrarian transition. Then, cross borders and regional interactions between Laos and its neighbours are dealt with. The third subject concerns the rubber models of development and the rubber regimes. Finally, the last themes are the socio-economic ones.

3.2.1. Push factors

The principally policies coming from the central government. They focus mainly on land problematic (land use and land tenure). The transition illustrated by the increased importance of cash crop has principally been pushed by several governmental policies. These policies are based on three interlinked objectives: (i) stabilization of shifting cultivation, (ii) poverty alleviation, and (iii) eradication of opium eradication.

In a related issue, one of the most important facts about the rubber industry is its cross border range. This fact can be explained by both market and policy factors. The members of networks established across the borders, especially the Chinese border, favored their relatives over the distribution of technical knowledge, access to capital and inputs.

There is a pressure for the success of smallholder's development. The successful smallholder plantation relies upon a low rate of rubber mortality. To reach these objectives, it is necessary to supply information, as well as to complete to the information already available.

In other side, the extension material support was becoming more important, with the contribution of governmental institutions such as the NAFRI or NAFES. An information campaign has been implemented in 2008 to this effect, by the Laos Extension for Agriculture Project (LEAP). Called "*Think before you plant*" the goal of the campaign was to accompany all the actors in their decision-making. Doubtlessly, farmers are prime targets, with information on what to plant, when and how? But the main target is the extensions who receive tools for a strategic intervention.

In March 2001, the 7th Party Congress outlined the socio-economic guidelines on poverty eradication and sustainable economic growth, based on three pillars: economic growth, socio-cultural development and environmental preservation. Furthermore, they have developed a global strategy: the national development potential had to take into consideration regional and global opportunities, to enhance the Lao PDR economic integration.

Secondly, the poverty alleviation is also a governmental objective. For this purpose, one of the 7th Party Congress long term development strategies was "to halve poverty levels by 2005 and eradicate mass poverty by 2010" (GoL, 2004). Rubber plantation is used by the government, notably in Luang Namtha, for poverty alleviation.

In 2004, the Rubber shift from 5th to 1st priority in DAFO strategy plan are including: (1) livestock, (2) paddy, (3) cash crop, (4) poultry, (5) rubber plantation, and (6) ecotourism. Until nowadays, the rubber plantation become the first priority in Nalae district.

3.2.2. Pull factors

the present a diversity of influence. First, economics factors are quite important, as rubber is an attractive crop, in a particular attractive geographical context. The increased demand of natural latex makes its growing economically attractive.

The secondly the social factors can often be linked to the ethnic factors, as it appears in interviews. Initially, the cross borders influence had a huge impact on the beginning of the rubber plantation and the adoption of rubber. Farmers were able to see at their relative's village the effect on livelihood, which is pushed them to try to emulate it.

The regional investment in industrial crop both for concession, contract farming and some of extent to smallholders (Foreign investors promotion). In other view, pioneer from some areas rubber successful because its cross borders influences had huge impact on the beginning of the rubber plantation and the adoption.

3.3. *Cross border influences on the Laos rubber trajectory*

There are three major geographical zones of influence in the expansion of rubber industry in Lao PDR, each one linked with Laos's neighbors: China, Vietnam and Thailand (Figure 2). Each of these countries has a specific rubber trajectory that influences the unfolding rubber industry in Laos.

The interactions have been developed at different levels, from official bilateral diplomatic relations between governments and trade agreements to informal cross border relationships such as kinship or traditional commercial linkages (Douangsavanh et al., 2008; Shi, 2008). Different kinds of contracts and agreements have resulted from these interactions that often are not compatible with each other. This situation tends to create tensions between stakeholders. There is a need to rationalize the commitments of different stakeholders in order: (i) to reach a global agreement about the kind of rubber pathways they are engaging in collectively, (ii) to make sure that they do not over-commit with respect to the land and resources actually available, and (iii) to balance the costs & benefits and the risk among the different groups of stakeholders.

3.3.1. Rubber influences from China

The introduction of rubber in Laos is linked with its cultivation in China. At first, the plantation in Luang Namtha concerned the district of Sing and Long. The main driver at that time was the kinship network. Following advice from relatives or members of the same ethnic groups – in this instance the Hmong ethnic groups, farmers began to adopt rubber. The members of networks established across the borders, especially the Chinese borders, favored their relatives over the distribution of technical knowledge, access to capital and inputs (Antonella). This particular location can be explained principally by sociological and economical reasons, such as the close ties between the farmers across the border to China, and the exceptional economic boom of China and Laos.

The most influential neighbor of Laos, through political and economic ties, China is one of the most important producers and consumers of rubber. China is in need of rubber to support its industrialization (its growth is in the range of 10-12% per year) (Etat du monde, 2008). For example, transport is one of the developing sectors, and as such, tires for trucks, planes and cars are needed. For the government, rubber is an essential product to achieve and support China's industrial growth and reinforce national defense.

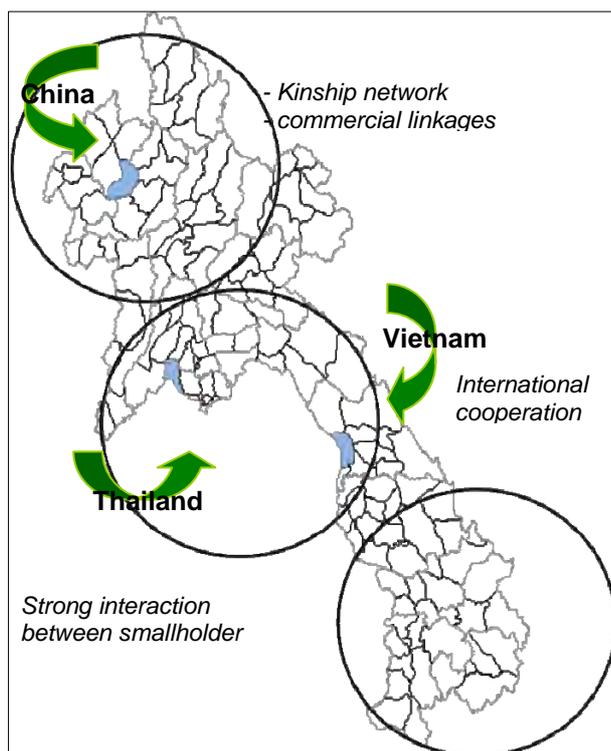
3.3.2. Rubber influences from Thailand

In the western part of Laos, both in the center and the south, a strong interaction with Thailand can be noticed. This interaction with Thailand has been noticed in two of our study locations (Vientiane Municipality and Khamouane Province).

3.3.3. Rubber influences from Vietnam

Eastern neighbour of Laos, Vietnam is an important player in the regional rubber industry. Vietnam influence in Laos is essentially turned toward economical and political aims. Vietnamese companies invest mainly in concession scheme, and therefore have little interaction with the local villagers. These concessions function as a closed box where interactions are principally made with the country of investment. There are minimal transfers of technology.

Figure 2: Rubber influence from neighboring countries



Rubber plantation in Laos were influence from neighbors country in different regimes as Sangthong district was influence from smallholder in Thailand. Normally, local farmers cross border to work in rubber plantation in Thai border. So, they can learn lesson and access to rubber information. In contrast, Thakeak district is sharing border with Thailand but local farmers do not know any rubber information. In this case, it difficult to understand which's influence because there are many companies invest on plantation. In case, the Northern of Laos as Nalae district which's influence from commercial linkage border between Chinese and Laos middle man.

3.4. Actors of rubber plantation

The actors in the rubber industry can be reduced to three categories are including: government, company/rubber industry and farmers. The relationship between actors have shaped the expansion of rubber plantation and influence the choice of rubber regimes.

3.4.1. The government

The state has to be considered at two different levels as the local authorities and the central administration. The local authorities represent the provincial and district levels. At the provincial level, concerned department such as the agricultural industry department were investigated. The provincial department of planning and investments (Provincial DPI) is under the authority of the Department of Planning and Investment, part of the central government of Vientiane. The Land Authority has the responsibility for the major arrangements and management of concessions. It attributes land for explorative purposes, gives the legal authorization. Nevertheless, some lands do not fall under its authority. It is the case of military land, under the authority of the Ministry of Defense. Finally, the Province Agricultural and Forestry Office (PAFO) is a primordial actor, in link with each District Agricultural and Forestry Office (DAFO) of the Province. It is important to differentiate the provincial government, where some outstanding key persons are primordial in the rubber industry of the area, and the district authorities. The DAFO is the main governmental actor at the local level, often in association with the district governor. As a matter of fact, they try to be present in the field and be involved in the rubber expansion through the companies or the land management. However, their lack of resources weakens their action, in spite of some ingenious scheme to support the transition from shifting cultivation to cash crops.

The Central government, on the other hand, is constituted by the Ministry and the major agencies. It is based in Vientiane, but has branches in the provincial towns.

3.4.2. The company/industry

The major rubber companies are mainly Chinese, Vietnamese and Thai. Joint ventures are becoming more and more important, but the nationality of a company can be difficult to assess as the investment can be done by remote partners. Companies from various industries and nationalities are joining investment strategies to take over market. The industry can be present at several levels, depending on its size. Only the biggest companies are present at a national level, and would then have links with the central government. In this study, it was the case of the Lao-Thai Hua Rubber Company, a joint venture between Thai, Malaysia and Chinese interests. Multiple activities are quite common for industries involved in rubber cultivation. Some, as the Lao Thai-Hua Rubber Company, have links with the car industry, while others are much more diversified, from car dealership to wood processing. Other companies are smaller, and while having no links with the central government, compensate that by a very dynamic relationship with the district authorities.

The organization of rubber companies at the district level is following two different patterns, depending on the implication of the rubber company in the districts. The first instance is where a company happens to have a representation in the district town. It was the case in two out of three districts (Nalae and Thakek Districts). The district office serves then as a local base of operation for explorative and logistical purposes. The second case, in which the district has no local representative of the company, supposes an increased collaboration with the local government.

3.4.3. The farmers

Farmers are much diversified group, with differences notably based on the farming systems they adopt. On one hand, they are all growing rice, either paddy or upland rice, depending on their location. The difference is based on the other grown crops, the importance of livestock or any other complementary activity. There is also an ethnic factor.

Labour organization is of a paramount importance, considering its influence on crops and farming systems. The first basis of labour organization is the household, which supplies most of the workforce for cultivation. The extended family is utilized in period of heavy labour, as the weeding or plantation. Farmers are also organized in units. Each unit regroups around 10 households, each with a leader, who answers to the village headman. The roles of these units differ from village to village. Firstly, units have an administrative role and this in all villages. This functions as a relay to help the headman to transmit the information. Second, it can be part of a labour exchange scheme. Thirdly, it can be used as a basis for a savings group.

3.5. Emergence of a large range of rubber regimes from multi-scale negotiation

3.5.1. Five factors determining the rubber regimes

These regimes can be summarized in the relationship between the three main actors: (1) farmers, (2) industry and (3) government. Each regime is characterized by a combination of the five factors, which are present (1) land, (2) labour, (3) capital, (4) access to market and (5) information. The norms for each of these factors are integrated in the society and shape the social interactions between the actors.

– *Land*

One of the major factors of the regimes, which has wide consequences on several issues in Laos, is the land management. There are four ways of “acquiring land”.

Transforming: the land was often previously used for growing rice or in sometimes vegetables were transform into rubber plantation.

Acquisition: the land was bought specially for the purpose of establishing a rubber plantation. The transfer is approved by the village headman.

Communal land: in the North, some villages have delimited a rubber areas/rubber zones and villagers have been assigned plots inside this areas.

Long term rent: this concerns principally the state land that is rented to companies for concession in large scale.

The main difference between smallholder and contract farming regimes, with regard to land tenure, is in the involvement in the land management. Management rights exercised by farmers are the essential key to the property of smallholders. In the contract regime, management is performed by the industry and the farmers fall under the status of authorized users, on a land that would otherwise be theirs (at least in a proprietor sense). Even if smallholders have the right of exclusion, they don't apply it as heavily as in the concession regime; where maps are drawn, and land removed from the land use plan of neighboring. On the other hand, smallholders' exclusion rights apply mainly to the exclusion of livestock from their rubber plantation, by land-use planning or fencing.

– *Labour*

Rubber is a very labour intensive plantation from the beginning until tapping. There are two stages of rubber plantation as immature and mature have different work patterns.

In the immature stage, there are two different works are including plantation of the seedlings and regular weeding. The labour at this stage is compressed in time, but is very intensive. Weeding can be mechanical or chemical, which is uncommon. Mechanical weeding is mostly done by hand or in some locations with the help of a grass trimmer.

In the mature stage, which generally happens seven years after plantation, the work is more regularly spread during the whole year. In fact, the work consists mainly in latex harvesting. The harvest can be organized in several ways, but is always made during the night, and must be finished in the early morning.

Labour is an important factor in the characterization of regimes. It is one of the few bargaining tips that the farmers can provide in a contract. Their work can be provided for free, and in this case they will be compensated in the sharing benefits. Or their work can also be remunerated, with a negative impact on their share of latex. Several types of labour managements can be found in rubber plantations. If some are characteristic of a particular rubber regime, this is not always the case. By example, hired labour is most commonly found in the smallholder and the concession regimes. In the latter regime, two types of hired work: regular company salary men, who have a full time job, and daily hired labour. Regular salary men take mainly in charge the management of the plantation, including the supervision of the day to day operations. In all the village, units were found. They can serve different purposes: administrative, credit management and labour exchange. The labour

exchange was particularly important in the case of Nalae District, where it was used for the labour intensive weeding.

– *Capital*

The access to capital is paramount to start a rubber plantation. There are two different options for the access to capital: private funding or industrial funding. On one hand, the capital can be private, and is not regulated by contract. On the other hand, capital offered by the industry is subject to regulations normally specified in a contract signed between the company and the farmer.

Capital includes the supply of inputs, including seedlings, technical support, fertilizers and other equipment. The first investment is the purchase of seedlings. In some cases, this purchase has to be preceded by a fund allocation for the land preparation, depending on the type of labour available (hired labour or one's own).

In the premature phase, there is no actual fund transfer; that relates more to a payment in kind. In the mature phase, there is supposedly a transfer of funds between the company and the farmers, although its modalities are frequently unclear and not always specified in the contract. The contract specifies the sharing of the harvest, fixing the percentage of each partner's shares.

– *Market*

That should be one of the most distinct factors. This access is possible through the industry, or a network of producers. It is striking to notice that, in a lot of cases, the access to market is not the paramount factor in the decision for rubber.

Farmers without the support of the industry rely on their current networks to find potential buyers. The networks involved are mainly familial or ethnic, include family members currently producing latex, and having already links with the market.

– *Information*

Information is one of the most important factors for success of plantation. It impacts on all the different stages of plantation: selection of the right area and right seedlings. Each stage of the plantation requires some specific care. The establishment of the plantation has to be done following certain rules, such as density or adapted varieties, for maximizing its future production. There are five ways of knowledge transmission are following:

Learning through work in a rubber plantation (seedling nursery or maintain of rubber plantation). It is very common at the border with Thailand. Some work is a way to learn new skills in relation to rubber. For other, it is unskilled work, but which will sensitize them.

Advising by company technical advisors: specialists are employed by companies to advise farmers and inspect their plantation. These specialists are often of the same nationality than the company. The Chinese companies in Luangnamtha are known to have Chinese specialists. That can lead to problems of communication between farmers and advisors, requiring the employment of translators.

Advising by family members: The help of family members already investing in rubber can go further than only offering advice on how to plant rubber. It can have an important impact on the adoption.

Advising through rubber group: Such a group was seen only once during our study. It was constituted around a successful rubber farmer, and was offering credit in addition to technical advice.

Advising thorough books: in special case of Sangthong district, Thai technical books were available. They were bought in Thailand, and mostly found along the border side.

The combination of these inputs can be broken down in three main regimes: (1) smallholder, (2) contract farming and (3) concession.

3.5.2. Three main rubber regimes

There are three main rubber regimes in Laos, which could as well be found in other crop cases, such as maize. While the classification is based on several factors, an intuitive classification, broadly used, is actually based on the leading actors in each regime.

– *Smallholders*

Smallholder is a type of rubber plantation, which's farmers planted by their own capital (capital available). Some of them got fund from relatives then sharing benefit together. They learn lesson individual as worked in the rubber plantation (grafting and planting) from neighbor country especially they have been worked in rubber plantation or studied tour in Thailand and China. These effective activities to made them decided into rubber plantation.

Smallholder is a leading social role model in the North. In the rubber domain. It is considerate the most adequate way of rubber plantation, appropriate to give a decent livelihood. Smallholders are pressured into rubber by their extended kinship. Following their migration from Northern China, former rubber farmers endeavored to bring new techniques to their communities.

There are three smallholder sub regimes “traditional sense” smallholders, corporate smallholders and familial organization smallholders.

Traditional smallholders: This regime is characterized by the empowerment of the farmer. The farming scale is small. The labour management changes during the season and depending on the amount of work, is a mix of own and hired labour. The source of knowledge varies, but farmers try to obtain several sources to override their lack of knowledge.

Cooperate smallholders: These farmers are investors who specialized in rubber, but mainly work in a different field. The labour is principally hired. In some occasions at crucial steps, the owner participates himself.

Familial organization smallholders: These farmers function in association with extended kinships who provide sometimes labour, but principally capital and knowledge. The capital factor is very specific in these regimes. The funding is provide through private channels, without any recourse to external capitals, other than kinship. Thus, the extent of smallholders financed through kinship networks is difficult to evaluate, as these are unofficial channels. The “traditional” smallholders on the other hand have a smaller investment capacity, which limits the size of their plantation and may impact on their inputs/technical level.

The access to market is the most limited of all regimes, and is often put aside, especially in the traditional smallholders sub regime. The other smallholder sub regimes benefit of a better network which will be essential in their access to market. This lack of anticipation in the market access is

one of the “problems” associated with these regimes, especially in the case of the “traditional” and “corporate” smallholder. The market is currently in expansion, and some smallholders have faith in their capacity to find a willing buyer without trouble in several years.

– *Contract farming*

There is two kind of contract farming, the 2+3 model and 1+4 schemes.

- The 1+4 model is more similar to the concession scheme, for a small amount of wage in the maturing years. It then requires only the land input, which can be an advantage for poor or distrustful farmers. It minimizes their risks at short term.
- The 2+3 model is promoted by the government, while the 1+ 4 model is a better strategy for companies, as it gives more security and profits over their contracted land, acting similarly to concession land.

This general lack of information relevant to Lao conditions has led the provincial authorities promote the planting of rubber under what is known the 2+3 scheme. Under this scheme farmers planted rubber on their own land and using their own labor force. A company provides inputs which include credit and extension, processing facilities and marketing. Farmer and company then share the profits in proportion to their inputs. The total export cost will be shares 60% goes to farmers and 40% goes to the company. The state enters the scene as a regulator, ensuring contracts are fair and obligations by all parties are fulfilled.

Photos 1: The finger print to approval in contract farming of farmers in Nalae district



In case, contract farming in Nalae district all members in each households have to show their fingers print into contract. Related to the company purpose to know the exactly members in each household, who will get benefit or who response to reimburse seeding credit back after tapping in the future. In contrast, villagers in Thakeak and Sangthong district were difference because the company manage by their own as individual sign households by household.

Contract farming is an important driving force of the rubber expansion. For a lot of interviewees, it is seen as one of the few means which allow them to be part of the rubber revolution. This feeling is shares by companies, who consider it to be the only way to generalize the rubber plantation efficiently. The sub regimes of the contract farming are divided according to the intensity of the contract. Actually, there is a graduation in the sharing of the five inputs, from a minimal implication of the companies to a heavy involvement. The common factors in all the contract farming sub regimes are the contribution of the industry to the capitalization and the supply of technical advice.

The capital factor is quite subtle. The funding is always external to the farmers, who are then supported financially to produce rubber. there are two major ways of funding: (1) the industrial funding is a part of the contract and is always supplied in kind. Seedlings are either imported from neighboring countries or produced locally from imported seedlings. The technical supervision by the company technical advisor varies from an enterprise to another. Some are really involved, while others experience communication problems with local farmers. In fact, the essential key is the advisor. They are often brought by the companies from countries familiar with rubber. Experts are often Chinese and do not always speak Lao. This language communication problem limits the interactions with farmers and makes the use of translators indispensable. (2) the government funding can be present under the credit form.

– Concession

Concessions are normally only applied to state land. However, the official designation of state land can vary, according to diverse interpretations and interests (REF). It is mostly found in the Southern Provinces of Laos. There is a limited amount of cooperation between the local people and the investors, as the land is often designated by the government officials. The labour is frequently of foreign origin, Chinese by example, which limits the transfer of technology to the local farmers (REF).

Within the agricultural policy of the GoL there are effectively three hierarchies of decision making for granting concession to private companies based on following criteria:

- For areas of 3-100 ha the provincial authority is the approving body.
- For areas of 100-10,000 ha the Ministry of Agriculture is responsible for granting concession, after permission is granted from the government.
- For areas over 10,000 ha the government is responsible for the granting of concession, after approval by the parliament.

Rubber concession was implemented in the Southern of Laos which's attract foreign investment especially Vietnamese, Chinese and Thai investors implementation in Khammouan, Savannakhet, Champasack and Saravanh province. By the ways, local farmers did not get any rubber information, so they still lack of based knowledge on rubber management. Sometimes, they have been working in rubber concession as planting, weeding and using fertilizer.

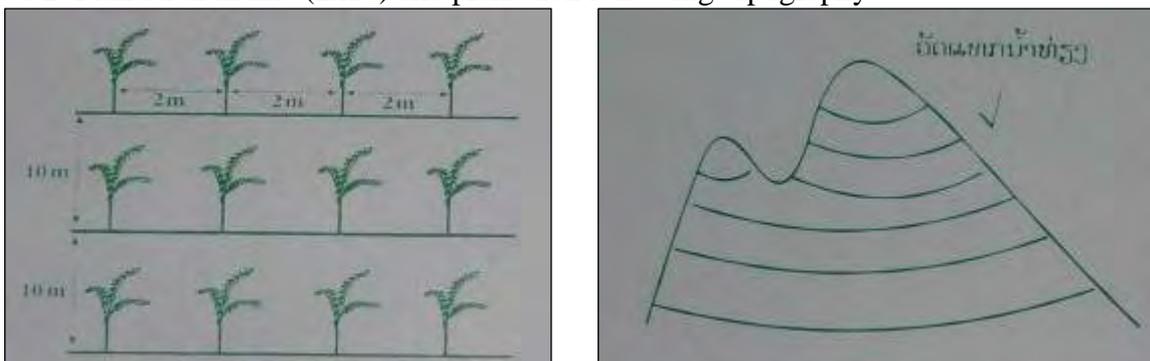
Confronted with several strategies, developed by an array of actors, the GoL endeavored to back up the rubber development. First, a concession moratorium was declared the 8th of May 2007 by Laos Prime Minister Bouasone Bouphavanh over the establishment of new concessions of 100 ha. The purpose of this moratorium was to review the existing strategies to grant concession land and improve them, based on studies of their shortcomings. This moratorium was important in the rubber development strategies as rubber is one of the industrial crops most planted in concession.

3.6. Rubber management

3.6.1. Planting techniques

Technically two types of spatial organization of rubber plantations can be found in Laos. The two illustrations bellows are taken from a promotional poster in the hall of the DAFO of Sangthong presenting rubber and the advantage of contract farming.

Photos 2: Plantation in line (2x10) and plantation following topography.



Source: Detail of a promotional poster for the V-Power Cie, in Sangthong DAFO.

The first layout is made of straight lines, which spacing is in a range between 2.5 to 5 meters width on one side to 6-10 meters length on the other side. The density ranges from 400 to 600 trees/ha, with a target of 500 trees. This was the most popular arrangement within our sample. The simplicity of carrying out the plantation and its recommendation by companies' experts is the main reason for its success.

The second possible layout is made following the topography. Almost none of the farmers interviewed had ever heard of such an arrangement, and none used it. However, while flying over Luang Namtha city, and visiting the village of Ban Had Nyao, it was clear that the earlier plantation in the north were following this spatial layout.

The rubber concession case study of Thakeak district

The lands on which concessions are established are state propriety. They are attributed either by the central or the provincial government. The central government is mostly involved through the Ministry of Defence, which can lease military land under a long term agreement. Villagers are not involved in this transfer of land. The research of land is a specialized job. The company have a branch devoted to land acquisition.

There are several types of labour in the concession. Firstly, a distinction has to be made between the regular labour force, used throughout the year, and the irregular labour force, sporadically used. The regular labour force is organized at different levels, each of them heavily relying on the previous levels.

The concession divided in 25 hectares per block, with a chief for each of them. He has the responsibility to look after plants all year long, monitor the plantation diseases, use fertilizers, and directly oversee the land preparation and plantations during the summer.

- The one block chief is supervised by a supervisor whose responsibility includes three other blocks. He has to compile and analyse the data from the four blocks and check these data on the field. He has to approve the labour employment as suggested by his subordinate.
- These “4 blocks” responsible to control 100 ha, supervisors report directly to the head of the plantation, who will send a work plan for the whole plantation to the Khammouane offices. The responsibility to approve this plant belongs to the Vientiane central office of the company.

The irregular labour, who are came from the outside villages and other district as Mahasay district with sharing border with Thakeak district. Especially, young labour works with them⁷. The company also provides food for lunch and drinking water to labour.

The exceptionally hired working force consists mainly of unskilled labourers. They come from the neighbouring villages. The conditions are considered quite advantageous by the villagers⁸. However, the period of employment is short, as it is around one month, but the interviewed villagers declared having worked only days. The access to market is one of their forces. The

⁷ Hire local labour for kill weed 25,000 Kip/day, dig holes and planting together 2,000 Kip/hole, and lump sum 400,000 Kip/ha.

⁸ Transport is provided and amenities such as bottled water are given.

massive potential latex production of the concessions is a perfect guarantee of supply for the companies, mainly in the case of the ones which are vertically integrated, for example producing tires or cars.

The technique is the most up to date possible. Their technical knowledge is excellent. They invest by hiring of foreign rubber specialists. These specialists come from rubber producing countries such as China, Thailand or Malaysia.

In 2007, the density of rubber plantation is 7 x 3,5 m (475 trees/ha). In 2008, follow to the Chinese, Thai and Malaysia experts would like to change new density as 6 x 3 m (555 trees/ha) because the old density lose of areas, but the rubber tree can supply more latex also.

In 2007, the company used fertilizer one time a year normally in September. The fertilizer formulate is 10:20:12 and 25:77 both are imported from Thailand, with mixture 200 g/seedling. In 2008, the company would like to change new formulate fertilizer, but not yet being use. In addition, The company use “*Polidan Herbicide*” to kill insects before plantation (100 g/seedling). All of them imported from Thailand.

3.6.2. The alternative plantation

In each locations, rubber was associated with at least another crop. This association came from two actors: it was either promoted by the farmers or the industries. By example of Sangthong district, focus was more on perennial cash crops as teak and agar wood. In 1993, GTZ cooperated together with the Faculty of Forestry (NUOL) promoted plantation alternatives for local farmers are including teak, fruit tree plantation. This project also support plantation training course for farmers and gave a chance for them to better understand on plantation in the future. Then, local farmers became interested in plantation especially teak plantation because it easily management. Later on, they were well done managing the seeding nursery themselves. Until nowadays, teak plantation areas are increasing approximately 32,700 teaks. However, the Korean Company promoted agar wood plantation by concession since 2006. But local farmers is considering on those situation the same as rubber.

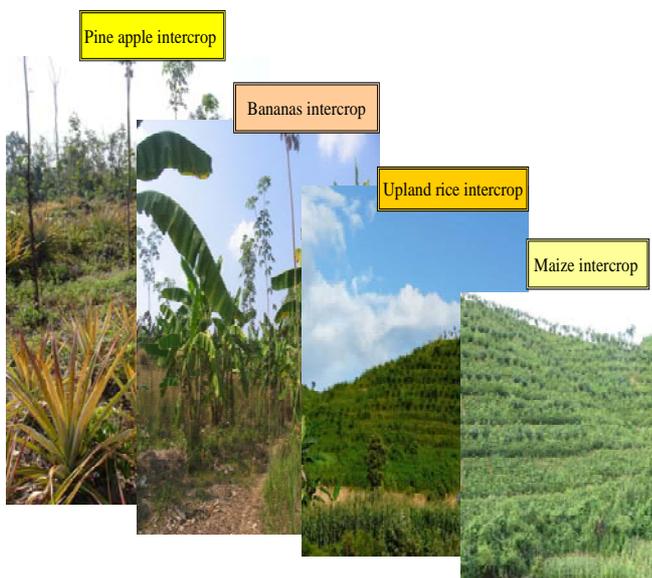
Nalae district, the Jia Xuang company developed a system parallel to rubber, promoting maize cultivation, aiming at the same target that with their rubber strategy. This second option was incorporated a few years after the introduction of rubber. On the other hand, farmers diversify their activities by introducing other cash crops either annual or perennial to their fields.

Thakeak district, banana trees was the main option. However, there are many plantation companies promoted local farmers, especially *Jatropha*, *Eucalyptus*, *Kathinnalong* and teak plantation. In 2007, the OJI Company came to promote *Kathinnalong* plantation (pulp and paper mills). Then 2008, the Kolao Company came to promote *Jatropha* plantation under the contract farming. Although, this company support fund for land preparation and other necessary cost (hire labour). But, several farmers still consider in this condition because *Jatropha* plantation is a new plantation for them the same as rubber. In contrast, rubber plantation is hard access to information, without promotion from company, the most important things is need more fund for maintenance and investment. In addition, they are not sure on rubber management. So, several households prefers to *Jatropha* plantation then rubber plantation. In fact, smallholders have to learn lesson by themselves without promotion from company or local authority. Although, many foreign companies investment in this site, but they did not know any rubber information.

The CP Company and the Lao-Indo China Company promoted maize and cassava cultivation in 2008 at Sangthong district. Local farmers became interested in those crop and they have plan to expand areas in the future. In addition, maize and cassava is the main cash crop for local farmers in Nalae district, which is influence from Chinese companies as higher demand. The purpose of company would like to promote maize intercrop with rubber to generate households income for local farmers at the first three years of rubber plantation. The company arranges cash crop one by one year contract.

Moreover, farmers lack technical knowledge about tree care-taking and tapping the latex. At the normal plantation spacing, during the first three years intercrops can be planted with rubber, then during the fourth to eighth year, when rubber has grown older, crops cannot be planted with rubber. So, this period rubber farmers face difficulty. It is also unknown what other spacing systems and agro forestry intercropping might be possible.

Photo 3: Intercropping with rubber plantation at the first three years of rubber plantation



Upland rice and cash crop is the main intercrop at the first three years of rubber plantation. Those cash crop is the main source incomes. Together with, possible for consumption in households, short term harvesting, no need taking care and possible to market accessibly. By the way, farmers are prefer to attend intercrop at the first year of plantation only cause of soil fertility and some neighbor do not cultivate at the same farm plot. So, it is difficult taking care of their cultivation areas because it hard to against wide life.

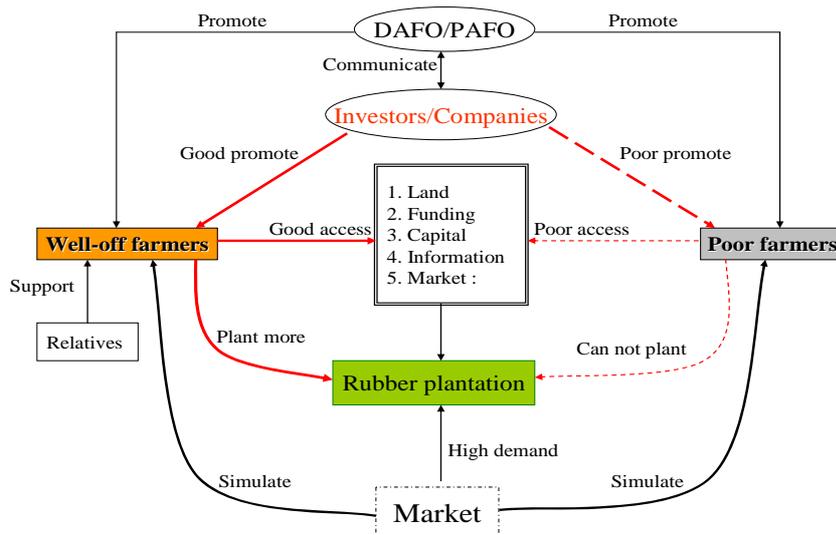
Table 9: The rubber situation in each study sites

Situation	Site study		
	Sangthong	Nalae	Thakeak
Rubber plantation areas	130 ha	1,515 ha	1,664 ha
How seen the first rubber plantation (RP)	- work in RP Thailand - visit relatives in Thailand	- study tour in Ban Hadyao - study tour in China - work in seedling nurseries	- daily work in concession - work in RP in local
Study tour	- study tour in Ubon province Thailand	- study tour in Ban Had Yao - study tour in Yunna province, China	- study tour in Xebangfay district Khammouan province
Location before RP	upland rice, bananas garden	fallow, upland rice	upland rice, bananas
Year start RP	1997	2004	1993
Density	3 x 7 m	- 2.5 x 7-9 m	3.5 x 7 m
Rubber Company	- Yunan Lilieng Company - Semuong Group Company	- Jai Xuang Company - Xai Ma Company	- Lao-Thai Hua Rubber Company - Jong Ji Hong Ching Company - Thai-Vietnamese Plantation Company
Sharing benefit	without sharing benefit	65:35	without sharing benefit
Labour origin	hire labour and households labour	exchange labour in unit mix with households labour	hire labour and households labour
Land management	buy land and own land	own land	sell/buy land and own land
Livestock management	individual fencing, grazing areas available	sold them out, the grazing areas limited	Individual fencing and grazing areas available
Plantation alternatives	teak, eucalyptus and agar wood plantation	prefer rubber plantation, no more alternative	bananas, Jatropha, eucalyptus and agar wood plantation

3.7. Perception on rubber plantation

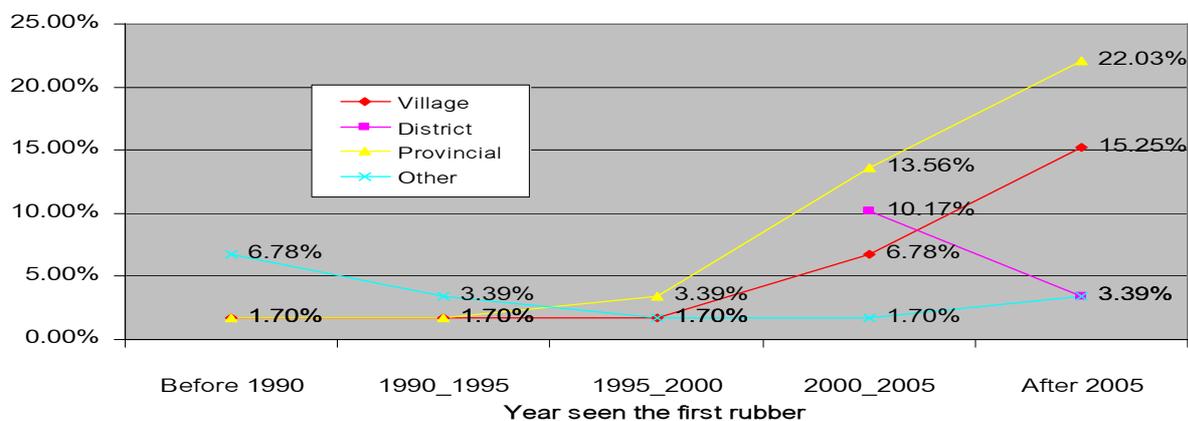
They are a very composite group, with some variation in their knowledge of rubber and perception. The rubber is generally perceived as a great cash crop, perfect to alleviate poverty, and is a good combination to subsistence cultivation. The member of the social networks in which they are evolving, particularly their kinship at the borders, comfort them in this perception. After having adopted rubber plantation, Chinese or Thai farmers have experienced an increase of their livelihood. Farmers have also the perception that rubber market is stable, and that they will have no trouble to access it.

Figure 3: PARDI Diagram of farmers statute into rubber plantation



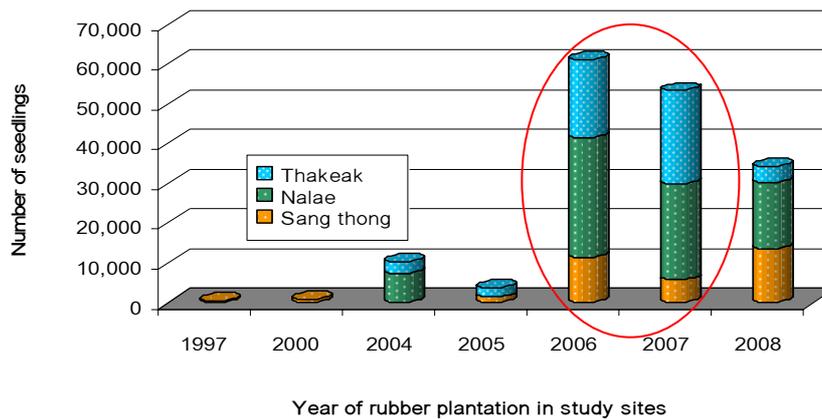
PARDI Diagram based on a sequence of stages meant to precise: (1) Problems, (2) Actors, (3) Resources, (4) Dynamics and (5) Interaction. This above figure is showing the different farmer statute between well-off farmers and poor farmers access to rubber plantation. It is clearly of poor farmers have poor access in each rubber regimes which are consider the households limited. While well-off farmers are good access and good promotion from rubber company (contract farming) and relatives supported (smallholder).

Figure 4: When and where farmers seen the first rubber plantation?



Regarding to interview both local farmers (who planted and no planted rubber) in study sites were asked where they seen the first rubber plantation? 42% seen the first rubber inside village, 33% in provinces, 13% in districts and 10% in China or Thailand. Some of them have been working in Thailand (Sangthong district) and studied tour in La district Yunan province of China were supported by Chinese companies (Nalae district). Then next question were asked when they seen the first rubber plantation? After 2005 with 47%, before 1990 with 8% and period of 2000-2005 within 31%.

Figure 5: Compare the rubber plantation areas in each year of study sites



This above figure is showing the duration of farmers seen the first rubber plantation. The rubber expansion in study sites were boom in numerous form in the period of 2006-2007. The main factor was influenced from foreign companies invest in large scale of rubber plantation. Especially, the concession areas in Thakeak district. In contrast, Ban Nasa was initiative of rubber plantation by smallholder since 1997.

Farmers who no planted rubber were asked whether they liked other villagers rubber plantation. the significant of respondent 29% lack of labour and fund, 18% lack of agriculture land or land limited, 14% lack of information because there is no any company promoted rubber plantation and within 11% are not sure on rubber management because they worry about their lifestyle might be change especially wake up early, work hard for maintenance. By the way, some of them really want to try if without any limitation. However, they do not know anything on rubber management because they never saw the first rubber plantation anymore, so they do not have any rubber information. But they would like to plant after everybody in community planting because they are not sure on rubber management. Some of them lack of fund and agriculture land limited. According to interview poor households in study sites did not heard anything from company and village headmen. They said only smallholder rubber plantation in village, no contract farming at all.

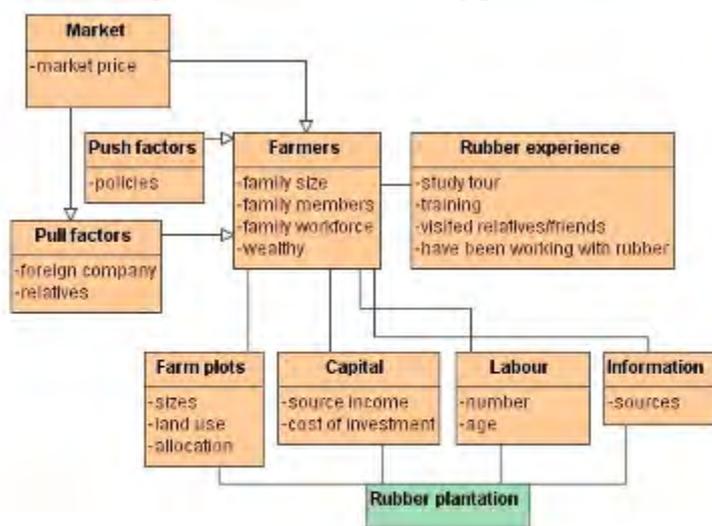
The local farmer’s perception on rubber concession: Ban Nakhom, where nearest the rubber concession in large scale. The local communities were not consulted when the rubber concession was planted, awareness was generally low, despite the fact of concession extends right up to the boundary of the village. Regarding to the company contact directly to give permission from the Ministry of Defense. So, the rubber plantation in Ban Nakhom is none active. In contrast, local farmers were happy that the company had arrived to village because it provided employment. Event, it is the short time daily work in rubber concession (clear land after slash and burn, dig hole and planting). However, they still lack of rubber information and knowledge. By the way, several poor farmers prefer to be daily workers with rubber concession, especially who are new comers because they lack of agriculture land and no more source income. While some of farmers declared their willingness to plant rubber if they would have the means. Meanwhile, banana cultivation is seen as less risky as it requires less funds of investment and possibility consumption in households. By the way, after the company began rubber concession is impacts to local farmers, who are living nearby the concession is relatively loss of access to NTFPs, although it is not a central income generating activity, would still affect families “day to day living”

3.8. Decision-making into rubber plantation

Based on data collection from study sites of both farmers who planted rubber for 67% (79% by contract farming and 21% by smallholder) and who no planted rubber for 33% of respondents.

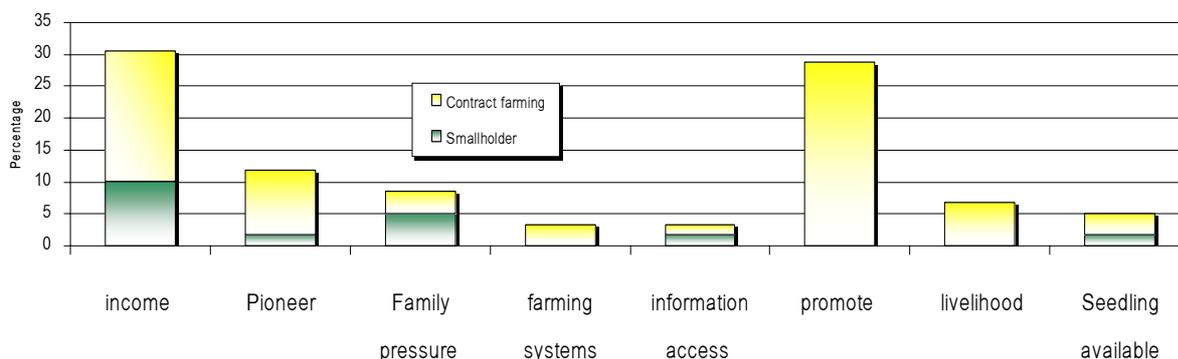
Farmers who planted rubber have been seen the first rubber plantation before. Regarding from interviewed farmers 49% seen from the company owner (large scale of concession areas) that is motivate them active to plant, 29% seen from neighbor, 19% seen from relatives plantation. In addition, they have rubber experience before because they have been working in rubber plantation within 35% of households respondent. It is not specific only local farmers who planted rubber, but its also someone who are working with government (DAFO/PAFO) are interested in rubber plantation. However, the rubber plantation is need higher investment, so it is not easy for farmers decide into rubber plantation.

Figure 6: Class diagram of decision-making process into rubber plantation



In this figure is showing the decision-making process into rubber plantation. The main factor is farmers decide their households statute (size, amount of member and workforce in households), then consider in each rubber regimes is including land, capital, labour and information.

Figure 7: The decision-making to be smallholder and contract farmers



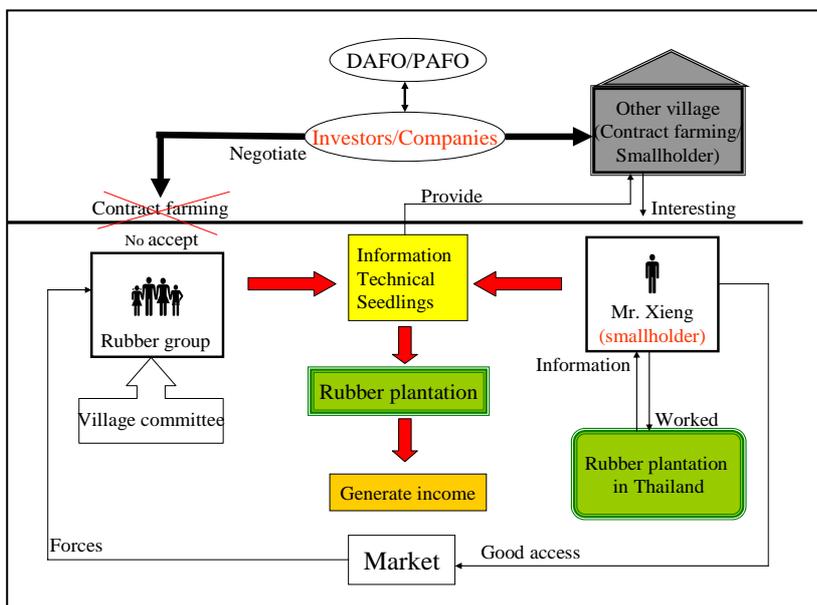
This above figure is showing the reasons to be a smallholder and contract farmers. The significant in this figure are show the higher decide to be contract farmers because company and local authority promote them closely into rubber plantation. This is the effective from promotion to local farmers have a chance to change their traditional farming systems.

– **Smallholder**

Smallholder rubber plantation are confidential to manage by their own lesson. They careful not too much plantation because they know how much they can plant. In addition, they have enough capital, land available and information access. However, they need to hire labour, or exchange labour and helping from relatives. All of them faith in rubber (although, massive investment since first year of plantation), the leader with the special networks, knowledge are a reference to other farmers.

The smallholder of Sangthong district are good access to rubber information. According to the location site is along to the Mekong River side, which is sharing border with Northeastern part of Thailand. That is the main factor for local farmers got easily information. Together with, local farmers have rubber working experience before and they have a chance visited relatives.

Figure 8: Strong interaction between local farmers negotiate the company



In this above figure is showing the strong interaction between smallholder and companies. In case of farmers in Ban Nasa prefers to be smallholder because the village committee set up the rubber plantation group in 2006. Mr. Xieng played a leadership role in managing the small rubber cooperative, providing technical knowledge, credit service and marketing information to all members. Many villagers who planted rubber joined the group (22 members equal 70% of village households). This happened, when the company offered to establish contract farming, several villagers were not interested and they won't share benefit with the company. The contract conditions were judged not fair as they would have had to provide 50% of their benefits to the company for receiving no other service than already provided by the group.

– **Contract farming**

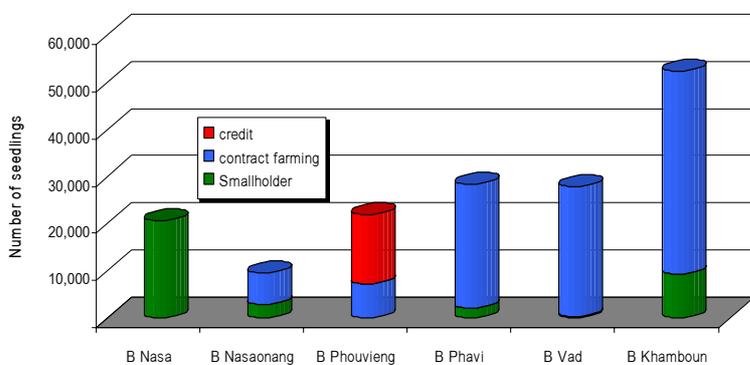
The contract farmers, who are lack of capital, pioneers and some of them are not sure on rubber management as they would like to bet on their plantation. In other reasons, they would like to learn lesson from companies as follow the company implementation. They establish a plantation under the guidance of the company. By this spot training, they learn the best way to select seedling and how to plant it to maximize its potential. A few years after their first experience with the company, they start in parallel, their own smallholder rubber plantation, to maximize their profits. They have a mixed position. They hope to benefit of their existing contractual connection with the company to

obtain through it a market prospect, selling their smallholder latex with contracted latex. But no relating clauses have been put in the original contract, leading to the risk of a potential sale loss at the mature stage.

The most important thing is depends on local negotiate between farmers, company and local authority. In case, the successful story of Ban Nasa is that local leadership is a key component of the negotiation. Thank to experience of Ban Nasa they could negotiate good conditions with the company as provided free seedlings and other inputs for local farmers. In contrast, farmers in Thakeak district no have any option to negotiate because only company provides them credit of seedlings without any promotion. Normally, only well ranging farmers planted by contract farming. In case, farmers in Nalae district are prefer to be contract farmers. Regarding to the company promoted different way is to motivate farmers decide into rubber plantation. Especially, the company provided study tour and training course were introduce by Chinese rubber experts. In addition, the company show the video from China. In addition, the company engages if farmers can plant rubber more then 50 ha, they will provide road access to the rubber areas.

However, local farmers lack of knowledge for contract management, misunderstand the detail of contract some of them do not see their contract. They know only company will provide them seedlings and some of necessary equipments. In the further, after tapping latex they have to reimburse the cost of seedlings and sharing benefit together. Whether, some of them do not know exactly how to share benefit? The most important they do not know the term of credit they got. So, they are not sure on rubber management. In addition, several farmers do not know the seedling original where is it came from? They do not have chance to select the best seedling when company distribute.

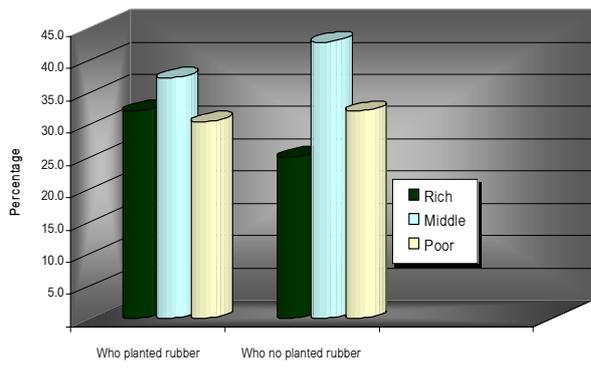
Figure 9: Compare types of rubber plantation in study sites



In this figure is showing the rotation in each type of farmers planted rubber. In case farmers in Ban Phouvieng got credit into rubber plantation from the Agriculture Promotion Bank supported through DAFO/PAFO. The contract farming is large scale than smallholders.

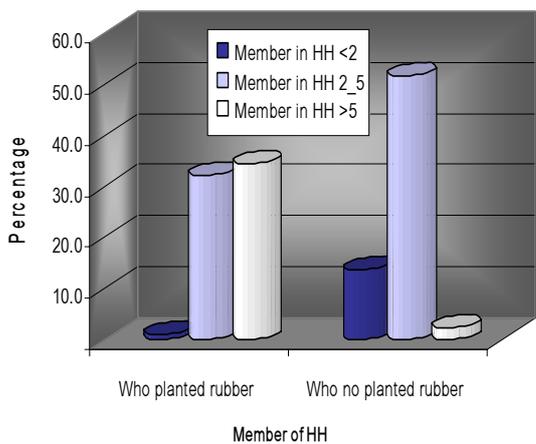
During year 2006-2007, rubber expansion in three districts of study sites are dramatic increase rapidly. Especially, in Nalae district was planted too much approximately more then 30,000 seedlings (contract farming). In case, Sangthong district were initiative smallholder rubber plantation since 1997. After tapping, several neighbor became interested in rubber plantation and they would like to follow foot step. until 2006, the foreign companies came to each district and promote farmers rubber plantation by contract farming.

Figure 10: Compare wealthy of HH who planted and no planted rubber



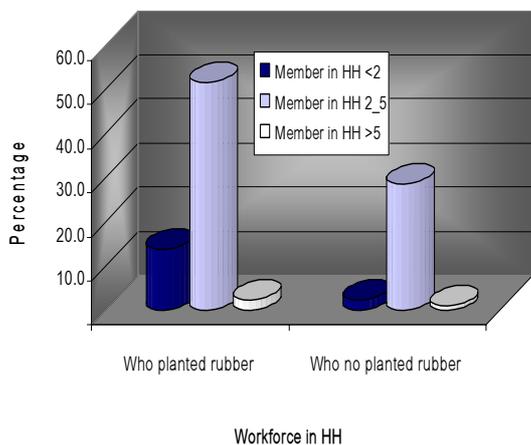
The wealthy for farmers who planted and no planted rubber is the main factors to push farmers decide planting. However, well-off farmers are good access to rubber plantation more than poor farmers. Event though, this figure is showing higher middle farmers do not plant rubber any more because all of them are not sure on management process and they prefer other plantation alternatives.

Figure 11: Compare the member of HH who planted and no planted rubber



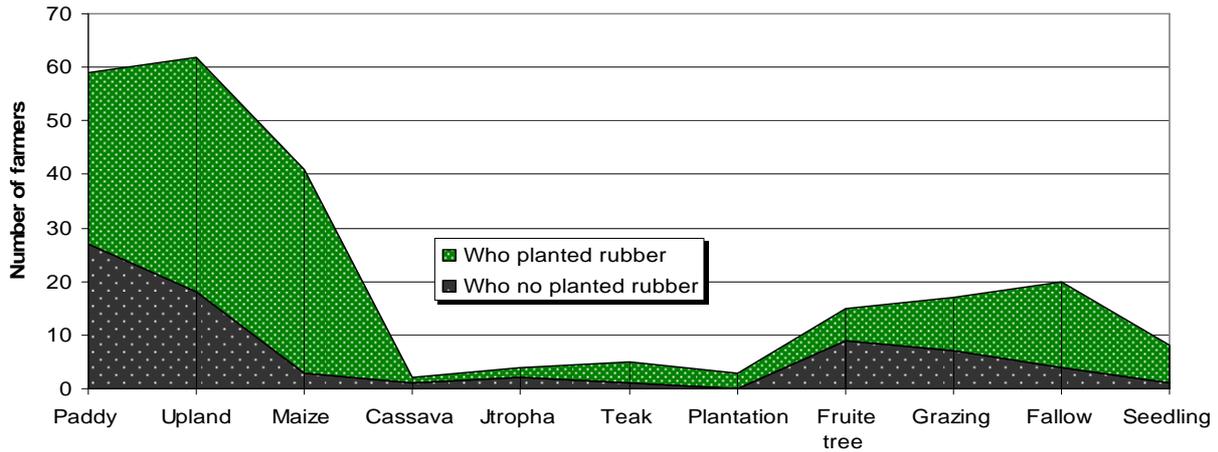
The member in households for farmers who planted and no planted rubber are different amount. Because farmers who planted rubber have around 2-5 members or more than 5 members in households. In contract, farmers who no planted rubber, they are few member in households. The main reasons is a new comer in village and young family or move separate households from their parents.

Figure 12: Compare the workforce of HH who planted and no planted rubber



The amount of workforce in households for who planted and no planted rubber. The significant of workforce in households is need around 2-5 workforces or more than that. However, those amount of workforce is not sufficient for their households activities, especially rubber plantation. Because there are a lot of farming activities in households (upland rice, maize and other cash crop) so local farmers have to work hard on their rubber plantation and really need more workforce to maintenance their plantation.

Figure 13: Compare agriculture land areas for who planted rubber and who no planted rubber.

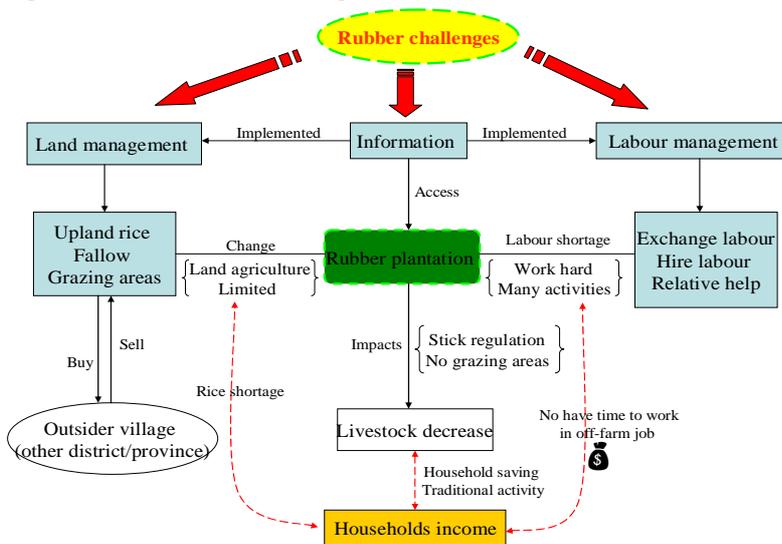


The agriculture land areas of both local farmers who planted and no planted rubber, are different allocate land as showing above figure. Farmers who planted rubber has a lot of farm plots and large areas available, especially upland land rice or paddy field fields. In contrast, farmers who no rubber plantation as well known they lack of agriculture land.

3.9. Rubber challenges

Rubber challenges are similar to more general challenges of sustainable agriculture. In Lao PDR, rubber expansion is therefore emblematic of the fundamental changes in agriculture and rural development patterns that the country is undergoing. It can be used as an entry-point to understand the larger societal process of the agrarian transition in Lao PDR and to provide cross-sectoral solutions to problems that are not specific to rubber, e.g. concessions, farmers’ associations, promoting of conservation agriculture and agro forestry systems, monitoring mechanisms for land use planning, environmental impact assessment and mitigation measures. As a consequence, the policy measures that will have a major influence on the rubber industry are not necessarily related to rubber but to more general mechanisms of regulation of foreign investment and patterns of development.

Figure 14: Rubber challenges

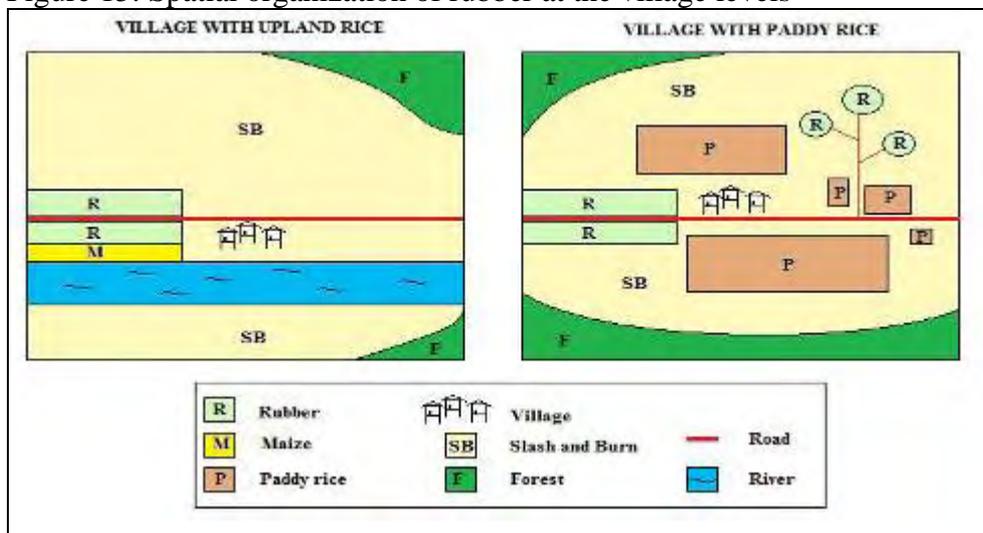


3.9.1. Land management

The government policy based on land and forest allocation, and land allocate to local farmers. So, local farmers are adapt to this policy which is impacts to land use pattern as have been done so far. The agriculture systems was change is impact to land use pattern and livelihood aspects.

The rubber is most often situated near the residential areas, to facilitate the access, which is the main reason for 47% of respondents. Especially, village headman in Nalae district divided rubber plantation zone because it is easy taking care in large areas and protect fire burn from shifting cultivate. Other important factors to select the location is closeness of the paddy fields and necessity of fence the plots to against livestock. In addition, the village committee and elder person in village agree together to provide rubber zones. Rubber was planted along to the Tha River located in Nalae district. The Tha River is the main communication for local people. In contrast, farmers in lowland areas of Sangthong and Thakeak district select rubber plantation which's easy to access.

Figure 15: Spatial organization of rubber at the village levels

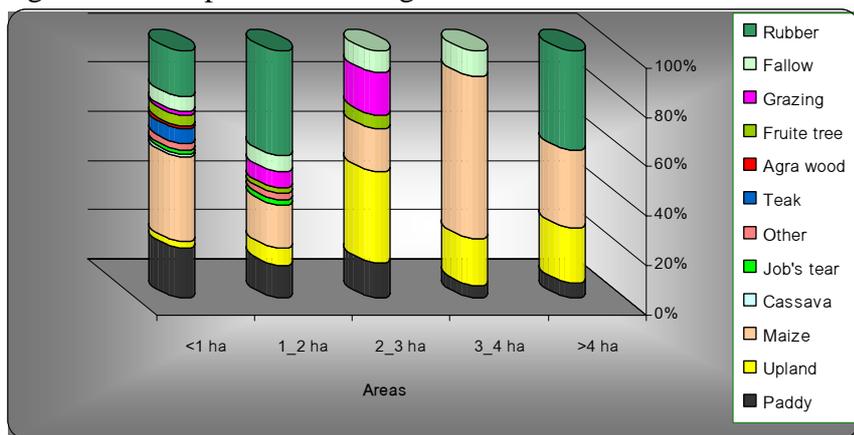


Source: Elodie Alberny.

Ban Khamboun is located to the Southern National Road, which is easy to access and suitable for rubber plantation. So, It is attract the outside villagers is interested in rubber investment. It means *“the outside villagers own plantation and local farmers will work for them”*. Because some of farmers sold off the land to the outside villagers, who came from Hinboun district of Khammouan province and Savananket province. Factors behind this were severe poverty, family members getting sickness and persuasion. One informant stated that the expensive of agriculture land, which outside villagers motivate to buy. For example, one household decide sold off some piece of land then bought land in other village which cheaper. This measures were taken by various actors to intimidate villagers selling their land. The latter, local farmers no have enough land to cultivate and then they have to be a daily worker in rubber plantation. That is not permanent jobs because local farmers have been working in rubber plantation as a short time per year. Its concern to local farmers in the future *“how was their livelihood without agriculture land”*.

In 2006, some of household in Ban Khamboun decided provide the agriculture land for the Jong Ji Hong Ching Company rend. Later, they are interested in plantation but they no have enough land to planted. So, they are considering those land were rend by company (under contract).

Figure 16: Compare farmer's agriculture land rotation



In this figure, show the farmer's land areas and category of cultivation and some of plantation. Normally, farmers attend to cultivate cash crop under areas of less than 1 ha. For large areas only have rubber, maize, upland rice and paddy field. In contrast, rubber plantation are consider the large areas of plantation.

3.9.2. Labour management

In term of mandays in each different activities are different management. Sometimes, it is not easy for farmers to estimate how many labour they use? or how long they work in each activity? So, the data collection from the field work are average of investment cost, estimate number of labour and mandays in each activities are including dig hole, planting and weeding after plantation.

Farmers in Nalae were exchange labour together in village unit (8-10 labour/unit). They help each other working in the fields without hire labour. The digging hole is need to spend long time and request many labour because it is hard work especially land preparation before planting. In contrast, farmers in Sangthong and Thakeak are prefer to hire labour and some of them mix households labour together. Related to the lowland areas, so they do not spend long time to dig hole. In addition, farmers in Santhong are realized to use herbicide and fertilizer for taking care their immature and mature rubber. Beside that, some households prefer to use the weeding machines instead of using herbicide because using herbicide it is not good for their health.

The labour work in rubber plantation is mix together with outside and inside labour of households between hire labour and use labour in households. Normally they hire labour for slashing and burning of the bush fallow, annual weeding, and sometimes using weeding machines. Labour in households are usually used for nursery work, using herbicide, care and maintenance in the immature stage.

Table 10: Compare mandays activities in difference study sites

Study site	Mandays in each activities		
	Dig hole	Planting	Weeding
Sangthong district	8	5	6
Nalae district	97	9	112
Thakeak district	17	17 ⁹	47

Source: data collection in the field work.

⁹ Farmers in Thakeak dig hole and planting together. So, it was difficult for them to estimate the mandays

Table 11: Compare in each types of rubber plantation

Study site	Dig holes		Planting		Weeding	
	SH*	CF*	SH	CF	SH	CF
Sangthong district	8	15	4	4	7	-
Nalae district	68	105	6	8	155	99
Thakeak district	35	21	-	-	173	29

(SH* smallholder/CF* contract farming)

Source: data collection in the field work.

Table 12: Labour working in rubber plantation

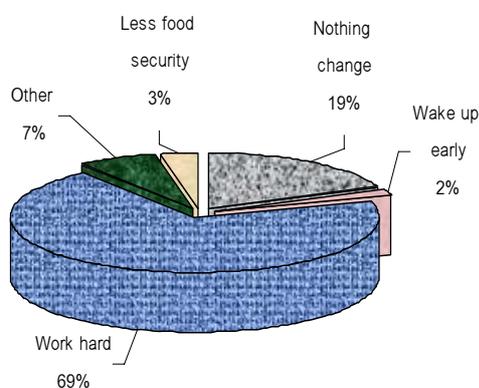
Labour in each activities	Labour (ha)
Rubber	251
Coffee	150-240
Maize	110
Soy bean	174
Irrigation rice	122
Rainy season rice	132
Upland rice	362

Activities	Labour
Land preparation	80
Fencing	30
Planting	20
Kill weed (three time/year at year 1-3)	120
Kill weed (three time/year at year 4-14)	80
Harvesting (tapping)	119

Source: The economic potential for smallholder rubber production in Northern Laos, 2007.

3.9.3. Routine change

Figure 17: The routine changes after rubber plantation



After rubber plantation several households have to work hard because there are many activities need taking-care. Especially, weeding after plantation together with upland rice cultivation. So, it impacts to the number of workforce in farming systems. In addition, they do not have time to work in off-farm jobs to generate their households income (as handicraft, go outside village to find other part time jobs as workers or carpenters). For households who are tapping already is need to get up early. So, all of them need more adaptation.

Table 13: Farming calendar between crop cultivation and rubber plantation

Month	1	2	3	4	5	6	7	8	9	10	11	12
Land preparation				→								
Clear land				→	→							
Slash/burn			→	→								
Dig hole					→	→	→					
Planting					→	→	→					
Herbicide							→					
Fertilizer						→			→			→
Weeding	→	→	→		→		→	→	→			→
Harvest	→	→								→	→	

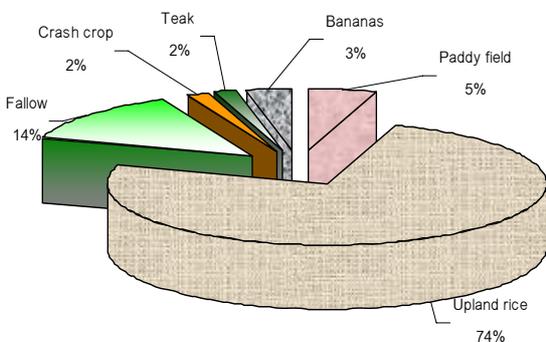
Rubber →
 Upland rice →
 Maize →

3.9.4. Food security

Food security related to local farmers who are rubber plantation have to work hard on their rubber management. After, they finish upland rice cultivation they continue to grow rubber at the same reason. After that, they have to taking care more to kill weed in the first three year of plantation. So, it means they are many activities to do at the same time, so they do not have time to do anything to generate income to households. According to interview farmers who planted rubber always complain is hard work than upland rice or other cash crop.

While several households attention taking-care their rubber plantation, it means they do not have time to work in off-farm jobs (daily workers, handicraft). It concerned to food security as rice shortage in their households within 44% response. Related to the agriculture land were limited because before rubber plantation have been upland rice areas and some of paddy field became rubber plantation areas. Nowadays, forest are being clear in ever-expanding areas across the country to make way for new plantation.

Figure 18: Agriculture land before planted rubber in local village



Rubber plantation come numerous forms cause of before rubber plantation has been upland rice and fallow (especially, in Nalae district is a mountainous areas). That is concerned to their agriculture land limited and other impacts. The most important is ensuring food security in households levels. From study sites, food security is already concern in some villages, which is rice shortage to survive for all year. Rubber and food crops are planted during the maturing years.

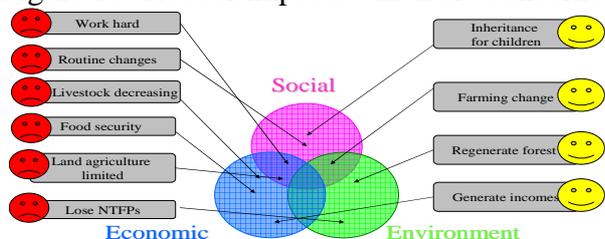
3.9.5. Number of livestock decreased

Livestock production is a main source income for smallholder activities in rural areas. Several farmers can generate households income from livestock and stock saving. It the best saving for their household's emergence. However, livestock and farming system both are the main sources income for local farmers. Both of them should be go together, it might be good entry for rubber plantation and rearing livestock.

According to the fifth years DAFO's strategy for Development Plan in Nalae district are including six priorities (livestock, paddy field expansion and increase productivity, cash crop, poultry, rubber plantation and ecotourism). Nowadays, the rubber plantation becomes the first priority in Nalae district. After, rubber became to the first priority and livestock were reduce to the last priority of Nalae district. So, local farmers are daily worry for rubber plantation and livestock. Related to the local authority and village committee agree together to set up the livestock regulation, that mentioned do not allow farmers rearing livestock near the rubber plantation. In case, local farmers in Nalae district fines livestock entering the rubber plantation and ate young rubber trees. The owners of livestock have to reimburse to the owner of rubber plantation depend how old of rubber plantation? Finally they have to sold their livestock out because they nervous to against livestock into rubber plantation.

In case, some household would like to continue rearing livestock, they should have individual grazing areas or village grazing areas to save livestock. Sometimes, it hard for them to look after and against their livestock into rubber plantation. In another reasons, lack of grazing areas, feeding is not enough. Then, they decide to sell all livestock out. In contrast, it is not fair for who no plant rubber at all, they are not happy with this regulation because livestock is the main source income of households. So, they are prefer rearing livestock then plantation. By the way, nobody can tell exactly what will happen in the future without livestock.

Figure 19: Rubber impacts which are concerned to social, economic and environment



In this figure is showing the main positive and negative impacts for local farmers after they began rubber plantation. Those activities are concerned to the part of social, economic and environment impacts.

4. Conclusion

Nowadays, the rubber expansion in everywhere of Laos without any consideration. The local farmers do not know exactly the plantation condition. Some of them are pioneers who are successful plantation before. The local rubber management depend on the levels of the negotiation and the social networks that are mobilized to support the negotiation. The negotiation is an important for rubber arrangement between local farmers, local authority and company. In case farmers in Sangthong district negotiate good conditions with the company as provide them free seedling and other inputs.

Rubber information in local areas are limited, it depends on the roles of local authority. In Thakeak district is the main district of Khammouan province but local farmers did not hear anything about rubber. Beside of the local authority are lack of budget to work closely with farmers. Together with, the rubber plantation is not contain in the provincial strategy plan. Regarding to the first priority is emphasis to the Hydro Power Company (Nam Turn II) and rubber concession in higher levels. However, there is some foreign investor work on concession try to promote local farmers by contract farming.

In contrast, farmers in Nalae district, is a poorest district, remote areas has a chance access to the rubber information easily because the local government are active to promote rubber plantation as the first priority. Together with, the company promote and supported local farmers into rubber plantation by provided study tour in Ban Had Yao and La district, Yunnan province of China.

The local Labour is difficult to management because farmers has many alternatives to cultivate/plant for generate households incomes, they should estimate how much they will cultivate related to their households levels. When the amount of farming activities are increasing due to number of workforce are decreasing. According from data collection several farmers hard working on their farm activities. They have to work hard on cultivation seasons, including growing, planting and weeding, concern to the number of workforce limit. Although, farmers exchange labour in unit and hire labour to work in their own land but it is not enough. They have to work on their individual field after that they turn to help each other.

Reference

- Alton C., Bluhm D. & Sannikone S., 2005. *Para Rubber Study: Hevea brasiliensis* Vientiane, Lao - German Program Rural Development in Mountainous Areas of Northern Lao PDR, NAFRI.
- Antonella D., 2006. Socio-economic Dynamics of Rubber in the Borderlands of Laos: case study in Muang Sing, Luangnamtha province – Field report. Department of Anthropology, Australian National University.
- DAFO Nalae, 2007. *Report on Nalae District*. DAFO.
- DAFO Sangthong, 2008. *Report on Sangthong District*. DAFO.
- DAFO Thakek, 2007. *Report on Thakek District*. DAFO.
- Douangsavanh L., Thammavong B & Andrew N., 2008. Meeting Regional and Global Demands for Rubber: A Key to poverty Alleviation in Lao PDR?, Sustainable Mekong Research Network (Sumernet).
- Douangsavanh L., Bouahom B & Viravong B., 2008. Rubber Production in Hat Nyao Luangnamtha province, Agricultural Trade in the Greater Mekong Sub-Region.
- Hanssen C., 2007. *Lao land concessions, development for the people*. Bangkok, RECOFT. International Conference on Poverty Reduction and Forests: Tenure, Market and Policy Reforms.
- Improving Livelihoods in uplands of Lao PDR., 2005. NAFRI, NAFES and NUOL.

- Ketphanh S., Mounlamai K. & Siksidao P., 2006. *Rubber Planting Status in Lao PDR*. Vientiane, NAFRI, NAFES, NUOL, LSUAFRP and GTZ. Workshop on Rubber Development in Lao PDR: Exploring improved systems for smallholder production.
- Nhoybouakong M., Malivarn S., Souphonphacdy D., Rajvong A., Baylatry M., Voravong S & Khamphanh S., 2009. Rubber: Costs or Benefits to the Lao PDR?. The sustainable Mekong Research Network.
- Manivong.V and R.A. Cramb., 2007. Economics of Smallholder Rubber Production in Northern Laos, Queenstown, New Zealand.
- Rebeca L., <http://www.terrapeer.org>., Laos: promoting tree plantation., WRM's bulletin No 124, November 2007. Rural livelihoods made vulnerable as rubber investments take over land in Laos, WRM's bulletin No 137, December 2008.
- Study on state land leases and concession in Lao PDR., 2006. Land Policy Study No.4 under LLTP II, Lao-Germen Land Policy Development Project.
- Shi W., 2008. *Rubber Boom in Luang Namtha: A Transnational Perspective*. GTZ.
- Thongmanivong S. & Fujita Y., 2006. Recent Land Use and Livelihood Transitions in Northern Laos. *Mountain Research and Development* 26 (3), pp. 237-244.
- VT, 2008. Rubber growers need road access. *Vientianes Times* (Vientianes), 01/05/2008.
- VT, 2008. Think before you plant rubber. *Vientiane Times* (Vientiane), 28/04/2008.
- Vongkhamhor S., Phimmassen K., Selapeth B., Xayxomphou B & Petterson E., 2007. Key issue in smallholder rubber plantation in Oudomxay and Luangphabang provinces, Lao PDR, Upland Research and Capacity Development Programme, NAFRI.
- Vongkhamhor S., 2006. Rubber situation in Lao PDR, Forestry Research Centre, NAFRI.
- Workshop on Rubber Development in Lao PDR: Exploring Improved Systems for Smallholder Production., 2006. NAFRI, NAFES, NUOL & LSUAFRP.