Agrarian Land-Use Transformation in Northern Laos

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Abstract

Farmers in northern Laos have been experiencing a rapid transformation from subsistence agricultural production to intensive cash crop cultivation over the last decade. In particular, this transformation has been accompanied by conversion of secondary forest areas which were formerly part of the upland swidden system into permanent agricultural land. Introduction of new crops such as sugar cane, maize, and rubber are providing new economic opportunities to upland farmers who have traditionally been dependent on upland rice cultivation for household food consumption. While this commercialisation of upland agricultural production is being promoted by the government to alleviate rural poverty, not all upland communities are able to capitalise on the emerging opportunities. The current research examines land-use change patterns and the driving forces behind farmer's decisions regarding changing land use and selecting crops, particularly in areas along the new North-South Economic Corridor that passes through Luang Namtha and Bokeo provinces in northwestern Laos. The study incorporates spatial analysis, using LandSat ETM+ and ASTER satellite images from 2000 and 2005 to understand the recent trend of land-use change in Sing and Vieng Phoukha districts of Luang Namtha province as well as Houay Xay district of Bokeo province. To analyse key factors that influenced community land and resource management practices, and farmers' decisions, the research also incorporated techniques such as cognitive mapping, group interviews and household interviews. Policy review and local stakeholder discussions were used to understand how government policies affect land and resource use in the study sites.

Keywords: agrarian transition, land-use change, northern Laos

1. Introduction

Farmers in the Lao PDR began to experience transition from subsistence agricultural production to cash crop cultivation after the state announced market liberalisation in 1986. In the last decade this transformation has accelerated, particularly through the increased development of infrastructure and institutions that support regional trade (Leebouapao et al, 2005). This development has also increased the economic and investment opportunities for investors from neighbouring countries to engage in various forms of contract farming. In the mountainous north of the country, where many rural farmers have traditionally been engaged in subsistence food production, farmers are

quickly converting their swidden and fallow fields to cultivate cash crops such as sugarcane, maize, cassava and rubber (Socio Economic Unit, 2006; Vernon 2006). Commercialisation of agricultural production, particularly in upland areas, is promoted by the Lao government as an alternative to shifting cultivation practices and is deemed to eradicate rural poverty at the same time. However, the realities in rural areas are complex. Commercialisation of agriculture is occurring mainly in areas along major road corridors and near towns, particularly along national borders. Conflicts over productive agricultural land and resources are becoming more common, often involving stakeholders from outside the villages.

2. Background

Current research is part of an on-going regional multi-disciplinary research project carried out by researchers from Chiang Mai University, the Kunming Institute of Botany, the National University of Laos, the World Agroforestry Centre and the East-West Center. The overall goal is to understand dynamic patterns of land use and livelihoods in Mountainous Mainland Southeast Asia (MMSEA). Based on past and present resource use practices, it aims to project future scenarios of land use in the MMSEA region, especially in northern Laos, northern Thailand and Yunnan province of southern China. Research in Laos is jointly conducted by a group of researchers from the Faculty of Forestry of the National University of Laos and the Environmental Program of the East-West Center in Hawaii.

This study from the Lao PDR focuses on patterns of land-use change along National Route A3, and on the conditions under which rural farmers in different regions make decisions on their agricultural production systems. The research addresses the following questions:

1) What are the recent patterns of forest and land use in Luang Namtha and Bokeo provinces along the new economic corridor? What factors drive forest and land-use change here (e.g. government policy, population, and agricultural production system)?

2) How do farmers make decisions on agricultural production and land use practices? What are the key factors for their decision making? How does this differ between different classes of households and ethnic groups?

This paper summarises preliminary findings from research conducted in two districts (Sing and Viengphoukha) of Luang Namtha province and in Bokeo province (Houay Xay district). The paper presents recent patterns of land use, and addresses key concerns on land-use transition and livelihoods in the uplands of northern Laos.

3. Research methods

The research incorporates different methods to understand the driving forces behind land-use and livelihood changes. Spatial analysis was conducted for Sing district using Landsat satellite images from 1973-2004. Out of the total district area of 142,957 ha[1], changes in forest and non-forest land use were found to have occurred on 79,494 ha (56% of total area). The main objective of the analysis was to understand the historical patterns of forest cover in Sing district. Forest was defined as including both secondary as well as dense forest. Although district statistics on forest area include bush, bamboo and degraded forest areas, this study regarded these land categories as non-forest areas for the spatial analysis.

ASTER satellite images of Sing and Vieng Phoukha districts are currently being processed for detailed comparison of recent trends in land-use change. In addition to spatial analysis, various interview techniques were incorporated to understand the key factors influencing communities' resource management practices and farmers' decisions on land use. These included key informant interviews, cognitive mapping, and household interviews and discussions. Staff from the Provincial Agriculture and Forestry Offices (PAFO), the District Agriculture and Forestry Extension Offices (DAFEO), and the District Planning Offices (DPO) were interviewed to understand the development history of each area. Potential research villages were selected in each district based on discussions with DAFEO. This was followed by preliminary field visits and interviews with village leaders and households using cognitive mapping and group discussions to understand the background of the area and its resource management practices. Cognitive mapping was conducted with groups of farmers planting rubber to understand key factors determining their decisions to plant cash crops, especially rubber, and the relative importance of those key factors (figure 1).

After the preliminary visit, villages were selected for further household interviews. The villages of different ethnic groups were selected to compare the factors that affect land-use change. In order to understand how different factors affect household decisions on land use within each village, different classes of household were selected based on their access to land and household economy. Finally, the research incorporated stakeholder discussions to understand the impact of government policies on land-use change in the study sites.

[1]The district agricultural and forestry office records 187,900 ha as the official area of Sing district. This includes areas of Meuang Yuan which are now part of China. In our research, the district area is based on field observations and interviews at district government offices.

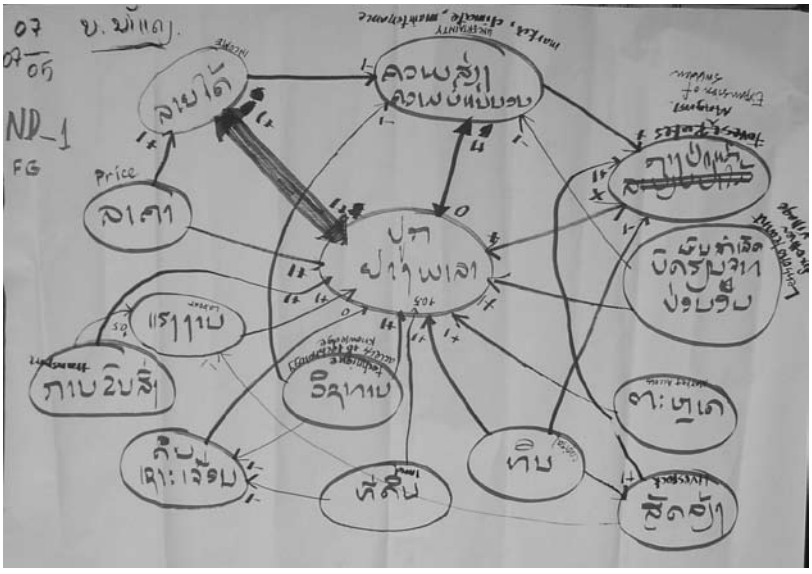

Figure 1: This cognitive map drawn by a villager indicates the factors behind decisions to plant rubber. These included labour, capital, access roads, knowledge and techniques, information on planting in other villages, and income potential. Relationships between the factors, and the relative importance of each factor, are also shown by ratings: double plus, plus, zero, minus, etc.

4. Trends in land-use change

Based on the spatial analysis conducted in Sing district, forest area declined from 50% to 30% of the total district area between 1973 and 2004 (figure 2). The period 1974-1986 indicates the most significant forest decline, from 50% to 30%. There was a recovery to 40% by 1992. Several possible causes could have led to this significant loss between 1974 and 1986. The first possibility is forest fire: a satellite image from 1986 indicates large areas affected by fire in Xiengkheng and Xay sub-districts in the northwest of the district along the Mekong River. During the stakeholder interviews staff from the District Agriculture and Forestry Office (DAFO)[2] in Sing district noted a high incidence of forest fires in Xiengkheng and Xay every year, due to local hunting practices that make use of fire. Between 1986 and 2000, a general cycle of forest cover ranging between 30% and 40% can be observed, but after 2000 the rate of forest remains stable at approximately 30%.

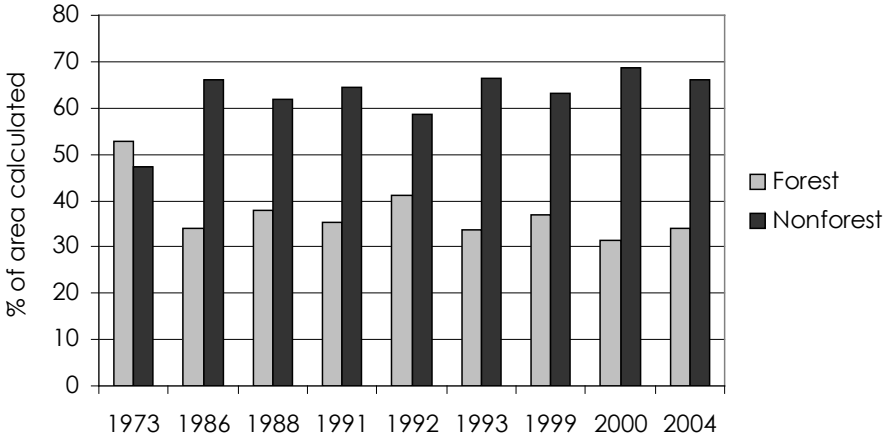

Figure 2: Forest and non-forest land in Sing district

[2] In 2005 this was changed to the DAFEO under the Provincial Agriculture and Forestry Extension Office.

Currently, satellite images (LandSat and ASTER) from 2000 and 2005 are being processed using Leica Geosystem's ERDAS Imagine version 8.5 to detect detailed land-use changes. Land cover is classified into five main categories: 1) forest, 2) secondary forest, 3) shrub forest, 4) agricultural land, and 5) water bodies. By integration analysis with Digital Elevation Models through the Geographic Information System, agricultural land is being further reclassified into upland and lowland agricultural land.

5. Agrarian transition in the uplands

5.1 From subsistence to commercial farming systems

Commercialisation of Farming Systems

Raintree and Soydara (2002) describe the upland farming system in Laos as being based on a long history of extensive shifting cultivation practices that evolved due to low population density. These systems are also characterised by their high dependency on forest resources and diverse activities. Over recent decades infrastructure development, combined with improved economic relations with neighbouring countries, have rapidly integrated rural communities into the market economy and influenced farming systems. As more farmers become engaged in commercial agricultural production there is greater pressure on commercially valuable forest resources and increased competition for agricultural land. The government also encourages the commercialisation of upland agriculture both as an alternative to shifting cultivation practice, which has long been blamed for deforestation (MAF and NAFRI, 2005), and as a way of alleviating rural poverty, particularly in upland areas.

Table 1 shows rice production areas in Luang Namtha and Bokeo. Both provinces have increased production of paddy rice over the last two decades by expanding paddy area. Figure 3 shows that over the same period both the area and the production of upland rice has declined. The decrease was particularly sharp from 1995-2000 due to the impact of the government Land and Forest Allocation policy, which regulated household access to upland swidden.

Table 1: Rice production area in Luang Namtha and Bokeo provinces

Crops	Province	1985	1990	1995	2000	2004
		hectares				
Paddy rice	Luang Namtha	4,056	4,460	5,802	8,500	11,130
	Bokeo	2,931	4,458	7,083	10,000	12,455
Upland rice	Luang Namtha	14,610	14,266	13,370	6,500	9,270
	Bokeo	6,208	4,324	7,184	2,000	4,240

Source: National Statistics Centre, 2006.

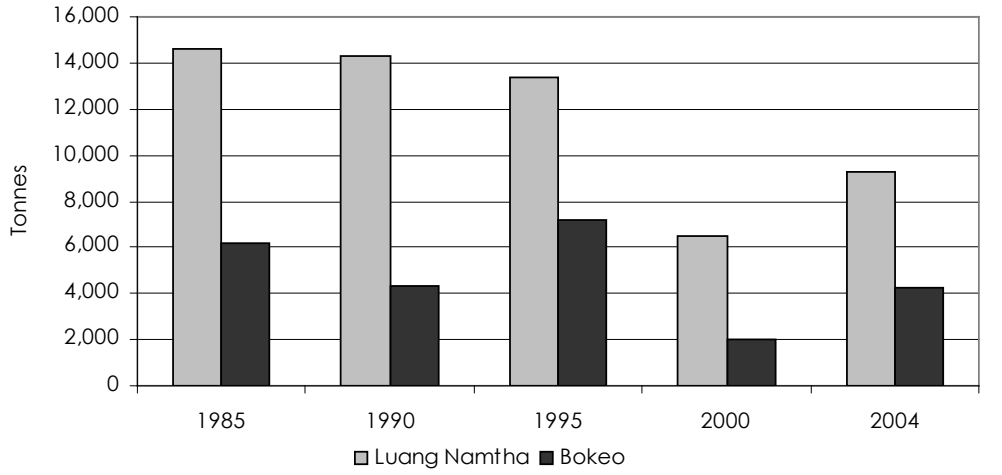

Figure 2: Upland rice production in Luang Namtha and Bokeo

Source: National Statistics Centre, 2006.

Table 1 also shows that between 2000 and 2004 the upland swidden area increased in both provinces. This is possibly linked to the shortage of rice induced by the LFA Programme, which by restricting access to land shortened swidden cycles and so forced farmers to expand their upland fields. However, as will be explained later, the nature of upland swidden expansion from 2000-2004 appears to be different from traditional practice as many farmers, particularly in Luang Namtha, began to convert their swidden and fallow land into rubber plantations, on which they could cultivate rice during the first few years alongside the rubber seedlings. The increasing importance of cash crops in Luang Namtha and Bokeo, especially those planted in the uplands (i.e. maize and sugarcane) is shown in Table 2. In Luang Namtha, sugarcane production began to increase particularly in the mid-1990s as more farmers entered farming contracts with Chinese investors (Manivong et al, 2003). Between 1985 and 2000, both maize and sugarcane production increased steadily in Bokeo. Table 2 shows that there have been boom and bust cycles of cash crop production in both provinces. For instance, in Luang Namtha, maize production dropped nearly by half between 1995 and 2000, but increased again in 2003 due to increased demand for animal feed from Yunnan province in China (Socio-Economic Unit, 2006), whereas in Bokeo sugarcane production plunged after 2000, indicating a possible decline in the market demand for sugarcane in neighbouring Thailand.

Table 2: Maize and sugarcane production

Crops	Province	1985	1990	1995	2000	2004
		tonnes				
Maize	Luang Namtha	150	2,500	1,260	743	3,212
	Bokeo	133	1,440	1,272	4,471	5,577
Sugarcane	Luang Namtha	390	2,620	10,500	43,900	66,296
	Bokeo	1,436	1,680	1,632	5,250	192

Source: National Statistics Centre, 2006.

Another notable increase over the last five years is the rapid expansion of rubber growing, as shown by Table 3. Field observations and discussions with DAFEO indicate a steady increase of rubber in both provinces, particularly since 2003. Rubber is currently planted on old swidden and fallow land[3], a fact which corresponds to the increased area of upland swidden fields between 2000 and 2004 (Table 1).

Table 3. Rubber plantation in Luang Namtha and Bokeo

Province	Existing plantation (ha)	Area targeted for rubber up to year 2010 (ha)
Luang Namtha	4,490	20,000
Bokeo	701	15,000

Source: Forest Research Centre, 2006.

5.2 Contract farming

One of the reasons for the rapid expansion of commercial agricultural production is increased trade and investment with neighbouring countries. Since the early 1990s, trade relations with China and Thailand particularly have increased the flow of investment and goods into northern Laos. In Sing district contract farming began when the regional border with China was opened in 1992. The first wave of contract farming began with rice production in lowland areas as Chinese companies brought hybrid rice varieties to local farmers. Chinese investment also promoted intensive use of lowland fields as Chinese farmers and investors sought land to cultivate vegetables and watermelons during the dry season (Lyttleton et al, 2004). By the mid-1990s, contract farming of sugarcane had begun to expand rapidly in the uplands of Sing district as Chinese sugar processing companies signed contracts with villagers. Such contracts were very informal, often with no written forms at all, while the farmers were often unable to assess the volume of sugarcane actually sold to the companies as the products were bought by the truckload in Laos and only weighed in China afterwards.

Towards the late 1990s Chinese investors began to take interest in rubber planting in northern Laos. Investors began to survey different parts of Sing district in early 2000 to identify potential areas for plantation. In the meantime, local villagers' interest in rubber also began to surge as they observed the increasing price of rubber and the success of the Hmong village of Hat Yao in Namtha district, where rubber planting had begun in the mid-1990s (Alton et al, 2005). While wealthy farmers in Sing district began to invest in rubber on their own[4], others with insufficient investment capital began to take an interest in contracts with Chinese investors. Patterns of contract farming in Sing district range from informal family-based contract farming supported by relatives in China (especially in Akha and Tai Lu villages), to small and medium-scale foreign investments that are formally registered at district and provincial levels.

[3]Farmers expressed a preference for using old swidden fallow land for rubber plantation. This requires slashing and burning of the plot before the rubber is planted.

[4]These farmers started to invest in rubber in the mid-1990s. However, many of the trees were damaged and destroyed by frost in 1999 and 2000.

5.3 Land tenure

In both Sing and Viengphoukha districts, over the last decade the rural population has started shifting towards lower elevations, particularly along the road corridors (Figure 4). According to stakeholder interviews, this relocation of the upland population to lower elevations and roadside areas began in the 1980s in Viengphoukha and the 1990s in Sing. Government-sponsored relocation was aimed at restricting expansion of shifting cultivation while extending government services (i.e. healthcare and education) to rural villages by concentrating them alongside roads, where these services can be reached more easily.

This concentration of population at lower elevations is also due to upland farmers being attracted by new economic opportunities. Since the LFA Programme of the mid-1990s demand for agricultural land, particularly swidden and fallow land, has increased as farmers have become increasingly engaged in commercial agriculture. This has stimulated privatisation of agricultural land, particularly areas of swidden and fallow land which had been part of the traditional communal land and resource management system.

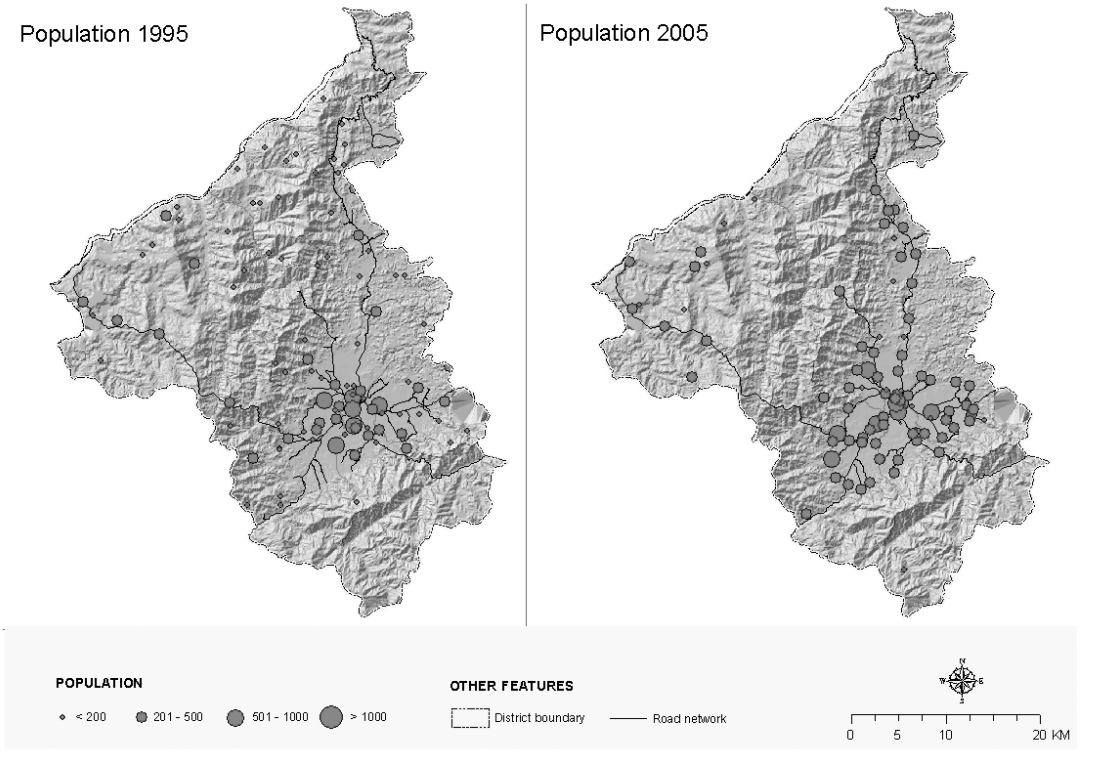

Figure 4. Population shift in Sing district 1995-2005

6. Discussion and future research plans

This preliminary work in Luang Namtha has provided evidence of a significant rural transition from farming systems based on self-sufficient rice production towards commercialisation. Spatial analysis in Sing district indicated an overall decline in forest area. The recent trend towards cash crop production (rubber and sugarcane), particularly in upland areas, is encouraging conversion of swidden and fallow land into permanent agricultural land. This appears to be part of farmers' response to declining rice yields in the uplands after the LFA Programme restricted access to swidden land.

The impact of agricultural commercialisation on forest area requires further study, particularly from an environmental perspective (Ducourtieux et al, 2005; Lestrelin et al, 2005). There is also a need to review government resource management policies such as the LFA, particularly as the context of communal resource management has changed over the last decade with the move away from subsistence farming systems. Resource management must move beyond the village boundaries delineated by the LFA process, and should consider the implication of land-use changes at a watershed level.

Conversion of swidden and fallow plots to permanent agricultural land requires intensive labour input. The current expansion of rubber and other cash crops in the uplands through contract farming may lead to future labour shortages. It may be that this matter has not been adequately considered by the local authorities encouraging farmers to engage in contract farming (Alton et al, 2005). While in the past rural farms engaged in multiple livelihood activities, this new intensive agricultural production will require farmers to select fewer livelihood activities and concentrate their household labour.

Expansion of commercial agricultural production in the uplands is also changing how local people access and manage communal areas such as pasture land. In Sing and Viengphoukha districts farmers are beginning to sell their cattle as they are losing grazing land to permanent agriculture. Villages are beginning to define more rules for households with cattle, and these are having to adopt new grazing methods, such as developing communal grazing land and fodder production systems.

Another clear indication of commercialisation is the increased privatisation of agricultural land. Those who are able to mobilise capital and labour, and have the ability to negotiate with local authorities, have an advantage when it comes to claiming more productive land. Planting crops such as rubber trees, which can last for 40 years, will change the flexibility of tenure relations and strengthen private ownership of land in rural areas.

Despite the increasing swing towards commercial production, access to capital and markets remains a significant constraint for farmers, who are highly reliant on foreign investment for credit to buy agricultural inputs. This often leads to unfavourable profit-sharing arrangements between farmers

and investors. Access to markets is also often dependent on foreign companies and investors, a fact that has triggered many problems in the past. More information is needed to solve these problems, and this information should flow to local authorities, policy makers, and extension service providers. Future research will also need to examine the gaps between policy and policy enforcement.

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