Rural Livelihoods, Biodiversity and Market Forces

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1. INTRODUCTION

"Livelihood" is simply the way people make a living. UNDP and others have defined sustainable livelihood as "the capability of people to make a living and improve their quality of life without jeopardizing the livelihood options of others, either now or in the future."

"Employment" refers to an income-earning job usually in a specific workplace, but not everyone that makes a living has a job. A job can be part of a livelihood strategy but until recently most people living in rural areas of Laos have earned their living directly from the land, pursuing various subsistence and income-earning activities without having a job, selling their labor, or earning a wage. Most of the upland households have multi-livelihood strategies, engaging in many different activities to achieve a viable household economy. In order to cope with environmental and economic uncertainties they maintain a diversity of on-farm and off-farm activities, combining fallow farming with hunting-and-gathering, horticulture, animal husbandry and forestry to piece together an adequate living. A livelihood study in a village in Nan District of Luang Phabang found that the households engage in no fewer than 8 and sometimes as many as 15 distinct livelihood activities. Economic diversity is characteristic of traditional livelihood systems.

Biodiversity is the foundation of traditional livelihood systems in rural Laos. The IUCN website lists the ways in which biodiversity supports livelihoods:

- it provides many and diverse subsistence requirements that a rural community needs for survival, including food, fodder, fuel, housing/agricultural material, cultural and spiritual sustenance;
- it provides an element of livelihood stability — the failure of one element of biodiversity does not lead to collapse, since alternative elements are usually available;
- it allows local communities a degree of self-reliance and independence from the market and government, since many goods and services can be obtained locally;
- it provides a variety of products which can be bartered and sold in markets by rural communities, thereby enabling them to gain access to goods and services that they are not able to get locally. (Kothari n.d.)

Contrary to what some central planners believe, it is not necessary to "give" rural people their livelihoods. They are not members of a proletarian class whose only option is to work for wages in the factories of the wealthy. The only situation in which it might be necessary to "give" rural people a means of livelihood is if something happens to take away the economic diversity that characterizes their traditional livelihood system or to destroy the biodiversity on which it is founded.

An enlightened government would focus most of its efforts on trying to assist the rural people in pursuing their own livelihood strategies and achieving their own livelihood objectives. Rural people are a dynamic element in the economy of Laos and poor people are part of the solution not the problem.

The household is the sovereign decision-making unit in respect to matters of livelihood and survival. A good way of understanding the inner workings of the livelihood systems of rural Laos is to analyze how households organize the means of production at their disposal in order to meet the basic needs of the household economy. This is the basic picture that emerges from diagnostic research in the LSUAFRP research areas in Luang Phabang and Oudomxay:

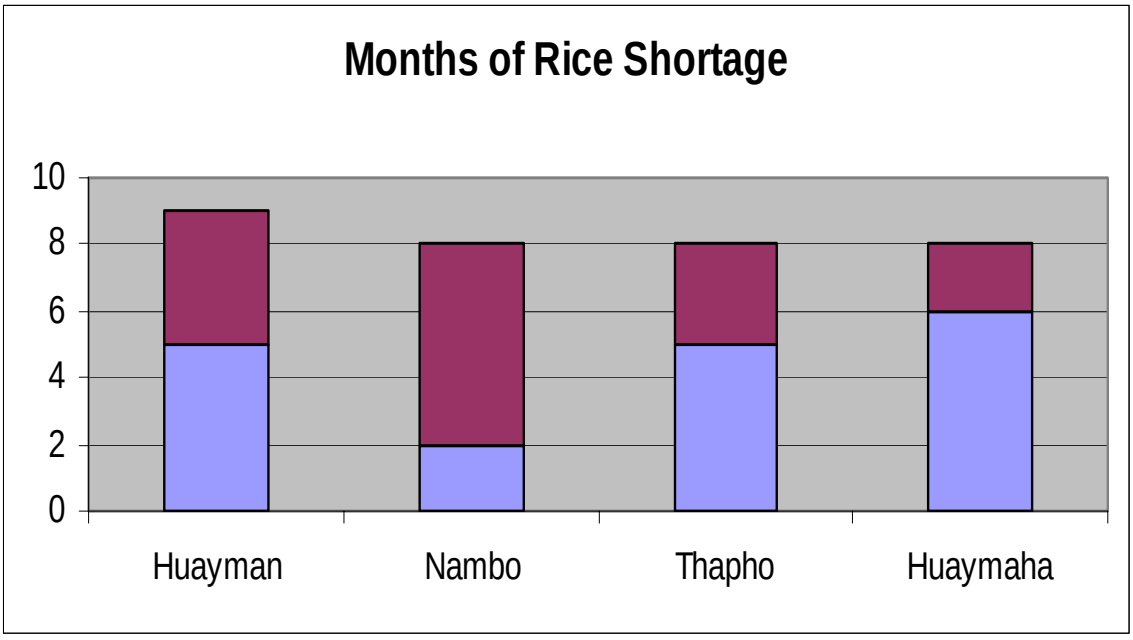
HOUSEHOLD LIVELIHOOD SYSTEM

BASIC NEEDS SUPPLY SYSTEMS	←	PRODUCTION SUBSYSTEMS (Components of Basic Needs Subsystems)
Direct Needs (outputs consumed directly by the household)		
• FOOD	←	Crops, livestock, fish, NTFPs, purchased foods
• ENERGY	←	Firewood from forests & fallows, crop residues, etc.
• SHELTER	←	Timber, NTFPs, purchased
• MEDICINE	←	Medicinal plants, purchased medicines
• CASH	←	Short term cash crops, livestock, NTFPs, cottage industries +
• SAVINGS/INVESTMENT	←	Long term savings/investments in livestock, trees, banks, farm improvements +
Indirect Needs (major inputs for producing outputs that are consumed by the household)		
• FEED FOR LIVESTOCK	←	Grasses, forage, crop residues, feed crops
• RAW MATERIAL FOR COTTAGE INDUSTRY	←	NTFPs, timber, crops, purchased materials

Source: John Raintree, Socio-economics Unit, LSUARFP, NAFRI

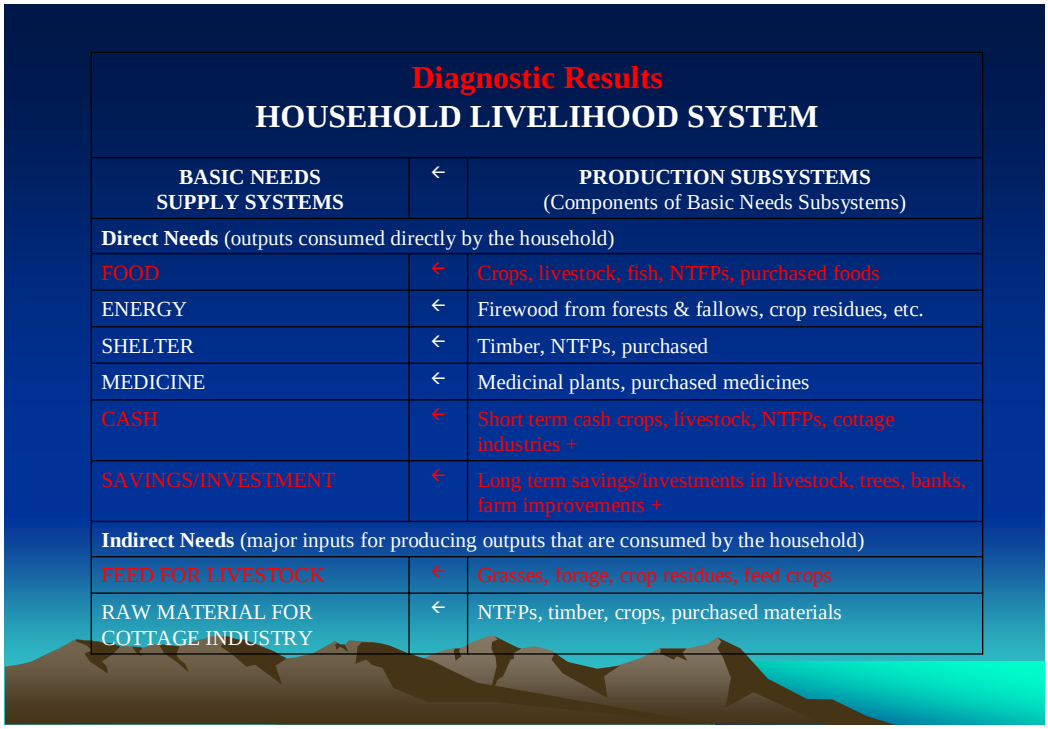
2. LIVELIHOOD SYSTEMS IN TROUBLE

The Lao Swedish Upland Agriculture and Forestry Research Programme has been assisting NAFRI to diagnose and address problems in rural livelihood systems in northern Laos. Food security has emerged as an issue in many of our research villages, among other issues.

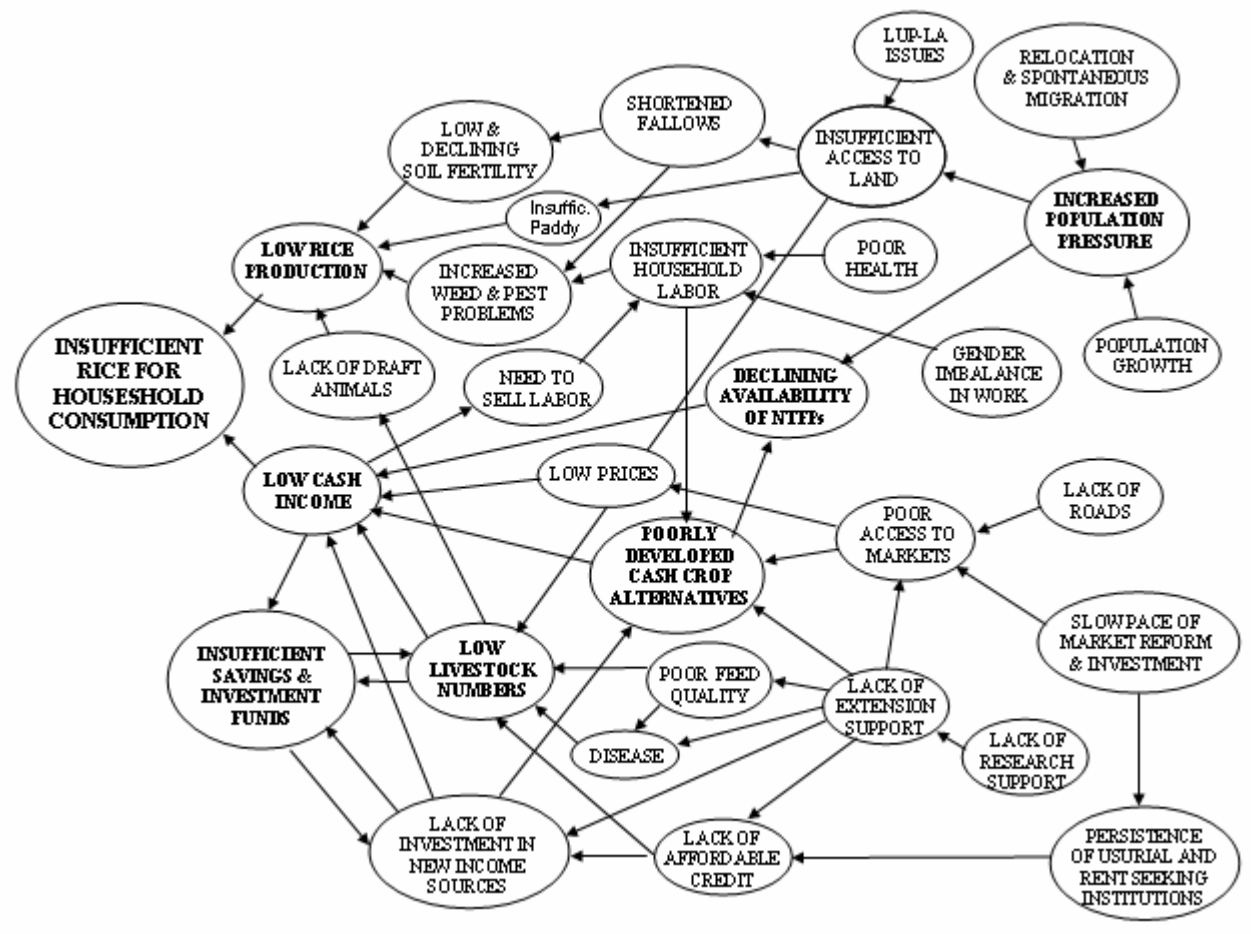


In rural Laos food security is usually defined as "having enough rice to eat." Rural households pursue a hierarchy of strategies in achieving their food security objectives:

The diagnostic research at the LSUAFRP sites revealed the following problems within the livelihood systems (problem areas shown in red)



A causal diagram of the etiology of these problems is shown below, based on an analytical synthesis of the data from the LSUAFRP research sites together with the findings of the national Participatory Poverty Analysis, which may be regarded as the people's poverty analysis.



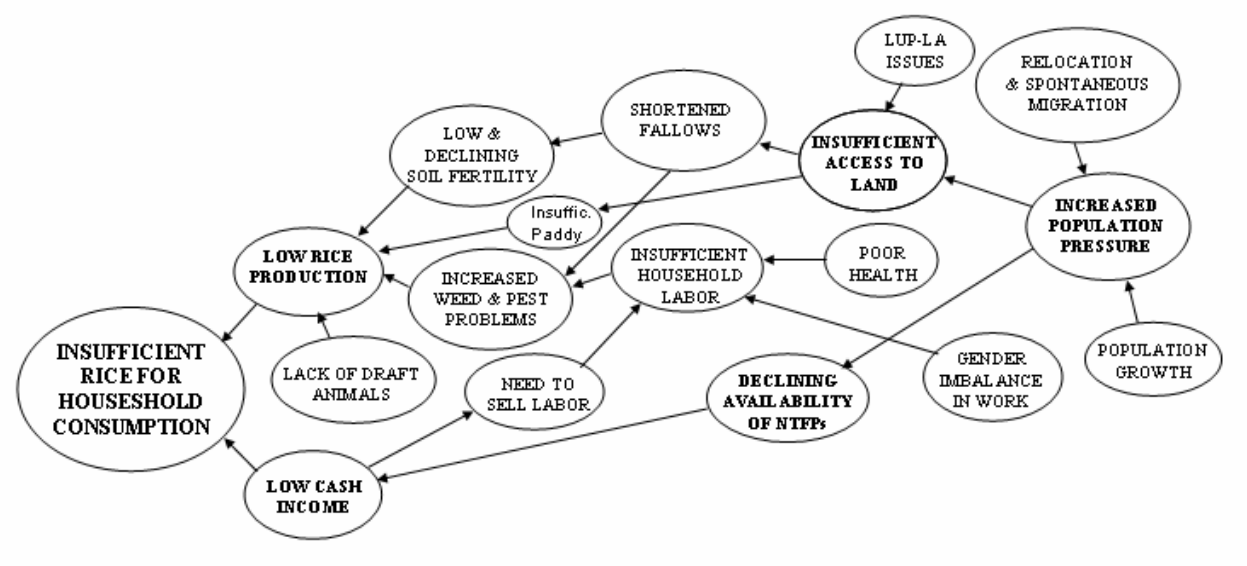
This analysis reveals three major causal complexes or syndromes responsible for these problems:

- **declining productivity in swidden-based upland farming systems**
- **declining productivity of non-timber forest resources**
- **failure of alternative income sources to transform the rural economy**

Localized population pressure is the ultimate long-term driving variable behind the "swidden degradation" syndrome depicted in the causal diagramme, but the governments relocation programme and constraints arising from the land allocation process have accelerated the problem by adding an "artificial" dimension to the problem of reduced land availability. For whatever reasons it occurs in different localities, once land shortage forces reduced fallow cycles, soil fertility begins to decline and weed and pest problems increase, as farmers return with increasing frequency to cultivate the same worn out plot of land. Labour shortages within the household compound the problem, as labour requirements increase for even the meager yields that can be obtained. The number of months of rice shortage increases, poor health and the need to mortgage the coming rice crop and sell family labour to get money to buy rice further compound the downward spiral. Without a sufficient rest period to rejuvenate the land, this downward spiral is inevitable unless there is a major change in upland farming technology.

What we found during the diagnostic research in our research villages was that, under the government's targets for village merging and relocation of population from the highlands in accordance with the focal area strategy, the population of the roadside villages is increasing dramatically. Villages are being amalgamated into larger villages with the idea of making it easier to provide basic services (water, medical care, schools, etc.). So far, not many of the expected benefits have been realized, but population

pressures have increased dramatically in the relocation villages. Not all of the localized increase in population pressure is due to relocation, however. Spontaneous migration also plays a part. Having a house near the road is something that appeals to many highland people. Nevertheless, for whatever the reason, the movement of population down out of the highlands and its concentration in target villages has placed severe pressures on local livelihood and biodiversity resources.



This is experienced in two ways, first as a decline in per capita agricultural land, which has direct impact on months of rice shortage for many households. A rough estimate would place the amount of available land for these families at around 50% of the basic livelihood requirement. As one villager put it: "Each year the people must borrow or rent land." The same applies to livestock raising. A men's focus group in Huaymaha, Phonxay reported that they used to raise cattle, buffalo, goats and poultry in their old villages in the highlands but that there was no land for raising animals in the new village by the road.

The other major impact is a decline in NTFPs available for collection, which has a severe impact on the primary cash-mediated food security strategy. This has resulted in reduced economic diversity. As an informant in Ban Pangdou, Nambo District explained, "It is difficult to earn money because the number of things to sell have decreased.""

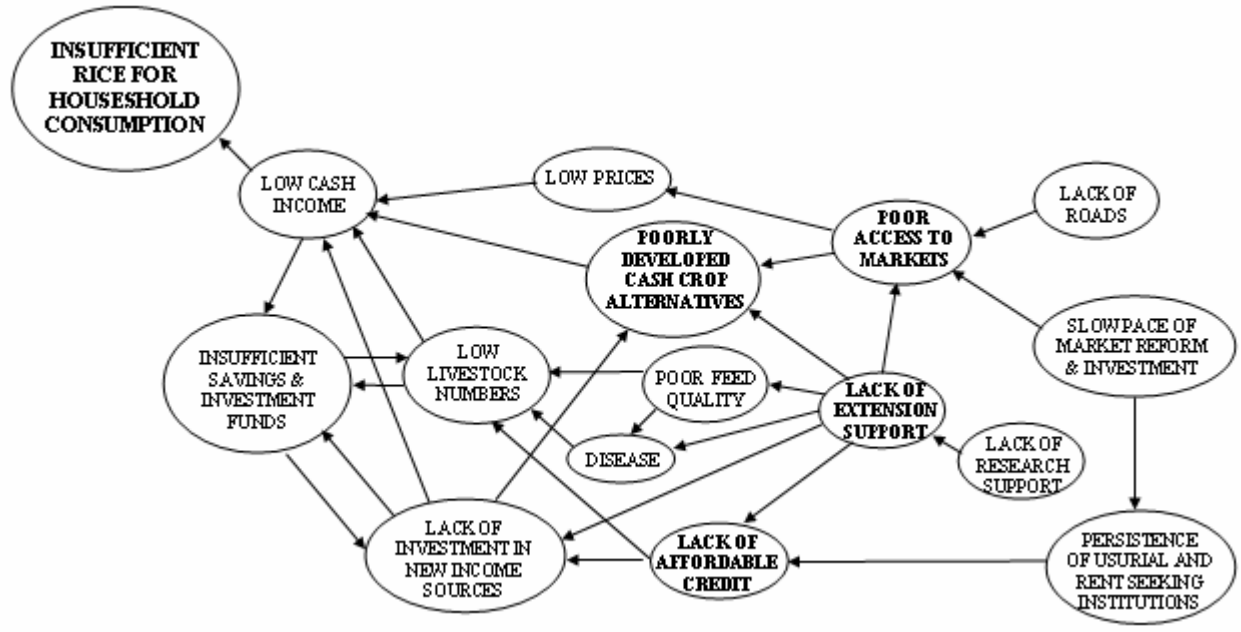
People are quite interested in new cash crops and even in shifting to a market-oriented livelihood strategy based on cash crops, if possible. This interest is growing directly out of their experience in struggling to cope with the degraded condition of the swidden agroecosystem. One family in Ban Huayman, Phonxay District said that the weeding situation was becoming so difficult that they intended to just stop trying to grow rice and only focus on cash crops like Job's tears. A woman in a focus group in Huaymaha said, "Women need lowland rice, weaving and raising animals instead of hard work weeding upland rice 4 times a year! It wastes a lot of time."

This might sound like the central planners' dream come true – farmers being forced by land scarcity to give up growing upland rice and shift to rice paddies, cash crops and livestock for the market – but paddy land is severely limited in many mountain areas and market oriented production is not so clearly a solution to the problem of food security and poverty when upland markets are poorly developed. We need only recall the crash of the Job's tears market in 1999-2000 in Luang Phabang to understand this. The situation has improved somewhat with the arrival of new processing and marketing capacity in Luang Phabang (a private sector initiative from Taiwan), but there is no guarantee that boom and bust cycles will not recur with this or any other commodity under the prevailing conditions of weakly developed market systems in most rural areas.

In fact, there is no lack of technical options. The root constraints on the adoption of cash crop alternatives are:

- poor access to markets
- lack of extension support
- lack of affordable credit

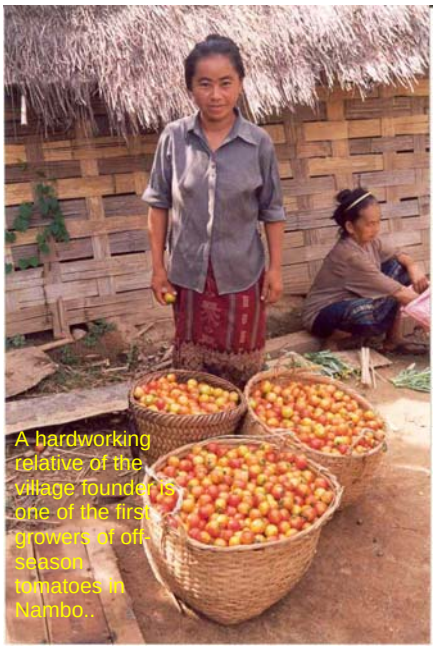
These are the problem that must be solved if alternatives are to be widely adopted by villagers



3. THE SEARCH FOR SOLUTIONS

Villagers are actively searching for new solutions. To assist them in this search NAFRI researchers in the LSUAFRP are pursuing on-farm experiments with farmers on a long and growing list of technologies. But it would be a mistake to think of this as a researcher-driven process. In reality, although researchers may occasionally suggest something new that meets with farmers' approval, the surest path to success with farmers is to provide research support to the farmers own initiatives. Some of the best examples of this are seen in the enterprising village of Ban Nambo, Phonxay, where the level and variety of market gardening activities is notably higher than in other research villages. As much as 36% of the households in Nambo own river gardens, compared to a high of 10% in the other research villages, and a surprising 45% own paper mulberry gardens. Still, the land is not enough. A number of enterprising Hmong farmers in the village have bought or rented land for market gardens in *other villages*. (Unfortunately, the entrepreneurial activities of the Nambo villagers is experienced by the other villages as additional land pressure.) Why is Nambo so different? There are several factors:

- growth of population is due to spontaneous migration rather than relocation
- it is the site of a Ten Day Market
- it was founded by a very enterprising Hmong man who has actively sought out expert advice for his farming experiments


A hardworking relative of the village founder is one of the first growers of off-season tomatoes in Nambo..

and has provided encouragement and financial support for the entrepreneurial activities of other villagers (mostly relatives

Villagers inspect a new seed variety received from researchers.

In fact there is no lack, either of innovative spirit or interest in new alternatives in the rural areas. One of the biggest surprises from the early research work by the Land Management Component of LSUAFRP following the farming systems diagnosis in Namo District, Oudomxay was the finding that farmers were quite interested in growing rubber, of all things! Reportedly, the search for new cash crop alternatives had prompted a group of Hmong farmers in Namo District, Oudomxay to visit their relatives in Luang Namtha to see what was interesting cash crops were there. They returned from their visit with the firm conviction that rubber would be a good crop for Namo and asked for assistance from DAFES. DAFES then approached NAFRI, who then started to provide research support on rubber, beginning with socioeconomic studies.

4. THE RUBBER PLANTING BOOM IN NORTHERN LAOS

Currently rubber planting for the Chinese market is taking the North by storm. It is being driven by vigorous private sector initiatives from China, met by enthusiastic response from Lao government officials and farmers alike. Everyone returning from the North these days brings a new story of rubber planting developments. Deals are being made and seedlings are going in the ground at an astounding pace. The Vientiane Times has announced that rubber will soon be the No. 1 export crop in Laos! The fact that all of this is occurring without out any evidence of a feasibility study or systematic planning is shocking to western observers. The first reaction from the international assistance community, quite naturally, is one of concern for the livelihoods systems and biodiversity resources in the North.

To fill the gap planning gap two donor-sponsored projects have begun studies of rubber developments in Laos. One is the LSUAFRP support to NAFRI and the other is the GTZ project in Luang Namtha. These two projects, which are collaborating closely, are beginning to provide some answers. The two burning questions are: Is it good for livelihoods? and Is it good for biodiversity? This paper will assay an early indicative answer to these questions, but conclusive evidence and more detailed proposals must await the completion of research underway.

Is it good for livelihoods?

To answer this question is it important to first understand how rubber has actually gotten started in the north. Recent fieldwork by NAFRI's Socioeconomics Research Unit (Khamphou et al. 2004) has uncovered the fact that the beginnings of rubber cultivation in Luang Namtha was itself the result of a self-organized farmer's study tour to learn about cash crop alternatives in Thailand, Myanmar and China, which they visited to check out stories about plantation cash crops in these places. In Thailand they found orange and sweet tamarind but concluded that these crops required too many expensive inputs to be suitable for poor farmers in Luang Namtha. In China they found other types of orange and rubber. On returning home they discussed their observations with the other villagers and the conclusion was that rubber was the best choice, since it required labor but not much in the way of capital. Labor intensive production was not regarded as a problem by Hmong farmers who had experience with opium growing and judged the two crops to be similar in their labor requirements.

They then set up a second study tour to China for rubber planting, accompanied by PAFO this time, to learn how to prepare land, plant and take care of rubber, to see where they could sell it and how much they might earn from a hectare of rubber. They concluded that rubber is reasonable for villagers. On returning home they had a meeting with villagers and found 30 families that were willing to try rubber. They divided into four groups, selected very active families to be the head of each group, and exchanged labor with the group for land preparation. They also created a committee composed of villagers to take responsibility for insuring that the same technical standards were followed in regard to land preparation, planting, spacing, etc. When it came time to tap the rubber, they approached a Chinese rubber tapper who had married a local Lao women and lived in Luang Namtha to provide training on tapping to other villagers. The local government has been providing low interest loans to villagers for rubber plantation establishment since 1994 and the experience of growers has been positive (Khamphou et al 2004).

Recently a whole new level of rubber planting has been seen, based on Chinese support. The full extent of this support has yet to be documented but here is an indicative glimpse is provide by the example of the Luang Namtha Rubber Development Co., a joint venture between the Sino-Lao Rubber Co. and the Luang Namtha PAFES, where PAFES was given a 40% equity stake in the new company (with a capitalization of USD 1 million) by a grant from the Chinese government. The company will provide clonal rubber seedlings, technology, extension and marketing, and it will also operate a research facility to support the new northern rubber varieties (Khamphou *et al.* 2004).

Most significant, perhaps, is that the three root constraints on adoption of cash crop alternatives identified in the causal diagram are all effectively addressed by this Chinese-style joint venture. What else can we point to in Laos that has such favorable characteristics for farmers?

What is driving the rubber boom?

So the planting boom is not as unplanned as one might have feared, but is there really enough market demand to support conversion of land to rubber plantations on a large scale in Laos? Almost certainly there is.

Although the market for rubber in developed countries is basically saturated and is not expected to grow in future, in "New Asia" (India, ASEAN and especially China) it is booming (Jumpasut 2004, Lim 2004,). The rubber price, which had been declining for about 20 years, has recently started to rise again. It has been projected that the price of rubber will continue to rise for at least 10 years before it starts to level off (Burger and Smit 2004), and then we may expect it to fluctuate like a normal commodity. There is a huge opportunity for new rubber plantations close to the demand centers in Asia and, as a result, rubber is no longer considered a sunset industry in Malaysia and the main rubber manufacturing countries (Thailand, Malaysia, China) are encouraging new plantations. What we are seeing in Laos is just the tip of the iceberg, as production gears up to meet the rising tide of rubber

demand, as China builds a national road system and manufactures tires for the vehicles that will travel those roads.

Conventional rubber plantations appear to offer good income opportunities for small farmers. It is not difficult to grow and yet provides abundant employment opportunity in rubber tapping. Moreover, unlike some other plantation crops, it does not appear to be associated with poverty. A recent survey of rubber farmers in N.E. Thailand who adopted rubber report that they are better off with rubber than without it. The internal rate of return for rubber plantations is quite reasonable at around 20% per annum.

What is especially interesting, both from a livelihood and a biodiversity conservation point of view, is that rubber growing in any of its forms appears to offer better employment opportunities on less land than the normally available alternatives, as indicated in the following table.

LAND USE	**LABOR REQUIREMENT** (man-days/ha)	**RETURNS TO LABOR** (relative to minimum wage)	**EQUIVALENT POPULATION SUPPORT** (pop/km)
Clonal rubber agroforests	150	1.0 - 1.7	80
Clonal rubber monoculture	133	1.7	71
Traditional rubber agroforests	157	1.0	59
Intensive short fallow upland rice	98-104	1.05	54
Extensive long fallow upland rice	15-25	0.75	11

Note: The estimate of population support capacity is based on the assumption of 150 work days per year/person and 80% of the land available for productive land use. This is indicative data from Sumatra, Indonesia. Equivalent data is not available for Laos. It is the *relative differences* that are important. Adapted from Murdiyarso *et al*. n.d. and Tomich *et al.* 1998, 2001

The most interesting possibility for Laos would be the clonal rubber agroforests, for this is the type of rubber cultivation that would offer not only the highest economic returns but also the highest economic diversification and, hence, the greatest *safety* for Lao villagers. Concerning other characteristics of this option that would tend to make it particularly suitable for the less labor intensive conditions prevalent in Lao farming, the following elaboration is highly interesting:

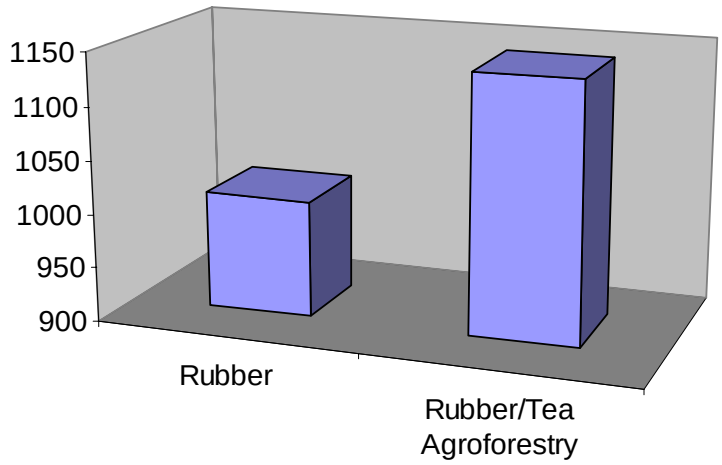
> Ongoing research on various forms of rubber agroforestry demonstrates that selected high-yielding clones can be successfully established in smallholder systems at substantially reduced management intensity, compared with the monoculture plantations for which they were originally selected. Weeding intensities of 1-3 times per year are sufficient for good rubber growth, and this need only be done within the rows of rubber trees. It was also found that fertilizer application could be reduced or eliminated. The main constraint to rubber establishment appears to be pig and monkey damage, which can be controlled by fences, bamboo shafts around individual trees, or regular guarding of the plots (Murdiyarso *et al*. n.d.)

Sunderlin (1997) has called attention to the finding that "There may, in fact, be a strong association between smallholder tree crop production and deforestation. Chomitz and Griffiths (1996) found that tree crops, and rubber in particular, may play a more important role in deforestation in Indonesia than subsistence-oriented shifting cultivation." However, a close reading of Chomitz and Griffiths (1996) with Lao conditions in mind reveals an important difference. Deforestation by tree crop substitution in Indonesia occurs in the context of a deep pool of excess labor, ever-ready to migrate to the forest frontier and often assisted to do so by transmigration programmes. This is a critical factor in the reported deforestation and this is certainly not the situation in Laos. No one has ever identified an excess labor condition in Laos, and migration in Laos tends to be from forest areas to urban areas and roadsides. Unless Laos opened its borders to Vietnamese or Chinese migrants there would not be a sufficient source

of migrant labor to make the Indonesian scenario happen. In lieu of this, the higher productivity of rubber would make it possible to fully occupy the available labor supply in a given rural area on a smaller percentage of the land, thus reducing the population pressure on other land and even, possibly, allowing the regeneration of forest from degraded fallow land. This is what the studies of Murdiyarso *et al.* and Tomich *et al.* studies show us is possible.

Rubber-based intercropping systems are an agroforester's dream come true. Among the many rubber intercropping systems already practiced in Asia, we may list:

- Rubber + food crops -- rice, maize, cassava, peanuts, banana
- Rubber + cash crops -- tea, coffee, sugar, pineapple, chilli, cardomom, lemon grass, medicinal plants, etc. This kind of intercropping is found in some but not all parts of southern China.
- Rubber + livestock -- cattle, sheep, goats



Source of data: Roland Cheo. n.d. Evaluation of the Impact of Rubber Trees in China on the Rural Economy with Specific Focus on Xishaungbanna, Yunnan and Hainan Island (http://natureproducts.net/Ecology/Rubber/Rubber.htm).

The advantage of rubber intercropping is that it increases and diversifies the farmer's income and, in many cases, it even increases the per hectare yield of rubber by stabilizing the soil and preventing excessive erosion associated with rubber monocropping on steep slopes, as in the case of the rubber-tea agroforestry system in China.

The price of rubber, like all commodities, can be expected to fluctuate once it reaches an equilibrium level, but rubber offers many opportunities to achieve for economic diversification through intercropping.

But is it good for biodiversity?

The effects on biodiversity of different ways of cultivating rubber could be mixed, but the overall tally seems to support the view that under Lao conditions rubber planting could have a net positive effect on biodiversity if it displaces short fallow farming on degraded land rather than forests. To the extent that rubber can act as a magnet for labor by providing higher returns than alternative activities, it can relieve pressures on forests and allow regeneration of overexploited biodiversity resources. Reduced land pressure can restore sustainable NTFP collection opportunities and in some areas might even allow return of sustainable long fallow farming practices, which are themselves a major source of agrobiodiversity. If agroforestry techniques are adopted the agrobiodiversity of the rubber plantations will automatically increase . Contrary to normal expectations about plantation crops and market forces, the rubber planting boom, which began as a farmer initiative, could mature into a major regenerative force for biodiversity in northern Laos. Whether in fact this occurs will depend on *how* and *where* the planting is done.

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