

Dynamics of Food Security in the Uplands of Laos

A summary of 10 years of research



Andrew Bartlett
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Northern Upland Development Programme (NUDP)
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Introduction

The purpose of this report is to summarise what is already known about the relationships between agricultural commercialization, food security and nutrition in Lao PDR.

The report consists of extracts from 12 documents produced over the past decade and a synthesis of the findings. These documents have been selected to represent a variety of perspectives and sources, with an emphasis on the situation in the Northern Uplands. Included are a conference paper, journal articles, a thesis and donor reports. The authors include experts in agriculture, nutrition, economics, human geography and political science. The findings are based on an examination of government policy, survey data, project progress reports, anthropometric studies, and interviews with farmers and business people.

These 12 documents are not the only reports that have been written about rural livelihoods in the north of Laos. If more time had been available, the author would have included extracts from additional reports, for example the *Poverty and Social Impact Assessment* by Hans-Dieter Bechstedt and Valery Gobos, and the report on *Poverty, Gender and Ethnicity Issues in the Uplands* by Rita Gebert and Ny Luangkot. Nevertheless, the current sample contains a wide range of perspectives and conclusions. A larger selection of documents would have contained more data, but it seems unlikely that this would have yielded a greater number of findings.

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Synthesis of findings

The 24 findings below are based on the 12 documents reviewed by the author. Each finding can be found in two or more of these documents. The letters in square brackets indicates the sources. For example, [D,G] would mean that this finding is taken from 'Understanding Food Security in the Northern Uplands' by Joost Foppes *and* 'Cooking Up – Dietary Change in Lao Upland Kitchens' by Jutta Krahn.

1. Agricultural commercialization is part of a broader transformation [A,E,I,L]

Although agricultural experts often use the phrase 'connecting farmer to markets', the reality of agricultural commercialization is far more complex. Rural communities are being profoundly impacted by a number of interrelated developments: expansion of roads and mobile phone networks, granting of land concessions and monopsonies, logging and hydropower, village resettlement and efforts to eradicate slash-and-burn farming. Separating the impact of one development from another may be impossible, but the combined result has been described by one researcher as "the collapse of traditional livelihood systems".

2. Most commercial crops are not food crops [E,K]

There is a lack of accurate statistics, but the area under rubber, sugar, maize and cassava is probably more than half a million hectares. All of these crops are grown for export. The rubber is turned into car tyres, while the maize is fed to livestock. Some of the cassava could end up in Chinese snacks with almost no nutritional value, but may also be converted – like sugar - into ethanol. In short, none of these crops are grown for domestic human consumption. Consequently, the contribution that cash crops make on food security arises from their impact on incomes.

3. Commercialization has winners and losers [B,D,I,J,L]

It is clear that economic growth does not automatically lead to improvements in food security for the population as a whole. Development benefits are not evenly spread in Laos, and some social groups are becoming more vulnerable not less. Nevertheless, commercial agriculture is creating new livelihood opportunities to replace those that are being lost. Not all rural households can take advantage of those opportunities, with the result that while some rural people are making good money from new crops, others are struggling to survive.

4. Household food security does not depend on farming [A,D]

Although Government and donor agencies tend to look upon rural people as farmers, most upland households are collecting or buying more than half of their food. A study of villages in Oudomxay and Luang Namtha showed that less than 30% of food was derived from the farm. Dependence on farming appears to be lowest among the poorest households, and the trend is

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downward. Although there are opportunities for increasing production of food crops, this alone will not guarantee food security for rural people.

5. The most vulnerable are those with little or no land [H,K]

The opportunities associated with commercialization are skewed in favour of households with more land. Given the variation in slope and soil type in Laos, the size of land holdings can be misleading as a measure of assets, but a useful distinction can be made between households with paddy land and those without. Paddy land is a valuable asset, but only available to a minority of upland households. A further distinction can be made between households that regularly buy labour in order to cultivate their land, and those that regularly sell labour in order to survive.

6. Access to land is declining [A,B,D,E,F,K]

Government has been attracting foreign investors by claiming that Laos has plenty of land. Many people in the uplands would not agree that land is plentiful. Population growth has led to a shortening of fallow periods in traditional farming systems. Huge areas are being lost to plantations, mines and reservoirs. Resettlement programmes have also left many households with greatly reduced access to land. Consequently, although market opportunities are expanding, the number of households that can avail of these opportunities may be contracting.

7. Conflicts over productive resources are rising [A,D,E]

As land becomes scarce, conflicts are starting to emerge. Some communities complain that land concessions have left them with insufficient land to graze their animals. Compensation has often been inadequate and promises of employment have been ignored. Efforts to improve food security in the uplands may need to include measures for conflict resolution.

8. Rural people survive by collecting forest foods and selling labour [B,D]

The coping strategies that are most frequently mentioned by rural people are gathering wild products (NTFPs) and selling labour. These strategies fill the gap between household food production and consumption. There is a high level of seasonality to these coping strategies. Generally, they are most important at the time of rice deficit that starts in April and is most severe in August, prior to the harvest.

9. Forest foods are declining [A,B,G,I,K]

The dependence of many rural communities on forest foods is well documented, although often overlooked in Government policy. The diets of ethnic minorities typically include dozens of different roots, leaves, shoots, mushrooms, seeds and fruits. Many villagers are more likely to eat crabs, frogs and insects than pigs and chickens. The availability of forest foods is falling rapidly. In the uplands, most of these foods are collected from

secondary forest, ie. areas that have been cut as part of shifting cultivation during the past 20 years. In terms of food security in the uplands, the decline in access to secondary forest is of equal or greater significance to the decline in access to land for crop production.

10. The commercialisation of NTFPs has pros and cons [A,C,I,L]

The inhabitants of the northern uplands have been selling forest products for generations. The development of new market chains for NTFPs is attractive because it involves an evolutionary rather revolutionary approach to commercialisation. Consequently, it is hoped that this will have a less disruptive effect on environmental and social systems compared to monocultures such as rubber, maize or cassava. There are success stories in which rural people are able to supplement their crop production with cash from selling benzoin, tea, or bamboo shoots, thereby enabling them to meet their food requirements. There are also cases over over-extraction that has accelerated the loss of NTFPs. As they enter the cash economy, many rural communities appear to be making a windfall profit by liquidating their natural assets rather than adopting a sustainable strategy for food security.

11. Proletarianization: the rise of the wage labourer [A,B,D,J,K]

As agricultural commercialisation takes place in the uplands, an increasing number of rural people are becoming dependent on wage labour. With declining access to land and forests, poorer households need to sell their labour to meet their food requirements. Skilled workers and traders have better food security than families that depend purely on farming. The most vulnerable, however, are semi-subsistence households that cannot grow or collect enough food to meet their needs, and who perform unskilled tasks to earn cash. This latter group are caught in a vicious cycle, unable to spend enough time on their own plot of land, while also and unable to earn a decent wage.

12. A key question: is commercial agriculture producing enough jobs? [E,I]

Many rural people are working as labourers in sugar fields, rubber plantations, vegetable fields, but are there enough jobs to guarantee the food security of the current and future rural population? Do the jobs pay well enough, and are they secure enough to provide a regular income? Or are household members forced to seek work in other parts of the country or across the border in Thailand? According to one official estimate, there are 300,000 Lao people working in Thailand. The number could be much higher at certain times of the year. Is this how Laos wants to solve its food security problem, by allowing rural people to seek work overseas? Or could the success of commercial agriculture be measured in terms of the number of worthwhile jobs that are created, and the incomes that are generated, not just the tonnes of commodities that are exported?

13. Rural people as food consumers, not just producers [A,D,F,G,J,L]

According to one recent report, an estimated 40% of food consumed in the study area came from outside the village. This was an area that still had plenty of forest and the production of some food crops. Elsewhere in the uplands, where there is wide scale conversion to cash crops, many farming households will soon be buying most of their food. As a consequence, food security and vulnerability is increasingly dependent on the vagaries of global commodity markets.

14. Indebtedness is a growing phenomenon [A,D]

Linking farmers to markets involves new forms of borrowing. Inputs are often provided on credit and households may find themselves in debt when yields and prices fail to reach the expected levels. The significance of financial debt for household food security needs further examination. Borrowing food (or accepting food gifts) has long been a coping strategy for poor households, but borrowing money to buy food is a new phenomenon, and the implications of this change are not clear.

15. Shifting cultivation is of central importance [B,K,L]

Agricultural commercialisation can be seen in terms of what is gained: new crops, new companies, new markets, new jobs. It can also be seen in terms of what is being lost: at the top of that list is shifting cultivation. Most of the area now planted to commercial crops was being used to produce upland rice only a decade ago. There is an extensive literature on shifting cultivation in Laos, but a lack of agreement on the current area and productivity of the system. The eradication shifting cultivation involves the eradication of a food security strategy used by thousands of upland households. The inevitable question is whether or not alternative strategies of equal or greater effectiveness are available to these households.

16. Resettlement has a negative impact on nutritional status [B,D,H]

Government policies related to focal area development and village consolidation have led to the resettlement of many rural communities in Laos. Although these policies were not originally linked to agricultural commercialisation, there have been a number of recent cases (particularly in the South) of villages being moved to make way for plantations. In addition, the policy has been to move rural people close to roads, into the same areas that are most attractive for production of cash crops for export. Consequently, resettled households are suffering from lack of access to land for food production. Anthropometric studies of children in resettled households show severe food deficits, resulting in high proportions of wasting.

17. Attention needs to be given to the composition of diets [B,C,D,F,G,J]

Although traditional diets may include dozens of plant and animal species, they often lack essential nutrients. Dietary diversity should not be mistaken for nutritional balance. Particularly noteworthy is the low level of protein and fat in many rural diets. In the past, these nutrients were sourced from wild animals, but over-extraction and declining access to forest has led to a reduced intake. The cash incomes that accompany agricultural commercialisation provide rural people with a means to improve the balance of their diets. Some studies show that pork meat (protein) and cooking oil (fats) are among the food items that are most commonly purchased in villages. Nevertheless, there are other studies that suggest many rural families are feeding their children on sticky rice and chilli paste while using cash to buy non-food goods.

18. Food security should not be equated with rice sufficiency [F,G]

The number of months of without rice has long been used as a measure of household poverty in Laos. For example, an average of 4.8 months rice insufficiency is reported for Oudomxay. This measure overlooks the fact that in the past many rural households were able to feed themselves from the forest when rice was unavailable and, furthermore, the forest diet was often healthier than the rice-and-jeow mentioned above. In short, a lack of rice should not be equated with poor nutrition. In addition to which, growing more rice does not necessarily improve food security; at least one study shows that rice yields were not associated with differences in nutritional status.

19. Home gardens are one way to improve rural diets [C,J]

As cash crops expand, the collection of wild food is being replaced by buying food with cash. It has already been noted that there are concerns about the lack of dietary balance in both strategies. Home gardens are one way to address nutritional deficiencies. Many villagers already maintain home gardens but project reports show these gardens can be improved in various ways. New plants can be introduced for their nutritional qualities, and small livestock can be added to create a balanced diet. Surplus production can be sold for cash. These gardens do not need to depend on imported seed, but can be stocked with plants relocated from swidden fields.

20. The role of women is crucial [C,F]

Women play a crucial role in household food security and nutrition. Traditionally they have done much of the work in shifting cultivation and gathering wild foods. They also uphold dietary practices and food taboos that impact the nutrition of children. Studies show that women's social status and educational level are significant determinants of malnutrition. Less is known, however, about the impact of agricultural commercialisation on women. If rural households are shifting toward off-farm employment and buying food, is there a gender dimension to these new roles? For example, studies in other countries have shown low levels of breast-feeding among plantation workers; is this happening in Laos?

21. A livelihoods framework is useful for understanding connections [I,J,K]

A number of studies have used livelihood concepts to examine food security in Laos. These concepts provide an holistic framework that emphasises the connection between issues such as access to land (natural capital), the cash economy (financial capital) and nutritional levels (human capital). The livelihoods perspective also brings attention to vulnerability and coping strategies, which are highly pertinent to the changing situation in Laos.

22. Anthropometry is useful for measuring impacts [C,F,H]

Other studies have used anthropometry - the science that deals with the measurement of the size, weight, and proportions of the human body – to add much-needed precision to our knowledge about food security and nutrition in Laos. Measurements of child wasting and stunting provide hard facts about which groups are suffering the most from poor nutrition.

23. Policy options are available [D,E,J,L]

Although many of the reports included in this study have identified negative impacts associated with the land concessions, resettlement and the eradication of shifting cultivation, they all indicate that options are available. Negative impacts can be reduced. Some of the recommendations focus on restricting certain types of investment or reconsidering certain policies. Other authors have accepted that these investments and policies are going ahead, and focus their attention on mitigating measures.

24. More research is needed [B,G,K]

There is a lack of accurate information on which to base policy decisions regarding agricultural commercialization and food security. Government officials and donor experts alike have called for more research. In particular, there is a need to know what is happening at the household level in vulnerable groups of society. How are the poor actually coping with changes in policy, investments, infrastructure and market prices?

Proposed Field Studies

NUDP plans to support a number of field studies in the northern uplands of Laos that will help to fill some of the gaps in our knowledge about the dynamics of agricultural commercialisation and food security.

Five studies will be implemented over the next 12 months:

- The NAFRI Policy Research Centre (PRC) will carry out an assessment of the impact of agricultural commercialization on food security and nutrition. In addition to a desk study - that includes this report - the PRC will undertake series of case studies that attempt to identify the circumstances that lead to positive and negative impacts on food security and nutrition. Fieldwork will be carried out in Phongsaly and Huaphan. Contact person: Somsameu Douangdavong
- The Northern Agriculture and Forestry Research Centre (NAFReC) will carry out field studies in Luang Prabang to understand the impact of commercial agriculture on women and youth. The study will look at three main types of commercial agriculture production, namely a) concession agreements, b) contract farming, and c) surplus production for open markets. For each economic model, the study will assess the impact on the use of household resources including land, labour, and capital. Contact person: Somphet Pengchan
- Through the Lao Agricultural Research Fund, three studies have been approved:
 - 'Cash crop production and its impacts: case study of smallholder corn production and its impact on food security in Houn district, Oudomsay'. This will include a close look at coping strategies of households who have replaced rice production with maize, including details of their food purchasing arrangements. Contact person: Khamphou Phouyyavong (NAFRI)
 - 'Role of rural women in the income generation through livestock production and trade in Luang Prabang province'. This study will look at how women make use of the income generated from commercial livestock production, in particular how the use their income to ensure household food security. Contact person: Sangkhom Inthapanya (Souphanouvong University)
 - 'Kitchen vegetable production in improving livelihoods of smallholder farmers in the Northern provinces'. The study will examine how farmers have switched from collecting wild vegetables to growing vegetable in kitchen gardens in response to the expansion of rubber plantations, and how this affects incomes and food security. Contact person: Xayasinh Sommany (Horticulture Research Centre)

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Under each of these agreements, Lao researchers will be examining household level impacts of the changes that are taking place in rural livelihoods. The issue of coping strategies will be of central importance, and attempts will be made to differentiate between the social groups.

In addition to using traditional survey techniques, some of the case studies will include the use of video as a means of capturing the perspectives of rural people.

Results from the NUDP collaboration with NAFRI-PRC and NAFReC will be presented before the end of 2012, while the studies funded through LARF will continue into 2013.

Full references

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- I Rigg, Jonathan (2006) **Forests, Marketization, Livelihoods and the Poor in Lao PDR** Land degradation and development 16
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Reference A

Farmers' Voices

Randall Arnst (2010), Laos Extension for Agriculture Project (LEAP)

<http://www.laofab.org/document/view/937>

Key Points:

Interviews were conducted in a total of 14 villages in three Provinces: Champassak, Vientiane Municipality and Oudomxai (see map). In each village, a team of researchers spent an entire day talking to farmers, both as individuals and as focus groups divided into men and women.

“Too many mouths eating and not enough hands working leads to hunger and shortages.”

“Earlier, there was lots of food in the forests. But now it is all vanishing. Everything goes to the market. Everyone needs money.”

“The future will be worse because nature is gone. We will just be labour for the foreign businesses.”

“In 2007, before the concession, there was forest. Not any more.”

“We are not raising buff loes and cows because we are increasing the rubber trees and have no grazing grounds.”

“In earlier days we had cows and buffaloes... since we started growing corn we sold them all. We don't have grazing lands anymore... We also don't have time...”

“If the government wants us to stop growing corn, they should give us another crop to grow that brings as much income.”

“The government won't let us live too far from the road.”

“Before, we just foraged for ourselves, but now we forage to sell.”

“All of this fighting and conflict is over foraging for food that isn't there.”

“Before, we shared and borrowed food from each other. Now it is all about money.”

“These days, as far as food, it is easy for those with money.”

“Incomes are up, but the environment is down.”

“In today's times, no-one has labour to share. Everyone wants money.”

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“It isn't a matter of insufficient rice. It is a matter of insufficient money.” “Those with a lot of land, have a lot. Those with a little land, have only a little.”

“Now we eat well, but are in debt. Before we did not eat well, but had no debt.”

“Before we had only salt, but now we have MSG and Knorr.”

“Money is important if you don't have any.”

“We have limited land for production. We do not rotate the fields as before. We keep using it over and over. The land is losing its quality.”

“The buyer sets the price; the buyer has the rights.”

“Money is important if you don't have any.”

“The rich will rise to the sky, while the poor will be beaten to the ground.”

Author's Conclusions:

‘Food’ and ‘rice’ are often used interchangeably in the Lao PDR. Indeed, food security or shortages are often and inaccurately assessed by how many months per year people have rice to eat.

For many farming families, annual rice shortages usually occur late in the year, in the months leading up to harvest. These seasonal shortfalls are serious only for those without access to tubers and other NTFPs that provide an adequate, albeit less desirable, alternative.

Seasonal shortages for other foods fall into two periods. The first is during the later months of the dry season, when foraging becomes most difficult, and water most scarce. The second period is the early months of the rainy season, when heavy field work leaves little time to forage, and heavy rains or flooding make it difficult.

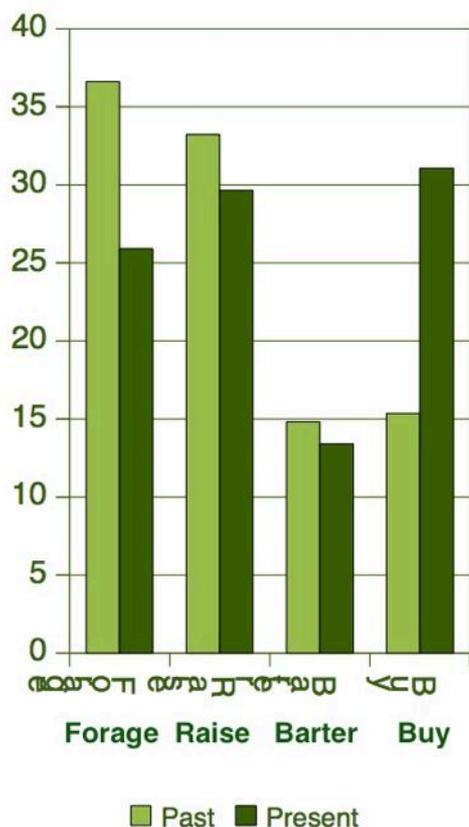
More serious and chronic shortages are due primarily to lack of land, and/or poor or decreasing soil quality. Increasing population, shortened rotational cycles in upland fields, forced displacement, banning of swidden systems (‘slash and burn’), economic concessions, cash cropping and associated debt; these trends are all making the problems worse.

Most villages have no collective system to deal with food shortages. Except in emergency cases involving calamity or sickness, unremunerated assistance is usually limited to close family.

Although foraging was estimated to provide just over one fourth of families' regular food needs, its centrality as a backup system cannot be overestimated. Nor can it be overstated that many of the same trends referenced above are destroying this backup.

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Foraging and gathering are decreasing as ways of directly meeting food needs because there is less food available in the natural environment and agricultural fields as a result of deforestation, environmental degradation, and over-harvesting for sale and consumption.



Not only are more people foraging for fewer resources to eat, they are also increasingly collecting them to sell, largely to buy foods to eat. Women reported selling wild food items (such as mushrooms, bamboo shoots and tubers) that fetch good market prices and buying cheaper foods to eat. Women in majority of the villages also reported that wild food sources are depleting because of the growing market in non-timber forest products.

In villages that were visited, foraging has declined significantly in recent years. Subsistence production (growing crops and rearing animals for own consumption) remains important, but cash purchases of food have doubled.

By combining categories for foraging, raising and bartering, we can compare cash and non-cash methods of meeting food needs. Non-cash methods have decreased from 85 to

just under 70 percent, while cash purchases have increased from 15 to just over 30 percent.

This suggests that although the use of cash has doubled, it still accounts for less than one third of total food needs. Any analysis of economic activity in Laos needs to take this into account; food security in the country still depends – for the most part – on transactions that are not included in expenditure and income statistics.

What emerges from these interviews is a story of two economies. The first economy has sustained the people of the region for centuries.... This economy is predominantly rural, localised and largely non-monetary. It is closely linked with and dependent on the natural environment.

The second economy, for the most part, is measured in decades rather than centuries. This economy is largely urban, increasingly globalised, and almost wholly monetary. It is increasingly detached from, yet closely dependent on, the exploitation of the natural environment... In brief, this is an economy of extraction.

Reference B

Food Security and Biodiversity in the upland Lao PDR: A Review on Recent situation of Causes and Effect

Linkham Douangsavanh, Khamphou Phouyyavong (2009), TRF Conference “Agriculture, Environment, Food Security, and Cooperation of Countries in Asian Sub-region”, Bangkok, 25th - 27th May, 2009

<http://www.laofab.org/document/view/513>

Key Points:

The policy of the Lao PDR Government is to eliminate the cultivation of slash-and-burn upland rice cultivation and to replace it with more ecologically sustainable land use system at the village and household level. This study was conducted to gain in depth understanding of the food situation and the causes of food security in the upland areas of the Lao PDR.

Upland shifting cultivation through slash and burn and long fallow has been practiced for centuries in Phonsay and Namou districts. However, the rising population pressure and land use restrictions have forced farmers to reduce fallow periods to only 2-3 years.

In general there are rather significant land shortages in the research villages of Phonsay and Namou. All the research villages are located along the road, often in narrow valleys surrounded by steep hillsides. Consequently, flat land is relatively rare. The lack of sufficient agricultural land in the different villages has been compounded by the effects of the government's relocation programme, and also by spontaneous migration. There is simply not enough land available within the existing boundaries of the relocation villages to allocate sufficient land for livelihood to the relocated families.

Upland rice yields are highest for the well-off farmers and lowest for poor farmers. This may be because well-off farmers are able to hire labor for weeding while poor farmers must sell their labor to earn wage income and, hence, may not be able to adequately attend to their fields. In addition, the land quality operated by the poor farmers may be poorer than that of the well-off farmers who due to their superior economic situation are likely to be able to appropriate better quality land. These are hypotheses that require further investigation. The finding from the case study areas had found that, in Namou village, the average rice yield of well-off farmers was approximately 1.6 tones/ha, while the poor villagers had only 0.9 – 1.2 tones/ha. In Phonxay village, the well-off households had the average yield of 1.5 tones/ha, whilst the poor households had only 1.0 - 1.2 tones/ha.

Normally all villages experience a minimum of 3 to 4 months of rice insufficiency in a year, extending to a maximum of 5 or 6 months in some years... The average in the research villages is in line with the results of the

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The complex web of interrelated problems and syndromes in the research areas were identified through the group discussions and focus group discussions. The summary of this complexity, which leads to insufficient rice for household consumption, is shown in Figure 1.

This analysis reveals three major causes or roots 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

Author's Conclusions:

To alleviate the poverty and rice insufficiency in northern upland of Lao, integrated farming systems with rice, cash crops and livestock were good solutions to increase household income, food security and generate year-round employment for farmers in the upland. In both study area, their main occupation in the past was agriculture under the slash and burn shifting cultivation. The main crops were rice for household consumption, maize and cassava for animal and for households' consumption in time of rice shortage. At present, their main occupation is still agriculture, but under three land types: very few lowland paddy fields, upland fields, and highland fields. In upland and highland fields are majority land use for cultivation and they still practice shifting cultivation as main occupation, but under the mixed type of shifting cultivation with maize, cassava and other crops. Apart from cropping they also raised animals in the highland and in upland valley floors, they also raised pigs, poultry and a less amount of cattle and buffalo, for consumption, ceremonies, rituals, cash and exchange. The economy in the highland was based on their crops, livestock and NTFPs. These things mostly were not enough for their living in their environment.

Author's Recommendations:

Based on the results of this study, recommended areas for further investigation are as follows:

1. Continuation of existing research-and-development lines
2. In-depth diagnostic research to understand the nature and severity of food security problems (purposive sampling)
3. In-depth household livelihood studies to understand how households are coping with food insecurity (nutritional adaptations) and other problems (wealth-stratified sampling)
4. Area-based studies at district level to understand the processes behind increased population pressure on resources (spontaneous migration, relocation, land use planning issues)
5. Policy studies to understand how policy makers might better assist the Districts to achieve national goals in rural development, poverty alleviation and sustainable use of natural resources.

Reference C

Home Gardens in the Lao PDR - Linkages between Agricultural Biodiversity and Food Security

Pernille M. Dyg and Saleumsy Phithayaphone (2005), Juth Pakai 4

<http://www.laofab.org/document/view/1709>

Key Points:

Home gardens are good examples of the close link between biodiversity and food security. While they are important micro-environments for in situ or on-farm conservation of a wide range of plant genes, they also provide essential sources of food, fodder, medicines, spices, construction materials and income for rural households in many countries around the world.

It is widely recognised that genetic diversity in a farming system provides more crop stability in terms of yields, which has an important impact on food security. Furthermore, it also enables more sustainable production methods, as the interaction between the diversity of plants lowers the dependency on chemicals and other external inputs. This in turn provides a place where plants, animals, insects, micro-organisms and the soil interact, thus maintaining the agro-ecological balance and protecting the soil from erosion

Diversity of plant species makes an important contribution to improving the nutrition of rural and urban families. Fruit and vegetables cultivated in home gardens are rich in micronutrients and increase diversity of diet, thereby preventing various diseases and malnutrition. This is especially true when garden-raised meats are used to add important protein. Women are vital to the management, production and utilisation of produce from home gardens. This includes selecting and storing seeds, planting, weeding, and using the produce in the household or selling it. Women's role in conserving local varieties is important and their knowledge has been vital in resource enhancement (Engels, 2001).

A two-district survey of indigenous agro-forestry practices, by the Lao-Swedish Upland Agriculture and Forestry Research Programme (LSUAFRP) and the Northern Agriculture and Forestry Research Centre, recorded that home gardens are well-known and widespread in both districts, and that some kind of home garden is present in almost every village. In the two districts, Namo in Oudomxay Province and Phonxay in Luang Prabang, there are different kinds of home gardens but also similarities. Crops include fruits (papaya, banana, citruses, pineapples, mango and jackfruit) and vegetables (aubergine, chilli, cabbage, beans) plus ginger, taro, bitter bamboo, peanuts and various medicinal plants. In one garden, in the mountains of Phonxay, more than 50 different plants were grown (Sodarak et al, 2003).

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In 2002, FAO initiated an eighteen-month pilot project, entitled Home Gardens for Improved Nutritional Well-Being. The objective was to establish a model to reduce the severe malnutrition prevalent in rural areas and improve the nutritional well-being of the population by increasing production and consumption of nutritious foods, emphasising foods rich in micronutrients. The model includes small livestock and aquaculture

More than 25 different species of fruits and vegetables were found in the home gardens before the project started, some of which were local varieties. During the project, additional local varieties were recommended, and farmers were provided with vegetable seeds and fruit saplings. Twenty-three different varieties of vegetables were identified and promoted for their important nutritional qualities, as well as fifteen varieties of fruit and nine types of forest food, including underexploited indigenous fruits and nuts (FAO and DOA, MAF, 2004).

Not only did the project improve existing traditional home gardens, it also helped farmers to grow a variety of different leafy vegetables and other crops on a year-round basis, with increased yields and better quality... Before the project started, only 23% of the households were growing these vegetables in their gardens, but after project completion, the proportion had reached 75%. Increased home garden production led to a 17% reduction in the ratio of vegetables derived from the forest, thereby alleviating the stress on over-harvested forest resources (FAO and DOA, MAF 2004). This is also likely to have a positive impact on time use and labour, reducing the time women in particular spend on gathering these foods from the forest.

Nutrition education and food preparation activities were closely linked to food production. Food preparation demonstrations were offered to the target households to increase the number of foods used in daily meals. This programme managed to improve nutritional practices in a relatively short time.

In addition to crop production, other components were also included to enhance food and nutrition security and provide income. The project helped increase farmers' awareness and skills in fish farming techniques. With better management of ponds, fish consumption increased, while improved marketing boosted sales of fish. Poultry production (chickens and ducks) was also included to enhance animal protein and energy in protein-deficient diets. This helped families accumulate income: for a three-month period: at the end of the project, each household had an earning of US\$150 from the sale of poultry, after meeting the consumption needs of the household.

After six months of regular growth monitoring combined with nutrition education, anthropometric measurements showed the prevalence of underweight children was declining. The final measurements in July 2004 recorded a rate of 15.6%, down from 23.2% at the baseline (April 2003). For underweight children 24-35 months old, the prevalence dropped from 33.3% to 5.6% post intervention.

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This innovative home garden model integrates agricultural production with nutrition awareness. The results have demonstrated that it can serve to:

- Increase food production with optimum use of available area;
- Diversify food production;
- Increase food supply and availability;
- Meet the food and nutritional needs of household members.

Author's conclusions and Recommendations

The home garden farming system not only ensures household food security and improves nutrition, but can also foster conservation, domestication and development of crops. The close links between biodiversity and food security are evident in home gardens, and although research and development of home gardens is still limited in Laos, the work of LSUAFRP and FAO offers important opportunities for further strengthening these links. The National Agricultural Biodiversity Programme offers a framework for supporting and implementing research and development of home gardens, and for strengthening agro-biodiversity conservation, nutrition improvement and household food security. In summary:

- Home gardens can play a key role in domesticating NTFPs and relocating fallow plants from swidden fields. Therefore, more research and projects should be launched to support the documentation and development of NTFP domestication and preservation of fallow plants.
- Home gardens can make significant contributions to dietary diversity and the food and nutrition security of rural households. The pilot project model and methodologies, as well as other successful home garden experiences, should be expanded and replicated across other rural areas.
- Home garden projects, as well as other agricultural programmes and policies, ought to take agricultural biodiversity considerations into account when promoting new crops or proposing changes to existing farming systems. If agricultural biodiversity concerns are not mainstreamed at the project and policy levels, adverse effects will inevitably result.
- Indigenous foods are important for the food security of many rural households and are likely to contribute micronutrients and other nutritional qualities. However, this needs to be documented and supported through more research. Increasing the limited knowledge of indigenous food nutritional qualities could enable more promotion and marketing of such products.
- Nutrition education should be an integral component of community development activities, so as to promote increased awareness and consumption of the varied diet required to meet dietary nutrient needs.
- Community networks are needed to monitor and promote food security, nutrition, health and home economic improvements. Accordingly, as part of community empowerment and capacity building, a critical mass of community members should be organised and trained in strengthening rural livelihoods and nutrition improvement.

Reference D

Understanding Food Security in Northern Laos: An analysis of household food security strategies in upland production systems.

Joost Foppes, Thongsavanh Keonakone, Nitkham Chanthavong, Somnuk Chitpanya, Am Phengkhammy (2011) Northern Upland Rice Based Farming Systems research Project (NURIFAR)

<http://www.laofab.org/document/view/1631>

Key Points:

The report includes a literature review, plus the results of interviews in 4 villages in Oudomxay (Khamu) and Luang Namtha (Akha). The study aimed to answer 4 questions:

1. How do farmers understand food security?
2. What are their strategies for achieving food security?
3. How do they deal with uncertainty and shocks?
4. How do they think food security can be strengthened?

Local people in the surveyed villages understand food security in terms of rice self-sufficiency. Relative wealth of households is expressed in terms of how many months a household can feed itself.

Villages reported that 29 varieties of rice were being planted of which 22 are upland varieties and 7 were planted in the paddy fields. 24 varieties were glutinous (sticky) rice, while only five were not.

Households reduce risks of rice harvest failures by planting a mix of varieties in their rain-fed upland fields. There was no clear correlation between wealth class and rice yield; wealthy families just plant larger areas of upland rice.

Average households produced 2.5 tons of rice, more than enough rice to meet their requirements (estimated to be 2.3t), but most families sell a portion soon after harvest and need to buy or borrow rice latter in the year. Insufficient rice is most often attributed to not having enough land or the poor quality of soils. The rice shortage is most acute in August, but can start as early as April.

The practice of “khao kheo”, selling rice before harvest at a low price to pay off debts, is part of a vicious cycle for poorer households. Selling labor and forest products are the main coping strategies for vulnerable families.

On average only 27% of all food is estimated to be derived from the farm. Other sources of food include food collected from the wild (15%), food bought with cash (18%), food borrowed (12%) food exchanged for labor or barter (10%) as well as food received as a gift from relatives (7%) or from the Government and/or aid projects (11%).

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Women groups in the four villages mentioned 33 types of vegetables and 11 types of edible shoots (eg. bamboo and rattan). Many medicinal plants, fruits, nuts and spices are also used.

Sesame is the most important source of cooking oil, followed by peanuts and soybeans. But 60% of interviewees used cooking oil less than once per week.

Most households consume meat only once or twice per week. Wildlife and aquatic animals were ranked as an equally important to livestock. The list of wild animals that are eaten includes crabs, fish, snails, birds, shrimps, frogs, insects and rats, wild boar and deer. Fish and other aquatic animals account for 45% of the wild intake. The most frequently consumed domestic animals were chicken, ducks, pigs, cattle and dogs.

An estimated 40% of food consumed in the study area is derived from outside the village. The top five food products bought are salt, MSG, pork, eggs and cooking oil. The buying of food is increasing while collecting food from the wild is declining.

The main factor limiting food security that was identified by village women is **access to land**, for both cultivation and gathering of wild products. They also mentioned lack of labour opportunities as a factor limiting their access to cash income for buying food. They did *not* mention food prices or access to markets.

All 4 villages reported periods of severe food shortages in the past 10 years due to drought, rat damage, rice and livestock diseases. Resettlement has also caused problems, as many families compete for land. Some villagers blame cassava and sugar cane companies not honouring contracts, causing them to lose cash income which is needed to buy food. Villagers identified district authorities as the main stakeholder who could help resolve their food security problems.

Author's Conclusions

Food production from farms is already low and is likely to drop even further. The increased intensity of cropping with very short fallow cycles, exhaustive cultivation of maize and other commercial crops is likely to lead to a deterioration of soils. If nothing is done, the share of food produced from the farms could drop from 30% to 10-20% over the next ten years.

Food collected from the wild is rapidly decreasing, making rural households more dependent on their ability to buy food on the market. If nothing is done, the share of food collected from the wild could drop from its present level of 18% to less than 10% over the next ten years.

Cash cropping has brought cash income enabling households to buy food, but not for everybody. The risk is that large groups of households belonging to ethnic minorities in remote communities will remain locked out of this development.

Rural households are becoming more and more dependent on their ability to work as laborers to obtain cash to buy food. Meat and eggs are among the most often bought products. That means that people who can afford it are consuming more protein. Poor households are at risk of not being able to earn enough cash income to buy the food they need.

Livestock raising is reaching crisis levels, many animals are dying, there is not enough land to graze animals. If nothing is done, livestock is likely to become less important as a source of food and as a source of income.

Rural households experience conflicts with companies over land use and shocks in their food security. They lack awareness, ability and organizational power to deal with these threats effectively. If nothing is done to improve the organizational capacity of rural communities, the risk is that they will be left out of economic development opportunities.

Food aid to schoolchildren is being scaled back. Previously successful schemes providing rice, maize, sugar and tinned fish to school children are now being scaled back, increasing the risk that the nutrition status of this group could get worse.

Author's Recommendations:

Six key areas of research seem to be needed:

A: Sustainable and Equitable Land Use. eg:

What is the effect of intensive commercial cropping of maize, bananas etc. on the soil condition of uplands?

B: Increasing cash income from upland farming. eg:

What niche products could be cultivated with upland rice that could provide either food for consumption or cash income for farmers to buy food?

C: Reducing dependency on labor to buy and produce food. eg.

What food production systems would allow families to grow more food with less labor inputs?

D: Mitigating the loss of wild food resources. eg.

How could local communities become more involved in sustainable management of wild foods?

E: Developing locally adapted intensive livestock systems. eg.

Develop livestock management systems that reduce diseases and provide enough food for animals and can be managed with the limited labor available?

F: Improving food utilization. eg.

How could nutritious diets be composed from available food products in the uplands?

Reference E

Development in Lao PDR: The Food Security Paradox

David Fullbrook (2010) Swiss Agency for Development and Cooperation (SDC), Vientiane

<http://www.laofab.org/document/view/1026>

Key Points:

Food security Scenarios for Laos towards 2020...

Robust Food Security: Against a background of growing international concern about environmental degradation, climate change, food production and deepening worries in neighbouring capitals, the government of Laos reconsiders the country's development trajectory.... Food production is given priority for using land. Industrial crops focus on bamboo, rubber and jatropha grown not in plantations but as integrated facets of holistic, small-holder farming to diversify incomes and increase agricultural resilience. ... Farmers are strongly assisted, encouraged and incentivized not to leave land idle. Revenue from mining is invested in farmer education and training, extensive irrigation, credit, processing and marketing. Active farmer cooperatives emerge to source inputs, manage irrigation, local energy generation, training and marketing. [Comparisons: Singapore, South Korea, Taiwan, UAE]

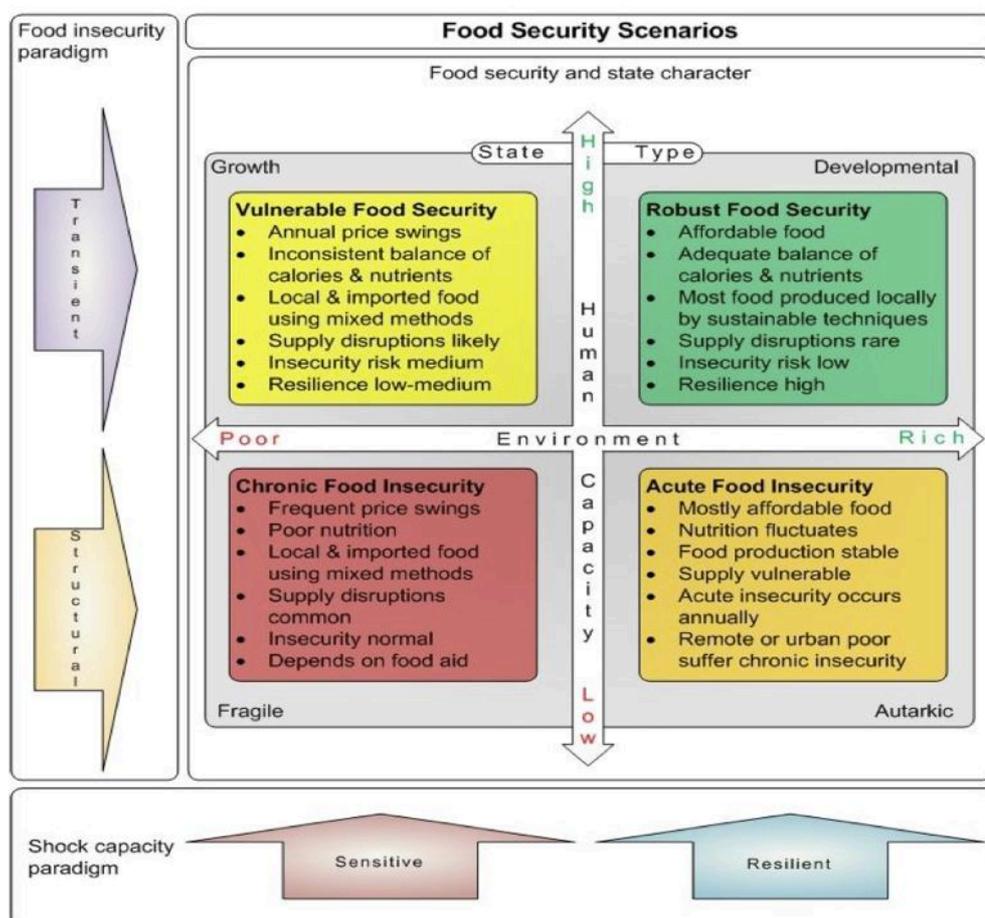
Vulnerable Food Security: While food security is a concern, the government determines the country needs more manufacturing and foreign investment to strengthen the economy.... Economic growth, at any cost, is considered the best and quickest way to generate revenues for the government and raise peoples' incomes to eradicate poverty.... Loss of paddies, fields and forests to industry reduces farming opportunities – and food production, although this is partially offset by rising yield. Food agriculture also suffers because of intensifying environmental degradation,... Overall, food production at best stagnates, and even begins to fall, as the population continues to grow. More and more people stop growing their own food, instead buying food, often processed products, from the market using incomes from factory work and other non-agricultural employment. [Comparisons: Philippines, Thailand and even Botswana.]

Acute Food Insecurity: Seeking to protect Laos from volatile global food prices and ensure stability, the five-year plan 2011-2015 sees the government emphasize self-reliance, especially for agriculture and food production, while taking a more cautious approach to trade and foreign investment. The country takes on an authoritarian character.... As a result foreign investment and domestic industry slow. Mineral projects take longer to develop or are cancelled. Overall government revenues do not rise as high or as quickly as was projected during the previous decade. Meanwhile demands on the budget are rising. Consequently investment in agricultural infrastructure,

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particularly local energy and irrigation, and farming education and training falls short... The result is a stable food security situation, showing little improvement from the previous decade. Natural disasters are often accompanied by instances of acute, localized food insecurity. Many poor people in remote rural areas or with farming poor soils, along with poor people living in towns, suffer chronic food insecurity. [Comparisons: Myanmar, North Korea and Turkmenistan]

Chronic Food Insecurity: Encouraged by revenues from mining and enjoying increasing attention from investors, especially from other developing countries eager to exploit resources, the Lao government makes its priority - commodities. Focusing on resources is expected to generate revenues, create jobs and accelerate growth. The plan for 2011-2015 focuses on measures to support mining, large hydropower dams and industrial plantations. The environment is sacrificed for resources. Expectations are that food insecurity will be solved by the knock-on effects in terms of jobs and government revenues from resources development.... The subsequent inflow of investment washes away the state's capacity for regulation. Together with fast-rising revenues, the country suffers a severe resource curse. Meanwhile agricultural production stagnates.... Many people now live in chronic food insecurity. The worsening situation is offset by rising food aid from international donors.... The situation is compounded because the vast scale of resources exploitation is leaving much of the country with a poor environment further damaging farmers' harvests. ...[Comparisons: Congo]



Author's Conclusions:

Food security will remain out of reach for many people, especially women and children, in the Lao People's Democratic Republic, or Laos, if the country continues to emphasize commodities and resources development at the expense of the environment and livelihoods while ignoring global trends for food and energy. Development might be expected to improve food security, but the indications and trends suggest otherwise. This is the paradox of food security in Laos.

Policy is pumping up the economy with investment in resources through dams, mines and plantations. The promise of this big push for development is jobs, incomes and revenues to end poverty... It is understandable to pursue resources-led investment given the extent of poverty in Laos amid so much natural wealth. However similar strategies elsewhere have with but a few exceptions fallen short of expectations. There is much to suggest that expectations will also fall short in Laos.

Food security depends upon an intact, robust and healthy environment, secure livelihoods and political recognition of the costs and risks of uncontrolled resources development.

The food security paradox is not inevitable, but it will require a change in perception to open the door to new paradigms of development playing to the natural advantages of Laos. Without change, it will be business as usual which will deepen problems and sustain threats to national food security, leaving many to face a future of hunger, sickness and poor well-being security.

Author's Recommendations:

- Review and revise government strategies and policies to support and promote food security, environmental protection and comprehensive national power to achieve sustainable security.
- Implement a moratorium on large dams, mining and industrial crop plantations.
- Ensure a robust, effective and transparent government planning, management, regulatory and mitigation regimes are in place prior to investment projects
- Support research, development and implementation of holistic inter-cropping regimes for producing food and industrial commodities such as rubber, fuel, fibre and starch.
- Support research, development and implementation of regimes and methods to protect, nurture and increase catches of riverine fisheries with a view to expanding exports.
- Impose high taxes on mono-cropping.
- Integrate food security into the core of all programmes and projects in ways similar to gender and HIV/Aids.
- Encourage compliance with the Extractive Industries Transparency Initiative.

Reference F

The nutrition situation in Northern Laos – determinants of malnutrition and changes after four years of intensive interventions

Silvia Kaufmann (2008). Thesis, Justus Liebig University, Giessen

<http://www.laofab.org/document/view/1669>

Key Points:

The purpose of the study was to identify determinants of malnutrition and analyse the interventions used for its alleviation in two districts in Northern Laos.

From 1995 to 2001, ...GTZ supported the Ministry of Health (MoH) of the Lao PDR for the implementation of the Integrated Food Security Programme (IFSP) in Nalae and Sing district, in Luang Namtha province, Northern Laos.

The IFSP followed a twin track strategy. First, the programme aimed to implement measures to directly alleviate malnutrition, to improve living conditions and to initiate a sustainable development process among the vulnerable population groups. Second, based on evidence and experience gained through the direct implementation, the programme aimed to contribute to a national upland development strategy, effective and feasible for its transfer to and implementation in other areas of the country.

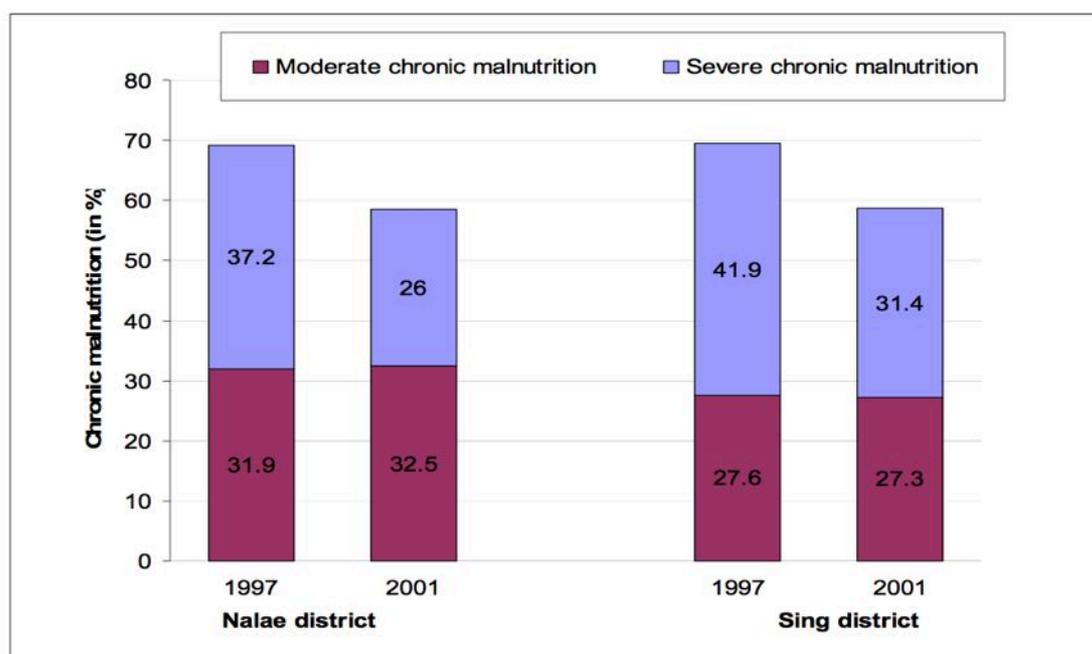


Figure 4: Changes in moderate and severe chronic malnutrition by district in 1997 and 2001 (in %)

The unifactorial analysis model showed a negative association between rice production and nutritional status at baseline. Prevalence of malnutrition was

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significantly higher in households being rice sufficient... Rice consumption was lower in households doing upland farming compared to those doing flatland farming... Rice yields were not associated with the differences in nutritional status.

Apart from the association between income and possession of small livestock there was no further significant association with causes of malnutrition. Possession of livestock did not correlate with the consumption of animal products. The number of big animals raised was neither associated with nutrition nor with causes of malnutrition.

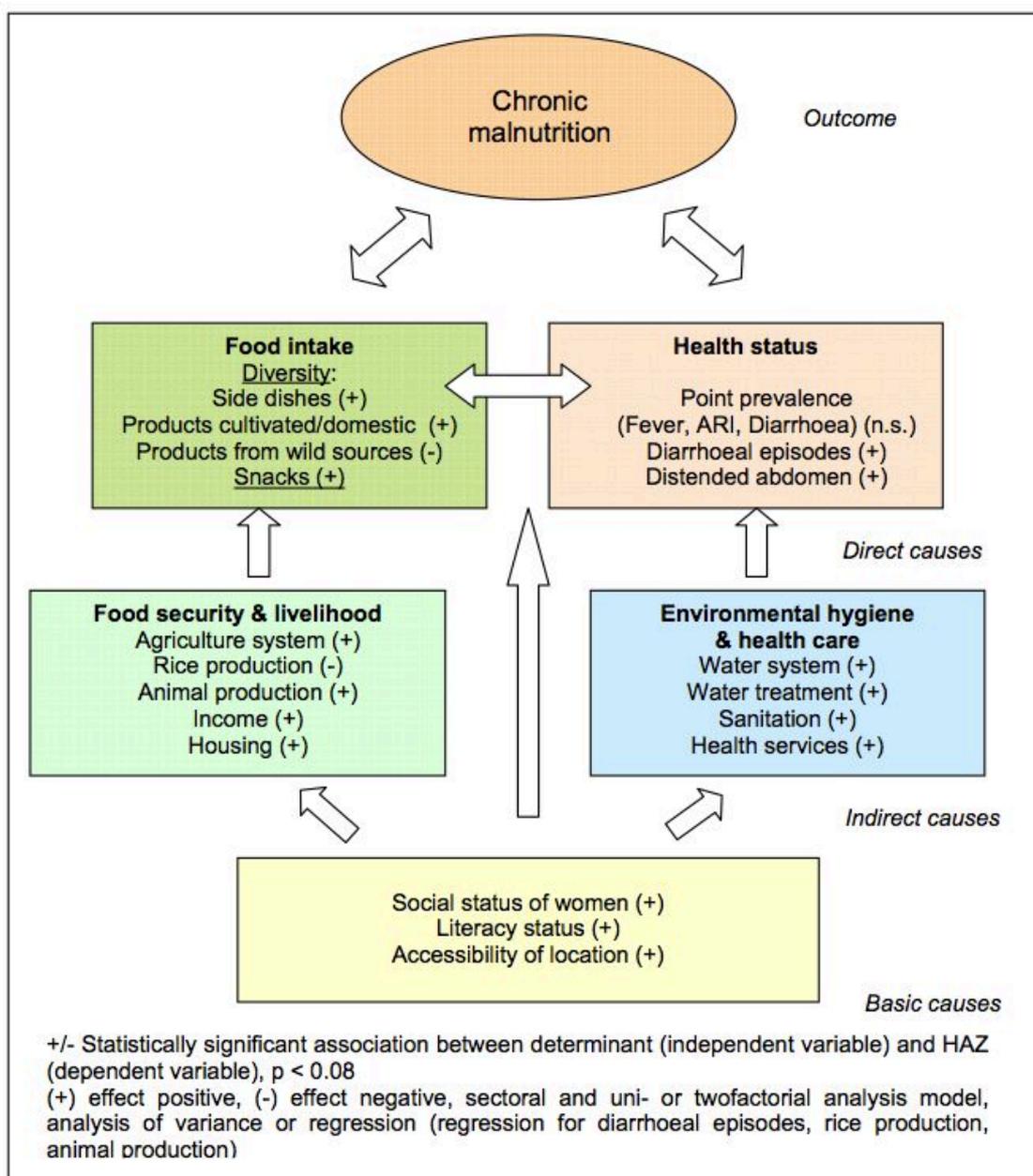


Figure 14: Significant determinants and their association with height-for-age (uni-factorial analysis, n = 475)

Author's Conclusions:

Chronic malnutrition of children was extremely high within the area studied. Morbidity was a direct determinant of malnutrition. The relationship between food intake as well as infant and young child feeding practices and malnutrition was complex. Cash income, possession of poultry, access to water, adoption of hygienic habits as well as access to health services were the most important indirect causes of child malnutrition, showing significant associations performing sector-wise statistical analysis. Those associations also explain the causalities between basic causes and nutritional outcomes. Women's social status and the literacy status of parents were the basic and most significant determinants of malnutrition when applying multi-factorial analysis model controlling for interactions between the selected determinants. Social status of women and literacy mitigated negative effects affiliated with a family's low income.

The study shows that programme interventions led to a significant reduction in malnutrition, prevalence of diseases, and mortality rates. The situation of indirect causes also changed significantly, the most important of them being adoption of an improved agricultural production system, improved water supply, hygienic habits, and easier access to health services. Improvements in the water supply, in terms of both availability and purity and improvements in the agricultural production system were statistically the significant determinants of the reduced child malnutrition measured at the end of the programme.

Besides their direct impact on food production and health, improved agriculture and water supply systems were also important interventions to reduce the workload, particularly of women. Improvements in poultry farming were important to enhance women's access to resources. This probably resulted in improved family and childcare and, in turn, might have contributed to the reduction in malnutrition as well.

Women's social status and education were key determinants of malnutrition at the start of the programme, whereas improved access to water and agricultural production systems were the key interventions reducing malnutrition effectively within the programme cycle of four years.

Precondition for successful implementation was the availability of resources, particularly natural resources, such as agricultural production area, as well as human and financial resources to build up and strengthen social services, such as health, education and also agricultural services. A further pre-requisite for success was the commitment of institutions and stakeholders aiming for a better life of the local population.

Reference G

Cooking Up - Dietary Change in Lao Upland Kitchens

Jutta Krahn (2003), Juth Pakai 1

<http://www.laofab.org/document/view/1712>

Key Points:

Understanding of existing ways of food acquisition, preservation and storage is lacking, as is knowledge of local cuisine, including recipes, cooking methods and eating practices. What *is* known is that poverty in Laos is inextricably related to culture and ethnicity (PPA 2001) and that its primary locus is with the highlanders.

Table 1: Important key nutrients of traditional upland non-rice foods

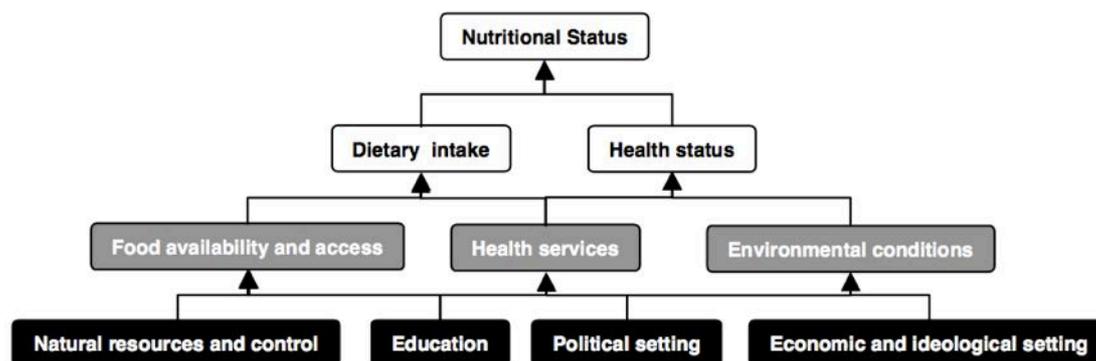
Food group	Examples	Key Nutrients
Roots and tubers	Cassava, taro, yams, sweetpotato, potato, etc.	Carbohydrates, Vit C, beta-carotene, potassium, Vit B ₁ and Vit B ₂
Leaves, stems, sprouts	Cassava leaves, penny wort, mustard greens, ferns, etc.	Carbohydrates, beta-carotene, iron, zinc, calcium – if pickled Vit B ₁₂
Seeds and nuts	Almond, sesame, peanut, tamarind and pumpkin seeds, etc.	Fat, Vit E, calcium, protein, iron, copper
Mushrooms	<i>Polyporaceae</i> and <i>Russulaceae</i> species, etc.	Calcium, iron, protein
Gums, nectars and saps	Sugarcane, Palm species, vines juices**, etc.	Vit C, iron and other minerals
Flowers	Sesbania (yellow sp), squash, pumpkin, etc.	Niacin, beta-carotene, iron
Fruits	Mango, papaya, pineapple, guava, etc.	Water soluble vitamins such as Vit C, B Vitamins, iron and special enzymes
Freshwater fish	<i>Cyprinidae</i> and <i>Cobitidae</i> species, etc.	Protein, fat, niacin, calcium*
Frogs, snake, lizards	<i>Ranidae</i> and <i>Bufo</i> species, ratsnakes, <i>Scincidae</i> species, etc.	Protein, fat, calcium*, zinc
Freshwater snail, crab, shrimp	<i>Thiara asperata</i>	Protein, fat, calcium, iron, Vit E,
Domestic animals	Pig, chicken, goat, buffalo	Protein, fat, iron, Vit B ₁ and Vit B ₂
Wild animals	Deer, wild boar, monkey, civet, rat, etc.	Protein, fat, iron, zinc, Vit B ₁ and Vit B ₂
Wild birds	Partridge, wild pigeon, peafowl, wild chicken	Protein, fat, iron, zinc, calcium*
Insects	Termites, dung and longhorn beetles	Protein, fat, PUFAs***, calcium, iron, niacin

* If cooked with bones. ** When in the deep forest, many villagers use vines as thirst quenchers. *** Poly-unsaturated fatty acids, such as for instance gamma-linolenic acid.

The basic principles of food security are rapidly changing. While traditional foods are decreasing, and some have almost disappeared (for instance millet, wild roots and tubers), new food items are finding their way into upland kitchens (new fish species in ponds, certain fruits like tamarind, guava, insects, occasionally sweets and snacks). While in some areas positive dietary change appears to be occurring, in many areas unexpected negative dietary change is apparent (Krahn 2003b). Traditional diets rich in meat, vegetables and fruit are low in cereal staples but appear to be nutritionally

adequate. Increased consumption of rice with a reduction in meat intake seems to be the greatest nutritional challenge for Lao uplands. Environmental and social changes mean that traditional diets will not be sustained even though the food items themselves warrant retention from a nutritional perspective. A problem arises when the nutritional intake of the new diet is inadequate: contemporary meals often comprise only glutinous rice, eaten together with a simple *cheo* of pounded chilli, salt and monosodium glutamate.

Table 2: The Nutrition Problemtree



Analysing the trend for upland development, the intended nutritional outcome can be broken down into six elements: 1) higher rice consumption, 2) diversified diet, 3) decreased wildlife consumption, 4) higher consumption of domestic animals, 5) higher consumption of market foods, 6) better health and nutritional status, 7) better hygiene and higher food quality. It appears that most development efforts are currently allocated to rice production. For a true positive dietary improvement to occur, the concept of food security has to be expanded.

Author's Conclusions:

To achieve true positive dietary change, the concept of rice security has to be expanded. From a nutritional point of view, there is high potential in the Lao uplands. For a higher benefit of food security efforts, certain preconditions have to be acknowledged within the different phases of the strategy design. Table 3 responds to the shortcomings identified by this article. There is a need for a clearer vision of what food security in the Lao uplands really means, an understanding that responds to different ethnic groups and agroecosystems. Existing ideas have to be refined towards a more holistic approach, acknowledging both materialistic and cultural aspects of food systems. It should be acknowledged that production is not equal to consumption, and at the same time, problems with food procurement should be truly identified, including those not on the level of food production and marketing. Here, the importance of foods derived from forest areas is crucial.

In the vein of a modified vision of food security, a corollary would be different types of assessment, planning, funding, implementation, monitoring and evaluation as outlined in the table opposite. Close examination of kitchen and

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cooking habits would yield the details and actions necessary for a true understanding of dietary change. Working more closely at the cooking pot level would reveal culture-specific cuisines, and fill the vision with foods other than rice. Exploring and using local cuisines holds tremendous potential for continuing the rich Lao heritage with a balanced input of external techniques. Defining food security is like defining a recipe for *khao piak* (rice soup). Various cooks have their own secret ingredients and ways of preparation, and they might all be delicious.

The vision of food security should be more understood as recipe, in which all ethnic groups can actively participate by referring to their own knowledge, capacities and aspirations. How many recipes consist of rice alone? To continue to understand food security mainly as rice security threatens the nutritional status of most upland cultures, and will lead to increased levels of stunting and wasting.

Author's Recommendations

Table 3: Tentative proposal for correcting the rice-bias

Steps	Actions
1. Vision	Integrate all food groups in the vision of food security
	Applying a holistic approach
	Understanding dietary change as a cultural affair
	Expanded attention to basic causes of food insecurity
	Include issue of food security in all forest issues
2. Assessment	Threat analysis of wild foods
	Recording culture-specific local knowledge
	Exploring the local perspective of change
	Identifying structuralistic constraints
	Nutritional analysis of Lao foods (esp. wild foods)
3. Planning	Identify alternative proteins to wildlife
	Start co-operation between all relevant disciplines relevant to food security
	Stronger reflection of current policies and strategies
4. Funding	Funding research on underlying and basic causes of food insecurity
	Funding research for validation check of local knowledge
	Establish more qualitative reporting
5. Implementation	Expand time frame
	Establish taste and cooking trials for newly introduced foods
	Use external knowledge only after local solutions tested for failure
6. Monitoring and Evaluation	Anthropometric analysis before and after implementation
	Dietary intake analysis
	Continual constraint analysis

Reference H

Nutritional status of children in rural Lao PDR: who are the most vulnerable?

M Miyoshi, B Phommasack, S Nakamura and C Kuroiwa (2005), European Journal of Clinical Nutrition 59

<http://www.laofab.org/document/view/1496>

Key Points:

A cross-sectional study was undertaken to assess the nutritional status of children aged 3–15 y in remote villages of Lao PDR. Study sites were chosen from two provinces: Luang namtha (north) and Sekong province (south). All the sampled 1075 children were measured for anthropometry, following the standard methods. Dietary intake, morbidity and socio-economic data were obtained by interviews with parents. This study confirmed the high prevalence of growth retardation among children, as well as persistent food insecurity in the remote areas of Lao PDR. Prevalence of stunting was 74.1% in Luang namtha and 62.6% in Sekong province, with school-aged children being worse-off than under-five ones. Children's diets were inadequate in quality as well as in quantity, with very limited availability of rice and other food items throughout the year.

Almost all the study households live on subsistence farming based on sifting cultivation (Long 100%, Kalum 89.8%). The majority is very poor, and 62.4% of households in Long and 9.2% in Kalum had an annual income less than 500 000kip (US\$65). Of the study households, major ethnic groups were Akha in Long and Ngea in Kalum, followed by Kui (26.6%) and Chatong (13.2%), respectively.

Little variation was observed in their diets, and the typical meals consisted of rice and chilli, and occasionally with vegetables or small fishes, showing the highly staple-dependent diets. Food security was assessed by the question of 'How many months of the year do you have sufficient rice, enough for all of your family?' for which the mean value was 7.0 (s.d.: 4.3) in Long and 4.6 (s.d.: 3.6) in Kalum. More than one-third of the study households (Long 34.1%, Kalum 49.1%) reported that they had sufficient rice only for 3 months or less after harvesting, and this proportion was highest in Kui village (84.4%). Children in these households were more likely to be stunted (64.3%) than those in the households with rice for more than 4 months in a year (55.9%) ($w^2 \frac{1}{4} 5.2$, $P \frac{1}{4} 0.015$). None of other economic variables were associated with any anthropometric indices of children.

Author's Conclusions:

Our findings indicate that the nutritional situation in the remote areas of Lao PDR was very severe, even worse than it had been perceived. Food insecurity was extremely serious, especially in Kalum where about half the

Dynamics of Food Security in the Uplands

study households had rice only for 3 months or less per year. The dietary data also proved their diets were very poor in both quantity and quality. It is therefore plausible that the persistent food shortage, mainly due to poverty and geographical constraints, was at the root of high prevalence of stunting among study children. Although the number of children wasted (WHZ <-2) was small, high proportions of those with low MUAC imply the significance of malnutrition in study areas.

As a part of the rural development policy, the government encouraged the populations in the mountain to move down to the lowland in the hope that their access to the market, medical service or education would be improved (Gordineau, 1997). However, our findings of high morbidity among children in the resettlement villages suggest that, in reality, living environments following the relocation were so unstable that their health has been unfavourably affected. This was particularly obvious among Kui children who had the highest morbidity and severe food deficits, resulting in the high proportions of wasting, in terms of WHZ (3.4%) as well as MUAC-for-height (57.4%).

Laos is characterised by its diverse topography and multi-ethnicity, and donors tend to focus on specific areas, with the remote areas being neglected. For future interventions, it is important to identify the area-specific problems as top priorities. In addition, more attention should be paid on the resettlement villages, and the disadvantaged status of ethnic minority should not be overlooked.

Reference I

Forests, Marketization, Livelihoods and the Poor in Lao PDR

Jonathan Rigg (2006), Land degradation and development 16

<http://www.laofab.org/document/view/32>

Key Points:

I am interested in exploring how market integration and, more widely, globalization (reflected in the Country's integration into the Greater Mekong Subregion) have pressured traditional systems and reworked the place of the forest in rural livelihoods. In particular I wish to elucidate the implications of this for marginal groups in rural society and show how the forest resource has, in a real sense, been wrested from the grasp of local people.

The paper conceptualizes degradation in a twofold, and circular relationship. Natural resource decline contributes to livelihood decline, and livelihood decline places additional pressures on natural resources.... While this view of the relationship between degradation and livelihoods may resonate with Blaikie and Brookfield's (1987) notion of the 'desperate ecocide of the poor', the twin and intertwined spiral of decline is not—necessarily—a closed one, with no escape route. There are ways in which rural households in Laos have raised incomes and improved livelihoods even in the context of a deteriorating natural resource base, largely through beginning the process of de-linking their livelihoods from the forest.

...forests provide more than just timber. They are repositories of village food and wealth, and buffers during times of crisis. Forests in Laos provide food items such as game, fish, bamboo shoots and honey; fibres including khem grass and paper mulberry; condiments like cardamom as well as traditional medicines; inputs for the chemical and perfume industries like benzoin and damar resin; and bamboo poles, rattan and fuelwood. Unlike most other countries of Southeast Asia where the importance of NTFPs in livelihoods has declined markedly, forests in Laos remain an important source of food and marketable products for villagers in many parts of the country. No systematic countrywide survey has been undertaken but this basic point is emphasized in study after study. It has been estimated that the average rural Lao family consumes the equivalent of US\$280 of NTFPs per year, equal to 40 per cent of total rural family income (World Bank, 2001, p. 11)

Perhaps the most significant theme to be highlighted in socio-economic studies carried out in Laos since the mid-1990s has been the recognition that modest levels of economic growth have been accompanied by a worrying increase in inequality...

As well as widening inequalities, people and households are being squeezed by a variety of processes and policies: by the government's Land-Forest Allocation Programme (LFAP) that has extracted people from their upland

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homes (see below); by population growth in the context of declining land availability; by resource decline associated with the over-cropping of marginal sloping lands; by the pressures of marketization; and by the failure of alternative livelihood opportunities to expand sufficiently rapidly to compensate for the decline in traditional activities.

We can delineate three main market-induced pressures on the non-timber forest resource. First, the intensification of the collection of forest products by villagers for sale; second, the infiltration of non-local people into the local market in NTFPs; and, third, the arrival of non-Lao actors on the resource stage.

In 1996 CARE undertook a study of 12 villages on the Nakai Plateau and described communities who were dependent on shifting cultivation allied with some livestock production, hunting, fishing and the collection of NTFPs. Even in the mid-1990s, however, the latter three activities—hunting, fishing and the collection of NTFPs—had made the transition from subsistence to commercial activities for many villagers. ‘Enough’ was becoming greater as values changed and ‘people begin to try every means to obtain cash to purchase more clothing, medicine, household goods, etc.’ (CARE, 1996, p. 5). The 1996 study forecast a gradual decline and likely collapse of traditional livelihood systems. Soil erosion was marked, swidden rotations had declined from 10 years to 3–4 years or less, flooding had become more severe, many larger animals had been hunted out in the area, and the collection of NTFPs was becoming more and more time intensive.

The developmental lessons of the Nakai Plateau, and other areas of the country, are not hard to discern: roads, and the market integration that roads encourage, do bring wealth, but who controls that wealth, how it is apportioned between households, villages and groups, and what the implications of new livelihood practices are for established ways of making a living are critical components in building an understanding of livelihood change.

Author’s Conclusions:

This paper has presented a largely depressing story of the interplay between market integration, forest exploitation, and livelihoods in Laos. To summarize: while the role of forests in rural livelihoods remains important, and is often central in upland areas, the progressive integration of rural peoples into the economic mainstream is leading to over-exploitation and a gradual degradation in the richness and productivity of the forest resource. For those groups and individuals who are unable to take advantage of the new opportunities that market integration is offering, this process of natural resource decline is leading to a parallel process of livelihood decline.

Some analysts have identified possibilities for the restructuring of forest extraction/cultivation in Laos so that NTFPs remain a key component in rural livelihoods. Foppes and Sounthone Ketphanh, for example, write that the ‘Lao PDR has a remarkable opportunity to build a strong NTFP sub-sector as a basis for sustainable economic development in the Southeast Asian region’

(2000, p. 15). The view of this paper, and the lessons from other countries in the region, is that the best outcome in the medium term is that NTFPs will become a niche livelihood activity undertaken by the few, rather than the many.

It would be easy to leave the analysis here and to argue that market integration and the wider process of transition in Laos—and elsewhere in the uplands of Southeast Asia—is poverty-creating and environment- degrading and, in general, destructive of rural livelihoods....

It fails, however, to tell the full story in at least two respects. First, it tends to exaggerate the nature and productivity of ‘traditional’ systems. And second, it ignores the opportunities that market integration can provide. There is a case, as the paper has outlined, for seeing modernization, marketization and integration as both livelihood eroding and livelihood enhancing. Much of the latter is linked to the possibilities for diversification and livelihood reorientation. The difficulty—and the challenge—is that in Laos, Vietnam, China and elsewhere, the opportunities that market integration offers are unequally distributed, as are the costs, which often contribute to an accentuation of the disparities and inequalities that already exist in rural society.

‘Subsistence affluence’ is an attractive and beguiling rhetorical device, but traditional upland production systems did not, in the main, produce a comfortable surplus. Rotational swidden systems were, it seems, characteristically in deficit rather than surplus and the forest became the means by which upland households could supplement diets and make up this deficit. Food security was not achieved through subsistence land-based production alone, but through a complex layering of activities among which the exploitation of the forest resource played a central role....

Just as subsistence affluence has often been assumed rather than interrogated, so market integration has been caricatured as poverty-creating. However, it is clear that market integration delivers real benefits just as it also brings costs and challenges.

There is, certainly, a persuasive argument that market integration—and the effects of government policy—have been livelihood eroding. But the self-same policies and processes of market integration also provide the means by which rural households can access greater income and higher standards of living. At the most obvious level, accessibility means that villagers can access the services of the state, from health to education. Less obviously, market integration means that (some) villagers can diversify their activities and sources of income, raising their real standard of living, and beginning the process of reducing their reliance on a declining and degrading forest resource.

Reference J

Comprehensive Food Security and Vulnerability Analysis (CFSVA)

World Food Programme (2006)

<http://www.laofab.org/document/view/36>

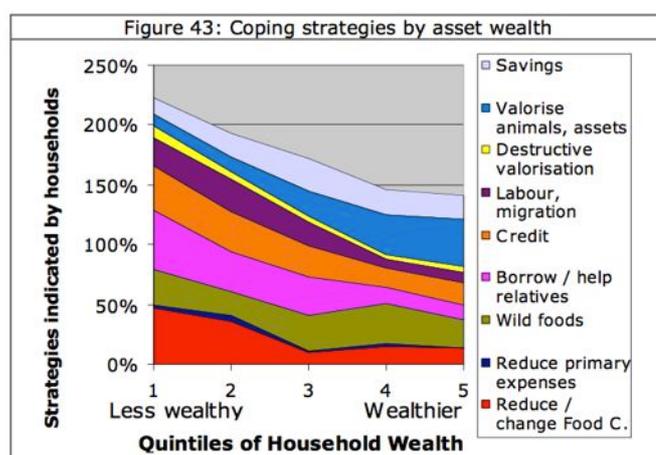
Key Points:

A total number of 84,000 households were food insecure at the time of the survey (poor and borderline food consumption). The largest proportion of food insecure households was found in Bokeo (41 percent), Saravane (30), Xiengkhuang (25), and Sekong (24).

There is no single indicator that can easily identify food insecure households. However, a combination of several characteristics can be used to differentiate food insecure from food secure households. For instance, food insecure households tend to be typically farmers with low engagement in fishing and hunting or unskilled labourers. They practice upland farming on a small plot of land in fragile areas with steep slopes. Often, they do not possess a kitchen garden. They are mostly asset poor, poorly educated, illiterate and from non-Lao Tai ethnic groups. They live in villages with little or no key infrastructure, and suffer from bad sanitary conditions.

The analysis show that only about one third of the rural population of Laos can be considered food secure (acceptable food consumption) in the strict sense. The rest of the population faces risks, endangering their food security. One quarter (26%) faces multiple risks (more than one shock affecting a household simultaneously). Another 40% is at risk of becoming food insecure because of either loss of access to natural resources, flood, drought or the sudden increases in food prices.

The analysis shows that a household's food security is to a large extent determined by their asset wealth. In addition, the livelihood strategy that a household employs will affect the food security outcome. Households involved



in non-farming activities such as petty trading and skilled and salaried work have better food security than purely farming households, although households engaged in unskilled labour are also not doing well. However, among the farmers, involvement in additional activities such as fishing and hunting clearly did better than pure farming households.

This shows the importance of understanding livelihood opportunities, to find the most appropriate intervention to address food insecurity. These livelihood opportunities may be enhanced if certain assets are strengthened. A livelihood strategy that is currently not providing food security or not available to many households may work better or become available if crucial assets for these activities are enhanced. It should also be noted that the policy context in which these livelihood strategies take place, may significantly affect the livelihood outcome.

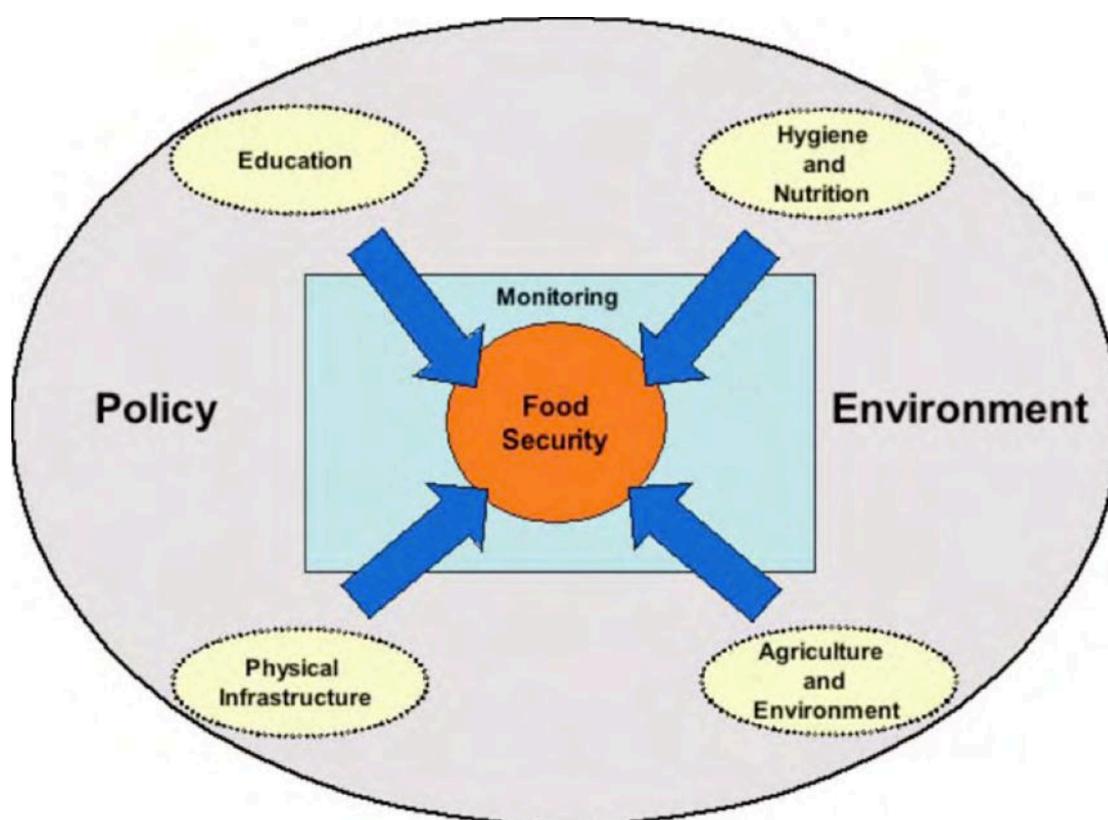
Markets constitute the second source of food for households after their own production. While many households have very limited surplus production to sell on the market, a substantial amount of their purchases on markets are made of food items (45 percent). Farmers may also, due to insufficient storage facilities, have to sell their products at post-harvest time, when prices are low, and replenish their stocks at pre-harvest time, when prices are high. Combining their limited income opportunities with some dependence on markets for food at certain times of the year, an increase of food commodity prices or a decrease of income levels would have a negative impact on households' purchasing power and consequently the pattern of their food consumption.

Author's Conclusions:

- The chronic malnutrition in Lao PDR is at an alarmingly high level. Every second child in the rural areas is chronically malnourished, affecting not only their physical development but also their cognitive capacity.
- The steady economic growth that Lao PDR has experienced over the last 15 years, has not yet translated into improved nutritional status of the Lao population. Chronic malnutrition is as high today as it was 10 years ago.
- Thirteen percent of the rural households have either poor or borderline food consumption. However, two thirds of the rural households also have a livelihood portfolio that puts them at additional risk of becoming food insecure should one or more shocks occur in a given year.
- Sino-Tibetan ethnic groups are the most disadvantaged and food insecure followed by the Hmong-Mien and the Austro-Asiatic. Most of these groups reside in the Southern and Central Highlands and the Northern Highlands agroecological zones of the country.
- Dietary intake of fat is generally too low. Use of vegetable oil in the diet is rare, and most of the fat comes from animal sources.
- Access to wild meat and aquatic resources (animal protein) is critical for ensuring food security for the most vulnerable groups. Wild meat and aquatic resources, especially wild fish, is the biggest source of animal protein in rural Lao PDR. Consumption of domesticated animals is currently not at a level where it can compensate for a potential loss of access to wildlife.

Author's Recommendations:

This report has shown that food insecurity in Lao PDR has many causes and that it can only be adequately addressed through a multi-sector approach. Household food security is inextricably linked with education, hygiene and nutrition, the physical infrastructure, and the agricultural and environmental sector. However, stand-alone interventions within any of these sectors will have a limited effect unless the overall policy environment is favourable to food security. One of the key messages emanating from this report is that a favourable policy environment for food security has to be ensured before technical solutions can significantly reduce food and nutrition insecurity. It is not enough to just focus on poverty reduction since it is a necessary but not a sufficient condition for improved food security and nutrition, issues that need to be explicitly addressed.



Specific Recommendations on Agricultural and Environmental Factors:

- Sustainable management of wildlife and aquatic food resources in accordance with Lao Forest Law and Hunting Regulations
- FFW programmes that focus on creating access to land through paddy expansion should ensure that all ethnic groups benefit equally from these programmes
- Promote programmes that encourage and facilitate development of kitchen gardens
- Promote alternative development programmes in the Highland

Reference K

Agriculture in Transition: The impact of agricultural commercialization on livelihoods and food access in the Lao PDR

Samantha Wright (2009) WFP

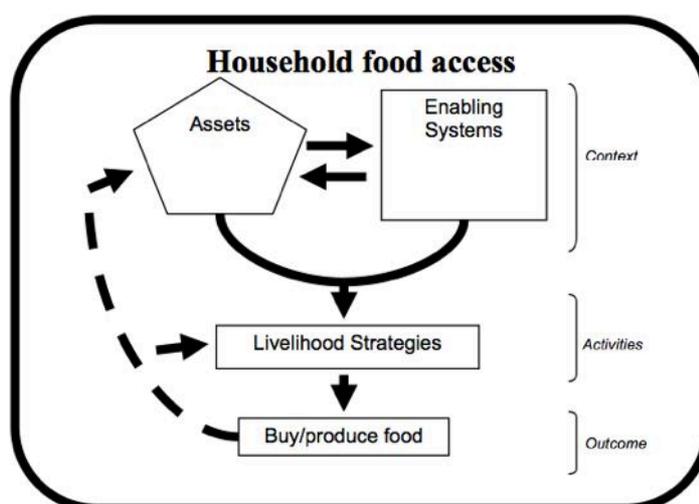
<http://www.laofab.org/document/view/788>

Key points:

WFP decided to undertake this study as an important supplement to the CFSVA. Questions to be addressed:

1. How is food security affected by the transitions to commercial agriculture?
2. Should WFP conduct a more in depth study?
3. If so, what should the study focus and methodologies?

In the context of agricultural commercialization, the anticipated primary impact is on livelihoods and *how households access food*. In building a framework to assess the impacts of commercial farming on food access and livelihoods, we must have both a static picture of what has changed and a dynamic picture of how these changes are likely to impact household welfare.



HH vulnerability = exposure to risk + inability to cope

In the commercialization of agriculture, land availability for smallholders is declining.... In the upland areas, smallholder land tenure is also changing dramatically. Aiming to eliminate shifting cultivation and encourage commercial agriculture production, government policy has zoned village land and allocated households a fixed plot not to exceed 3 hectares. These policies effectively limit the area of land under cultivation, encourage commodity production, and restrict access to shared land. In so doing, it changes the land available for subsistence food production. Given the significant effect of such changes on rural livelihoods, such zoning is often disregarded by villagers

Social networks are often important components of successful commercial transitions.... Where communities are strong or groups well established, farmers are better positioned to borrow small amounts against income from the crops being grown under contract. Farmers' groups are increasing in number across Laos. These groups are important social capital for

smallholder farmers involved in the commercial transition, helping relatively powerless individuals come together to exert a higher level of market power.

Existing land use policy has had a particularly adverse effect on remote upland communities. These households face more restrictions with regard to their livelihood opportunities and transition options because of decreased land tenure, decreased managed access to natural wild resources, and limited market access through which to seek alternative work.... The administrative haste accompanying the accelerated processing of these investments has generated several governance and land management issues. These issues are linked to the transparency of land allocation, long-term environmental sustainability and the distribution of benefits

Author's Conclusions

Commercialization is changing what households do and how they access food. Household livelihoods vary widely in their level of commercial ownership, crop cultivation, and production systems. The result is varied transitions from subsistence to market dependence and food purchasing.

The asset rich tend to be the main direct participants in commercial schemes. They tend to have the best land near roads with a supplementary subsistence production. As they increasingly integrate into the market, they rely more and more on cash to buy food. Their food security is thus increasingly dependent on their income security which is partially a function of market access.

Limited land restricts direct commercial participation of the rural poor. They thus tend to continue subsistence cultivation with wage labour to supplement food deficits. Food is largely self-produced or gathered, and purchased in the lean season. Households may introduce some commercial crops into their subsistence systems under policy inducement. Households that have lost their land altogether likely transition to wage labour entirely. Wage labourers depend on income to purchase food.

The commercial transition is changing livelihood options for non-participating subsistence farmers. Declining land availability changes what and how households produce food. Declining managed access to natural resources limits secondary livelihood options and thus increases household reliance on primary activities. Meanwhile, increases in wage labour increase the use of cash to buy food. Food access strategies vary in the commercial transition and depend largely on the specific changes occurring.

A decline in managed access to forests is particularly problematic for the rural poor. Beyond limiting secondary livelihoods, declining access reduces the availability of an important coping strategy and thus weakens how well households can cope with shocks.

The new landless are very vulnerable to food insecurity. In concession schemes, some households have ceded their land entirely and made a complete transition to wage labour. They are vulnerable to food insecurity

should something happen to their employment. Households without land and labour opportunities are likely already food insecure.

Vulnerability is increasing for households dependent on managed access to natural resources. Many households depend on natural resources as an important secondary livelihood and as a critical coping strategy. The decline in access thus decreases livelihood diversity and weakens household coping capacity. As the CFSVA identified, 25% of rural households are vulnerable to food insecurity should they lose access to natural resources.

Vulnerability is increasing for households with declining diversity in their livelihood activities. This is likely households with reduced access to natural resources, full transition to wage labour, and cultivation of a single crop. Risk is even greater for single crop ventures with longer cultivation periods. In these cases, shocks will have a more severe impact and increase the likelihood of food insecurity.

The asset wealthy may reduce their vulnerability. In the long-term, if their venture is profitable, they are likely to increase their net wealth, reinforce safety nets and reduce their vulnerability to food insecurity.

Author's Recommendations

Further research needed:

- Accurate and regularly updated maps of where commercial farming is happening.
- Primary data collection of changing livelihoods and food security in the commercial transition.
- A food and crop price monitoring
- Conduct a comprehensive study. Focus on livelihoods and vulnerability analysis in case studies spanning agro-ecological zones and livelihood profiles as established in the CFSVA.

Possible implications for WFP in Laos:

- **Support improvements in human capital.** WFP should consider developing Food for Work (FFW) and Food for Training (FFT) operations.
- **Develop rural infrastructure.** WFP should continue developing rural infrastructure (particularly small- scale, community based rural infrastructure) to support better market access through FFW.
- **Consider support for new food insecure households with FFR.** Relief programming may want to find households adversely affected by concession farming and provide support if possible. Certain contract farming may be attractive FFW schemes if they fulfill the right conditions.
- **Advocate for better support of the rural poor in the commercial transition.** WFP should encourage the government to adjust its land-use policies in remote upland areas to allow for a smoother transition. Particularly important is good access to quality land and natural resources.

Reference L

Study on Enhancing Upland Food Security and Crossborder Agricultural Production Supply Chains in the GMS

Anthony Zola (2008), Rockefeller Foundation

<http://www.laofab.org/document/view/29>

Key Points:

Cases from Lao PDG:

- Community Based Rural Development Project for Conservation of Watersheds in Oudomxay (GAA)
- Benzoin Production in Huaphan (Agroforex)
- Tea Marketing in Huaphan (Outhaithany)

GAA: The introduction of a modified farming system to replace traditional slash and burn and shifting cultivation practices can only be successful if it enhances food security and results in improvement in the overall quality of life of upland households. Enhancing food security can also mean generating sufficient income to purchase food to meet personal, family, and community needs and other basic necessities.

The project lacks a marketing component. As designed, the intervention does not take into consideration that farmers accept a significant risk by not cultivating upland rice or maize, crops they have traditionally produced to feed their families. Instead, NTFPs are being produced which can be consumed in the community. Farmers expect to produce a surplus of the NTFPs that will be sold to traders for cash used to purchase food. The project takes no responsibility for identifying market outlets or for introducing any traders to the target villages to ensure that any surplus is sold. Nor does the project accept responsibility for absorbing any surplus NTFPs that farmers cannot sell

Agroforex: The intervention is reducing the vulnerability of the poor by providing them with cash income for NTFPs (benzoin and lac) obtained from multi-purpose indigenous trees (*Styrax tonkinensis*). This supplementary cash income improves food security and self-sufficiency by providing the financial resources required to purchase food during any periods of shortage. By offering producers higher prices for benzoin meeting minimum quality standards, poor communities are being empowered. They are being given the opportunity to receive an increase in their share of value-added based on the company's system of purchasing four grades of benzoin.

The approach used by the concessionaire could be replicated elsewhere in Lao PDR and similar areas of the GMS. The blend of indigenous technical knowledge and modern tree planting techniques, to produce an export product with a ready market is attractive to farmers. They also benefit from technical assistance related to value added processing at the family and community levels. The relationship between the company and the producers

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is based on trust, using the traditional verbal contract approach rather than a written contract which is legalistic in nature and which semi-literate villagers would likely hesitate to sign. In addition, the company has wisely used respected people in the community to represent the company, as a local manager and as extension and purchasing agents.

The ***Outhaithany Company*** is encouraging farmers in the Ban Kang group of villages to expand production of tea, a crop indigenous to the area and one with which farmers already are familiar. The tea observed⁵³ growing at Ban Kang belonged to an agroforestry system employed by the farmers. Tea was part of a mix of trees, including lychee and cinnamon (*Cinnamomum Cassia* and *Litsea Cuveva*), that were planted mid-slope on relatively steeply sloped lands (estimated to be 30 degree slopes). Having been taught to grow by their forefathers, growers are at ease cultivating tea and grow it well.

The intervention mobilized community leaders and youth to play a role in organizing and managing the tea production and marketing program for the participating villages. The Outhaithany Company left the organization of the village marketing group to local leaders who were in contact with the company through a community liaison agent.

In terms of impacts on tea producers' households, the farmers are benefiting from increased incomes generated from the sale of additional quantities of a traditional crop that can be used to meet their basic needs. The Outhaithany Company thus contributes to poverty alleviation improving farmers' livelihoods and reducing their dependence on unreliable local markets and itinerant traders, thus lessening vulnerability.

Author's Conclusions:

...several factors have emerged as central to the success of upland agricultural development interventions. Although other factors may have been supportive, the following are seen as most critical to their success:

- - Links to domestic and regional markets;
- - Dependable technical assistance at the farm level;
- - Familiarity with activities being introduced;
- - Linkages to food security and quality of life;
- - Access to natural resources; and,
- - Role for business.

Market linkages: Changes in cropping systems for farmers using traditional agricultural practices create risks for food security and local trading. Such farmers have learned to cope with production problems and often rely on local forest resources to tide them over. Modifying production patterns requires the opportunity cost to be low and the benefits attractive to give sufficiently high returns to compensate for the risks. A reliable market is thus an essential motivating factor to incite any change.

Technical assistance: Upland farmers in many GMS communities have traditionally practiced a form of agroforestry based on shifting cultivation, with

a mixture of upland crop production and livestock raising in and around natural community forests. These traditional systems are slowly being abandoned in favor of permanent, market-oriented production systems, as a result of increased population pressure that has led to shortened fallow periods and land use restrictions imposed by governments for environmental reasons. This transition requires new skills and technologies that can be facilitated with technical assistance that provides culturally sensitive and appropriate advice and boosts farmers' confidence in modified livelihood systems.

Familiarity with activities being introduced: Many rural women in the GMS use local forests as “markets” for regular procurement of food supplements and medicines to feed and care for their families, which is particularly important during times of famine and natural disasters... This knowledge of agroforestry gives upland farmers a comparative advantage over lowland farmers in undertaking forest-based development that takes advantage of the special ecological conditions prevailing in the uplands.

Links to food security and quality of life issues: Many upland communities cultivating sloped areas of the GMS experience seasonal food deficits due to low crop productivity and labor and land constraints to expanding the productive area. Improving household food security and quality of life is therefore a major incentive to the adoption of modified farming practices. Most low-income farmers, particularly those dependent on forests to meet subsistence needs and supplement income appear to be willing to take greater risks, and make bigger investments in agricultural activities, when they feel that family and community food security is at least preserved if not improved. Thus the links to food security, social status, environmental enhancement, and an improved quality of life are seen as factors central to the success of upland agricultural interventions. Initiatives are more likely to succeed when local conditions, basic community needs, and human development requirements, as well as the readiness of communities to respond, are taken into consideration.

Access to natural resources: Access to land, water, and forests is critical to motivating rural communities to invest increased time and family labor in agricultural activities. Upland farmers are willing to adopt modified agricultural production systems when land rights are transferable, so that labor invested in land development and efforts to improve water management and land-based assets add value to the land.

Role for business: Business enterprises have played a critical role in promoting sustainable agro-economic development in the GMS uplands. Cooperation between business and government stimulates the local economy, provides on-farm income generating opportunities, reduces the vulnerability of the poor, and increases the value of farm outputs and assets.