Juth Pakai

New Thought *Issue one, December 2003*

Perspectives on Lao development

First Issue: Food, fields and disaster

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Issue 1, December 2003

Sharing Information to Stimulate Development

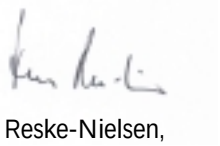
In March 2003 the United Nations Country Team in the Lao PDR met to discuss how to promote debate and information exchange among those working for the country's development. The team decided to begin a journal that would provide a forum for development issues, and then created an editorial board to guide it. The Editorial Board of *Juth Pakai* firmly believes that the objectives of alleviating poverty and stimulating development in the Lao PDR will be better pursued if information and innovative thinking are shared. The articles presented here challenge our current way of thinking and/or contain information that has not yet been published. We sincerely hope that Juth Pakai will stimulate an active development debate and will contribute to a better understanding of the development challenges in the Lao PDR.

Food, Fields and Disaster

Welcome to the first edition of *Juth Pakai, Perspectives on Lao Development*. Roughly translated, *Juth Pakai* means 'new thought' and the rationale behind this journal is explained in the vision statement on the previous page. *Juth Pakai* will be published three times per year in both Lao and English and aims to become a forum where Lao and international development professionals can exchange information and ideas. Encouraging more discussion of the methods being used across all sectors, and the results of completed or ongoing activities, can only help planners and project workers in their efforts.

This first issue offers three diverse but overlapping articles that all deal with one of the fundamental issues facing rural people in the Lao PDR: access to land and food production capacity. Jutta Krahn examines how change in rural diets is affecting nutritional status, while Anneke de Rouw's team present inital results from their comparison of different farming techniques in the marginal agricultural land of the north. Sarah Wood, formerly with Concern, puts forward a very interesting thesis that the more important disasters in Laos are not the floods and famines that periodically affect certain provinces, but rather the almost daily pressures that result from land access and other problems.

While this first edition groups three stories with connecting themes, *Juth Pakai* welcomes contributions from every sector and from all writers with something to offer to the development debate. Your feedback to Issue 1 is welcomed. Drop us an e-mail at **laodevelopment.journal@undp.org**, and if you would like to submit work for possible inclusion in the journal, in either Lao or English languages, please see the invitation at the back of this issue.



Finn Reske-Nielsen,
UN Resident Co-ordinator

Cooking Up - Dietary Change in Lao Upland Kitchens

by Jutta Krahn

Most Lao upland cultures are undergoing a rapid process of dietary change. Development policies, both ultimate and proximate and their resultant activities, are having direct impact on dietary intake. The author argues for an urgent need to look into the cooking pot and understand the nutritional impact of dietary change. As in other countries the vision of food security needs to be shifted away from its focus on staples.

Food is culture and in every country of the world food cultures are changing, for better or for worse. Negative dietary change (here understood as change that leads to inadequate intake of nutrients) is often the result of unbalanced development efforts (Pottier 1999). In Laos the government, together with foreign development organisations, is trying to change food cultures in upland areas (hilly and mountainous zones with limited wet-rice production areas). The aim is to improve food security (GOL 1995), the achievement of which is understood as key to poverty reduction (NPEP 2003: 121). Food production for local self-sufficiency and markets forms one of the government's eight priority programmes (NPEP 2003:9), with the central focus of food production being rice growing. The policy parallels efforts to stabilise shifting cultivation by 2010 (NPEP 2003: Annex 2a).

In many low and middle-income countries, such as Brazil, China, and Thailand, rapid dietary change is creating a situation where undernutrition and overnutrition exist side by side. Laos is also a good example. While many people in the cities enjoy a surplus of food and some drink a lot of beer, many upland cultures are deadlocked in the decrease of their traditional foods, especially wildlife and fish. Yet with no new viable foodways, how can upland cultures improve their livelihoods, integrate into the national economy and maintain a delicious and healthy diet? The long-term consequences of nutritional differentiation may be as insidious as those of economic stratification. Dietary change in the Lao uplands needs further understanding.

Unfortunately, development supporters have not yet broken into the pool of upland food cultures. 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.

Food and Nutrition in Lao Uplands: Underlying Principles

Laos is a rich centre of tropical evolution; diversity and numbers of species in the biota are extraordinary (Gressitt 1970), especially in the mountainous areas inhabited by a large diversity of ethnic groups. These groups have varying attitudes to food. Selecting plants and animals as edible is a highly cultural affair (Levi-Strauss 1997) and differs for the various ethnic groups and eco-regions.

The classification of insects provides a good example. In areas where wildlife is abundant, like the remote district of Kaleum in Sekong Province, the Katu consider *meng da* (water bugs - *Belostomatidae spp*.) to be inedible. The Katu of Thateng District, however, are experiencing a rapid decrease in wildlife and have started to eat *meng da*. The same insect is quite established in Lao Loum cuisine as the main ingredient of a delicate *cheo* (sauce) and is even exported. In the past, the Hmong did not consider such insects as edible but in Muang Nga, Oudomxay, there has also been a considerable decline in wildlife consumption and the people have started to eat termites and dung beetles. Although this is surely a general picture differing for villages, families and even individuals, there is no doubt that dietary change is a very cultural affair.

Staples form the core of Lao upland diets, both in volume and calories. Besides glutinous rice, and to a lesser extent non-glutinous varieties according to the ethnic group, roots and tubers from garden and forest, together with corn make up a great share of the bulky foods. In times of shortage bamboo shoots, green leafy vegetables, ferns, mushrooms, wild stems and bulbs, bananas, jackfruit and so on are eaten in greater amounts as filling foods. The ratio of rice to non-rice staples always changes with season, but has considerably altered over the course of the last years. Traditionally, cassava and maize consumption was significantly higher than rice consumption in some mountainous areas. The Katu saved rice for guests, festivals and special occasions (Krahn 2003b).

Many wild plant and animal species provide foods with greater nutrient densities than are present in alternative foods imported through market networks

While garden crops such as eggplants, pumpkins, beans, cucumbers and chillies form a big share of vegetable foods, most ethnic groups frequently collect a wide variety of forest products like leaves, shoots, sprouts, mushrooms, flowers, weeds and herbs. Clendon (2001) has shown this in detail for the Katang and Lao Loum. The ratio of forest to garden plants varies though, according to ethnic group and subgroup, season, and also cultural change. In the past forest fruits were of stronger importance than now, but still today a wide variety of forest fruits and nuts are collected. Garden fruits are increasingly planted, particularly the banana (Krahn 2003b).

In most upland cultures, livestock plays a significant role in yearly rituals, especially the buffalo (Kirsch 1973). Its consumption has always been limited however. Among the Katu, wildlife including fish, frogs, crabs, snails, lizards, rats, squirrels, weasel, martens, wild boars, civets, wild birds, occasionally muntjac or deer, porcupine, bats, turtles, ferret badger, macaques, langurs and gibbons, provides a far greater share of meat. In general, it can be said that in the past there was a significantly higher consumption of big mammals than now (Krahn 2003b). WCS has observed that in Luang Namtha Province small animals from the nearby forest, such as fish, frogs, rats and squirrels, form the main

share of wildlife in local diets, while bigger mammals are hunted less frequently in a more distant forest (personal communication by Johnson, 2003). Naturally abundant small animals are often the most important species for subsistence consumption.

In their intact state, traditional food systems often provide essential nutrients within a holistic human ecological context. Many forest foods have a very high nutrition density and are often of higher nutritional value than domestic animals or garden foods (FAO 1989 and 1996). Chemical analysis of some traditional Katu foods corroborates this (Krahn 2003b). Many wild plant and animal species provide foods with greater nutrient densities than are present in alternative foods imported through market networks in remote mountain areas. Moreover, in some areas of Laos such as Kaleum District, market food supply is highly restricted; there are many days when even bananas are not available.

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	*Polyporaceae* and *Russulaceae* 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	*Cyprinidae* and *Cobitidae species, etc.*	Protein, fat, niacin, calcium*
Frogs, snake, lizards	*Ranidae and Bufonidae* species, ratsnakes, *Scincidae* species, etc.	Protein, fat, calcium*, zinc
Freshwater snail, crab, shrimp	*Thiara asperata*	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-linonelic acid.

Availability, Access and Utilisation of Foods

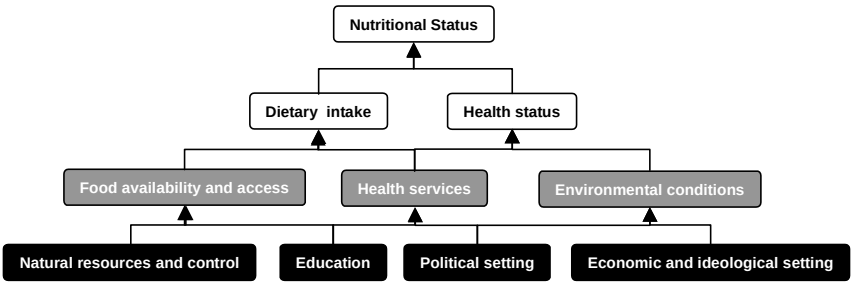
The basic principles of food security are rapidly changing. While traditional foods are decreasing, and some have almost disappeared (for instance millet, wild roots and tubers), new food items are finding their way into upland kitchens (new fish species in ponds, certain fruits like tamarind, guava, 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.

By definition, nutritional status is a function of both dietary intake and health status, which can be best measured with anthropometric indicators such as stunting and wasting of children under five years. The nutritional situation in Laos is grim. National statistics report the incidence of stunting as 41%, and wasting as 15% (MOH 2001). Iron, iodine, Vitamin A, and B Vitamins have been identified as critical nutrients. It appears that an improved nutritional status, when it occurs, is not an outcome of better dietary intake but rather of better health status (Kaufmann *et al* 2001, Krahn 2003a). As long as parasitic infections together with malaria, diarrhoea respiratory problems and other infections prevail, nutrients from a balanced and rich diet cannot be utilised for biochemical body functions: malnutrition follows. Besides high levels of stunting and wasting in her research region, the author identified a 54% average infection rate with roundworm (*Ascaris lumbricoides*), 30% with hookworm (*Anclystoma duodenale*), and 21% with whipworm *(Trichuris trichuria*). Only four cases of liverfluke (*Opstorch veverri)* were identified.

Outlining a full framework for malnutrition in Lao uplands is beyond the scope of this article. However, a general tentative framework for nutritional status can be broken down into three types of cause: immediate causes, underlying causes and finally basic causes. A full framework for negative dietary change for the Katu will be outlined in the author's PhD thesis (Krahn 2003b). Detailed lists of causes will give each village, district and province a slightly different framework.

Table 2: The Nutrition Problemtree



Food Security Strategies

Different theoretical concepts of food security exist for the Lao uplands. This results from major conceptual differences in the approaches of nutritionists, doctors, agriculturists and economists, and those of anthropologists and sociologists (Krahn 2000). For example, the entry of bear meat into the stomach is distinct from each perspective. For the nutritionist, nutrients are released in the stomach to further interact with one's body. For the anthropologist, this is the climax of a cultural sequence of hunting, sharing, preparation and eating. To the chemist, it is clear that the crunch of roasted meat comes from a carbohydrate-protein complex caused by the *Maillard* reaction. Traditional healers value the bitter gall bladders of the bear for medical properties, while for the conservationist eating bear meat is unsustainable as *ursus* is a protected species. The economist tries to calculate the animal's economic value. Back in the village, the eater might wonder why all the fuss about bear meat – after all, Westerners use the skin as head gear (and not only the British).

Who is actually at the cooking pot in the Lao uplands? There are three main players: the uplanders themselves, the government, and lastly development organisations such as UN agencies, INGOs, bilateral donors, the ADB and World Bank. In this triangle villagers try both to maintain their cultural identity (including food) and to move and negotiate in the rapidly changing social and economic environment.

For true positive dietary improvement to occur, the concept of food security has to be expanded

As yet, no clear vision of food security has been outlined for the Lao uplands. Local food sufficiency, as of May 2003, is understood mainly as rice security embedded in the overall national development framework (MAFO 1999, NPEP 2003). As in other South-East Asian countries, rice is often the main source of income and the key component of private expenditure (IRRI 1993:24), not to mention a vital spiritual and cultural symbol. Lao uplands, however, are often rice insecure. This automatically leads to the areas' designation as food deficient. For instance, a farmer might own many buffalos, pigs, goats and chickens, with a garden rich in vegetable and fruit species. He may have a stable income from selling NTFPs and be skilful in trapping and fishing. However if his family's staple was cassava together with corn and other tubers, they would be classified as rice or food insecure. The quantitative and qualitative intake of meat, vegetables and fruit would be of little importance.

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.

What is Missing in the Food Security Strategy?

In short, the proposed food security framework follows a six-step strategy design model based on vision, assessment, planning, funding, implementation, and finally monitoring and evaluation.

1 - Vision

The vision of food security for the Lao PDR appears to be unfinished. There is rice, but what next? According to government policy, shifting cultivation should be stopped by 2010. Villagers and development supporters are left to ponder this edict, and to find alternatives not only for upland rice but also for vegetables, fruits and meats. In particular, there is no viable protein alternative on hand for wildlife. It is clear that different populations have different food practices. For example, while traditional Katu prefer to eat glutinous rice with *cheo* and foods cooked in a bamboo-tube, the Hmong prefer non-glutinous rice, eat with spoons, and do not discharge the ricewater, which the Katu always give to the pigs. However, culture-specific data on livelihood systems, kitchens, recipes, ingredients and eating patterns is lacking for the different ethnic groups and eco-regions. Stopping shifting cultivation across all areas will significantly affect what comes into the cooking pot.

2 - Assessment

Current analysis of the Lao nutritional situation is based on vague suspicions. There are no recommended daily allowances (RDA) for the Lao PDR and nutritional tables on Lao foods are lacking. Thai, Vietnamese, or other references have to be used. Even in those, there is no data on Vitamins E, B_6, B_{12}, folic acid, PUFAs, selen, iodine, etc. Therefore dietary intake as one of the two immediate causes of malnutrition cannot be assessed comprehensively (see table 2). Basic causes of malnutrition are not sufficiently recognised and remain untouched by any sort of analysis. The issue of dwindling natural resources deserves particular attention. The World Wildlife Fund states that declining biodiversity is linked with poverty and that areas most vulnerable to poverty overlap with areas considered to be biological hotspots (WWF 2003).

3 - Planning

Theoretically the various foreign organisations working in accordance with the government acknowledge the need for stronger cooperation between the development sectors (HDR 2002). As the next step, the government plans a triangular relationship between growth, social/cultural development and conservation of resources (NPEP 2003). Real networking does not yet take place however. Work is strictly divided between agriculturists, health workers, economists, and foresters or conservationists. Ironically, both the government and foreign development institutions rarely employ nutritionists. The biochemical dimension of food security is not understood: strategies are planned on questionable assumptions while visions for food security remain blurred.

4 - Funding

Since serious research is not something promoted by either the government or foreign development institutions, there is little space to enter the cultural dimension of food security for the different ethnic groups, to find out about nutritional values of food, or to understand the health dimension of changed dietary patterns. Funding and therefore duration of programmes and projects often does not match the timeframe required to fully advocate dietary change. Whilst it might be possible to introduce new crops

and their production, there is often not enough time to test usage with recipes. Needs for quantitative reporting to donors and headquarters do not leave much space to set out more in-depth work.

5 - Implementation

Programmes and projects often only scratch at the surface of food security. Compounding factors might overshadow project sustainability or short-term success. A fictional project, aiming at food security, intervening at the level of food availability and working exclusively on agricultural production, might result in increased rice production, with some vegetable gardens and fish ponds. However, if the project also considered the availability of local forest foods (wild fish, frogs, squirrels, birds, bamboo shoots etc.), the net food availability and nutritional density, it may find there is in fact no increase in food security. Issues of logging, road access, village consolidation, unsustainable practices for harvesting NTFPs, and improper implementation of land allocation schemes may undermine the overall goal of food security.

6 - Monitoring and Evaluation

Anthropometry is not yet standard for monitoring food security activities. To monitor the impact of dietary change is a difficult task. Reference data is not extensive. Besides the nationwide survey by the MOH (2001), only isolated anthropometric surveys have identified levels of wasting and stunting. Even less data is available for micronutrient deficiencies, levels of anaemia, goitre and Vitamin A deficiency. Some organisations that have conducted anthropometric surveys successfully proved that the nutritional status of the target population has improved over the course of the project (GTZ Kaufmann 2001). In every case however, it needs to be checked if the nutritional status improved because of better health or better nutritional intake. One of the underlying assumptions behind increasing food security is that more market foods can be bought with increased income. However, surveys on market supply, price elasticity and expenditure are necessary to monitor transitional food systems.

Nutritional Consequences: Tentative Outlook

The NHDR reports an average national rice intake of 608 grams in rural areas without road access (NHDR 2002:152). Nutritional analysis reveals that a daily consumption of 600 g of rice (glutinous rice, polished and steamed) does not provide sufficient quantities of all nutrients required (Thai reference: female, 31-50 years). According to Thai Recommended Daily Allowances (GOT 1989a and 1989b), such a serving provides only 79% of energy, 50% of protein, 16% of Vitamin B_1, 43% of Niacin, 4% of Calcium, 10% of Phosphorus and 6% of Iron. Vitamin B_2 is more than covered at 109%. The author has no data for calculation for the other nutrients. Even without reference it can be assumed that rice is not a good source of Vitamin C (RDA: 75mg/d), Vitamin E (RDA 15mg/d), Vitamin B_6 (RDA 1,3 mg/d), folic acid (no RDA), Vitamin B_{12}, Selenium (RDA 55 ìg/d), and so on. 600 g of rice provides only 1.8 g of fat - far below the approximate 30 g contained in a good diet. Low fat intake hinders the biological utilisation of fat-soluble vitamins such as Vitamins A, E, D and K. The same is true for protein, which forms certain carrier substances in the blood. If levels of protein are too low, the transport of Vitamin A, iodine and other micronutrients is hindered. Substituting rice with other staples like corn, cassava, etc would also fail to yield better results. For a balanced diet, sufficient intake of various meats, vegetables

or legumes, fruits, oils and fats is crucial. From a nutritional point of view therefore, an increased rice intake holds many risks if consumption of non-rice foods is not increased at the same time. The shift from a low rice diet that is rich in tubers and corn, with various wild meats, lots of wild fruit and sufficient vegetables, towards a diet rich in rice but low in other food groups is clearly a negative dietary change.

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

Conclusion

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 agro-ecosystems. 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 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.

About the Author

Jutta Krahn is a freelancer and nutritionist currently working towards a PhD at the World Food Economics Unit of Bonn University's Institute for Agricultural Policies, Market Research and Economic Sociology.
Her PhD deals with dietary change among the Katu in Sekong province and 'lessons learnt' in development work. Jutta has already conducted field work in Laos with the support of the Cultural Research Institute (Ministry of Information and Culture) and UNDP's Sekong Ethnic People's Development Project. She will return to Laos for further study.

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Four Farming Systems: a comparitive test for erosion, weeds and labour input in Luang Prabang region

by Anneke de Rouw, Keooudone Kadsachac and Isabelle Gay

In Northern and Central Laos, clearing the slopes for annual crops causes soil erosion, with severe environmental, economic and social effects. Rotational no-input slash-and-burn farming is the prevalent cultivation system, and with fallow periods reduced to one to three years, farmland is increasingly subject to weed competition. The progressive weed invasion of fields and the subsequent extra work to clear them induces tillage erosion, a type of erosion not caused by runoff. This study compares erosion and yields in four farming systems: (i) rotational slash-and-burn, (ii) improved fallow with pigeon pea and Crotalaria micans, (iii) improved fallow with contour planting and (iv) mulch planting without tillage. The systems were tested in separate one-hectare minicatchments at Houay Pano watershed, Luang Prabang.

Forest area has been reduced to less than 30% of Northern and Central Laos, most commonly through rotational slash-and-burn agriculture*. Deforested areas are subject to land degradation and soil erosion: on steep land particularly, soil erosion has been identified as the major problem for sustainable agriculture. Predicted soil loss has been estimated at 30-150 tonnes per ha each year, depending on parameters such as soil characteristics, land slope, land cover and cropping system (Phommasack et al. 2001). Erosion causes severe on- and off-site environmental, economic and social impacts. On-site, it reduces the chemical fertility of soil by nutrient and organic matter depletion. Erosion also damages physical fertility by removing surface soil, reducing soil depth and water-holding capacity. These soil changes slowly reduce crop yields, farm incomes and household nutrition. Major off-site effects include flooding, damage to roads, and siltation of dams and canals resulting in reduced water supply for crop irrigation.

Farmers usually do not identify soil erosion as a main problem in upland farming. Instead, they consider weed competition the single most serious constraint to rice cropping (Roder 2001). Other constraints mentioned by farmers, such as land availability and labour, are directly related to weed infestation because, as a result of short fallow periods, labour requirements for weeding have increased substantially over the last few decades. Roder et al. 1995, observed that weeding labour required 150-200 days per ha every year in upland rice fields.

After progressive invasion of weeds, the subsequent extra work required to clear fields and continue subsistence upland farming bares and disrupts the soil surface, thus triggering another type of erosion not induced by runoff. On the steep slopes of the region's fields, this weeding work induces tillage erosion, which is the process of downhill soil movement caused by agricultural tools and gravity. In

northern Laos, soil losses due to tillage erosion are now equal to the loss caused by runoff. This has been measured at the plot scale under traditional practices, at 5.7 tonnes per ha each year (mean over five years, Phonmasack et al 2001). Where slash-and-burn rotations are very short, tillage erosion has increased exponentially, not only because fields are cleared more frequently, but also because more fields are cultivated simultaneously.

farmers consider weed competition the single most serious constraint to rice cropping

During research activities conducted by Lao-IRRI from 1991 to 1995, it was found that farmers usually provide adequate weed control to avoid yield losses in rice (Roder et al 1998). With fallow periods ranging from six to eight years, rice farmers weeded on average three times during the season, while the practice of burning the slashed fallow vegetation constituted the best weed control (Roder et al 1997). Fallow periods have now been reduced to two to four years, resulting in further weeding demands. The quantity of slashed material is no longer sufficient to provide an overall burn and thus a clean seedbed. Repeated shallow tillage becomes a necessity before rice planting and because of this preparatory cultivation, farmers are naturally late with planting. By the time this has been completed, weeds are already well away on the part of the field planted earlier, and so farmers are never able to catch up and do weeding at the optimum time. In this situation, yields are apt to suffer both from a reduced growing season and from weed competition. The effects of reduced fallow periods are likely to become more pronounced after the same areas have been used for several short cycles.

Acute weed problems, combined with the more hidden impact of erosion, are severe threats to agricultural development in Laos. To address these problems, the Management of Soil Erosion Consortium (MSEC) has adopted a new research paradigm based on a participatory, interdisciplinary catchment approach. The focus is on scientifically sound information for decisionmakers and the involvement of a whole range of stakeholders. MSEC, which was launched in 1996, has study sites in seven Asian countries. At the Lao MSEC site, soil erosion, crop productivity and weeds have been quantified and evaluated under the rotational slash-and-burn cultivation system since 1999. Since 2002, three promising alternative farming systems have been tested and compared with the short cycle slash-and-burn system. This paper presents the results of the first season.

Materials and Methods

Study Site

The MSEC site, the 73 ha Houay Pano catchment, is located south of Luang Prabang near road No.13 and is part of the territory of Lak Sip village. The population density is 98 persons per km^2, quite high compared to the average density of Luang Prabang Province (23 persons per km^2). Khmu constitute 92% of the village population and 97% of household heads are engaged in farming as their major

source of livelihood and income. Farmers in the village practice upland rice-based cultivation, in rotations of one to three years of bush fallow with one year of rice or Job's tears (*Coix lacryma jobi* L.). About 80% of the families make use of exchange labour, mainly for sowing and weeding. Farmers consider weeding to be the most difficult task in upland rice cultivation. Because of more intense cropping and reduced fallow periods, farmers reported that crop yields have declined to about half of what they were twenty years ago (3 to 4 tonnes per ha). To compensate for the resulting recurrent rice shortages, farmers resort to the sale of secondary crops, livestock, firewood or non-timber forest products (MSEC 2002). The cultivated soils in the catchment are of medium fertility. Alfisols cover 71% of the catchment, with Entisols and Ultisols at 14% and 12% respectively (MSEC 1999).

Farming Systems

In contrast with other projects in Laos, where testing of farming systems is carried out on a field-scale plot, MSEC uses the watershed or catchment scale. This implies that landscape features such as topography, gullies and rock outcrops are better accounted for. Practically it means that all farmers cultivating within such a watershed have to apply the same farming system.

The four farming systems studied were:

1. CONVENTIONAL SLASH-AND-BURN system, with no inputs and reduced fallow periods ranging from one to three years.

2. IMPROVED FALLOW with Pigeon Pea (*Cajanus cajan* Hutch.) and *Crotalaria micans* (Link), as recommended by the Integrated Upland Agricultural Research Project (IUARP).
Such systems aim to enrich the poor bush fallow with additional biomass, early ground cover and extra litter, to improve the soil and suppress weeds in a short period. Farmers in the region seem able to adapt to improved fallows rather quickly.

3. IMPROVED FALLOW COMBINED WITH CONTOUR STRIPS of pineapple, as recommended by the Asialand/Sloping land project.
This system could be adopted when the fallow system is no longer possible.

4. NO-TILL AND DIRECT SOWING IN DEAD MULCH of Ruzi grass (*Brachiaria ruziziensis* Germain & Evrard) with limited use of glyphosate as recommended by CIRAD (French Research Centre for Agriculture and Development).
During the dry season, Ruzi grass acts as a grazed fallow. Farmers can adopt this system only under better economic conditions.

Measurements

Erosion

Hydrologic stations were installed in the main Houay Pano creek in 1999-2000 and weirs were equipped with automatic water level recorders to monitor water flows. Seven manual rain gauges and an automatic weather station were installed in 1999. In 2001 four additional weirs were added, each draining a

minicatchment of less than 1 ha. These four minicatchments were used to test a single farming system each. Sediment that accumulated in the minicatchment traps (weirs) was collected and measured to get an indication of erosion under the different land uses. Data on water level and discharge was collected automatically. Soil and nutrient loss were calculated from analysis of runoff water and sediments (University of Paris).

Agronomy

In 2001, the commercial value of Job's tears in Luang Prabang was superior to that of rice. Expecting a good price in 2002, the farmers in Ban Lak Sip cultivated Job's tears extensively. In the minicatchments, field preparation consisted of slashing and burning the fallow (as in the above systems 1, 2 and 3), with slashing followed by herbicide spraying in system 4. Systems 2 and 3 included the planting of the improved fallow species (cover crops), Pigeon pea and Crotalaria, three weeks after the sowing of the main crop. The densities used were similar to those recommended in Roder (2001) at 20,000 hill/ha. In treatment 4, Ruzi grass cuttings were planted one month after sowing the main crop. All work input throughout the season was recorded. Cover and height of main crop, cover crop and weeds were recorded at two-week intervals in permanent observation plots (9 m^2, total 55 plots). In systems 2 and 3, competition between the main crop and cover crops received special attention. Plots of mixed Job's tears and cover crop were compared with plots where Job's tears was allowed to grow in pure stands (9 m^2 plots, 6 repeats). At harvest, yields and total aboveground biomass was determined by crop cuts in the four treatments (9 m^2, total 55 plots). In addition 28 crop cuts in rice fields and 20 crop cuts in Job's tears fields were made elsewhere in the catchment.

Results and Discussion

Erosion Effect

Marked differences in soil losses were noticed between the four minicatchments (Table 1). The biggest loss produced by either runoff water, or by accumulation of sediments outside the field, was recorded in the rotational slash-and-burn system. Here, losses in suspended and bed loads accounted for more than 300 kg per ha of organic matter. In comparison, erosion losses in the other three systems were

Table 1. Soil and nutrient losses in four farming systems, Houay Pano, 2002 rainy season

	Slope %		Soil loss (t per ha)		Nutrient loss (kg per ha)				
	Mean	Range	Suspended load	Bed load	Suspended load	Bed load			
					Org. matter	N	P_2O_5	K_2O	Org. matter
Conventional slash-and-burn	45	35 - 71	0.99	4.74	58	8	3	1	262
Improved fallow	40	30 - 49	0.01	0.40	1	1	0	0	24
Improved fallow & contour planting	66	38 - 85	0.56	1.95	30	3	1	0	101
Mulch planting & no tillage	39	30 - 48	0.47	0.11	32	0	0	0	8

Suspended loads are evacuated by runoff water, bed loads are sediments trapped in the weirs.

reduced by between one-third to less than a tenth. Though the cultivation practices of the four farming systems can be held responsible for much of the variation, slope and weeding frequency were important too. Losses in the slash-and-burn catchment were intensified by the steep slopes (Table 1) and the impact of frequent weeding (up to four clearings), which causes extra tillage erosion. In contrast with this, the catchment with improved fallow had less steep slopes. This, plus the fact that only two weeding rounds were required, reduced erosion to less than one-tenth of that in rotational slash-and-burn. The steepest slopes were in the catchment with improved fallow and contour planting (system 3), and these inclines were mainly responsible for the moderate level of erosion recorded there. The areas planted with improved fallow, with and without contour planting, probably suffered less from erosion because of the better overall soil cover. Soil losses were least in the system with mulch planting due to the combination of no tillage, good cover and only moderately steep slopes.

The 2001 Houay Pano catchment experiments were conducted to quantify tillage erosion on steep slopes. For Alfisols, downward soil transport amounted to 2 tonnes per ha, 5 tonnes per ha and 20 tonnes per ha each year on slopes with gradients of 30%, 60% and 100% respectively (Dupin et al. 2002). In the minicatchments, the significance of tillage erosion on steep slopes was confirmed. Soil aggregates, loosened up by clearing and weeding, rolled into the weirs where they were measured as bedload. Finer particles were mostly evacuated by runoff water and were recorded as suspended load when they left the field. Reducing the number of tillage operations effectively reduces erosion losses, but the cultivation of steep slopes annuls the effect.

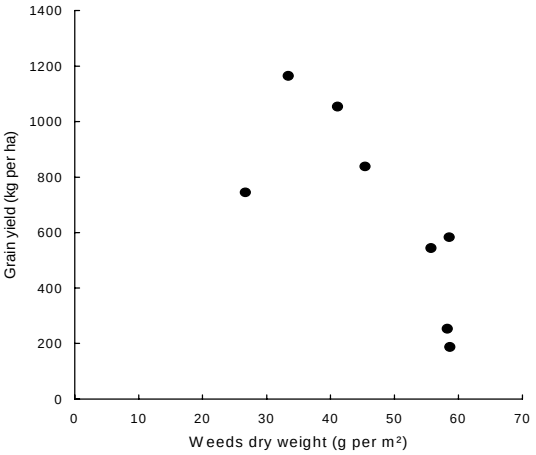
Weeds and Yield

Grain yields were highest under rotational slash and burn, averaging 1.9 tonnes per ha in rice and 1.4 tonnes per ha in Job's tears. Yields were lowest in mulch planting, at 280 kg per ha of maize, mainly because the sowing of maize was delayed due to problems of clearing and access. Clearing away fallow vegetation as high as 4 m to gain access to the field without using burning proved very troublesome. In addition glyphosate killed mainly seedlings and left the resprouting plants unaffected. In the fallow system the proportion of weeds regenerating vegetatively is high and these plants escape herbicide treatment. Grain yield of Job's tears in improved fallow and contour planting averaged 0.9 tonnes per ha and only 0.4 tonnes per ha in improved fallow. The main difference was due to poor weed control in the latter.

Mixed cropping of Job's tears and Pigeon pea caused yield reduction of 26-53%, with 11-29% less biomass produced compared to pure stands of Job's tears. Mixed cropping of Job's tears with Crotalaria on the other hand gave an improved grain yield of 5-47% for Job's tears, with a biomass surplus of 21-29%. The positive effect of Crotalaria on Job's tears was particularly evident in the catchment heavily infested by weeds. This leads to the suggestion that Crotalaria reduces weed competition, by suppressing the otherwise vigorous growth of some weeds, without being itself a severe competitor to Job's tears. Pigeon pea might reduce weed growth as well, but being a more aggressive plant, it seems to also reduce the yield of Job's tears.

Figure 1 relates grain yield of Job's tears to dry weight of weeds at harvest time. Weed infestation particularly affected the crop in the second half of the growing season. In fact at the beginning of the growing season, a positive relation existed between weed biomass and crop growth. This can be explained by the fact that both weeds and crop enjoyed the superior soil conditions without competing. More observations are needed to understand the competition shift between weeds, main crop and cover crop during the growing season. Wide spacing or late planting, especially of Pigeon pea, could reduce competition with the main crop.

Figure 1 Grain yield of Job's tears and weed biomass at harvest, Houay Pano, 2002



Labour

In terms of labour, the improved fallow and contour planting systems required more input than the others did (Table 2). Much of this work was needed for field preparation, due to thick fallow vegetation and the transport and planting of pineapple. In mulch planting, a mixed treatment of repeated slashing and herbicides was necessary to guarantee field access and the establishment of Ruzi grass. Planting the Pigeon pea and Crotalaria into the main crop took extra time because each planting hole had to be marked with a bamboo stick to stop it being weeded by farmers unfamiliar with the system.

The workload in rotational slash-and-burn cultivation was comparable in 2002 and 2001, both for rice and Job's tears. Roder et al (1997) report very consistent work inputs for all practices except weeding in rotational slash-and-burn cultivation. Roder's data generally consists of averages taken from many farmers or derived from monthly household surveys, whereas our information is provided by the two or three farmers working in each minicatchment, or derived from the daily observations of students and staff staying permanently in the village. Comparison of farmers' estimates and our direct observations showed

that farmers accurately estimate the work spent on clearing, sowing and harvesting, but tend to overestimate the work lost in weeding. This could also have been the case in the data of Roder et al (1997).

Table 2. Labour required (days per hectare) for upland cultivation, rice and Job's tears.

	2002, Houay Pano*				2001, Houay Pano *		1991-92 †
	Conventional slash and burn	Improved fallow	Improved fallow & contour planting	Mulch planting no tillage	Slash-and-burn Rice	Slash-and-burn Job's tears	Slash-and-burn Rice
Field preparation	41	53	77	29	30	27	33
Burning	1	1	1		1	1	2
Second clearing	26	70	31	63	30	25	27
Herbicide				5			
Total work prior to planting	**68**	**124**	**109**	**97**	**61**	**53**	**62**
Transport and planting pineapple			56				
Planting main crop	43	42	36	21	39	8	29
Planting cover crop		52	65	62			
Weeding	74	37	26	19	80	75	146
Harvest and transport	25	7	26	3	48	32	55
Grand total	**210**	**262**	**317**	**200**	**228**	**168**	**292**

* data from direct observation
† data from interviews, Roder et al 1997.

Conclusion

The information presented has been collected over one year and not all of the data has been thoroughly processed and analysed. Compared to the slash-and-burn system, the three alternative farming systems were effective in combating erosion due to better seasonal ground cover and less frequent weeding. However, yields were reduced in the alternative systems for two reasons: farmers are relatively unfamiliar with the alternative systems, resulting in slow and delayed work; secondly, the alternative systems are not fully adapted to the Houay Pano environment. For instance, improved fallow species in Laos have mostly been tested intercropped with rice or maize, whereas few examples can be found of mixing improved fallow and Job's tears. Extra knowledge is therefore needed to adjust the life cycle of the two crops. In addition, the plant densities of the Pigeon pea and Crotalaria were probably too high - the current high density planting in farmers' fields reduces their lifespan and vigour (personal communication by Dr B. Lindquist, IRRI.). In various ongoing experiments, plant densities are actually reduced to 1 hill per m^2. Proper testing of the systems only occurs after a full cycle of cultivation and fallowing, because only then can the positive and negative effects of improved fallows be compared with the natural fallow.

Finally, the high population density in Houay Pano catchment, resulting from the grouping of villages after 1975, has resulted in very short cycles. Slash-and-burn cultivation is now close to a critical point at which it will be profitable for farmers to shift to other land use systems. The economic profitablity of these attempts must be weighed against the relative ecological degradation caused. Researchers should not forget to observe and report the spontaneous efforts of farmers to modify their systems.

* Editor's note: *In Laos there are basically two types of shifting 'slash-and-burn' cultivation: pioneering and rotational shifting cultivation. While pioneering shifting cultivation is prevalent in the north and indeed is regarded as environmentally very damaging, rotational shifting cultivation is regarded as one of the most sustainable forms of utilising natural resources.*

About the Authors

Anneke de Rouw is an agronomist with the IRD (Institut de Recherche pour le Développement), MSEC programme, at NAFRI (the National Agriculture and Forestry Research Institute).

Keooudone Kadsachac and Isabelle Gay are students from the Faculty of Agriculture, Nabong, and from ISTOM, France.

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Coping with Disasters: the challenge of ongoing hazards

by Sarah Wood

What do the rural poor do when faced with shocks to their livelihood systems? In Laos, such shocks include flooding, drought, pests, weeds, animal disease, epidemics and opium addiction. This article is based on findings from a research project on local sequential coping mechanisms, within the context of disaster management. A major focus is on how environmental, economic and socio-cultural changes are weakening indigenous coping strategies. The study was conducted by Concern, together with the National Disaster Management Office, Norwegian Church Aid and World Vision, in nine villages across five provinces. Survey villages were selected to give a sample population from different ethnic and geographical backgrounds, and exposed to a wide range of different disaster risks. The methodology employed is described at the end of the article.

Perception of a Disaster

Disasters are often perceived in Laos as large and sporadic cases of flooding or drought. This study has revealed that in fact other 'ongoing' or 'everyday' hazards, such as crop pests and animal diseases, cause more damage to poor communities. The finding mirrors research in other countries, which has shown that the impact of 'everyday disasters' may be much greater than that of the large events formally recorded as disasters. Indeed, it is much more difficult to cope with the adverse effects of 'ongoing disaster', caused by an increasingly fragile local environment and an aggressive new market, than with those of an isolated big flood or drought.

Despite the size of the material damage caused by big disasters, people in many of the villages surveyed believe that recurrent seasonal human disease constitutes the greatest threat to their livelihood security. In a subsistence livelihood system, human labour for collecting food, hunting, fishing and carrying out agriculture activities constitutes the core capital. When illness saps this capital, the ability of people to both sustain their level of subsistence and withstand other disasters is reduced.

Recurrent disasters have more impact on the poor people of Laos than big one-off events because these disasters deplete their resources, wear down their resilience, weaken their resistance to disease and undermine their ability to withstand future hazards. People are becoming trapped in a cycle of poverty and increased vulnerability.

What are Coping Mechanisms?

Coping strategies are sets of measures taken by communities to obtain resources in time of adversity and disaster. A community's strategies are based on their experience, social structures, resources and capacity to combine these factors. Coping strategies are often complex and involve a number of sequenced mechanisms referred to in the text as 'coping mechanisms'. They can include preparation, mitigation, and response or rehabilitation measures.

Coping strategies are often passed from generation to generation within communities and households. They depend on the assumption that reoccurring disasters will follow a familiar pattern, and that people's earlier actions will be a reasonable guide for similar events. However, coping strategies are not static. Under the change of their internal and external environment, communities and households develop progressively different livelihood patterns. Subsequently, community coping methods have evolved over periods of time to suit the local socio-economic, cultural and political environment.

Over time, strategies which formerly served people well come under a variety of pressures (reduced family ties, population pressure, change in agricultural modes of production, negative market influences etc), which reduce their range and efficacy. Eventually indigenous coping mechanisms may be undermined or weakened, thus increasing vulnerability. According to Keiffer, "Strong external influence may act, often inadvertently, to break up internal coping mechanisms and their effectiveness".

New or emerging hazards may be unfamiliar to communities. In adverse and uncertain conditions people have to adopt mechanisms or makeshift mitigation measures, which often prove totally inadequate against the characteristics or magnitude of the hazard faced. In uncommon crises, coping mechanisms often respond to the immediate effects of disaster. By focusing on short-term and targeted beneficiaries, the mechanisms may undermine livelihood basis in the long run, without the actors being aware of the negative impact on existing resources and the social environment.

The real crisis emerges when vulnerable communities shift from reversible to non-reversible strategies, which cut into their long-term options and future ability to respond to hazard

A variety of different conceptual frameworks has been used to categorise and analyse coping strategies; functional mechanisms, structural mechanisms and sequential mechanisms. This article looks only at sequential mechanisms, as they highlight the stages of vulnerability that communities in Laos go through. The full study used all three frameworks, giving a fuller analysis of coping mechanisms.

Sequential Coping Mechanisms

When faced with disasters, communities mobilise diverse resources based on their experience, vulnerability and capacity, and following a set of sequences. In the first instance, communities tend to adopt strategies designed to secure the sustainability of their livelihood. People would rather eat less than sell their assets (livestock, tools, etc) and thereby undermine their long-term livelihood. However, when the magnitude of a hazard impact moves beyond the community's capacity to cope, some mechanisms become inadequate. The real crisis emerges when vulnerable communities shift from reversible to non-reversible strategies, which cut into their long-term options and future ability to respond to hazard.

The communities studied have adopted sequential coping mechanisms that fall within the four distinct and progressive stages of coping mechanisms defined by Peter Walker:

Stage 1 mechanisms are short-term strategies based on existing livelihood capacities, and are used to respond to an emergency that has just occurred. Their purpose is to maintain basic human needs and social structure, and to reduce loss of both life and assets.

- Selling natural resources, eg. non-timber forest products (NTFPs)
- Changing of food habits
- Buying rice
- Assistance in-kind (in Laos, this is an accepted custom referred to as *kor khao*, used within many ethnic groups and viewed as a positive strategy. It involves the whole community and does not imply a negative practice such as begging).
- Use of traditional herbal medicine (for human disease)
- Treatment (of animal disease)
- Consumption of dead animals (eg. chickens which have died of animal disease)

Stage 2 encompasses the strategies people employ to overcome normal seasonal stress. They are all reversible and none affect main sources of livelihood. These mechanisms might not be sufficient to totally recover from a disaster which has long-lasting negative effects. In seasonal stress, when a number of factors converge to weaken food supply and production capacity, people use strategies that help them face difficulties without undermining their main source of livelihood. All these strategies are temporary in nature and reversible. The period of stress can be followed by a period of recovery.

- Short-term dietary changes in terms of quality (at first another food item is taken as complementary to rice but will then become a substitute as rice shortage deepens)
- Reducing food intake quantity (quantity of rice is sometimes halved for up to six months)
- Exchange of NTFPs (if sold, at this stage they are sold for much cheaper prices)
- Increased use of kinship transfers and network solidarity (borrowing rice or animals)
- Request for external support from the government (particularly in times of rice shortage, animal disease or human epidemic)
- Daily paid/in-kind work (often implies temporary migration)
- Sale of non-essential possessions (e.g. jewellery and poultry)
- Traditional spiritual resources (for human and animal disease when herbal remedies have failed)
- Modern treatment for human diseases (mostly the last resort, using cash obtained through loans or sale of livestock)

Stage 3 is reached if stress is prolonged. The strategies bring short-term gains at the risk of creating long-term problems. Such actions undermine the basis of people's livelihoods by reducing their assets and creating modes of behaviour very different from normal routines.

- Sale of essential assets (eg. livestock or land)
- Consumption of seed for next harvest (the sale of unharvested 'green' rice)
- Borrowing food and money from outside kinship relations (i.e. from moneylenders or richer families from other villages)
- Paid labour and temporary migration (mostly paid in-kind)
- Income diversification towards products which they do not usually make (often leads to poor quality goods which are then unsuccessful at the market)
- Displacement: as the incidence of disease increases, people may move to escape the conditions (either physical or spiritual) that they believe have caused the disaster.

Stage 4 mechanisms are the final strategies adopted when all else has failed. Affected people can resort to extreme measures such as raiding warehouses, permanent out-migration of whole families, reliance upon emergency food aid, abandoning children, begging, and stealing food. These strategies can often lead to disintegration of household structures, community cohesion and loss of human dignity. While the impact of such methods is not measurable, their effects are long lasting and often irreversible.

- Permanent out-migration (this was found only in Champassak and Savannakhet; migration was to other districts and to Thailand)
- Begging (In Savannakhet, groups of five to ten women hire a truck to go to neighbouring districts and provinces or Thailand for a week at a time. Some of the women go to Vietnamese timber camps or army camps).

During the research these stages were used as a framework to analyse the various mechanisms that vulnerable communities adopt for the hazards they themselves identified. A major conclusion was that poor communities in Laos constantly live at stage 1 or stage 2 of the coping mechanisms described above.

For such communities, coping mechanisms are integral elements of livelihood systems – breakdown into categories of mitigation, preparedness, response and recovery is difficult. When a hazard befalls them, people who are already living in a state of 'ongoing disaster' adopt stage 3 or 4 mechanisms straight away. These mechanisms have a negative impact on people's livelihoods, increase their vulnerability and expose them to new hazards. Such methods can be viewed not as coping mechanisms at all, but rather as indicators of disaster (the extreme cases being begging and prostitution) and a prelude to future hazards (sale of assets, deforestation).

Impact of Socio-Economic Changes on Coping Mechanisms

While using the sequential coping mechanism framework as an analysis tool it is important to consider one of the major issues raised within the study; the impact of socio-economic changes on these indigenous coping mechanisms.

The Lao PDR has seen fundamental socio-economic changes, which have had particular impact on remote ethnic minority communities. The last decade has brought extreme changes to people traditionally adapted to an environment based on fundamental balances between man, nature and belief systems. Causes include relocation of populations from forested mountains into valleys, rapid population growth, and the expansion of the market economy. In this fast changing context, communities are not able to cope with their new environment or adapt their livelihood systems. People must produce food in an alien environment with unfamiliar agricultural conditions and little technical extension support. This results in less production on already fragile lands. Indigenous coping mechanisms may be undermined and weakened by these external changes, leading to increased vulnerability during times of stress.

The study reveals that villagers generally feel that the time 'before', when more traditional livelihood systems prevailed, was better. People were healthier and when they got sick they had plants and skills to treat themselves. Now plants are not accessible and the knowledge that was passed from generation to generation is held by only a few people. Many traditionally upland villagers have relocated down to the valleys over the last decade and feel that they have poor resistance to lowland diseases and climatic conditions.

Cases: Nam Seo and Ban Sot

In Nam Seo, a Lamet village in Bokeo province, villagers said that before they moved down to the valley there were less cases of malaria. Now, although they have better access to health services, the people are more prone to disease because they have not been able to adapt to their new environment. They reported that their animals were also less affected by diseases in the past. They used to have large numbers of pigs, buffalo, goats and horses, none of which ever had diseases. Villagers could keep animals until they were fully-grown before selling them, whereas now they feel they have to sell them quickly before they die.

Land pressure, resulting from no or ineffective land allocation, has played a major factor in weakening communities' coping mechanisms. Rice shortages now prevail. In upland villages such as Nam Seo and Ban Sot, also in Bokeo, swidden agriculture is commonly practiced on poor soils in small plots using fallow periods of three to five years. In 1937 a Swedish anthropologist, Karl Gustav Izikowitz, recorded fallow periods of between 12 and 15 years in these villages. The vulnerability of the Lamet has been increased by growing competition for limited land resources. Lamet who have migrated down into the river valley occupied by Tai-Leu villages find there is less and less paddy land available to

recent arrivals. The vulnerability of the communities is exacerbated by plans to reduce slash-and-burn, restricting access to their former swidden lands.

Average yield from swidden upland rice cultivation has declined from 1 tonne per ha in 1976 to 0.6 tonnes per ha today, meaning that households generally only have rice for between four and eight months; this leaves villagers extremely vulnerable to shocks. Labour time in swidden fields can be up to ten months for the villagers of Ban Sot and Nam Seo. In swidden cultivation, 140-190 days per hectare is used for weed control, compared with less than ten days per hectare throughout much of the lowland environment. Time invested in weeding increases as the fallow period is shortened, thus creating more labour and more vulnerability.

In Bokeo, necessity dictates that the forest is being used more and more as a source of income. It has become a major component of coping strategies in most rural areas of Laos. Izikowitz describes how in the 1930s, rice was the primary product traded in Bokeo whereas forest products were only a source of food. Nowadays forest products, including resin, rattan, palm fruit, galangal, cardamom, bark, *khem* flower and bamboo, represent the main resource available to communities coping with shocks. In Nam Seo 90% of household income for the whole village is derived from NTFPs, with an annual 600,000 kip per household. Palm fruit accounts for 78% of NTFPs collected, followed by a local product, *kaissana*, at 10%. In Ban Sot the average income for NTFPs is 264,000 kip with 56% derived from resin and 22% from *kaissana*.

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When communities are over-dependant on the forest their vulnerability can be increased through deforestation, over exploitation and competition for resources. In Ban Sot villagers lamented that some important species could no longer be found at all. In Nam Seo villagers constantly have to go further to collect resin, which is in high demand, and other villages involved in the trade are using the same forest. As the number of people resorting to NTFP gathering increases, its efficacy as a coping mechanism in times of severe stress or disaster is severely reduced.

Access to markets has created new trading patterns within communities and seems to have affected coping mechanisms based on kinship and solidarity. As people become more exposed to markets they tend to view rice as a tradable item, or they specialise in cash crops or other sellable products, and thus rely increasingly on financial trade. A barter-based economy and the continuation of indigenous support mechanisms for the poorest and most vulnerable is now largely confined to families with close kinship relations in very remote regions.

The Challenges

Concern's Study on Local Coping Mechanisms highlights many interesting issues and points the way forward to a more holistic approach for disaster management planning, based on livelihoods and a deeper understanding of the complex livelihood systems of the many ethnic groups in Laos. It shows that disaster management cannot be a stand-alone set of activities but rather that it should be integrated or mainstreamed into all rural development programming. The study provides some key pointers and challenges for development agencies and policy makers within Laos:

- Build on and strengthen existing local coping mechanisms, which are being threatened by environmental changes
- The need for disaster management planning to move its major focus from big disasters to ongoing ones
- Analyse the limitations of local coping mechanisms in responding to disaster, particularly in the light of a rapidly changing environment
- Ensure the sustainability of these traditional coping mechanisms following external interventions

Research Methodology

In order to document differences in coping strategies and capacities between regions and ethnic groups, nine villages were selected in five provinces from Concern project areas in Bokeo, Khammouane, Savannakhet; the World Vision project area in Champassak; and the Norwegian Church Aid project area in Luang Namtha. All target areas have experienced large and frequent impacts from disasters.

The research was carried out in April and May (southern provinces) and September (northern provinces) of 2002 by a core team of two consultant researchers (one international, one local), and two assistants. At each research site the core team was joined by district or provincial counterparts, who participated in the research. NGO staff played a facilitation and occasional translation role in their target area.

Data Collection and Analysis

To gather primary information at the village level, data collection techniques were based on a combination of tools drawn from participative methodology, such as Participative Rural Appraisal (PRA). The use of participatory tools in Hazard Vulnerability Capacity Assessment (HVCA) ensured that information gathered was from the perspective of the community. However, the information gathered was analysed by the research team alone, and it is worth noting that the use of participative methods was an attempt simply to integrate community perspective into the research analysis, rather than to strengthen community awareness or build capacity for government counterparts.

The research consisted of three days of focus group discussions with key informants and selected households, with whom Semi Structured Interviews were used along with some relevant PRA tools. The following three steps were used in data collection:

First Step	**Disaster risks, community vulnerability & capacity profile**: group interviews, baseline information and hazard assessment tools e.g. HVCA.
Second Step	**Household livelihood systems and specific disaster coping mechanisms:** case studies, activity ranking, food path analysis, mobility and daily routine diagram.
Third Step	**Obtaining an in-depth understanding of the disaster risks and community coping mechanisms:** SWOT analysis, problem tree and Hazard-Capacity-Vulnerability scoring table.

Analysis

On the spot analysis was conducted with the team on a daily basis and the process of information gathering adjusted where necessary. A more in depth analysis was made in June 2002, mid-way through the study, with provincial representatives of Savannakhet and Khammouane, the National Disaster Management Office, the International NGOs working in the study area, the research team and the Concern Disaster Preparedness Project team. The workshop reviewed the methodology and drew recommendations for the next phase of the study to be carried out in the northern provinces. The final data of the nine selected villages was analysed by the consultant team in Vientiane**.**

About the Author

This article has been compiled by Sarah Wood for Concern and is based on text by Aicha Brahmi and Keophet Phoumane, conducted between April and September 2002. The full study is available from Concern (concern@laotel.com).

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Lao Development Journal: Contributions Required

The UN Country Team in the Lao PDR is supporting production of a development journal called Juth Pakai, Perspectives on Lao Development. Juth Pakai ('new thinking' in Lao) aims to stimulate dialogue on all issues related to development in Laos. The journal will disseminate knowledge and serve as a forum where debate and analytical thinking can be shared, while also promoting the goals and commitments embodied in the Millennium Declaration.

The journal, to be published three times a year, is seeking voluntary written contributions from the development community, including national and international development practitioners, government officials, staff from bilateral and multilateral agencies and NGOs, journalists, academics, researchers or anyone with a keen interest in Laos. The journal will be written in English and Lao and shall be available both in hardcopy and online.

The UN in Laos sees this as an exciting opportunity for development practitioners and organisations to disseminate reports, studies and opinions on any aspect of the state of the development agenda in this country. All material submitted for the consideration of the Editorial Board should be in English or in Lao. Articles should be no longer than eight pages of A4. Manuscripts should include a short (100-120 words) summary of the issues addressed, the most important findings and a list of references where appropriate. For full guidelines on writing for 'Juth Pakai', e-mail laodevelopment.journal@undp.org or write to the Secretariat, Juth Pakai, c/o UNDP, PO BOX 345, Vientiane, Lao PDR.

The Editorial Board accepts manuscripts on the understanding that they are subject to revision. Contributors should indicate if the material provided has previously been published or submitted for publication elsewhere.

Juth Pakai Secretariat
c/o UNDP, PO Box 345
Vientiane, Lao PDR
Tel. +(856 21) 213390-97
e-mail: laodevelopment.journal@undp.org