SHIFTING CULTIVATION AND POVERTY ERADICATION: A COMPLEX ISSUE *

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Abstract

Shifting cultivation is often described as 'traditional', inflexible and outdated, in contrast with 'modern', mechanised and chemical agriculture. That belief overlooks farmer know-how, accumulated over generations to exploit natural resources while adapting itself to the mutations of the physical, social and economic environment.

Research conducted in Phongsaly provides an idea of how complex and consistent a slash-and-burn farming system can be, and how farmers optimise family labour but also limit their risks.

External interventions - policies, projects, etc. - are aimed at improving farmers' livelihoods by converting their farming practices. When those interventions overlook how diversified slash-and-burn agriculture is, they often lead to oversimplification of farming systems, thereby impoverishing people and exposing them to natural and economic risks. The actions are then counterproductive. To improve them, the role of local services should be rethought, from the underlying policies/projects through to an active interface that adapts each intervention to local conditions and farmers.

Introduction: shifting cultivation, an important agricultural practice discredited in the Lao PDR

Shifting cultivation plays an important role in the Lao economy and society. In a country where 80% of the surface area is hilly or mountainous, shifting cultivation or 'slash-and-burn' crops provide jobs to over 250,000 families (MAF 1999), i.e. 35% of the country’s population. These people are among the poorest in the country and mostly belong to ethnic minorities from the remote uplands in the northern, eastern and southeastern regions of the country.

Slash-and-burn farmers are often accused of destroying the forest and many authors hold them responsible for deforestation in Laos (NAFRI and CIRAD 2003; UNDP 1995; Vorakhoun 2003; Watershed 2000): in 50 years, the country’s forest cover has reportedly fallen from 70% to 51% (MAF 2000). For a resident of the lowlands, culturally used to distinguishing permanent farm areas (rice fields, gardens) from forest areas (protected or exploited forest), images of slash-and-burn in uplands are traumatising (figure 1). As a result, it can seem obvious and natural to call on political powers to make such destructive practices stop (Aubertin 2001).

However, some authors have put forward convincing arguments saying that this is a culturally conditioned position, rather than a rational judgement (Mellac and Rossi 1999; Menzi s 2002). This paper contributes to the debate through a study, conducted in Phongsaly,

* This paper will also be appearing in a special issue of the journal “Moussons”, dealing with the recent transformations in Lao agriculture. The paper will appear under the title “Is the diversity of shifting cultivation held in high enough esteem?” You can find out more about this special issue of “Moussons” by going to: http://www.edisud.com/edisud/site/affichecollection.asp?IdCollection=52
on a shifting cultivation farming system that demonstrates how farmers use reasoned and complex management of their human and natural resources to maximise the efficiency of both. For lack of study on and esteem for this farmer know-how, interventions by administrative services and projects have often led to results contrary to the political aims of environment preservation and poverty alleviation.

**Complex and coherent management of environmental resources in a shifting cultivation farming system**

**Economic study of a small region: Phongsaly**

**Study methodology**

Within the framework of the assessment of the PDDP\(^1\), in late 2002 we began characterising agricultural development in Phongsaly district to place the project in a historical perspective. The methodology selected relies on the theory of differentiating agrarian systems (Dufumier 1995; Mazoyer and Roudart 1997), already applied in many regions of Laos\(^2\). The study dealt with 40 rural villages in the southwestern part of the district, where 1,850 families live (47% of the district’s population), for the most part from the Phunoy\(^3\) ethnic group, but also from the Akha ethnic group.

In each of the 40 villages, interviews with elderly farmers made it possible to reconstruct the historical evolution of the village in the demographic, technical, economic and social domains, while farm surveys made it possible to characterise current agricultural

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\(^1\) Rural Development Project of Phongsaly District (Ducourtieux, Visonnavong et al. 2004).

\(^2\) In particular in Phongsaly (Alexandre and Eberhardt 1998; Baudran 2000; Laffort and Jouanneau 1998), Xayabury (Laffort 1998; Pasquet 2002), Vientiane (Sackloham 2003; Sackloham and Degoul 1999), Luangprabang (Kousonsavath and Lembre, 1999) and on the Bolovens (Babin 1999; Ducourtieux, 1994; Grimeaud and Meaux, 1999; Pelliard, 1998).

\(^3\) 34 out of the 40 villages studied are Phunoy (89% of the study zone population), compared to five Ahka villages (9%) and one Laoseng village (2%).
practices and the differences between villages and families. That initial phase brought to light a dual zoning of the region: the situation of farm families and their practices differs depending on how far they are from Phongsaly, the region's administrative and economic capital. In the first zone, villages along the roadside or in the immediate vicinity of the city do substantial commercial trade with city dwellers and benefit from sustained attention from administrative services; that is the case for 16 out of 40 villages\(^4\). On the other hand, in the second zone, over a two-hour walk into forested land, trade with Phongsaly is progressively lower and public intervention is less forthcoming for the 24 villages concerned\(^5\) (Cf. figure 2).

To round out the study, one village per zone was selected for an in-depth economic interview with all families. The interview surveyed the family, farming practices and their results over the past five years, as well as other economic activities: gathering, fishing, hunting, handicrafts, trade, etc. The second phase has just been completed (Nov. 2003), with processing of the surveys conducted in the villages of Samlang (forest zone) and Yapong (roadside).

**Phongsaly District: a landlocked, mountainous forest Region**

The terrain throughout the whole district is hilly and uneven, culminating at 1,948 metres, with some twenty peaks over 1,500 metres high. The valleys, under 500 metres in altitude, are very steep-sided; their V-shapes limit the potential for agricultural hydraulic projects. The schist or sandstone substrates create fairly deep, acid, clayey or silty-clay soils, which are rather fertile but very heterogeneous (Zhou, Yao et al., 1999).

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\(^4\) 966 families, i.e. 52% of the study zone population and 25% of Phongsaly’s rural population.  
\(^5\) 890 families, i.e. 48% of the study zone population and 23% of Phongsaly’s rural population.
The region, like all of the Lao PDR, is subject to a tropical climate marked by the monsoon system. Nevertheless, the altitude and latitude temper the tropical influences here, providing a cool dry season and a milder rainy season, during which on average 75% of the annual rainfall (1,560 mm) occurs. The very high inter-annual variability in rainfall (980-1,860 mm) strongly conditions how successful farming activities are.

The zone’s climax ecosystem is a tropical evergreen mountainous rain forest at altitudes over 800 m, and tropical rain forest at lower elevations. The very productive forests are characterised by their rarely equalled range of biodiversity, with over fifteen times more ligneous species than in a temperate forest (De Koninck 1997), and still widely unknown endemic vegetal or animal species (Chaze 1990a and 1990b).

**Phounoy shifting cultivation: Complex and coherent management of the environment and workforce**

This chapter describes the production system of the forest zone villages (Cf. figure 2). That system is a result of experience handed down from one generation of farmers to the next, and will serve as a reference. The technical and economic findings are from families in the village of Samlang over the past three years.

**A zoned agricultural production system**

In a traditional Lao village, agriculture production is usually based on three distinct zones: family gardens, in and around the village, the agroforest crown, around and slightly above the village, and the slash-and-burn zone, which constitutes the main part of the village land - planted fields and forest regrowth, or fallow land (Laffort and Jouanneau 1998):

- **Village gardens**: near the main dwelling families cultivate a small vegetable garden, with tubers and fruit trees, for household consumption. The village proper is also used for animal raising, with poultry that wander among the houses, looking for consumable waste and rice bran.

- **Agroforest crown**: the village, generally located near hilltops, is surrounded by an agroforest crown, which plays an essential role as a water reservoir. Trees from the remaining primary forest and plantations provide part of the village’s timber and firewood, as well as fruit. Free-range pigs raised there forage for their food, and are also given supplements gathered on the fallow land.

- **Slash-and-burn zone**: swidden farming occupies most of the village land, with a low proportion recently cleared and planted - 6% to 40% of the surface area depending on the length of the rotation - and the rest left fallow - 60% to 94% - in landscapes ranging from grassland to secondary forest, and including all possible forms of shrubby thickets.

**Slash-and-burn fields**

Following the clearing and burning of one strip of forest, the plots are planted for one year, sometimes two. In the first year, glutinous rice dominates, with many associated crops (maize, tubers and roots, cucurbits, cruciferae, peppers, sunflower and groundnut). In Samlang, all the work requires an average of 130 days of work per active worker, i.e.

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*6 Sources: Meteorology Department, Phongsaly Forest and Agriculture Service (2002).*
320 days per family, for a production of 500-700 kg of paddy rice, 30 kg of maize, 130 kg of tubers and 420 kg of various vegetables per active worker. In the second possible crop year, rice is sown alone; the farmer simplifies his crop complex in order to preserve his priority crop, rice.

The bottleneck in this crop system is weeding, an activity requiring substantial manpower (75 days per active worker per year). It must be done according to a specific, restrictive schedule, or else weeds will put a strain on the yields of rice and associated crops. For example, weeding done too late lets the weeds sprout and spread their seeds, complicating the management of grass cover during subsequent weeding periods. In June, July and August, weeding monopolises the entire workforce.

After the second crop year, the plot is freed for forest regrowth, with a 13-year long fallow period. Those long periods allow for the reconstitution of dense secondary formations, a biomass source of fertility for the next slash-and-burn crop cycle (Ramakrishnan 1992). The fallow land is the pasture area for large cattle; cows are limited to grazing grassy fallow whereas water buffalo can graze year round on shrubby, tree-covered and grassy fallow.

Figure 3: Weeding of a slash-and-burn field in Phongsaly

7 Namely a yield in paddy rice of 1,310 kg/ha on average between 2000 and 2002 (minimum of 450 kg/ha and maximum of 3,550 kg/ha depending on the years and families, for a sample of 28 families), with 260 days of work/ha.

8 Seven to fifteen years for villages in the forest zone studied (Cf. figure 2).
Shifting cultivation productivity: a complex interaction of limiting factors

Due to the low population density\(^9\), the bottleneck of farm production is the workforce. There are more potentially farmable areas than areas actually farmed. Weeding is the major constraint limiting work productivity, representing 60% of the annual labour by an active worker in swidden cultivation\(^{10}\). The maximum surface area farmable per active worker is approximately 0.8 ha; even if a family could clear more in January or sow more in April, limits are observed due to the labour overload of weeding in the middle of the rainy season, July – August.

The limits on production that are due to fertility problems are harder to assess. The direct comparison of rice yields in lowlands and swidden fields - 1.7 tonnes/ha in the Vientiane rainfed paddy fields (Sacklokham 2003) and 1.3 tonnes/ha in the Samlang swidden fields - is misleading, as it does not take into account the other crops associated with the swidden crop\(^{11}\).

The importance of the fallow period to yield is itself the interaction of a large number of cumulative and synergetic factors, for which it is hard to isolate the respective contributions. Traditionally, fertility is presented as proportionate to the fallow period (Ramakrishnan 1992). While progressive build-up of biomass resulting from photosynthesis on the fallow land has been proven\(^{12}\), yields are not directly proportionate to the fallow period (Foppes, Phongsavath \textit{et al.} 1994; Roder \textit{et al.} 1995; Van Keer 2003). In addition to the build-up of biomass for mineral fertility and soil structure, there is pest control. The density of harmful insects and

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\(^9\) On average nine inhabitants/km\(^2\) in Phongsaly district.

\(^{10}\) Namely 20-25% of the annual work of an active worker, all activities combined.

\(^{11}\) Although it is not possible to add up the disparate quantities, the value of crops grown can be calculated: one hectare of wet paddy field produces an average of 2,550,000 Kip (US$ 245) of added value on the Vientiane plain, whereas a slash-and-burn field in Phongsaly reaches 3,320,000 Kip (US$ 320) of added value per hectare.

\(^{12}\) After a three-year fallow period, the biomass is over 20 tonnes/ha, then 30 t/ha after 7 years, 70 t/ha after 10 years and 80 t/ha after 18 years (Van Keer 2003).
weeds in a slash-and-burn field rapidly decreases, the longer the fallow period lasts before clearing (Van Keer 2003). Furthermore, rapid rotations amplify erosion, limiting future productive potential (De Rouw, Baranger et al. 2002; Moa, Valentin et al. 2002).

Recent research conducted by Van Keer (2003) for an agronomic diagnosis of shifting cultivation systems in northern Thailand shows that soil fertility is not the factor limiting how the genetic potential of local cultivars is expressed. The author established that the constraints concerning yield are, in order of importance, the number of successive crop years, climatic hazards, the topographical position of the plot, weeds and predators (Van Keer 2003). In Laos, farmers draw up a comparable list (Roder, Phengchan et al. 1997), ranking weeds, rodents and inadequate rainfall at the top of constraints affecting their slash-and-burn crop. Samlang farmers rank drought - once every three years - as the main problem, followed by parasite attacks on roots, and rodents.

A crop is stopped after one or two years due to fertility and weeding problems. The increased workload required, beyond a family’s potential, for countering the invasion by weeds and the drop in fertility contribute to reasons for abandoning a plot. Given current knowledge of the region’s agriculture, it is not possible to systematically come to a conclusion about the preponderance of one factor in relation to another (George, Magbanua et al. 2002).

**Extensive animal raising**

Technically, the association of livestock and crops is limited in the Phongsaly farming system; however, livestock plays an important role in the family economy by strongly increasing work productivity and income, but especially as a saving and capitalisation process (Alexandre and Eberhardt 1998; Baudran 2000; Laffort 1997).

Water buffalo are raised on fallow land where they graze freely year round. In order to limit animal losses, regular regroupings and monitoring are organised at the village level. Raising of cows has been historically limited due to food restrictions: cows only graze on grass, whereas a water buffalo grazes indiscriminately on grassy and shrubby fallow. Nevertheless, an administration incentive policy and strong urban markets, in Vientiane and Bangkok, have favoured the emergence of cow raising in the easiest-to-reach villages.

Animal husbandry is of extensive character while vegetation resources are plentiful in these upland humid tropical zones. Food and genetics are not therefore factors limiting livestock development. On the other hand, the economics of animal raising are hazardous particularly because of excessive mortality problems. Smaller species are affected by recurrent epidemics, often devastating all the head in a village: Newcastle disease and cholera among poultry, swine fever (hog cholera) among pigs. For cow raising, there are fewer health problems, and the diseases present remain circumscribed and secondary. However, acciden-

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13 The combination of climatic factors and topography expresses the sensitivity to drought, the main cause of a drop in yield in swidden cultivation (Van Keer 2003).

14 The main parasite identified by Van Keer (2003) is a root aphid (Tetraneura nigriabdominalis) and, secondarily, birds and rodents. The other pests only have an anecdotal impact in the farming environment (Van Keer 2003).

15 Weeds are only a secondary limiting factor of the yield for Van Keer (2003), due to their control by farmer weeding. If that control fails, weeds do indeed have a drastic effect on the crop, hence they are ranked as the number one constraint by farmers.
tal mortality is high. In Samlang, 60% of young cattle born between 2000 and 2003 died, with predators\textsuperscript{16} accounting for 75% of those losses.

**Very secure traditional family tenure**

In the southwestern part of the district, agricultural production is a nuclear family activity although clearing is regulated at the village level. Every year, the active workers slash a single strip on the village land. In that strip, each family farms its own plot, of which it is the owner: the field is always planted by the same farmer and the plot is inherited by the children. Each family owns a plot in each strip of the annual clearing.

With demographic growth, there is a trend towards splitting up plots from one generation to the next. Regulating this trend of lowering the surface area per active worker is complex, based on four successive mechanisms: loan of land between families, possible lengthening of crop period from one to two years, departure of part of the population, acceleration of rotations as a last resort (Laffort and Jouanneau 1998).

The inflexibility of this land system tends to slow down the decrease in the fallow period, a characteristic response to demographic growth in many other slash-and-burn farming systems (Dufumier 1996; Foppes, Phongsavath et al. 1994). This management system favours the maintenance of fertility and satisfactory production levels, at the cost of expulsing a fraction of the village population, essentially the younger generation, towards other zones. The growth rate in the district was 1.9% a year between 1985 and 1995, compared to nearly 2.6% for the whole country (Sisouphanthong and Taillard 2000). This land tenure system, comparable to private property farmed by the owner, is unique in shifting forest agriculture. It confers high degree of land access security to each family, particularly in the long term. Farmers can plan on investing in their plots so as to increase productivity. With its social control, Phongsaly’s traditional land system allows farmers (Ducourtieux, Visonnavong et al. 2004) to:

- **Invest in their land:** Despite limited water resources and rough topography, nearly 12% of the families have developed terraced rice fields. The substantial and long-term investment of labour and capital required to achieve this is fairly unique for forest agriculture with a low population density. The farmers also grow market gardens and plantations of cash crops, such as cardamom or teak (in the valleys). Those investments demonstrate the trust the farmers have in their access to land. The traditional land system contributes to tenure security.

- **Maintain long fallow periods:** For shifting cultivation, rotation varies from eight to sixteen years in villages where traditional land management endures. The traditional land system contributes to forest and soil protection, as well as biodiversity maintenance.

- **Finance the development of other economic sectors through the transfer of capital from agriculture:** Even if the Phongsaly agrarian system seems fairly unproductive and poor, it exports manpower and capital to other regions and other activity sectors on a regular basis. The traditional land system contributes to the general economic development of Laos.

\textsuperscript{16} These were mainly felids on cows and canids on water buffalo.
Like any agricultural activity, swidden farming in Phongsaly is not a practice that follows a set standard. On the contrary, each family is constantly adapting its actions based on the natural (climate) and socio-economic (manpower, tools, markets, consumer needs, etc.) environment. During the crop cycle farmers elaborate a unique technical itinerary, which differs from that used the previous year and from the other families’ methods (S billotte 1990).

Shifting cultivation has evolved as a function of the historical context. Cotton and tobacco have vanished from the fields at the end of the 1960s, when low-cost manufactured products from China arrived on the local market. Poppy has also progressively disappeared under the government’s pressure. On the other hand, some villages have developed maize or white rice farming as a raw material for the distillation and trade of alcoholic spirits in Phongsaly.

At the beginning of each year, farmers decide on the surface area to be cleared and sowed. Their decision is based on consideration of factors such as the surface area available based on the land system (in effect, the topography of the plot\textsuperscript{17}), the previous year’s harvest and perspectives of stock or shortages, how far away the new plot is from the village, its potential fertility - evaluated based on past crops during previous rotations and recent observations such as the soil texture or colour.

For example, the remoteness of a field is not an important factor for clearing or sowing, but does represent a certain constraint for gathering firewood and transporting the harvest. Furthermore, every hour spent walking during the rainy season is an hour’s lost weeding. Added to the marginal production gained by fallow periods over ten years (Van Keer 2003), the constraint of distance explains why villagers choose not to include in rotations the forest land that is within their domain but farthest away from the village.

\textsuperscript{17} A sloped, rocky plot located on a mountain top only offers a family low income prospects, whereas a fairly flat field located down below with deep soil is very hopeful. The family will be able to limit risk by multiplying plots in complementary conditions.
Out of the 24 forest villages in the study zone (Cf. figure 2), 20 have unofficial forest reserves.

After calculating the ideal dimensions, farmers elaborate the sowing plan, choosing the varieties and their distribution on the plot. Each of the 40 villages studied has a sample group of four to twenty varieties, enabling precise adaptation of the crop to the farmer’s strategy; the choice of varieties is based on the length of the cycle\(^{18}\), risk limitation by multiplying the number of cultivars, adaptation to the soil and altitude, crop technique\(^{19}\), rice required\(^{20}\), and so on. Biodiversity is wide, with nearly 550 sticky rice varieties identified for shifting cultivation in northern Laos (Roder, Keoboulapha \textit{et al.} 1996) and Laos contributing nearly 50% of the germplasms in the IRRI’s rice germplasm bank (Douangsavanh, Bouahom \textit{et al.} 2002).

On a plot, sowing is neither standardised nor random. The farmer decides how to do it based on his experience in using all the environment’s resources, on a very precise scale for each square metre. For example, the sowing density will depend on the slope, with tubers being planted preferably in large heaps of ashes, while maize does best in the wettest part. On a larger scale, this well thought-out choice of land use can be observed in the development of terraced rice fields in the scarce irrigable zones or in the use of shady, damp plots that are not too high in altitude for growing cardamom (Ducourtieux, Visonnnavong \textit{et al.} 2004).

After sowing, farmers decide how family labour is to be used. When the village clears several zones, in particular if there are two consecutive years of crops, each family first allocates its workforce to the plot considered potentially the most fertile. It is usually the plot cleared that same year, but the choice is not systematic: seed quantities vary every year and with each plot. Furthermore, the initial distribution of labour can evolve over the year, depending on the problems encountered. If a plot is substantially damaged, for example by

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\(^{18}\) Particularly important for limiting the rice shortage period the year after a poor harvest.

\(^{19}\) Sowing in hills with a hoe or cast sowing.

\(^{20}\) Basic food, cakes for festivals, alcohol distillation, etc.
drought or rodents, the family will reduce the amount of work there and transfer labour to other plots to limit the risks of a drop in production. There are other rescue strategies, such as sowing a plot again if growth is deficient due to lack of rain in April-May, or, when problems arise too late, sowing sesame as a main crop to replace the rice.\footnote{This is no longer a crop for self-consumption; the sesame is marketed for buying rice.}

Associated crops in a slash-and-burn field maximises work productivity and income per area but, above all, limits the risks for the farmer. Crop failure arising from a particular situation does not jeopardise the family’s survival if they can count on the farm’s other harvests and activities. Dynamic and evolving allocation of the workforce and diversification of activities are two aspects of the strategy used for limiting risks and maximising family income. Resources that are limited, such as workforce, or fragile, like soil, forest, water and biodiversity, are individually managed by each family so as to be integrated into a sustainable and synergistic strategy.

**Solid economic performance in a hard context**

The average family income in Samlang is over 15.6 million Kip (US$ 1,490)\footnote{i.e. US$ 0.7/day/person or 17,000 Kip/day/active worker (US$ 1.6).} per year, including the market value (replacement value) of self-consumed produce. Monetary income, at 2.1 million Kip (US$ 200), is only 13% of the total income: the family’s farming system is focused on fulfilling its direct needs.

Families conduct many activities to reach that income. Swidden farming only ranks second, behind collecting (hunting, fishing, and gathering), which procures over 40% of the family income in forest villages (Cf. figure 6). This is in line with the country average (Douangsavanh, Bouahom \textit{et al.} 2002; UNDP 2002).

The breakdown of income into multiple activities quantitatively expresses the farmer strategy of diversification to optimise the use of labour and maximise income while limiting risks. Furthermore, the wide range of products in a self-consumption economy contributes to the balance of family nutrition.

\textit{In brief, shifting cultivation no longer appears to be an archaic and rudimentary practice but a complex economic activity managed by farmers who adapt to changing conditions. They optimise the use of resources with practices that are based on neither chance nor inflexible norm, but on the know-how and experience acquired from one generation to the next. This precise and detailed use of resources leads to a generally forested landscape, dotted with small areas of crops.}

**Eliminating shifting cultivation to protect the environment and eradicate poverty**

**Eradicating poverty has become a national cause in Lao PDR**

In 1986, the Lao Revolutionary Party (LRP) committed the country to a socialist market economy via the New Economic Mechanism policy. Private ownership of production means and free enterprise became new principles for prosperous development. In 1996, the 6\textsuperscript{th} LRP Congress set the government aim of removing Laos from the list of ‘least-developed
countries’ by 2020. In 2001, the 7th Congress reinforced that position with quantified objectives\(^{23}\) and based the policy for eradicating poverty on three pillars: economic growth, socio-cultural development and environmental protection (GOL 2003).

The government is committed to reaching its goals by implementing the national programme for the eradication of poverty (NPEP), supported by a decentralisation policy\(^ {24}\). Rural development plays a central role in that policy. The NPEP promotes development based on community demand. Improving access to the poorest landlocked districts is also a priority\(^ {25}\) (GOL 2003). The Ministry of Agriculture and Forestry is enacting a complementary programme in which the country’s development includes modern, permanent and intensive agriculture. It is charged with generating sufficient raw materials to supply the domestic and growing export markets, and for the emergence of a national agro-industrial fabric (MAF 1999).

Not all the country’s regions have the same potential to meet such intensification. Government policy differentiates between the productive lowlands, vectors of the country’s economic development, and the uplands, where environmental protection must prevail (MAF 1999). Although the economic role of the rice-growing plains in the Mekong Valley is undeniable, limiting the problematic upland issue to the single dimension of protecting nature is simplistic: slopes cover 80% of the country’s surface area and 250,000 families - nearly a third of the country’s total population - live there (MAF 1999). These rough figures convey the social and economic importance of upland agriculture in the Lao PDR.

**Shifting cultivation: the source of all evil**

During the 7th Congress in 2001, the LRP took up a twofold fight against poverty: elimination of opium production by 2005, and progressive phasing-out of shifting cultivation by 2010 (Lao PDR 2003).

Those strategic measures confirmed earlier positions, in which slash-and-burn agriculture was presented as outmoded and destructive by the colonial administration (Mellac and Rossi 1999), then by development institutions (UNDP 1995). In 1994, the government decided to eliminate shifting cultivation by the year 2000 (Keonuchan 2000); in 2000, the objective was postponed until 2020 (MAF 2000), before being brought back down to 2010 (GOL 2003). The policy of banning slash-and-burn agriculture falls into a historical and regional, logic: it can be observed in Thailand, Vietnam, Malaysia, China and Indonesia (Durand 1997; De Koninck 1998; Rossi 1998; Zaifu 1998; Mellac and Rossi 1999).

The goal of eliminating shifting cultivation is motivated by the reasoning that it is one of the main causes of rural poverty. Demographic growth in swidden agricultural regions tends to accelerate rotation and reduce forest areas, which leads to a reduction of income among the families involved while burdening the country’s future development through the destruction of natural resources. Furthermore, the poverty of families who practice

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\(^{23}\) Reduce poverty by half by 2005 and eradicate it by 2010

\(^{24}\) Prime Minister Decree PM/01 dated March 11, 2000.

\(^{25}\) Prime Minister’s Decree 010/PM defines poverty as “the lack of ability to fulfil basic human needs such as not having enough food, lacking adequate clothing, not having permanent housing and lacking access to health, education and transportation services”. That same decree specifies the criteria for measuring poverty in households, villages and districts; 47 districts were acknowledged as priority targets out of the 72 villages identified as poor (GOL 2003).
shifting cultivation drives them to grow opium, a source of addiction and therefore increased poverty (UNDCP 1999; GOL 2003). The vicious circle is complete and poverty is self-maintained (Dasgupta, Deichmann et al. 2003).

Based on this observation, the solution seems obvious: converting farmers who practice slash-and-burn to permanent crops or non-agricultural activities would make it possible to interrupt the process and therefore eliminate poverty (UNDP 2002). Is it that easy?

**Outside interventions are often counterproductive**

*State intervention based on accessibility to villages*

In Phongsaly, converting from shifting cultivation has been on the administration’s agenda since the end of the 1960s. From 1968 to 1969, over 400 families were displaced to the Boonneua and Boontai lowlands during the ‘paddy rice field movement’.

More recently, local authorities have implemented three programmes to apply the national policy:

1. Resettlement of forest mountain zone villages to the roadside.
3. Land allocation.

In Phongsaly District, eight villages (300 families) have been instructed to move since 1987. Five of them (200 families) were settled on an abrupt ridge along the road from Phongsaly to Boonneua. Seven other villages have been eliminated by the authorities since 1990; the 200 families concerned joined neighbouring villages along the roadside, or migrated to towns (Phongsaly, Oudomxay, Luangnamtha, and Vientiane).

At the same time as this restructuring, the DAFO introduced cash crops to replace swidden agriculture. Between 1996 and 1998, the first experience with sugar cane concerned four villages along the roadside and ended in failure26 for the 275 families, who were obliged to farm a minimal surface area per active worker (Ducourtieux 2000).

Since then, the tea crop has taken over. There are plans for the town of Phongsaly (1,100 families) and 14 rural villages (880 families) to plant 500 ha between now and 2005, at a minimum mandatory rate of 0.3 ha per active worker. In those villages, clearing is being progressively banned: the three rural villages closest to Phongsaly are not allowed to clear land for the next crop season (2003-2004), and the ban will be extended to seven more villages for the following season (2004-2005). In other villages, the mandatory tea crop is rounded out by fruit trees (three villages, 100 families) and by galanga (Zingiberaceae, 17 villages, 980 families). In the 40 villages studied, 45% of the families are involved in the tea programme, 13% in the galanga one and 5% in the fruit trees plan.

Since 1998, the local administrative services have been carrying out the land allocation programme, the central component of national land reform (Ducourtieux, Laffort et al. 2004). At the end of 2003, 22 rural villages had a new land use map in the district27.

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26 Due to a contractual ambiguity concerning the responsibility for transportation costs between Phongsaly and Mengla, China, it was not possible to find buyers for more than 3/4 of the crop in 1998.

27 19 villages out of the 40 in the study zone.
meaning 47% of their village domain has been placed under forest protection.

Due to lack of human resources, the Phongsaly DAFO focuses on land allocation and cash crop promotion only in easy-to-reach villages, along roads and tracks or on the Nam Ou river banks (Cf. figure 2). Villages in the forest zone are, for the time being, fairly unaffected by these programmes. Because of insufficient financial means, support to farmers for implementing the programmes is limited to very basic technical training and planning. Farmers are accumulating debts with the Agricultural Promotion Bank or private merchants in order to buy the mandatory crop seedlings that they have to plant.

**Drastically reduced economic performance in reconfigured villages**

To assess the recent changes in Phongsaly district agriculture, we compared the technical and economic performance over the past three years in two drastically different villages in the study zone.

Twenty-eight families were surveyed in the village of Samlang, an old and archetypal Phunoy village in the forest zone, with swidden cultivation fairly unaffected by recent

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<th>Yapong</th>
<th>Samlang</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield</td>
<td>kg paddy rice /ha</td>
<td>602</td>
<td>1,308</td>
<td>- 54%</td>
</tr>
<tr>
<td>Surface per active worker</td>
<td>ha/active worker</td>
<td>1.1</td>
<td>0.5</td>
<td>+ 120%</td>
</tr>
<tr>
<td>Herbicides</td>
<td>kg/tonne of rice produced</td>
<td>2.0</td>
<td>0.1</td>
<td>+ 1,900%</td>
</tr>
<tr>
<td>Work Productivity</td>
<td>Kip/workday</td>
<td>6,300</td>
<td>14,000</td>
<td>- 55%</td>
</tr>
<tr>
<td>Rice Deficit (gap)</td>
<td>month/year/family</td>
<td>3</td>
<td>0.5</td>
<td>+ 500%</td>
</tr>
</tbody>
</table>

28 First-year slash-and-burn field, 2000-2003 average for all the village families.
reforms. The results were compared with a survey of 48 families from Yapong, a Phounoy village on the roadside, six kilometres away from Phongsaly.

Like all the villages along that road, the Yapong families have been successively resettled (1996), grown sugar cane (1997-1998), participated in village land allocation (1999) and, since the year 2000, been developing tea plantations.

For the two villages, data collected during a two-hour interview with each of the families allowed us to model the various income components and relate them to the work supplied and the family structure (number of members and number of active workers).

**Public intervention reduces shifting cultivation performance**

Land allocation has had a direct impact on swidden cultivation in Yapong. Fifty-eight percent of the village land was classified as forest. As clearing is now forbidden in the forest reserves, these areas are taken out of rotation. The surface area of fallow land available for swidden cultivation has diminished, thereby inducing a quicker return to the fallow strip to be cleared each year. The fallow period dropped from ten to three years.

Yield is limited to 600 kg/ha of paddy rice on the plot cleared each year, compared to 1,300 kg/ha for the village of Samlang, in the forest zone. This represents a 54% reduction (Cf. figure 7).

In an attempt to maintain rice production, Yapong families developed a strategy of increasing surface areas within the limits of the land allocation, with two to three successive years of cultivation, compared to one year in Samlang.

To extend their farmed surface area, families have to face the crucial problem of weed control. Due to a lack of resources, farmers can not devote more time to weeding: 78 days/year/active worker in Yapong compared to 75 days/year/active worker in Samlang. The Yapong families compensate for the saturation of the available workforce with new and massive use of herbicides: the consumption of weed-killer per tonne of rice produced

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29 Swidden cultivation, rice fields, tea, gardens, cardamom for vegetal crops; water buffalo, cows, pigs, goats and poultry raising; hunting (snares, traps), fishing (nets, hoop nets, dams), gathering (bamboo sprouts, ‘peuk meuak’ lines, mushrooms, banana tree flowers and trunks, firewood, etc.); crafts (alcohol distillation, basketry, weaving, dyeing, metalwork) and services (husking, video screenings, grocery trade, transport, firewood trade, etc.); possible double-activity (teachers and other civil servants, salaried farm or forest workers).
is 20 times higher in Yapong than in Samlang. The product, of Chinese origin, is poorly identified and used, and doubtlessly poses public health and environmental problems.

With rising work, a falling yield and production costs that are increasing, work productivity for roadside village farmers has dropped drastically. In Samlang a workday brings in the equivalent of 14,000 Kip, but in Yapong the figure is less than half this at 6,300 Kip per workday (Cf. figure 12).

Furthermore, the family workforce is a limited resource. Production per family is dropping, thus increasing shortage problems. Rice shortage is still rare in Samlang at an average of two weeks of shortage/family/year over the past three years, affecting 20% of families. It is however becoming the norm in Yapong, with three months of shortage per year on average, and 60% of families affected every year (Cf. figure 9). It should be noted that the National Poverty Assessment (NPA) states that poverty is closely correlated to food availability in terms of rice (CPC 2000; ADB 2001; UNDP 2002; Lao PDR 2003).
The drastic drop in the technical and economic performance of swidden cultivation, as caused by land allocation, is not intrinsically a problem. It could even be a method of urging farmers to convert to alternative crops which can provide income.

**Other activities also affected**

Unfortunately, the performance of other economic activities does not meet the needs of the families either. All the components of family income in Yapong are on average lower than those in Samlang (Cf. figure 10).

Income from livestock is decreasing substantially (-72%) due to decapitalisation: to buy rice, families sell their animals, including reproductive females. They can no longer capi-

![Figure 12: Comparison of work productivity for different rural activities](image)

![Figure 13: Comparison of total income per person](image)
There were 110 head of cattle in Yapong in 1996, but only 85 left in 2003. Animal raising brings in less than one million kip per year to 73% of the Yapong families, whereas 80% of the Samlang families have a livestock income over a million kip per year (Cf. figure 11).

Tea, the cash crop promoted as an alternative to slash-and-burn, is characterised by low income - 515,000 Kip/family/year (US$ 50) - and substantial work - 70 days/active worker/year. As labour is the limiting factor for agriculture in the region, farmers give priority to products that optimise employment, or in other words, give high productivity. As tea farming in fact offers the lowest income level of all the farm activities (Cf. figure 12), it cannot be a credible alternative to swidden cultivation in reaching the political aim of poverty eradication.

The introduction of cash crops such as tea is based on the presupposition that it is possible for farmers to sell cash crops and that the monetary income procured will make it possible to buy rice instead of producing it in the family slash-and-burn fields (Ducourtieux, Visonnavong et al. 2004).

The family monetary income is on average 2.3 million Kip (US$ 215) in Yapong. It is slightly higher than in Samlang\textsuperscript{30} (+7%), but that difference only enables a family to buy 100 kg of rice\textsuperscript{31}, less than 10% of its annual needs.

**Poverty is rapidly increasing**

The average annual total income for a Yapong family is 7.1 million Kip (US$ 680) compared to 15.6 million Kip (US$ 1,490) in Samlang, i.e. a 54% difference. Taking into account the difference in family size between the two villages\textsuperscript{32}, the income gap is great: 1.7 million Kip (US$ 160) per person in Yapong compared to 3.1 million Kip (US$ 300) in Samlang. The average income in roadside villages is half that in forest villages (Cf. figure 13).

\textsuperscript{30}Average of 2.1 million Kip (US$ 200) per family and per year.

\textsuperscript{31}That is to say a third of the average yearly shortage in rice for a family in Yapong (Cf. figure 8).

\textsuperscript{32}3.7 people per household in Yapong compared to 5.1 in Samlang.
This drop in income does not affect all the families. Although a large fraction of the population is impoverished (Cf. figure 14), a few families have taken advantage of the resettlement towards the road and Phongsaly to get involved in transport and trade\textsuperscript{33}. At the time of the move, those families had slightly more capital than the others - in particular, more animals - which enabled them to limit the effect of decapitalisation for buying rice, as well as invest in profitable services. This has led to increased socio-economic differentiation in the village.

**Discussion of findings and conclusion**

The comparison of the economic findings in the villages of Samlang and Yapong is striking. However, are these two villages representative of their respective zones, namely, on the one hand forest villages practising traditional shifting cultivation, and on the other, easy-to-reach villages involved in the local administration’s development programmes?

Survey work conducted in 40 villages over six months, including interviews with more than 200 families, made it possible to establish this zoning and establish Samlang as the reasoned choice for an archetypal forest village. For the easy-to-reach zone, the first village selected as a model could not be surveyed, as the farmers did not have time to accommodate us during the three-week period needed for interviews with all the families. As a result Yapong was selected, as it like the first choice, participates in all the activities developed by the DAFO and is therefore characteristic of the easy-to-reach zone. All the families in the village were surveyed.

Although the findings of the comparison are clear, there are many cumulative causes behind the situation. The effect of some factors, like land allocation for swidden cultivation, is easy to identify and quantify. For many farmer activities though, there may be multiple and combined causes for the differences between the villages. The villages are

\textsuperscript{33} Trade and transport of firewood and banana trunks between the village and Phongsaly, using moto-cultivators.
neighbours and are located in comparable natural environments: soil and climatic effects do not explain the differences. However, the farming systems in the forest zone are not permanently set, and the easy-to-reach zones are subject to pressures other than those applied by the local administration. The relative and progressive opening up of the land-locked region\(^{34}\), the increase in both cross-border exchanges with China and Vietnam and cooperation projects in the region, all also contribute to the varying evolution of farming systems. For example, the number of animals per active worker is comparable in Samlang and Yapong for both water buffalo and cows, but an active worker in Samlang raises three times more pigs than an active worker in Yapong (Cf. figure 15). The existence in Samlang of a credit scheme belonging to the microfinance network developed by the Phongsaly District Rural Development Project (PDDP) explains that difference, given that pig raising accounts for 77% of the credit granted from the network funds\(^{35}\).

Nevertheless, despite the wide range of differentiating factors, the sheer size of the gaps points to the conclusion that the Phongsaly programmes are counterproductive. Instead of contributing to the eradication of poverty, they drastically increase it. The aim set during the 7\(^{th}\) Lao Revolutionary Party Congress to cut poverty in half by 2005 (Lao PDR 2003) will not be reached in Phongsaly; it is more likely that it will have doubled.

**Rethinking public intervention to reach political aims**

The impoverishment of the farmer community observed in Phongsaly is not an isolated phenomenon. Studies in other mountainous regions in northern Laos obtained similar findings in Luangprabang, Luangnamtha, Oudomxay (Keonuchan 2000) and Huaphan (Aubertin 2003). The NPA\(^{36}\) conducted by the Planning and Cooperation Committee shows that poverty in rural mountain zones is a contemporary phenomenon, widely triggered by development programmes, with land allocation ranking first as a cause (CPC 2000). These conclusions are reported in recent official publications by the government (GOL 2003) and international development agencies (ADB 2001; UNDP 2002). Many development programmes conducted in the field are counterproductive to the main political goal of poverty eradication.

The official statistics highlight this problem, without necessarily identifying and analysing it. As a result, the preliminary findings of the latest household consumer survey\(^{37}\) announced an overall reduction in poverty in Laos - in 2003, 30% of the population were living under the poverty threshold compared to 39% in 1998 and 45% in 1993. However, it also indicated that the increase in wealth is unequally distributed between the uplands and lowlands, between rural and urban zones and between different groups of the population; in some northern provinces, poverty has increased (GOL 2003).

To reach the goals set by the political authorities - cut poverty in half by 2005 and eradicate it by 2010 - the reform of development programmes in upland regions is of utmost urgency. That reform must be founded on the principle that the farmers are the solution to and not the cause of the poverty problems; on that account, farmers should be involved in choices concerning the direction to be taken and in the definition of develop-

\(^{34}\) Opening of the Phongsaly–Oudomxay road in 1996, opening of the Phongsaly–Vientiane air link in 2003, etc.

\(^{35}\) Source: Phongsaly District Rural Development Project (PDDP).


\(^{37}\) Lao Expenditure and Consumption Survey III (LECS III), forthcoming.
ment actions, so that the programmes take into account their elaborate environmental management know-how. That experience, acquired over many generations, enables them to use natural resources sustainably, whereas underestimating that know-how generally has the opposite effect to what is desired.

In order to be effective and pertinent, public interventions must be rethought. Decentralisation entrusts the provinces and districts with new responsibilities. To reach the national policy goals, those services must be capable of defining development programmes with the farmers. They must be called on to rapidly become an active interface that can adapt public intervention to local conditions.

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