Properly managed swidden systems can lead to a balanced and productive environment. When traditional fallow periods are kept, forest regenerates into a harvestable resource.

Shifting cultivation is often described as ‘traditional’, inflexible and outdated, in contrast with ‘modern’, mechanised and chemical agriculture. That belief overlooks farmer know-how, which is accumulated over generations to exploit natural resources while adapting itself to the physical, social and economic environment. Research conducted in Phongsaly provides an idea about how complex and consistent a slash-and-burn farming system can be, and how farmers optimise family labour but also limit their risks.
Economic study of Phunoy shifting cultivation

Forty rural villages, mainly from the Phunoy ethnic group, were studied between 2002 and 2004 in Phongsaly District. In each of the villages, interviews with elderly farmers made it possible to reconstruct the historical evolution of the village, while farm surveys made it possible to characterise current agricultural practices and the differences between villages and families. The study surveyed family farming practices and their results over the past five years, as well as other economic activities like gathering, fishing, hunting, handicrafts and trade.

Phongsaly district is hilly and uneven, with some twenty peaks over 1,500 metres high. The valleys are very steep, limiting the potential for agricultural hydraulic projects. The altitude and latitude temper the tropical influences here, providing a cool dry season and a milder rainy season. The very high variability in rainfall (980-1,860 mm per year) strongly contributes to the success of farming activities. Evergreen mountainous rain forest dominates at altitudes over 800 m, with tropical rain forest at lower elevations. These forests have great biodiversity and are very productive.

Zoned agricultural production

Village agricultural production is traditionally based on land use in three distinct zones:

- **Village gardens**: small vegetable garden near the house, with tubers and fruit trees for household use. Poultry also wander among the houses, looking for waste food.

- **Sacred crown**: the village, generally located near hilltops, is surrounded by a forest crown, which acts as a water reservoir. Free-range pigs forage for food and are also given supplements.

- **Slash-and-burn zone**: swidden farming occupies most of the village land. Some is recently cleared and planted but 60% to 94% is left fallow in landscapes ranging from grassland to secondary forest.

- **Crop technique**: Villages along the roadside or near Phongsaly town do substantial trade with city people and are close to administrative services; that is the case for 16 out of 40 villages. In the forest zone, over two hours' walk from town, trade is lower and public services less forthcoming.

Slash-and-burn fields

In the village of Samlang, following the clearing and burning of a strip of forest, plots are planted for one year, sometimes two. In year one, glutinous rice dominates, with many secondary crops (maize, tubers and roots, curcurbits, cruciferae, peppers, sunflower and groundnuts). In the second crop year, rice is sown alone - the farmer simplifies in order to preserve his priority crop. Farming stops on a plot after one or two years because of fertility and weeding problems. The bottleneck in this system is the weeding, requiring 75 days per active worker each year. It must be done according to a specific, restrictive schedule, or

To lowlanders, images of recently slashed-and-burned fields are traumatising. However, in traditional Phunoy farming, fallow soon returns to a healthy ecosystem.
else weeds damage the yields of rice and other crops. 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 fallow period that makes the land fertile for the next cycle (Ramakrishnan 1992). The fallow land is also the pasture area for cattle and water buffalo.

**Active management**

Due to low population, labour is the major constraint to production. There are more potentially farmable areas than are actually farmed. Even if families have time to clear more land, they limit their area due to the overload of weeding in the middle of the rainy season.

The fallow period is important due to many factors: letting the forest grow back does more than just make the soil more fertile. In addition to the build-up of vegetation for mineral enrichment and soil structure, there is also pest control. The density of harmful insects and weeds in a slash-and-burn field decreases rapidly when longer fallow periods are used (Van Keer 2003). If there are short fallow periods and rapid crop rotations, soil erosion is also greater, damaging future production (De Rouw et al. 2002).

### Yield constraints in slash-and-burn fields: order of importance according to farmers in three different studies

<table>
<thead>
<tr>
<th>Northern Thailand</th>
<th>Laos</th>
<th>Samlang</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Number of successive crop years</td>
<td>Weeds</td>
<td>Drought once every three years</td>
</tr>
<tr>
<td>2 Climatic hazards</td>
<td>Rodents</td>
<td>Root parasites</td>
</tr>
<tr>
<td>3 Topographical position of the plot</td>
<td>Inadequate rainfall</td>
<td>Rodents</td>
</tr>
<tr>
<td>4 Weeds and predators</td>
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**Animal raising**

Livestock plays an important role in the family economy, especially as a means for saving and capitalisation. Water buffalo graze freely year-round on fallow land. Raising of cattle has been limited by food restrictions: cattle eat only grass, whereas water buffalo graze indiscriminately on grassy and shrubby fallow.
However, a new incentive policy and strong urban markets are now encouraging people to raise cattle in the easiest-to-reach villages.

Animal raising can be economically hazardous: Small species are affected by recurrent epidemics of Newcastle disease and cholera among poultry, and swine fever among pigs. For buffalo and cattle there are fewer problems, but accidental mortality is high, with predators accounting for 75% of losses.

### Secure family tenure

Agricultural production is a nuclear family activity, but clearing is regulated at the village level. Every year the active workers slash a single strip on the village land. In the 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. With population growth, there is a trend towards splitting up plots from one generation to the next. Regulating this sub-division of surface area 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.

In many other slash-and-burn farming systems villagers decrease the fallow period in response to population growth. Phunoy management favours keeping fertility and satisfactory production levels: a fraction of the village population, essentially the younger generation,
moves out to other places. This system, which gives land security to each family, is unique in shifting forest agriculture. Farmers can plan on investing in their plots so as to increase productivity. With its social control, Phongsaly’s traditional land system allows farmers to:

- **Invest in their land**
  Nearly 12% of families have developed terraced rice fields, a remarkable investment of labour and capital for forest agriculture with low population density. The farmers also invest in market gardens and plantations of cash crops, such as cardamom or teak.

- **Maintain long fallow periods**
  Where traditional land management endures, rotation varies from eight to sixteen years.

- **Finance development of other economic sectors through transfer of capital from agriculture**
The Phongsaly agrarian system thus exports manpower and capital to other regions and other activity sectors on a regular basis.

**Adaptation to environmental variations and uncertainties**
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, soil, slope, etc.) and socio-economic (manpower, tools, markets, consumer needs, etc.) environment. During the crop cycle, farmers elaborate a unique technical itinerary, which differs from the
previous year and from the other families’ methods (Sébillotte 1990). Shifting cultivation evolves: cotton and tobacco have practically vanished from the fields since the end of the 1960s, when low-cost manufactured products from China arrived on the local market. Poppy has also progressively disappeared under the administration’s pressure. Meanwhile, some villages are now growing maize or white rice for the distillation and trade of alcoholic spirits.

Resources that are limited, such as workforce, or fragile like soil, forest, water and biodiversity, are individually managed by each family as part of their livelihood strategy. Associating crops maximises work productivity and income per area but, above all, limits the risks for the farmer. Crop failure from a particular situation does not jeopardise the family’s survival if they can count on 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.

There are other rescue strategies, such as sowing a plot again where 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 rice.

**Economic performance**

The average family income in the forest zone village is over 15.6 million Kip (US$1,490) per year, including the market value of self-consumed produce. Cash income, at 2.1 million Kip ($200), is only 13% of the total income: the Phunoy farming system is focused on fulfilling a family’s direct needs. Families conduct many activities to reach this income. Swidden farming ranks second, behind collecting (hunting, fishing, and gathering), which procures over 40% of the family income in forest villages. This is in line with the country average (Douangsavanh, Bouahom et al. 2002).

The farmers’ strategy of diversification optimises use of labour and maximises income while limiting risks. Furthermore, the wide range of products in a self-consumption economy contributes to the balance of family nutrition.

The Phunoy system is just one example of knowledge accumulated over generations to exploit natural resources. Shifting cultivation is not 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.
Projects and policies that aim to improve livelihoods by converting farming practices sometimes overlook how diversified slash-and-burn agriculture is. Oversimplifying farming systems can impoverish people and expose them to natural and economic risks.

**Selected references**


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