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Coffee bushes planted in natural forest. Photo: Andrew Bartlett

Environmental, social and economic sustainability in Lao coffee

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“Growing coffee doesn’t require a lot of hard work, so a woman like me can do it very easily,” says Seaumkham Lertmanyphan.

“I don’t know to what extent forest cover has increased, but before [we cultivated coffee] we cut down trees before planting crops, especially when growing rice and maize in upland areas.”

Introduction

Seaumkham Lertmanyphan is one of a growing number of Lao farmers, many of them women, who have taken up the cultivation of coffee in the understorey of the natural forest near their homes. This is a form of agroforestry that utilizes the shade of existing trees to grow high-quality speciality coffee that is in much demand on the market. The forest and its biodiversity are preserved, rather than being cleared for agriculture, and more importantly for the farmers of Khoum District in Xieng Khouang Province, they earn a significant and growing income. A project of the Swiss Agency for Development and Cooperation (SDC) has assisted the farmers in establishing two agroforestry learning centres, where farmers work on processing the coffee cherries, and test the means to “climate proof” their production. The project approach combines environmentally-friendly coffee cultivation with farmer-based training and action research, engagement with private companies in local processing, and scaling up the experience to national markets.

Previously precarious livelihoods

The northern hills of the Lao People's Democratic Republic (henceforward Laos) are home to many ethnic minorities whose traditional way of life is shifting agriculture.

Typically, the landscape is made up of a patchwork of large plots at different stages in a cultivation cycle of some 5 to 20 years' duration. Under traditional tenure arrangements, the user rights for these plots belong to various families. In the dry season at the start of the first year of the cycle, trees and shrubs are felled and burned; upland rice is planted once the rainy season starts.

Women often live in small shelters on the plots during the growing period, spending many hours weeding the crop by hand. The following year, the first plot is left fallow while a new plot is cleared and planted. Fallow plots produce a wide range of wild food, the mix of which changes over the years.

With increasing population pressure and competing demands on land use — including flooding for hydroelectric dams and intensive contract farming — this way of life is no longer sustainable. Although shifting agriculture still occurs, it is within a more confined area on a shorter rotation, with farmers often using herbicides to kill weeds. Farming families also need to supplement their income through labour migration; this is generally carried out by the younger generation, leaving the elderly to take care of the farms, along with young children. Opportunities for future farmers that respond to needs for income generation, social interaction and environmental sustainability are very limited in these upland areas. However, agroforestry coffee has shown that it is attractive enough to keep some young people, particularly women, in their home villages.

Coffee cultivation in Keoset

The work on coffee (*Coffea arabica*) that is detailed here began in Keoset, a community of roughly 500 households clustered in five rural villages in Khoun District, Xieng Khouang Province. The land of steep hills and valleys lies around 1,200–1,400 m above sea level; temperatures generally peak at 30°C during the hottest months, and rarely dip below zero (although, as indicated later, this is changing). There is one rainy season, May to October, and the average annual rainfall is around 1,500–2,000 mm.

The coffee is planted in mixed seasonal tropical forest with a height of 15 to 30 m. Much of this is secondary forest, having been cleared in the past during shifting cultivation. The dominant species are *Castanopsis hystrix*

and *Castanopsis echinocarpa*. Other trees are *Nauclea orientalis*, *Quercus serrata*, *Pterocarpus macrocarpus* and species of the genus *Dysoxylum*, *Hopea*, *Lagerstroemia* and *Lithocarpus*. As noted in the Provincial Biodiversity Strategy (Department of Natural Resources and Environment 2013), the area is also home to *Aquillaria* spp. (agarwood) and *Dalbergia* spp. (rosewood), but the value of these trees has resulted in overharvesting. Various non-timber forest products are collected, including the nuts of *Castanopsis*, mushrooms and roots, some of which are used in traditional medicine, both locally and exported to China.

The farmers of Keoset began planting coffee in forested areas close to settlements some three decades ago under an International Fund for Agriculture Development project. This was combined with mixed farming, including some livestock and limited shifting cultivation. Coffee was seen as a new and promising opportunity, but most of the coffee farms were abandoned when the project ended in 2005 due to the lack of a market. Some bushes remained, however, and in 2010 an SDC project began to revive cultivation and develop a market. The Mueang Xieng (MX) Coffee Company set up in the area in 2012 and began buying coffee cherries to process in its factory. The District Agriculture and Forest Office (DAFO) provided broad support for coffee development, but lacked specific expertise. Gradually, however, the volume of production increased. A scoping study conducted by the SDC project Lao Upland Rural Advisory Service (LURAS) in 2016 recognized the considerable market potential. The project is implemented by the Swiss NGO Helvetas and works in close collaboration with the Department of Agricultural Extension and Cooperative under the Ministry of Agriculture and Forestry and with the district authorities (DAFO).

The coffee nurseries in the area were established with seeds brought from the Bolaven Plateau in southern Laos, where the crop was introduced a century ago during colonial times. Seedlings are planted in the forest at 6 to 12 months and a density of 2,000–2,500 per ha. The resulting bushes start to bear fruit in the third year, increasing in yield until the full production is reached between 5 and 7 years. Occasional pruning keeps the bushes at a manageable height of no more than 2 m.

Learning by doing

LURAS worked with coffee farmers to establish learning centres in two villages. Complete with mini-processing facilities, these centres serve as a hub for knowledge exchange on all aspects of coffee cultivation and

processing. The development of processing and marketing has been key to success. In working on these aspects, the project has taken care to collaborate with two companies, thus avoiding a monopsony (a market situation in which there is only one buyer) and to ensure that the product is tailored to market demand.

Coffee cherries are harvested between November and February, with drying and grading extending through March. Everything must be finished by mid-April, in time for the Lao new year holiday, after which farmers are busy preparing their rice fields. Processing the coffee cherries is conducted using the wet method: first immersing them in water and separating off the immature and damaged ones (which float). The skin of the good cherries (those that sink) is then mechanically removed in a pulping unit, which still leaves some mucilage clinging to the beans. This is detached by fermentation for 24 to 36 hours. The resulting coffee beans remain coated by a middle layer known as parchment. They are spread on raised racks

in drying sheds with transparent covers. Compared to drying on the ground or on exposed racks, this provides better control of moisture and temperature, and avoids contamination by dust.

Lao farmers refer to coffee at different stages of processing by its colour (see Table 1). Once the moisture has fallen to between 10 and 12%, the coffee is hulled to remove the parchment, leaving green beans; 5 to 6 kg of cherries produces 1 kg of green beans. These are then graded by hand to remove any defects that would reduce the sale value, such as immature or broken beans, or those that show signs of damage by insects or fungus. This primary processing ensures a significant value addition for the farmers. Further processing through roasting is a highly skilled operation and must be conducted outside the village. Another 15–18% of weight is lost during roasting. Nevertheless, there are ways to significantly increase the quality of the green beans and thus achieve a premium price.



Keoset coffee producers carrying out primary processing: picking, weighing, soaking and drying. Photos: Andrew Bartlett

Table 1: Prices in USD per kg for coffee from Keoset at the time of the 2022–23 harvest

Stage	Description	Price
Red	unprocessed coffee cherries	0.58
White *	semi-processed beans	2.75
Green	the traded product after hulling and grading	4.30
Brown	roasted beans	21.80

*Note: White is known in the industry as parchment (washed, pulped and dried, but still retaining the endocarp).

The first mini-processing centre was established in the village of Ban Pieng in 2017, when LURAS facilitated a contractual collaboration between the MX Coffee Company and a group of farmers. Working with the district authorities, the project also provided advisory support for the establishment of coffee nurseries in nearby areas. The following year, a second learning centre was established in the village of Ban Tan Tai; there, the project facilitated collaboration with the Comma Coffee Company. The company invited farmers to a cupping session, where the quality of different coffees was assessed. It then offered training in quality control and grading and signed a contract with the farmers for their green beans. LURAS meanwhile continued to facilitate further farmer interest, especially among youth, and collaborated with MX, Comma and international experts on improvements such as the design of drying beds, natural processing, and factors affecting the sugar content of beans.

The global Covid-19 pandemic of 2020 at first threatened all the progress made, as tourist numbers plummeted, and local demand for coffee dropped. Yet this also proved to be an opportunity, as MX, Comma and other companies started investigating international markets and found interested buyers. The roasted coffee beans are sold as a high-quality niche product, a reputation that was consolidated when Keoset coffee produced under contract to Comma was awarded first prize in the Washed Arabica category of the Taste of Laos competition in 2022. It achieved the very high cupping score of 84.29. This unusually high cupping score obtained for Keoset coffee may be due to the natural fertility of the forest soil, which has been supplemented with compost made by the farmers.

A decade ago, coffee farmers in the north of Laos often sold their unprocessed cherries to traders who came across the border from Viet Nam. More recently, producers have been able to sell parchment (semi-processed beans) to locally based companies, thereby gaining a higher price. The LURAS project has shown that farmers can go even further in adding value at the village

level. By using a simple hulling machine and spending a few hours grading, they can sell green beans to roasting companies and exporters at prices determined by the international market for specialty coffee.

Profitable returns

In the period 2018–2022 the Keoset farmers sold approximately 31 tonnes of coffee and earned an income of some USD 115,000. This equates to an average income of about USD 575 per household per year, but averages are deceptive. There is a wide range in income from coffee among households in these villages; the largest household coffee gardens, about 2 hectares (ha) each, are now generating an income of approximately USD 2,400 per year, while the smallest gardens may each earn an annual income of less than USD 100. Within the area of Keoset there are now about 155 ha of coffee planted under natural forest, at a density of some 2,000–2,500 bushes per ha. Most of these bushes are young and have only just reached full production (which is from the fifth year onwards); they are likely to produce well for at least 20 years and probably more, given the favourable conditions. The average yield at present is 1.5–2 kg per bush, but this is expected to increase to up to 2.5 kg per bush as the bushes mature.

As commercial interest in north Lao coffee has increased, other actors have crowded in – sometimes tempting farmers to sell to them rather than honour contractual agreements with MX and Comma. The two companies have responded by offering credit at favourable rates and establishing benefit-sharing schemes.

Women at the forefront

As the quotation at the beginning of this article indicates, coffee is a “woman-friendly” crop. The coffee harvest takes place in the dry season when the weather is cool and there are fewer demands on women’s labour. Picking coffee is relatively light work for those who are used to planting and harvesting rice. The forest is within a few hundred metres of the villages, and women can carry



A buyer from Comma Coffee Company provides advice on grading. Photo: Andrew Bartlett

out the processing as a collective enterprise beside their homes, where they can also take care of small children.

Of the some 2,900 Keoset farmers now engaged in coffee cultivation, the vast majority, around 90%, are women. The groups at both the learning centres are led by women. Not only are the women responsible for picking and processing, they also play a leading role in negotiating contracts and managing finances. Nevertheless, as interest and income opportunities have grown, so too has the engagement of men, some of whom have opted to remain at home rather than participate in seasonal labour migration. The timing of cherry harvesting and processing dovetails nicely with rice and maize cropping. Thus, while household members continue to cultivate food crops and keep a few livestock animals, coffee brings a significant additional income. In a few cases, such as that of Seaumkham Lertmanyphan quoted earlier, coffee has become the main household production system.

Coffee essentially allows rural livelihoods to rise above a level of wearying subsistence to one of dignity, with enough money to buy necessities. Through coffee, women have a greater voice in household decision-making and have their own source of cash without threatening food security. They also have the knowledge that they are maintaining the local environment for the next generation.

Risk management — building community and ecosystem resilience

The next generation will almost inevitably feel the effects of climate change even more strongly than the present generation does. Already the frequency of temperature extremes is increasing, and rainfall patterns are becoming more erratic. Whereas frost was rarely reported in the past, there have been recent sudden cold snaps when the temperature dropped to -3°C . Coffee is particularly sensitive to frost, but within the forest the bushes are protected; there, temperatures have not dropped lower than -1°C . Similarly, the forest provides protection against sudden intense storms.

The maintenance of forest cover helps to conserve soil organic matter and carbon, and farmers have further improved soil health by applying compost made from coffee waste and locally available animal manure. In addition, pests and diseases are more readily controlled by natural predators in the biodiverse forest ecosystem. This has special recent significance, given the discovery of the coffee cherry borer (*Hypothenemus hampei*) in the area in 2020. LURAS has worked with farmers to test various non-chemical methods to control this very serious pest; these have to date been largely successful, probably in part due to natural predators that thrive in the forest environment. For example, ants are described by Perfecto and Vandermeer (2015) as important agents in the control of coffee cherry borer, among the many other benefits of biodiverse production systems.



Seaumkham Lertmanyphan and other members of the Keoset producer group prepare coffee cherries for processing.
Photo: Andrew Bartlett

Challenges

Although the story so far is very positive, a variety of challenges remain: institutional and legal context; world price fluctuations; remote and scattered production; geographical limitations; and competition from other cash crops.

Institutional and legal context

Within the government structure in Laos, as in many other countries, agroforestry occupies an uncertain position between different departments of the Ministry of Agriculture and Forestry. The Ministry of the Natural Resources and Environment could also claim responsibility, while commercial aspects, in principle, fall under the Ministry of Industry and Commerce. To date, LURAS has focused on building the relationship between farmers and private companies, which fortunately cooperate readily with each other. However, it is also important to build capacity within the government to guide and support this cooperation, especially given the potential for developing climate-resilient livelihoods and the legal ambiguity associated with agroforestry in the current *Forestry Law*.

World price fluctuations

Dramatic changes in the price of green coffee beans are a characteristic of the global coffee trade, meaning that the price Lao farmers receive is influenced by events in countries such as Brazil and Indonesia. Since Laos produces less than 1% of global coffee, it will always be a price-taker rather than a price-maker. It is therefore important that farmers continue to practise a mixed farming system and not rely solely on their income from coffee.

Remote and scattered production

Northern Laos is not ideal territory for export-oriented investment given the poor road system, scattered production, and the country's land-locked status. The strategy has therefore been to focus on specialty-grade coffee (i.e. cupping scores over 80), enabling buyers to export relatively small volumes of "single origin" coffee to independent roasters — and providing farmers with a premium price for their beans. This is currently working well, yet it remains to be seen how the market develops.

Competition from other cash crops

In a drive to boost production and farming incomes, the agriculture sector in Laos has experienced a rapid expansion in various commercial crops. Some of these, especially rubber and bananas, have enriched foreign investors. Others, most notably maize and cassava, have provided quick wins for small farmers, but at the cost of forest destruction and declining soil fertility. In the south of Laos, there have been several reports of farmers replacing coffee with cassava. While there is a risk that this might also happen in the north, it is hoped that growing awareness within government and among farmers of the environmental risks associated with cassava production will serve to curb short-term interests. Cassava production could be especially damaging on sloping lands, where soils are vulnerable to erosion; this demands stricter zoning and regulation over different production systems on the part of the government.

Conclusions

Alarm within the global coffee industry about the impact of climate change on production was sounded some time ago; indeed, a public-private venture for sharing information on the threat was established in 2010 (the Initiative for Coffee and Climate). The positive experience of Lao farmers with coffee in a relatively climate-resilient agroforestry system has potential significance for other countries with forested upland areas in similar agroecological zones. While such agroforestry systems

are unlikely to ever compete seriously with large-scale coffee production at greater planting densities, they can be complementary to that production. Given their potential for promoting small farmers' incomes at the same time as resilience to climate change and the promotion of biodiversity, they deserve further attention.

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