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Building an Evidence Base for Policy Formulation in the Agriculture and Rural Development Sector in Lao PDR

Research from the
National Agriculture and Forestry Research Institute



November 2020

Citation

Building an Evidence Base for Policy Formulation in the Agriculture and Rural Development Sector in Lao PDR

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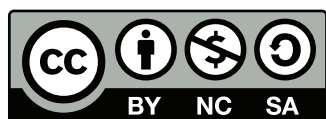
Cover Front: Sengphachanh Sonethavixay; # Vilachit Vodetphayboune; page 4,6,14,16,39,41; # Simone Vongkhamho; page 10,11,29,30,49,75; # Sengphachanh Sonethavixay; page 20,22,44,46,50,55,58,67; # Piya Vongpit; page 24,26; # Kaviphone Phouthavong; page 33,34; # Latsamy Phouvisouk; page 62,64; # Anthony M.Zola; page 70; # Andrew Barlett; page 78

Layout and Design

Vilaylack Khounvisith

Printing

Lao UniPrint press Co.,LTD, Vientiane, Lao PDR



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Acknowledgments

This research would not have been possible without the generous financial and technical support provided by the Swiss Agency for Development and Cooperation (SDC) and technical support from the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD).

We are grateful for the kind cooperation of our colleagues in other Ministries at the national, district, and provincial levels, as well as experts and development projects.

We would also like to acknowledge those in the private sector and farmers who were kind enough to share information with us and to the many people in the communities where we conducted our research for their time and their inputs.

Introduction

In June 2012, the Government of the Lao PDR, with the support of development partners, established a Policy Think Tank as part of the Sector Working Group on Agriculture and Rural Development. The Policy Think Tank is led by NAFRI, the National Agriculture and Forestry Research Institute, which is under the Ministry of Agriculture and Forestry. The aim of the Policy Think Tank is to engage government ministries and private sector stakeholders in dialogue and consensus building to address critical national policy issues that impact actions at the provincial and district levels to support the improvement of livelihoods among the rural poor.

Senior officials in the Lao government and concerned organizations and business enterprises are increasingly interested in policy formulation based on science and evidence-based research. Technical assistance and funding for policy research is increasingly linked to hard scientific evidence and demonstrated success in the belief that better policies will be formulated, and existing policy implementation gaps will be addressed. Decision-makers continue to seek solutions to persistent challenges to sustainable agricultural development that form the research agenda for the Policy Think Tank. These are:

- **Agricultural technology issues** related to agriculture, rice productivity, irrigated agricultural development, agroforestry farming systems, agricultural technology transfer, sanitary and phytosanitary measures, and food and nutrition security.
- **Farmer organization issues** related to reducing risks and increasing benefits through strengthening farmer organizations, promoting commodity marketing, farming systems to increase agricultural productivity of subsistence farmers, and access to credit.
- **Livestock technology and fishery issues** related to livestock rearing and breeds, livestock nutrition, disease control and prevention, pasture management, livestock trading, meat processing, and quality control of livestock by-products.
- **Agro-economic issues** related to trade and marketing (including WTO issues), economic integration (including ASEAN and GMS issues), promoting domestic agribusiness development (including agroprocessing and agro-industry), agricultural credit, and agricultural land concessions.
- **Agrobiodiversity issues** related to conservation and sustainable use of agrobiodiversity including sustainable management of nontimber forest products extraction by farmer organizations to conserve agrobiodiversity.
- **Agricultural land issues** related to agricultural land management, agro-ecological zoning, conservation agriculture, soils, watershed management, and land use planning.
- **Forest management issues** related to production forestry, forest conservation (including sustainable use), agroforestry, assisted natural regeneration, climate change, REDD+, and community participation.
- **Nutrition agriculture sensitivity** related to sustainable agricultural systems for nutrition, for balancing food security and nutrition, increasing productivity, reducing risk, and improving equality and empowerment of women and ethnic peoples in the context of natural resource management and family nutrition.

The Policy Think Tank has made significant strides in building a core team, carried out numerous studies, and generated interest among development partners and international research organizations. NAFRI has an important role to play in ensuring that the research conducted by its Policy Think Tank is understood and appreciated by policymakers and planners. Evidence-based research helps ensure that policy formulation processes are inclusive, fair, and sensitive to the many contexts in which people earn a living.

The most recent capacity-building initiative has been a project on Strengthening Research for Agriculture Policy Development with financial and technical support from the Swiss Agency for Development and Cooperation and additional technical support from the Centre de Coopération Internationale en Recherche Agronomique pour le Développement. The project began in 2012 and was completed in December 2020. Under the final phase of the project (July 2017–December 2020), research teams from the Policy Think Tank undertook the studies summarized in this publication. In addition to strengthening the capacity of the Ministry of Agriculture and Forestry to facilitate and coordinate research across sectors and ministries, it is our sincere hope that these results will find their way into current policy dialogues.

Sustainable Commercial Agricultural Production: A Case Study of Commercialized Banana Production

August 2016

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Abstract

Over the past ten years, commercial banana production in Lao PDR has grown rapidly. Initial expansion was in the north, but production has spread to the central and southern regions. Most investment is by companies from PR China. Laos has good conditions for producing bananas. Chinese investors are looking for new production areas to reduce risks and maximize profits. However, banana production can impact negatively on the environment and society. The purpose of this study was to establish a systematic approach to commercial banana production, processing, managing investments, standards for selecting agribusiness investors, and appropriate roles for government agencies, investors, and producers. Data were collected through literature reviews, stakeholder interviews, and field observations in five provinces. Based on the results, researchers proposed 13 policy recommendations for commercial production of bananas in Lao PDR.

Background

Beginning with the announcement of the New Economic Mechanism in 1986, the Government of Lao PDR has had a policy of promoting foreign direct investment to expand economic growth. Investment in the agriculture sector from PRC is primarily in the north and through land concessions and contract farming 2+3¹ or 1+4² methods to produce rubber, bananas, sugar cane, tea, coffee, fruit, and other dry season crops.

Agribusiness development is constrained by granting land use rights that entail land clearing and exterminating pests, loss of the ability to diversify short-term dry season crops in response to price changes in international markets, and loss of control of land management. Maintaining soil fertility is an important strategy for accelerating expansion of the food sector.



Commercial production of bananas began in Luangnamtha Province in 2005 and expanded widely and has become part of the livelihood pattern of people in remote areas. In the *Agriculture Development Strategy to 2025*, bananas are designated as a commercial crop for export and a strategic commodity for production in lowland areas. Chinese investors have easy requirements for accessing land to establish banana plantations. In 2014, bananas were cultivated on an estimated 22,920 ha with more than 260,000 tons produced, valued at USD 45 million. Banana cultivation has sparked conflict about land use, plastic waste disposal, and the use of agrochemicals.

Purpose and methodology

The purpose of this study was to gather the data and information needed to establish a systematic approach to commercial banana production processing, managing investments, standards for selecting agribusiness investors, and appropriate roles for government agencies, investors, and producers. In addition, the study aimed to identify impacts on the economy, society, agro-ecology, and environment, understand regional and world market conditions for bananas produced in Laos, and assess policy options. Data were collected from the literature, stakeholder interviews, and field observations in five provinces.

Banana trade and markets

World markets. World markets are dominated by 10 producer countries and six multinational companies. Laos is not among the top ten producers. Total global imports were about 21 million tons with a value of about USD 11 billion (2017 figures). China is the second largest producer and the fifth largest importer. China has no official import quota on bananas from Laos.

Domestic markets, exports, and imports in Lao PDR. The Lao Ministry of Agriculture and Forestry and the People's Republic of China (PRC) General Administration of Quality Supervision, Inspection, and Quarantine signed a protocol in September 2013 on sanitary and phytosanitary conditions for banana exports from Laos to China. However, exports from Laos remain unofficial at this time.

¹2+3: Farmers contribute land and labour (2 things), while investors contribute inputs, technical advice, and access to markets (3 things).

²1+4: The company or trader makes decisions over the use of land, inputs (seeds, fertilizers, agrochemicals, machines) and technology (technical guidance), and the marketing; the community or villagers contribute land or labour or both.

Overview of policies and legislation for promoting production

Investment policies. Provincial governors authorize land leases and investments according to government decrees. The Governor appoints a provincial Investment Management Committee. The Provincial Planning and Investment Office acts as the Secretariat. Banana production is mainly by foreign investors who lease land to cultivate 100 percent bananas or who have contract farming arrangements. Investor applications tend not to be reviewed carefully resulting in poor compliance with laws and regulations.

Trade policy. Cavendish bananas are the principal variety in demand in international markets. This variety is sensitive to diseases and pests. Laos continues to encounter problems with neighbouring countries that prevent the transit of exports to third countries. For this reason, it is necessary to continue negotiating bilateral trade agreements.

Health issues. Commercial production of Cavendish bananas requires 40 chemical sprayings over one year. Contrary to Lao regulations, herbicides and pesticides for producing bananas are not labelled with Lao language information on contents and use. Researchers found at least 16 chemical products used to cultivate bananas in the northern provinces. Some herbicides and pesticides contain chemicals prohibited under the Rotterdam Convention. Provincial Investment Management Committees are responsible for inspections. Numerous environmental and human health issues were brought to light in this study.

Land issues. Bananas continue to be cultivated improperly on paddy land, which impacts food security plans. In June 2014, the Lao government issued a decree on *Restrictions for Illegally Cultivating Bananas on Paddy Land*. Governors in northern provinces issued instructions to implement the decree, but paddy in some provinces and the central and southern regions continues to be used for banana production.

Environmental policy. Based on a survey of approvals for land concessions to cultivate bananas, environmental control plans are generally lacking, including disposal of wastes. Environmental monitoring committees have been established in some provinces, but do not operate according to consistent laws or guidelines.³

Commercial banana cultivation among farm households

Farming households. Nearly all the heads of farm families cultivating bananas in the north are ethnic Leu. Ninety-two percent in the central and southern provinces are ethnic Khmu and Lao.

Banana production. The recent cultivation of bananas as a commercial crop has led to farm families gaining experience and knowledge. Some 42 percent of the farmers in the north join banana producing groups. Bananas cultivated by farmers in northern provinces are nearly 100 percent Cavendish imported from China. In the central and southern provinces, burro bananas⁴ are cultivated by just over 80 percent of farm households.

Contract farming. In the central and southern provinces, investment is self-managed and contract farming is not yet formalized. In the north, investment is in the form of contract farming between producers and an investment company.

³ *The Environmental Protection Law (29/NA 2012)* contains a clear explanation of the administration of investment projects consistent with environmental and social management plans and conserving natural conditions and designates duties for preserving the environment according to regulations and laws.

⁴ Burro bananas are an indigenous species. They are easily cultivated and have good nutrition characteristics.

Types of bananas produced, use, and marketing. Bananas in the northern provinces are produced for harvesting the fruit. Leaves and flowers are discarded. In central and southern provinces, farmers use all parts of the banana plant. Farmers in northern provinces sell 99 percent of their bananas to Chinese traders. In central and southern provinces they sell 92 percent to traders.

Use of chemicals. Banana growers in the central and southern provinces use far fewer chemicals than northern growers. Only eight percent can read and understand the directions for use, which are written in Chinese. Over two-thirds of chemicals are improperly discarded, and more than half the unused plastic wrapping is burned.

Extension and support. Investors and chemical retailers provide some technical assistance and support. Credit is extended in the form of seedlings and production inputs in advance. In the central and southern provinces, government services provide some technical support.

Sources of funds and credit. Almost all the growers in the north and two-thirds in the Central and South regions self-finance their operations. Banks charge an annual interest rate of about 10.6 percent for an average period of 8 to 9 months and most often ask for a land title as collateral.

Ideas about future banana production, processing, and consumption. Nearly half the farmers in northern provinces and two-thirds in the central and southern regions expect production to continue as usual. Growers believe three principal factors contribute to successful production: stable prices, an assured market, and support from the government.

Land tenure and leasing. Farm families in all regions have less than 3 hectares of land for paddy and other crops. Land lease prices vary from just over 15 million LAK (USD 1,647.00) to as little as 3 million LAK (USD 330.00) per hectare per year depending on the type of land. Two-thirds of growers in northern provinces reported no problems with companies or investors in contrast to 100 percent of growers in central and southern provinces reporting that companies do not adhere to the contract. In all provinces, almost all contracts with companies or investors are with Chinese nationals. Just over half of all contracts conform to the law and pass through the government. In the central and southern regions, 50 percent lease their land because they receive an immediate lump sum they can use to finance other activities. The main reason given by farmers in the north is more income.

Working on banana plantations. In the north, 39 percent of respondents said they do not work on plantations because they refuse to work with chemicals, or they had insufficient labour for household work and other duties. Overall, two-thirds of respondents in the north said they would not lease their land because they want to cultivate alternative tree crops or raise livestock. In the central and southern regions, 100 percent said they would cultivate other crops. Most people in all regions said they would not invest in commercial banana cultivation themselves.

Employment on banana plantations

Working conditions for labourers. In the north, 90 percent of labourers work on plantations operated by Chinese companies or investors. On average, 97 percent are permanent and 84% are housed in company guesthouses. In the central and southern regions, 69% work on plantations operated by Chinese and 31% on plantations operated by Lao owners. All plantation workers reported being involved in applying fertilizers and herbicides, with only 77% reporting they receive training. Companies provide equipment and materials for mixing pesticides, fertilizers, and other chemical solutions. Only 49% of labourers reported wearing any kind of protective clothing or taking protective measures and only 16% said they understand the use of chemicals, citing their inability to read directions in a foreign language.



Income and remuneration. Income and remuneration vary by region with workers in northern provinces receiving more. More than half of all labourers said they did not plan to continue working on plantations. In the northern provinces, over 80 percent said they would invest in their own production but only 45 percent in central and southern provinces would do so.

Economic impacts by production method

Returns to farmers. Data on fifty-nine respondents from three provinces showed that income increased significantly. Cultivating Cavendish bananas accounted for 44 percent of total income. Farmers in the north have an assured market with Chinese companies. Respondents in southern Laos reported lower income from producing burro bananas. Leasing land for banana cultivation increased household income. However, in comparing costs and benefits of concessions, specifically the cost of damage caused by the concession and benefits from income, the study showed negative results.

Impacts on society and health

Impacts on society. Positive contributions of commercial banana production are company investments in infrastructure, social activities at the village or district level, and local employment opportunities. Negative contributions include a decrease in availability of land for cultivating rice and other economically valuable crops, local lifestyle changes, conflicts related to land use, social conflicts with foreign labourers, and health problems from the misuse of chemicals. Most respondents had favourable attitudes towards commercial banana production citing increased income and educational opportunities. Respondents cited negative impacts as higher medical bills, social and health problems.

Illnesses from using chemicals. Farm families cultivating bananas for six months became ill after using insecticides, herbicides, and chemical fertilizers. About eight percent of the farmers in the north became ill. On average they were ill four times and for about four days each time but could continue working. Labourers in the north were ill more frequently than those in the central and southern provinces due to higher use of chemicals.

Environmental impacts. Positive environmental impacts include putting degraded and fallow land to use and increased tree cover. Negative impacts are: 1) degraded soil quality from use of chemicals, 2) air pollution from spraying affects human health, 3) water pollution from chemical runoff, 4) water shortages for other sectors, 5) it can take decades to rehabilitate soils, and 6) large volumes of plastic waste. Eighty-five percent of respondents recognized that insecticides and other chemicals damage the environment, but Cavendish bananas must be protected from insects and fungi. More than two-thirds were concerned about air and water pollution and impacts on human health.

Conclusion

Over the past 10 years, the commercial production of Cavendish bananas in Laos has expanded rapidly. Banana production and cultivation practices are linked to and have impacts on the environment and human health. Notwithstanding an agreement signed between the two countries in 2013, no official certificate of phytosanitary hygiene has been issued. The export of bananas from Laos to China continues to be in the form of unofficial cross-border trade. Laos has existing laws and regulations but lacks enforcement capacity and the vertical and horizontal coordination among various agencies is unsystematic.

This study suggests that for the commercial production of Cavendish bananas it will be necessary to make significant investments in production infrastructure. Farmers generally agree that cultivating bananas increases family income, provides opportunities for increased education for family members and generates funds to invest in agricultural production.

Policy recommendations and next steps

The plan for the near term is to prepare a summary of policies related to commercial production of bananas in Lao PDR. Scientific research in the following areas is needed:

- Research to assess the impacts of commercial banana production on soil and water.
- Studies on the impacts of commercial banana production on human and environmental health.
- Research on managing banana shoots and roots and processing bananas that do not meet standards, including establishing a banana flour factory, while identifying crops that can be cultivated after bananas.
- Research to identify options for generating income for poor families cultivating bananas as a commercial crop.

The following policy suggestions are offered.

- Strengthen enforcement capacity for laws and regulations on environmental management plans and assessments before approval of commercial crop production.
- Capacity building for the Investment Management Committees at provincial level who act as the Secretariat of the Provincial Governor in the investment approval process.
- Formulate a participation mechanism for villages and districts so they can contribute to the concession approval process.
- Capacity building at the district level for implementation, monitoring, and management of business sectors, especially training on the safe use of chemicals.
- Promotion of banana production in the form of contract farming.
- Promote best practices (individual growers and companies).
- Determine optimal locations for banana production.
- Set up a committee to improve regulations on the use and registration of the chemicals used in production. Update the list of banned chemicals and issue measures for strict prohibition of use.
- Develop supporting policies to minimize marketing and price risks.

Development of Benzoin Upstream Value Chains for Uplands of The Lao PDR

A Case Study in Houaphanh, Phongsaly, Oudomxay, Luangprabang and Xiengkhouang Provinces

October 2016

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Abstract

Agricultural production is focused on export of raw materials with little emphasis on local processing. Due to the lack of a framework for providing incentives to local businesses and farmer organizations, the potential for value addition by local agroforestry industries has not been fully realized. The specific objectives of this research were to i) map natural benzoin distribution areas and yield capacity, ii) investigate best practices for silviculture techniques in plantation and natural areas, iii) analyse production systems and benzoin value chains to identify constraints and opportunities, and iv) identify policy gaps and offer recommendations for benzoin development policies. Data collection used desk study of documents retrieved from the Internet and libraries, field surveys, interviews with stakeholders and key informants, SWOT analysis, value chain analysis, and policy gap analysis. Results include data on the distribution production area of *S. tonkinensis*, benzoin resin productivity, production, silviculture techniques, benzoin value chain and exports, SWOT analysis of benzoin resin production, the role of benzoin resin for livelihood improvement, stakeholder analysis, and policy gap analysis. Policy recommendations are offered on natural resources management, trade and marketing, and other supporting policies.

Introduction

The general approach to improving smallholder farmers' capacity for production and income generation has been through promotion of agricultural diversification and commercialisation. Contract farming, community entrepreneurs, and private investors have the potential to contribute to this aim by incorporating low-income and small-scale producers into modern supply chains. Some upland areas in Laos are blessed with an abundance of nontimber forest products. Potential products include silk production, weaving, natural herbs, cottage industries and handicrafts, and benzoin resin. To ensure sustainable harvesting of nontimber forest products, the Government of Lao PDR is seeking cooperation from ministries to increase reforestation and small and medium scale plantations for tea, coffee, and other high-value products such as benzoin resin, a balsamic resin obtained from the bark of several species of trees in the genus *Styrax*. In Laos, *S. tonkinensis* is the species from which benzoin resin is harvested.



At present, agricultural production is focused on the export of raw materials. There are few incentives for local businesses and farmer organizations to invest in value addition. Based on consultations with experts, benzoin tree resin has been chosen as a potential high-value product with good market prospects. Production offers significant economic opportunities to smallholders, competitive advantages in international markets, and an increase in forest cover. Benzoin resin trees are naturally distributed in Houaphan, Phongsaly, Luangnamtha, Oudomxay, and Luangprabang provinces. A growing population demanding large quantities of natural resources is one of many challenges to forest areas where benzoin resin is harvested. A ban on exploiting forest areas where these trees grow has contributed to a decrease in domestic production. Supportive policies to promote benzoin resin production and trade could be strengthened.

The many uses of benzoin resin

The better grades of Lao benzoin are used in the manufacture of fragrances, personal health care products, household products, and cleaning agents. Lao benzoin resin is used to impart a sweet, 'oriental' note to a fragrance and is used in the more expensive fragrances at the higher end of the market and in the more expensive soaps. Benzoin resin also functions as a fixative for other fragrance materials. Fragrance industries in France, Germany, India, and the USA are the main buyers.

Objectives and methodology

The objectives of this study were to i) map natural benzoin distribution areas and yield capacity, ii) investigate best practices for silviculture techniques in plantation and natural areas, iii) analyse production systems and benzoin value chains to identify constraints and opportunities, and iv) identify policy gaps and offer recommendations for benzoin development policies.

An extensive literature review was conducted on existing policies, laws, and regulations relating to management and marketing benzoin resin, its uses, distribution, ecology, propagation, harvesting, processing, marketing, and sustainability. To analyse value chains, interviews were conducted with 223 people in 41 villages, nine districts, and three provinces. To analyse yields, investment costs, and benefit returns, 149 farmers were selected to represent three provinces engaged in benzoin resin production and upland rice cultivation and other cash crops, and 15 farmers in three provinces engaged in benzoin resin production.

Results

Distribution. Distribution of *S. tonkinensis* in upland Laos encompassed 1.92 million hectares in conservation, protected, and production forest areas and agricultural land. *S. tonkinensis* is most abundant in Houaphanh Province (784,600 ha). Luangprabang and Phongsaly have a little less area and then Oudomxay and Xiengkhouang. The soil and weather conditions in these areas produce a high-quality resin. In past decades, up to 50 tons of resin per year was harvested. Production area has declined as farmers have turned to other alternatives for income generation (e.g., corn, cardamom, livestock) and out-migration of young people to work in towns. The main remaining areas for tapping are Houaphanh, Luangprabang, and Phongsaly, in which there are 184 villages and 3,285 households. The total area amounts to about 5,307 ha (average of 1.62 ha/family). Most villages are poor and in remote areas. The majority of the population are ethnic Khmu who have a long tradition of *S. tonkinensis* propagation, maintenance, and tapping.

Productivity. Productivity is determined by factors including the age and size of the tree, time of year and harvesting techniques. Yields are highest in Houaphanh (about 267 g/tree). The total yield for all three provinces is 136 tons per year. The results indicate there is ample room to expand production in forest areas and on agricultural land.

Silviculture. Nearly all production is from natural stands of *S. tonkinensis*. Mature trees can provide up to 40 kilograms of seeds per year. The seeds are dried under shade and can be stored for up to one year. Dried seeds can be planted in burned-over areas often with upland rice crops. Trees can be tapped once saplings reach a height of 2 to 3 meters after about five years of growth. Tapping has been local knowledge for generations and resembles rubber tree tapping. Trees can be tapped for up to 30 years if well maintained and cared for.

Value chain and exports. FAO (2001) reported that production of benzoin was 40–55 tons per year. In the three provinces surveyed in this study, average production between 2006 to 2015 was 50.83 tons per year. Resin is purchased by two main companies, Agroforex and Anouphap, and transported to Vientiane Capital for cleaning and grading. After cleaning, the weight of the resin is reduced by about 10 percent. Anouphap was established in 2010 and started buying resin in Luangprabang. The company currently buys about 19 tons of resin per year. Agroforex was also established in 2010 and buys about 16 tons per year. Other companies buy less than 10 tons.

Comparison of cost benefits of *S. tonkinensis* with other cash crops. Compared to benzoin production, income from upland rice was higher. Benzoin resin requires approximately USD 300 in inputs per hectare, which is two to three times higher than the inputs for rice and maize. However, in the long term (9 years), natural stands of *S. tonkinensis* generate more return. Comparing labour wages in the countryside with those in town, benzoin resin production yields higher returns. In addition, the long fallow period of upland rice cultivation has a positive effect in terms of ecosystem services.

SWOT analysis. While there are potential opportunities for benzoin resin, some of the main weaknesses and threats include i) an incomplete understanding of the ecology of *S. tonkinensis*, ii) competition with upland rice production, iii) lack of household labour, and iv) weak government support.

Role of Benzoin resin in livelihoods improvement. Nontimber forest products play an important role in generating income (48% of family income) and resin collection contributes up to 17% of total household income. Problems and obstacles in production and trade include the seasonal effect on resin production and quality, lack of technical knowledge, and access to credit. Trade problems include price fluctuations, and changes in market demand, the government quota and taxation system, illegal traders, the cost of transport, and lack of information. The total tax value (export tax, profit tax, natural resource fee) from 2006 to 2015 was 1,013,398 USD, but due to illegal trading, the state lost an estimated 240,000 USD.



Stakeholder analysis

Local producers and collectors. Farmers are the main producers. The main buyers are two companies, Agroforex and Anouphap. Illegal traders from China and Vietnam smuggle resin to neighbouring countries. Companies find it difficult to control the illegal trade as farmers will sell to anyone offering a good price.

Government involvement. Mandates for controlling and supporting production, trade, shipping and export are divided among district offices of the Ministry of Agriculture and Forestry, the Ministry of Industry and Trade, the District Finance Office, the Customs Department, Tax Department, and Department of Import-Export. There is not a lot of coordination or sharing of information.

Policy gap analysis. Laws, decrees, regulations, policies, and strategies that have a direct effect on the production of benzoin resin and its trade include Article 3 of the Forestry Law, Articles 15 and 17 of the Land Law, Article 49 of the Promotion and Investment Law, Article 8 of the Law on Industrial Processing, numerous articles in the Law on Small and Medium Enterprise, the Tax Law, and at least six other laws. This patchwork of laws makes it difficult for all the stakeholders involved, including the government. For example, in the last 10 years, the data collected on resin production from state entities and other stakeholders differed by plus or minus 19 tons per year. Examples of the numerous policy gaps include:

- Article 3 in the Forestry Law does not distinguish between fallow land and agricultural land, which means benzoin resin could be considered an agricultural product and not a nontimber forest product.
- Article 17 in the Land Law designates three categories of agricultural land, but how that land can be used is often not clear nor does it recognize actual practice.
- Benzoin resin production. Three gaps relating to i) forestry law and agriculture, ii) plantations, conservation and nontimber forest products, and iii) Land Law.
- Trade and export. Two gaps related to i) enforcement of laws related to investment and SME promotion in remote areas, and ii) rates for tax, customs, and some nontimber forest products.

Policy recommendations

Natural resources

- Clearly identify the ecology of *S. tonkinensis*, especially for areas where upland rice is cultivated.
- Consider how to register *Styrax* forest areas in villages.
- Identify techniques for benzoin resin production that encourage information exchange among farmers.
- Review existing agricultural land allocations in upland areas to identify ways to allocate for multiple uses, including benzoin production.
- Identify factors that stimulate the production of benzoin resin per tree per area.

Trade and marketing

- Promote benzoin production within a group model or village model with a focus on fair trade and prevention and control of illegal trade.
- Find a mechanism to determine annual benzoin resin prices.
- Create support tools to evaluate the efficiency of the present value chains.

Supporting policies

- Clarify the definition of 'fallow forest' and certify benzoin resin as a nontimber agroforestry product.
- Allocate upland agricultural land to match local potential.
- Enforce investment and SME laws at the local level to improve livelihoods.
- Assess whether the present quota mechanism is still pertinent in terms of managing tree crops, stakeholders, and village committees.
- Review profit and export taxes.

Cassava Value Chains in Champasak and Salavan Provinces

June 2019

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Abstract

Cassava production in Lao PDR is important for production of animal feed and is the third-largest grown crop in the country. Creating a cassava processing industry in Laos provides opportunities for farmers to diversify their source of income. The main objective of this study was to identify factors that will enable farmers and the private sector to respond to risks in the global cassava market. Case studies were developed using data from two provinces, four districts and 10 villages producing cassava in Salavan and Champasak Provinces. Data collection methods included group discussions, key informant interviews with farmers, cassava traders, cassava factory owners and managers, and secondary data on production, processing, and cassava marketing at the national and subnational levels. Six policy recommendations are offered on land management and production systems, certification, increasing farm income, farmer groups, information dissemination, and credit.

Introduction

Cassava has a wide range of industrial uses. In Southeast Asia, cassava is mainly grown by smallholder farmers as a source of income. The price of cassava has increased as demand grows in the region, especially in China. Prices fell in 2016 when China began subsidizing farmers to grow corn.

Cassava production in Laos is important for production of animal feed and is the third-largest grown crop in the country. Creating a cassava processing industry would provide opportunities for farmers to diversify their incomes. Most cassava is grown in Champasak, Salavan, Bolikhamxay, and Xayaburi Provinces. Most cassava products from the southern and central provinces are sold to Thai and Vietnamese traders. The northern provinces sell to China. The number of plants increased significantly from four factories in the mid-2000s to 14 in 2015.



Objectives and methodology

The main objective of the study was to identify factors that will enable farmers and the private sector to respond to risks in the global cassava market. Case studies were developed using data from two provinces, four districts and 10 villages producing cassava in Salavan and Champasak Provinces. Data collection methods included group discussions, key informant interviews with farmers, cassava traders, cassava factory owners and managers, and secondary data on production, processing, and cassava marketing at the national and subnational levels.

Cassava production overview

Cassava cultivated area increased from 31,135 hectares in 2011 to over 70,000 hectares in 2015–2016 and declined to just over 50,000 hectares in 2016–2017. Despite the decline in area planted, yields increased by almost 38%. Yields were highest in Champasak Province due to fertile soil and effective soil preparation and production methods.

Cassava production in Champasak province

In the past, most farming activities were oriented toward family consumption. Since 2010, cassava has become one of the main income generating crops for families in the area and the province hosts 11 cassava purchasing companies. The two main districts for production are Pathoumphone and Bajieng Chaleunsouk.

Cassava production was initiated by the KPN Cassava Production Company with 2+3 contracts between farmers and investors.⁵ In 2015, the factory ran out of operating capital. ASEAN Agronomy Company arrived in 2013 and set up chip drying fields. In 2017, there were 3,628 hectares of cassava in 34 villages, involving 895 families and total production was 85,258 tons with a yield of 23.5 tons per hectare.

In Pathoumphone District, farmers did not invest much in fertilizers and other inputs nor did they develop their production skills. When prices dropped, they cut back on growing cassava, leaving the factories with supply shortages. A meeting between farmers, companies, and local government officials resulted in the companies paying a higher price and production increased again.

⁵ 2 refers to land and labour which belong to farmers, 3 refers to capital, techniques, and markets, which belong to the company.

In Bajieng Chaleunsouk District, farmers used more up-to-date production techniques. While the market and prices were similar to Pathoumphone, total production reached 195,030 tons with yields of 30 tons per hectare in 2017.

Cassava production in Salavan Province. Cassava production in Salavan Province has increased in response to domestic and international demand, especially in Laongam, Lakhonepheng, Khongsedon, Wapy and Salavan Districts. In 2018, there was one cassava factory and 41 cassava companies operating in Salavan buying and exporting cassava products. Production spiked in 2013 and has fallen only slightly since.

The field survey focused on Laongam and Khongsedone Districts. The main export markets are Thailand and Vietnam. Exports generated more than 200 billion LAK (USD 22,000.00) with farmgate prices for fresh cassava ranging from 500–750 LAK/kg (USD 5 to 8 cents) and 1,000–1,500 LAK/kg (USD 11 to 16 cents) for chips.

Cassava production practices

Cropping calendar. Cassava production keeps farmers busy throughout the year. Soil preparation and planning starts in early April. Fields will be weeded once, sometimes twice between May and September depending on the availability of family labour. Harvesting begins between December and April when traders start purchasing cassava.

Use of labour. Four main types of labour can be mobilized: family members, household labour usually employed in other occupations, exchange labour with relatives, and paid labour from the village or neighbouring villages. Men and women were involved in all activities. Households hire temporary workers when household labour is not available. Exchange labour happens mostly for planting, weeding, and harvesting. At peak periods (e.g., planting, harvesting), farmers may hire workers from other districts.

Land preparation techniques. Most farmers plough before planting cassava using their own or hired tractors. Ploughing techniques can affect yields and soil erosion positively or negatively.

Planting material. Six varieties of Rayong cassava are imported from Thailand. The KM 94 variety is imported from Vietnam. Farmers keep the stems to regenerate the next crop. However, companies want farmers to use new stems for each crop. Companies sell cassava stems on credit. Just over two-thirds of farmers in Champasak bought new stems compared to one-third in Salavan.

Planting techniques. Planting techniques are similar in both provinces, except for the use of pesticides prior to planting. In Champasak, over two-thirds of farmers use chemicals before planting but only 14% do so in Salavan. The basic planting technique is to lay the stems lengthwise in a ploughed furrow and cover them with earth. Few farmers use fertilizers. Weeding is one of the most important (and most labour intensive) processes in cassava cultivation. Most farmers (nearly 90%) weed by hand. The incidence of pests and diseases has increased along with production area. Mealy bugs are the most common pest. Farmers will spray a soap solution on affected plants or cut or burn the affected stems.

Harvesting. Harvesting takes place between December and April each year. Nearly 90% of farmers in Champasak and 60% in Salavan sell fresh roots. Farmers will chip and dry their cassava if they have a dry area. Farmgate prices in the two provinces were similar. The average price for fresh cassava roots was 471 LAK/kg in Champassak (USD 5 cents), and 402 LAK/kg in Salavan (USD 4 cents). The price for chips was 1,200 LAK/kg (USD 13–14 cents).

Planting costs and returns. The costliest activities in cassava cultivation are soil preparation and weeding. Total production costs were similar in both provinces (approx. 2.8 million LAK or USD 320 per hectare). Income from cassava production is similar in both provinces (26.5 million LAK/USD 3,000.00).

Access to credit. Most farmers use their own cash reserves for cassava production (82% in Salavan; 45% in Champassak). Most will borrow from banks if they need to (90% in Champassak; 84% in Salavan). The average bank loan was 16 million LAK per household in Champassak (USD 1,750.00) and 7.3 million LAK (USD 800.00) in Salavan. Loans from Village Funds averaged between 6–7 million LAK per household. (USD 650.00 to 760.00).

Access to technical support. Farmers received the most technical support from government and some from companies. Technical support focused on planting and production techniques but little or no support for the safe use of chemicals or marketing. Most technical support takes the form of information dissemination.

Case studies: private sector involvement in cassava production

The KPN cassava factory. The KPN factory was established in 2010 in Pathoumphone District, Champasak Province and works with 23 villages and 695 households cultivating 1,341 hectares of cassava. The company does land preparation and provides stems on credit on the condition that farmers sell all their crop to the company. The factory purchase price of fresh cassava was 350–600 LAK/kg (USD 38–71 cents) and cassava chips 800–1,200 LAK/kg (USD 9–13 cents). The factory can process 300–400 tons/day during harvesting and exports the finished product to China, the Philippines, Singapore and other European countries at USD 360–400 per ton. KPN produces starch for export to China, Singapore, the Philippines, and other European countries. In 2017, the factory exported 2,881 tons of starch, mainly to China.

Hufugo Co. Ltd. Established in 2006 in Kaengtanglay, Laongam District, Hufugo is a Vietnamese venture with an investment of 2.5 million USD. It was granted 49 hectares of land for 30 years. The total area under cassava production is about 30 hectares and the rest for a drying yard, storage, factory, offices, and a dormitory for workers. Average processing capacity is about 25–30 tons per day for approximately 180 days a year. They produce one ton of starch for every 3.9 tons of fresh cassava. In 2017, 70% of the company's total cassava production was exported to Vietnam, 15% to China, 10% was exported to Thailand and 5% was sold on the domestic market.

Policy support. Cassava is one of nine priority crops considered suitable for commercialisation by the government. There are some incentives for investors under the Law on Investment Promotion, particularly the import tax policy for agricultural inputs and machinery. Smallholders might benefit from these policies if they would form a production group or cooperative. Provincial government agencies encourage the private sector to cooperate with farmers and farmer groups in terms of cassava investment, production and buying cassava products from farmers. A number of cassava drying fields have been set up by the companies purchasing cassava from farmers. Nayobai Bank supports the poor by providing low interest rate loans for agricultural production and household economic activities. However, no households accessed these loans as the study area is not considered a poor area. A few households borrowed money from commercial banks.



Cassava trade and value chains

The value chain in Champasak and Salavan Provinces is comprised of farmers, collectors, factories, and exporters. Price depends on the quality of the cassava product and international and regional market prices.

Value chain in Champasak. Companies act as collectors and factories act as collectors and processors. Cassava stems and other inputs are imported from Thailand. Dry cassava chips are exported to Thailand and Vietnam (85%) and 5% are processed in Laos and exported as cassava starch. There are four export checkpoints (Vang Tao-Songmek in Phonethong District in Champasak, and Ubon Ratchathani, Thailand, Lalay in Salavan Province, and Hue Province in Vietnam).

Cassava collectors. Eleven companies purchase cassava for export to Vietnam and Thailand. Some sell to factories to process starch. Purchasing price is based on world cassava prices. In 2017, the farmgate price of fresh cassava was between 400–600 LAK per kilogram (USD 4–9 cents) and 850–1,400 for chips (USD 9–15 cents). By 2017, cassava purchases totalled 588,663 tons.

Value chain in Salavan Province. Cassava stems, fertilizers and other inputs are imported from Thailand and Vietnam. Exports of starch from four companies go to Vietnam (70%), China, and Thailand. Companies act as collectors and exporters, while factories act as collectors, processors, and exporters.

Producers. Farmers in Salavan Province sell fresh cassava and dried chips (approximately 174,900 tons of fresh cassava between 400–600 LAK/kg or USD 4–6 cents; 116,600 tons of cassava chips at 800–1,600 LAK/kg or USD 9–18 cents).

Cassava collectors. Small companies and individual traders buy cassava then sell to larger companies such as Kounsap, Paksong Development and Bajieng Chaleunsouk in Champasak. For example, Import and Export Development Company Limited in Salavan Province established in 2016 buys 3,000 tons of fresh cassava and 5,000 tons of cassava chips each year then sells to a larger company in Champasak and buyers from Vietnam.

Processors. Hufugo SLV exports starch to international and domestic markets. The main market is Vietnam (70%), then China, Thailand, and the domestic market. The average price was 3,145 LAK/kg (USD 34 cents).

Conclusion

Although cassava production provides good incomes to farmers, they still face many issues. Access to credit remained low as most people do not know how to obtain a loan and interest rates are high and not uniform between banks. This was a major source of risk when incomes fell. Pest and disease risks are beginning to grow in Salavan Province. Other risks included the decline of soil fertility and unstable prices. The main quality risk for cassava was moisture content, which results in low prices. This is mainly due to a lack of technical knowledge. Logistic issues included high shipment fees for export, the weighting of transit loads, which is not internationally compliant and is difficult to achieve, the loss of product during transport, and the bureaucratic freight transport documentation system. The table below summarizes risks and opportunities along with recommendations.

Recommendations

The following recommendations are offered as a means of enabling farmers and the private sector to better respond to risks in the global cassava market.

Risks	Opportunities	Recommendations
<ul style="list-style-type: none"> • Decrease in soil fertility due to mono-cropping. • Cassava disease outbreaks as farmers buy uncertified raw stems. • Lack of rules and regulations to organize collaborations between farmers and negotiations between farmers and buyers. • Credit conditions to factoris are obscure. • Market information is not reaching farmers in time. 	<p>Technical support by DAFO staff: training farmers on planting, monitoring, pest and disease control.</p> <ul style="list-style-type: none"> • Good formulation of negotiations on selling cassava production to traders. • Knowledge sharing between group members. • Farmers have little information about prices and available marketplaces to sell. 	<ul style="list-style-type: none"> • Systematize crop rotation and land management of cassava production farming systems. • Production and certification of high-quality cassava stems. • Develop work opportunities to increa Factors and Implications of Sustainable Commercialisation of Cattle Production

Factors and Implications of Sustainable Commercialization of Cattle Production

April 2019

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Abstract

A recent increase in the demand for beef on both internal and external markets has provided an opportunity for cattle rearing farmers to raise their incomes and improve their livelihoods. Most cattle farmers raise their cattle under the traditional free-grazing system due to a lack of technical knowledge and limited access to markets. Laos PDR has high potential for promoting cattle commercialization. This study was designed to gather data using household surveys and value chain analysis for a mathematical model of optimal commercialization. Recommendations are offered on harmonizing cattle trade regulations and setting standards for tax and fee collections through a single window, training on fattening techniques using available crops, and improving access to credit to support farmers who have a high potential for raising cattle for commercialization.

Introduction

In Lao PDR, livestock provides food and income for the majority of the four million people living in rural areas, and 1.96 million people living under the national poverty line.⁶ Livestock is a priority product for the government and is promoted as a way to ensure food security and generate income. High demand for beef in domestic and external markets offers significant opportunities for the rural and peri-urban poor to increase returns from their livestock resources. There are an estimated 1.98 million cattle (2017 figures); about 55% in the Central region, 19% in the North and 26% in the South (2018 figures). Total cattle assets have been valued at USD 461.34 million (4.2% of GDP and almost 18% of total agricultural production).

Traditional smallholder free-grazing is the most common cattle rearing system. Farmers lack technical knowledge, which contributes to low productivity, disease outbreaks, low market access, and low value added.

The cattle trade in Laos is dominated by the live cattle trade and animals slaughtered for local meat markets. About 100,000 cattle are slaughtered annually, which represents 10,000 tons of beef annually consumed in Laos. The high demand for beef from neighboring countries, especially China and Vietnam represent a good opportunity to develop cattle production for commercialization and export. However, smallholder farmers sell their cattle at local markets with minimum processing and low hygiene standards. An increase in income and urbanization in both Laos and neighboring countries has led many urban consumers, high-end restaurants, and hotels to prefer processed hygienic beef over local products. Smallholder production systems and processing practices have not improved and consequently smallholder farmers are missing opportunities to capture high-end markets, which often offer higher beef prices in both domestic and international markets.

Live cattle and beef value chains are relatively short and value addition is minimal. Most beef processing is for the domestic market, while live cattle are exported under trade rules and regulations imposed by provincial and district authorities. To improve productivity of cattle rearing in Laos, it is important to understand the current issues faced by cattle raisers and to introduce incentives to support smallholder farmers to improve their cattle production practices and access more lucrative markets.

Objectives and methodology

This study analysed the cattle value chain from farmers to domestic and export markets. Data from 257 interviews carried out in Xiengkhuang (upland) and Vientiane Province (lowland) enabled a calculation of the value added from cattle production and helped identify the key issues faced by value chain actors. A thorough review of the literature revealed a number of pertinent factors that also need to be considered. For this study, the determinants of cattle commercialization were written as a formula, the Cattle Commercialization Index.



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⁶ Less than USD 1.00 per day. 2007 figures.

Cattle development and potential for commercialization

Overview of cattle development. Live animals, especially live bovines, are one of the country's top five agricultural exports. Total exports of live animals were worth USD 5.3 million in 2010, then declined sharply to USD 0.21 million in 2013 due to, i) the higher price of Lao cattle, ii) a high demand for beef on domestic markets, iii) extreme cold weather in the Northern and Central provinces in 2011, resulting in the death of over seven thousand cattle. Herd sizes are largest in the Central region.

Cattle value chain. Cattle fattening can triple the value, from 4 million LAK (USD 438.00) for cattle raised in the traditional way to 12 million LAK (USD 1,300.00) for fattened cattle. Farmers can receive training on cattle fattening from district agriculture and forestry staff. Cattle fattening generates a higher price but also incurs higher costs.

Survey findings. Household surveys were conducted from 10–20 December 2018 to gather data on farmer characteristics, methods of cattle rearing, and factors driving cattle commercialization in Vientiane and Xiengkhuang Provinces. While the majority of household heads are male and over 50, there are no gender restrictions on cattle raising or associated activities. Larger households have more labour for cattle rearing and therefore may be more inclined to take up commercial production.

Findings from the literature review

The low rate of market participation can be explained by broader aspects of smallholder cattle farmer livelihoods, including limited access to financial, social, and natural capital, as well as differences in livelihood strategies and motivations. Efforts must be made to advocate for women's active participation, enhance public support to smallholders, private sector development and new investments, improve access to technical advisory services, and sustainable use of local resources.

Laws and regulations. There are numerous, sometimes overlapping and conflicting laws, regulations, and procedures regarding sanitary and phytosanitary measures for exporting live animals and meat products. Such measures, while necessary, can complicate trade procedures and increase transaction costs. Furthermore, animal trade regulation and enforcement in each province is different. The Department of Livestock and Fisheries has recently been drafting a National Commercialized Livestock and Aquaculture Development Policy aimed at stimulating the growth of livestock production. This policy includes eight major subpolicies.

Commercialization indices. Mathematical commercialization indices can measure approaches to capture the potential trade of agricultural products including inputs, outputs, aggregate and individual production. Indices are considered an important estimate of the degree of commercialization of a product and measure the extent to which household production is oriented toward the market.

The Cattle Commercialization Index formulated for this study shows that 74% of farmers in Xiengkhouang and 60% in Vientiane Capital had a commercialization index below 25, meaning they marketed less than one-fourth of the total value of their herd. Farmers in this category most likely sell cattle only when they need money for daily expenses or to support their children to go to school. However, 18% of farmers in Xiengkhouang Province had a commercialization index of 25–50. Vientiane province performed a little better than Xiengkhouang Province in terms of cattle commercialization.

Conclusion and policy recommendations



A recent increase in the demand for beef has provided an opportunity for cattle rearing farmers to raise their incomes and improve their livelihoods. Most cattle farmers raise their cattle under the traditional free-grazing system due to a lack of technical knowledge and limited access to markets. Laos has high potential for promoting cattle commercialization. To promote the effectiveness of cattle commercialization and to ensure sustainable development, the following policy recommendations are offered:

Promote cattle rearing for commercialization:

The Ministry of Industry and Commerce, the Ministry of Agriculture and Forestry, and the Ministry of Finance could work to harmonize cattle trade regulations and set standards for tax and fee collections on cattle movement across provinces to promote exports. All fees and taxes should be paid through a single window to reduce transaction costs and facilitate exports.

Increasing the value of cattle sales:

The Ministry of Agriculture and Forestry could provide more training to potential farmers on

fattening techniques using available crops to improve overall meat quality thereby making Lao beef more attractive in high-value markets.

Improving access to credit to support farmers who have a high potential for raising cattle for commercialization: The provision of credit should be implemented based on the following considerations:

- Lending rate at 3–5% for free-grazing smallholder farmers without paying interest for 4 years, under the condition that farmers have to participate in technical training offered by the Provincial Agriculture and Forestry Office or District Agriculture and Forestry Office to adapt to fattening systems.
- Lending rate at 6–8% per year and paying interest after 1 to 2 years for market-oriented farmers and farmer groups who adopt cattle fattening systems. Farmers must participate in the technical training offered by DAFO/PAFO, and training on trade regulations offered by the Provincial Industry and Commerce Office and District Industry and Commerce Office.
- Strict monitoring and evaluating of effective loans must be made by both commercial banks and DAFO/PAFO to ensure sustainable cattle development.

Factors and Implications of Sustainable Commercialization of Indigenous Banana Varieties

January 2019

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Abstract

Because of the concerns related to Cavendish banana production on large plantations and the growing problem of fusarium fungus infections on plantations in Northern Laos, more attention has been given to traditional varieties of bananas, which are grown in a less intensive way and with shorter value chains. Among the numerous varieties grown in Laos, *kuay nam* (water banana) is widely cultivated in the central and southern parts of the country. This study aimed to 1) analyse value chains to identify stakeholders, activities, value added and bottlenecks; 2) study the determinants of commercialization; and 3) describe the relationship between commercialization and farmer income. It focuses on four Provinces: Vientiane, Salavan, Houaphan and Savannakhet. This paper describes and analyses the value chain for *kuay nam* in domestic and foreign markets. Identifying the determinants of commercialization will help inform policymakers on how to better support farmers to increase their incomes. Recommendations are offered regarding policy initiatives.

Introduction

The Lao PDR Agriculture Development Strategy 2025 lists bananas as a priority crop for export. In 2014, banana production covered a total area of 22,920 hectares with exports of 260,000 tons worth USD 45 million. Over 80% are exported to China and the remainder to Thailand. Chinese investors are attracted to invest in Laos by low land rental and labor costs and fertile soils. The banana harvesting season coincides with the Chinese New Year, a period when market demand is high. Commercial banana production generates incomes and creates jobs in Northern Lao PDR. However, banana plantations have significant negative impacts on environmental and human health due to the intensive use of chemicals. The people employed on banana plantations are mainly poor and live in vulnerable areas.



Because of the concerns related to Cavendish banana production on large plantations and the growing problem of fusarium fungus infections on plantations in Northern Laos, more attention has been given to traditional varieties of bananas, which are grown in a less intensive way and with shorter value chains. Traditional bananas play a major role in food security. Among the numerous varieties grown in Laos, *kuay nam* (water banana) is widely cultivated in the central and southern parts of the country.

Objectives and methodology

This study aimed to 1) analyze value chains to identify stakeholders, activities, value added, and bottlenecks; 2) study the determinants of commercialization; and 3) describe the relationship between commercialization and farmer income. It focuses on four Provinces: Vientiane, Salavan, Houaphan and Savannakhet. Identifying the determinants of commercialization will help inform policymakers on how to better support farmers to increase their incomes. Previous studies touched on general information on *kuay nam* production and value chains in specific locations. This paper describes and analyses the value chain for *kuay nam* in domestic and foreign markets.

Literature Review. The literature was reviewed for determinants of commercialization including organic vegetable value chains, commercial agriculture, productivity, determinants of commercialization in developing countries, traditional agricultural production in developing countries, and the impact of agricultural commercialization on livelihoods and food access in Lao PDR.

Value chain analysis. A draft value chain was developed based on previous studies, reports, and discussions with other researchers.

Focus group discussions. The draft value chain was shown to participants in a focus group. Participants gave suggestions to revise the value chain and identify bottlenecks.

Household survey. The survey was carried out in all four provinces. Households, traders, and banana processors were randomly selected for interviews.

Econometric analysis. We first analyzed the determinants of commercialization through a regression model. The commercialization ratio was defined as the ratio between the sale value of bananas and the total value of bananas produced. In our analysis, we regressed the commercialization ratio against a vector of household characteristics (gender, age, education, experience, and household size) and market access conditions. We then regressed household income over the estimated commercialization ratio, a vector of production variables (labor, capital, and land), a vector for household characteristics, and a government policy variable.

Results

Value chains in Houaphan province

Commercialization of *kuay nam* is at an initial stage in Houaphanh Province. The main obstacles to expansion are the lack of markets and high material and transportation costs. The main challenges are low demand in the local market, high transportation costs, and the lack of processed products. **Farmers** sell to traders, a few processors, and to locals at the market in Xam Nuea District. The average total cost of banana production was roughly 2.02 million LAK per household per year (USD 217.00), total income 3.06 million LAK (USD 326.00) for a profit of approximately 1.04 million LAK (USD 108.00). **Processors** make banana crisps and sell them in local markets. **Traders** buy *kuay nam* from farmers and sell to locals (75%) in Xam Nuea District, to processors (20%) and to customers in Vietnam (5%). Their average profit is approximately 9 million LAK per month (USD 980.00).

Value chain in Vientiane province

The total area of banana plantation significantly increased from 21 hectares in 2010 to 1,356 hectares in 2016. Most bananas are sold in Vientiane Capital. Banana exports to Thailand started in 2013. Approximately 10% of total production was exported. Exports sharply increased in 2016. Some bananas are processed into banana crisps and solar-dried bananas under the One District One Product scheme supported by JICA. For **farm households**, the average profit is approximately 10.7 million LAK per household (USD 185.00). **Local processors** sell to retailers in Vientiane Capital and occasionally export to retailers in Thailand. Their average profit is approximately 2.5 million LAK per month (USD 270.00). **Traders** buy from farmers and sell to customers at the market in Vientiane Capital. Their average profit is 7 million LAK per month (USD 762.00). A **Lao-China joint venture company** buys, packs, and exports to a distribution center in China. A **Thai importer** occasionally buys in Laos when there is a shortage in Thailand.

Value chain in Savannakhet province

Plantation area was 6,687 hectares in 2015. The Provincial Department of Agriculture and Forestry set a target of 126,000 tons by 2020. Most bananas are exported to Thailand. Some were used to produce whiskey or were processed into banana fiber for handicrafts under a pilot One District One Product project. Handicraft sales dropped due to low demand in the domestic market, while banana whiskey was abandoned because customers did not like the taste.

Bananas are mainly grown in Xepon District near the border with Vietnam. Plantation area increased from 132 hectares in 2016 to 5,120 hectares in 2017 due to demand from Vietnam and Thailand, although most bananas were exported to China. The volume of banana exports ranged from 200 tons per day during the peak season and 20 tons per day during the low season (2017 figures). **Farmers** sell 90% to distributors and 10% to processors. Their average profit is approximately 2.7 million LAK per household (USD 290.00). **Processors** make banana crisps and dried flattened bananas, which are unique in Savannakhet Province. Their average profit is approximately 3.4 million LAK per household per month (USD 340.00). A **Vietnamese distributor** buys from farmers in Xepon District and ships to Danang seaport in Vietnam and from there by ship to China.

Determinants of banana commercialization and impact on farmer incomes

Commercialization ratio. A commercialization ratio, a consumption ratio, and a loss ratio were computed for each farmer. Losses originated from quality control at farm level. The average commercialization, consumption and loss ratios were calculated for the four provinces. On average, the commercialization ratio was 82%. Almost 80% of the bananas were sold on the domestic market. The overall consumption rate was 12% (most bananas were used to feed livestock). The overall loss rate was approximately 6% (higher in Vientiane Province). Houaphan Province had the highest consumption rate (18%) and the main market was the domestic market. Salavan Province had the lowest consumption rate and the highest commercial rate. Many banana farmers shifted to other cash crops such as cassava, corn, and coffee because of Panama wilt disease. Vientiane Province had the highest percentage of loss. The consumption rate in Vientiane was relatively high because some farmers also processed bananas. Savannakhet Province had a relatively high commercial rate since almost all bananas were exported to Vietnam.

Banana commercialization model. Gender, age of head of household, education, and distance to farm did not play a significant role in banana commercialization. Distance to the market, experience and the number of family members significantly influenced commercialization. Most banana farms were located far from the city where the price of land was low. An increase of one year of experience increases the commercialization ratio.

Impact on banana income. The average income of households led by women was lower than that of households led by men. The coefficient of education was positive and significant, suggesting that higher education increased household income. This is consistent with previous studies. The coefficient of predicted commercialization was positive, which means that a 1% increase in banana commercialization increases household income by 8%. Income from bananas was sustainable at least in the short run due to the low cost of production, high demand, and environmentally friendly impact. The main variables in income were capital, labour, and land. The coefficient of capital and land was positive and significant, which is consistent with production theory. The coefficient of labour was not statistically significant, nor was the coefficient of the policy variable as most farmers did not receive any support from the government.



Conclusion and policy implications

The value-added analysis, mapping of value chains, and regression results suggested opportunities and challenges.

Opportunities and challenges

Farmers. The cost of production and labor use is low and the profit margin is high. Kuay nam bananas are a good source of nutrition. Cultivation is organic by nature and there are many opportunities to add value. However, farmers must deal with diseases and pests, which limits yields. Many lack basic financial knowledge and cannot effectively manage household income and expenditures. Local markets cannot absorb the supply.

Processors. There are not many processed banana products in the local market. The profit margin of processed products is higher than raw bananas. However, many farmers lack knowledge of marketing, product innovation and funding, and cannot access foreign markets due to small-scale production, low production quality and standards, and lack of packaging technology.

Traders and distributors. There is a huge demand from neighboring countries, especially China. However, there are many inspections during transportation from farm to markets and export procedures are bureaucratic and expensive.

Recommendations

Recommendation	Who and How	Timeframe
Exchange program for farmers and processors	MAF & MOIC coordinate with donors	1–2 years
Create processed products	MOIC, especially ODOP	Immediate
Policy to promote community products	MAF & MOIC with coordination of other government offices	1–2 years
Policies to facilitate movement of agriculture products	MAF, MPWT & MOPS	Immediate
Policy to promote village activities such as contests and awards	Provincial authorities, Lao Women's Union, Youth	1–2 years
Policy to promote household income and expenditure accounts	MOF & MAF	3–5 years

Opportunities for Sustainable Commercial White Charcoal Production

October 2018

Research team

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Abstract

The main objective was to identify the determinants of sustainable commercial white charcoal production in Lao PDR and offer policy recommendations to improve the sector. This study shows the main inputs used for white charcoal production, harvesting and production practices, yields and export volumes in Bolikhamxay and Vientiane Provinces and value chain actors and channels. Results show that white charcoal production from *mai tiew* trees has high economic potential and fits the Lao government policy of promoting domestic processing to add value within the country. White charcoal also plays a significant role in terms of creating local employment and opportunities to generate income as well as raising awareness about forest conservation and sustainable forest management. Sustainable production of white charcoal still faces many challenges, one of the most important being how to ensure a regular supply of the natural resource. Five policy recommendations are offered regarding i) individual and natural *mai tiew* forest management techniques and a growth model for natural forests and harvest rotations, ii) sustainable five-year forest management strategies for companies, iii) forest conservation, iv) stabilizing prices, and v) harvesting quota approvals and registration of individual and natural *mai tiew* forest areas and plantations.

Introduction

In the Lao PDR, *mai tiew*⁷ is the main raw material. The Ministry of Agriculture and Forestry approved yearly harvesting quotas of 67,362 m³ in 2017. The central and southern provinces of Laos have a high potential to harvest natural *mai tiew*⁸. Although *mai tiew* is a fast-growing tree that easily regenerates, natural growth has declined due to poor harvesting practices. There are few plantations due to the lack of technical guidelines and land zoning. The main challenge for the sector is to supply a brisk and remunerative market, while ensuring sustainable management.



Objectives and methodology

The specific research objectives were i) to understand the characteristics of white charcoal stakeholders relating to production systems, marketing, and the institutional environment; ii) to examine the relationship between raw material suppliers, charcoal producers, and market demand; iii) describe and analyze harvesting practices, and iv) formulate policy recommendations for sustainable production. Research was conducted in three districts in Bolikhamxay and three in Vientiane Province. The number of villagers interviewed was based on the number of enterprises in that province. Data were gathered using value chain analysis, interviews with key informants, and field observations.

White charcoal production and trade

White charcoal production increased from 9,814 tons per year in 2015 to 14,657 tons per year in 2017. There are charcoal factories in 12 provinces, but few plantations and while farmers are encouraged to grow *mai tiew* on their own land, unsustainable harvesting practices pose a danger that factory owners will overexploit the resource.

From 2015 to 2017, exporters shipped 35,625 tons of white charcoal to foreign markets. Transportation is mainly serviced by international logistics companies using trucks to transport white charcoal to ports in Haiphong, Vietnam and Bangkok, Thailand. The production of white charcoal in Japan and South Korea decreased over the past decades, but demand remains high. The top four exporting provinces are Vientiane, Savannakhet, Bolikhamxay, and Khammouane. Overall, exports from these four provinces are down from previous years. Most exports go to Japan and South Korea and smaller volumes to China, Malaysia and other countries. There are currently 51 companies exporting white charcoal. There has been a slight downward trend in prices since 2015.

Institutional environment for *mai tiew* extraction and white charcoal production

Overall regulatory framework. The forest management system in Laos is based on three forest categories: conservation forests, protection forests, and production forests. *Mai tiew* trees are not included in the list of prohibited trees and are usually grown on or near agricultural land owned by farmers. To harvest *mai tiew*, villagers need an approval letter with an annual harvesting quota and must pay taxes and fees. There are currently nine laws, ordinances, decrees and other regulations governing white charcoal production.

⁷ *Cratogeomys sumatranus* is a species of flowering plant in the Hypericaceae family indigenous to Southeast Asia. The tree may grow up to 51 meters tall and 80 centimeters in diameter.

⁸ Over an area of 4.5 million ha (ALUSPC, 2008).

The quota system. *Mai tiew* harvest quotas are granted to white charcoal production companies that make a formal request to government authorities yearly. There are eight steps in the process. The Provincial Agriculture and Forestry Offices (PAFO) have the mandate to issue business licenses and control exports. PAFO also monitors annual *mai tiew* harvesting quotas. In 2015–2017, the annual harvesting quotas were lower than the volume of *mai tiew* actually harvested. The Provincial Finance Office collects taxes but does not inform PAFO about the difference between approved quotas and actual exports. This weak collaboration between government agencies is detrimental to the economy and to the white charcoal industry.

Stakeholders in the white charcoal value chain

Overview. Commercial production of white charcoal started in Bolikhamxay and Vientiane in 2005 before expanding to other provinces. The ability of charcoal factories to manage the supply of raw material is the key element of their sustainability. Investors initially established their factories in or near villages where *mai tiew* was abundant, which led farmers to harvest from their own land. A few years later, the only trees remaining were young trees smaller than factory requirements. Some factories closed or reduced the number of kilns. Some white charcoal factories adapted by encouraging farmers to grow and conserve existing *mai tiew* under a contract farming system.

Income generation. In Bolikhamxay and Vientiane, farmers are mostly engaged in traditional agricultural activities. Harvesting *mai tiew* is a new activity within the past ten years and is becoming an important source of income. Income from *mai tiew* harvesting in Vientiane Province made up almost 20% of total household incomes and about 17% in Bolikhamxay.

White charcoal production and processing

Raw material requirements. Over the past decade, the overall demand for raw materials has increased each year along with the number of registered factories and the volume of government quotas granted. The volume of *mai tiew* used to make white charcoal doubled in Bolikhamxay Province while in Vientiane it remained unchanged due to a misunderstanding related to Decree No. 15/PM. The two processing methods (Japanese and Chinese) are similar. The Chinese procedure takes 45 days and tends to produce better quality charcoal. The yield depends on the volume of *mai tiew* used and the expertise of each factory. Over the past three years, white charcoal production increased by 140% in Bolikhamxay and decreased by 22% in Vientiane.



Value added

The white charcoal value chain. Stakeholders in the value chain are farmers, factory owners/operators, exporters/importers, and retailers. Other important actors are village heads, the District and Provincial Agriculture and Forestry Offices, the Provincial Industry and Commerce Office, the Provincial Finance Office, and the Department of Forestry. Government agencies encourage private sector collaboration by providing financial support and help set up contract farming arrangements. In districts where investors establish several factories, higher competition caused prices to increase. The data suggest that where factory owners are the single buyer, they impose lower prices on farmers. The price of white charcoal at the factory gate is about 6,560,000 LAK per ton (USD 720.00). The retail price in Japan can be as high as USD 2,600.00. Importers and retailers in foreign markets earn the highest returns.

Conclusion and recommendations

Mai tiew is a local resource that can be found throughout the country and is certified as a raw material for production of white charcoal. Since 2005, white charcoal production has been rapidly increasing. Most *mai tiew* species are suitable for making white charcoal. Price stability over the past five years should attract more factories. Foreign markets, Japan and South Korea in particular, have been importing increasing amounts of white charcoal from Laos and the government strongly supports white charcoal production.

The main challenges to the industry include the lack of plantations, the increase in the number of charcoal factories, and weak collaboration between local authorities on regulations and enforcement.

Based on the research findings, the following recommendations are offered:

1. Develop individual and natural *mai tiew* forest management techniques and a growth model for natural *mai tiew* forests and harvest rotations.
2. Design a sustainable five-year *mai tiew* forest management strategy for each company to ensure a sustainable raw material supply.
3. Establish *mai tiew* plantations and conserve individual forest areas to protect the resource and guarantee that *mai tiew* forests are not used to grow cash crops.
4. Set prices for *mai tiew* and fuelwood to make this activity economically attractive for farmers compared to other cash crops.
5. Establish a five-year harvesting quota approval and registration of individual and natural *mai tiew* forest areas and plantations.

Sustainable Fisheries for Food and Nutrition Security

October 2018

Research team

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Abstract

Malnutrition in Laos is high and is associated with long-term inadequate nutrition intake. Fish have long been a staple of diets in rural Laos and provide much of the protein and some of the micro-nutrients required for good health. Despite the importance of capture fisheries and aquaculture, priority has been given to other sectors such as agricultural crops, hydropower, and mining. Adequate financial support to conduct surveys and data collection on fisheries and aquaculture is scarce. The lack of information for policymakers is a challenge for the fisheries sector and there is a need to develop new formats to communicate research findings. The purpose of this research was to assess the contribution of fisheries and other aquatic animals (OAA) to food security and nutrition and to identify constraints to the development of profitable aquaculture production. This research gathered data on i) the status of the fishery and fish diversity in the Nam Tha and Nam Beng Rivers, ii) household food consumption and nutrition, and iii) fish cage culture. One village in Nam Tha and one in Nam Beng were selected for fish catch monitoring from August to October 2017. The results indicate that i) it will be vital to maintain habitat connectivity to sustain the wild fishery, ii) that fishes and OAAs are an important source of food for local people and while their protein intake is sufficient, their intake of micronutrients is not, and iii) cage culture is increasing but government aquaculture stations and private farms cannot provide enough high-quality seed and there is a need for improved collective action among stakeholders and higher standards for monitoring and regulation. Recommendations are offered on fisheries management (conservation zones, enforcement of laws on illegal fishing), food security and nutrition (increased support and funding to address micronutrient deficiencies, raise awareness), and cage culture. Recommendations include investing in brood stock and nursery facilities, developing standards and certifications, and improving access to credit.

Introduction

Food and nutrition security are high priorities for the Government of Laos. Malnutrition is high and related to chronic food insecurity. People in remote areas acquire their food from forests, rivers, natural ponds, and rice fields. Fish and other aquatic animals provide major sources of animal protein. Food consumption data at the household level are limited or out of date, especially in the remote areas of Northern Laos.

Capture fisheries can contribute directly to food security, balanced nutrition, poverty reduction, and rural development. Fishing requires low investment and provides cheap animal protein which contributes to livelihoods and well-being of the poorest people. The demand for fish in Laos is being driven by demographic and economic growth, leading to greater competition to catch large fish for trade. New fishing gear makes it possible for fishers to catch larger amounts of fish. These factors, along with illegal fishing, are causing a decline in fish catches for some species as well as a notable reduction in the number of large fish. Higher fishing efforts also result in a loss of brood stock, which are essential to the health of the fishery. Greater use of water resources, improvements in dry season navigation, dams, and climate change are also affecting fish populations.

In the last three decades, fish catch monitoring programmes in Cambodia, Laos, Thailand and Vietnam supported by the Mekong River Commission have helped researchers and natural resource managers better understand the biology and life cycles of fish species in the Mekong River. However, these programmes tend to overlook important tributaries and the northern part of Laos where fisheries play a vital role in food security and income generation for the rural poor. Collecting baseline data on fish catches and species diversity in important tributaries is crucial for sustainable use of fishery resources.

Aquaculture in Laos is less developed than in Thailand and Vietnam. Small-scale aquaculture is mostly at the household scale for family consumption and income generation. Over the past decade, aquaculture techniques have greatly improved and fish cage culture in the Mekong River and tributaries has increased considerably. Today, aquaculture systems in Laos are comprised of pond culture, cage culture, rice field-fish culture, and integrated livestock and fish culture. Commonly cultured species include Nile tilapia, Java barb, catfish, and several species of carp.

About 71% of cultured fish species are exotic species⁹. As aquaculture is shifting from small-scale extensive culture systems to large-scale intensive fish cage culture systems or cage culture farms, new techniques and more fish seed (eggs and fingerlings) are needed to support those changes. The main challenges to aquaculture development include fish seed and feed supply, culture techniques, and marketing.

Despite the importance of capture fisheries and aquaculture in terms of food security and rural livelihoods, priority has been given to producing sufficient rice and meat for household consumption and the bulk of the available funding has been granted to the agriculture and livestock sectors. As a result, the fisheries sector has received little attention and support and has been neglected on national agendas.



⁹ Species not indigenous to the area.

Status of The Fishery and Fish Diversity in The Nam Tha and Nam Beng River Basins

Objective and methodology

This study aimed to assess the status and diversity of fisheries in the Nam Tha and Nam Beng Rivers, using fish catch monitoring methods to record the species caught and their weight on a daily basis. One village in Nam Tha and one in Nam Beng were selected for catch monitoring from August to October 2017.

Results

The Nam Tha and Nam Beng fisheries are considered reasonably sustainable despite a slight decrease in large fish caught and the dominance of medium and small fishes. Most fishing takes place in remote areas.

Fish catch composition differed across villages. Alien species represented more than 45% of the total catch landed near Pak Beng hydropower reservoir, while indigenous fish dominated the Pak Beng River downstream of the dam. Indigenous species can be used as brood stock for aquaculture. In the Nam Beng River, alien species seem to have adapted to the environment, potentially threatening the breeding and nursing habitats of indigenous fish.



The fish populations in Nam Tha and Nam Beng are diverse. Many big fish are caught in both rivers, suggesting that wild fish are an important part of the rural economy and contribute to local livelihoods. The Nam Tha and Nam Beng Rivers were dominated by minnows, carps, and catfish species. Many carp species are localized and available all year round. Carps migrate short distances and are found in rivers at specific periods. Fish catches were high during the wet season when most migration takes place.

Fisher group interviews revealed that 116 species are found in the Nam Tha River and 136 species in the Nam Beng River. The number of species is likely an underestimation as many small species that inhabit the upper reaches may not be included in the list. If compared with other rivers such as the Nam Ou that has a bigger watershed and a longer length, the diversity of fish species in Nam Beng and Nam Tha Rivers is considered quite reasonable.

Data from daily fish catch monitoring indicate a lower number of species in Nam Tha and Nam Beng Rivers (41 and 59 fish species respectively) than in other tributaries i.e. Nam Ou (86 species), Nam Khanh (89 species). This may be because the monitoring in Nam Tha and Nam Beng Rivers lasted only three months, while monitoring in the Nam Ou and Nam Khanh Rivers was done over a full year.

As demand for fish in the two provinces has increased, fishers have more incentive to catch fish for trade. Improvements in fishing gear have made it easier to catch more fish and as a result, catches for individual fishers have declined. Current catches are characteristically dominated by small and medium-sized fish, with a notable reduction in the number of large fish. Because of this, fishers spend more time and effort on fishing. Fishers in both provinces mentioned illegal fishing activities (e.g., using small mesh sizes, dynamite, poisoning and electro-fishing) that destroy fingerlings and breeders. Although this is prohibited by law, enforcement is weak. Some villages have established fishery conservation zones where fishing is prohibited all year round to provide refuge habitats for brood stock fish, especially in the dry season.

Food consumption and nutrition

Objective and methodology

This study assessed the contribution of capture fisheries and aquaculture to food and nutrition security through consumption monitoring at the household level. It focused on food sources, the seasonal availability of different food types, and on villagers' protein intake of fish and other animal sources at the household level. Past studies of the contribution of fisheries and other aquatic animals to food security in Laos were mainly conducted in the Central region (Khammouan and Champasak Provinces) and there is limited information on household consumption of fish and other aquatic animals in the North. Household dietary monitoring methods were used to record daily food consumption (types and amounts) at different times of the year.

Results

Lao farmers generally eat three meals a day. Fish was the most frequently consumed food in all seasons. On average, fish and other aquatic animals (OAAs) accounted for 65% of all animal foods consumed. Fresh fish was the main food consumed by all households (around 50%). An increase in the consumption of pork was observed in both locations.

The average weight of fish consumed by households was 0.65 kg/household/day. The consumption of fish per person was low. Fish and OAAs accounted for 49% (Nam Tha) and 62% (Nam Beng) of all foods of animal origin by weight, and 44% in Nam Tha and 53% in Nam Beng of animal protein intake. The estimation of fish and OAA consumption in this study was 32 kg/person/year. These results are comparable with other studies.

People in Nam Tha and Nam Beng consumed a variety of foods of animal origin. There is no concern about daily energy consumption, but there is a concern over vitamin and micronutrient deficiencies due to the small quantities of food from animal sources. Farmers in Nam Tha and Nam Beng meet their basic daily energy needs with an average of more than 2,649 kcal/person/day.

Fish cage culture

Objectives and methodology

This research aimed to identify the determinants and constraints of Nile tilapia cage culture and fish seed production. A value chain approach was used to describe and analyze cage culture production in Vientiane Capital and Champasak Provinces.

Results

Overview. Vientiane Capital has high potential for aquaculture development, particularly in the districts along the Mekong River and its tributaries. Cage culture development has increased over the past decade, mostly for trade. Nearly all the inputs are imported (fish seeds, vitamins, antibiotics, cages, equipment). Fish cage culture in Vientiane Capital is practiced along the Nam Ngum River banks (Saythani District) and in the Mekong River (Hadsayfong District). Fish cage culture in Champasak Province was mainly practiced in the Mekong mainstream as there is a great diversity of fish species. Aquaculture was initially developed for household consumption, but in the past decade investment in aquaculture farms has increased. Fish seed supply in Champasak is limited to the production of fingerlings for pond culture.

Government intervention. The Ministry of Agriculture is responsible for the overall management of the sector, drafting policies, decrees and regulations, issuing licenses, and providing technical support. The Ministry of Natural Resources and Environment is responsible for water quality control, while the Ministry of Industry and Commerce looks after imports of feed and fish fry.

Markets and prices. Tilapia from cage culture in Vientiane Capital are also sold in Bolikhamxay and Xiengkhouang, while tilapia in Champasak are mostly sold locally. Although the farmgate price of fish was higher in Champasak (16,000–18,000 LAK/kg; USD 54.00–61.00) than in Vientiane (13,000–15,000 LAK/kg; USD 1.40–1.60), prices were similar at the retail market (20,000–22,000 LAK/kg; USD 2.17–2.38), and in restaurants (25,000–30,000 LAK/kg; USD 2.71–3.25). Grilled fish shops had higher profits than traders and fish sellers in the retail market. Price variations can be explained by over-production or by the availability of alternative food sources (e.g., wild capture fish in the wet season). Market competition among farmers also influenced prices. Traders buying fish from farmers and selling them to retailers or restaurants were able to set prices. In terms of marketing, fluctuating prices and limited processing further limited the value addition opportunities.

Technical data. Total production costs calculated for one cage (4 x 6 x 2 m) were over 30 million LAK (USD 3,500.00; 73% was feeding costs). The stocking period was six months, and the survival rate was 75–80%. The total harvest was 2,500–3,000 kg.

Access to credit. Commercialized cage culture requires considerable investment. Farmers experienced difficulties accessing finance as some banks set limits on the loans they grant. In addition, interest rates are high (10–12% per year). In Vientiane Capital, while the number of small- and medium-sized cage culture farms is expanding, the number of large farms involved in pond and cage culture has fallen since 2000 due to price risks and low profits.

Fry and feed. Fry (juvenile and fingerling fish) and feed were mainly imported from Thailand (lower price and higher quality). Feed costs represented over 70% of all costs related to Nile tilapia cage culture. Helping farmers develop a professional management system for feed would help them increase their profits. The quantity of feeding per unit of time is important in cage culture, but most farmers ignore this issue. There is little control over the quality of fry and feed.

Breeding facilities. Tilapia cage culture in Laos requires approximately 44–60 million fingerlings each year. Existing public and private fish breeding centers cannot produce enough to meet demand. Most breeding and nursing facilities are old and have limited funds to improve and maintain their facilities. As a result, they can only produce about 9 million fingerlings per year. These fingerlings cannot compete with imported fingerlings as the quality is low, they are not certified, and brood stock is too old.

Collective action. Setting up cage culture farmer groups or cage culture associations may i) help facilitate the exchange of market and technical information, ii) develop improved production planning based on market demand, iii) encourage sharing of problems and solutions, iv) help discussions between farmers and government representatives for support and with bank officials for loans, and v) help farmers sell their fish directly to retailers and restaurants.

Regulating and monitoring cage culture production. There is an urgent need for a cage culture farm certification program, including standards for certifying fingerlings, feed, fish meat, and environmental monitoring. Lack of quality control of mono sex tilapia production in local farms and large imports of fry and feed from Thailand make it difficult for the government to monitor cage culture production. There is no systemic monitoring system to check whether fish are contaminated with chemicals from the use of antibiotics or dioxin, or to monitor water pollution in intensive fish farming. Finally, the approval process for cage culture investments is not always clear, making it difficult to monitor and control when problems occur.

Conclusion

Fisheries management. Mekong fish depend on specialized habitats to complete their lifecycles. Many habitats are seasonally connected to the mainstream via wetlands and floodplains, which provide rich food sources for juveniles and young fishes. Many species migrate from the mainstream to floodplain habitats for spawning in the wet season and return to the main channel at the end of the flood period to take refuge in deep pools in the tributaries or the mainstream. As the reproductive process is highly dependent on this connectivity, it is vital that it be maintained. Infrastructure such as fish ladders and fish passage facilities may help in some locations for some species.

Food and nutrition security. Fishes and OAAs are an important source of food for local farmers: 49% of household animal protein intake comes from fishes and OAAs. Farmers meet standards in terms of protein intake (about 2,300 kcal person per day) but have an insufficient nutrition intake as they consume small amounts of fish and meat. As most of the important micronutrients come from animal food sources, the quantities of meat (average of 71 g/person) and fish (70 g/person) consumed by Nam Tha and Nam Beng households is considered low.

Tilapia cage culture. Fish cage culture in Vientiane and Champasak Province increased over the past five years as a result of government policy to promote commercial agricultural production. However, government aquaculture stations and private farms cannot provide good quality mono sex tilapia fingerlings for cage culture due to a lack of good quality brood stock, and because breeding and nursing facilities are too old.

Recommendations

Fisheries management

- Establish fisheries conservation zones to protect habitats (e.g., deep pools and critical spawning habitats) in tributaries and the Mekong River and ensure that fish can use these habitats for breeding and spawning.
- Enforce existing laws and regulations to eliminate the use of illegal fishing gear to ensure that fish populations are protected and harvested using sustainable methods.

Food and nutrition security

- Increase funding and resources to address micronutrient deficiencies.
- Raise awareness about the importance of micronutrients to individual health.
- Encourage people to eat more fish and OAAs through education campaigns in primary schools.

Tilapia cage culture

- Invest more in pure brood stock fish to improve breeding and nursing facilities for juveniles and fingerlings and improve breeding techniques for production of high-quality mono sex tilapia. This could be done through collaboration with China and Vietnam.
- Develop aquaculture standards and certification schemes, quality control and regulations on imported feed for the management and monitoring of Nile tilapia cage culture.
- Support farmer access to credit for investments to start operations, especially for commercial farming.

Farmers access to credit

23 December 2019

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Abstract

There is an increasing demand for investment in agriculture development. Financial support and access to finance could empower farmers to increase their wealth and ability to feed the population. A better understanding of available financial support at the local level could greatly contribute to developing and implementing agriculture finance strategies and instruments to enhance the access of smallholder farmers to suitable financial services and to risk mitigating strategies. The objectives of this study were to assess the main financial needs of smallholder farmers, to study the procedures for access to credit, to identify the factors determining farmers access to credit and analyze credit risk, and to identify support mechanisms for farmers to recover from the impacts of disasters. Primary and secondary data were gathered using field observations and desk study in May and June 2019. The assessment of rural household repayment performance was evaluated through the 5Cs approach. A total of 368 households were included in the analysis. Credit risk analysis suggests that most farmers have a relatively high level of risk, which limits their access to credit. Agricultural land is still one of the most important forms of collateral, and the occurrence of disasters increases the demand for credit among farmers. Policy recommendations are offered regarding financial literacy, promoting farmer production groups, a feasibility study on crop insurance, and establishing disaster protection funds.

Introduction and rationale

The financial sector does not adequately address the needs of poor farmers and small processing units in rural areas, as most of the 43 commercial banks, 103 branches, 533 service units, and 1,193 ATMs are in urban areas and the main policy supporting access to credit (SMEs Development Plan 2016–2020) focuses on SMEs. In rural areas, small-scale credit schemes and financial support are mainly provided to farmers through development projects and local government agencies. Rural finance institutions include Village Savings and Credit Schemes that mobilize village savings and provide funds for small agricultural and trade businesses and Village Banks.



Credit access procedures are complex, and loans are poorly configured to farmers' needs and constraints. A policy dialogue (NAFRI-FAO, 2018) highlighted the need to simplify lending procedures, help farmers prepare the required documents, and to take into account the seasonal and other constraints of farming activities by applying different interest rates to better take into account farming risks, and provide financial help in the case of disasters and shocks. Finally, the procedures and conditions for establishing farmer groups are not easy for poor farmers to follow.

There is an increasing demand for investment in agriculture development. Financial support and access to finance could empower farmers to increase their wealth and ability to feed the population. A better understanding of available financial support at the local level could greatly contribute to developing and implementing agriculture finance strategies and instruments to enhance the access of smallholder farmers to suitable financial services and to risk mitigating strategies.

Agriculture is vulnerable to setbacks likely to cause losses. It is crucial to think about how to help small farmers and their families recover from and adjust to various types of risk. One avenue worth exploring is the elaboration of a policy framework and the design of specific credit facilities to help poor farmers affected by unexpected events.

Objectives and methodology

The objectives of this research were i) to assess the main financial needs of smallholder farmers, ii) to study the procedures for access to credit, iii) to identify the factors determining farmers' access to credit and analyse credit risk, and iv) recommend support mechanisms for farmers to recover from impacts of natural disasters. A household survey was conducted in May and June 2019 in Vientiane Capital and in Vientiane, Khammouane, Savannakhet, and Attapue Provinces. Primary and secondary data were gathered using field observations and desk studies. The assessment of rural household repayment performance was evaluated through the information provided by farmers. To investigate repayment, the 5C credit system used by lenders was applied.

Results

Access to credit. Approximately 45% of the respondents had access to credit. The main reasons for not accessing credit were high interest rates, avoiding indebtedness, lack of collateral, and the lack of experience in borrowing.

Sources, conditions, and purpose of credit. Two-thirds of households borrowed from a Village Fund (on average about 3.5 million LAK or USD 380.00). The Agriculture Promotion Bank accounted for nearly 21% of loans (on average about 18.8 million LAK or USD 2,000.00). Over 90% of households

borrowed money for agricultural activities.

Credit risks. Banks use a 5C credit analysis system (character, capacity, capital, collateral, and condition).

Character. Level of education can indicate how farmers manage their farm activities, income, and expenditures. Farmers keeping household accounts tend to better understand their income and expenditures and costs and revenue from farm activities and household accounting links to household savings. All the farmers in this sample had low levels of formal education and household accounting skills. On average, 40% of the respondents had savings.

Capacity. Capacity depends on the number and amount of debt obligations the borrower currently has compared to the amount of income or revenue expected each month. In this sample, average revenue from agriculture was 24.4 million LAK (USD 2,670.00). Pig farmers had the highest average income and expenditures and the highest average net profit. Maize farmers had the lowest revenue, cost, and net profit.

Capital. Lenders analyse a borrower's capital to determine creditworthiness. Most farmers in this sample had land and a vehicle of some kind but few had land titles.

Collateral: Not all capital can be used as collateral. Recently, financial institutions started providing group loans without collateral (i.e., the group guarantees to repay the loan of a member).

Condition. Thirty-seven farmers in this sample were able to borrow money from a financial institution. The Agriculture Promotion Bank loan conditions show that maize farmers had the highest average debt and paid the highest interest rate (15% per year). The remaining debt of pig farmers was approximately 50 million LAK (USD 5,500.00). Data from the Lao Development Bank show that only rice farmers were able to obtain a loan (average amount 14.4 million LAK or USD 1,500.00) at an average interest rate of 5% per year. There was no remaining debt at the Lao Development Bank.

Determinants of access to credit

Farmers access to credit depends on factors including the characteristics of household heads and households. The data in this sample suggest there is no statistical difference between or among the characteristics of household heads with and without access to financial credit, except age and the share of household heads completing primary school. There is, however, a significant difference between households with and without access to credit. Households with better access to credit have a larger expenditure per capita and a smaller amount of savings than those without access to credit. Also, the larger the production group, the greater the number of households with access to credit. In line with other studies, education, availability of household labor, and ethnicity of household head are significant determinants of access to credit. There was no difference in access to credit markets between male-headed and female-headed households. Thus, gender discrimination in the credit market does not appear to be prevalent in Laos.

Organizations providing credit

The formal banking sector. The major banks extending credit to farm households are the Agricultural Promotion Bank (APB), Nayobai Bank, and the Lao Development Bank. The APB has no specific policy to support farmers following disasters or disease outbreaks. The Bank of Lao PDR can request cooperation from the APB when necessary.

Microfinance institutes are another source of credit, although they tend to concentrate on the trade sector. Few farmers are able to borrow from microfinance institutions because of high interest rates. Microfinance institutions do have a policy to support farmers in the case of disasters by extending terms of payment and reducing interest rates.

Village banks or saving groups are supported by the government and some are coordinated by both the government and international agencies such as GIZ and the International Labor Organization. Most offer emergency and short-term loans. The interest rate is similar to that of Village Funds.

Access to credit at times of disaster

The frequency of natural disasters occurring in the last decade has increased (floods, droughts, insects and other pests, and livestock diseases). Fifteen percent of this sample reported a disaster in their cultivation area every year. In most cases, farmers are likely to receive relief from the government. The role of the private sector, international organizations, and other farmers is relatively small. However, since donations from the private sector and other organizations are mostly made through government agencies, farmers might not know the source. At the national level, the National Disaster Management Committee is responsible for the prevention and control of disasters. The Labor and Social Welfare Division acts as the Secretariat. Their role is detailed in Decree Number 75/PM.

Labor and Social Welfare Division. Reasons offered for late and inadequate response to disasters are the lack of trained staff and the small budget allocated by the government. The involvement of the Labor and Social Welfare Division in the credit market remains limited and is currently beyond their mandate. Better information about agricultural losses would help farmers access credit when disasters happen. The sharing of information among government agencies and offices could help improve recovery.

The Bank of Lao PDR (BOL) implements credit policies for the victims of disasters and disease outbreaks. The policy includes: 1) deferring the payment of both principal and interest; 2) providing new loans to persons affected and certified by local authorities; and 3) any banks that postpone payment to affected debtors receive an incentive from the BOL. Remedial measures are implemented as follows: 1) revise the loan agreement, 2) provide a grace period for one year or according to the debtor's ability to pay, and 3) provide new loans.

Agriculture and Forestry Divisions. The role of the Agriculture and Forestry Division at the provincial level regarding farming household access to credit is still limited. Being a member of a production group enables access to credit more easily and facilitates sharing experience and practical knowledge and improves bargaining power.



Policy recommendations

Recommendation		Who	Timeframe
Extend financial literacy projects to other provinces. Distribute GIZ financial literacy teaching materials to schools, colleges, and universities.		GIZ and Bank of Laos are the leading institutes.	1–5 years
Encourage farmers to establish production groups by drafting a promotion policy.		MAF	1–2 years
Conduct a feasibility study on crop insurance with details on organization structure, stakeholders, insurance premiums, and payment systems.		NAFRI and NUoL should work on a feasibility study. MAF, Bank of Lao PDR, Ministry of Labor and Social Welfare and private companies should integrate and initiate crop insurance with a priority on agriculture products.	1–5 years
Utilize disaster protection funds according to the law on disaster management	Apply some part of disaster protection funds for pilot project and implementation of insurance	MOF and MLSW	1–2 year for pilot project 3–4 year for implementation
Basic procedures to ask for assistance and basic rules for disaster prevention should be distributed through posters, leaflets or electronic files.		MLSW	Immediate

Poverty Dynamics and Sustained Escapes out of Poverty

Evidence from Bokeo, Champasak and Salavan provinces

November 2019

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Abstract

The Lao economy has grown, on average, at 7.5%, but poverty reduction lags behind GDP and the gap has increased between urban and rural areas. Little is known about what happens to individuals and households once they have escaped poverty and poverty dynamics have important implications for the development agenda in terms of strategies for sustainable eradication of poverty. The specific objectives of this study were to i) explore poverty dynamics, ii) identify the determinants of transitory and sustained escapes from poverty, and iii) offer policy recommendations using data from Lao Expenditure and Consumption Surveys, a multinomial logit model, and field observations. The multinomial logit model indicated that the most significant factors in reducing poverty were improving infrastructure, raising awareness of sanitary issues, increasing household labour, household head education, and number of livestock. The focus group discussions identified lack of labour, agricultural land, and technical knowledge of agricultural production as factors in causing poverty. Specific policy interventions were suggested for chronically poor households, impoverished households, and for the chronic and transitory escape groups.

Introduction

The Lao economy has grown, on average, at 7.5%, but poverty reduction lags behind GDP and the gap has increased between urban and rural areas. About 80% of the population live on less than USD 2.5 per day (2013 figures). Agriculture and health shocks are the main household vulnerabilities. Poverty reduction is a government priority in the 8th National Socio-Economic Development Plan. The Lao Expenditure and Consumption Surveys (LECS) show that the estimated national poverty headcount rate decreased by 4.4 percent from 27.7 to 23.2 percent between 2007–2008 and 2012–2013.



Little is known about what happens to individuals and households once they have escaped poverty and poverty dynamics have important implications for the development agenda in terms of strategies for sustainable eradication of poverty. Past studies have identified several critical determinants of poverty including access to roads and credit, education and land holdings. Changes in lifecycle and household demographics along with natural disasters and illness are additional significant factors.

Objectives and methodology

The specific objectives were to i) explore poverty dynamics, ii) identify the determinants of transitory and sustained escapes from poverty, and iii) offer policy recommendations. Based on the data in LECS 3, 4, and 5, researchers selected Somesouk Village in Phathouphone District, Champasak Province; Houy Thong Village, Paktha District, Bokeo Province; and Asoke Nuea Village, Samouy District, Salavan Province as study sites. Household data from LECS 3, 4, and 5 indicated that 2,023 households out of more than 8,000 in each survey could be identified as belonging to one of the eight poverty trajectories:

- NNN: never poor
- NNP–NPP: impoverished
- NPN–PNP–PPN: transitory escapes
- PNN: sustainable escape
- PPP: chronically poor

Never poor (NNN) households were not included in the study.

A multinomial logit model was used to investigate the determinants of chronic poverty, impoverishment, and transitory escapes. In the model equations, the basic outcome is whether a household experienced a sustained escape out of poverty. A variable coefficient greater than one indicates a household has a higher risk ratio of the outcome (transitory poverty escape or impoverishment) relative to the base reference group of sustained escapers.

Statistical analysis was complemented with fieldwork. In-depth discussions were conducted with key informants from government, development partners, and knowledgeable community leaders at provincial and district levels. Focus group discussions were organized with villagers. Semi-structured interviews were carried out at the main government offices in charge of agriculture, rural development, and poverty reduction. Other tools used were village histories, village institutional mapping, community wealth ranking, and life history interviews.

Poverty defined

In Laos, poverty is defined as “the lack of basic needs for daily livelihood activities such as shortage of food that cannot provide 2,100 calories per person per day; deprivation of clothes and durable shelter; inability to afford health care in case of sickness; inability to afford the elementary education, inability access public services” (Decree 285/PM). The first LECS conducted in 1992–1993 established a food poverty line (the level of income required to attain a food intake of 2,100 calories per person per day) and a national poverty line defined as a consumption bundle.

Overall progress in poverty reduction

In October 2003, the government adopted the National Growth and Poverty Eradication Strategy as a tool to enhance growth, development, and poverty reduction with health and education among the top priority sectors. From 2003 to 2016, the Poverty Reduction Fund (PRF) had a total budget of USD 125.4 million for 4,700 projects. About half the direct beneficiaries were women. Ethnic minority groups accounted for about 70% of direct project beneficiaries. To enhance local capacity building, the PRF established village institutions and village volunteers and leaders trained by the project who are increasingly seen as development partners. Because of the positive results achieved, the government decided to continue the initiative by launching an expanded third phase beginning in October 2016 for four years.

Overall, poverty incidence dropped steadily from 46.0% to 23.2%. Both urban and rural areas experienced a steady decline in poverty, although poverty declined more slowly in rural areas. Poverty declined markedly in all regions (North, Central, South and Vientiane Capital) but most rapidly in Vientiane Capital. Poverty gaps and severity were lowest in urban areas and increased with distance from urban areas. Poverty severity is higher in the north and lower in the South. Consumption inequality grew in rural and urban areas in all regions except the South. National inequality, measured by the Gini Index, rose from 30.5 in 1992–1993 to 36.2 by 2001–2013. National inequalities have been widening over this period.

Exploring poverty dynamics in Southern Laos

According to LECS 3, 4, and 5, the number of poor households slightly decreased from 597 households in 2003 to 554 households in 2008 and to 415 households in 2013. Many regions where significant gains were made in monetary poverty still lagged in human development outcomes such as secondary school enrolment, stunting, and infant mortality (determinants of human well-being). At the national level, 14 percent of households escaped from poverty between 2002–2003 and 2007–2008, against 16 percent between 2007–2008 and 2012–2013.

Infrastructure development projects (roads, electricity, water and sanitation programs) may explain these figures. Many households temporarily escaped from poverty because they received support from the Poverty Reduction Fund or other projects. Bokeo has a border with Thailand and many households are involved in border trade activities.

Characterizing households

Chronically poor (PPP). These households remained under the poverty line during the entire period (2002–2013). This group comprised large households with low yet slightly improved access to physical capital and access to roads and irrigation. These improvements are mainly the work of the Poverty Reduction Fund and international organizations.

Impoverished households (NNP and NPP). Impoverished households are households that fell back into poverty. Results show how household head education improved, and household size increased but the number of household laborers decreased. Impoverished households showed a small increase in physical capital and access to roads, electricity, irrigation, and sanitation. Small

increases in financial capital put impoverished households at a high risk of falling back into poverty. Household access to markets remained constant while access to credit declined.

Transitory escape (NPN, PNP, PPN). Transitory escapes are households that escaped from poverty but fell back into poverty during the period covered by the three LEC surveys. Results show that household head education has increased, and the dependency ratio declined. A reduction in household labour increased the risk of falling back into poverty. These households had slow physical capital development, but a slight increase in access to roads, irrigation, and financial capital development. Access to finance was constant and access to markets and sanitation slightly increased.

Sustained escapes (PNN). These households were poor in 2003, managed to escape from poverty in 2008, and remain non-poor in 2013. Results show that development of human capital helped these households escape from poverty with improvements in all areas. Improved sanitation was a crucial factor.

Comparison of household characteristics

The results show significant differences between i) sustainable escape vs transitory escape for access to finance, and ii) sustainable escape vs chronic and transitory escape vs chronic for access to markets. Access to a toilet between chronic poor and other poverty groups is highly significant. Identifying root causes of poverty

Education of household head is a significant determinant of poverty reduction for the chronically poor (PPP). Household heads with better education have a lower risk of poverty as education is likely to enhance productivity and enable off-farm opportunities for income. For the poor, **off-farm income** was over 50% of total income. This finding aligned with the life history interviews. Health problems among family members could also be a cause of falling back into poverty. Households with an additional one point of **dependency rate** were less likely to be impoverished or make a transitory escape from poverty.

Households with **access to roads and electricity** were less likely to be chronically poor and impoverished as access provides opportunities to participate in a wider range of income generating activities. Households with **livestock** were less likely to be chronically poor and make a transitory escape from poverty. Raising cattle is a means of saving for households in rural areas. Households with **access to toilets** are less likely to be chronically poor relative to escaping poverty. Households with **access to irrigation** are more likely to be chronically poor and make a transitory escape compared to escaping poverty.



Another poor household characteristic is **insufficient labor for agriculture production**. Over the past decade, promoting **access to finance** via Village Funds has become a poverty reduction tool countrywide. Many Village Funds fail because villagers lack numeracy and management skills. **Lao Loum ethnic households** were 81% more likely to be impoverished.

Quantitative and qualitative analyses

The multinomial logit model indicated that improving infrastructure, raising awareness of sanitary issues, increasing household labor, household head education, and number of livestock are significant factors in reducing poverty. The focus group discussions identified lack of labor, agricultural land, and technical knowledge of agricultural production as factors in causing poverty.

Disasters (floods droughts, storms) and pests and diseases damage farmers' crops and reduce household income.

Policy implications

Households are not always able to benefit from development programmes due to personal limitations. Therefore, development and poverty eradication strategies should consider differences between individuals. Not all households have the same ability to seize opportunities to improve their livelihoods and sustainably escape from poverty.

Interventions common to all groups:

- Improve labor skills and capacities in rural areas. Focus on vocational training.
- Develop basic infrastructure (roads, electricity) in poor villages to improve their access to schools, basic healthcare services, and markets.
- Promote cattle rearing for chronically poor and transitory poor.
- Create early warning systems involving households to prevent and mitigate disasters.

Specific interventions:

- For **chronically poor** households:
 - o Improve sanitation and hygiene awareness and access to toilets to reduce the risks of infectious diseases and health insecurity.
 - o Improve household head education to ensure access to information, jobs and improved livelihoods.
- For **impoverished** households:
 - o Improve access to finance.
 - o Provide technical training (agriculture, animal husbandry) to ensure aid effectiveness and to avoid debt burden.
- For the **chronic and transitory escape** groups:
 - o Improve access to irrigation.
 - o Implement allocation policies to ensure people can use irrigation to support farm production.

Identification of Good Ecotourism Practices for Sustainable Development in National Protected Areas of Northern Lao PDR

July 2019

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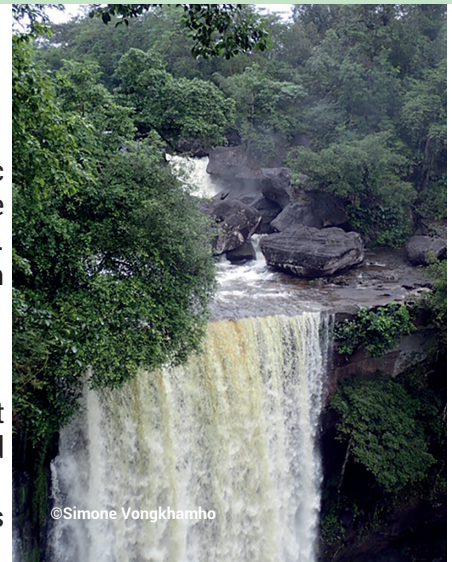
Abstract

This study identified good ecotourism practices for sustainable development in National Protected Areas (NPA) of Northern Lao PDR. NPAs were established for biodiversity conservation and are home to many minority ethnic groups. Ecotourism can be a good opportunity for local people to benefit from the natural features of the NPA in which they live. The selected NPAs were Nam Ha, Phou Heephi, Nam Et-Phou Louey, and Phou Khao Khouay. The study highlights two ecotourism practices: entrepreneur-based ecotourism (EBE) and the community-based ecotourism (CBE). The EBE model is driven by the private sector, with an independent firm developing and managing the site through a concession system. The CBE model relies on a partnership between local people, public agencies, NGOs, and tour operator companies. The share of ecotourism activities in the income of local households was 96% in the EBE model and 36% in the CBE model. The EBE model provided jobs for residents, while the CBE model resulted in secondary income. Only 10% of the villages in NPAs are involved in ecotourism activities and the remainder depend on agriculture, nontimber forest products collection, and (often illegal) hunting and logging. Recommendations are offered on zoning, participatory conservation and management, and investments in infrastructure.

Introduction

Tourism has played a significant role in national economic development since 1990 and is one of the eight priority programs of the National Socio-Economic Development Plan of the Lao government. In 2017, over 3.8 million tourists visited the country and tourism generated revenue of over 648 million USD.

Created in 1993, the 24 National Protected Areas (NPA) are intended for conservation and the protection of flora and fauna, forest ecosystems, history, and culture as well as tourism, education, and scientific research. The Tourism Development Department has been exploring tourism opportunities in collaboration with partners including international organizations.



Ecotourism projects have been implemented for many years and have great potential to support biodiversity conservation and rural and national economic development as an increasing number of tourists around the world come to visit Laos. Several ecotourism projects developed in NPAs have succeeded, others have failed, hence the need to identify good practices.

Objectives and methodology

The specific objectives were to i) characterize the potential of NPAs for ecotourism development, ii) analyse ecotourism practices developed by entrepreneurs and government agencies in terms of biodiversity conservation and income generation, and analyse existing policies supporting ecotourism and identify policy gaps. The study was conducted in the following NPAs and provinces:

National Protected Area	Province	Area (ha)
Nam Ha National	Luangnamtha	222,400
Phou Heephi	Oudomxay	87,350
Nam Et-Phou Louey	Luangprabang, Houaphan, Xiengkhouang	320,000
Phou Khao Khouay	Vientiane and Bolikhamxay	200,000

Data were collected through literature reviews, key informant interviews, and field observations. The data focused on four main areas: 1) characteristics of the target NPAs, 2) ecotourism practices, 3) involvement of local villagers, and 4) policies related to tourism and ecotourism. Stakeholders included were tourism businesses and ecotourism projects, NPA authorities, domestic and foreign tourists, and villagers and village heads. The research team interviewed 188 people.

Main features and ecotourism activities in the NPAs

Nam Ha NPA: Nam Ha in Luangnamtha Province was the first ASEAN Heritage Park in Laos and covers an area comprising 30% of the province. Nam Ha is home to nearly 300 species of plants, 22 endangered species of wildlife, 300 species of birds, 38 species of large mammals as well as minority ethnic groups that rely heavily on the forest for their daily subsistence. **Ecotourism:** Green Discovery Tour Guide Co., Ltd. has been operating in Nam Ha since 2002. Nam Ha offers ideal conditions for outdoor activities (e.g., kayaking, trekking, rock climbing). Green Discovery has a network of branch offices and offers benefits such as well-trained English-speaking guides and tax exemptions. Locals earn money by performing traditional dances, working as guides, and offering homestay accommodation, and food and beverage services. The number of tourists has been declining since 2016 due to competition from other tour operators and an increase in prices.

Phou Heephi NPA: Phou Heephi was established in 2012 and covers 87,350 hectares in Oudomxay Province. This NPA hosts pristine old-growth jungle, limestone outcrops and mountains surrounding the eastern side of Oudomxay town. **Ecotourism:** The private sector has been investing in ecotourism business development for several decades. Nam Kat Yor La Pa resort amenities include restaurants, shops selling handicrafts, Khmu traditional clothes, and food and beverages. The resort has six tour guides.

Nam Et-Phou Louey National Park (NEPL): NEPL is the largest protected area and has the greatest wildlife biodiversity. It is home to large areas of intact primary forests and a wide range of endangered species of wildlife. Several ethnic groups live in and nearby and earn income from ecotourism. NEPL is managed by the NPA Management Office of the Department of Forestry. **Ecotourism:** the NGO Wildlife Conservation Society has been supporting park management since 2003 and helping develop ecotourism practices since 2009. Locals earn income from ecotourism activities linked to conservation which provides an incentive for local people to protect endangered species. The only access for visitors is by taking a tour organized by the area ecotourism unit.

Phou Khao Khouay (PKK): The military was assigned responsibility for the management and protection of PKK. There are two tourist attractions (waterfalls and a pine forest). There may be some interest from tourism investors. **Ecotourism:** PKK is managed by the provincial Army unit. There are two concession companies operating in the park boundaries. Traders pay rent and visitors pay an entry fee. Guides pay a registration fee. The main attractions are waterfalls and nature hiking trails.

Two models

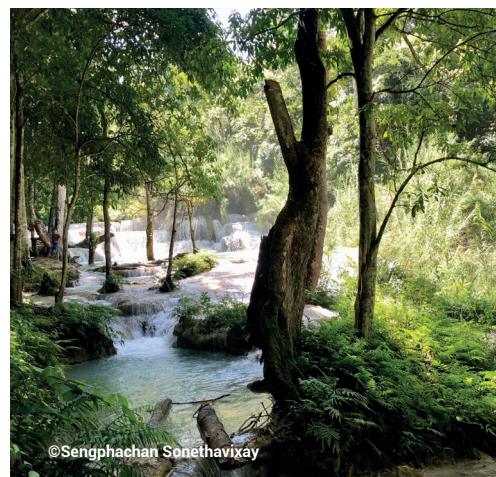
Entrepreneur-based ecotourism (EBE): The private sector invests to develop tourism in the NPA through a land concession arrangement. For example, in the Phou Heephi NPA in Oudomxay Province, the Namkat Yorlapa Resort partners with three private companies. Locals are employed as tour guides, workers, security guards, and general staff.

Community-based ecotourism (CBE): In this model, the main implementers are local communities, the National Tourism Authority, the NPA office, an ecotourism project, and tour guide service companies. For example, in Nam Et-Phou Louey National Park in Houamouang and Hiem Districts, ecotourism activities, programmes, and promotions have been designed and are controlled by the NGO Wildlife Conservation Society ecotourism project in collaboration with a tour guide service company. In Nam Ha and Phou Khao Khouay NPA, ecotourism activities and programmes have been influenced by tour operator companies such as Green Discovery.

The CBEP model is also implemented in some parts of Phou Khao Khouay, Nam Et-Phou Louey, and Nam Ha NPAs. Most tourists buy tour packages from tour companies. Locals offer homestays, tour guide services, food and beverages, and cultural activities.

Ecotourism activities, programs, and fees

The EBE model offers more activities and programs than the CBE model, however, CBE is more popular with non-Asian travelers. Currently, the EBE model is a form of monopoly. The entrepreneur has money to invest in developing the site and a program. For example, in Nam Et-Phou Louey National Park, the number of foreign visitors increased due to good management and effective promotion. In contrast, the CBE in Nam Ha and Phou Khao Khouay lack project support, and visitors have declined because of forest and wildlife degradation from intensive agriculture, illegal logging and hunting, and water shortages. EBE models have created 50 more ecotourism programmes than CBEs, but EBEs are more expensive for visitors.



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Community involvement

There are approximately 85 villages in the four NPAs. Ten are involved in ecotourism practices. Most villages inside NPAs are not involved in ecotourism and they depend on upland agriculture and nontimber forest products for household food security and income generation. EBE contributed higher incomes to local people than CBE because ecotourism is their main occupation, while people involved in CBE earn 39% of their income from ecotourism and the rest from agriculture cultivation, livestock raising, and collecting nontimber forest products.

Challenges

- Many villages in NPAs have not been involved in ecotourism activities and have expanded agricultural land, are engaged in illegal logging and hunting, and over-harvesting nontimber forest products.
- Conflict between some NPA ecotourism management units and households that do not benefit from ecotourism activities.
- Policies promoting intensification of agriculture production for export drives expansion of agriculture in NPAs.
- High external market demand for wildlife products drives illegal hunting and trading.
- An increase in the number of tour guide services may lead to reduced local involvement and benefits.
- CBE models need support from state authorities and private tour operator companies play a crucial role in tourism advertisement, marketing, and community capacity building.
- Lack of funding for developing NPAs for ecotourism.
- Degradation of forest and wildlife resources results in fewer tourists.
- Intensification of agriculture in non-ecotourism villages upstream have negative impacts on ecotourism sites downstream.
- Lack of knowledge about the tourism industry among young people results in poor tourism operations when ecotourism projects end.
- Tourism activities are defined by the tour company; locals earn income from providing products and services.
- Poor access roads to tourism sites limits the number of visitors.
- A lack of a reliable supply of local agriculture products leads EBE operators to source from other areas.
- CBE activities and programs mostly depend on natural attributes and there is a lack of social and cultural activities.

Lessons learned

Entrepreneur-based ecotourism:

- Sufficient funding for developing and managing tourism areas, and a wide range of products, amenities, and services plus natural attractions appeal to both domestic and international visitors.
- Good marketing and promotion offer information that attracts visitors.
- Local people are employed as primary or permanent staff (guides, workers, general staff).
- Using local products from organic agriculture production helps generate household income.
- Displaying the cultural heritage of local people helps attract visitors and generate income.
- Sustainable management action plans help stabilize forest and wildlife diversity.

Community-based ecotourism:

- CBE has three main players: communities, state authorities, and tour operator companies. The community is directly involved as local hosts, guides, and providers of products and services. State authorities play a role in marketing and promotion, and as a facilitator and coordinator. Tour companies attract visitors through marketing and promotion in line with trends.
- Support is needed from government and international organizations due to limitations of local funds and knowledge for development and management.
- There is participatory sustainable forest biodiversity conservation and management but also conflict among communities where households depend on agriculture production and (illegal) hunting and logging.
- Environmental degradation in CBE sites results in fewer visitors and less income.
- The CBE model offers more potential for locals to generate income.

Good ecotourism practices:

- Stabilize forest and wildlife diversity.
- Good infrastructure such as access roads and transportation.
- Creation of multi-ecotourism activities and programs.
- Good marketing practices.
- Provide high-quality services for visitors.
- Clean organic food using local products.
- Building ecotourism skills, particularly among young people, leads to an increase in community involvement.
- Expand links with national and international ecotourism agencies.

Policy recommendations

- Zoning based on the characteristics conducive to ecotourism development in NPAs and botanical gardens.
- Develop plans for participatory NPA conservation and management to ensure the stabilization of forest and wildlife diversity.
- Support NPA ecotourism cooperation through a combination of community members and entrepreneurs.
- Invest in infrastructure and capacity building for local people with a focus on young people.
- Create multifunction ecotourism activity-based on landscape management with interaction design including agriculture, forest resources, tourism and cultural heritage.

NAFRI research briefs

Unlocking the Full Potential of Lao PDR's Tea Sector was published in September 2018. Leveraging Geo-Economic Proximity and Agricultural Commercialization was published in November 2020.

Both briefs were resented to government officials, development partners and experts at various meetings and events in agriculture and rural development sectors and subsectors. The aim of these briefs is to provide a synthesis of policy research results and offer evidence-based and scientifically sound policy options and policy recommendations for discussion among decision-makers.

Agricultural Insurance a Case Study of Rice and Pigs

31 October 2020

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Abstract

Agricultural insurance has been discussed in the Lao PDR but has yet to be acted on by the government. This study offers some 'first options' for agricultural insurance and focuses on rice and pig farmers as examples. The specific objectives were to evaluate the level of farmers' willingness to pay for agricultural insurance, assess the determinants of farmers' decisions to take out agricultural insurance, and compare the current government budget for coping with natural disasters to a scenario where there is agricultural insurance. Interviews were conducted with government officers in five ministries, two financial institutions, and one private insurance company. The Contingent Valuation Method (CVM) was used to estimate the economic value of agricultural insurance by measuring the respondents' willingness to pay and scenarios were generated where the insurance scheme compensates for the loss of production cost. Rice farmers are more vulnerable to disaster shocks than are pig farmers but both groups expressed interest in buying insurance if it can be made affordable and if they have access to financial institutions.

Interviews with the Department of Agriculture and the Department of Livestock suggest that it would be difficult to implement agriculture insurance in Laos due to the limitation of the government budget to subsidize an insurance scheme. Insurance companies are interested in investing in agriculture insurance but lack sufficient information to assess the risk to them. The banking sector is also interested in insurance as a form of collateral for loans. Both parties are willing to work with the government to seek solutions. Budget constraints at provincial and district levels require a tool to support disaster management activities such as prevention and relief and if village authorities could implement agriculture insurance it would reduce delays in delivering aid. The main concern is that most farmers are smallholders who cannot afford to buy insurance products.

Introduction

Insurance is one of several possible risk-mitigating mechanisms. Agricultural insurance has been discussed but has only been converted into a government premium subsidy scheme. Private companies show little to no interest in agricultural insurance because of the high risk involved. However, there is a strong case for the government to consider insurance, either through subsidizing insurance companies or by setting up an insurance department under the Ministry of Agriculture and Forestry. This study offers some 'first options' for agricultural insurance and focuses on rice and pig farmers as examples. Successful agricultural insurance schemes in developed and developing countries are often supported by the government. Governments can implement policies to support insurance, for example, by issuing laws and regulations, setting up offices responsible for agricultural insurance, research and development, and subsidizing premiums.



Research objectives

The specific objectives were:

- To evaluate the level of willingness to pay for agricultural insurance.
- To analyse insurance premiums and returns.
- To assess the determinants of farmers' decisions to take out agricultural insurance.
- To assess and discuss the challenges of agricultural insurance in Lao PDR.
- To compare the current government budget for coping with natural disasters to a scenario where there is agricultural insurance.

Methodology

Interviews were conducted with the following stakeholders:

- Department of Livestock and Department of Agriculture, Ministry of Agriculture and Forestry
- Ministry of Industry and Commerce
- Ministry of Planning and Investment
- Ministry of Labour and Social Welfare
- Ministry of Natural Resources and Mines
- Nayobay Bank
- Agriculture Promotion Bank
- Allianz General Laos

Field survey. Based on the interviews, a questionnaire was drafted and a preliminary survey conducted in Xanakham District, Vientiane Province during 11–17 June 2020. Twenty rice farmers and 10 pig farmers were interviewed using the pre-test questionnaire, which was then revised. A total of 419 farmers were selected as the sample.

Willingness to Pay (WTP): The Contingent Valuation Method (CVM) was used to estimate the economic value of agricultural insurance by measuring the respondents' WTP by first building a choice scenario. The factors determining WTP were calculated using equation 1.

$$P(\text{wtp}) = f(\alpha + \gamma \text{bid} + \mathbf{x}\beta + \mathbf{h}\theta + \mathbf{f}\pi + \mathbf{d}\rho) \quad (\text{Eq.1})$$

Scenarios: The loss of farmers' cost of production and the compensation the government needs to subsidize was estimated by assuming disaster losses similar to those over the past five years. Scenarios were generated where the insurance scheme compensates for the loss of production cost. In the insurance case, the government need not provide compensation for production cost loss but instead subsidize the gap between farmers' WTP and the cost of insurance from a company. The insurance company can generate income and add value to the financial sector.

Results

Production risk (rice farmers). Although rice farmers do not rotate other crops in their rice fields during the dry season due to the lack of irrigation, they compensate by doing other agriculture activities such as vegetable cultivation and raising livestock. Most use chemical fertilizers imported from neighbouring countries but 28 of the 44 households in the sample use natural fertilizers. The production cost is approximately 37% of the total revenue from rice. Production costs do not include fixed costs such as machinery and equipment. Labour is the main cost in rice planting (20% of the total). Rice farmers will hire workers for 70,000–50,000 LAK per day (USD 7.54–5.40). Many cannot pay for labour, especially for transplanting, which is labour intensive, so they have changed to paddy-sowing which is less labour-intensive and cheaper.

Production risk (pig farmers). Pig farmers also earn income from various sources and most are also rice farmers. In terms of production, 51% raise less than 20 pigs. There were nine large pig farms in the sample where one farm has approximately 5,000 pigs. Most pig farmers, especially small-scale, do not have a company contract and use traditional techniques to rear pigs. Farmers who do have contracts with CP and Betagro use vaccines and feed supplied by the company which reduces their production risk. All pig farmers buy commercial feed to mix with agricultural by-products such as rice bran, vegetables, and maize which reduces the cost. Farmers who do have contracts must use the feed provided by the company

Marketing

Rice farmers: Most rice farmers sell to traders and information on market prices comes from neighbours, relatives, and village authorities. The selling price depends on the quality and type of rice. The most expensive is Khao Kai Noi, a special type of rice in Xieng Khuang Province, where the price is over 5,000 LAK/kg. The minimum price is set by a provincial committee comprised of staffs from provincial industry and commerce, provincial agriculture and forestry, and provincial planning and investment departments. The committee revises the minimum price annually, which mitigates the risk from negative price fluctuations. A few households have forward contacts with traders in which case the risk is transferred to the trader.

Pig farmers: Most pig farmers (72%) sell their pigs to traders at the farm gate. As the demand for pigs is high they have a relatively low level of risk. In the sample, 18% sell their pigs to a company under a contract. Those with few pigs sell to people in the village when they need money. On average, the market price of pigs is 25,000 LAK/kg where the highest and lowest prices are 71,000 LAK and 13,000 LAK. In 2019, the market price was high. During the spread of swine fever, farmers could sell their pigs for up to 28,000 LAK/kg compared to a pre-outbreak price of 18,000–22,000 LAK/kg. For pig farmers who have a contract, the price is set by the company which reduces risk from negative price fluctuations.

Finance

Rice farmers: In the sample, 45.34% of the respondents diversified their income with non-agriculture activities and the rest concentrated on agriculture activities. In the sample, 241 respondents (66.76%) have savings, which means they have secured their risk to some degree. Rice farmers mainly save cash in their house, although 75 have access to a bank. Many do not have a bank account. Farmers also save in the village fund. As a member of a village fund, they can borrow for agriculture activities and emergencies. Cattle are another form of savings and farmers sell cattle when they need money. In the sample, 65.74% do not gamble. Those who do risk falling into debt.

Pig farmers: Pig farmers also diversify their income with non-agricultural activities. In the sample, 69 respondents (73.4%) have savings, which means they have secured their risk to some degree. They mainly save cash in their house although 24 have access to a bank and 15 buy cattle as a form of savings. A major source of debt is bank loans. Two farmers borrowed money from a village fund for working capital. In the sample, 55.74% do not gamble. Those who do risk falling into debt.

Disasters

Rice farmers: Rice farmers have been affected at least once by a disaster in the last five years (87.53%). Floods and droughts account for 77.26% and 61.23% of the total who have been affected. In the sample, 72 (25.53%) were affected and 90 (31.91%) were affected twice in the past five years. Drought has become a major issue for rice farmers in recent years. In the sample, 121 (54.02%) were affected by drought in the past five years. Most farmers are highly vulnerable and are badly affected by floods but much less so by droughts. In the sample, only 45 (10.92%) are prepared for a disaster while most have no plan to prevent or mitigate a risk except for 21 who have prepared savings for a disaster. Twenty-two farmers use an insecticide to prevent pests. Only four have a pond and two use their own funds to connect to an irrigation system if a drought occurs. Only 10.74% of the farmers in the sample can recover from a disaster. Government assistance is the main support for rice farmers after a disaster. Support is in the form of food, clothing, and seed. The private sector offers some support after a disaster.

Pig farmers: Roughly half the pig farmers in the sample have not been affected by a disaster in the last five years. Swine fever and foot and mouth disease are the main problems. Two of the 34 pig farmers lost all their pigs because of swine fever. Only 22 (23.40%) are prepared for a disaster and the rest have no plan to prevent or mitigate risk. Nine pig farmers have prepared savings for a disaster. Fifteen select strong, local breeds as a way of mitigating swine fever.

Awareness of insurance

Rice farmers. Most rice farmers do not have crop insurance but they do buy car and life insurance. Just over two-thirds can explain what crop insurance is.

Pig farmers. Like rice farmers, most pig farmers do not have crop insurance and those with insurance have mainly bought car and life insurance. In the sample, 77.66% know what insurance is and they can briefly explain it. When asked about their interest in buying insurance for their pigs, 40 said they would be willing. Those not interested said it was because they have only a few pigs or a contract with a company.

Estimation of willingness to pay (WTP)

Within the sample, 339 farmers expressed a WTP. The contingent valuation method (CVM) and discrete choice analysis (DCE) were used to estimate mean and median WTP and to identify individual characteristics on the level of mean WTP. The characteristics of choice were evaluated using DCE. Overall, there was a positive WTP for crop insurance. The mean WTP was 102,547 LAK for the 900,000 LAK return, and 93,619 LAK for the 500,000 LAK return. The median was 183,054 for the 900,000 LAK return and 167,819 for the 500,000 LAK return. WTP was calculated as the ratio of WTP to return level. The ratio of the mean WTP was 11.4% for the 900,000 return and increased to 18.7% for the 500,000 return.

The mean WTP for those who had experienced a disaster was 109,383 (for the 900,000 return) and 100,455 (for 500,000 return), while the median levels were 40,219 and 31,291 for 900 and 500 thousand respectively. Experience of a disaster accounts for 69,164 LAK of the WTP.

Overall, the WTP in all four provinces was positive. WTP for the 900,000 return was higher than for the 500,000 return. The province with the highest level of WTP pay is Savannakhet (110,206 and 101,278), followed by Xiengkhuang Province (94,445 and 85,517), Vientiane (89,926 and 80,998), and Champasack Province (77,748 and 68,8200).

Respondent characteristics and willingness to pay

In estimating the value of WTP, respondent characteristics were included in the CVM estimation. The results suggest these characteristics are statistically significant at 10% or lower. The significant characteristics are education level, additional non-rice production, area of rice paddy, and experience with an insurance purchase. Individuals who had previously purchased any type of insurance were willing to pay a higher value than those who never had. The WTP for the 900,000 return was 148,101 LAK for one with experience and 96,202 LAK for one who bought no insurance before.

The results further show that if education increases by one year, WTP increases by 44,859 and is statistically significant at the 10% level. Individuals with larger paddy areas are less likely to buy insurance. If paddy increases by one rai, WTP declines by 20,756. The experience of buying other forms of insurance increases WTP by 7,242. Producing non-rice agricultural products increases WTP by 50,309. The conditions of the insurance are also part of the purchase decision. These include the rate of return when the disaster happens, the condition of using a particular rice seed, and the ability to access bank credit. The rate of return and bank accessibility are statistically significant whereas the rice condition is not.

The WTP from the rate of return is 0.16, which implies that a one-unit increase in return increases WTP by 0.16 (16%). The rice condition has a negative WTP, which suggests that an individual is not willing to use a new type of rice seed. Finally, the ability to get a loan from a bank is essential for decision making. If access to a bank is a benefit of taking insurance, individuals are willing to buy it at the higher price of 47,503 LAK.

Building agriculture insurance scenarios

To set a scenario for predicting the outcome of insurance costs to the government, the main assumptions are 1) the chosen return is 700,000 LAK/rai¹³ and the share WTP is 15%; and 2) specify the characteristics of individuals with a level of willingness to pay. A return of 700,000 was selected because it is the approximate half value of the total production value per rai and the approximate value is calculated according to the half value. The second assumption is that the rate of WTP is based on the mean WTP.



The range of natural disasters is from 5% to 25% because the rate in 2019 was 13.6%, and the insurance coverage was from 20% to 100%. From the 2019 baseline case, the disaster rate is set at 15% and we see that the insurance covers the loss if all the area is insured. If 20% of the farmers participate in the insurance scheme, government support is 405 billion LAK. The case when the insurance scheme could sustain itself is when the disaster rate is 5% and the insurance coverage is 40% to 100%, the disaster is 10% and coverage is from 80% to 100% and the disaster is 15% and the coverage is 100%.

¹³ One rai is 1,600 m².

Stakeholder interviews

The National Disaster Management Committee (NDMC) is responsible for the prevention and control of disasters for the whole country and for communicating and coordinating with stakeholders. The Labour and Social Welfare Division acts as the secretariat for the NDMC when a disaster takes place. Although the NDMC has a disaster relief fund, it is not sufficient to support all those affected. Agriculture insurance would support the NDMC and reduce farmers' reliance on the government.

Interviews with the Department of Agriculture and the Department of Livestock suggest that it would be difficult to implement agriculture insurance in Laos. The main reason is the limitation of the government budget to subsidize private insurance. To implement agriculture insurance requires cooperation between public and private sectors under a public-private partnership framework. Not all agricultural products can be insured as the government budget is limited so it would be necessary to prioritize which products are the most affected and their importance to the food security policy of MAF.

Insurance companies are interested in investing in agriculture insurance, however, the lack of information makes it difficult for them to initiate insurance in Laos and more research is needed. They are willing to work with the government to develop agriculture insurance products. The banking sector is also interested. However, it is not their role to develop insurance products for farmers and they are more interested in insurance as a form of collateral for loans. They too are willing to support government insurance products.

Provincial and district authorities work closely with farmers and communities to relieve disaster losses. Budget constraints at provincial and district levels require a tool to support disaster management activities such as prevention and relief. Agriculture insurance can reduce reliance on the government budget and increase farmer participation. Village authorities can also implement agriculture insurance because support from the government is often delayed. The main concern is that most farmers are smallholders who cannot afford to buy insurance products.

Conclusions and Policy Implications

Recommendation	How to	Main responsibility	Timeframe
Integrate stakeholders	Integrate financial sectors, especially banks and insurance companies with MLSW and MAF to set an agriculture insurance scheme. Public Private Partnerships are feasible in Laos.	NDMC	1–2 years
More research	Conduct more research on agriculture insurance by using other methodologies such as weather indexing, production cost insurance, and yield insurance.	NAFRI, NUOL and insurance companies	Immediate
Develop a pilot project for agriculture insurance	Initiate a pilot project in one village.	MLSW, MAF and insurance companies	1–2 year
Establish disaster protection funds	Establish disaster protection funds related to projects that may have a negative impact on farmers (e.g., hydropower, mining, wood processing).	MOF and MLSW	Immediate
Disseminate disaster management information	Basic procedures to ask for assistance and basic rules for disaster prevention should be distributed through posters, leaflets, and electronic files.	MLSW	Immediate
Promote financial literacy and risk management	Apply teaching materials of GIZ on financial literacy and include content on risk management and insurance.	Educational institutions should promote GIZ and BOL materials to students	1–5 years

Gender Empowerment and Agricultural Production in Lao PDR

October 2020

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Abstract

Despite significant efforts to address gender issues at the policy level in Lao PDR, most agricultural policies continue to target men more than women. Women seldom receive adequate attention, which may hinder the achievements of agricultural development and poverty eradication programmes. It is therefore important to characterize and measure women's empowerment to provide the government with guidance regarding policies to increase farming productivity and food security. As there is limited information about gender inequality and empowerment in the Lao PDR, this research aimed to provide statistical data on gender empowerment and agriculture production and policy recommendation for decision-makers. Data was collected from 431 households in five provinces among Lao-Tai, Hmong, Khmu, and other ethnic groups on five domains. The researchers also conducted an econometric analysis to quantify the impacts of women's empowerment on agriculture, focusing on rice and livestock production. The results show that women in rural areas play a key role in agricultural production and support the view that empowering women in agriculture would significantly increase the outcomes of agricultural production. Recommendations are offered regarding legal frameworks, institutional and coordination mechanisms, and implementation of policy, and capacity building for gender empowerment.

Introduction

Empowering women and reducing gender inequalities are important objectives for development policies throughout the world. Such objectives were stressed during several meetings of the Sector Working Group on Agriculture and Rural Development, in February 2019. Despite significant efforts to address gender issues at the policy level, most agricultural policies target “farmers”. Although women greatly contribute to agriculture and food security, they seldom receive adequate attention, which may in the end hinder the achievements of agricultural development and poverty eradication programmes. It is therefore important to characterize and measure women's empowerment in the Lao PDR to provide the Lao government with guidance regarding policies to increase farming productivity and food security.



Objectives and methodology

Whereas there is limited information about gender equality and empowerment in the Lao PDR, this study aimed to provide statistical data on gender empowerment and agriculture production and policy recommendations for decision-makers. The specific objectives were:

- To include gender empowerment in agricultural production in Lao PDR in the national policy agenda.
- Recognize the contribution of gender empowerment in agricultural production for food security and incomes.

To capture women's empowerment in agriculture, the researchers constructed a *women's empowerment index in agriculture* based on five domains following Alkire et al. (2013). These domains reflect the role and extent of women's engagement in agriculture and include decisions over agricultural production, decision-making power over productive resources, control over the use of income, leadership in the community, and time allocation (Alkire et al., 2013; Sraboni et al., 2014). A weighted mean of the domains was constructed to assess women's aggregate empowerment in the household across regions and provinces. It is important that women's empowerment in the five domains can be broken down by region and ethnicity to compare gender inequality and empowerment in agriculture between different population groups. The analysis of sub-indicators across regions and ethnicities will offer guidance for effective policy interventions for women's empowerment.

The researchers also conducted an econometric analysis to quantify the impacts of women's empowerment on agriculture, focusing on rice and livestock production. Based on Sraboni et al., 2014; Wouterse, 2019; and Diiro et al., 201), the analysis included a production function. The Women's Empowerment Index is incorporated into equation 1 along with a set of traditionally controlled variables, production inputs, household, and household head characteristics. This econometric analysis allows statistical inferences on the impact of women's empowerment on rice and livestock production (Equations 1 and 2). The researchers conducted a Breusch and Pagan test to check the correlation between error terms and to justify the application of the Seemingly Unrelated Regression technique.

A quantitative survey was conducted among 431 households from June to August 2020. The survey focused on rice and livestock farmers Xiengkhuang, Sayyaboury, Savannakhet, and Champasack Provinces. Households were chosen based on the husband's ethnicity. Most samples are Lao-Tai households (the predominant ethnic group in Laos) and then Khmu and Bru (generally regarded as the Lao Therng), Khmu and Hmong, and a small number of samples from other ethnic groups, mostly Souay.

Results

Women's labour contribution to rice production: Women are more likely than men to engage in planting and harvesting activities. Women in all four provinces spend approximately half their time on planting and harvesting activities and roughly 30% on land preparation and tending to crops.

Women's labour contribution to livestock production: Women in Champasack and Savannakhet spend approximately 70% and 50% of their time tending to cattle and roughly a third in the other two provinces.

Women's involvement in productive decisions, asset ownership, and control over household income from agriculture by province: In all four provinces, 70–80% of husbands and wives make joint decisions about production. The numbers for joint ownership of land and property range from 15% in Champasack to 40% in Xiengkhouang. The figures for joint decisions on the purchase, sale and transfer of major assets are much higher, ranging from nearly 50% in Xiengkhouang to nearly 80% in Sayyaboury. Joint decisions on borrowing are common in all four provinces (69–88%), however, control over household income is much lower with greater variance by province (11% in Savannakhet to 40% in Sayyaboury). In contrast, over 50% of women in the sample are active in community organizations, with the exception of Champasack (33%). The hours women work per day also varies significantly by province. Nearly two-thirds of the women in Xiengkhouang more than 10.5 hours per day, slightly less in Champasack (50%) and Sayyaboury, and the least in Savannakhet (30%).

Women's involvement in domains of empowerment by ethnic groups: In the three main ethnic groups in the sample (Lao-Tai, Hmong, and Khmu) more than thirds of all women make joint decisions with their husband on production, purchase, sale, and transfer of assets, and borrowing money. One-third or less have joint ownership of land or property and the numbers are lower for control over the use of household income (7% for Khmu and 18–28% for the other three groups).

Participation in village organizations by ethnic group: Again, the number varies widely from just over 50% for Lao-Tai, Hmong, and Khmu, and just under 30% for other ethnic groups.

Women's empowerment index in agriculture by province: Empowerment index scores range between 0.65 and 0.76. Women from Xiengkhouang (mostly Hmong) have a higher engagement score in at least one formal and informal organization. Women from Lao-Tai, Khmu, and other ethnic groups score higher than Hmong women in the resources domain, but a lower score in the workload domain than women from other ethnic groups. Women from Lao-Tai, Khmu, and other ethnic groups are in a better position in controlling household resources, including transferring ownership, lending and borrowing credit, and using household income from agriculture. Hmong women work harder, whereas they are comparatively disadvantaged in ownership of household resources, input in productive decisions, participation in decisions on credit, and the control of household income from agriculture.

Impact of women's empowerment on agricultural production: This study estimated rice and livestock income simultaneously using the Seemingly Unrelated Regression method. The result shows that women's empowerment in agriculture is positively and statistically significant as a predictor of agricultural production. Based on the result, a rise in the Women's Empowerment Index by 1 percent is associated with around 18% increase in the value of production outputs. This study found an inverted U-shaped association between household head's age and production outputs. While it has been widely reported that female-headed households are less productive than male-headed households in the farming sector, the present research shows that household head's gender does not make a difference in rice and livestock production outputs. There are positive correlations between agricultural outputs and dummy variables controlling for household heads' ethnicity. Khmu ethnic households tend to have, on average, 33 percent more rice outputs than those from other ethnicities in the reference group. But there are no significant differences between rice outputs produced by Lao-Tai and Hmong households compared to the reference group. However, the stakeholder interviews indicated there is increasingly an understanding of women's role in the sector.

Although there is no specific legal framework for women's empowerment in agricultural production, Laos has established a specialized unit for gender equality in the agriculture and forestry sector. The Division for the Advancement of Women (DAW) under the Permanent Secretary Office of the MAF. DAW acts as the secretariat for the leaders of the ministry in developing and promoting laws,



legislation, and regulations on women. DAW translates the Women's Advancement Development Strategy into the development plans and activities through encouraging and coordinating with offices under MAF from central to local levels. However, the role of offices in the line departments and provincial and district offices to the village Women's Union are not well described.

Stakeholders' perspectives on gender empowerment in agriculture: Existing policies and legislation that promote gender equity and the advancement of women in the agricultural sector are not sufficiently clear, and there are no clear instructions for translating laws or regulations

on gender issues into the implementation plans of development projects. Stakeholder interviews indicated that the incorporation of gender into the activities of the departments, provincial, and district offices is limited and the Woman's Union staff of each department lack the budget to implement policy, plans, and gender strategies in the agricultural and forest sector. At the village level, the Women's Union representatives do not have a clear plan and work under the guidance of the village authority.

Recommendations

The following recommendations are offered for consideration.

Legal frameworks

- Some of laws and regulations were released and revised for decades and gender issue was not clear mentioned or even not mentioned. Therefore, those law and regulations may need to be amended (The Law on Agriculture has not been revised since 1998).
- The national gender mainstreaming guidelines in agriculture, land, and environment sectors need further revision for a better clarification.
- Enact policies to overcome women's unequal access to economic livelihood opportunities, prohibiting sexual harassment, valuing and redistributing unpaid work, and ensuring full employment fair for all.

Institutional and coordination mechanism and implementation of policy

- Development donors should improve efforts to promote the advancement of women and gender equality under international commitments and national laws;
- Agriculture development projects should mainstream gender concerns into all stages of the project cycle;
- Each project should ensure that men and women have equal control and access to the resources and benefits from agriculture project operations;
- Provide special attention in encouraging women to participate in planning and monitoring processes.

Capacity building for gender empowerment

- Improve the capacity for all stakeholders to enable them to mainstream gender issues into the agriculture laws, decrees, and regulations, and legislation should address social issues associated with women in agriculture.
- Provide capacity building for women at PAFO, DAFO, agriculture technic service centre and village level to be able to incorporate women development work in their activity plan and implementing the plan accordingly.
- Provide more opportunities and more support for vulnerable community households; establish village funds for women of ethnic minority and increase their involvement at the village and household decision-making level.
- Institution arrangement structures of the sub-CAW network should be strengthened and clarified their roles and measures of coordination to streamline and better coordinate gender work at all levels and among all actors.

Leveraging Geo-Economic Proximity and Agricultural Commercialiation

Research brief No. 001/2020

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Abstract

Modernization and commercialization of the agriculture sector require significant public and private investment in terms of the transfer of scientific and technical knowledge to smallholder farmers related to diversification of farming patterns and cropping systems and management of land, family labor, and limited capital resources.

Evidence recognizes contract farming as the principal mechanism for introducing modern technologies and linking agricultural production to markets, thereby commercializing smallholder farmers and raising income from on-farm activities linked to poverty reduction.

The current policy and regulatory framework lacks incentives for adhering to the rule of law thus hindering the development of well-managed contract farming while facilitating negative impacts on land, labor, and the environment.

Credit and finance to invest in technologies required for commercialization are rigid, carry high interest rates, and are of short duration. Smallholder farmers are high-risk borrowers.

Geo-proximity to markets is a demand-pull driver of agricultural commercialization, with the northern region having a comparative advantage for several agricultural commodities.

The principal environmental risk to rural household income and remaining out of poverty is natural disaster.

Introduction

The purpose of this research brief is to synthesize the findings of ten policy research studies conducted by NAFRI's Policy Think Tank (PTT) research team between 2016 and 2020, and complementary research studies. The research was related to commercialization of agricultural products in Lao PDR.

Background of the policy on commercialization

On the theme of agricultural commercialization, the Second Party Congress in 1972 recognized the need "...to reorganize small individual and less developed agricultural businesses into larger social enterprises through cooperatives with the voluntary participation of farmers." The Fourth Party Congress in 1986 introduced the New Economic Mechanism to promote an open market economy with government supervision, including promoting foreign direct investment (FDI). In the late 1990s, the policy emphasis was on Household Economic Production, promoting farm production through household enterprises linked to regional and international markets. In the early 2000s, the National Growth and Poverty Eradication Strategy focused agricultural policy on poverty eradication and developing trade and investment opportunities linked to cross-border markets through upgraded transport and communications infrastructure in the region. FDI from China, Thailand, and Viet Nam, Lao PDR's major trading partners, soon followed, comprising almost three-quarters of all approved FDI projects between 2006 to 2016. Investments were concentrated in hydropower, mining, agriculture, construction, and real estate. The Chinese lead in agricultural investments that are located mainly on land concessions in the north, and are linked to contract farming for commercial crops, including rubber, banana, sugar cane, tea, coffee, watermelon, and vegetables, among others.

The Eighth National Social and Economic Development Plan, 2016–2020 (8th Plan) has provided a policy environment that enabled investments by regional trading partners to achieve the 8th Plan's anticipated social and economic development outcomes. Food and nutrition security and agricultural commercialization, including value-added processing of agricultural and forestry products, were important policy priorities. Significant investments in infrastructure to strengthen cross-border logistics have facilitated regional trade. Science and technology increasingly are applied to harmonize sanitary and phytosanitary measures among principal trading partners in the Association of Southeast Asian Nations (ASEAN). At the same time, institutional (e.g., quality standards, certification procedures) and organizational innovations (e.g., farmer groups, internal control systems, participatory guarantee systems) have been introduced to certify clean agriculture products through Good Agricultural Practices (GAP) and organic agriculture. Agricultural exports including coffee, fruit, vegetables, nontimber forest products (NTFPs), livestock, and selected field crops have gained a larger share of regional markets. The management of agricultural land has been improved through an increase in secure titles granted to smallholder farmers resulting in an expansion of commercial crops. Increased investments in irrigated agriculture have stimulated private investment in commercialized agriculture.

The policy emphasis of the Ministry of Agriculture and Forestry's (MAF) Agriculture Strategy to 2025 and Vision to 2030 (ADS) includes ensuring national food security through clean, safe, and sustainable agriculture, and strengthening capacity for commercialized agriculture that contributes to economic growth, industrialization, and modernization. The ADS targets include: (i) increasing the quantity of commercial agricultural commodities through industrialization and modernization; (ii) boosting competitiveness in terms of quality; (iii) improving quality standards and compliance to regulations; and, (iv) ensuring food security and safety linked to improving nutrition. Most recently (February 2020), the Lao People's Revolutionary Party's Politburo told leaders of central and provincial Party committees to improve policy implementation of providing credit for rural development and poverty reduction aimed at minimizing income inequality. Important measures include: promoting agricultural enterprises; protecting land



use rights; providing extension services to encourage modern collective farming linked to markets; encouraging local and foreign private investment; appropriate arrangements for contract farming including the '2+3' and '1+4' models; operating agriculture and forestry demonstration centers to increase investments in and application of scientific research; and, improving market access roads linking production supply chains to local and regional markets. In this context, the 9th Plan is expected to emphasize the geo-economic proximity of Lao PDR to maximize locational advantages within ASEAN. 'Soft' connectivity, i.e. more intensive economic interactions through preferential trade and investment agreements, and 'hard' connectivity in the form of upgraded roads, railways, ports, and air links to enable information and communications technology are prospective priorities.

Research approach

Based on a review of 10 policy research reports prepared by the PTT research team between 2016 and 2020, and selected complementary reports (listed under references below), several factors were identified as critical for facilitating commercialized agricultural development, namely:

Contribution to social development, specifically to alleviating poverty.

Environmental benefits, including contributing to resilience to climate change.

Application of science and technology, blending science-based technologies and indigenous techniques.

Enabling policy, institutional, and legal framework, emphasizing simplifying administrative procedures.

Geographic circumstances, specifically agro-ecological conditions, and proximity to markets.

Contract farming arrangements.

Land administration, including secure land tenure for smallholder farmers and arrangements for commercial land concessions.

Benefits in terms of financial viability of investments (profitability) by key stakeholders.

Markets, specifically the availability of and access to markets.

Labor requirements and availability.

Credit/financing arrangements.

A factor comparison table was prepared to organize the key findings of the research studies related to each factor. Common themes were identified among the findings and are synthesized in this research brief. Specific policy measures are proposed for overcoming constraints and impediments to agricultural commercialization. Policy measures include recommendations for improving institutional mechanisms and creating an enabling environment for agricultural commercialization, along with identifying who is responsible for each proposed measure.

Key findings and results

Synthesis of findings and results

Evidence indicates that commercialized agricultural development had generally positive implications for **social development, income generation, and poverty reduction** among rural households. Although research on banana production indicated disturbing negative impacts on the health of laborers in banana plantations, white charcoal and banana production, as well as ecotourism and contract farming, generate additional local employment opportunities and income for poor and marginalized residents. The long-term (7–15 years) harvesting of benzoin gum for sale also generates a higher return than upland rice and maize under shifting cultivation. Cattle rearing is an important store of family wealth and source of income. PTT research indicates that a one percent increase in cattle commercialization leads to an increase of 1 percent of farmers' income from sales. Important macro-level policies required to promote commercialized agricultural development were related to facilitating export-oriented trade and upgrading communications and transportation infrastructure. Linked to ensuring the sustainable alleviation of poverty, meso-level drivers of commercialization were deemed more important, including enabling access to natural resources (i.e., land), extension services, and credit, accompanied by measured regulation from government.

Minimizing dangers from natural hazards also is important since smallholder farmers have insufficient savings or social or market-based insurance schemes to cope with crises.

Environmental factors, including health and ecosystems, were important for the maintenance of natural resources required for cattle rearing, ecotourism, and sustainable harvesting of NTFPs linked to commercialized agriculture. The research studies provided evidence that commercial banana production had negative impacts on the environment and complementary studies verified the detrimental impacts of large-scale monoculture (maize, cassava, rubber, etc.) on forests and biodiversity. Climate change was found to be a critical environmental factor constraining expansion of smallholder commercial cattle production. Earning income (i) from ecotourism using biodiversity in National Protected Areas (NPAs); (ii) from commercial production of white charcoal using *mai tiew* (*Cratonyxylum sp.* or Yellow Cow Wood); and, (iii) from harvesting benzoin gum (resin) from styrax trees (*Styrax tonkinensis*); enhances smallholder awareness about conservation, the positive effects of ecosystem services, and the need for sustainable management of biodiversity. The studies provided evidence that the principal environmental risks to rural household income was natural disaster (e.g., drought, flood, frost). Natural disaster also is a key factor related to remaining out of poverty, accessing credit, and successful contract farming. Natural disaster also influenced whether smallholder farmers used agricultural practices that are not resilient to climate change which resulted in crop and livestock losses.

Application of **science and technology**: Access to and application, adoption, and adaptation of new technologies by farmers were critical to shifting from natural and subsistence farming to commercial agriculture that can compete in regional and global markets. The foreign investors and traders that import science-based technology require reasonably good infrastructure, including electricity, market access, all-weather roads, and communications, that also contribute to reducing poverty and facilitating agricultural commercialization. The technologies used in banana production and contract farming were imported by foreign investors. Alternatively, cattle rearing and white charcoal and benzoin gum production use indigenous knowledge and traditional techniques. Only two percent of cattle farmers use a science-based fattening system. Investors in commercial ecotourism blend modern management systems and local knowledge to operate biodiversity concessions. They also bring experience, knowledge of markets and consumer preferences, and the ability to build on indigenous knowledge to develop adventure, nature-based, and ecotourism products.

The expansion of commercialized agriculture linked to modern technologies is constrained however by complex and inflexible financing of loans and credit for smallholder farmers to innovate and adopt modern technologies and mechanization. Traders who provide production inputs to smallholder farmers are a channel for introducing innovation and modernization (see credit and finance discussion below). PTT policy research studies also have found that imported technology frequently is accompanied by the increased use and misuse of agricultural chemicals, particularly for banana production and contract farming, that have had negative health and environmental impacts.

Commercialization of the agriculture sector requires an enabling **policy, institutional, and legal framework**. The policy research studies revealed that the regulatory framework is inadequate for commercial production of banana, cattle, and white charcoal. Farmers seeking to commercialize operations for those commodities reported that regulations are enforced in a discretionary manner, including production approval processes and the administration, monitoring, and evaluation of investments. Coordination among departments is not systematic, including among local authorities. Trade regulations and their enforcement are different in each province. Administrative fees are charged throughout the production value chain for cattle rearing, including fees for transporting livestock from one province to another.

These administrative inefficiencies serve as a disincentive for farmers to invest in commercialization and increase costs for both farmers and consumers. Commercialized benzoin gum production is constrained by weak enforcement of the Investment Promotion Law and Law on the Promotion of Small and Medium Sized Enterprises, No. 011/NA (dated 21 December 2011) at the local level, and imposition of a profit tax and other fees on benzoin gum as an NTFP extracted from natural forests, when in fact it is obtained from plantations and agricultural land as permitted under the Land Law. Research findings show that contract farming is an important method of commercializing agriculture, reducing poverty, contributing to self-sufficiency, transferring knowledge and technology, and promoting production for export.

However, no clear policy on contract farming has been adopted resulting in a lack of incentives for farmers and farmer groups to participate in contract farming programs. Without specific policy-based laws and implementing regulations or guidelines, the current legal and institutional framework is not effective in regulating contract farming arrangements. Legal contract enforcement is weak and mechanisms to address conflicts are ineffective. The lack of implementation within a common policy and regulatory framework and of ways for sharing of information, skills, and practical experience among stakeholders constrains expansion of contract farming. Combined with weak capacities, smallholder farmers often are locked into unfair contracts, at times with the complicity of provincial and district officials.

Geo-economic proximity in terms of agricultural commercialization is defined as the geographic location and ecological conditions for producing commercial crops in proximity to markets for those crops or their value-added by-products. Proximity to cross-border and East Asian regional markets is a key demand-pull factor influencing agricultural commercialization. PTT policy research indicates that the northern region has a geo-economic comparative advantage for commercial agriculture products. The north (i) is a center for Chinese investments in commercial banana production for export to China; (ii) has some 15 to 26 percent of total national cattle rearing; (iii) contains an estimated area of 1.92 million ha of micro-climate suitable for styrax trees for commercial production of benzoin gum for export; (iv) produces nearly three thousand tons (2017) of white charcoal annually using *mai tieu* sourced from Bolikhamxay and Vientiane Provinces; and, (v) provides National Protected Areas for commercial ecotourism development. Contract farming of pigs takes place in all provinces and is expanding, with a target of supplying 50 percent of domestic market demand.

Contract farming is a key supply-push factor influencing agricultural commercialization. The research on contract farming revealed that investors are able to accelerate adoption of new technologies by smallholder farmers. Foreign agribusiness tends to dominate contract farming because domestic agribusiness enterprises are few, small, and weak. This situation leads to markets being dominated by large domestic and foreign enterprises. Agribusiness that operates through contract farming also has links with markets, providing opportunities for smallholder farmers. Research evidence confirms that commercial banana production in northern provinces was initiated by Chinese investors who established contract farming originally using the 1+4 model, with farmers providing land, but capital investments controlled by investors. In terms of risk management, research on the commercial production of pigs and green beans through contract farming indicated that the 2+3 model dominates, with companies controlling through vertical integration, but also bearing a higher level of risk. In contract production of rice, the 3+2 model is used, wherein farmers bear most of the risks.



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Cattle farmers with contracts had difficulty meeting standards and contractual requirements stipulated by contractors. Although the GOL has no comprehensive policies or incentives for contract farming, it does encourage enterprises to collaborate with villagers to promote (i) white charcoal production by providing financial support to register individual smallholder forest areas for *mai tiew* or by negotiating contract farming arrangements; and, (ii) commercial production of benzoin gum, wherein GOL staff collaborates with a foreign investor to promote planting and management of styrax trees on fallow agricultural land. Importantly, trust and a close relationship between companies and farmers are critical to contract enforcement.

Effective **land administration**, including facilitating secure land tenure for smallholder farmers and managing commercial land concessions, is another key factor influencing agricultural commercialization. PTT policy research shows that land use changes were accelerated by the granting of land concessions to domestic and foreign investors at reduced land lease fees. While Chinese investors in commercial banana plantations benefited, landowners were returned land that had been degraded and polluted with agricultural chemicals, and that required rehabilitation at significant cost. The granting of land concessions affected farmers rearing cattle and producers of white charcoal who reported a decrease in land availability for cattle grazing and the supply of raw material (natural *mai tiew*) for making white charcoal, respectively. Commercial harvesting of benzoin gum was less affected because the Land Law allows the use of agricultural land for growing industrial trees and perennial plants (styrax trees), thus limiting impacts from land concessions. Access to credit and finance needed by smallholder farmers for investments in commercial crops also is constrained by the inability of farmers to use agricultural land as collateral since many lack secure titles. In addition, the research revealed that poverty can be reduced by providing access to land to poor, smallholder farmers who use agricultural land for family food and nutrition security, livelihood, and income.

The research confirmed that smallholder farmer income can **benefit** (profit) significantly from commercialized agriculture. The financial viability (profitability) of smallholder investments increased for each commodity studied and for contract farming. Banana farmers benefited from land lease agreements with Chinese investors (1+4 contract farming) and, if investing themselves, when they had access to markets and a guaranteed price. However, benefits were decreased when the cost of land recovery is taken into consideration. Research results indicate that a one percent increase in commercial cattle rearing leads to a 0.1 percent increase in income from cattle sales. Thus, expanding cattle herds is important for raising smallholder income and sustainably reducing poverty. However, cattle farmers are slow to adopt commercial techniques (fattening) even though traditional grazing makes livestock vulnerable to disease infections.

Commercial producers of white charcoal increased household income from 17 to 19 percent annually. In addition, farmers can earn more than LAK 80,000 per day (above the daily rate of LAK 60,000 in July 2020) from commercial production of benzoin gum. Ecotourism contributes 36 percent to household income annually using the Community-Based Ecotourism Practice (CBEP) and 96 percent using the Entrepreneur-Based Ecotourism Practice (EBEP). Contract farming also raises farmers' income. The income of contract farming rice producers is higher than that of non-contract farming farmers, and the income of contract farmers cultivating green beans nearly doubles. The income of contract pig growers drops much less than non-contract growers when market fluctuations have negative impacts on farmers' income.

PTT's policy research revealed that demand-pull from export **markets** is a major driver of agricultural commercialization, although domestic markets remain relevant for some commodities. Commercial banana production originated in response to demand from Chinese consumers for clean agricultural products (GAP). Expanded commercialization of cattle rearing reflects growing demand from domestic consumers for increased food security and from export markets mainly in China and Viet Nam for dietary diversity. The increase in commercial production of white charcoal is in response to consumer demand in five countries, namely Japan, Korea, China, Thailand, and Viet Nam. Between 2005 and 2015 some 90 percent of commercially produced benzoin gum was exported to the European Union and 10 percent to the United States and India.^{Ref.4} Contract farming operated by experienced agribusiness with close links to markets provide new

opportunities for smallholder farmers and encourage them to pursue market share. The contract farming of rice, pigs, and green beans targets both domestic and neighboring country markets, although export markets for these products are limited to cross-border trade. Similar to cattle rearing, most farmers interested in contract farming lack sufficient market information for decision making due to weak mechanisms linking farmers to markets. Ecotourism targets both domestic and foreign tourist markets. The research revealed that facilitating access to markets through improved transport and communications infrastructure also contributes to poverty reduction.

The research provided evidence that the availability of family labor is an indispensable factor for agricultural commercialization of all commodities studied. At commercial banana plantations in the north, smallholder farmers work as laborers for Chinese companies that lease their land. At banana plantations in central and southern regions, family members are the principal source of labor. Family labor also is critical for cattle rearing (with equal participation by women and men) and for harvesting of *mai tiew* for commercial production of white charcoal, as well as for collecting and drying benzoin gum. Ecotourism provides employment opportunities for local people in various permanent positions. The CBEP approach to ecotourism generates income as a secondary occupation for about 10 percent of households, wherein the principal source of income is from on-farm activities and NTFPs. The research shows that contract farming creates employment choices for farmers. Household incomes can be raised, and poverty reduced when accompanied by improved education and skills for heads of households and increasing large and small livestock numbers.

Research results confirmed that farmers require access to **credit and finance** to invest in technologies that support agricultural commercialization. Most farmers do not borrow for fear of becoming indebted and because their financial literacy is inadequate. A complementary study found that in the case of maize, the only access to credit for farmers is through traders who provide inputs (e.g., seeds, pesticides, herbicides) early in the season. Farmers pay for inputs when crops are sold. This approach has two implications: i) a negative implication is that farmers are in debt to traders as non-institutional sources of credit and assume the risk of crop failure (i.e., due to natural disaster or climate change); and, (ii) a positive implication is that innovation and modernization can be channeled through traders. In addition, the Enhancing Milled Rice Production in Lao PDR project is cited as a good example of providing financing to intermediary stakeholders who in turn support farmers thus contributing to a win-win solution. Few financial institutions provide credit to smallholder farmers who have a relatively high level of risk. When available, credit is limited, interest rates are high, and repayment periods are short. Banks hesitate because farmers have demonstrated poor financial discipline, do not pay back loans, and cannot plan and manage business and finances. Sources of loans by cattle farmers include the Agricultural Promotion Bank (35 percent), and village development funds (30 percent).^{Ref.7} Commercial white charcoal production is of interest to domestic and foreign investors due to high demand in international markets. Investors in ecotourism (EBEP) and contract farming have sufficient funds to develop and manage their projects. The CBEP ecotourism approach, however, requires support from government and international organizations due to a lack of local funds and knowledge to develop and manage ecotourism areas. The principal constraints to accessing credit include insufficient experience in the commercial products being produced, a low-level of education, land size, and security of tenure and the availability of family labor.

Conclusions and recommendations

Evidence from the research and complementary studies indicates that generally agricultural commercialization has positive implications for social development, income generation, and poverty reduction among rural households. Negative impacts from commercial agriculture occurred to the environment (ecosystem) and labor (health) as a result of weak regulation of land concessions for banana production and for contract farming linked to land concessions that compete for fallow land used for grazing cattle and harvesting NTFPs. In addition, extensive monoculture reduces biodiversity and causes farmers to be more vulnerable by being dependent on a single crop. Integrated cropping is a viable option to combine with monoculture.

The financial viability of smallholder investments in commercial agriculture increased for each

commodity studied and for contract farming. Key supply-push factors influencing agricultural commercialization include contract farming that is accompanied by introduction and adoption of new technologies and facilitating smallholder farmer access to markets. The application of modern (science-based) farm technologies is important to shifting from natural and subsistence farming to modern commercialized agriculture that can supply a surplus of products for food and nutrition security and commodities that meet competitive standards for target markets. Investments that introduce science-based technologies require good transport and communications infrastructure that also support poverty reduction. Proximity to cross-border and East Asian regional markets is a key demand-pull factor for agricultural commercialization. The policy research indicates that the proximity of the northern region to China and Viet Nam provides Lao PDR with a geo-economic comparative advantage.

Commercialization of the agriculture sector requires an enabling policy, institutional, and legal framework. Farmers pursuing commercialized operations require equitable enforcement of regulations, systematic coordination among government departments, and uniformity of trade rules for each province. More effective land administration is needed to accelerate granting secure land tenure to commodity producers in rural areas and to monitor the use of land concessions. Land use changes have accelerated significantly by granting land concessions to domestic and foreign investors at low land lease fees, often with negative impacts on land customarily accessed by farmers.

Sufficient family labor is an indispensable factor for agricultural commercialization of all commodities studied. Farm families also require access to credit to invest in technologies and processing facilities needed for agricultural commercialization. However, few financial institutions provide credit adapted to smallholder farmers who have a relatively high level of risk. Farmers who collaborate with traders may be able to negotiate easier credit terms and gain access to innovative and modern agriculture technologies at the same time.

Policy recommendations

Related to investments by domestic and foreign agribusiness enterprises: The MAF should take the lead to create a national level steering committee that would include senior officials from concerned ministries to screen and endorse commercial investments before a business license is authorized. The steering committee or other appropriate mechanism should be led by MAF and consist of representatives from the Ministry of Planning and Investment (MPI), Ministry of Industry and Commerce (MOIC), and Ministry of Environment and Natural Resources (MONRE). Potential social, environmental, trade, and technical implications and impacts would be screened for each investment. Evidence of consultations with village and district authorities should be required to ensure informed consent is obtained prior to beginning a project on land or using resources within village territory. The agribusiness steering committee could make recommendations on investment proposals for consideration by the National and Provincial Investment Promotion Committees. A monitoring system should be established, and a responsible agency designated for ensuring that both investors and producers comply with business agreements and environmentally and socially responsible investment practices.

Related to building the capacity of local officials responsible for authorizing and managing investments: MAF should designate provincial agriculture and forestry offices (PAFO) to take responsibility for leading the monitoring and evaluation of agribusiness investments in each province. Key elements that should be monitored include the use of agricultural chemicals, social and environmental impacts of investments, including contract farming arrangements, and other issues raised by villagers, district and village authorities, and investors. Evaluation should be based on compliance with the regulatory framework. This recommendation requires that (i) funds are available to support inspection and enforcement; (ii) technical staff have adequate training on the use of agricultural chemicals, and (iii) provincial authorities have the authority to halt activities when negative impacts on environment and society are exposed.

Related to cattle rearing: MOIC should work with MAF and the Ministry of Finance (MOF) to harmonize trade regulations to promote cattle exports; set standard taxes and fees on cattle movements across

provinces, and organize the payment of fees and taxes through a single window (one-stop service) to reduce transaction costs. To promote commercial cattle rearing (fattening), MAF should provide training to interested farmers on nutritional techniques using existing domestic crops, aiming to improve overall meat quality for sale in high-value regional markets. Promoting cattle rearing to chronically poor households contributes to food and nutrition security and improves livelihoods. MOF should work with commercial banks, traders, and investors, to formulate policy lending mechanisms that would improve access to credit for farmers who have a high potential for commercialized cattle rearing.

Related to production inputs: MAF should focus on assisting smallholder farmers to access improved seeds and breeds (e.g., fingerlings in aquaculture, piglets from sources other than foreign companies), and should implement controls on the use of inferior quality seed, and to avoid the spread of disease (e.g., Panama disease in banana, anthracnose fungal disease in cassava).

Training should be provided to smallholder farmers and PAFO and district agriculture and forestry office (DAFO) technicians related to markets (research on commodity prices and demand, marketing techniques, market development), product certification, trade documentation, and financial literacy, among other aspects of commercialized agricultural development. PAFO and DAFO staff also should be better trained to prepare contracts and to monitor and enforce contract farming arrangements.

Related to the commercial use of natural resources, specifically in terms of ecotourism and by producers of white charcoal and benzoin gum: PAFO in each province should take the lead to prepare five-year sustainable land and forest management plans for each company investing in ecotourism, white charcoal, and benzoin gum or for each producer group, to ensure sustainable management of ecosystems and raw material supplies, including creating special use zones on suitable land with the registration of stakeholders. MAF and PAFO should take the lead to train DAFO technicians to monitor and evaluate implementation of these plans to ensure professional forest and land use management. MAF should work with ecotourism companies and civil society groups to strengthen the capacity of local people to manage ecotourism programs, focusing on youth groups. MAF should standardize forest and NTFP management regulations in each province to improve protection of resources and prohibit forest lands from being used to cultivate cash crops. Provincial industry and commerce offices should play a role in evaluating the efficiency of value chains and identifying means to increase value added through local semi-processing of NTFPs. At the national level, MAF and MONRE should collaborate to certify benzoin gum to be an NTFP. MOIC and MPI should provide training to concerned provincial and district officials to effectively enforce the Investment Promotion Law and Law on the Promotion of Small and Medium Sized Enterprises, No: 011/NA (21 December 2011) at the local level. MOF should undertake a review of profit and export taxes for NTFPs and ecotourism to consider the source of each NTFP and the local benefits from ecotourism and adjust taxes accordingly.

Related to contract farming: MAF should take the lead in creating a national level or cross-sector working group on contract farming consisting of representatives from the Ministry of Justice, MOF, MOIC, and Ministry of Information, Culture and Tourism, to review the Contract and Tort Law (No. 01/NA, dated 8 December 2008) and to prepare a code of conduct committing contract farming parties to ethical production, business, and trading practices. Following clarification of MAF policies related to contract farming, MAF should take the lead to improve institutional arrangements for monitoring and evaluating contract farming programs. MAF should formulate a set of guidelines that: (i) clarify institutional arrangements for contract farming; (ii) monitor agribusiness operations; (iii) provide incentives to encourage efficient operations and minimize rent seeking behavior; (iv) assess stakeholders' needs related to market information, market access (including feeder roads), and legal support; (v) promote farmer organizations and cooperatives; (vi) support agribusiness incubation and engagement in contract farming, and (vii) build capacity for domestic agribusiness to work with farmers through contract farming. PAFO and DAFO should take the lead and collaborate with civil society groups to promote ethics, social values, and village-based mechanisms for effective contract enforcement. The objective is to provide guidance related to supporting and improving the policy and legal framework for

investment and future implementation of the ADS, the policies of the Department of Rural Development and Cooperatives, and the National Nutrition Strategy 2025 and Plan of Action (2016--2020).

For chronically poor and transitory households:

The principal environmental risk to rural household income and remaining out of poverty is natural disaster. MAF should take the lead to train PAFO and DAFO technicians to promote climate resilient agricultural production practices that minimize crop and livestock losses. Working with provincial and district Disaster Management Offices and Committees, PAFO and DAFO should contribute to formulating local early warning systems to prevent sudden floods and to manage droughts, in an effort to reduce crop damage and loss of agricultural products and livestock. MAF should collaborate with the National Disaster Management Office to establish disaster protection funds and operate crop and livestock insurance programs through local branches of government banks. DAFO should play a role in information distribution related to basic procedures to request disaster relief assistance and to access post-disaster recovery funds.



Related to access to credit: PAFO and DAFO should work with government banks to facilitate access to flexible credit mechanisms for smallholder farmers and especially poor households to ensure funds are available to invest in technology and innovation. Additional training in financial literacy and the innovative transfer of knowledge and technology should be provided to ensure the effectiveness of institutional support and to avoid the burden of debt. For chronic and transitory escape groups, PAFO and DAFO should improve access to irrigation to support farm production over the long term.

Acknowledgments

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Unlocking the Full Potential of Lao PDR's Tea Sector

Policy brief No. 001/2018

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Abstract

Tea in Laos is mainly grown and collected by smallholder farmers. It thus has a strong potential to contribute to poverty alleviation and rural development.

Despite a relatively large production area, the volumes of tea produced and exported are low. Laos could take advantage of favorable production conditions, unique varieties, and traditional know-how to develop a high-quality tea sector.

The most pressing issue is to improve quality both inside the tea garden and at later stages (harvesting, processing).

Improving farmer capacity can only be successful if the value chain is organized in a way that farmers are able to reap the benefits of their efforts towards improved quality.

A sustainable and inclusive tea sector strategy focusing on the livelihoods and benefits of smallholder farmers, fair trade practices, upgrading local processing facilities and diversified markets should be collectively defined.

Tea production in the Lao PDR

Tea plants are native to East Asia and evidence of tea consumption in China goes back to the 2nd century BC. In Laos, tea was presumably cultivated and traded as early as the 7th century (Earth Systems, 2016). Forest tea, which includes both ancient and wild tea, has been grown in Northern Laos for centuries (Marseille, 1990). In the 1920s, the French brought tea from Vietnam to cultivate on the Bolaven Plateau and recognized the quality of wild forest teas from Xiengkhouang (Pedersen et al., 2016). The development of the tea sector was halted in the 1930s by a preferential trade agreement between the British and the French. While commercial tea production came to a stop, traditional tea cultivation remained, although at a much lower scale. In the early 1990s, tea production resumed after the adoption of the New Economic Mechanism in 1985 and the development of private tea companies. It was however not until the early 2000s that a growth in Chinese demand boosted the tea sector again. While more efforts need to be taken, the tea sector has been developing.



The Government of Laos has acknowledged the great potential of the tea sector to alleviate poverty and for rural development in Lao PDR. The 8th National Social and Economic Development Plan recognizes the potential for the tea sector to generate value within the country, encourages the development of local tea factories in selected provinces as well as foreign investment in industrial tea plantations. The Agricultural Development Strategy to 2025 focuses on developing tea production in the Northern Uplands and on the Bolaven Plateau and encourages tea certification (organic, GAP).

Today, the main tea production areas of Laos are located in the Northern Uplands. Phongsaly and Luangprabang Provinces are the leading provinces in terms of area of tea planted (Table 1). Smaller yet well-established tea production areas may be found in other areas, such as Paksong District (Champasak province) or in Peak District (Xiengkhouang province).

Table 1. Tea planted areas (hectares) by province

	2009	2010	2011	2012	2013	2014	2015	2016	2017
Phongsaly	620	2,460	2,585	2,650	2,655	3,230	3,235	2,812	2,371
Oudomxay	0	555	225	305	215	385	445	122	123
Luangprabang	1,300	450	430	125	695	710	785	785	1,334
Huaphanh	15	110	135	30	45	65	80	110	403
Xayabury	0	0	0	0	0	0	639	790	790
Xiengkhouang	0	0	0	0	0	120	135	290	291
Champasak	220	220	285	285	285	460	460	458	458

Source: Department of Agriculture and PAFOs, 2018.

¹⁰ Ancient tea and wild tea belong to the same variety (*Camellia sinensis* var. *assamica*). While wild tea trees grow naturally deep in the forest environment, ancient tea trees were planted in tea gardens more 100-400 years ago. The main difference between wild and ancient tea trees is that ancient trees do not naturally occur but were deliberately planted at some stage in the past (Smith, 2010). The Lao PDR may be home to one of the largest areas of naturally growing wild tea trees (*ibidem*).

Despite a relatively large production area, the total volume of tea produced in Laos is far below regional and global levels. In 2015, Laos produced only 6,295 tons of tea over a total surface of close to 6,000 hectares. In 2015, the national average tea yield (kilograms of fresh tea leaves per hectare) was 1,500 kg/ha with the highest tea yields in Oudomxay (2,000 kg/ha, MAF, 2016). In comparison, tea yields in Yunnan reach 5,250 kg of fresh leaves per ha (Boupha *et al.*, 2010). Not only are tea yields low, but they are also heterogeneous, due to differences in the age of the trees, altitude, varieties, plant density, and farming practices (e.g., land preparation, picking, pruning, use of fertilizers and irrigation). These differences may in turn be explained by the variety of production models and tea varieties present in the country.

Tea varieties and production models

Two main varieties of tea (*Camellia sinensis*) are cultivated in Laos (cf. Table 2). The most widespread variety, *Camellia sinensis* var. *assamica*, grows in the wild in the tropical forests of the Northern upland areas of Laos, and is generally used to produce *Pu'erh* tea. *Camellia sinensis* var. *sinensis* has been more recently introduced in Laos, mainly in Chinese plantations (Pedersen *et al.*, 2016). These two varieties of tea are generally used to produce a wide range of processed teas (green, black, oolong, *Pu'erh*, white). Not only are the two varieties different in the types of teas they produce they also give rise to different economic models and different modes of land use as shown in Table 2.

Table 2. Tea varieties

Local Terminology	Production Management	Market Conditions
Camellia sinensis var. assamica. Large-leafed variety of tea grown in India, Burma, Yunnan, Lao PDR and Viet Nam, and commonly used for making Pu'er tea in Yunnan and black tea in Assam.		
Wild tea trees ¹¹	<ul style="list-style-type: none"> • Native tea varieties growing naturally in the wild in different areas of the Northern Uplands. • In most cases, the villagers communally manage the wild tea trees. • Tea trees are harvested by farmers. • Organic or clean agriculture. 	<ul style="list-style-type: none"> • Demand on international markets • High market demand in China • Price premiums
Wild tea tree gardens	<ul style="list-style-type: none"> • Tea gardens developed from domesticated wild tea/ancient trees (wild tea nurseries). • Farmer propagation and planting of seedlings from wild tea trees or ancient tea trees. • Growing mainly organically in natural gardens. • Can reach a height of 2–3 meters, retaining a more natural shape. • Manual weeding. 	<ul style="list-style-type: none"> • Higher prices than tea from industrial plantations • Lower prices than wild tea or ancient tea • International markets

¹¹ Also called in some areas "natural" or "forest" tea.

	• Tea gardens belong to individuals or households.	
Ancient tea trees	• Tea trees were planted from wild tea seedlings in tea gardens over 100 years ago.	• Price premiums
	• Tea trees are old and usually located in remote evergreen forests.	• High market demand, especially in China
	• In most cases, the villagers communally manage tea trees.	
	• Tea trees are harvested by farmers as NTFPs.	
	• Natural product.	
Camellia sinensis var. sinensis. Small-leafed variety of tea common in China and lowland areas of South East Asia. Commonly used to produce green tea, and black tea production in Darjeeling (India).		
New Chinese & Vietnamese clones	• Investment model is usual land concession or contract farming.	• Low price
	• Tea plantation areas are managed by (1) individual households, (2) local or foreign companies.	• Local and international markets
	• Local labour hired to harvest the tea trees.	
	• Use of fertilizers.	
	• Seedlings may come from wild forest and from neighbouring countries (China & Vietnam).	

Source: Developed by NAFRI based on various sources.

Tea related livelihoods

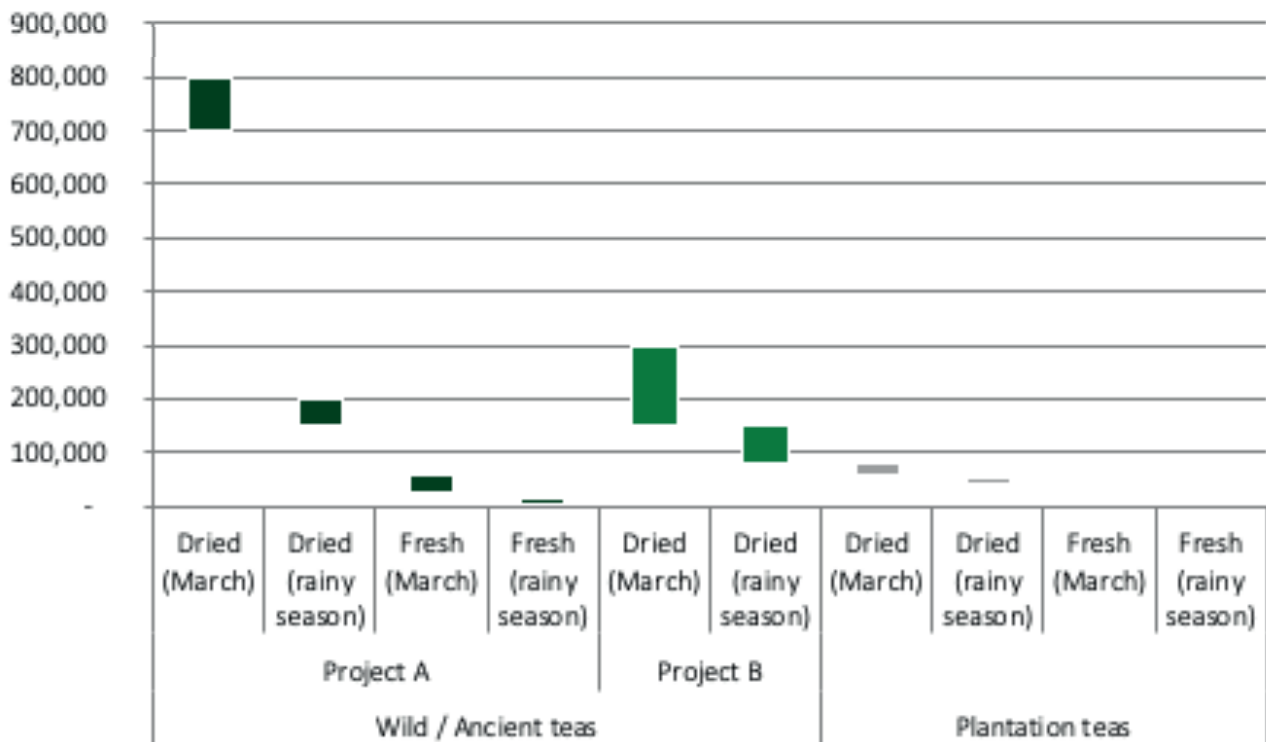
Unlike many other countries where large plantations prevail (e.g., Sri Lanka, Kenya, India), tea in Laos is mainly grown and harvested by smallholder farmers. Tea trees are cultivated in a traditional way, with a very low use of chemical inputs and little processing after harvest. Despite this lack of further on-site processing, various studies show the positive economic impact of tea production on the livelihoods of smallholder farmers, rural communities, ethnic minorities and women (Boupha, 2010; NUDP, 2015; Pedersen *et al.*, 2016). However, any generalization concerning tea incomes is rendered difficult by very large price differences. Tea prices depend on:

- the area of production
- the quality of the tea trees (which is determined by the variety, terrain, age of the tree, and harvesting period)
- existing market opportunities
- the degree of competition between traders
- processing quality
- farmers' bargaining power

In general, prices vary substantially between the spring¹² and the rainy season. Figure 1 shows that tea prices may also vary greatly within a single province. In Phongsaly for example, dried tea leaves sold in March commanded the highest prices (700,000–800,000 LAK/kg in Project A and 150,000–300,000 LAK/kg in Project B), while the lowest prices were paid in the rainy season (150,000–200,000 LAK/kg and 80,000–150,000 LAK/kg). The price range was wider in the spring than during the rainy season. Prices for plantation teas were much lower: dried tea leaves were sold for only 60,000–80,000 LAK/kg in March and 3,000–5,000 LAK/kg in the rainy season.

¹² Peak prices occur between March and May.

Figure 1. Variations in the prices of tea leaves in Phongsaly Province



Sources: CCL, Helvetas.

Prices also vary substantially from one province to the other, especially during the peak season (Table 3).

Table 3. Variations in wild/ancient tea prices over the year and between provinces

Unit: LAK/kg	Phongsaly	Xiengkhouang	Oudomxay
Dry leaves			
March	150,000-300,000	250,000-600,000	150,000-350,000
Rainy season	80,000-150,000	100,000-200,000	100,000-200,000
Fresh leaves			
March	25,000-60,000	25,000	25,000
Rainy season	5,000-15,000	10,000-15,000	20,000

Source: Helvetas.

Opportunities and challenges for the development of an inclusive tea sector in Laos

Tea produced in Laos has a high market potential that comes from: favorable production conditions (e.g., climate, soil types, and altitude) and the low use of chemicals, especially for wild and ancient tea varieties. This might provide Laos with a comparative edge in the production of organic teas for niche markets, provided that producers are able to become certified. Laos already has its own set of organic standards and a local certification body (Kousonsavath *et al.*, 2018) for the domestic market. Fair trade certification could also offer an additional opportunity for tea farmers grouped into cooperatives or associations, especially the branch of fair trade that focuses on smallholder farmers rather than on large plantations (e.g., the Small Producers' Symbol or SPP). Finally, other quality signals could be successfully developed, such as: private tea brands; the One District One product (ODOP) initiative; and geographical indications to promote the country's tradition of tea production and unique tea trees in coherence with the image of a highly biodiverse country with scenic landscapes that Laos has developed. In the case of geographical indications, this would imply being able to prove the historical link between the origin and the product. Ecotourism activities could also be developed to further promote Lao teas and their unique production methods, and the farmer communities involved in tea production.

Despite relatively large areas of tea, many farmers still gain little from tea production as local value addition remains low. With most of the tea sold in China, the prominence of Chinese in tea processing and trade is hardly a surprise. This may be seen as a tremendous opportunity, the abundance of small Chinese factories ensuring a regular access to the highly lucrative Chinese market. However, it might also be a source of concern if an important share of the value added is captured downstream, by stakeholders located outside the Lao PDR. Another issue may arise if foreign traders and factories compete with (or even hinder the development of) local cooperative processing units willing to buy tea from their farmers throughout the year to supply alternative markets. It is therefore essential to carefully consider how the value chain is organized in order to enable alternative models to exist and to ensure market access for all.

Related to value addition, the ability to produce high-quality tea is a major challenge as proper quality standards for tea are still lacking and farmers are slowly developing the skills to comply with existing market standards. While organic and fair trade certification seem promising, farmers' ability to comply with strict regulations and to keep records throughout the production process remains a challenge, not to mention the cost of certification to reach foreign markets. Training farmers to improve their understanding of (and compliance with) these standards is essential. Stricter monitoring systems are needed to ensure that tea labelled as organic is genuinely free of chemicals. The creation of cooperatives should also be genuinely encouraged for fair trade to become an option at all.

Last but not least, low tea yields could probably be improved by focusing on appropriate tea management, cultivation and harvesting techniques and better management of soil fertility. To be solved, the question of yields should however not limit itself to technical aspects, but also take into account what incentives farmers have to improve their yield and what means they are given to do so (e.g., access to rural credit, access to technical and market information).

Implications for the development of the Lao tea sector

The Government of Laos has a critical role to play in the development of a sustainable and inclusive tea sector. This may be done by creating the conditions for a fruitful dialogue and consultation between the various stakeholders (e.g., farmers, collectors, processors, investors, exporters, government) in view of developing a common vision and a strategy (development, marketing, communication) for the Lao tea sector. Within this concerted framework, meaningful measures to ensure that the tea value chain genuinely benefits the farmers should include, among others: the promotion and effective monitoring of fair contracts between farmers and their communities and tea traders; the adoption of strict and effective rules for foreign investment in tea (to ensure that the

investment approval process takes into account the livelihood and benefits of smallholder farmers); the effective prohibition of trade monopolies; and the protection of farmer land rights. Other less top-down approaches involve supporting farmers through farmer advisory services, and training farmers and government staff (PAFO, DAFO) to become tea specialists. Tea producers should be registered and comply with minimum requirements that should include maintaining simple records on the origin of tea seeds, plants, diseases, yields, prices, sales and names of buyers.

There seems to be some space for the establishment of a *Tea Learning Alliance* to capitalize on past experiences, promote information sharing, and collectively think about the future of the tea sector and the respective role of the different stakeholders in the definition of a national strategy. This task force could also play a leading role in investigating the diversity of international tea markets and in developing a collective strategy to satisfy such markets. Finally, it could be responsible for collective thinking about how to improve packaging (an important factor of success for the domestic and regional markets) and develop traceability and labelling, which are essential on foreign markets where companies buy loose tea that they package themselves and where food labelling requirements are often very strict.

Figure 2 summarizes different areas where improvements are needed for the Laotian tea sector to unlock its full potential. These areas cover the entire value chain and thus a variety of actors, both public and private, that are likely to be called upon to work together. The specific modalities of such cooperation between stakeholders are not detailed here.

Figure 2. Needs assessment

	Needs	Research Gaps
Inputs	<ul style="list-style-type: none"> Improved tea varieties and seeds Organic fertilizers Access to credit 	<ul style="list-style-type: none"> Identification of Lao tea varieties Tea variety selection
Production	<ul style="list-style-type: none"> Good agricultural practices Promotion of transplanting techniques Promotion of intercropping 	<ul style="list-style-type: none"> Tea grafting and propagation Tea tree nutrition Pest and disease control
Harvesting	<ul style="list-style-type: none"> Improved harvesting techniques Improved post-harvest handling of tea 	
Processing	<ul style="list-style-type: none"> Dissemination of good manufacturing practices 	<ul style="list-style-type: none"> Cost-benefit analysis of existing processing techniques
Quality control & certification	<ul style="list-style-type: none"> Minimum national quality standards for tea Internal control systems Training on standards and certification 	<ul style="list-style-type: none"> Compilation and analysis of existing quality standards for tea
Distribution & marketing	<ul style="list-style-type: none"> Good knowledge of markets Strong standards and certification system Recognized quality signals (ODOP, GIs) Improved labelling and traceability Advertising Improved road access Fair trade conditions Strict control of concessions 	<ul style="list-style-type: none"> Detailed market analysis for different teas
Value chain	<ul style="list-style-type: none"> Improved collaboration between value chain actors Creation of a Tea Learning Alliance Greater sharing of information 	<ul style="list-style-type: none"> Comparative analysis of alternative models (spot, contracts, concessions) Collection of data on production & prices Analysis of value distribution from the farm to the border, and to the final consumer

Source: NAFRI. Notes: in yellow and bold, the most urgent needs to be addressed. More long-term needs are indicated in white.

Supporters of the Lao tea sector

Joint development projects

Lao Upland Rural Advisory Services, The Agro-Biodiversity Initiative, Sum Son Seun Jai, Northern Uplands Development Programme, Eco-Friendly Intensification and Climate Resilient Agricultural System

Development partners

Agronomes et Vétérinaires Sans Frontières, Agence Française pour le Développement, CARE, Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), Comité de Coopération avec le Laos (CCL), Community Organization, Participation and Empowerment, European Union, Food and Agriculture Organization, Gesellschaft für Internationale Zusammenarbeit (GIZ), GRET, Helvetas, International Fund for Agricultural Development (IFAD), OXFAM, Swiss Development Cooperation, Stichting Nederlandse Vrijwilligers (SNV), United Nations Development Program.

Acknowledgments

Bounthong Bouahom, Chanphasouk Tanthaphone, Michael Victor, Andrew Bartlett, Tony Zola, Anthony Gueguen, Gaylord Robin, Morgane Cournarie, Niphaphone Nampanya.

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