International Labour Organization

Improving occupational safety and health in the global value chain of coffee in Lao People's Democratic Republic: Drivers and constraints.

A case study

VISION ZERO FUND + SAFETY HEALTH FOR ALL
A Global Programme for Positive Change

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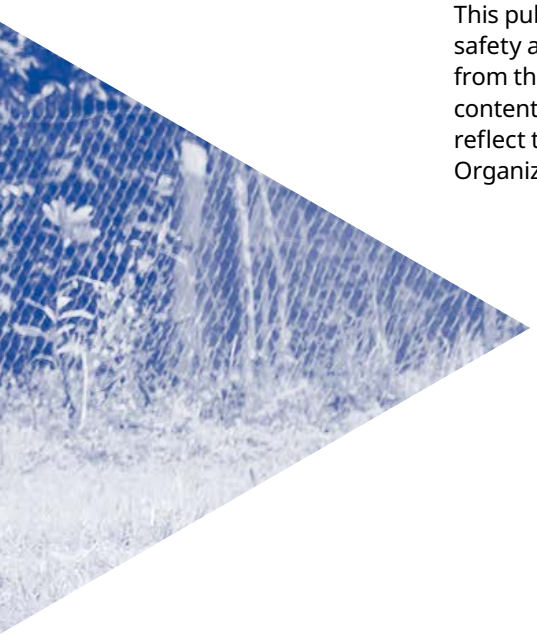


Abbreviations and acronyms

DAFO	District Agriculture and Forestry Office
GAP	good agricultural practice
GMP	good manufacturing practice
HACCP	hazard analysis and critical control points
ILO	International Labour Organization
Lao PDR	Lao People's Democratic Republic
LFTU	Lao Federation of Trade Unions
MT	metric tonne
OSH	occupational safety and health
PAFO	Provincial Agriculture and Forestry Office
UNCTAD	United Nations Conference on Trade and Development

Introduction

The Vision Zero Fund, an initiative of the Group of Seven (G7) countries and endorsed by the G20, aims to contribute to the achievement of zero severe fatal work-related accidents, injuries and diseases in global supply chains.[1]

The Vision Zero Fund embraces a **model of collective action for safe and healthy supply chains**, involving a wide range of stakeholders and resources to address the root causes of the most serious occupational safety and health (OSH) deficits in global supply chains. Interventions are clustered around the three following outcomes:

1. Strengthened global, regional and national **enabling environments** for the promotion of safe and healthy working conditions in targeted global supply chains.
2. Improved **legal and policy frameworks** to promote and enforce OSH protection, prevention and compensation in targeted global supply chains.
3. More effective OSH prevention, protection and compensation mechanisms for women and men working in global supply chains.

The Vision Zero Fund is a multi-donor trust fund, administered and implemented by the ILO. This case study was conducted as part of the Vision Zero Fund project on occupational safety and health in Lao PDR supply chains. It provides:

- a holistic understanding of the Lao PDR coffee global value chain,[2] its institutional environment, its drivers and constraints for decent work, and in particular OSH, and how those affect the nature, severity and probability of harm arising from exposure to workplace occupational hazards and their **impact on different groups of workers in the value chain**;
- an identification of **strategic entry points for improvement**, which may be multi-layered and indirect, or related to other inter-linked working and employment conditions, thereby setting them apart from traditional OSH interventions; and
- a **foundation for project design and implementation** based on the proposals for intervention models.

Selection criteria

The value chain was selected on the basis of the following criteria:

- **relevance, need and demand for improved OSH in the supply chain**, which included an analysis of current decent work deficits in the industry, in particular OSH deficits, evidence that the proposed sector is part of an employment-intensive supply chain, and relevance to the sector of the responsible business practices of national and international companies; and
- **feasibility and sustainability of the planned intervention**, including identification of relevant stakeholders at global, regional and national levels, their capacity, priorities and willingness to improve OSH, opportunity for market growth within the global market (or within specific countries), and an assessment of the potential impact of intervention on OSH conditions in the specific supply chain.

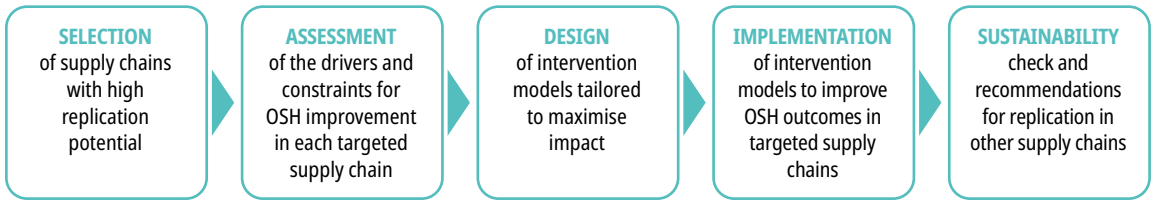
1 For more information, please visit: www.ilo.org/vzf.

2 The ILO has not yet adopted a set definition for the terms "global supply chains" and "global value chains". In its recent report *World Employment and Social Outlook 2015: The Changing Nature of Jobs* (ILO, 2015), the ILO published an estimate of the number of jobs included in global value chains from 1995 to 2013 for 40 countries. To make this estimate, the definition of global value chains used by the research team was "demand–supply relationships that arise from the fragmentation of production across borders, where different tasks of a production process are performed in two or more countries". The ILO has also used the following definition of value chain: "the full range of activities which are required to bring a product or service from conception, through the different phases of production, ... delivery to final consumers, and final disposal after use", see Raphael Kaplinsky and Mike Morris, *A Handbook for Value Chain Research* (2002). The range of activities required may include design, production, marketing, distribution and support services. The activities that comprise a value chain can be performed within a single firm or divided among different firms, within a single geographical location or spread over wider areas.

Methodology

The case study followed the ILO methodology for the assessment of drivers and constraints for OSH improvement in global supply chains and intervention design.[3]

Figure 1. Assessment of drivers and constraints for OSH improvements



Source: ILO, 2018.

A mapping that identified a typology of the actors and supporting functions of the Lao PDR coffee supply chain was conducted, followed by an in-depth assessment to determine the root causes contributing to drivers and constraints for OSH improvement. This assessment and the design of the intervention models were carried out using a participatory process that required an iterative analysis, and involved the following:

a. a preliminary desk review, covering: relevant scientific and technical publications, including on the coffee value chain and its market and environment; current legislation and relevant policies in the country of production; trade statistics; data on working conditions; local and international press articles; and selected websites;

b. field research based on key informant interviews and focus group discussions with the different types of actors in the value chain and the institutional and market environment.

The field research was conducted in Champasak Province, the main coffee-producing area of Lao PDR and an area in which the majority of coffee processors and exporters are located. Key informant interviews and focus group discussions were held with representatives of market actors, workers, government – including the Ministry of Labour and Social Welfare – development programmes, cooperatives, the Lao Coffee Association and the provincial Lao Federation of Trade Unions (LFTU). Interviews facilitated the collection of information on individuals' experiences and quantitative data. A dot survey[4] was conducted with 29 farmers and farmworkers in two villages, 31 per cent of whom were women. Direct observations of the work performed on farms and plantations and in three coffee mills took place in October 2018, at the beginning of the harvest season.

The field research identified OSH deficits during farm establishment (preparation of seedlings, land clearing, planting and replanting), farm maintenance, harvesting and primary processing of green beans (including the packing of beans for export). While carrying out these production steps along the coffee supply chain, farmers (own-account smallholders) and farmworkers are exposed to multiple occupational hazards (ergonomic, physical, mechanical, chemical and biological). Exposure to these hazards is likely to cause occupational injuries and diseases.

c. stakeholders' consultations with key actors in the supply chain and the institutional and market environment. On the basis of the field research results, stakeholders developed a strategy for improving OSH and competitiveness.

3 The methodology adopted was developed under the auspices of the Joint ILO–EU project to improve knowledge base and safety and health in global supply chains to support G20 work on safer workplaces. See ILO, *Occupational Safety and Health in Global Value Chains Starterkit – Assessment of drivers and constraints for OSH improvement in global value chains and intervention design*, 2018.

4 A dot survey involves the construction of close-ended questions that are displayed on posters. Participants are invited to answer the questions by using stickers.

1 The coffee value chain of Lao PDR

1.1 Product and market

Product

Coffee beans are the seeds inside the red purple fruit of the coffee plant, also known as the coffee cherry. The fruit normally contains two beans covered by an envelope commonly referred to as the *parchment*. Before it becomes a beverage prepared using brewed roasted beans or instant/soluble coffee, the beans go through different processes. *Parchment coffee* refers to the dried beans covered with their parchment envelope, while *green coffee* refers to the hulled dried beans. There are many species and subspecies of coffee plants. Global trade consists almost entirely of the Arabica and Robusta varieties.

Countries located in the so-called "coffee belt" around the equator, between the tropics of Cancer and Capricorn, offer the best conditions for coffee production. While Arabica is best suited for high altitudes (1,000–2,000 metres) and average temperatures of between 15° and 24°C, Robusta is mainly produced at low elevations, close to sea level. Robusta is easier and cheaper to produce due to its high plant yield, stronger resistance to diseases, and the fact that it is less labour intensive.[5] Arabica has a more aromatic flavour, has a sweeter taste, and enjoys a greater value in the world market.[6]

A coffee plant usually starts to produce flowers three to four years after planting, and it is from these flowers that coffee cherries derive. The time between blooming and maturing of the fruit varies appreciably with the variety, the climate, and the level of maintenance. Agro-technical requirements[7] related to plant management include watering, weeding,

5 United Nations Conference on Trade and Development (UNCTAD), *Commodities at a Glance: Special Issue on Coffee in East Africa*, 2018.
6 UNCTAD.
7 Agronomic practices also largely determine the quality of the coffee produced, and thus the prices farmers can receive.

and pest management to control plant diseases (such as coffee leaf rust[8]). On average, it takes seven months for Arabica beans to mature, and nine months for Robusta beans.

Market

More than 70 countries in the world produce coffee, the main producers being Brazil (38 per cent), Viet Nam (18 per cent), Colombia (7 per cent) and Indonesia (7 per cent).[9]

World production of *green coffee* is over 150 million 60-kg bags per crop year (crop year 2017–18).[10] Arabica represents 61 per cent of world production, and Robusta 39 per cent.[11] About 72 per cent of world production of green coffee is exported, which makes it one of the most traded agricultural commodities in the world, with a total export value of US$19 billion in 2016.[12]

The European Union is **top importer and re-exporter**[13] of green coffee, with an average annual import volume of 45.80 million 60-kg bags (43 per cent of imports). Germany, Italy and Belgium are the top importers among the European Union countries. The United States ranks second, with an average annual import volume of 24.72 million bags (23 per cent), followed by Japan (6 per cent), Canada (3 per cent), the Russian Federation (3 per cent), and Switzerland (3 per cent).[14]

In 2016, about 86 per cent of exported green coffee beans were roasted, blended and retailed as whole beans or ground coffee, while 14 per cent were used for instant or soluble coffee.[15]

Arabica is imported in higher proportions in the European Union, the rest of Europe, Oceania, and North, Central and South America, while Robusta, typically used for instant coffee, is favoured in Asia, the Middle East and Arab States, and Africa.[16]

World consumption of coffee for the year 2018/19 was equivalent to 165,269,000 60-kg bags[17] and is expected to continue growing, driven largely by increased demand in coffee-producing countries (for example, India, Indonesia and Mexico) and in emerging consumer markets (for example, the Russian Federation, the Republic of Korea and Algeria).[18]

However, global prices for green coffee remain low. In 2019, average international coffee prices fell to their lowest level in over a decade. This is largely due to an oversupply of coffee in the world market, which originates primarily from Brazil.[19] Supply levels are expected to stay above demand.[20] Due to the fall in coffee prices, farm incomes decline and the livelihoods of coffee-producing households, the majority of which are led by smallholders in low- and middle-income countries, are increasingly at risk. The slump in coffee prices has severe economic and social consequences for producing countries and affects their ability to achieve the Sustainable Development Goals.[21]

Europeans are the **top consumers** of coffee worldwide, followed by consumers in North America. Coffee consumption in the European Union, in 2017, was around 52 million 60-kg

8 Coffee leaf rust is caused by the fungus hemileia vastatrix. It causes yellow and burn-mark-looking spots on the leaves of a coffee tree and the leaves to wither until the tree looks like a skeleton. It stops bean-producing cherries from growing. See https://www.bbc.com/news/blogs-magazine-monitor-27474621.
9 International Coffee Organization, "Historical data on the global coffee trade".
10 International Coffee Organization, "Historical data on the global coffee trade". Coffee is a seasonal crop and seasons vary from country to country, which makes statistics on worldwide annual production difficult to collate. Crop year is defined as a period of 12 months commencing on the first day of the month in which the harvesting of the crop begins. According to *The Coffee Exporter's Guide* (International Trade Centre, third edition, 2011), "[i]n order to compare supply aggregates as well [as] supply with demand, where possible supply data has been converted from crop year to coffee year" (which runs from 1 October to 30 September). According to the International Coffee Organization, in its May 2019 "Coffee Market Report", world coffee production is estimated at 168.05 million bags in coffee year 2018/19, 1.5 per cent higher than in 2017/18.
11 International Coffee Organization, "Coffee Market Report", July 2019.
12 International Coffee Organization, "Development of Coffee Trade Flows", March 2018.
13 According to UNCTAD, *Commodities at a Glance: Special Issue on Coffee in East Africa*, Europe dominates the market for re-exports of green coffee, accounting for three quarters of global re-exports.
14 United States Department of Agriculture, "Production, Supply and Distribution", online database.
15 UNCTAD.
16 International Coffee Organization, "Development of Coffee Trade Flows".
17 International Coffee Organization, "World Coffee Consumption".
18 UNCTAD. For 2019–2020, global consumption is forecast at a record 167.9 million 60-kg bags, see United States Department of Agriculture, "Coffee: World Markets and Trade – 2019/20 Forecast Overview", December 2019. In 2018–19, consumption grew by an estimated 2.1 per cent, see International Coffee Organization, "Coffee Market Report", July 2019.
19 International Coffee Organization, "Coffee Market Report", July 2019.
20 United States Department of Agriculture, "Coffee: World Markets and Trade – 2019/20 Forecast Overview", December 2019.
21 International Coffee Organization, *Coffee Development Report 2019: Growing for prosperity*, 9–10, 14.

bags of green coffee.[22] A growing demand for exemplary and certified coffees has been observed in Europe and in the United States, including organic and other certifications linked with specific sets of economic, social and environmentally sustainable standards.[23]

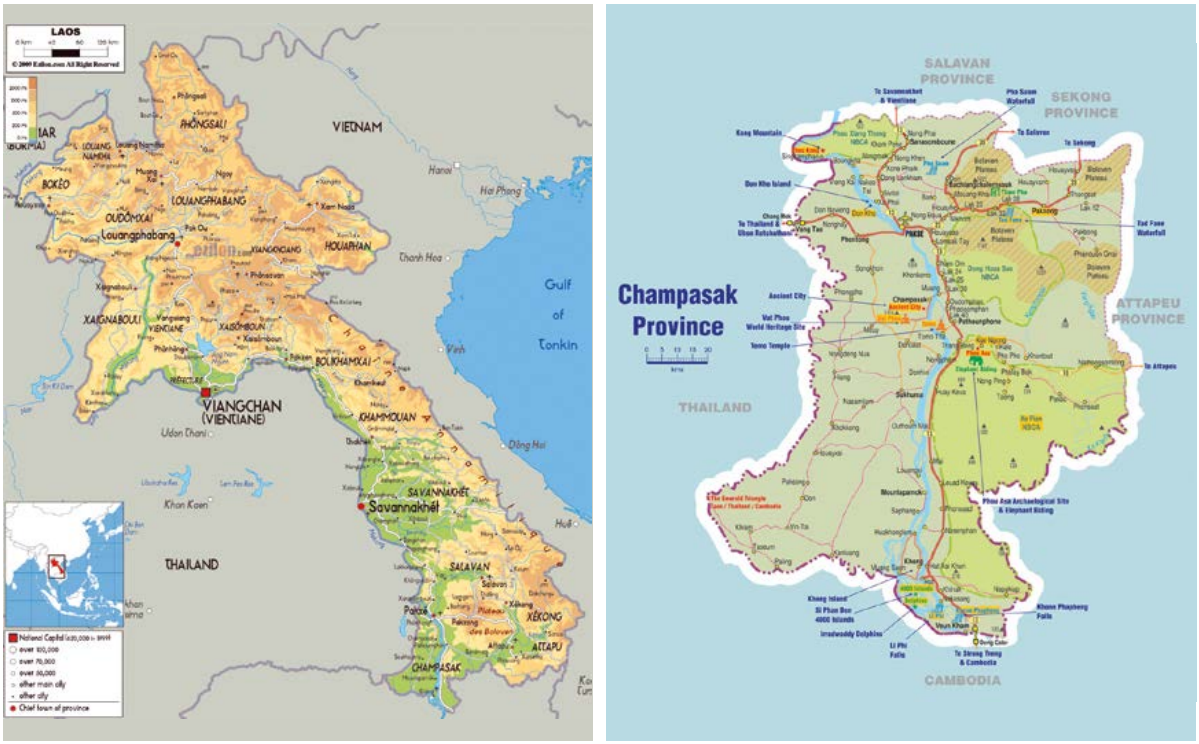
1.2 Structure of the value chain in Lao PDR

In **Lao PDR**, production of coffee commenced more than a century ago, but commercialization only started in the mid-1990s, when the Government began to encourage private sector investment and coffee was promoted as an export commodity.[24] Coffee **is now considered to be one of the country's most valuable agricultural commodities.**[25] Its production and exports have grown steadily for over a decade, making it the **fourth product with the most potential for export**.[26]

The geographical centre of production is the Bolaven plateau in Southern Lao PDR. The three main districts for coffee production are Paksong (Champasak Province), Thateng (Sekong Province) and Lao Ngam (Salavan Province). The three districts produce 95 per cent of Lao coffee, and coffee plantations in these districts cover more than 75,000 hectares.[27]

The region is particularly good for coffee cultivation, due to its high elevation, volcanic red soil, even rainfall distribution, and cool temperatures. The Arabica beans produced are known for their medium body and a combination of mild citrus and floral tones. While the majority

Figure 2. Map of Lao PDR and localization of Champasak Province



Source: Physical map of Laos; physical map of Champasak Province.

22 Centre for the Promotion of Imports from developing countries, "Exporting sustainable coffee to Europe".
23 UNCTAD.
24 Linda Yueh (ed.), *The Future of Asian Trade and Growth: Economic Development with the Emergence of China* (Routledge, 2009).
25 International Trade Centre, "Trade Map", accessed 25 July 2019.
26 International Trade Centre, "Lao People's Democratic Republic, Country Brief: Export Potential", accessed 25 July 2019.
27 Data provided by the Lao Coffee Association in 2019.

of coffee-producing countries plant Robusta at lower elevation or at sea level, in Champasak Province, Robusta coffee is planted at high altitudes (1,300 metres above sea level). This results in unique characteristics (good body, neutral characteristics, clean tasting) that make it sought after in the global coffee market.

In Champasak Province, coffee products range from green beans to ground coffee to instant/soluble coffee. Most of the coffee that is internationally traded is exported in the form of green beans (90 per cent).[28] Roasted beans and ground and soluble coffee produced in Lao PDR are generally sold on the domestic market.

The total coffee production of the Lao Coffee Association members in Southern Lao PDR, in green bean equivalent, was 50,000 metric tonnes (MT) in 2018.[29] Between crop year 2012–13 and crop year 2016–17, the production volume of coffee in Southern Lao PDR increased at a compounded annual growth rate of 12 per cent.[30] This increment has been linked to the Government's efforts to promote agribusiness investments through the granting of land concessions to domestic and foreign investors, and to improve farmer support structures and production methods.

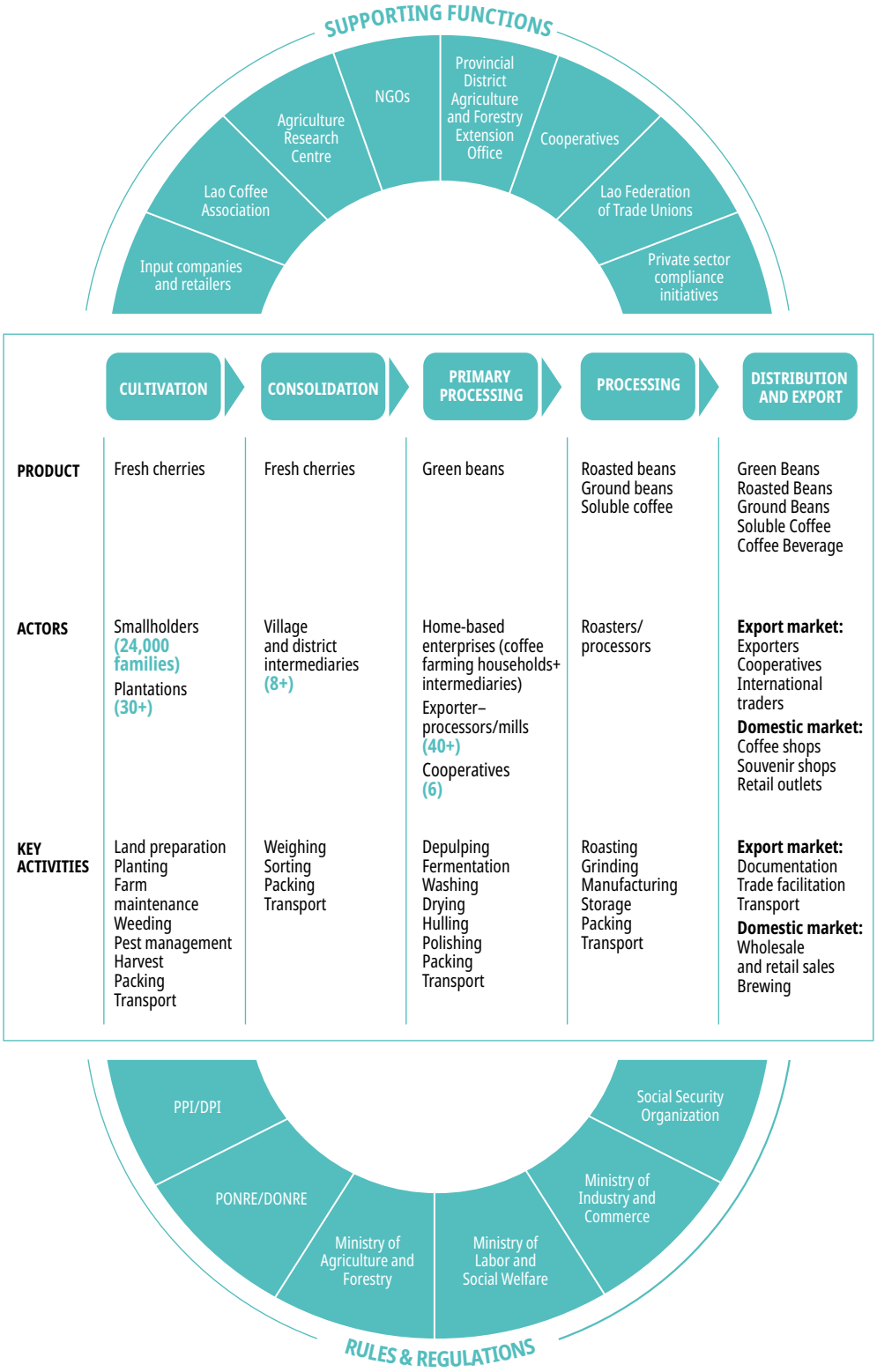
In 2017, data from the Lao Coffee Association indicated that total coffee exports had reached 32,965 MT (green bean equivalent), more than 549,000 60-kg bags, with a total value of US$83,086,078. In 2018, as per information from the Lao Coffee Association, total coffee exports had increased to 35,000 MT. Despite the general slowdown of the global coffee market, the country registered a 22 per cent increase in export volume over 2016 performance. As per estimates by the Lao Coffee Association, 70 per cent of coffee produced in Lao PDR is being exported. The percentage share of Arabica in total export volume is considerably higher than the share of Robusta. Most of the coffee is exported to other Asian countries.

In 2017, Lao coffee exports consisted of 60 per cent Arabica and 29 per cent Robusta. The remaining 11 per cent was comprised of Excelsa and processed[31] green beans (mostly soluble coffee). Lao coffee was exported to countries in Asia (95 per cent) (predominantly, to Viet Nam) and Europe (3 per cent), and to the United States (2 per cent) (see Appendix I). The volume sold to countries in Asia increased by 57 per cent in 2017 over 2016 figures, while volume sales to Europe and the United States decreased by 83 per cent and 49 per cent, respectively.[32]

The supply chain structure is complex and can be differentiated on the basis of a wide range of factors. The coffee value chain system in Champasak Province is made up of the following segments: cultivation, consolidation, primary processing to obtain green coffee, green beans processing, and export or distribution in the domestic market. Roasting, grinding, branding and packaging of coffee is done mainly in importing countries closer to the final consumers and is retailed in various forms (roasted beans, ground and soluble coffee).

28 Estimate based on data provided by the Lao Coffee Association (2017).
29 Estimate based on data provided by the Lao Coffee Association (2019).
30 This data represents the coffee production of Lao Coffee Association members in Southern Lao PDR.
31 In figure 3, processed green beans refers to roasted, ground and soluble coffee.
32 Data provided by the Lao Coffee Association.

Figure 3. Coffee value chain in Champasak Province, Lao PDR

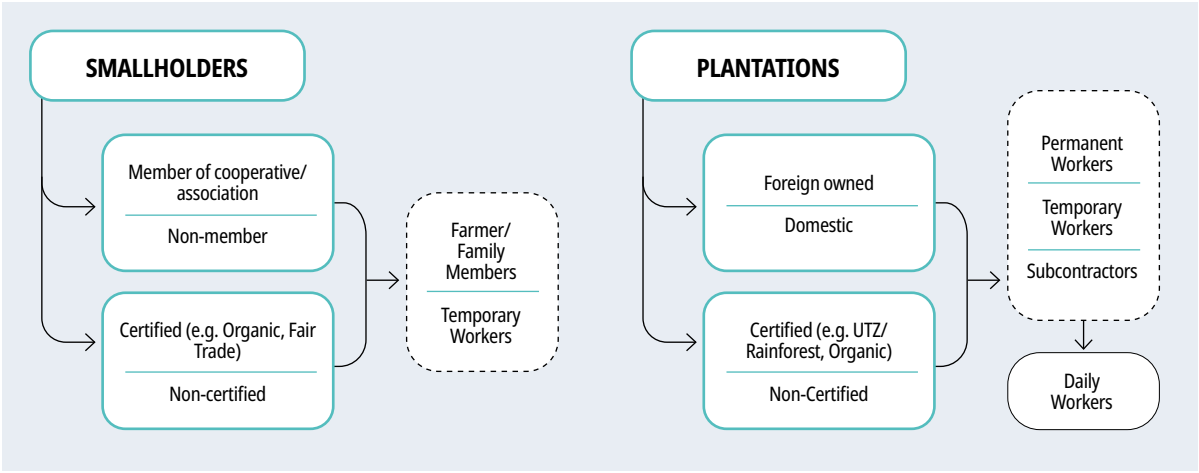


Note: PPI: Provincial Planning and Investment; DPI: District Planning and Investment.
PONRE – Provincial Office of Natural Resources and Environment; DONRE – District Office of Natural Resources and Environment.

Source: Authors.

Coffee growers in Champasak can be subdivided into the following two categories: (i) plantations owned by individuals or companies who were granted land concessions by the Government; and (ii) farms owned by smallholders, who may sell their coffee as individuals or as members of farmers' groups or cooperatives.

Figure 4. Typology of enterprises and workers in farms and plantations



Source: Authors.

Plantations account for around 30 per cent of the land under coffee cultivation, with the size of farms ranging from 10 to 3,500 hectares. Companies owning plantations may be domestic, foreign (mostly from Thailand or Viet Nam), or a joint venture.

Under the land concession scheme, the Government leases land to domestic and foreign companies for periods of up to 50 years.[33] In return, the Government receives a yearly fee based on the location, amount of land rented, and type of agricultural activity. This is intended to benefit local people through compensation with cash and improved village-level infrastructure and providing them with stable employment.[34] Foreign companies started to acquire concessions from the Government to manage coffee plantations at the beginning of the 2000s.

Coffee farms owned by **smallholders** range from 1 to 10 hectares (average size per household: 2.5 hectares). It is estimated that there are about 24,000 families involved in coffee farming in Champasak, which collectively comprise 70 per cent of total coffee hectares. Households also grow vegetables, tea, pepper and other short-term crops to augment their income.

Six cooperatives on the Bolaven plateau in Southern Lao PDR are currently members of the Lao Coffee Association, comprising 3,450 households in 2019 (about 14 per cent of smallholders engaged in coffee farming on the Bolaven plateau in total). The average number of households per cooperative amounts to 575. Members have contracts with the cooperatives to which they sell parchment coffee they produce for export. They can still sell fresh cherries and parchment coffee to other traders.

Many smallholders are involved in contract farming with investors (companies or cooperatives). Under the most common model, the smallholder provides labour and land, and the investor provides capital, technology, and marketing.[35] Under this model, farmers and/or households are able to maintain their access to land while securing more reliable income, improved technology, and agricultural productivity.

33 Previously up to 99 years, prior to the promulgation of the Investment Promotion Law in 2016.
34 Miles Kenney-Lazar, Michael Dwyer and Cornelia Hett, *Turning Land into Capital: Assessing a Decade of Policy in Practice* (Vientiane, Land Information Working Group), 2018.
35 Roderick Campbell, Tristan Knowles and Amphaphone Sayasenh, *Business Models for Foreign Investment in Agriculture in Laos* (Winnipeg, International Institute for Sustainable Development), 2012.

Cultivation

The production of coffee in Lao PDR includes own-account farmworkers, who fall under the informal sector, and permanent employees. The work is largely seasonal, with employment increasing during the harvest season. Employment on smallholder farms and plantations also fluctuates according to farm productivity.

Workers can perform multiple roles, for example as farm owners on their own small farm and as day labourers to supplement their income. On farms owned by smallholders, an average of two to three household members help in various activities. In Champasak Province, contributing family workers who work for a family business without receiving any regular pay account for almost 60 per cent of the total labour employed, all sectors combined. The livelihoods of about 300,000 people are estimated to depend on the sector.

Permanent employees are employed on plantations and consist primarily of office staff, supervisors/technical staff for clearing activities and harvest, and a core group of plantation workers in charge of farm maintenance activities, such as fertilizer application, weeding, pruning, and replanting. The ratio of permanent employees to coffee hectare is about one permanent employee to 10–15 hectares. The number of permanent employees in the sector ranges from 3,500 to 5,000.

1. Farm establishment (preparation of seedlings, land clearing, planting, replanting)

The coffee cultivation process begins with a coffee cherry. Planting materials (seedlings or seeds) are sourced from farmers' own farms, nurseries, and the Agriculture Research Centre (ARC) of Southern Lao PDR. Seedlings are prepared at least six months before planting. Many smallholders are provided with seedlings by exporter-processors, especially for some Arabica varieties. The farmers then pay for the seedlings with fresh cherries.

The preparation of seedlings usually occurs during the dry season, at the same time as land clearing activities.[36] Plantations tend to hire temporary workers, who work under the supervision of permanent employees. Land clearing involves the removal of weeds and trees and is mostly carried out by male members of the household and temporary workers working **manually** using knives, axes and hoes; at times, grass cutting machines and **small tractors** are used. In plantations where trees need to be removed, this is usually done using mechanized equipment such as chainsaws.

After the land has been cleared, the fields are ploughed and harrowed. Soil amendments such as phosphorus and lime and/or organic fertilizer (animal manure) are incorporated into the soil at least two months before transplanting. Both women and men, a mix of household members and hired temporary workers, apply fertilizer. Smallholders generally use a hoe and sometimes a manual plough, while plantations use mechanized ploughs. Where the land cannot be ploughed, holes are dug instead.

Seedlings are transplanted at the beginning of the rainy season, in May or June, when the soil is moist and conditions are cool. The main tool used is a knife to move the seedling out of the pot in order to replant it.

Figure 5. Worker preparing seedlings for replanting

Source: Vision Zero Fund, 2019.

2. Maintenance

Maintenance activities include fertilizer application, pest and disease management, weeding, and pruning.

Few smallholders use **fertilizer**, be it organic or inorganic. Organic farming seems to be understood by smallholders as "applying no inputs at all". However, coffee requires nutrients in adequate and balanced amounts, and annual leaf and soil analyses are recommended when the trees start producing, in order to

36 The dry season for the Bolaven plateau, Champasak Province, is between October–November and April–May.

implement an accurate and complete fertilization programme.[37]

Compared to smallholders, plantations use a high level of inputs which can either be organic or inorganic or a combination of both. For plantations that have adopted the organic or natural farming system, mulching and organic fertilizer (compost from cattle manure and coffee pulp) are routinely applied.

Use of **chemical pesticides** is relatively low, especially among smallholders. Their use seems to be more prevalent on plantations, but the research team was not able to validate this information. As for herbicides, anecdotal evidence indicates that they are increasingly being used, especially on large plantations.

Management of insects, especially the stem borer, is critical. Cultural control, such as sanitation or removal of all plants showing symptoms of stem borer attack, can be an alternative to chemical use. In a study conducted in 2011, smallholders complained of increased incidence and severity of pest and insect infestation.[38] As per information (October 2019) from the Agriculture Research Centre of Southern Lao PDR, a principal reason for the increase in coffee plant diseases is the delayed start of the rainy season, which leads to heavy rainfall continuing in the months of August and September. Exposure to too much water at a time of the year where rainfall should be moderate makes coffee trees prone to insect and fungi attacks.

Weeding is done once annually (before harvest) on Robusta coffee farms, and two to three times annually on Arabica farms, using simple agricultural implements and/or grass cutting machines. In plantations under conventional farming, weeding is done manually, mechanically, and through the use of herbicides.

Pruning entails cutting branches and removing shoots, buds and leaves to ensure the growth of new plant tissue and to increase yields, the quality of cherries, resistance against diseases and the longevity of plants. If done properly, pruning also contributes to limiting the height of trees. It is performed more regularly on plantations than on smallholders' farms. The key tools used are handheld saws and machetes, pruning shears, and files for sharpening tools.

Weeding and pruning are usually done by temporary workers and daily wage workers recruited by smallholders and plantations by the day, week or month. The need for temporary workers is higher on Arabica farms than on Robusta farms, as Arabica requires more care during maintenance and harvesting.

Figure 6. Workers performing farm maintenance

Source: Vision Zero Fund, 2019.

37 Edward Winston et al., "Plant nutrition & fertiliser management", in *Arabica Coffee Manual for Lao-PDR* (FAO Regional Office for Asia and the Pacific, 2005).

38 Vonesili Saysana, *Promoting Organic and Fair Trade Certification in the Lao PDR Coffee Sector: Benefits and Challenges for Farmers and Local Economies*, Oklahoma State University thesis, 2011.

3. Harvesting

Harvest activities involve the largest group of temporary workers employed by both plantations and smallholders. A high percentage of internal migrants from other districts and provinces are usually hired for the season, some moving as families, including children. **The workforce is made up of more women than men**, although sex disaggregated data is seldom available. Household members also participate in harvesting. For Arabica, the harvest season is from October to December and for Robusta from November to February. Because the harvesting of Arabica coincides with the harvest season of lowland rice, recruiting labour poses some challenges.

On an annual cropping season basis, the average yield of a one-hectare coffee plantation is 8 MT of fresh cherries. Yields usually increase with the age of the tree and starts to decline about 15 years after planting. Under good management, however, the tree can have an economic life of up to 50 years.

For cherry picking on slightly different terrains, workers walk from tree to tree to gather the cherries. In most cases, and mostly among smallholders, makeshift ladders are used to reach tall trees (especially for Robusta trees, which are usually taller than Arabica).

Robusta is harvested using the strip method, which consists of grabbing a branch near the trunk by the hand and pulling it outwards, knocking all of the fruit onto a piece of canvas on the ground. This method is faster and easier than the selective handpicking used for Arabica, where handpicked cherries are placed in a basket or bag, with workers sometimes carrying up to 10–12 kg of cherries.

Figure 7. Workers harvesting coffee in plantations

Source: Vision Zero Fund, 2019.

Figure 8 shows the example of a plantation where a tractor with a platform in tow is used to reach cherries in the upper part of a tree and to move from tree to tree.

Figure 8. Platform towed by a tractor to reach cherries in tall trees

Source: Vision Zero Fund, 2018.

Workers sometimes have to carry sacks of cherries for a few hundred metres to reach a central cherry collection point. In plantations where the roads are wide enough, tractors or trucks may be used for transportation.

Figure 9. Workers weighing sacks of harvested cherries on a plantation

Source: Vision Zero Fund, 2019.

Freshly picked coffee cherries are both heavy and highly perishable. Delays between harvesting and processing (either drying or pulping) the fresh cherries should be kept to a minimum. If smallholders do not do the primary processing themselves, they must deliver the cherries to a nearby mill or intermediary the day they are picked. Consequently, smallholders make frequent deliveries to buyers located a maximum of 20–30 km from their farms. The cherries are packed in sacks and taken to mills or intermediaries using motorcycles, two-hand tractors or power tillers with trailers. A common practice is to fill empty fertilizer sacks (with a capacity of 50–60 kg) with cherries. These empty sacks are easily available in agriculture input shops at low cost. Farmers who actually use fertilizer may re-use empty fertilizer sacks to transport their coffee.

Figure 10. Smallholders delivering fresh cherries to a processing plant, using mini truck and tractor

Source: Vision Zero Fund, 2019.

After harvesting, most smallholders' farms and plantations practise sanitary strip picking, which involves the removal of all remaining cherries. This activity is important because cherries can be potential breeding sites for the coffee stem borer.

Wage setting

Different factors influence wage setting for temporary workers in coffee farms and plantations in Southern Lao PDR.[39] These include the working tools to be used, given

39 Dexanourath Seneduangdeth et al., "Labor Employment Opportunities in Coffee Production in Southern Lao People's Democratic Republic", in *Journal of Asian Rural Studies*, 2(1), 2018, 16–36.

their implications for productivity and the level of technical competence required; the location of the farm (farms or plantations located in villages near a town centre or near paved roads pay higher wages); and the worker's residence (local workers living in the same village as the smallholder will receive higher wages, as the smallholder does not have to provide food and lodging). Planting and weeding are often done by temporary workers from the village where the farm or plantation is located. In contrast, workers harvesting coffee consist of a mix of village residents and others from nearby districts and provinces. In most cases, workers go home every day. Some plantations have basic housing facilities for permanent and temporary workers contracted for extended periods (two weeks to a month).[40]

For farm establishment activities, temporary workers are paid between 40,000 and 80,000 kip per day, depending on the technical complexity of the job and the distance of the farm from the main road. For weeding, a worker using traditional tools, such as knife and hoe, is paid 40,000 kip per day, while a worker using a grass cutter receives 50,000 kip per day.

Wage differences between women and men are observed, primarily for farm maintenance activities, due to the perception that men are "stronger" and, thus, more versatile and flexible than their female counterparts. **In harvesting, wage rates tend to be the same for both women and men.**[41]

Payment

There are various payment schemes for **harvesters** in both smallholders' farms and plantations. Most harvesters are seasonal workers and are paid per kilogram of cherries. The price per unit ranges from 800–1,000 kip. Daily payment is between 40,000–50,000 kip and may include food.

In **plantations**, payment can also be made through contract payment. In the 2018–19 harvesting season, contract farmers received 7 million kip per hectare of red cherries harvested. In this payment scheme, the contractor has the option to hire additional workers to perform the task. The responsibility is transferred to the contractor, who becomes responsible for the supervision and payment of hired workers.

Many smallholders and plantations are shifting from per unit payment to daily rate payment as an incentive for workers to consider the quality of the cherry (stage of ripeness) rather than the quantity. Practices vary as to when payment is made to harvesters. Some farms prefer to pay harvesters only a portion of what they are due to ensure that they return the next day.

Cost and income

Coffee requires a heavy "start up" (establishment) cost. Plantations tend to have higher establishment costs than smallholders due to heavier investments in infrastructure, including roads and drainage. Based on smallholders' estimates, costs during the establishment period can range from 20 million to 25 million kip, with labour accounting for about 56 per cent of this amount.

Costs incurred in the course of a cropping season consist of workers' remuneration and the cost of inputs such as fertilizers, pesticides and fuel to operate machinery. Among smallholders, labour costs account for about 77 per cent of total annual production costs. This includes the imputed costs of labour provided by farmer and household members. In plantations, labour costs comprise 70–75 per cent of total production costs (see Appendix II).

Revenue per hectare is a function of yield levels and the market price obtained per unit of output. It is estimated that smallholders get only about 8 per cent return on their investment, based on the 2017 prevailing price of 1,900 kip per kilogram of fresh cherries. As per interviews with coffee farmers, in October 2019 the price had fallen to 1,700 kip per kg of fresh cherries.

Innovations in technology or work organization hold great potential to increase grower profitability. The processing of cherries into parchment increases the grower's share in total profit. **Good quality management practices** at the farm and processing levels can reduce the proportion of defective beans that are rejected by buyers or paid for at discounted prices.

40 Saithong Phommavong et al., *Mapping context of land use for a non-traditional agricultural export (NTAE) product: case study of land use for coffee plantation in Pakxong district, Champasak Province, Lao PDR,* Conference Paper No. 75, 2015.
41 Seneduangdeth et al.

Consolidation

Village or district intermediaries are collectors who source fresh cherries and parchment from smallholders. They sell either to exporter–processors or to other intermediaries. The majority of intermediaries are buying stations or agents affiliated with exporter-processors. They weigh, sort, pack and transport fresh cherries to processing facilities in the same day. The intermediaries are sometimes engaged in primary processing as it is not possible to store the fresh cherries for more than 12 hours after harvest. Some intermediaries also have their own plantations.

Many intermediaries provide credit services to farmers through cash or rice loans. Loan repayment is deducted from the proceeds of the farmer's delivery. By providing credit, intermediaries secure their supply of coffee cherries or beans. In general, loans are based on verbal agreement and trust.

An increasing number of mills/processors are accepting deliveries of fresh cherries directly from farmers. Mills do not have a minimum volume requirement for a supplier to sell directly to them.

Primary processing

Primary processing involves the **separation of the beans from the skin and pulp**. The end product is green coffee for export. Before beans go through the processes of hulling and polishing, the cherry can be processed to obtain parchment coffee. Parchment coffee is normally produced by smallholders, industrial mills and intermediaries. Hulling is centralized in industrial mills/processing plants, owned by either companies with plantations or cooperatives.

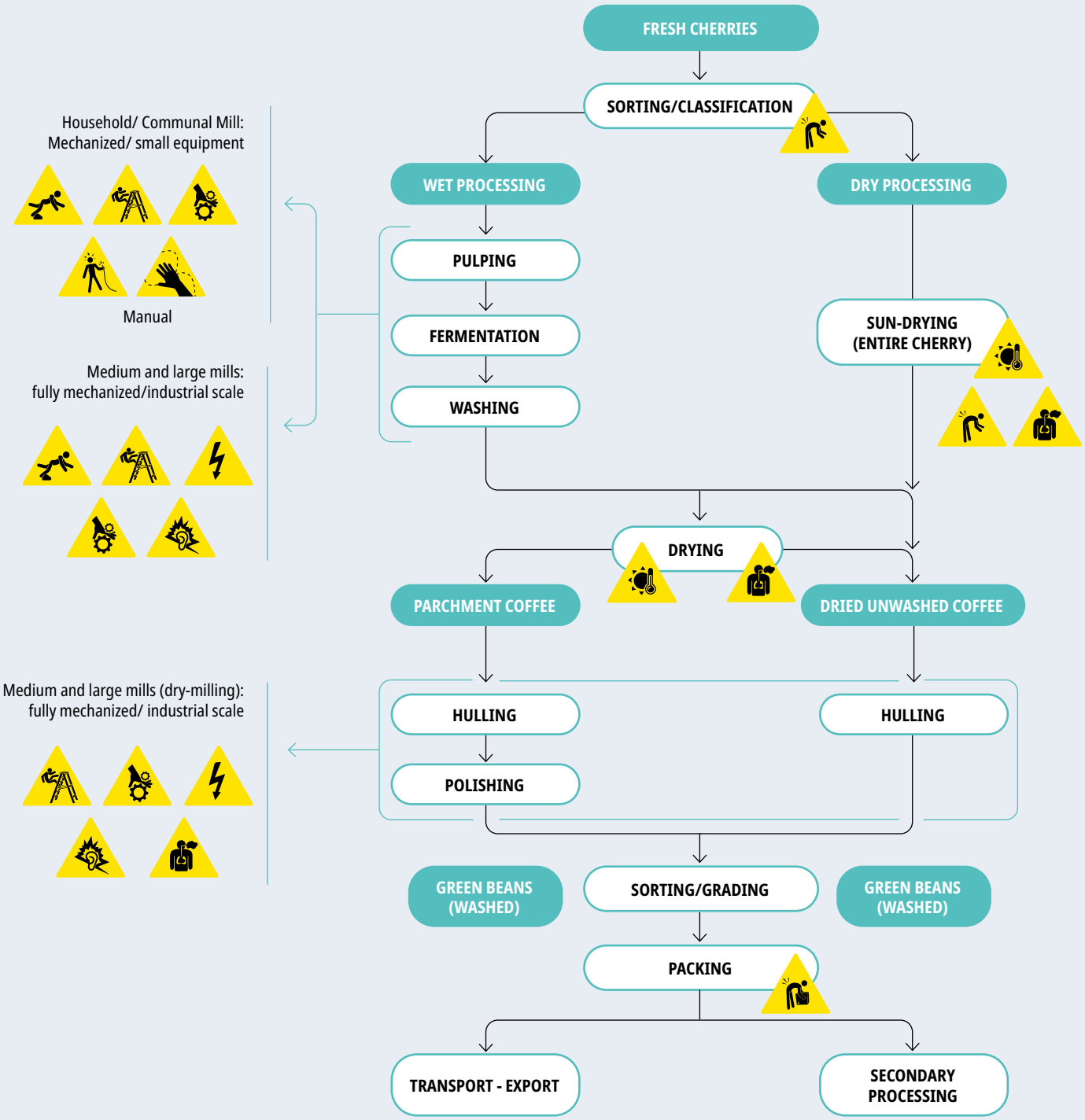
Industrial mills source the cherries and parchment from smallholders and from their own plantations. Some mills prefer to buy only cherries and uniformly process the coffee beans to ensure consistent quality. Many of the mills have already automated most of their processes, except for drying activities, which require the greatest number of seasonal workers. During the harvest season, mills operate in two shifts. A few mills continue to operate during the rest of year, but at a very low level and with a reduced workforce.

The majority of **smallholders** are only able to produce Robusta parchment as it does not require machinery or equipment. Those who are able to process their Arabica cherries into parchment are usually members of cooperatives and share a communal pulping facility provided by the Government or development projects. There are a few progressive and relatively better off farmers who have acquired their own small depulping machines. Parchment processing is done in their homes. However, home processing does not result in uniform quality.

In the case of **intermediaries**, cherries are usually processed into parchment in makeshift work areas using simple equipment like smallholders. Some intermediaries use the same equipment as industrial mills, including hulling machines to process coffee into green beans.

During the peak harvest season, the primary processing segment of the chain provides temporary employment to about 3,500 workers. Daily wages range between 40,000 and 50,000 kip.

Figure 11. Coffee cherry primary processing



Source: Authors.

Key activities

Figure 12. Workers receiving, weighing and transporting fresh cherries at an industrial mill

Source: Vision Zero Fund, 2018.

Figure 13. Household-level pulping facilities

Source: Vision Zero Fund, 2019.

1. Sorting

Upon delivery, the cherries or parchment are weighed, cleaned and sorted. Industrial mills use a series of float tanks for classification. Home-based and village-level processing involves the use of screens with small openings to remove impurities and of water tanks to separate heavier ripe fruits (sinkers) from partially dry and overripe cherries (floaters).

2. Depulping

Cherries are either dried in the sun or processed using the wet method prior to being dried. The **wet method** requires the use of pulping equipment and substantial quantities of water to remove the pulp. The dry method is mainly used in processing Robusta coffee, while for Arabica varieties the wet method is used more often. Wet and dry milling operations generally take place only during the harvest season.

In Champasak, pulping facilities range from hand-cranked depulpers located on household premises to multimillion-dollar structures. An industrial-scale pulping machine can process 2,000 MT of fresh cherries per hour. Communal pulping equipment, on the other hand, has processing capacity of 5 MT of fresh cherries per hour.

In **industrial-scale wet mills,** harvested beans are fed into the pulping machine that separates the bean from the fruit. The pulp is carried into the waste water, while the bean is sent into the fermentation tanks, in which the residues can be broken down by natural enzymes and then easily rinsed away. The beans may stay in the fermentation tanks for 8 to 72 hours, depending on the efficiency of the pulping machine. When the fermentation is complete, the coffee is washed thoroughly with clean water in tanks or in special washing machines.

The number of permanent employees in industrial mills is limited to an average of 10 to 15 employees per mill, **mostly men**, consisting of skilled machine operators and office staff. Large firms usually hire foreign workers to handle machine operations, due to the lack of availability of skilled local workers and a preference by foreign investors for hiring workers from their countries.

During the peak harvest season, mills hire temporary workers to do the drying, hauling/loading, and packing. Large processors in Champasak can hire up to 200 workers over a three to four month period. Companies can operate in two shifts of 100 workers per shift. The number of temporary workers varies from year to year depending on the size of the coffee harvest.

Figure 14. Community pulping facilities

Source: Vision Zero Fund, 2019.

In **household- and village-based wet processing**, all of the activities are done manually except for the pulping. Cherries are fed manually into the depulping machine. After pulping, the lighter immature beans are separated from the heavier mature beans by shaking the beans through a strainer. Fermentation is done by soaking the parchment beans in water for three to four days. The completion of fermentation is determined by feeling the coffee with the hand. The beans are then washed to completely remove the mucilage. Good and bad beans are separated using the floating method. Washing may be done in vats but the general preference, especially among those processing relatively high volumes, is to construct a washing canal. Workers at the household or smallholder level consist primarily of family members. Households primarily hire additional temporary workers to help with drying.

Figure 15. A small-scale "depulping" machine and an industrial-scale pulping facility

Source: Vision Zero Fund, 2018 | Vision Zero Fund, 2019.

The **dry process** involves placing cherries in the sun to dry naturally. This is the common dry process for Robusta coffee. The main purpose of drying is to reduce the moisture content to 11 per cent to ensure proper storage, hulling, and roasting. Similarly, the moisture content of freshly pulped coffee (from the wet process) has to be reduced from 55 per cent to 11 per cent. It generally takes 10 to 12 days of sunny weather to reach the desired percentage. Common drying practices in Champasak are to lay the beans on the ground covered with tarpaulin and to use raised beds that permit air circulation and, thus, speed up the drying process. In some industrial-scale mills, the drying process is accelerated by using drying machines.

Hulling

After drying, hulling is performed to remove husks and skins from the beans and to transform the dry fruit (natural or parchment coffee) into green coffee. The hulling operation is usually performed when beans are due for shipment or for further processing in order to maintain the product's original characteristics. Although there are a few micro hull operators in Champasak, hulling is generally performed by industrial-scale mills. Industrial-scale hulling facilities and the classification of beans are fully automated and require supervision by a technician. Machines generally include ventilation systems and adjustable metal blades. Once hulled, an optional process is to polish the beans in a polishing machine.

Figure 16. In an industrial mill, temporary workers rake parchment on the ground for drying

Source: Vision Zero Fund, 2019.

Beans are packed into 60-kg bags or sacks and are transported to storage areas. Workers use rakes, shovels, string, sealing machines and forklifts for packing and transport. Large mills in Champasak also have automated sackers; more sophisticated hulling facilities hold machines such as densimetric separators and electronic pickers.

Distribution and export

As Lao PDR is a landlocked country, export shipments of green beans need to be transported through neighbouring countries, either to the Laem Chabang seaport in Thailand or the Da Nang seaport in Viet Nam. Hence, in addition to the downward trend in global prices,[42] coffee exporters in Lao PDR are faced with high transportation costs and lengthy procedures. However, tax regulations have been enacted to lower the barrier to the export of agricultural products, and consequently enterprises are not subject to taxes on exports.

Figure 17. Parchment drying at household level

Source: Vision Zero Fund, 2019.

42 International Coffee Organization, *Coffee Development Report 2019: Growing for Prosperity*, 10.

There are **three main markets** for coffee from Lao PDR, namely:

- The **mainstream export market**, with border trade to Viet Nam accounting for about 76 per cent of total export volume. This channel deals primarily with fair average quality beans, including natural Robusta and washed Arabica. Viet Nam tends to blend Lao Robusta coffee beans with domestic beans to meet the flavour, aroma, and taste profiles demanded by Vietnamese consumers and their export markets.
- The **specialty/niche market,** with Europe, Japan and the United States as the key destinations. Beans sold in this channel consist primarily of washed Arabica (generally certified as organic, and Fairtrade and Rainforest Alliance certified). This market segment opens up opportunities to ask for premium prices.[43]
- The **domestic market** channel, with roasted coffee, ground coffee, and soluble coffee as the main products.

It is estimated that about 50–60 per cent of coffee bean production in Champasak goes to the country's largest coffee processor and exporter, a domestic company based in the province. Beans are either roasted or processed into soluble coffee, Viet Nam being the main export destination. The coffee products are mainly exported to Viet Nam through Vietnamese coffee companies operating in Champasak.

International traders play an important role in the global coffee trade. Trading houses not only own a large part of the processing and storage facilities in most coffee-producing countries, but also engage in farm management, export and import, logistics, storage, risk management and finance. The global coffee trade is highly concentrated. The top five international trading companies collectively account for more than 40 per cent of total coffee trade.[44]

Import and roasting

The value added in the coffee supply chain occurs mainly in importing countries, where the largest share of value is captured through roasting, branding, packaging and retailing. The production, and especially the collection of the beans, is labour intensive, while roasting can be seen as more capital intensive. Similar to the international trading sector, the roasting segment is highly concentrated. Seven major roasters share most of the global market.

Roasted coffee loses quality within a matter of weeks, even with high-quality packaging, so roasting activities are typically concentrated in the major end markets of Europe, North America and, increasingly, East Asia. Under good storage conditions, the shelf life of roasted coffee can range from six months to one year.

1.3 Support organizations and services

The institutional environment of the country's value chain is composed of the following government authorities and entities:

- **Ministry of Labour and Social Welfare**:
  - Under the Ministry of Labour and Social Welfare, the Labour Management Department is responsible for the promotion and enforcement of OSH legislation. As per information from the Labour Management Department, in 2019 the Ministry had 80 full-time labour inspectors, of which 14 were responsible for the inspection of Vientiane Capital and districts and 66 for the 18 provinces (an average of three to four inspectors per province).[45]
  - Under the Social Security Law (enacted on 26 July 2013 and amended in July 2018), the Social Security Office of the Ministry is responsible for compulsory insurance schemes for employees and workers of both state and private enterprises with one or more employees or workers. Self-employed persons in agriculture, industry, commerce and services can register as voluntary members. Compensation in the

43 International Coffee Organization, *Coffee Development Report 2019: Growing for Prosperity*, 39.
44 UNCTAD.
45 Ministry of Labour and Social Welfare, Lao PDR, November 2019.

event of work-related injuries, disease or death is managed by the National Social Security Fund.

- **Ministry of Health**: The Ministry of Health's Hygiene and Health Promotion Department is responsible for the delivery of occupational health services, in collaboration with the Ministry of Labour and Social Welfare. The Ministry of Health carries out workplace inspections in respect of health and hygiene and manages the Occupational Health Service Centre in Vientiane. A National Health Insurance scheme is being implemented by the National Health Insurance Bureau, which promotes access to health services for all. Anyone who is not paying into social security can access the National Health Insurance health services by paying a fixed amount set depending on whether: (1) the contracted health service provider is a community health centre or a district or provincial hospital; and (2) the service is provided by the outpatient (OPD) or inpatient department (IPD). The service access fees are as follows: (1) health centre: 5,000 kip for both OPD and IPD services; (2) district hospital: 10,000 kip for OPD and 30,000 kip for IPD; (3) provincial hospital: 5,000 kip for OPD and 30,000 kip for IPD. For regional or central hospitals, the service access fees are: 20,000 kip for OPD and 30,000 kip for IPD. Once a person has paid the service access fee, the healthcare facility will provide curative healthcare. There are no expenses for the patient in addition to the service access fee amount.

- **Ministry of Agriculture and Forestry**. The Ministry of Agriculture and Forestry is responsible for agricultural development. The Department of Agricultural Extension and Cooperatives coordinates the delivery of extension services in the country. Its role includes providing technical training to farmers' groups, disseminating information, and promoting the use of machinery and modern production technologies.[46] The Ministry of Agriculture and Forestry is present in all provinces through provincial agriculture and forestry offices, and in all districts through district agriculture and forestry offices. Government extension services are provided by the Provincial Agriculture and Forestry Office (PAFO) and the District Agriculture and Forestry Office (DAFO). These offices also support the formation of farmers' groups and cooperatives.[47] In addition, the Ministry oversees the implementation of pesticide regulations at the national level, with PAFO being in charge of implementing regulations at the provincial level, such as for the import and distribution of pesticides and agricultural products, and licence approval, and the DAFO implementing regulations at the district level, such as for the inspection of retail shops that sell pesticides.

The development of agricultural commodities, including coffee and other cash crops (such as rice, maize, tea, sugar cane, tobacco, cassava and vegetables), is guided by the Agriculture Development Strategy to 2025 and Vision to the Year 2030.[48] This includes, among other things, a production target for coffee (120,000 tons by 2025, in line with the Lao Coffee Sector Development Strategy of 2014 [49]). The strategy focuses on modernizing the agriculture sector by promoting food security and quality, clean and safe production, increasing commercialization, ensuring environmental protection and addressing climate change. It supports measures that improve farming practices, seed and soil quality, farm machines and other agricultural inputs of which coffee farmers are beneficiaries.

- **Clean Agriculture Development Centre (CADC).** Under the Ministry of Agriculture and Forestry, the CADC is responsible for the promotion and development of all safe and environmentally friendly agricultural systems. The Lao Certification Body is operated under the CADC. It was approved by the Ministry of Agriculture and Forestry in 2008 and is in charge of providing organic inspection and certification services and assisting producer groups in setting up their own internal control systems.

- **Agriculture Research Centre of Southern Lao PDR.** This is a government institute under the National Agriculture and Forestry Research Institute (NAFRI). The Centre's main activity is the production of seedlings,

46 As stipulated in Ministry of Agriculture and Forestry Agreement No. 1896/AF on the organization and function of the Department of Agricultural Extension and Cooperatives, dated 10 August 2012.
47 Ministry of Agriculture and Forestry, Lao PDR, *Agriculture Development Strategy to 2025 and Vision to the Year 2030*, May 2015, 31–32.
48 Ministry of Agriculture and Forestry, Lao PDR, *Agriculture Development Strategy to 2025 and Vision to the Year 2030*.
49 Lao Government and Lao Coffee Board, *Lao Coffee Sector – Development Strategy by 2025*, June 2014.

which are sold to growers, especially plantations and development programmes. Other activities include the preparation of the registry of coffee varieties and the provision of training on coffee production. The frequency and type of training activities, however, are largely dependent on external support from development programmes.

Social partners are also involved in Lao PDR's coffee value chain:

- **Lao Coffee Association.** The Association promotes Lao coffee in local and international markets. It represents producers, processors and exporters at all levels of the value chain. The Association supports its members in finding markets and provides them with marketing advice as well as training on topics related to business matching, management and product quality. The Lao Coffee Association acts as a focal point enabling members and Government (Ministry of Commerce and Industry and other government organizations) to exchange on issues and challenges faced by members. The Association is involved in promoting the quality of Lao coffee and in meeting international standards and requirements. It also collects data and produces statistics on production, processing and exporting.[50]
- **Lao Federation of Trade Unions (LFTU).** The LFTU is the only national trade union centre in Lao PDR. While the LFTU is not yet represented on coffee plantations, it engages with coffee farmers through their village union committees. According to the LFTU office in Vientiane, the union has been assisting coffee farmers in one village in Paksong District, Champasak Province, in forming and working as a group to improve their capacity to negotiate better prices. This village belongs to the group of three model villages that the Government is currently supporting to become models in terms of their socio-economic, political and cultural development.

50 Lao Coffee Association, see https://laocoffeeproductprice.la/.

1.4 Legislative framework

Lao PDR has ratified ten ILO Conventions, of which nine are still in force, namely:

Convention	Date	Status
C029 – Forced Labour Convention, 1930 (No. 29)	23 Jan 1964	In force
C006 – Night Work of Young Persons (Industry) Convention, 1919 (No. 6)	23 Jan 1964	In force
C138 – Minimum Age Convention, 1973 (No. 138) Minimum age specified: 14 years	13 Jun 2005	In force
C182 – Worst Forms of Child Labour Convention, 1999 (No. 182)	13 Jun 2005	In force
C100 – Equal Remuneration Convention, 1951 (No. 100)	13 Jun 2008	In force
C111 – Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	13 Jun 2008	In force
C144 – Tripartite Consultation (International Labour Standards) Convention, 1976 (No. 144)	29 Oct 2010	In force
C171 – Night Work Convention, 1990 (No. 171)	04 Jun 2014	In force
C013 – White Lead (Painting) Convention, 1921 (No. 13)	23 Jan 1964	In force

In November 2014, an amended Labour Law (Labour Law, 2013, No. 43/NA) became effective, providing the main legislative framework for OSH in Lao PDR. The amended Law is better aligned to international labour standards, [51] and places limitations on working hours,[52] regulates night shifts and overtime, defines sick leave and leave entitlements, making special provisions for pregnant women, and includes measures aimed at increasing the skills of the country's labour force. It also contains a clause on compulsory social security for employees in accordance with the Social Security Law. Every workplace is required to make compulsory payments to the National Social Security System.

The Law defines the responsibilities and obligations of the State, employer, employee, and suppliers in ensuring safety and health in the workplace,[53] and requires employers to assess risks to safety and health and to report the results to the Labour Inspection Agency at least once a year. Employers are obliged to: (i) provide training to develop employees' skills and knowledge; (ii) ensure working conditions are safe and that there is appropriate lighting, a supply of drinking water, showers, toilets and so on, a storage room for toxic substances, and that measures are taken to guard against electric shocks and fire; and (iii) facilitate medical examinations of employees once a year and provide a first aid kit on site.[54] Workers' OSH must form part of the internal regulations.

The Law stipulates that companies/economic labour units with 100 employees or fewer must have at least one employee responsible for labour health and safety. It calls for the recording and reporting of work accidents and their causes to the Labour Administration Agency.[55] It also provides for safe working conditions and higher compensation for dangerous work, but it does not explicitly protect a worker's right to remove himself or herself from a hazardous situation.[56]

Child labour is prohibited, with the minimum age for employment set at 14 years of age. Children between the ages of 14 and 17 are able to work under limited conditions. They are allowed to carry out activities that, by their nature or the circumstances in which they are carried out, do not harm the health, safety or morals of children. As for the employment of women, an employer cannot require a pregnant woman or a woman with a child of less than 1 year of age to carry heavy loads, stand for long periods, undertake dangerous work or work at night, work overtime

51 United Nations in Lao PDR, *Country Analysis Report: Lao PDR – Analysis to inform the Lao People's Democratic Republic–United Nations Partnership Framework (2017–2021)*, 2015.
52 Six days a week, no longer than eight hours a day or 48 hours a week.
53 Section VIII.
54 Arion Legal, "The Basic Rules of Employment in Laos: Updates to the Lao Labour Law", 2015.
55 Arion Legal.
56 United States Department of State, "Laos 2017 Human Rights Report", 2018.

or work on a day of rest. If necessary, the employer shall temporarily assign the employee to more suitable work during this period, but pay her the salary she earned prior to the new temporary job assignment.

The new national Decree on Occupational Safety and Health (No. 22/G) was formally approved by the Prime Minister on 5 February 2019 and provides clarification on the chapter on OSH in the Labour Law. The Decree is the first legislative instrument that defines the minimum requirements for OSH management systems in the workplace; the obligations of the Government and the structure of coordination at the central and provincial levels; the roles of employers and employees; and a basic set of occupational health and safety services, such as workplace inspection, workers' health surveillance, and notification and cause investigation of occupational diseases and injuries in the workplace.

The Decree covers all types of enterprises (including micro, small and medium-sized enterprises) and workers in both informal and formal economic sectors across the country. Its scope extends to all types of enterprises and workers across all functions in the coffee chain.

The implementation of the Decree involves several ministries. Those most relevant to ensure safety and health in the coffee value chain are as follows:

- Ministry of Labour and Social Welfare: inspection of workplace health and safety; enforcement of the Decree on OSH; development and dissemination of OSH policies and strategies; coordination with other ministries and social partners (convening of tripartite OSH committees at national and provincial levels).
- Ministry of Health: inspection of workplace hygiene in relation to workers' health and food safety; inspection of workplace environment (including temperature, noise level, light, dust, exposure to hazardous chemicals) and its impact on workers' health; monitoring of workplaces to provide annual medical check-ups for their workforce (which is a requirement under the Labour Law).
- Ministry of Industry and Commerce: formulation of workplace standards for factories and buildings; approval of importation of chemical substances and machinery; inspection of factories and their machinery and equipment, particularly their installation.
- Ministry of Agriculture and Forestry: promotion of OSH in the agriculture sector, including the capacity-building of extension officers and farmers in respect of OSH; formulation of measures to ensure that all processes and materials are safe and comply with OSH standards.
- Ministry of Natural Resources and Environment: establishment of measures to ensure a clean and safe environment, and monitoring of their implementation.

Regulation on management of hazardous chemicals

Lao PDR ratified the Stockholm Convention on Persistent Organic Pollutants in 2006, and in 2010 it ratified the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. A Decree on Pesticide Management,[57] which consolidates the various regulations governing the sale and use of pesticides, was issued in 2017. It also includes an article on the labelling of chemicals (Art. 26) to counteract the pervasiveness in the market of pesticides that are labelled inaccurately or in a foreign language. It requires that all pesticides that are produced, imported into and distributed in Lao PDR have a label comprising a picture and text in Lao and foreign languages to show the pesticide, indicate the hazard, and provide instructions and guidance on safety measures relevant for the pesticide. The picture and content of the label shall be determined by the Ministry of Agriculture and Forestry. The Law on Chemicals (No. 07/NA), adopted by the National Assembly in 2016, establishes provisions on the management, monitoring, and inspection of chemicals to minimize health risks and promote cleaner production. This Law represents the first unified overarching regulation of all chemicals in Lao PDR, including pesticides. It entrusts the Ministry of Agriculture and Forestry with the right and duty to manage and monitor chemicals used as pesticides. The Law on Plant Protection and Quarantine (No. 13/NA), adopted in 2016, introduces international standards on phytosanitary measures, including pest management.

57 Government of Lao PDR, "Decree on Pesticide Management", No. 258/GOV, 2017 (unofficial translation).

2 Drivers and constraints for OSH improvement

This section presents market-based incentives, as well as national strategies and initiatives, that can facilitate OSH improvements. It considers the institutional and regulatory framework, and the capacity of different actors to support the necessary upgrading of OSH practices and improvements at all stages of the value chain. It also discusses issues in relation to land use rights, labour market trends and institutional OSH capacities that may limit the increase in OSH performance in the coffee sector.

2.1 Prospects for growth in markets with OSH requirements

As consumers show increased interest in the origin of their coffee, how it is produced and what its social, economic and environmental impacts are,[58] companies are increasing their efforts to improve working conditions, increase transparency and trace their products from seed to table. Compliance with voluntary standards and codes of conduct is becoming a prerequisite for participation in premium markets, such as the European countries, the United States and Japan.

Although most of Lao PDR's coffee is sold for export as mainstream or average quality, the industry is trying to establish a strong foothold in the premium and exemplary market segments. Based on interviews with exporters, a significant part of the beans sold to European countries, the United States and Japan are of high quality and are certified (Fairtrade, Rainforest Alliance and organic).

Production of good quality, organic and/or socially responsible coffee is not possible without OSH improvements. Overall, private compliance initiatives promote and require compliance with decent work conditions and OSH standards. Improvements in OSH can lay the groundwork for enterprises

58 UNCTAD.

to achieve, sustain, and scale up compliance with voluntary standards across their supply chains. Various requirements of global traders, roasters and final users of coffee can potentially be leveraged to promote workers' safety and health. The greatest challenge is to identify and define measures to facilitate compliance that are both cost-effective and have the potential to contribute to the triple bottom line (economic value, sustainable environmental practices, and fair and beneficial business practices for labour and the community).

The intrinsic characteristics of coffee beans in Champasak Province are not fully optimized due to inconsistent quality management practices at the farm and processing nodes. Quality control should be enhanced at every stage of production and processing.

An integrated management system based on quality, OSH and productivity can make it possible for enterprises to document processes and patterns of working conditions that would enable them to consistently comply with established production standards and improve efficiency.

Voluntary sustainability standards

As buyers and producing countries have sought greater differentiation in the coffee market and responded to growing concerns about the sustainability of the supply chain, there has been a proliferation of standards.

The ability of farmers and small enterprises in Lao PDR to comply with standards is limited without significant institutional support. In Champasak Province, producers show increasing interest in complying with voluntary sustainability standards in order to obtain certification. The number of applications for certification has increased and the type of certification sought depends on customer demand. There is a clear trend towards more organic coffee.

However, the conditions under which certification will be a viable option for farmers remain highly context-specific, as is the question whether there is a market for their certified coffee. In 2016–17, 55 per cent of global coffee production consisted of certified beans, but only 20 per cent was actually sold as such.[59] Linking the promotion of OSH to promoting compliance with social standards would be viable and beneficial for producers that are linked to buyers requiring compliance to specific standards rather than those engaged mainly in spot or arm's length transactions.

In Champasak Province, the collaboration and support of exporter-processors, many of which are members of the Lao Coffee Association, are critical for promoting the adoption of safe behaviours and practices across all functions in their respective chains. Corporate social responsibility is practised in the country by some companies and cooperatives supplying niche markets in Europe, the United States and Japan, but further awareness-raising activities could be conducted.

Certified organic coffee

The organic market is among the niche markets currently being targeted and catered to by the coffee industry in Champasak. Organic farming can help eliminate risks associated with exposure to chemicals among workers and the farming community. The price for organic coffee is generally 25 per cent higher than for conventional coffee.[60] Organic certification is issued by the Lao Certification Body and focuses on the Lao Organic standard.

Food safety and quality requirements

Mandatory requirements for the export of green coffee consist of regulations concerning food safety, contaminants and labelling, as well as quality requirements. Alignment with good agricultural practices (GAP), good manufacturing practices (GMP), and the system of hazard analysis and critical control points (HACCP)[61] can facilitate compliance with the legal requirements as well as help improve productivity and OSH.

Traceability requirement

The traceability of coffee beans is necessary to access niche markets. Beans must be traceable

59 Sjoerd Panhuysen and Joost Pierrot, *Coffee Barometer 2018*.

60 Oksana Bulavtceva et al., "The Market for Organic/Fair Trade Coffee in Germany and the United States", in *EOS series: Export Opportunity Surveys,* EOS Research Paper 1/2016.

61 HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical and physical hazards from raw material production to distribution and consumption of the finished product. The Food Safety Modernization Act of the United States requires the inclusion of preventive control measures in food safety management plans, and Council Directive 93/43/EEC of 14 June 1993 on the hygiene of foodstuffs prescribes that the HACCP is mandatory for companies which process, treat, pack, transport, distribute or trade foodstuffs. It also applies to foreign suppliers.

throughout the entire supply chain to guarantee food safety, allow appropriate action in cases of unsafe food, and limit risks of contamination.

To increase the competitiveness of Lao coffee beans, in 2016 the Government initiated the geographical indication (GI) scheme, an intellectual property right protecting products whose specifications are closely linked to their geographical location or origin (such as a town or region).[62] So far, only one coffee cooperative in Lao PDR has applied for GI certification, and its application is still being processed. GI applications are managed by the Department of Intellectual Property under the Ministry of Science and Technology.

2.2 Potential for implementing the Lao PDR strategy for sustainable development of the coffee sector

The sustainable development of the coffee sector is a government priority. The Lao Strategy on the Development and Promotion of Lao Coffee to 2025 aims to enhance the contribution of the sector to the achievement of the national socio-economic development goals of poverty alleviation and economic growth, and to support the sustainable development of the sector. [63] It sets the basis for supporting stakeholders along the supply chain to comply with market requirements, upgrade their practices, and increase quality and productivity while improving OSH.

The Lao Coffee Board is the body responsible for securing the implementation of the Strategy. It is made up of public sector and private sector representatives, including from the Ministry of Agriculture and Forestry, the Ministry of Industry and Commerce, the Ministry of Natural Resources and Environment, and coffee businesses, as well as smallholder coffee farmers and provincial vice-governors.

In 2015, the country adopted an Agricultural Development Strategy, which identifies coffee as one of the priority products.[64] The Strategy establishes a target of 130,000 hectares throughout the country planted with coffee, with an annual production of 280,000 MT by 2025. The Lao Government plans to increase the number of organic and GAP-compliant farms to 70,000 and 100,000 by 2025, respectively.[65] OSH can help lay the groundwork for achieving the Government's objective of producing clean and sustainable agricultural products.

2.3 Support for rural development and upgrading of farm practices

Multiples initiatives have been undertaken in Lao PDR with this objective, namely:

Government extension services in agriculture

As mentioned, through PAFO and DAFO, the Department of Agricultural Extension and Cooperatives delivers extension services, including technical training to farmers' groups, disseminates information and promotes the use of machinery and modern production technologies. However, PAFO and DAFO tend to

62 The decision of the Minister of Science and Technology on the Implementation of Geographical Indications under the Law on Intellectual Property No. 1119/MOST was enacted in October 2016.
63 Secretariat of the Lao Coffee Board, *Lao Coffee Sector Development: Progress, Learning and Challenges* (SWG-ARD Meeting, 31 March 2015).
64 Asian Development Bank, *Lao PDR: Accelerating Structural Transformation for Inclusive Growth – Country Diagnostic Study* (Mandaluyong, 2017).
65 Patamasiri Hoonthong and Rojana Manowalailao, "Planting 'Clean Agriculture' for Future Laotian" (ASEAN Sustainable Agrifood Systems, 2016).

be understaffed, which limits their resources to disseminate agricultural knowledge.[66]

A 2017 country study by the Asian Development Bank identified large gaps in facilitating technology adoption on farms. At the district level, farming systems extension workers are not specialized. At the village level, an informal network of village extension workers recruited from among village members receive information materials and training from district offices.

While the Government has a policy of giving district offices the responsibility for managing extension activities in response to farmers' needs, capability needs to be built at the district level to put this policy into practice. Past experience in the country has shown that participatory planning at the village level, with village authorities playing a coordinating role, was a key to success. Training should also be designed to solve real problems faced by farmers and should involve practising skills in real conditions. Incentives and transportation should be provided for field staff to improve motivation and efficiency.[67]

Support from companies, cooperatives and trade unions

During the past years, the private sector has been increasingly involved in the delivery of agricultural extension and social services. It is common for lead companies engaged in the contract farming model with smallholders to provide support to improve skills and farm practices. The medium-term to long-term goal for them is to obtain certification. One lead company on the Bolaven plateau, for example, supports more than 1,700 coffee farmers through training on good agriculture, social and environmental practices, and coffee processing. The company also engages in various corporate social responsibility activities, including the provision of free basic medical care and access to drinking water for contract farmers.

The presence in Champasak of these lead firms that are already certified and helping their suppliers to achieve certification can provide points of leverage and the infrastructure for the promotion and implementation of OSH.

Some cooperatives conduct training on organic farming practices for their members. One cooperative provides credit services and is engaged in fertilizer production and marketing. The Decree on Cooperatives (No. 136/PM) authorizes cooperatives to be engaged in a broad range of activities (not only production, processing and marketing, but also research and the promotion of suitable technologies to their members, and various other services) that could easily incorporate specific actions dedicated to OSH.

The LFTU has been helping coffee farmers in one village in Champasak Province to organize and work in groups, with the aim of strengthening their bean-selling capacity and ability to negotiate better prices. The organization of coffee farmers' groups can be a stepping stone to the formation of a cooperative at a later stage. The establishment of cooperatives must be in line with Decree No. 136/PM, which falls under the Ministry of Industry and Commerce.

2.4 Limited legal land use rights

An important challenge faced by farmers when seeking to upgrade their practices is their limited legal land use rights. Although the Government, in collaboration with development programmes, has started the process of clarifying land use rights, this has not been completed.

The absence of land use certificates makes it difficult for farmers to apply for bank loans. Without documented proof of ownership, it is still possible for the land to be reallocated to other users. With the risk of land loss, farmers are less likely to make long-term productive investments in the lands that they are currently cultivating.

66 Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH, *Sector Skills Study for the Agriculture and Food-Processing Sectors* and *Value Chain Analyses for Selected Sub-Sectors of the Agriculture and Food-Processing Sectors,* 2017, 24.
67 World Bank, *Lao People's Democratic Republic – Agriculture Competitiveness Project* (Washington, DC, World Bank Group, 2018).

2.5 Shortage of labour

A number of studies indicate that a shortage of labour is a constraint faced by the private sector in Lao PDR. Among other factors, this lack of labour supply can be related to the following:[68]

- low productivity in agriculture, which means that it is necessary for more workers to stay on their farms;
- a large number of rural residents in central and Southern Lao PDR are leaving their farms and migrating to Thailand, attracted by the opportunity to earn higher wages.

In the coffee sector, the availability of labour is a problem mostly during the harvest season, which requires a high number of temporary workers. Labour shortages occur in part because the Arabica harvest coincides with the harvesting of rice and because many households are busy taking care of their own coffee farms.[69]

2.6 Limited institutional capacities for OSH

Producers and other actors within the coffee value chain have limited knowledge of the OSH hazards and risks to which they are exposed. Except for promotion of the use of personal protective equipment, it appears that initiatives to build the capacity of employees, workers and employers in the coffee industry to implement OSH in their workplaces have been very limited. There is also a paucity of data on work-related accidents and illnesses in the coffee industry and the agriculture sector in general. Monitoring data is necessary to inform the effectiveness of OSH interventions and to guide the formulation of development plans and preventive strategies.

Although by law companies are meant to undergo safety inspections by labour inspectors at least once a year, the research team found little evidence of these inspections being conducted in coffee plantations and mills. The functions of labour inspectors include enforcing the Labour Law, providing technical information and advice to employers and workers to comply with the Labour Law, and notifying the competent authority of defects or abuses not specifically covered by existing legal provisions.[70]

Based on random visits to input shops in Paksong, it appears that regulations on the management of hazardous chemicals are not yet being fully implemented. All pesticides and herbicides sold and used in Lao PDR are imported from Viet Nam, Thailand and China. Contrary to the law, labels are written in Thai, Vietnamese and Chinese. PAFO and DAFO officials conduct training on banned hazardous agriculture chemicals and also encourage farmers to buy only agriculture chemicals that are labelled and come with safety instructions in the Lao language.[71] In addition, they promote integrated pest management aimed at reducing pesticide exposure and decreasing pesticide use.

68 Emerging Markets Consulting, *Business Formalization in the Lao PDR*, 2016.
69 Oliver Schönweger and Peter Messerli, "Land Acquisition, Investment, and Development in the Lao Coffee Sector: Successes and Failures", in *Critical Asian Studies*, 47:1, 94–122, 2015.
70 The Labour Inspection Convention, 1947 (No. 81), Art. 3.
71 Government of Lao PDR, "Decree on Pesticide Management", Arts 14 and 34.

3 Opportunities to improve competitiveness and OSH

3.1 OSH vulnerability profiles

Vulnerability profiles combine characteristics that make specific groups of workers especially vulnerable when exposed to occupational hazards and risks. Identifying vulnerability profiles can help to prioritize and tailor interventions to improve OSH.

This case study explored the following dimensions in order to identify vulnerable groups:

- **Risk exposure**: identifies occupational hazards and risks by activity.
- **Sensitivity**: identifies which specific characteristics of the employment situation of workers are linked to their exposure to specific hazards and influence OSH outcomes. The following factors are considered in particular: access to a workplace OSH risk management system; access to and information on control measures; and status in employment, if it is linked to differential access to OSH prevention, protection and promotion services.
- **Coping capacity**: identifies the strategies and resources that workers have at their disposal to cope with the consequences of exposure to occupational hazards. In particular, this is a matter of assessing access to care and compensation services in the event of an occupational injury or disease.

Land cultivation and harvesting

Cultivation process

Exposure to the main occupational hazards and risks identified in the cultivation process of coffee is classified by risk factor and nature of risk. The information was gathered through focus group discussions, results of the dot survey and field interviews.

Exposure

Ergonomic risks

Farmers and farmworkers are exposed to multiple ergonomic hazards that can lead to the development of musculoskeletal disorders. The risk is intensified when farmers do not take adequate rest breaks, perform the same activities for long periods of time, and work at a fast pace. Awkward positions, manual handling of heavy loads, repetitive movements, and exposure to vibrations are identified in multiple work operations:

- During establishment activities (performed mostly by men), farmers and farmworkers reported experiencing backache and muscle pain after several days of land preparation, weeding, and fertilizer application. These are most likely caused by prolonged periods of work in **awkward positions**, highly **repetitive movement**, and **lifting/carrying heavy loads**.
- The use of ergonomically inadequate and poorly maintained tools during establishment and maintenance activities also requires **excessive force and awkward positions** (for instance, cutting tools that require excessive force to compensate for the dull cutting edge or use of tools whose handles are either too small or too large in diameter for the user). Harvesting involves activities that are strenuous and repetitive, including: bending and **repetitive movements** of the arms to reach cherries while carrying weights (baskets/bags carried by workers can contain up to 10–12 kg of cherries). Risk is intensified by poor organization of work and the use of containers/baskets that are not well designed. Heavy loads (for example, sacks of harvested fresh cherries weighing 40–50 kilos) are transported to processing facilities using incorrect lifting techniques and with these loads being carried over longer distances. Hoists, rollers or conveyors reduce the risk of injuries when lifting or moving heavy loads, [72] but their use at farm household level is not common.
- The regular and prolonged use of handheld power tools, such as chainsaws to cut trees, can also cause hand–arm **vibration**, which can affect blood circulation in the hands and forearms and may damage nerves, tendons, muscles and joints. These tools are used mostly by men. Power tillers used for transport also generate a high level of vibration due to their single cylinder diesel engine and the lack of vibration-damping facilities.

Safety hazards and risks

- **Cutting tools.** The use of cutting tools during plantation establishment and maintenance activities, like knives, machetes, grass cutting machines and chainsaws, to cut roots, branches and trees, present the risk of serious injuries. These activities are mostly carried out by men. As per the research team's observations, women might be more at risk of injuries if carrying out the same tasks, since tools seem more adapted for men than women, on average (for instance, large grip size causing slippage). In addition, men are more experienced at using mechanized/semi-mechanized tools (for instance, grass cutting machines), which reduces their risk of injury, compared to women, who use these tools less often.
- **Storage of tools.** In general, it has been observed when visiting farms that tools are not properly stored. Farmworkers and their household members may trip on or over them, which may cause injuries. Cutting tools represent a risk, if not safely stored, especially for children.
- **Slipping/tripping and falling.** Farmers often do not use suitable footwear and work at a fast pace while carrying loads. The risk of falling from slipping is magnified during the rainy season when the ground is wet and muddy. The presence of debris in walking areas between rows of coffee trees also presents a risk of tripping and falling.
- **Falling objects**. A common accident during pruning is being struck by branches of a coffee tree. Land clearance during farm establishment, where trees have to be cut, also presents risks for workers. These activities are mostly performed by men.
- **Falling from heights.** Harvesting and pruning activities involve working at a height, and this is often done using unstable ladders and platforms. Workers generally do not use proper safeguards to prevent falls, and falling from ladders or a tree is a common occurrence during pruning. On plantations

72 Shengli Niu and Kazutaka Kogi (eds), *Ergonomic Checkpoints in Agriculture*, (ILO, 2014), 24–27.

that have safety standards in place, workers are more likely to be provided with stable ladders or a stable platform.

- **Unguarded machinery and moving parts** also present a risk of injury. On plantations, the use of a mechanized plough during establishment activities decreases the risk of musculoskeletal strain but increases machinery-related risks (for instance, entanglement in moving parts, injury from protruding parts) if proper maintenance and use are not observed.
- **Use of motorized vehicles**. Motorized vehicles (tractors, motorcycles, power tillers) are used during land-clearing activities and for transport during other activities. A road safety study conducted in 2010 on two-wheel tractors in Lao PDR indicated that they are involved in about 5.5 per cent of reported fatal accidents in Lao PDR. [73] The risk is higher when a worker is not wearing protective equipment (helmet), the vehicle is overloaded or poorly maintained, or when there is poor load distribution and balance. Motorized vehicles are usually operated by men. It was, however, observed that in some households women also operate motorized vehicles such as tractors.

Physical risks

- Workers are exposed to **ultraviolet rays and heat** (for an average of seven hours per day, seven days a week during harvest). Heat stress, skin damage and dehydration have been reported. The risk is intensified when workers take limited breaks, where access to water is limited, and when workers do not wear clothes to protect them from the sun (such as hats). Generally, sun intensity is higher for activities carried out during the dry season, such as land clearance, field maintenance and harvesting. It was observed that on some plantations drinking water was provided in big bottles in rest areas near the fields.
- **Exposure to constant loud noise** generated by the use of chainsaws (for example, during land clearance) without adequate protection can lead to hearing loss.

Biological risks

- **Vector-borne diseases and parasitic infections, including insect and mosquito bites.** Poor maintenance, lack of sanitation and hygiene at the farm, and inadequate protection increase the risk of insect and mosquito bites. In Lao PDR, diseases transmitted by mosquitoes, in particular dengue fever and malaria, are common. The risk of contracting the dengue virus is higher during the rainy season, while the risk of contracting malaria is present throughout the year.
- **Snakebites** while working on the land have also been reported. It is common practice for workers and farmers to wear open-toed sandals or slippers, and the use of appropriate boots is rare. In addition, poor farm maintenance may result in excessive undergrowth, which is conducive to the presence of snakes. Bites by venomous snakes can cause, among other symptoms, panic, nausea and laboured breathing, which can eventually lead to respiratory failure.[74] Snakebites represent a high risk to farmworkers, as while snake anti-venom is available at the provincial-level hospital (Champasak Province), it is not available at community health centres and the district hospital in Paksong District.
- Exposure to **organic fertilizer**, such as animal manure, that contains pathogens could cause diseases in humans (diarrhoea, nausea and fever). [75] In many cases, organic fertilizer is handled with bare hands. It was also observed that bags of fertilizer are stored and transported near foodstuff. This poses a potential risk of food contamination where fertilizer and food are not safely packed.

Chemical hazards. Workers and farmers are exposed to various chemical products (fertilizers, pesticides and herbicides). Depending on the type of hazardous chemicals and the duration of exposure, health effects can be acute (such as vomiting, headaches, skin and eye irritation, respiratory distress) and long term (such as cancers, neurotoxicity, liver diseases and allergic dermatitis). Exposure to chemicals poses special health risks for women during pregnancy and periods of breastfeeding.[76] However, the use of

73 Matthew Ericson, "Two-wheel tractors: Road safety issues in Laos and Cambodia", in *Safety Science*, Vol. 48, Issue 5, June 2010, 537–543.
74 ILO, *Safety and Health in Agriculture*, ILO code of practice, 2011, 172.
75 ILO, *Safety and Health in Agriculture*, 157–162.
76 ILO, *Safety and Health in Agriculture*, 107–110.

chemical pesticides is relatively low in Lao PDR, especially among smallholders. In respect of herbicides, anecdotal evidence indicates that their usage is increasing, especially on large plantations. Herbicides are sprayed during maintenance activities on plantations and smallholder farms. It was observed that farmers protect themselves when using sprayers by wearing raincoats, boots, goggles, hats and gloves. They buy these items in local shops, but their quality, as reported by farmers, is often not sufficient to protect them effectively. Also, farmworkers do not have access to showers and facilities to change their clothing in the event of exposure. Chemicals are sold without labelling or safety instructions in the local language and there is little awareness among farmers as to how to use them. Containers are not properly stored, and some are reused for storage purposes (including for water, food, rice, grains). Legal regulations require that imported chemicals have labelling and safety instructions in the Lao language and that chemicals are properly stored and disposed of. However, these regulations are not yet systematically applied.

Psychological risks. Financial insecurity, concerns about yield and price fluctuations are sources of stress. Stress can affect a farmer's overall well-being and can also result in a lack of concentration and focus, which in turn makes them more prone to suffer from a work-related accident or injury or to contract a disease.

Transportation risks. Plantations often pick up farmworkers from their villages in the morning to drive them to the plantation for work and back home in the evening. To transport farmworkers, small trucks are used which do not have proper seating facilities (most of the time workers sit on the floor in the back of the truck) and which have no safety barrier to prevent workers from being injured in the event of the vehicle coming to a sudden halt.

Lack of welfare facilities. Access to welfare facilities (such as toilets, water, sheltered rest areas, first aid) may be limited on a plantation, especially where workers perform work in a remote area of the plantation several kilometres from main buildings or the community hall/centre. This poses various health risks to workers, especially in situations where they need first aid. Workers usually take drinking water with them, but as they cannot refill their bottles during the day they may not drink enough and face the risk of dehydration.

Sensitivity

Employment status often has an impact on OSH risks and hazards. The following differences have been observed between temporary workers and permanent employees:

- **OSH training.** Survey findings suggest that very few workers (irrespective of employment status) have received OSH training. However, permanent workers tend to have greater access to work-related training than temporary workers. Farmers and farmworkers generally protect themselves against workplace hazards and risks using their work experience and measures to cope with risks they have adopted over the years. When plantations provide orientation to workers, the sessions typically include more information on the technical aspects of the job and very limited information on OSH. Farmers who are members of cooperatives that have direct contact with international coffee buyers are more likely to receive some training on OSH than non-organized farmers. Workers employed through subcontracting arrangements or via a broker are less likely to receive training or appropriate supervision or to participate in prevention activities, than workers hired directly by plantations. Labour contracting through brokers creates a grey area around employers' OSH responsibilities.
- **Personal Protective Equipment (PPE).** Permanent workers are more likely to receive PPE, which includes safety boots, workwear, gloves, hat (to protect against the sun), and protection against chemical exposure, than temporary workers, who are usually expected to provide their own PPE.
- **Likelihood of risk exposure.** It has been observed that temporary workers, being paid per kilogram, seem to be more at risk of accidents than those paid on a daily or monthly basis. Since they tend to work at a more intense pace in order to maximise income, they are less likely to observe good OSH practices.

The results of the dot survey indicated that female farmworkers have greater OSH awareness than their male counterparts, especially regarding the ill effects of exposure to heat and sun and the lifting of heavy loads. The negative effects of working in an awkward position were identified by 67 per cent of female respondents, compared to 54 per cent of male respondents. As for reusing empty chemical/

input containers for other purposes, 63 per cent of female respondents were aware of the ill effects related to this practice, compared to 38 per cent of male respondents. When it comes to handling organic fertilizer, the general impression among farmers and workers is that there is no need to take safety precautions.

Knowledge of how to prevent accidents and diseases at the workplace is limited, especially among male workers. The results of the dot survey showed that both men and women have limited knowledge of how to reduce the presence of snakes on farms, how to protect themselves against exposure to excessive noise, and how to prevent slips, trips and falls. Most female respondents (86 per cent) know how to reduce the harmful effects of the sun, compared to only 18 per cent of males. As for prevention of muscle pains and discomfort related to work, 75 per cent of women could identify the appropriate preventive measures, compared to 11 per cent of men. General knowledge on how to prevent stress and depression is low, especially for men. Overall, smallholders lack the resources, knowledge and support to carry out prevention activities.

Based on observations and interviews, access for workers to information on OSH hazard and risk prevention and control measures is still limited. Workers in general do not have a good awareness of their rights in this respect. Also, employers and workers have little knowledge of their responsibilities, and there is a weak culture of prevention of OSH risks. As mentioned, OSH support functions for both formal workplaces and smallholders are limited.

Information gathered through interviews with employers suggests that commitment to OSH and the associated competencies are higher in companies that aim to achieve or maintain sustainable certification than in companies that do not participate in certification processes.

Coping strategies

As self-employed workers, smallholders are not covered by the social security system unless they pay voluntary contributions of 9 per cent of their average monthly income. The research team did not come across any smallholders who were registered with the social security system or who benefited from social protection in the event of incapacity to work or the need for care. The farmers interviewed indicated that they found it more practical to seek treatment through the National Health Insurance system rather than paying a monthly contribution towards the social security system. This may in part be due to a lack of understanding of social protection benefits on the part of farmers. Irregular income also makes them reluctant to join the social security system.

As for farm employees and workers (permanent or temporary), the majority were not enrolled in the compulsory social security scheme for salaried workers. Based on interviews with the Social Security Department under the Ministry of Labour and Social Welfare, only a few plantation companies have enrolled their permanent employees in the national social security scheme.

Evidence to date suggests that social health protection schemes in Lao PDR have not had a major impact on reducing out-of-pocket spending due to low coverage rates. According to calculations based on National Health Insurance accounts, of all people in Lao PDR seeking curative healthcare in 2018, 42.1 per cent used their own resources for OPD and IPD health services (including costs for both services and medicine).

Farmers and farmworkers without access to social security are particularly vulnerable in the event of a severe work-related injury or disease. Through the National Health Insurance they can receive curative care, but not OSH risk compensation benefits to deal with the long-term consequences of a work accident or disease (such as disability or chronic illness). They often follow the traditional approach to coping with diseases or injuries, by turning to the family for support in the first instance and, secondly, to the community.

In cases of serious or prolonged diseases, households may have to resort to disposing of scarce assets, removing a child from school to assist with farm work, or increasing debt by taking out loans.

Primary processing

Exposure

Primary processing or the production of green beans is carried out in homes, communal microscale mills, and industrial mills. This segment of the chain employs more male than female workers. In home-based processing, women are primarily involved in washing and drying, while sorting, pulping, fermentation and packing are generally done by men. Industrial mills have automated most of their processes except for drying activities, which are carried out by both female and male temporary workers. In mills, hulling, packing and loading are normally

performed by men. Work in this segment is performed over a fivemonth period and involves long hours of work in light of the very short shelf life of the cherries. Based on field observations and interviews, workers in this segment of the chain face the following risks:

Safety hazards and risks

- **Slipping/tripping and falling**, due to poor housekeeping and wet floors, can lead to injuries (such as strains, and bruises to joints and muscles). Risk is increased by inadequate footwear and working at fast pace.
- **Falling from heights**. In industrial mills, about two to three people, mostly male, normally oversee one production line. Their work involves going up and down raised platforms to check that there are no blockages that could cause machine malfunctions. These platforms and stairs often have no appropriate guard rails. In communal depulping facilities, falls from heights are due to poorly maintained and unstable ladders. Falls from heights can cause severe injuries, such as bone fractures.
- **Unguarded machinery and moving parts** present cutting or crushing risks. In industrial mills, machine parts that have to be inspected or replaced may require work at height. Maintenance work is sometimes carried out without fall arrest equipment in place. Machine operators are mostly male. In village-based facilities, installations are often poorly maintained and there is a lack of collective and personal protective equipment for workers carrying out maintenance tasks. It has been observed that feeder machines often have no belt cover, which increases the risk of cuts (mostly hand injuries).
- **Lack of electrical safety**, due to unsafe wiring, poor maintenance and presence of water, in both communal and industrial mills, can lead to electrocution.
- **Fire hazards** in industrial and communal mills mainly exist as a result of unsafe electrical wiring and the storage of combustible packaging and waste material. In industrial mills, drying machines manually fuelled by wood represent an additional hazard. Exposure to the heat and smoke produced by fire can have severe health effects (for instance, burns and respiratory failure).

Ergonomic risks

- **Frequent manual handling of heavy loads** with improper lifting methods and poor organization of work. In industrial mills, beans are packed into 60-kg bags or sacks and are transported to storage, sometimes without load transfer devices. In village-based and home-based processing, coffee bags are lifted and carried manually without tools. This increases the risk of back injuries. In both types of facilities, manual handling is primarily carried out by men.
- **Awkward posture/repetitive movements** because of non-ergonomically adapted working areas and tools, and poor organization of work. In village-based and household facilities, repetitive work is often performed in squatting position, where workers sit directly on the floor, or in bending position, using non-ergonomically adapted tools and machines. This can lead to low back pain and leg muscle fatigue.[77] In post-harvest washing processes in industrial and communal mills, workers need to bend frequently to move the beans in the water channels. During the drying process, raking the beans is another repetitive movement, often performed by temporary workers, that can cause muscle strain and back pain.

Physical risks

- **Exposure to ultraviolet rays and heat** (in home-based, communal and industrial mills). During the drying process, temporary workers and farmers are exposed to intense sunlight between 10 a.m. and 3 p.m. In home-based processing and communal mills, post-harvest washing processes are also performed in the open, where workers are exposed to the sun. Prolonged exposure to heat can have various negative health effects, such as heatstroke, heat exhaustion, heat rashes and dehydration.[78]
- **Exposure to constant loud noise** (in both communal and industrial mills), emanating from feeders and hulling and milling machines, without hearing protection. This can lead to hearing loss.[79] These machines

77 Niu and Kogi, 38.
78 ILO, *Safety and Health in Agriculture*, 247–248.
79 ILO, *Safety and Health in Agriculture*, 180.

operate throughout the day during the harvest season.

Biological risks

- **Exposure to coffee dust**, mainly observed in industrial mills during the process of feeding beans into drying and hulling machines and during packaging, is associated with respiratory symptoms and changes in lung function.[80] Eye and nose irritations have been reported by workers who lack access to appropriate personal protective equipment.

Chemical hazards

- **Exposure to waste water**. Wet processing produces waste water containing a high level of organic material and acidity. The maximum chemical oxygen demand concentrations in coffee waste water are between 18,000 and 55,000 milligrams per litre, which are very high contamination levels.[81] Households engaged in parchment production generally dispose of the waste water in their backyards. Poor waste water disposal poses environmental and health problems that can have a community-wide impact. From pulping to washing, water is used to move the coffee from one process to the next. This also means that workers' hands and feet are exposed to water for sustained periods. Prolonged wetness of the hands may cause skin irritation and musculoskeletal spasms.

Psychosocial risks

- **Long hours of work** in industrial mills, due to a limited number of skilled machine operators. Overtime is common during harvest season, and working hours may exceed eight hours. Break times may be limited, which results in fatigue and increases the risk of workplace accidents and injuries.

Sensitivity

Machine operators in industrial mills are permanent workers with vast work experience. The operators have received training from machine suppliers, as well as from other training providers, on technical aspects, including safety instructions. During the peak harvest season, mills hire temporary workers to do the drying, hulling/loading, and packing. Many of them are not aware of the risks involved in their jobs and long-term consequences. They often associate health and safety risks only with physical symptoms (for example, respiratory irritations due to coffee dust).

Overall, when visiting mills, the research team found that companies were not yet systematically applying OSH risk prevention and protection measures as well as other OSH requirements as prescribed in the Labour Law. This includes a lack of worker protection through training and provision of personal protective equipment/collective protective equipment.

Workers in home-based and communal mills are primarily farmers and their household members, and a few temporary workers. The majority of the workers and farmers have attended training on processing. In most cases though, this training did not cover OSH. Likewise, their workplaces do not offer adequate protection and are not compliant with OSH regulations. More importantly, in the same way as the temporary workers in industrial mills, workers are not fully aware of the health and safety risks involved in their jobs. Since almost every step in the process is done manually, workers in home-based and communal mills work long hours to ensure that cherries are processed within 12 hours after harvest. Working long hours six to seven days a week at a fast pace increases exposure to occupational hazards and risks.

Coping strategies

The coping strategies of workers involved in the processing of coffee are similar to the ones used by farmworkers and farmers. If they are not affiliated to the compulsory social security scheme, they can still access curative healthcare services through the National Health Insurance. All Lao citizens are eligible to be covered by the National Health Insurance and receive a membership card if they are able to submit a family book, an ID card or a certificate from the village chief to confirm their identity and residence.

The burden of the cost associated with occupational injury and diseases almost always falls on workers and their households, unless it is taken care of by the employer. Workers most commonly pay for health expenditure by using savings and social capital (such as borrowing money from relatives, neighbours, and so on).

80 Gloria Sakwari et al., Dust Exposure and Chronic Respiratory Symptoms Among Coffee Curing Workers in Kilimanjaro: A Cross Sectional Study, in *BMC Pulmonary Medicine*, v. 11–54, 2011.
81 UTZ and Aceres Consultores, *Manual for the Construction of Waste Water Treatment Systems in Small Coffee Processing Plants*, n.d.

3.2 Possible interventions

Considering the identified OSH drivers and constraints, as well as the vulnerability profiles in the coffee value chain, sustainable OSH improvements with a positive impact on productivity and business can only be achieved through a multi-pronged approach that combines capacity-building and monitoring activities, and involves strong collaborative action between different sets of stakeholders. These may include domestic lead firms (exporters/processors/affiliates of foreign owned companies operating in Champasak), cooperatives, workers' organizations, employers' organizations, civil society organizations, and government. Initiatives to promote OSH through voluntary standards must not deflect attention from the critical role that the Government should play in strengthening enforcement legislation that promotes and protects workers' safety and health, or from encouraging enterprises to follow OSH regulatory requirements and engage in prevention activities on their own initiative.

Short-term

A. Improve access of smallholders and workers to practical training on OSH.

1. Build the capacity of national partners (notably the Ministry of Agriculture and Forestry) and service providers, including the Agriculture Research Centre and vocational schools, to integrate OSH in training on:

- good agricultural practices (GAP);
- organic farming;
- primary processing/green bean production;
- machine operations and maintenance;
- organic input production.

The inclusion of OSH requirements in skill standards and technical training will make safety and health an integral part of the way farmers and workers do their work – rather than making it an "add-on" or separate component of work.

2. Develop "OSH in agriculture" training material, with a focus on prevailing OSH hazards and risks in the coffee sector; integrate the OSH requirements of Lao good agricultural practices (Lao GAP) into training material.

3. Develop a gender-sensitive approach to training delivery:

a. Include in training material sessions that address the specific OSH hazards and risks women and men working on coffee farms are exposed to, as well as their specific needs (for instance, have one training module on protecting the health of pregnant farmworkers).

4. Work with national tripartite partners and service providers in the development of OSH training courses for smallholders and workers employed on plantations and in industrial mills. The following are some training courses that may be considered:

a. Conduct training of trainers for OSH officers from plantations and industrial mills (permanent staff). After completion of the training, plantation OSH officers can roll out OSH training to plantation workers (permanent, temporary, seasonal for coffee harvest) and smallholders they are working with. OSH officers in industrial mills can train permanent and temporary workers employed by the mill.

b. Make the training of temporary and seasonal coffee harvest workers by plantations and industrial mills a prerequisite for hiring. Provincial stakeholders (such as the Department of Labour, the Lao Coffee Association, the Agriculture Research Centre, the provincial Chamber of Commerce and Industry, and the provincial LFTU) may support plantations and mills in conducting such training.

c. Training of smallholders by cooperatives, PAFO/DAFO, and LFTU. The project may also explore collaboration with existing farmer field schools established by development programmes

(such as the Food and Agriculture Organization of the United Nations (FAO) and the United States Agency for International Development (USAID)). Cooperative members (smallholders) could be trained on good OSH practices in line with Lao GAP by national partners/ service providers (including the provincial Department of Labour, the provincial LFTU, the Lao Coffee Association and the Agriculture Research Centre).

d. A workshop to share good practices on OSH to be organized by the Lao Coffee Association for its members.

e. Explore with agriculture training centres (such as the Agriculture Research Centre) and vocational schools the inclusion of OSH in their curricula.

f. Develop a short OSH awareness-raising/training video to be used during training sessions and shared on social media.

g. Explore the use of mobile applications to raise awareness and build capacity on OSH practices among smallholders.

B. Improve OSH services to enhance the capacity of cooperatives, plantations and mills to address OSH gaps.

1. Support national tripartite partners (notably the Department of Labour, Champasak, and the Lao Coffee Association) in the development of a capacity-building programme for cooperatives, plantations and mills, with a focus on the establishment and operationalization of an OSH management system. The capacity-building programme may consist of the following phases:

a. classroom training: introduction to OSH management systems;

b. a peer-to-peer learning session on the development and implementation of OSH management systems; companies take turns to host the session;

c. follow-up visits by national partner organizations to offer advice and coaching on the process of setting up and implementing an OSH management system.

2. Conduct training for labour inspectors on OSH hazards and risks in agriculture (with a focus on the coffee sector), strategic labour compliance, occupational hazards and risks assessment, and OSH management systems (representatives from the employer associations and the LFTU to be invited as observers). The training will assist labour inspectors to conduct OSH inspections in agriculture, including formal workplaces in the coffee sector, such as mills and plantations, in a more systematic manner.

C. Improve chemical safety on smallholder farms and plantations.

Assist national tripartite stakeholders to take effective measures that protect coffee farmworkers and their families against exposure to hazardous chemicals. These could include:

a. improving import controls of agriculture input chemicals (not allowing banned hazardous chemicals to enter the country) (this activity could be led by the Ministry of Industry and Commerce);

b. enforcing, through the Ministry of Industry and Commerce and the Ministry of Agriculture and Forestry, the requirement that imported chemicals can only be sold when they are labelled and have user and safety instructions (Material Safety Data Sheets) in the Lao language (control of input providers);

c. training agriculture input providers on chemical safety, through PAFO/ DAFO, in order for them to have the capacity to provide advice on the safe use of chemicals to their customers so that the customers know how to protect themselves against chemical exposure;

d. providing training to smallholder farmers and plantation workers on the safe use, storage and disposal

of chemicals; possible training providers to include the Agriculture Research Centre and PAFO/DAFO staff;

e. promoting organic farming methods and discouraging the use of chemicals during OSH training sessions delivered by PAFO/DAFO and the Agriculture Research Centre.

D. Increase businesses' understanding of the business case for OSH.

Demonstrate how positive OSH outcomes can contribute to improving productivity and growth. Possible activities may include:

a. publishing success stories to highlight the benefits of good OSH practices for workers' health and productivity – social media, radio, print;

b. supporting the Lao Coffee Association in facilitating the sharing of OSH improvement measures (adopted by cooperatives, plantations and mills) and their impact on productivity, bean quality and workers' satisfaction with their workplace (for instance, through workshops to share good practice or an online portal);

c. designing and providing OSH training material for coffee farmers based on Work Improvement in Neighbourhood Development (WIND), which addresses the impact of OSH improvements both on workers' health and on productivity (OSH improvement measures presented to farmers during the training will have the twin objectives of promoting workers' safety and health, and productivity);

d. collaborating with initiatives that provide market development support to cooperatives and farmers' groups by promoting the adoption of good OSH practices (with the objective of helping farmers fulfil certification requirements which cover OSH).

E. Improve OSH and other decent work conditions for vulnerable groups.

a. Identify labour brokers who supply plantations with seasonal workers for the coffee harvest.

b. Agree with national tripartite partners the decent work standards that labour brokers need to meet when hiring seasonal workers, in line with the national Labour Law and international good practice (for example, provide seasonal workers with personal protective equipment/collective protective equipment; train seasonal workers on basic OSH before they begin their work, in cooperation with the plantation; pay at least the daily minimum wage; no child labour).

c. Train labour brokers on the Lao Labour Law and OSH, and, together with national tripartite partners, develop a system to monitor the hiring practices of labour brokers to ensure that they are in line with Labour Law requirements and that they protect workers against workplace accidents and diseases.

d. Advise plantations and smallholder farms on measures to improve welfare facilities for seasonal workers (for instance, have clean and safe dormitories, childcare facilities, toilets, drinking water, and access to first aid).

Long-term

F. Improve awareness among coffee workers and employers of their rights and responsibilities with respect to OSH and social security membership.

a. In collaboration with national tripartite partners, design effective communication materials on OSH rights and responsibilities, the benefits of social security membership, and the benefits of having in place a systematic approach to address OSH hazards and risks (for example, by promoting the content of the national Decree on OSH).

b. Support national tripartite partners in the dissemination of information in a variety of ways – including campaigns, social media, short message service/text messages, posters, comics, radio, the LFTU hotline – to ensure that as many workers as possible benefit from the messages.

c. Support the development of a simple monitoring system to be used by the national tripartite partners to assess the effectiveness of channels, content/ messages, and mediums.

d. Assist the National Social Security Fund and other relevant organizations to pilot schemes that protect own-account farmworkers and their family members against the consequences of work-related accidents, injuries and diseases.

G. Pilot basic occupational health services in coffee farmer communities.

The primary healthcare system at community level can play an important role in improving the health status of coffee farmers by diagnosing acute and chronic work-related diseases and providing adequate curative and preventive care. Pilot measures, implemented in cooperation with the Ministry of Health and the Ministry of Labour and Social Welfare, can include:

a. designing guidelines and training materials for basic occupational health services;

b. developing a pool of trainers (training of trainers) who can train primary healthcare staff at the district and community levels on basic occupational health services;

c. rolling out training on basic occupational health services to primary healthcare nurses and village health volunteers;

d. supporting primary healthcare staff to provide preventive care to coffee farmer communities (such as awareness-raising activities to help prevent occupational diseases).

H. Improve the capacity of workers to organize.

a. Customize the ILO Accelerate.COOP package to the context of the coffee sector.

b. Conduct training of trainers on the Accelerate.COOP package.

c. Strengthen the capacity of the LFTU to promote the establishment of farmers' groups as the first step towards forming a cooperative.

I. Link OSH improvement measures with initiatives that strengthen coffee farmers' livelihoods.

Introduce OSH-focused recommendations (such as the delivery of OSH training) into initiatives that strengthen coffee farmers' livelihoods through income diversification measures (for instance, intercropping of coffee with other crops). Where farmers can generate sufficient income, they will be more inclined to invest in OSH improvements and continue to apply good OSH practices than farmers who face financial difficulties.

Appendix I

Breakdown of export sales of Lao coffee by destination and type, 2017

Region/country	Volume (in MT)					Value in US$	Unit price/ MT in US$
	Arabica	Robusta	Excelsa	Processed	Total		
Asia	18 444	9 493	120	3 311	31 368	78 407 309	2 500
Viet Nam	13 641	8 100	120	3 311	25 171	60 825 719	2 416
China	6	1 080		0.01	1 086	1 986 600	1 829
Japan	1 235	38			1 274	3 275 845	2 572
Republic of Korea	594				594	2 109 179	3 549
Cambodia	825				825	1 646 036	1 995
India	380				380	1 124 730	2 960
Thailand	1 604	100		0.14	1 704	6 638 448	3 895
Taiwan, China	138	173			312	736 072	2 363
Philippines	19				19	55 810	2 907
Hong Kong, China		2			2	4 620	2 200
Others	1				1	4 250	4 250
Europe	909	60	38		1 007	2 625 626	2 608
Germany	458	41			499	1 244 484	2 494
Spain	60				60	137 862	2 300
Russian Federation	44				44	150 210	3 444
Italy	134	19			153	437 943	2 855
London	6				6	19 800	3 300
Oman			38		38	86 400	2 250
Belgium	77				77	193 823	2 524
Netherlands	130				130	355 104	2 740
North America	589	1	-	-	590	2 053 143	3 479
United States	589	1			590	2 053 143	3 479
Total	**19 942**	**9 555**	**158**	**3 311**	**32 965**	**83 086 078**	**2,520**

Appendix II

Annual costs and returns from 1 hectare smallholder farm, 2017

Assumptions: Mature coffee farm
average yield/hectare: 8,000 kg of fresh cherries

Item	Unit	No. of units	Unit cost (in kip)	Total cost (in kip)	% share
Materials				**1 000 000**	**7.1**
Fertilizer	bags	5	200 000	1 000 000	7.1
Labour				**10 850 000**	**77.4**
Farm maintenance	person days	50	50 000	2 500 000	17.8
Pruning	person days	5	70 000	350 000	2.5
Harvesting	kilograms	8 000	1 000	8 000 000	57.1
Other costs				**1 000 000**	**7.1**
Amortized establishment costs				**1 166 650**	**8.3**
GROSS PROFIT				**1 183 850**	
Return on investment				8%	

Source: Focus group discussion.

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