



Food and Agriculture Organization
of the United Nations



EXPLORING COFFEE FUTURES

Building coffee
climate resilient
pathways in Lao
People's Democratic Republic



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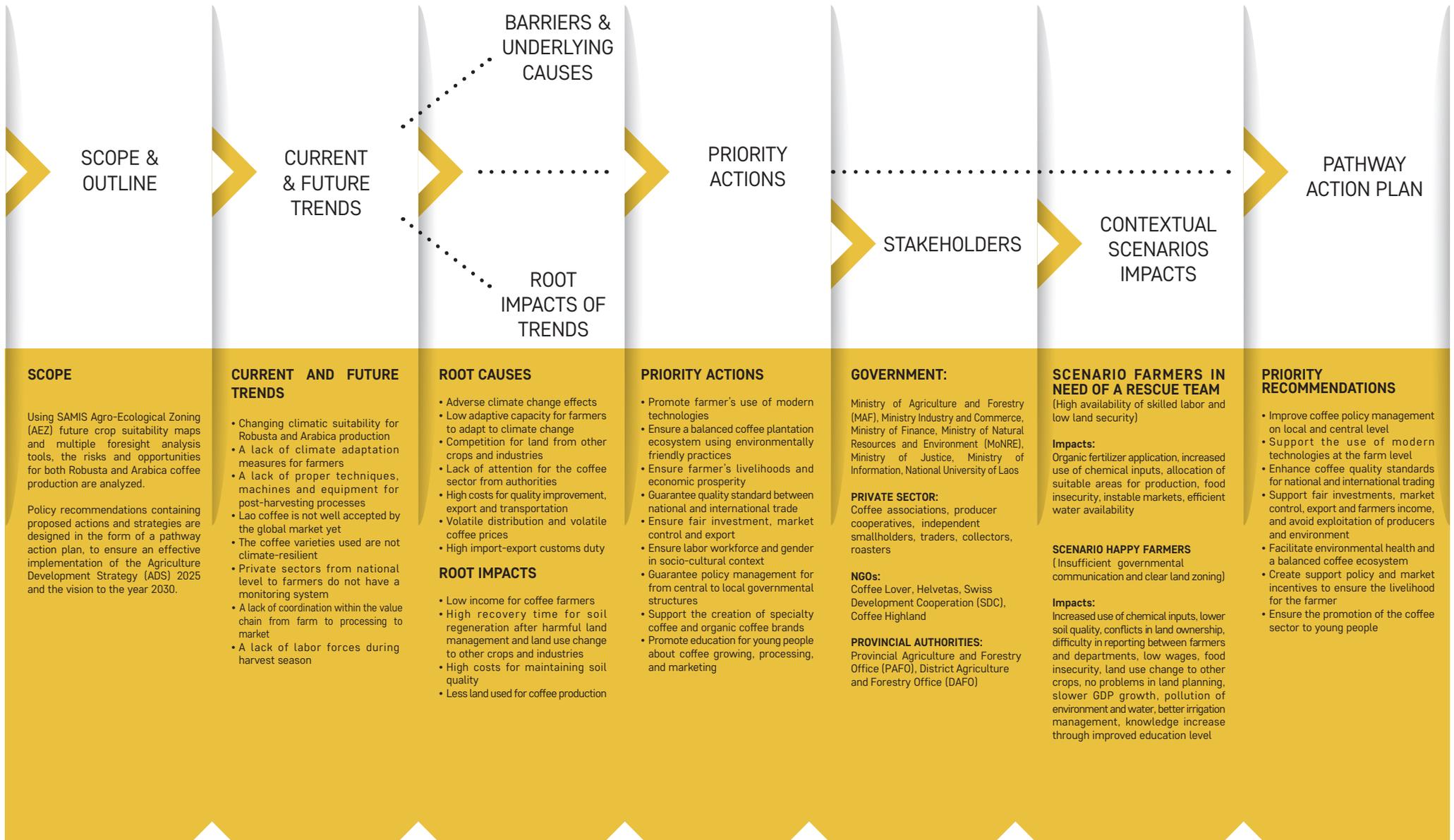


RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



Utrecht
University

STORYMAP HIGHLIGHTS



SCOPE & OUTLINE

SCOPE

Using SAMIS Agro-Ecological Zoning (AEZ) future crop suitability maps and multiple foresight analysis tools, the risks and opportunities for both Robusta and Arabica coffee production are analyzed.

Policy recommendations containing proposed actions and strategies are designed in the form of a pathway action plan, to ensure an effective implementation of the Agriculture Development Strategy (ADS) 2025 and the vision to the year 2030.

CURRENT & FUTURE TRENDS

CURRENT AND FUTURE TRENDS

- Changing climatic suitability for Robusta and Arabica production
- A lack of climate adaptation measures for farmers
- A lack of proper techniques, machines and equipment for post-harvesting processes
- Lao coffee is not well accepted by the global market yet
- The coffee varieties used are not climate-resilient
- Private sectors from national level to farmers do not have a monitoring system
- A lack of coordination within the value chain from farm to processing to market
- A lack of labor forces during harvest season

BARRIERS & UNDERLYING CAUSES

ROOT IMPACTS OF TRENDS

ROOT CAUSES

- Adverse climate change effects
- Low adaptive capacity for farmers to adapt to climate change
- Competition for land from other crops and industries
- Lack of attention for the coffee sector from authorities
- High costs for quality improvement, export and transportation
- Volatile distribution and volatile coffee prices
- High import-export customs duty

ROOT IMPACTS

- Low income for coffee farmers
- High recovery time for soil regeneration after harmful land management and land use change to other crops and industries
- High costs for maintaining soil quality
- Less land used for coffee production

PRIORITY ACTIONS

PRIORITY ACTIONS

- Promote farmer's use of modern technologies
- Ensure a balanced coffee plantation ecosystem using environmentally friendly practices
- Ensure farmer's livelihoods and economic prosperity
- Guarantee quality standard between national and international trade
- Ensure fair investment, market control and export
- Ensure labor workforce and gender in socio-cultural context
- Guarantee policy management for from central to local governmental structures
- Support the creation of specialty coffee and organic coffee brands
- Promote education for young people about coffee growing, processing, and marketing

STAKEHOLDERS

GOVERNMENT:

Ministry of Agriculture and Forestry (MAF), Ministry Industry and Commerce, Ministry of Finance, Ministry of Natural Resources and Environment (MoNRE), Ministry of Justice, Ministry of Information, National University of Laos

PRIVATE SECTOR:

Coffee associations, producer cooperatives, independent smallholders, traders, collectors, roasters

NGOs:

Coffee Lover, Helvetas, Swiss Development Cooperation (SDC), Coffee Highland

PROVINCIAL AUTHORITIES:

Provincial Agriculture and Forestry Office (PAFO), District Agriculture and Forestry Office (DAFO)

CONTEXTUAL SCENARIOS IMPACTS

SCENARIO FARMERS IN NEED OF A RESCUE TEAM

(High availability of skilled labor and low land security)

Impacts:

Organic fertilizer application, increased use of chemical inputs, allocation of suitable areas for production, food insecurity, instable markets, efficient water availability

SCENARIO HAPPY FARMERS

(Insufficient governmental communication and clear land zoning)

Impacts:

Increased use of chemical inputs, lower soil quality, conflicts in land ownership, difficulty in reporting between farmers and departments, low wages, food insecurity, land use change to other crops, no problems in land planning, slower GDP growth, pollution of environment and water, better irrigation management, knowledge increase through improved education level

PATHWAY ACTION PLAN

PRIORITY RECOMMENDATIONS

- Improve coffee policy management on local and central level
- Support the use of modern technologies at the farm level
- Enhance coffee quality standards for national and international trading
- Support fair investments, market control, export and farmers income, and avoid exploitation of producers and environment
- Facilitate environmental health and a balanced coffee ecosystem
- Create support policy and market incentives to ensure the livelihood for the farmer
- Ensure the promotion of the coffee sector to young people

SCOPE & OUTLINE

Coffee production is a growing industry in Lao People's Democratic Republic. The popularity of the drink is increasing, and there is a need to enhance the quality and quantities of production, as well as livelihoods for farmers. Coffee is mainly an export crop and an important industry for the economy. In the country, the crop is often cultivated using traditional farming practices, based on subsistence farming and labor-intensive techniques. The market demand is high from investors of both domestic and foreign parties such as China, Vietnam and Thailand. The national government of Lao People's Democratic Republic promotes farmers for commodity production in order to eradicate the poverty of people.

Climate change is very likely to have a large impact on coffee production, through increased temperatures and changing precipitation. Also, the production of coffee itself comes with a wide variety of consequences for agricultural land and natural resources, both for short and long term. Examples of land management problems largely vary per region and can be low soil quality caused by soil degradation and erosion, unstable yields, use of pesticides, natural hazards induced by climate change such as floods, droughts and heavy rainfall, destruction of forest area, land conflicts among farmers and landowners, and difficulties in managing and monitoring private sectors and government agencies.

In this "story map", the coffee production system is analyzed using the output of the SAMIS AEZ future crop suitability maps and multiple foresight analysis tools. All elements of the coffee value chain are identified, as well as current and future risks and opportunities. Based on these analyses, priority recommendations containing proposed actions and strategies are imposed in the form of a pathway action plan. This is done in order to ensure an effective implementation of the Agriculture Development Strategy (ADS) 2025 and the vision of the agriculture sector to the year 2030.

This document aims to provide the latest climate risk information and an integral analysis of current and future developments in the coffee sector, to inform policy makers on climate adaptation and achieving sustainable production. Ultimately, the goal is ensuring food security, producing comparative and competitive potential agricultural commodities, developing clean, safe and sustainable agriculture and shift gradually to the modernization of a resilient and productive agriculture economy, linking with rural development contributing to the national economic basis". Achieving these goals requires all partners both at the central and local levels including farmers to pay attention, enhance the coordination and collaboration needed for consistency and strong support. This story map is a crucial tool for policy markers and other stakeholders involved in coffee production.

As stated in the ADS 2025 and the 9th national socio-economic development plan of the government for the years 2021-2025, coffee production is aimed to be increased to a total area of 130,000 ha and a production of 280,000 tons million ton/year. In 2019, the total area was 85,269 ha, with a production of 150,878 million ton. The geopolitical boundary in this analysis is at national level.

The key themes in this document are:

- Identification of suitable areas for future coffee production;
- Sustainable land management and environmentally friendly production;
- Improvement of availability of high yield coffee variety;
- Availability of modern technologies, innovation and information and communication technologies;
- Resilience and adaptation to climate change effects;
- Reinforcement of existing laws, decrees, regulations and establishment of new policies for support of farmers and other stakeholders.

Who is this story map for?

At national level, the story maps are a means of communication for technical spatial teams to formulate priority areas for investments in an understandable and efficient manner. Experts from Ministry of Agriculture and Forestry (MAF) can use the results of the analyses to base policy or investment related decisions on. The story maps can also be used to communicate results in between departments, teams of the MAF and relevant stakeholders of the assessed crop value chains.

CLIMATE CHANGE AND FUTURE COFFEE SUITABILITY & HOTSPOT MAPS

The two coffee species grown in Lao People's Democratic Republic, Arabica (*Coffea arabica*) and Robusta (*Coffea canephora*) are considered to be relatively climate-sensitive crops. Of the two species, Arabica coffee is the most sensitive to temperature increase as has its optimal growing temperature between 18 and 22 °C (Davis *et al.*, 2012). Robusta coffee can flourish in temperatures up to 27 °C (Bunn *et al.*, 2015). Due to projected shifts in temperature and precipitation due to climate change, it is expected that coffee quality and yield are changing in the coming decades. Higher temperatures can also lead to increased exposure to diseases and harmful insects.

The SAMIS crop suitability maps for this document consist of the current climate suitability of both Arabica and Robusta coffee, the projected suitability for 2050 and the change in suitability between the current suitability and projections for 2050. For the climate change projections, RCP8.5 is used (see box "What are RCPs?"), to show the largest expected climate change effects and therefore allow policy makers to explore and anticipate on the most extreme climate scenarios. These maps are shown on the next two pages of this document and indicate the areas that are likely to increase or decline in suitability for coffee production. With this information it is possible to allocate the areas that would be most suitable for coffee production, while avoiding using natural forest area and paddy rice area as sites for future expansion of coffee production.

For Arabica coffee, the suitability is projected to mainly increase in the Northern areas, with an exception for the provinces Houaphanh, Phongsaly and Louang Namtha. In the central areas, mostly increases are visible but decreases are expected in Khammouane and Savannakhet. In the South, all area shows projected increases.

For Robusta coffee, the suitability is projected to change more variably than Arabica. In the North, slight decreases are visible in all provinces. Increases are expected in Xieng Khouang, Houaphanh and Luang Prabang. In the central region, increases are projected for Bolikhamxay, Xaysomboun and Vientiane province. In Savannakhet and Khammouane, both increases and decreases are found. In Vientiane Capital, suitability is expected to decrease. In the Southern area, Xekong province sees an increase, while the suitability in Champasak, Salavan and Attapue is increasing in some areas and decreasing in others.

WHAT ARE INPUT LEVELS?

Input levels as determined by FAO are based on the level of agricultural management that is general for an area (FAO/IIASA, 2012)

Input level	Agricultural management
LOW	Traditional management, subsistence based, labor intensive techniques.
INTERMEDIATE	Improved management, partly market oriented, improved varieties, some mechanization.
HIGH	Advanced management, mainly market oriented, commercial production, optimum use of chemical inputs.

MAJOR TRENDS:

- Changing suitable areas for coffee production;
- Lack of knowledge and availability of modern technologies and sustainable land and soil nutrient management;
- Lack of availability of climate resilient varieties;
- High occurrence of pathogens and pests;
- Lack of well-balanced policies, laws, decrees and regulations for support of farmer and processor sectors;
- Insecure incomes and livelihoods for people working in farming sector;
- Lack of quality branding and market information.

WHAT ARE RCPs?

RCPs are Representative Concentration Pathways that describe different climatic futures under different projections of greenhouse gas (GHG) emission in the coming decades. There are four RCPs, constructed under four possible ranges of radiative forcing values in 2100. They indicate different trends in emission declines and consecutive global temperature increases (Van Vuuren *et al.*, 2011)

RCP	Temperature increase	GHG trend
RCP2.6	~2.0°C	Strongly declined emissions
RCP4.5	~2.4°C	Slowly declined emissions
RCP6.0	~2.8°C	Stabilising emissions
RCP8.5	~4.3°C	Rising emissions

For this analysis, RCP8.5 is chosen in visualizing the crop suitability changes as outputs of the SAMIS project. As this scenario represents a scenario without climate policy and with unstoppable GHG emissions, the extent of climatic possibilities is covered.

WHAT IS A HOTSPOT MAP?

- The hotspot map highlights the difference between the present suitability crop map and future suitability;
- The hotspot maps indicate the areas that are likely to increase or decline in suitability for the identified priority crop production. With this information it is possible to allocate the areas that would be most suitable for the crop production, while avoiding using natural forest area and paddy rice areas as sites for future expansion of the identified crop production.

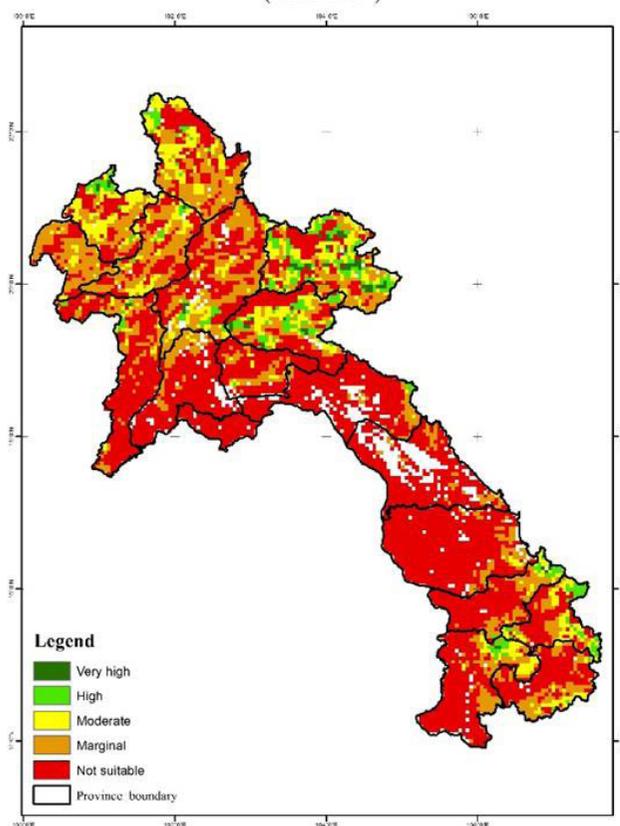
CURRENT & FUTURE SUITABILITY AND HOTSPOT MAP: ARABICA

PRESENT

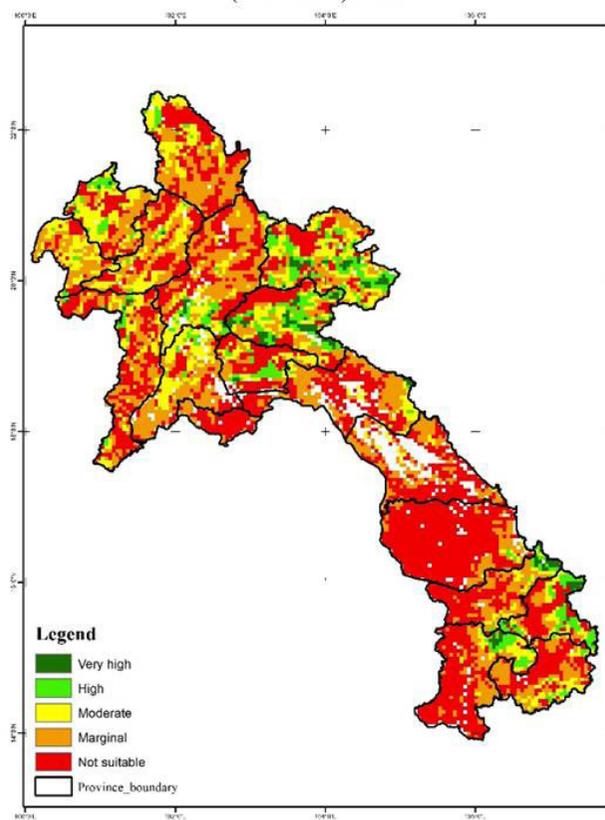
FUTURE

DIFFERENCE PRESENT AND FUTURE
SUITABILITY

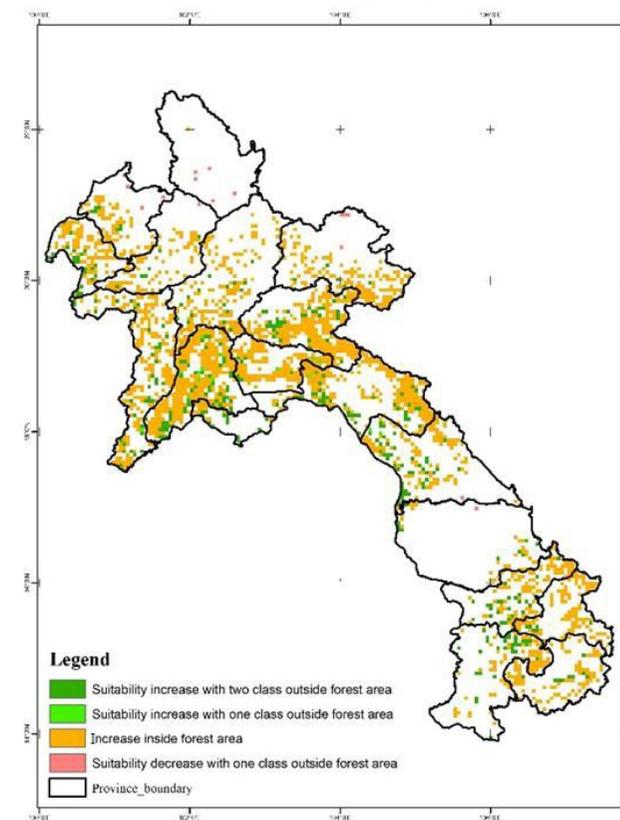
Suitability of Arabica Coffee using medium input level
(2010-2019)



Suitability of Arabica Coffee using medium input level
(2041-2050) RCP8.5



Arabica Coffee hotspot map



Source: coffee suitability and hotspot map by Department of Agriculture Land Management of Ministry of Agriculture and Forestry, 2022.

Administrative boundaries of Lao People Democratic Republic, National Geographic Department, 2013.

Present suitability for Arabica coffee production (2010-2019) and future projected suitability using medium input level and RCP8.5 for the time period 2041-2050. The hotspot maps shows the change in suitability class between present and future suitability, with increased suitability in forest area indicated in orange. Data are available at <https://lirms-dalam.net/?thematic=aez>.

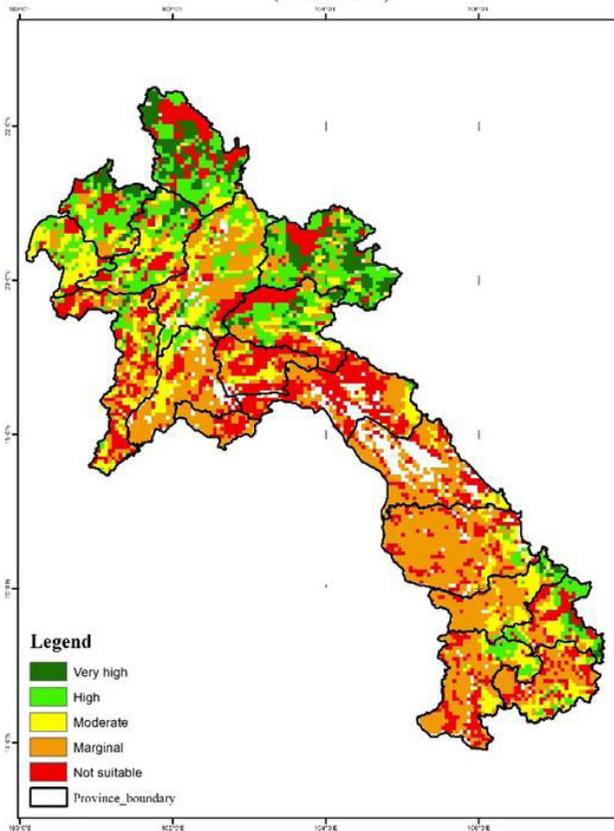
CURRENT & FUTURE SUITABILITY AND HOTSPOT MAP: ROBUSTA

PRESENT

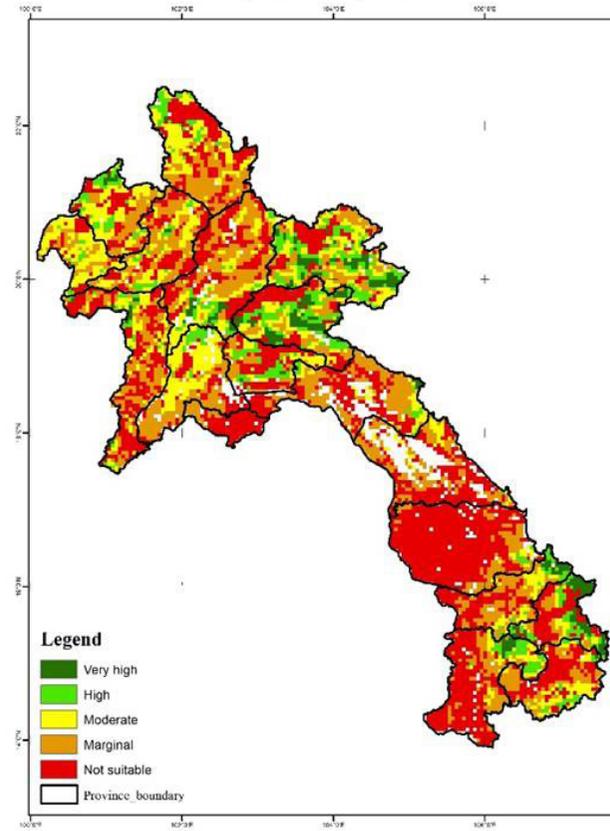
FUTURE

DIFFERENCE PRESENT AND FUTURE
SUITABILITY

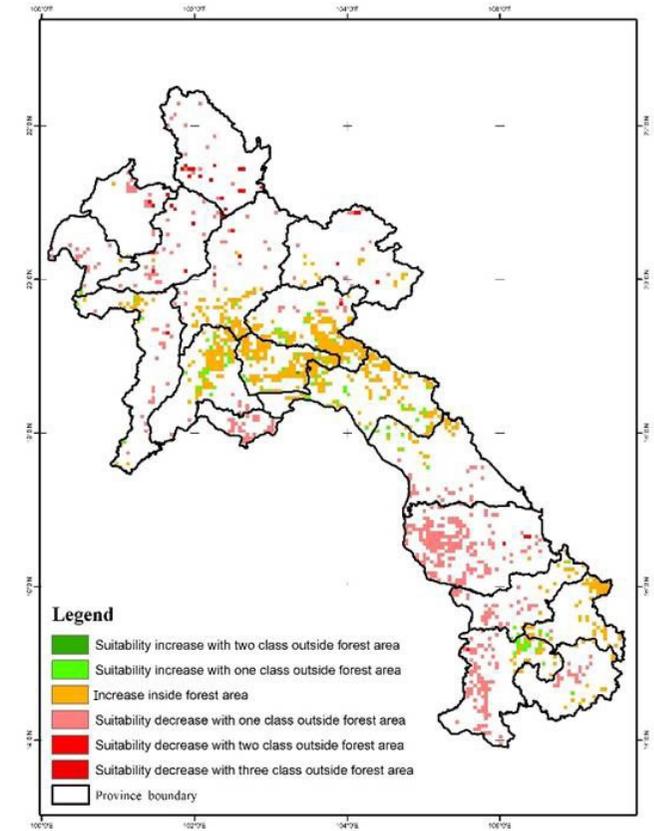
Suitability of Robusta Coffee using medium input level
(2010-2019)



Suitability of Robusta Coffee using medium input level
(2041-2050) RCP8.5



Robusta Coffee hotspot map

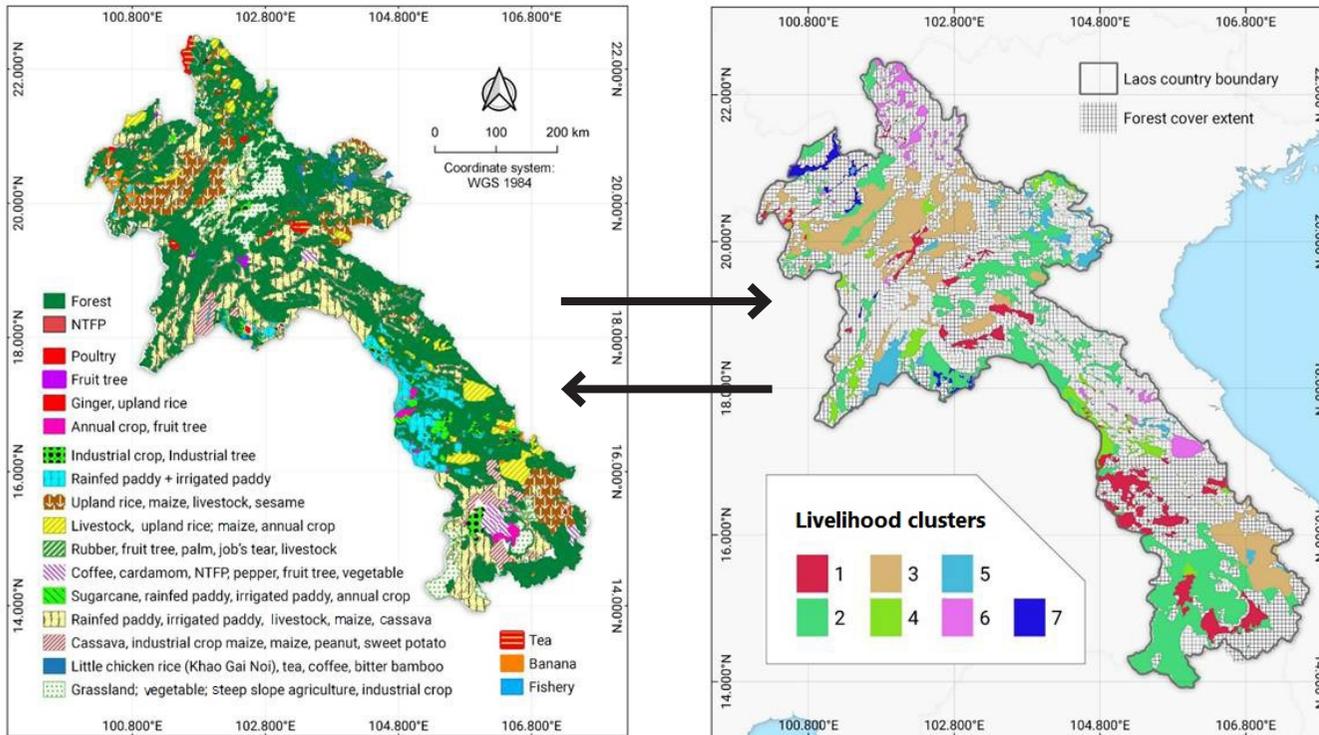


Source: coffee suitability and hotspot map by Department of Agriculture Land Management of Ministry of Agriculture and Forestry, 2022.

Administrative boundaries of Lao People Democratic Republic, National Geographic Department, 2013.

Present suitability for Robusta coffee production (2010-2019) and future projected suitability using medium input level and RCP8.5 for the time period 2041-2050. The hotspot maps shows the change in suitability class between present and future suitability, with increased suitability in forest area indicated in orange. Data are available at <https://irims-dalam.net/?thematic=aez>.

Agricultural Livelihoods and Adaptive Capacity



Source: Map by Department of Agriculture Land Management, Ministry of Agriculture and Forestry, 2022.

Administrative boundaries of Lao People Democratic Republic, National Geographic Department, 2013.

A livelihood zones is a landscape unit that have similar set of production system, scale of farm operation, natural environment, and level of market orientation of farmers.

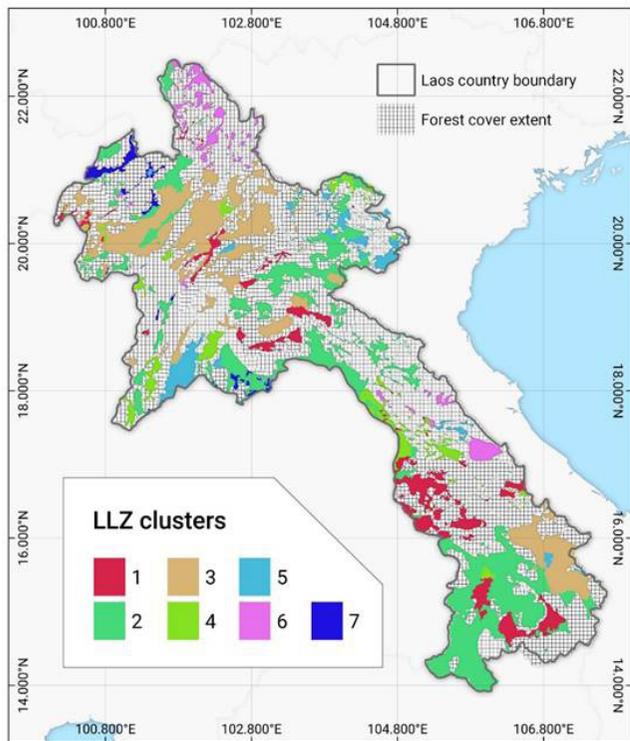
Each cluster describes a group of landscape unit that shares the same socio-economic and institutional attributes. A subset of information on adaptive capacity can be used to analyze a specific crop-based system using the livelihood zones.

Data are available at <https://lirms-dalam.net/?thematic=sava>

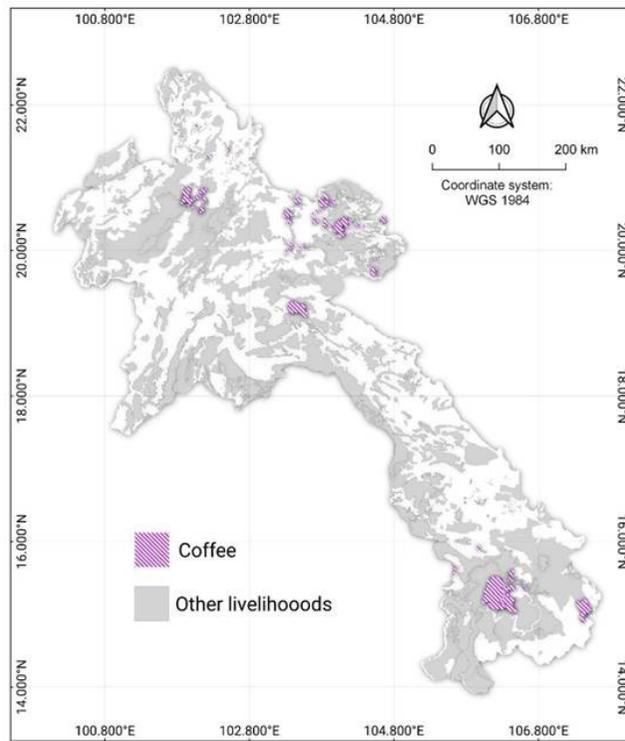
- Participatory approach with local crop experts was done to map the livelihood zones
 - Livelihood zones are land areas with homogeneous physical and social attributes. Each zone referred to as a “**landscape unit**” is characterized by a specific production system, a defined farm size, a unique natural environment, and scale of market access.
- Local consultation per district was done to assess adaptive capacity of each landscape unit
 - Adaptive capacity assessment was based on a characterized set of indicators for three conditions: basic needs satisfaction, conditions for innovations, and capacity to translate innovations into action.
- Hierarchical clustering model was applied to the adaptive capacity data to group together landscape units with similar characteristics. Each cluster describes a group of landscape units that shares the same adaptive capacity characteristics but is unique with other clusters.

A livelihood map was developed through collaborations of the **DeRISK SE Asia Project** (Applying seasonal climate forecasting and innovative insurance solutions to climate risk management in the agriculture sector in SE Asia), **SAMIS** (Strengthening agro-climatic monitoring and information systems), **DALaM** (Department of Agricultural and Land Management), and **NAFRI** (National Agriculture and Forestry Research Institute).

Opportunities and Barriers for Coffee-based Livelihood Adaptations



Source: Map by Department of Agriculture Land Management, Ministry of Agriculture and Forestry, 2022.



Administrative boundaries of Lao People Democratic Republic, National Geographic Department, 2013.

Each cluster is a group of landscape units that shares similar socio-economic and institutional attributes. A subset of information on adaptive capacity can be used to analyze a specific crop-based system.

Location of landscape units where coffee is an integral part of farmers' livelihood.

Data are available at <https://lirms-dalam.net/?thematic=sava>

- Investment in water harvesting practices or supplementary irrigation for coffee would benefit farmers in **cluster 2**.
- Farmers in **cluster 3** have comparatively lower literacy level with low extension services. This could partly explain the poor fertilizer application of farmers and adoption of improved varieties of coffee. This can serve as a barrier for climate change adaptation. Moreover, use of ICT is comparably low as well which may hamper the delivery of climate information and advisories.
- Livelihood in **cluster 5** are highly exposed to climate risks that jeopardize food security. This is exacerbated with low use of fertilizers to optimize coffee production. Additional caveat of very low use of ICT. This means other channels to deliver climate information and advisories should be explored to reduce climate risk of the coffee-based livelihood.

TRENDS, IMPACTS & ACTIONS



The trends in coffee production affect multiple elements in the production chain and have a large range of different impacts for people, the economy and the environment. In the table below, the trends have been categorized in the major STEEP categories (socio-cultural, technological, economic, ecological and political) and their possible impacts are identified. For each category, advised actions to counteract these trends are given.

The five key trends are:

- Changing suitability for coffee production due to climate change;
- A lack of labor during harvest season;
- Technologies, machinery and equipment for post-harvesting processes are insufficient;
- Lao coffee is not well accepted by the global market yet;
- Coffee varieties are not climate-resilient;
- Lack of monitoring system from national level to farmers and there is a lack of coordination within a value chain from farm to processing to market.

The five key impacts are:

- Changing future yields and production volumes;
- Land use conflicts such as hydropower projects on coffee land;
- Labor cost is high due to a lack of labor supply;
- In cold season, coffee trees tend to die during cold chills low to zero productivity;
- Some farmers do not know that there is a policy to promote organic coffee and special coffee;
- Impacts on not being accepted by the global market imply not being able to achieve full export potentials and thus affecting the socio-economic growth potential of the country.

TRENDS, IMPACTS & ACTIONS

The major trends in the coffee sector and the impacts they bring about are listed below. The trends and impacts are categorized under socio-cultural, technological, economic, ecological and political categories. Actions are described for each of the trends to offset or counterbalance negative trends

	Trends	Impacts	Actions
SOCIO-CULTURAL	<ul style="list-style-type: none"> Growing interest in coffee production by the public, seen by events like the International Coffee Day and the Lao Coffee Festival Shortage of labor during the coffee harvest season 	<ul style="list-style-type: none"> Lao People's Democratic Republic is a small producer in proportion to the global scales Migration of workers: most Lao workers go to work in neighboring countries Insufficient crop management due to lack of workers, because coffee needs most personnel during the pruning and the harvest season 	<ul style="list-style-type: none"> Ensure the labor workforce and gender in socio-cultural context Ensure the promotion of the coffee sector to young people to understand about coffee growing, processing, marketing and production
TECHNOLOGICAL	<ul style="list-style-type: none"> Lack of pre-harvest and post-harvest techniques Varieties susceptible to the thick fog during the winter season Lack of ability to develop coffee flavors Limited technical knowledge of the processing process Small businesses lack opportunities to increase their knowledge and skills in quality coffee production Need of online platforms or monitoring systems to support the government sector in assisting farmers 	<ul style="list-style-type: none"> Low production volumes Degraded yield and quality of coffee Crop diseases and dying coffee trees Low quality of aroma and flavor of coffee High budgets necessary to train farmers in remote areas to use modern technologies Traditional practices such as hand weeding and pruning coffee needs a lot of labor 	<ul style="list-style-type: none"> Support the use of modern technologies by transforming traditional practices such as manual labor to the use of new techniques and machineries. This should be done by developing the mindset of farmers and by widely distributing machinery and fertilizers. Also, providing training for farmers, financial incentives and more research on climate resilient coffee varieties.
ECONOMIC	<ul style="list-style-type: none"> The quality of Lao coffee is not yet internationally recognized Lack of marketing information Farmers, middlemen and local traders lack funds to finance their activities Lao People's Democratic Republic is a small producer compared to other countries Costs of labor of harvesting cherries are high Low price for agriculture products and low profitability for farmers Lack of appropriate financial support mechanisms High costs for export and transportation Lack of international economic integration 	<ul style="list-style-type: none"> Difficulty with generating and guaranteeing higher incomes Lack of media promotion of Lao coffee branding Low quality of final products of coffee production Lack of processing technologies and modern machinery Limited market control 	<ul style="list-style-type: none"> Ensure the livelihood for the farmer (economic prosperity, profits from sector, food security) Enhance coffee quality standards for national and international trading by developing scientific quality certificates. Especially the harvesting, postharvesting, roasting and storing techniques are important in this matter. Contribute and support the farming system by create more coffee quality and branding to develop brands for export of specialty and organic coffee.
ECOLOGICAL	<ul style="list-style-type: none"> Reckless and improper use of chemicals in accordance with government regulations Unsustainable land management Adverse climate change effects such as higher temperatures, more fluctuating precipitation and more extreme weather events There are difficulties in expanding coffee plantation areas for coffee growers and foreign investors 	<ul style="list-style-type: none"> Less favorable farming circumstances and instable production volumes Decreasing soil quality leading to land degradation Biodiversity decline Environmental pollution and health issues Conflicts in land use and risks for forest protection 	<ul style="list-style-type: none"> Facilitate environmental health and a balanced coffee ecosystem by creating integrated coffee systems with intercropping (mix with other crops), and avoiding overuse of fertilizers and chemicals. This will support good future soil quality and also the livelihoods and incomes of farmers through better coffee prices and side income coming from intercropping
POLITICAL	<ul style="list-style-type: none"> Lack of coordination between national and subnational level and to farmers Differences between administrative rules and decision-making at the central and local levels There is no oriented of political stability and rules protection for enforcement and specific mandate policy between nationally and internationally Possible increase in conflict between coffee growing policy and dam construction policy 	<ul style="list-style-type: none"> Open new opportunities for national and international investment by enforcing the infrastructure policy 	<ul style="list-style-type: none"> Ensure social rights in accordance with the law by facilitating secure investment and marketing Create support policy and market incentives to ensure the livelihood for the farmer by improving economic prosperity, profits and food security. This should be done by promoting commercialization using scientific techniques to generate income, and sustainable access to markets. This will ensure the wellbeing, income and health of workers in coffee industry and gender in socio-cultural context Improve coffee policy management by facilitating coffee contracts focused on export, specifying the direction of future coffee production and the types of coffee to be grown, facilitating organic coffee production and stimulate collaboration, between the public and private sector and producers on local and central level.



BARRIERS & UNDERLYING CAUSES

Trends and drivers of change often have underlying issues or developments that cause a system to change in a certain direction. Trends are then a result and therefore a symptom of these underlying causes, as they can follow from a cascade of developments. To understand the identified trends and the barriers they form for realizing sustainable and resilient coffee production, the trends are looked at in a systems approach. With this approach, the root causes and implications are being identified from the key barrier. This is visualized in a causal analysis framework. As the deeper roots of the barriers are being investigated, the framework allows for a focus on the problems underlying the driving forces instead of symptoms.

The root causes of the trends:

- Adverse climate change effects;
- Competition for land from other crops and industries;
- Lack of attention for the coffee sector from authorities;
- High costs for quality improvement;
- Low adaptive capacity for farmers to adapt to climate change;
- Limited number of coffee species;
- Volatile distribution and volatile coffee prices;
- High import-export customs duty;
- High costs of export and transportation.

The root implications of the trends:

- High recovery time for soil regeneration;
- High costs for maintaining soil quality;
- Low income for coffee farmers;
- Less land used for coffee production;
- Soil regeneration time needed after land use change to other, more harmful crops, like cassava.

BARRIERS & UNDERLYING CAUSES

Low productivity and low resilience to climate change in the coffee sector is identified as the main barrier to having a future proof coffee sector. The implications of this barrier and the chain of impacts these have are described in this figure, as well as the causes and forthcoming root causes of this issue. Identifying the root causes can help in developing actions that act upon the sources rather than the symptoms of the issue.



Elaborated by the authors.

KEY STAKEHOLDERS

The stakeholder mapping as shown in the figure on the next page serves as a tool to understand the variety of stakeholders in the coffee value chain, as well as their influences and interactions. The results show that climate change and unsustainable farming practices not only influence farmers, but all actors in the value chain. Also, the key actors in coffee production can be identified with this figure. These key actors are the stakeholders that are most important to involve in a transformation of the system towards climate resilient production. The stakeholder groups and their components are grouped per sector and their specific interactions are indicated using arrows.

The policy frameworks and stakeholders on global, regional and national level are indicated below. On the right side the key stakeholders and involved governmental departments are listed.

GLOBAL LEVEL

The SDG Framework, UNFCCC Paris Agreement, Lao Intended Nationally Determined Contribution.

REGIONAL LEVEL

ASEAN Regional Guidelines for promoting climate smart agriculture practices, ASEAN Ministers of Agriculture and Forestry.

NATIONAL LEVEL

7th National Socio-economic development Plan (NSED) Lao Agriculture Development Strategy, 2020, 9th national socio-economic development plan of the government for the years 2021-2025 and Agriculture Development Strategy to 2025 and vision to the year 2030.

Key stakeholders:

National government:

Ministry of Agriculture and Forestry (MAF), Ministry Industry and Commerce (MIC), Ministry of Finance (MoF), Ministry of Natural Resources and Environment (MoNRE), Ministry of Justice (MoJ), Ministry of Information (MoI), National University of Laos

Private sector:

Coffee associations, producer cooperatives, independent smallholders, traders, collectors, roasters

NGOs:

Coffee Lover, Helvetas, Swiss Development Cooperation, Coffee Highland

Provincial authorities:

Provincial Agriculture and Forestry Office (PAFO), District Agriculture and Forestry Office (DAFO)

Media:

State media, TV program MAF, Newspapers, Radio station, Social media, Center of Information and Research

Involved governmental departments:

MAF: DOPLA, DALaM, NAFRI, DoA, DoPF, DAEC

MIC: Lao National Chamber of Commerce and Industry (LNCCI)

MoF: SOE Management, Development and Insurance Department

MoNRE: National Land Management Authority (NLMA)

MoJ: Department of Inspection and Legal Assessment

MoI: Department of Tourism Management

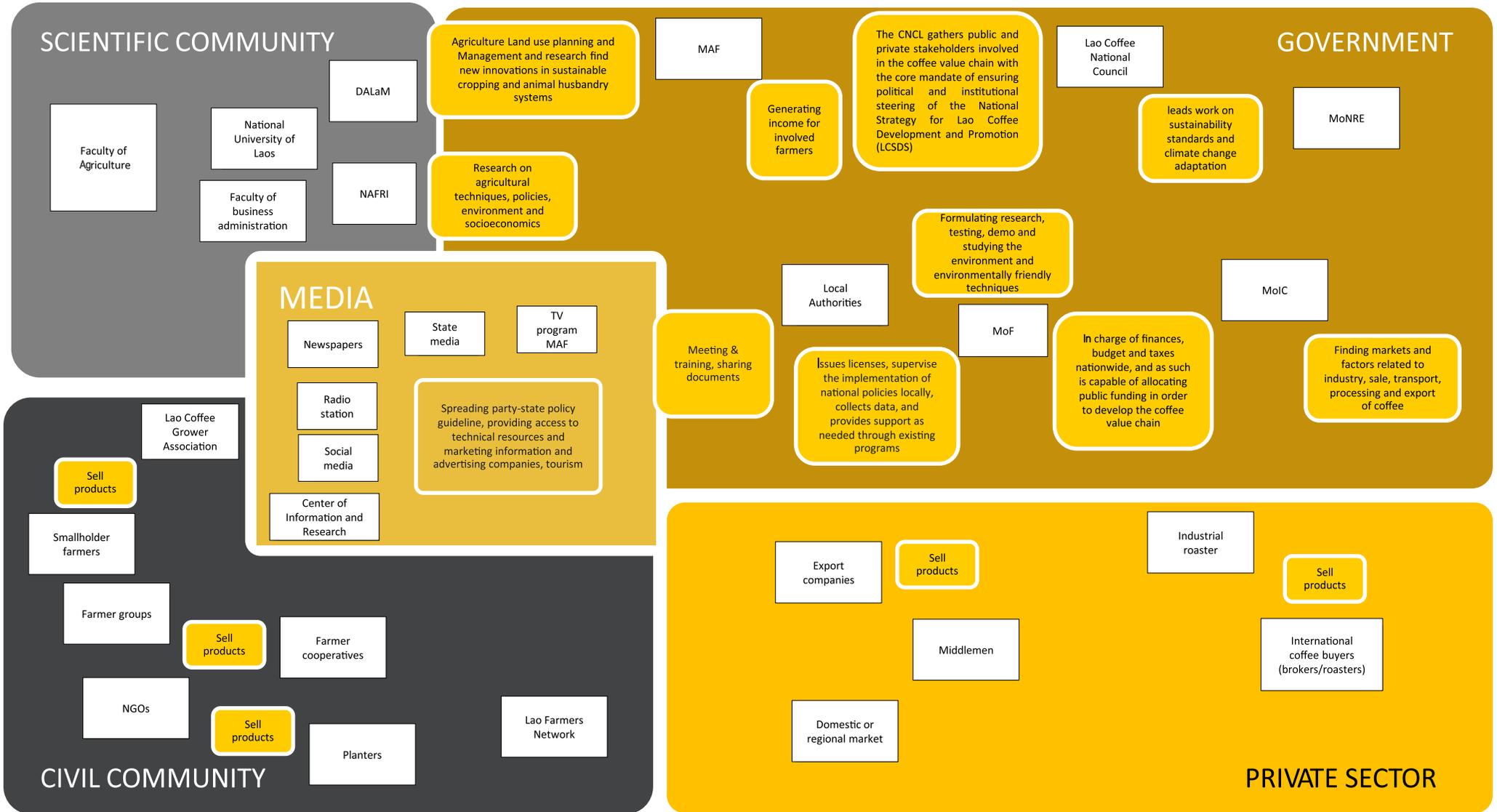
National University of Laos: Faculty of agriculture, Faculty of Business Administration

PAFO: PALaM, PoA

DAFO: Division of Agriculture Land Management



STAKEHOLDER'S MAPPING



Elaborated by the authors.

FUTURE CONTEXTUAL SCENARIOS ANALYSIS

The contextual scenario narratives described in box 1 and 2 have been developed during the SAMIS contextual scenarios workshop of 2020 (Peou *et al.*, 2020). The scenarios are concrete examples of what future states could look like. They are based on current developments in the coffee sector in Lao People's Democratic Republic. These so-called drivers of change are then extrapolated to the year 2050. When combining a selection of these drivers, a possible future context can be sketched. A narrative of this context describes a possible future state of the coffee sector, with two of the drivers that are dominant. The dominant drivers have a large variety of impacts on other trends, for example food security, income, migration, export values and environment, as described in box 1 and 2. The contextual scenarios give an understanding of the complexity of the food system, and explore a range of possibilities for the future. Policy documents and proposed actions can be evaluated on their robustness by imagining their effectiveness if one of these scenarios would be reality. The risks and opportunities that the scenarios and trends bring about as a consequence are specified. With this information, specific recommendations are set up to respond to the developments in the scenarios. This allows for current policies to be complemented and evaluated on their robustness, to see if the proposed actions would still be adequate and in place, in case the future scenario would be realized.

Key priority actions based on the two scenarios:

1. Ensure land ownership for farmers and promote cultivation of coffee to avoid land use change;
2. Apply organic fertilizer inputs thanks to policy and high skills workers that have been trained with good agriculture practices;
3. Implement management and application of sustainable land use and management;
4. Improve communication between government and farmers, especially in the Northern areas with less information spreading
5. Improve access of farmers for agricultural funding by banks and encourage farmers groups formation;
6. Sustain effective land zoning plans and improve communication between government departments to obtain more coordinated agricultural and natural area management plans.

AGRICULTURE IN NEED OF RESCUE TEAM

Less secure land ownership & high availability and skills of labor forces

In 2030, coffee production is highly specialized in Lao People's Democratic Republic and especially in south: Champasack is the province with the highest experience, the provinces of Xienkuang and Huapanh are popular for their organic coffee and are well received by marketing. The district of Paksong (KM35 village) is recognized nationally for its high-quality coffee and won multiple national prizes. Despite the high-quality coffee, the quantities produced by the farmers are insufficient to respond to the demand coming from different regions of Lao People's Democratic Republic. This is due to the insecure land ownership of farmers as over the years multiple land issues raised. Coffee area will be changed to other cash crops and agricultural land is converted to industrial land for e.g., mining or reservoirs.

Meanwhile the production levels of basic commodities to maintain food security, such as rice, cannot be kept stable and as incomes decrease, the youngsters of the villages are seeking new opportunities in the cities. Key agricultural production areas and green baskets in Savannakhet and Champassak provinces are being left empty due to land degradation related to the use of fertilizers and pesticides. To mitigate the flux of migration the government is encouraging agro-industries to build factories in non-permanent lands. Those large lands areas are being taken by agro-industries doing intensive agriculture, such as Lao Coffee Association in Champasak province. This decreased even more the soil fertility and has a tragic impact on the environment. Despite big factories that have been located in the Bachiengchaleanshouk district, people are still migrating, as the modern agriculture is mainly mechanized and only two types of jobs are available: those that required almost no skill and are paid badly or those that required degrees in science and research with high salaries. As families are regularly out of food and income insecurity, there is a need to further improve public administration, especially laws, decrees and regulations.

HAPPY FARMERS

Clear land zoning & insufficient communication between government actors

In 2030, weak governmental management, relationship capacity and low technical and developmental support cause communication problems. Examples are technical issues and land management in coffee production, conflict in population or land use change. This has led to delays in accessing local information and delivering climate hazard information to farmers and people on the ground in Northern regions of Phongsaly, Huaphanh, Xiengkhuang. These mountainous areas have less mobile phone signal and less information spread, leading to lower production volumes and adaptation capacity. The use of traditional techniques and low level of knowledge about modern techniques of farmers is an obstacle for maintaining stable production levels of coffee, as well as rice, maize and legumes. This is caused by not keeping up with pace of other countries and low access to information (internet, radio, tv). It is harder for farmers to access funding for agricultural production, and credit or loans from banks. This is mainly because banks assess income, use of technology and farmers plans and mainly provide to strong farmers groups.

There is a risk of land overuse through overlap of agricultural land management plans and natural resources management plans. This results in conflicts among the population as governmental departments may be making different plans for the same area. There is uncertainty among the people about who coordinates land use plans. Prices and import and export volumes are inconsistent between sectors due to uncoordinated data collection. Nevertheless, the land zoning plans of the government are very clear, mainly because appropriate sub-legislations and decrees for agricultural land management are defined. Natural areas and sustainable use of natural resources can be maintained effectively, resulting in effective management of agricultural land, ensured soil quality, improvement of sustainable production capacity, income generation for farmers leading to better livelihoods, better access to information and education, firm political stability, expansion and commercialization of production, and improvement of trade and markets.

ACTIONS & RECOMMENDATIONS

With this document, the need to include all relevant factors in the current and future production of coffee for Lao People's Democratic Republic is highlighted. It is highly recommended that all partners use and support the scientific output and following recommendations described in this document. Before implementation of the recommendations, it is necessary to get the permission of all relevant partners. The recommended priorities for realizing effective land use planning and a sustainable and climate resilient coffee production system are explained below. Next, the components that would help build income for farmers as well as building the national economy are described.

- Improve coffee policy management by facilitating coffee contracts focused on export, specifying the direction of future coffee production and the types of coffee to be grown, facilitating organic coffee production and stimulate collaboration between the public and private sector and producers on local and central level. Implementing agents are MAF, National Coffee Council and the Policy Team at the Department of Planning and Cooperation;
- Support the use of modern technologies by transforming traditional practices such as manual labor to the use of machineries. This should be done by developing the mindset of farmers and by widely distributing machinery and fertilizers. Also, providing training for farmers, financial incentives and more research on climate resilient coffee varieties are recommended. Implementing agents are Southern Coffee Research Center (NAFRI), finances need to come from Coffee Lover, the budget provider is MAF;
- Enhance coffee quality standards for national and international trading by developing scientific quality certificates, especially for harvesting, postharvesting, roasting and storing techniques. Contribute and support the farming system with higher coffee quality and branding for export of specialty and organic coffee. The implementing agent is Department of Agriculture (MAF) by making quality certificates. Also involved are MoIC, MoF, PAFO, DAFO, LNCCI, Coffee Training Center, Biotechnology and Ecology Institute, coffee cooperatives and companies.



ACTIONS & RECOMMENDATIONS



- Support fair investments, market control, export and farmers income, and avoid exploitation of producers and environment, by formulating an implementation and monitoring system for the Responsible Agricultural Investments (RAI) guidelines. MPI is the key leader to implement and monitor, MoIC and MAF are also involved;
- Facilitate environmental health and a balanced coffee ecosystem by creating integrated coffee systems with intercropping (mix with other crops), avoiding overuse of fertilizers and chemicals. This will support good future soil quality and also the livelihoods and incomes of farmers through better coffee prices and side income coming from intercropping. These investments are put into practice through training farmers in sustainable farming practices. DALaM (MAF) has the lead in this, together with DoL (MoNRE);
- Create support policy and market incentives to ensure livelihoods for farmers by improving economic prosperity, profits from sector and food security. This should be done by promoting commercialization using scientific techniques to generate income, and sustainable access to markets. This will ensure the wellbeing, income and health of workers in coffee industry and gender in socio-cultural context. MAF is the implementing agent, as well as MPI, MoIC and the National Assembly;
- Ensure the promotion of the coffee sector to young people to understand about coffee growing, processing, marketing and production.

SDGs TARGETS

The 17 Sustainable Development Goals (SDGs) were agreed on in 2015 by the Member States of the United Nations to create a better world by 2030. These goals envision the urgency to take on actions against poverty, hunger, inequality, climate change and biodiversity decline. Governments, the private sector and civilians are taking up the SDGs to indicate the societal value of their projects. This story map explains the vision of multiple relevant department of the Ministry of Agriculture and Forestry (MAF) for the future of maize production, therefore having a large influence on achieving relevant SDGs. The SDGs that are being adhered to by the analyses and recommendations indicated in this document are displayed below.



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