Climate Hazard Risk & Vulnerability Assessment

DEPARTMENT OF AGRICULTURE PROMOTION AND COOPERATIVE, MAF

G0585-LAO: CLIMATE-FRIENDLY AGRIBUSINESS VALUE CHAINS SECTOR PROJECT

SOFRECO

Background

- The Asian Development Bank (ADB) is supporting the Government of Laos in the implementation of the G0585-Lao: Climate-Friendly Agribusiness Value Chains Sector Project (CFAVC).
- The purpose of the CFAVC project is to improve agricultural production and value chain processes.
- The CFAVC will *identify a range of adaptation options for the management and reduction of climate vulnerabilities and risks*
- *The Climate Risk and Vulnerability Assessment is one component of the project.*

The objectives of the assessment

- To identify the climate hazards in target provinces
- To identify the climate adaptation/resilience options and measures
- To identify capacity building and training need of the target provinces

Methodology

- Related documents review
- Field data collection
  - Consultation meeting with stakeholders in 6 provinces and 6 districts
  - Consultation meeting with Bio-fertilizer factory, Agriculture promotion center, agriculture production group,
  - Direct field observation: Dongxiengdy bio-fertilizer factory (Naxaythong), Napork irrigation project (road and irrigation)(Xebangfai), Thongbak-Lak4 irrigation project (road and irrigation) (Champhone), Nongdeng irrigation project (road/irrigation), Nongdeng agriculture promotion center (Salavan), Road and pond development in Lakkhao village (Tateng), and Pond development in Houyset village (Paksong)
- Training workshop consultation with stakeholders at central and provincial level.

Finding

The CFAVC project area is highly exposed to 4 climate-related hazard risk categories, these being:

1. Temperature rise and extremes (heat waves & hot days);
2. Water scarcity and increased incidence of drought;
3. Increased frequency and intensity of precipitation, extreme storm events, cyclones; and
4. Increase risk of flood (river-based flooding).

Climate Hazard Risks in Lao PDR

The Climate Risk Index 2017 indicates a level of exposure and vulnerability to extreme events that countries should understand as a warning to be prepared for more frequent and/or more severe events in the future.

(Think Hazard, World Bank Group; http://thinkhazard.org/en/)

Key Climate Change Vulnerabilities

Two key vulnerabilities are particularly critical for agriculture in Lao PDR: i) the future precipitation patterns and their distribution throughout the year; and ii) the incidence of extreme weather events (IPCC, 2007, 2008, 2014).

- The main consequences of these vulnerabilities for agricultural production include:
  1. ***Increased demand for water in all regions due to increases in crop evapotranspiration in response to increased temperatures;***
  2. ***Increased water shortages, particularly in the spring and summer months, increasing the water requirement for irrigation, especially in areas with current water stress;***
  3. ***Reduced water quality due to higher water temperatures and lower levels of runoff in some regions, particularly in summer, imposing further stress in irrigated areas; and***
  4. ***Increased risk of flooding due to the expected concentration of winter rainfall.***

Summary of Provincial Exposure and Vulnerability to Climate Hazards

Province/ Subproject Location	Climate Hazard Risk Exposure & Vulnerability			
	Rising temperatures & extreme heat	Water scarcity and drought	Extreme precipitation, storms & cyclones	Flood (river based)
Vientianne	Medium	Low	High	High
Khammouane	Medium	Low	High	High
Saravan	Medium	Low	High	Low
Savannakhet	Medium	Low	High	High
Sekong	Medium	Low	High	Medium
Champasak	Medium	Low	High	High

Hazard risk exposure in Subproject locations.

*The ratings in table are based on **the assessment of historical occurrence of the hazard** within a provincial/subproject area, and **the expected increase in the frequency and intensity of these events** (i.e., estimates of hazard frequency and severity), and provide insight on the priority hazard risks relevant to the subproject locations (GFDRR, 2021).*

Adaptation and Increasing Resilience

The key focus of increasing climate resilience is to reduce the climate vulnerability to the effects of climate change through climate change adaptation efforts.

- **Climate change adaption**: is the process of adjusting to current or expected effects of climate change. Adaptation aims to moderate or avoid harm, and exploit opportunities; for natural systems, humans may intervene to help adjustment.
- **Climate change resilience** is defined as the "capacity of social, economic and ecosystems to cope with a hazardous event or trend or disturbance".

Practical adaptation solutions include climate resilient infrastructure, climate resilient agriculture and climate resilient development.

Adaptations included in the project design

The CFAVC Project has three key adaptation outputs:

- **Output 1:** - Critical agribusiness value chain infrastructure improved and made climate resilient;
- **Output 2:** - Climate-smart agriculture and agribusiness promoted; and
- **Output 3:** - Enabling environment for climate-friendly agribusiness enhanced.

Developing Adaptation Solutions

The CRVA risk management component is cross-cutting and applies to includes 4 key sub-tasks addressing climate risk management and the development of adaption solutions, these being:

1. Undertaking a comprehensive climate risk and vulnerability assessment for the Project;
2. Developing climate risk management and adaption solutions for the Project;
3. Mainstreaming climate adaptation solutions for effective mitigation of climate disaster risk-related impacts on all aspects of the Project; and
4. Identifying priority activities for strengthening the capacity of policymakers and relevant stakeholders, including capacity building, institutional strengthening and continued training in climate risk management.

Climate Adaptation Priorities

- **ADB's Country Partnership Strategy (CPS)**: identifies sustainable natural resource management and climate resilience as a priority. Under this priority the partnership aims to support sustainable natural resource management and climate resilience.
- **Lao PDR's Nationally Determined Contributions**: identifies climate change mitigation and adaptation actions in agriculture, forestry and land use, water resources, energy, transport, urban development, and public health as national priority. These have been selectively incorporated in ADB operations.
- **Climate resilience:** Additionally, ADB projects and support will strengthen climate resilience through improved watershed management by supporting better land use management and the introduction of climate-resilient agricultural practices
- **Disaster risk management**: Support integrated disaster risk management and climate change adaptation in support to the government response to climate change in Lao PDR.

Key Adaptation Measures

- **Sustainable climate smart agriculture**: supporting sustainable soil, water, agricultural production.
- **Diversification**: Introduction of drought, flood and pest resilient crops and improved cropping systems.
- **Managing climate risk**. concentrate on climate-related hazards and their impacts by ensuring infrastructure systems are resilient to potential increases in extreme weather events such as storms, floods and heat waves etc.
- **Value chain adaptation**. Promoting and incentivizing broader private sector iand agri-business involvement in adaptation initiatives.
- **Capacity building & training**. Focusing on capacity development and tend to involve institution strengthening, training, information sharing and technology.
- **Access to climate information.** Including dissemination of weather and climate forecasts and access to early warning systems.

Effective risk management and adaptation are tailored to local and regional needs and circumstances.

Adaptation Strategy of target provinces

Climate Change Hazard	Adaptation strategy
Building assets, Agriculture development	
Increasing temperatures & Heatwaves	• Monitoring the weather forecasts and early warning systems • Tree plants around buildings/assets to protect light and heat
Water scarcity and increased incidence of drought	• Borehole drilling and using solar power • Effective water use for reducing soil erosion of groundwater use
Increased frequency & intensity of precipitation, storms & cyclones	• Design and construction meet the high standards • Follow the building code in construction, • The construction materials meet the standard in procurement • Construct strong buildings, houses, and production drying places in the non-open space • Building a reservoir for flood protection • Make fence or wall construction around building/assets

Adaptation Strategy(cont..

Climate Change Hazard	Adaptation strategy
Pond and water storage	
Increasing temperatures & Heatwaves	• Sediment removes and cleaning to have more water storing capacity • Tree plantation to conserve water in the pond • More water is stored in the pond for sufficient water volume in use
Water scarcity and increased incidence of drought	• Convert more water from another irrigation system • Reservoir construction for draught prevention in all agricultural areas where have not an irrigation system • More tree plants to store water
Increased frequency & intensity of precipitation, storms & cyclones	• Bank erosion/landslide prevention construction • Bigger or equal drainage system construction for inlet-outlet drainage • Water drains out to maintain the water level in the pond and to protect the pond's crest dike.

Adaptation Strategy(cont..

Climate Change Hazard	Adaptation strategy
Irrigation infrastructures	
Increasing temperatures & Heatwaves	• Effective water use and management. • Follow building code in construction, based on designed • Dam/reservoir construction • Regularly deliver the water to the canal
Water scarcity and increased incidence of drought	• Design and construction of the pump for flexible use based on changing water levels. • Rain storms resilience design and construction of the reservoir. • Monitoring, checking, operation and maintenance; • Comprehensive irrigation system construction • Committee establishment or improvement, • Pond construction and dam/reservoir for water storage; • Forest prevention upstream of the watershed • Forest and water resources rehabilitation to protect draught • Continuously water management and covered all areas before the beginning of the cultivation season

Adaptation Strategy(cont..

Climate Change Hazard	Adaptation strategy
Irrigation infrastructures	
Increased frequency & intensity of precipitation, storms & cyclones	• Upgrade earth canal to be brick or cement canal construction, Increase higher canal level • Design and construction based on building code/construction standards • Reforestation/tree plantation • Improve early warning system, including water gauge and water level measurement and rain gauge station • Regular irrigation canal cleaning to remove drainage system block.

Adaptation Strategy(cont..

Climate Change Hazard	Adaptation strategy
Agriculture field access road	
Increasing temperatures & Heatwaves	• Reforestation • Tree planting along the road to reduce the heat
Water scarcity and increased incidence of drought	• Watering at least 3 times/day
Increased frequency & intensity of precipitation, storms & cyclones	• Up road level in construction, Culvert construction for drainage in low points. • Early warning for farmers • Green line Building (planting trees) • Cleaning before the rainy season • Improve drainage system and soil erosion protection • Grass cultivate alongside the road to protect against soil erosion, cleaning sediment along the side of the road

Thank you