

UNDP NEPAL
Terms of Reference

Assessment of Climate Impact on Agriculture Value Chain

1. BACKGROUND

Agriculture is most vulnerable to climate change risks with anticipated significant production losses globally against projected increase in future demand. Estimated rise in temperature higher in upland areas than the lowlands is likely to impact Nepal's upland agriculture production. Even the low land agriculture will suffer from continued spell of droughts and floods.

UNDP in collaboration with FAO implemented 'Integrating Agriculture in National Adaptation Plans Programme (NAP-Ag)' in Nepal under the leadership of the Ministry of Agriculture and Livestock Development (MoALD) of the Government of Nepal between 2016 and 2019. The programme, through evidence-based advocacy, supported the government to integrate climate change adaptation into agriculture sector planning and budgeting. It supported the MoALD to develop a roadmap to make Nepal's agriculture sector climate responsive in the long run and prepare Guidelines for integration of climate actions into sectoral plans and budgets through climate coding.

Nepal's agriculture sector contributes to almost one third of Nepal's GDP, employing about two thirds of the population directly or indirectly and represents 13% of total foreign trade. Nepal's Agriculture Development Strategy (2015-2035) identifies erratic monsoon rains and increase in average temperature resulting into frequent flood and drought as major climate risks to Nepal's food production and agriculture value chain development. IFAD warns that "some agricultural value chains may no longer be economically viable over timespans of as little as 20 years, as climate change pushes beyond the thresholds of crop, pasture, or fisheries suitability in the areas of production.¹"

Despite Nepal's priority to commercialize agriculture sector, insufficient knowledge about climate impacts on value chain and choice of adaptation options linked to technology, finance, and market, the sector is far behind the goal of commercialization. Some of these gaps include:

- Limited research available regards to CC impacts across various stages of a VC and climate risks projections are not calibrated with farmers knowledge.
- Lack of analysis to guide choice of adaption option to support VC investment decision making.
- Less incentive for scattered, small produces to participate in value chains and be able to manage climate risks

2. OBJECTIVE

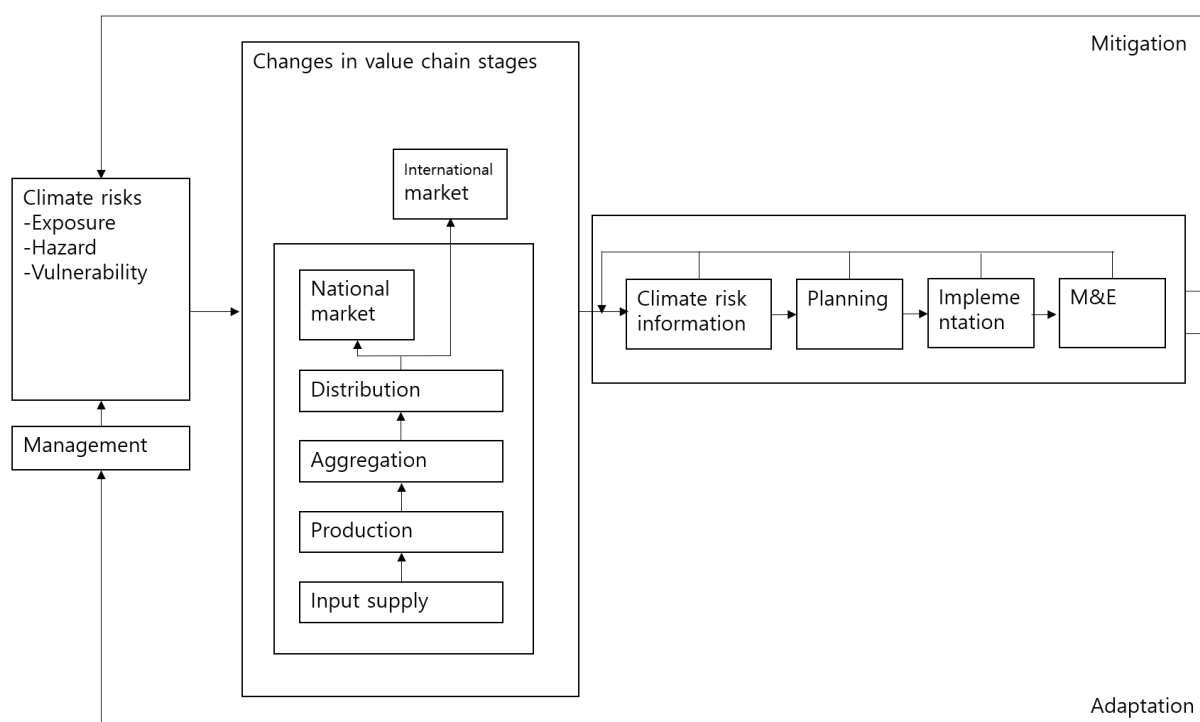
The objective of this study is to fulfill the knowledge gap by identifying climate impacts on selected agriculture value chain and propose appropriate adaptation measures that will influence investments in the value chain. Through assessment of climate impacts on different stages of the value chain, the study will contribute to long term sustainability of the value chain market and build confidence of public and private investors with viable adaptation options to address the risks. The assessment will mainly include:

¹ International Fund for Agriculture Development (2015) How to do climate change risk assessment in value chain projects. IFAD Policy and Technical Advisory Division.

- Selection of value chain for the study of climate impacts
- Building climate change scenario and micro-climate assessment
- Developing 'climate risk model' for select value chain
- Estimation of potential climate impacts at different stages of value chain
- Identifying adaptation options to mitigate climate risks
- Socio-economic and financial analysis for choice of an adaptation option
- Developing advocacy tool to influence public and private investment on value chain

3. CONCEPTUAL FRAMEWORK

Following conceptual frame is proposed for the study:



4. SCOPE OF WORK

4.1. CLIMATE RISK ANALYSIS

Climate change has significant impact on the agriculture sector as the sector is most sensitive to changes in climatic conditions. Changes in weather patterns, temperature, precipitation, frequency of extreme weather events affects the annual yield, storage and transportation of produces, and market volumes. In addition, the severity of the weather and climate events depends on the level of vulnerability and exposure of elements of the value chain to these events².

IPCC defines the risk factors as hazard, exposure and vulnerability. Hazard refers to the possible and future occurrence of natural or human-induced physical events that may have adverse effects on vulnerable elements. Exposure is the inventory of elements in an area where hazard may occur. The propensity of

² https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap2_FINAL-1.pdf

exposed elements such as human, livelihoods and assets to suffer adverse effects by hazard events refers to vulnerability³.

To assess risks, high quality, consistent and timely climate and weather information is a key resource. Climate information describes past, current and future climate conditions, which determines climate variability and nature of hazards. This information is useful for building climate scenarios and making climate projections, which are helpful in appraisal and prioritization of adaptation actions. Together with the micro-climate analysis, climate analysis plays an important role in sustainability of the value chain.

<Table 1. Types of climate information required in agriculture sectors⁴>

Subsectors	Types and relevance of climate information
Annual crops	<ul style="list-style-type: none"> rainfall, temperature and soil moisture for planting and harvesting seasonal rainfall duration for deciding on long/short season varieties rainfall, temperature and soil moisture on weekly timescales within a season affecting decisions on pesticide, irrigation and fertiliser applications long term rainfall/temperature projections affecting crop suitability and shifts in agro-ecological zones
Livestock	<ul style="list-style-type: none"> temperatures affecting heat stress and fertility rainfall and temperature affecting water availability, forage, supplementary feed stocks, milk production and parasites
Forestry/perennial crops	<ul style="list-style-type: none"> temperatures affecting flowering, ripening and chill units (apples) rainfall affecting pests and diseases; solar radiation affecting fruit crops cyclone incidence and damages from strong winds long term rainfall/temperature projections affecting suitability of growing conditions
Fisheries	<ul style="list-style-type: none"> water temperatures and water availability (rainfall) affecting freshwater fish farming sea surface temperatures, salinities, plankton and algal blooms affecting saltwater fish availability cyclones and storms affecting safety at sea for fishing boats long term changes in sea temperatures and salinities affecting fish migration and abundance

<source: NAP-Ag Handbook>

4.2.AGRICULTURAL VALUE CHAIN ANALYSIS

The agricultural value chain approach consists of a range of actors and activities involved in bringing an agricultural product from production to final consumption with value addition at each stage.

The stage constitutes of a set of activities from input supply, production, aggregation, distribution and market. The purpose of the value chain analysis is to identify actors and key activities across each stages of the chain and achieve competitive advantages in markets. Actors from different stages can pursue competitiveness by using vertical and horizontal linkages. Vertical linkages refer to the connection between

³ https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap2_FINAL-1.pdf

⁴ This does not include indirect impacts on worker productivity, price volatility, etc.

different stages, while horizontal linkages is relationship among different actors in the same stage of the chain. Vertical and horizontal information sharing is key to success, as all share the common end objective: supply of produces tailored to end user (consumer) needs.

Important steps to consider during the agricultural value chain analysis include:

- Identifying actors at each stage of the chain and detailing their functions and relationships;
- Determining the chain governance/leadership;
- Identifying value adding activities along with the value added in those activities; and
- Flow of goods, information and finance through the chain.⁵

Based on past work on value chain analysis, few target commodities will be selected for value chain research and identification of a value chain for climate impact study based on its market value potential and its contribution to the local economy. Selection of a value chain will also depend upon availability of value chain analysis and climate information that can be plugged in for impact analysis.

Selection of value chain may cover the transaction only in domestic markets or beyond depending on its economic and financial potential. For instance, in Nepal, coffee and banana are domestically consumed, while cardamom is exported for international markets. Considering all these, the simplified representation of value chain stages will be developed.

4.3. CLIMATE IMPACT ACROSS AGRICULTURE VALUE CHAIN

A value chain approach is useful in analyzing climate risks as it looks after not only the production stage but all stages from farm to fork, helping actors take a more systematic approach to risk management. The study is expected to use secondary source of information thorough desk review and its validation through interview and expert consultation.

A climate risk model for select value chain will be developed based on future climate projection and scenario to know impacts on climate on the value chain across various stages. The study will analyze varying degree of climate impacts on different actors of the value chain. For example, impact on farmers' production, dependent upon droughts, floods, and changes in seasonal patterns, will impact the supply for traders, transporters, and processors. In addition, disruption of roads and electricity caused by direct impacts of floods, also impacts transportation, marketing and processing.

Socio-economic and financial analysis of value chain is a crucial process to understand the dynamics along actors and identify financial needs within each stage. For instance, not only the exposure level by actors and their asset assessment to risks, but the ability of actors in anticipating and responding to climate changes affects the level of resilience to climate shocks. This is associated with the accessibility to climate information, the number of income sources, and the level of assets they possess to buffer stresses. It will highlight the importance of enhancing adaptive capacity for vulnerable actors along the chains.

Climate impacts along the value chain will be analyzed. It will be a complex task to quantify the likelihood and potential impact of most of risks in advance. Much less research has been done on climate risks in the post-harvest stages. Given the difficulty, prioritization of a top set of climate risks is imperative⁶. Data availability needs to be assured before selecting the target commodities.

⁵ "Agro Value Chain Analysis and Development: The UNIDO Approach", 2009, United Nations Industrial Development Organization.

4.4. CHOICE OF ADAPTATION OPTIONS

Adaptation measures increasing resilience and adaptive capacity will be identified, evaluated and prioritized. Adaptation options will be identified in a way they reduce climate risks by modifying one or more elements that define risk and vulnerability – reducing exposure, reducing sensitivity, or increasing adaptive capacity. This help both value chain actors and investors mitigate or transfer potential risks. IFAD (2015) proposes that three elements are needed for effective climate interventions:

- Diversification: a set of options to increase farmers' livelihood, farming and environmental management portfolios
- Climate proofing: interventions to make key stages of the value chain climate resilient
- Supply chain efficiencies: measures that increase efficiency and delivery high profitability to farmers and small businesses

4.5. ECONOMIC AND FINANCIAL ANALYSIS

A cost-benefit analysis would be useful for choice of financially feasible adaptation options to help the investors in making sound investment decisions. A socio-economic analysis might be useful as well for understanding the social and economic benefits of adopting a suitable adaptation option. A potential adaptation model will be worked and recommended to help mitigate the impacts.

A monetary valuation of climate impacts will help in estimating loss or gain to the potential future investments to be made in VC development.

Based on the analysis, a strategy for advocacy aimed at influencing investment decision making will be developed involving the actors responsible for processes, products and services in the value chain.

5. METHODOLOGY

The consulting firm should propose a detail methodological framework in the inception report. The study should undertake a quantitative and qualitative assessment. The firm will be responsible for designing and conducting the STUDY including proposing appropriate methodology, designing tools, developing questionnaires, and other instruments for data collection and analysis. The firm is responsible, but not limited to:

- Desk study and review of all relevant documents, reports, briefs
- Consultation with UNDP, advisory group, concerned ministries, and concerned development partners for strategic direction
- Field observations, interactions, interviewed (structured, semi-structured), and consultation with stakeholders and actors along the value chains
- Sample survey shall be conducted with a reasonable and statistically meaningful number of sample numbers in target areas and crops. Important actors along the value chains should be interviewed.
- Briefing and debriefing sessions will be organized.

- The firm should ensure triangulation of various data sources to maximize the validity and reliability of the data. Analysis leading to evaluate judgement should be clearly spelled out. The limitations of the methodological framework should be also spelled out in the review reports.
- Any necessary methodologies for ensuring that the study addresses the needs of vulnerable groups employs a rights-based approach and takes questions around gender into consideration.

6. IMPLEMENTAION AND TIMEFRAME

The study will be conducted by a national research institution with experience and capacities of doing climate, value chain and economic research. The study will be guided by an advisory group consisting of members from institutions working on climate and agriculture value chain in Nepal such as ICIMOD, IWMI, Li-BIRD, GIZ, Helvetas, NARC and others. UNDP-supported agriculture value chain development project (funded by KOICA) will provide coordination, technical and logistic support to the study.

Timeline: Main body of the study is expected to complete by December 2020 - January 2021 with final report completed by March 2021. The following indicative time line is suggested for the process:

Main Deliverables	Timeline	Deadline
Commencement of the Evaluation (<i>Signing of the Contract</i>)	Signing day	4 th week of September 2020
Briefing of the assignment to the consulting firm by UNDP	Next day of the signing	4 th week of September 2020
Desk review	7 days after the contract signing	1 st week of October 2020
Submission of Draft Inception report	10 th day after the contract signing	2 nd week of October 2020
Debriefing on the draft Inception Report	Next day of the submission of draft inception report.	2 nd week of October 2020
Submission of the final Inception Report	2/3 days after receiving feedback from UNDP	3 rd week of October 2020
Field work: (Stakeholder Consultation, data collection from fields)	20 days after finalization of the inception report. This schedule may be revisited depending on the COVID-19 situation.	2 nd week of November 2020
Climate impact assessment	20 days after finalization of the inception report.	2 nd week of November 2020
Submission of the first draft of the draft report and presentation	25 days after the data collection mission ends	3 rd week of November 2020
Presentation of the draft report to UNDP/advisory group	Next day of the report submission	3 rd week of November 2020
Peer review and comment incorporation	10 days after the presentation	1 st week of December 2020
Final report submission	10 days after receiving feedback from UNDP/Advisory group	1 st week of December 2020

Notes: The time line will be verified and amended by the consultant team based on the findings of the inception report.

7. DELIVERABLES

The deliverables from the assignment are as follows:

- **Evaluation Inception Report** detailing the team understanding of what is being evaluated and why, outlining which data collection methodologies and a proposed schedule of tasks.
- **Draft Report** to be shared with UNDP and the advisory group for feedback and quality assurance.
- **Debriefing** meeting with UNDP and the advisory group where main findings will be presented.
- **Final Evaluation Report**

8. TEAM COMPOSITION AND COMPETENCY REQUIREMENTS

The evaluation will be carried out through a firm to be selected through competitive selection process. While the firm will assume overall responsibility to ensure the quality of study and process to be followed as per the TORs: it is envisioned that it will have a gender balanced team of experts.

8.1. Team Leader cum Value Chain Expert

Roles and responsibilities:

- Lead the climate impact analysis along the selected value chain(s)
- Assume overall responsibility to produce inception, draft and final outcome reports;
- Be responsible for the designing of study, coordination with the UNDP and advisory group and timely submission of all deliverables, assuring quality;
- Lead the team for desk review analyses, discussions and meetings, assign clear roles/responsibilities/deliverable for each of the team members, prepare presentation and present the findings of the report to different stakeholders;

Qualification/Experience

- Ph. D in value chain analysis-related field with sound technical knowledge on the assignment subject,
- At least 5 years of experience in leading impact assessment, value chain analysis, socio-economic study, etc as team leader for minimum two evaluations,
- Extensive knowledge of value chains on agriculture commodities,
- Expertise, familiarity, knowledge on gender and social inclusion,
- Working experience with multilateral organizations, UN, or donors will be an added advantage,
- Excellent command of written and spoken English.

8.2. Climate change analyst

Roles and responsibilities:

- Assume overall responsibility in analyzing and modelling climate risks, assessing climate impact, and planning climate scenarios
- Recommend the choice of adaptation measures along the value chain

Qualification and Experience:

- Master in environment science or related field (PhD will be an added advantage),
- At least 5 years of experience on climate risk modelling, climate impact assessment, scenario planning,

- Sound knowledge of the national context and issues related to climate risks
- Working experience with multilateral organizations, UN, or donors will be an added advantage,
- Excellent command of written and spoken English.

8.3. Economist

Roles and responsibilities:

- Propose target commodities for value chain analysis based on literature review
- Conduct financial/economic analysis along the select value chains

Qualification and Experience:

- Master in economics or related field (PhD will be an added advantage),
- At least 5 years of experience on financial and economic analysis, value chain assessment, cost-benefit analysis, etc.
- Sound knowledge of the national context and issues related to agricultural value chain
- Working experience with multilateral organizations, UN, or donors will be an added advantage,
- Excellent command of written and spoken English.

9. EVALUATION ETHICS

Evaluation in the UN will be conducted in accordance with the principles outlined in both Norms and Standards for Evaluation in the UN System by the United Nations Evaluation Group (UNEG) and by the UNEG 'Ethical Guidelines for Evaluation'. These documents will be attached to the contract. Evaluators are required to read the Norms and Standards and the guidelines and ensure a strict adherence to them, including establishing protocols to safeguard confidentiality of information obtained during the evaluation.

10. IMPLEMENTATION ARRANGEMENTS

This evaluation is commissioned by UNDP Nepal. UNDP Nepal will oversee the study process and provide the consulting team with any logistics and administrative support if needed. The advisory group comprising of development partners who worked on climate risks and value chains in Nepal will be formed to provide technical advice.

11. PAYMENT SCHEDULE

Deliverable	Payment
Inception report	30%
Draft report and presentation	30%
Final report submission	40%
Total	100%