GEF-8 PROJECT IDENTIFICATION FORM (PIF)

TABLE OF CONTENTS

General Project Information

Project Title	
Climate Resilient Transformation of Rice-based Farming and Food Systems in Central Nepal (CRAFT Nepal)	
Region	GEF Project ID
Nepal	11401
Country(ies)	Type of Project
Nepal	FSP
GEF Agency(ies):	GEF Agency ID
FAO	747104
Executing Partner	Executing Partner Type
Ministry of Agriculture and Livestock Development	Government
GEF Focal Area (s)	Submission Date
Climate Change	10/18/2023
Project Sector (CCM Only)	
Climate Change Adaptation Sector	
Taxonomy	
Focal Areas, Climate Change, Climate Change Adaptation, Adaptation Tech Transfer, Disaster risk management, Climate information, Climate resilience, Least Developed Countries, Influencing models, Strengthen institutional capacity and decision-making, Demonstrate innovative approache, Stakeholders, Local Communities, Type of Engagement, Participation, Information Dissemination, Consultation, Private Sector, SMEs, Individuals/Entrepreneurs, Beneficiaries, Indigenous Peoples, Communications, Awareness Raising, Behavior change, Gender Equality, Gender Mainstreaming, Sex-disaggregated indicators, Gender results areas, Access to benefits and services, Capacity Development, Capacity, Knowledge and Research, Enabling Activities, Learning, Theory of change, Indicators to measure change, Innovation	
Type of Trust Fund	Project Duration (Months)
LDCF	60
GEF Project Grant: (a)	GEF Project Non-Grant: (b)
8,932,420.00	0.00
Agency Fee(s) Grant: (c)	Agency Fee(s) Non-Grant (d)
848,580.00	0.00
Total GEF Financing: (a+b+c+d)	Total Co-financing
9,781,000.00	10,000,000.00
PPG Amount: (e)	PPG Agency Fee(s): (f)
200,000.00	19,000.00

PPG total amount: (e+f)	Total GEF Resources: (a+b+c+d+e+f)
219,000.00	10,000,000.00

Project Tags

CBIT: No NGI: No SGP: No Innovation: No

Project Summary

Provide a brief summary description of the project, including: (i) what is the problem and issues to be addressed? (ii) what are the project objectives, and if the project is intended to be transformative, how will this be achieved? iii), how will this be achieved (approach to deliver on objectives), and (iv) what are the GEBs and/or adaptation benefits, and other key expected results. The purpose of the summary is to provide a short, coherent summary for readers. The explanation and justification of the project should be in section B "project description".(max. 250 words, approximately 1/2 page)

Nepal is facing severe climate change induced problems due to rising temperatures (at the rate of 0.056 °C per annum) and changes in rainfall pattern (intense dry season and wet seasons). The projected rise in temperature, decreasing pre-monsoon and winter precipitation and increasing monsoon precipitation will affect crop production through an increase in diseases and pests, prolonged droughts in planting season and intense floods after plantation. These disturbances will negatively affect agricultural production and threaten the food security of the country's farming community.

As rice is the main staple crop of Nepal, protecting the crop from climate related hazards and increasing the productivity and resilience of rice-based cropping systems and value chain is critical to sustain the livelihoods of smallholder farmers.

The project objective is to promote transformation toward climate-resilient rice-based production landscapes in central Nepal that improve agro-ecosystem function, food security and nutrition through inclusive, climate resilient value chains and adoption of innovative Nature-based Solutions (NbS). The project will be implemented in four districts of central Nepal namely, Mahottari, Sarlahi, Nuwakot and Parasi, through climate resilient value chains and Nature-based Solutions (NbS) that improve agro-ecosystem function, food security and nutrition. The project will address climate change induced problems at the landscape level to transform the rice-based cropping systems from subsistence-based low production to a more commercial model by promoting climate resilient production systems. This intervention will reduce vulnerability, improve adaptive capacity and strengthen food security and nutrition among vulnerable farmers and other value chain actors . The transformation will be possible through partnerships with each level of governments, farming communities, cooperatives and private sector actors to enable a whole-of-society approach to removing institutional, technical and capacity barriers to climate resilient rice-based farming and food systems.

The project will adopt NbS at landscape level for improving ecosystem services and functions in farms, and innovative technology and capacity building interventions along the entire value chain supporting improved, climate resilient agronomic advisories and practices and the creation of an enabling environment to promote and scale-up climate resilient value-chains and NbS. Project activities will be underpinned through the establishment of systems to foster adaptive learning and knowledge management including a robust M&E system.

The targets for the Core Indicators include 148,000 direct beneficiaries, 10,000 ha area of land managed for climate resilience, 22 number of policies, plans, and frameworks that mainstream climate resilience, 4,840 people trained or with awareness raised, and 60 private sector enterprises engaged in climate change adaptation and resilience actions. These targets will be revisited during the PPG phase.

Indicative Project Overview

Project Objective

To promote transformation toward climate-resilient rice-based production landscapes in central Nepal that improve agro-ecosystem function, food security and nutrition through inclusive, climate resilient value chains and adoption of innovative Nature-based Solutions (NbS).

Project Components

I. Climate resilient rice-based production landscapes promoted

Component Type	Trust Fund
Investment	LDCF
GEF Project Financing ($)	Co-financing ($)
4,850,000.00	5,005,000.00

Outcome:

Outcome 1. Resilient rice-based production landscapes with improved agro-ecosystem function promoted through adoption of nature-based solutions and climate resilient practices at farm and landscape level

Indicators:
-Number of direct beneficiaries (male, female)
-Area of land managed for climate resilience (ha)
-Number of people trained or with awareness raised (male, female) and
- Cropping intensity (%) and crop yield (kg/ha)
- Number of farmers adjusting practice based on agro-advisory services

Output:

Output 1.1 Nature-based solutions (NbS) adopted for the sustainable management of rice-based production landscapes and strengthened climate resilience

Output 1.2 Climate resilient seed systems, agronomic practices, technologies and farm management strategies verified and scaled in rice-based production landscapes

Output 1.3 Crop and location specific agro-advisory services disseminated to and used by women and men farmers and other value chain actors

II. Climate resilient value chains developed and supported

Component Type	Trust Fund
Investment	LDCF
GEF Project Financing ($)	Co-financing ($)
2,250,000.00	2,750,000.00

Outcome:

Outcome 2. Climate resilient value chains in rice-production landscapes developed and supported through enhanced access to infrastructure and services to manage climate risks and access market opportunities.

Indicators:
-Number of people trained or with awareness raised (male, female),
-Number of private sector enterprises engaged in climate change adaptation and resilience action
-Number of technologies introduced/improved
-Number of value chain actors (male/female) receiving technical support and
-Number of farmers (male/female) and enterprises receiving & using market information

Output:

Output 2.1: Adaptive capacities of agricultural value chain actors enhanced through climate resilient business planning and access to risk mitigation services including credit and insurance

Output 2.2: Climate resilient post-harvest infrastructure including storage facilities and processing technologies promoted

III: Enabling environment to promote transformation toward climate resilient agricultural landscapes strengthened

Component Type	Trust Fund
Technical Assistance	LDCF
GEF Project Financing ($)	Co-financing ($)
1,158,108.00	1,750,000.00

Outcome:

Outcome 3. Government policy, planning frameworks and climate services strengthened in gender responsive manner
for climate change
adaptation and
governance mainstreamed at three levels of government to enable a whole-of-society approach for adaptation.

Indicators:
-Number of government staff (male/female) trained,
-Number of government institutions with strengthened capacity,
-Total number of policies, plans, and frameworks that mainstream climate resilience,
-Number of farmers (male/female) receiving & using agro-advisory services,
-Multistakeholder dialogues conducted and
-Number of non-state actors and private sector entities engaged in the multistakeholder dialogues

Output:

Output 3.1 Governance and regulatory systems to promote climate resilient value-chains and NbS at local, provincial and federal government levels strengthened in gender responsive manner

Output 3.2 Multi-stakeholder dialogues with non-state actors and private sector entities promoted to develop inclusive services and approaches to promote climate resilient value-chains and NbS

M&E

Component Type	Trust Fund
Technical Assistance	LDCF
GEF Project Financing ($)	Co-financing ($)
249,122.00	

Outcome:

Outcome 4. Learnings from adaptation innovations monitored, analysed, reported and disseminated
Indicators:
-Communication strategy and plan developed,
-Project newsletters produced and disseminated,
-Technical reports published

-Robust M&E system in place.

Output:

Output 4.1 Adaptive learning and support programmes established for collection and scaling up of innovation and transformation for rice-based production landscapes

Output 4.2 Robust M&E systems established to track and evaluate adaptation and resilience in agriculture

Component Balances

Project Components	GEF Project Financing ($)	Co-financing ($)
I. Climate resilient rice-based production landscapes promoted	4,850,000.00	5,005,000.00
II. Climate resilient value chains developed and supported	2,250,000.00	2,750,000.00
III: Enabling environment to promote transformation toward climate resilient agricultural landscapes strengthened	1,158,108.00	1,750,000.00
M&E	249,122.00	
Subtotal	**8,507,230.00**	**9,505,000.00**
Project Management Cost	425,190.00	495,000.00
Total Project Cost ($)	**8,932,420.00**	**10,000,000.00**

Please provide justification

PROJECT OUTLINE

A. PROJECT RATIONALE

Briefly describe the current situation: the global environmental problems and/or climate vulnerabilities that the project will address, the key elements of the system, and underlying drivers of environmental change in the project context, such as population growth, economic development, climate change, sociocultural and political factors, including conflicts, or technological changes. Describe the objective of the project, and the justification for it. (Approximately 3-5 pages) see guidance here

1. **Climate vulnerability:** Nepal is a least developed country with per capita income of $1,399 (MoF 2023), multidimensional poverty index of 0.148 (headcount 9.55 million out of 29 million) and approximately 15% of the population living below $1.99 per day (UNDP 2020). The country is prone to geological and climatically induced hazards as it has fragile terrains mainly due to tectonically active and seismically sensitive geology[1][1]. Nepal is highly vulnerable to climate change risks and impacts due to its i) fragile topography, ii) agrarian-based economy, iii) weak human, technical and financial resources, iv) insufficient physical infrastructure and v) limited access to technologies. Male outmigration, which is partially attributed to climate change[2][2], is increasing the vulnerability of women and girls to the negative impacts of climate change and leading to the feminization of agriculture. Precipitation in Nepal is affected by two weather systems, summer monsoons (June to September) and westerly circulation (November to May). Summer precipitation is higher along southeastern parts of the country and approximately 80% of annual precipitation (Table 1) is observed in the monsoon (Shrestha, 2000). Precipitation is unequally distributed over the months causing floods during the monsoon and limited rains in other seasons causing droughts.

Table 1. Average precipitation and mean temperature of Nepal for different seasons during the reference period (1981-2010).

Seasons	Average precipitation		Mean temperature (˚C)
	mm	%	
Winter (Dec-Feb)	84	5	4.6
Pre-monsoon (Mar-May)	232	13	12.5
Monsoon (Jun-Sep)	1418	77	17.7
Post-monsoon (Oct-Nov)	96	5	11.4
Annual	1830	100	12.1

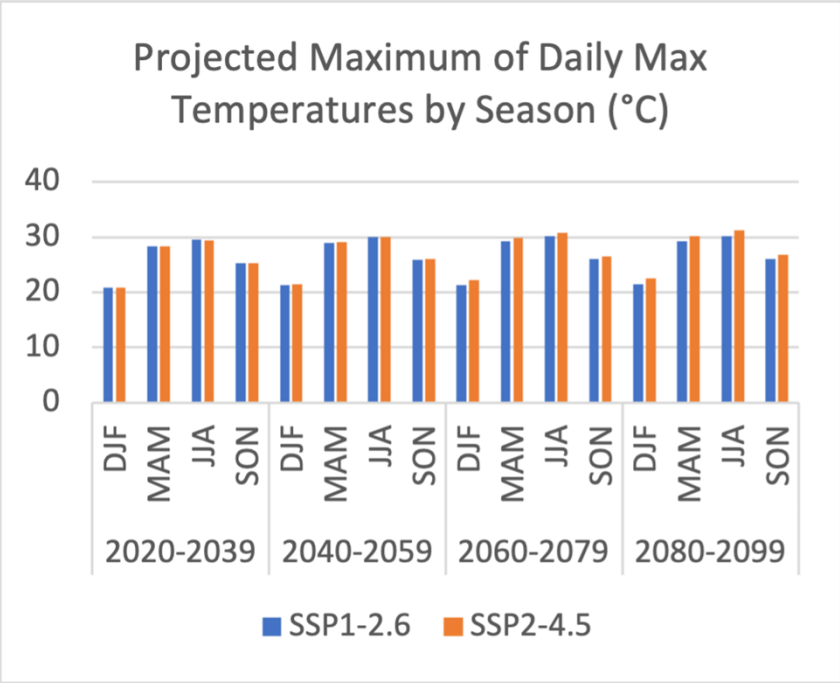
Source: MOFE 2019

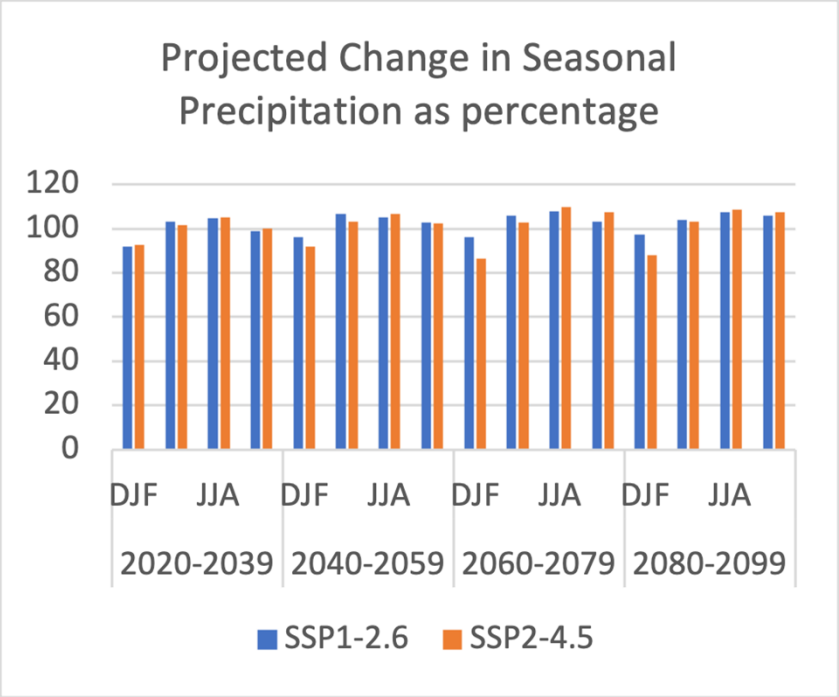
2. The projected daily maximum temperatures by season shows continuous increase over the years (Figure 1), exposing some crops to the risk of heat stress and may increase evapotranspiration, and disease and pests risks. Projected change in seasonal precipitation (%) shows that the precipitation will increase during the monsoon season and decrease during the winter. The increased precipitation during the monsoon season will increase the risks of floods whereas the decrease in precipitation during winter season will increase drought risks for winter crops that follow the rice crop. The rising temperatures and shifting rainfall patterns will generate uncertainties for traditional agriculture and food security. This situation has already deteriorated in recent decades and was further aggravated by the COVID-19 pandemic.

[1] Nepal is ranked as the 11th most at-risk country in the world in terms of seismic vulnerability.

[2] World Economic Forum 2022. The Global Risks Report, 17th Edition.

Figure 1. Projected daily max temperatures (°C) and seasonal precipitation as percentage in Nepal





Data source: https://climateknowledgeportal.worldbank.org/country/nepal/climate-data-projections, accessed on 8 November 2023.

3. For temperature extreme indices, the percentage change of warm days (when Tmax is higher than the 90th percentile) in Nepal is likely to experience a significant increase over time, by about 64.5 and 87.3% (23.9 and 32.3 days/year) for RCP 4.5 and 71.4 and 124.7% (26.4 and 46.1 days/year) for RCP 8.5, respectively by 2016–2045 and 2035–2065 (MoFE, 2019). The percentage change in warm nights (when Tmin is higher than the 90th percentile) is likely to experience an even higher rate of increase than Tmax. For instance, over the 2035–2065 period, the number warm nights are likely to increase by 115.7% (43.3 days/year) for RCP 4.5 and by 159.2% (59.6 days/year) for RCP 8.5.

4. As a result of increasing temperatures, the percentage change in warm spell duration (at least six days when Tmax is higher than the 90th percentile) may increase by 110 and 149% (19.3 and 26.2 days/year) for RCP 4.5 and by 157 and 245% (43 days/year) for RCP 8.5, respectively by 2016–2065 and 2035–2065. The projected change in warm spell duration is likely to be particularly high along the eastern most parts of Nepal, with a percentage change exceeding 300% in the distant future under RCP 8.5. On the contrary, the cold spell duration index (at least six days when Tmin is lower than the 10th percentile) may decrease across Nepal, except for few patches of increase in southeastern parts of Nepal. Regional differences in temperature anomalies are presented in Figure 2.

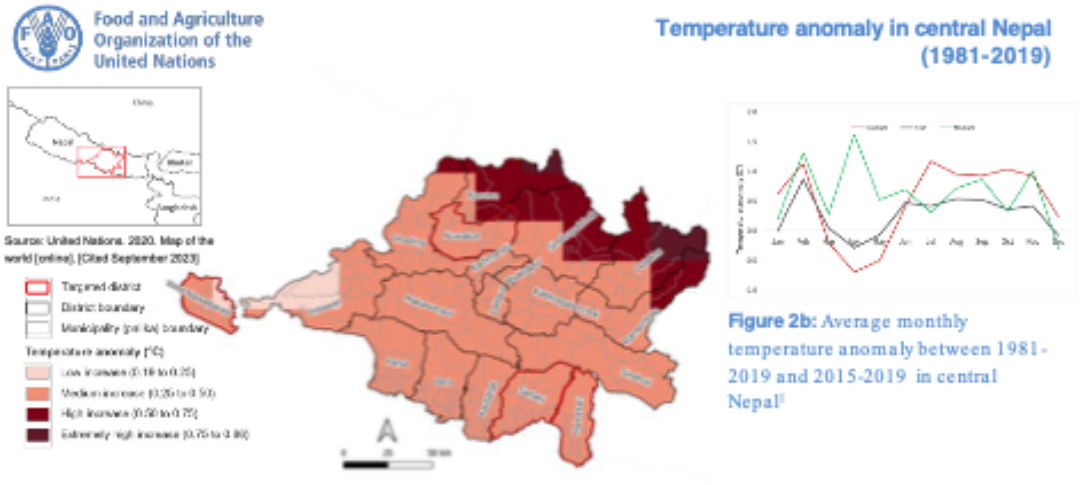


Figure 2b: Average monthly temperature anomaly between 1981-2019 and 2015-2019 in central Nepal[1]

Figure 2a: Extent of average mean temperature anomaly in central Nepal[1]

Prepared by Rachata Arunsurat, Shripad Adhikari, and Damon Beau for the GEF8 LDCF project, Food and Agriculture Organization of United Nations, Rome, Italy.
[1]Temperature anomalies were obtained as a difference between long term average (1981-2019) and last five years (2015-2019) from Copernicus Climate Service.
The boundaries and names shown, and the designations used on these map(s) do not express any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries. Dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

5. The National Adaptation Plan report on Climate Change Scenarios for Nepal projects an increase in the number of very wet days (precipitation higher than 95th percentile) in eastern and central regions (RCP 4.5) and in the western and central regions (RCP 8.5) over the 2016–2045 period (MoFE, 2019). For the 2036–2065 period, the increase is mostly concentrated in the central region. Extremely wet days (precipitation higher than 99th percentile) may also increase across Nepal. For the 2036–2065 period, the increase is the highest in central regions, with an increase in extreme wet days by about 41.3 and 59.8% under RCPs 4.5 and 8.5, respectively. In addition, the change of consecutive dry days is likely to increase by 2.4% (equivalent to 1.1 days/year) for RCP 4.5 and decrease by 2.9% (1.3 days/year) for RCP 8.5. On the other side, the number of consecutive wet days is projected to increase by 2.2% (1.7 days/year) under RCP 8.5 by 2035–2065. Regional differences in precipitation anomalies in Figure 3.

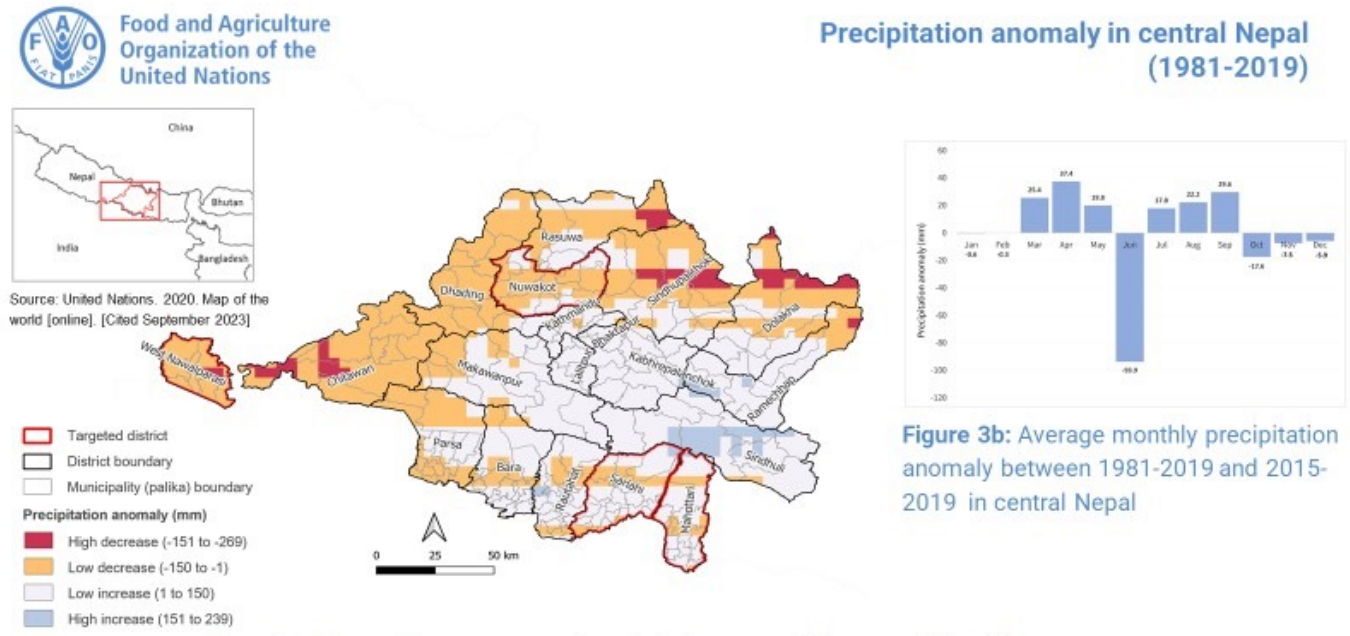


Figure 3a: Extent of average annual precipitation anomaly in central Nepal[1]

Figure 3b: Average monthly precipitation anomaly between 1981-2019 and 2015-2019 in central Nepal

Prepared by Rachata Arunsurat, Shrijwal Adhikari, and Damien Beau for the GEF8 LDCF project. Food and Agriculture Organization of United Nations, Rome, Italy.
[1]Precipitation anomalies were obtained as a difference between long-term average (1981-2019) and last five years (2015-2019) from Copernicus Climate Service.
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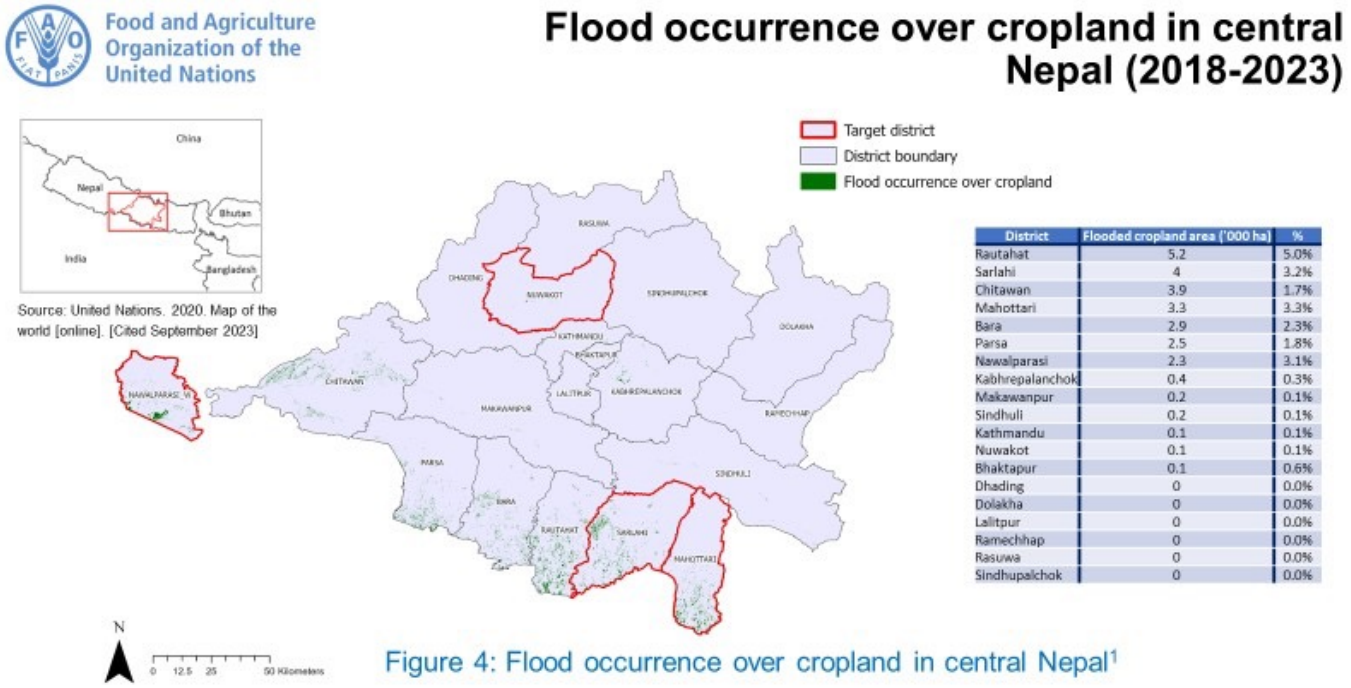
6. Extreme temperatures and weather events risk inflicting lasting economic and societal damage in Nepal as the country is limited budgetary sources for investing to guard its agriculture against climate change and recover from its worst effects. Agriculture is dependent on climate-sensitive resources such as precipitation-based water sources and fragile land, making it vulnerable to climate-related hazards including floods, droughts and landslides. Extreme climate events are likely to be more frequent and severe in the future (MoFE, 2019) affecting food production. These hazards are both location specific (e.g., flood-prone areas in large river basins and plain areas, and landslides in fragile hills) and non-location specific (e.g., droughts and heat/cold waves).

7. Over the past decade, Nepal has witnessed more frequent and severe floods, droughts and earthquakes, increasing physical and economic impacts, particularly in rural areas. With low adaptive capacity, climate change is posing serious challenges to socio-economic development. Low capacity and insufficient access to technologies, compounded by an inadequate policy environment, mean that farmers are highly vulnerable to climate risks. The occurrence of drought affects rice production in Nepal as most of the area under the rice production is lacking irrigation facility (Gahatraj et al. 2018). According to the International Disasters Database, since 1955 Nepal has experienced 111 natural disasters of which 53 have been caused by floods, 26 by landslides, 8 by storms, 8 by extreme temperatures (mostly cold waves), 7 by earthquakes, 6 by droughts and 3 by wildfires (EMDAT, 2021). Since 1955, the casualties associated with natural hazards has exceeded 20,000, most of them due to earthquakes (i.e., 2015) and numerous flash-floods. Historical observed data over the 1987–2016 period shows a positive relationship between the number of heavy precipitation events (≥20mm) and areas recording the highest annual precipitation such as Pokhara and eastern parts of Nepal, with an average of 50 days/year reporting heavy rainfall conditions (≥20mm).

8. However, for extreme precipitation events (≥100mm) there is a spatial pattern throughout the country. The highest number of extreme precipitation events (≥100mm) are observed along the low-lying areas of the Terai with an average of 1 to 2 events per year over the 1987–2016 period. Trends of warm days/nights and very warm spells are significantly increasing in the majority of districts. As a result, cold spells are also decreasing in most parts of the country, with some exceptions across the northern and northwestern districts. Furthermore, it is extremely difficult to establish a relationship between landslides and rainfall. For instance, out of the 677 landslides reported in Nepal's Himalayas, only 193 have been associated with rainfall data and showed a relationship between rainfall intensity, rainfall duration, and landslide initiation (Dahal and Hasegawa, 2008). While the DHM has operationally set 120 mm/day as a threshold value for flood and landslide warning, the events exceeding 200 mm/day are found almost every year and those exceeding 300 mm/day

occur once every year in at least one area of Nepal (Talchabhadel et al. 2018). Districtwise variations in flood occurrences over cropland in central Nepal are presented in Figure 4.



District	Flooded cropland area ('000 ha)	%
Rautahat	5.2	5.0%
Sarlahi	4	3.2%
Chitawan	3.9	1.7%
Mahottari	3.3	3.3%
Bara	2.9	2.3%
Parsa	2.5	1.8%
Nawalparasi	2.3	3.1%
Kabhrepalanchok	0.4	0.3%
Makawanpur	0.2	0.1%
Sindhuli	0.2	0.1%
Kathmandu	0.1	0.1%
Nuwakot	0.1	0.1%
Bhaktapur	0.1	0.6%
Dhading	0	0.0%
Dolakha	0	0.0%
Lalitpur	0	0.0%
Ramechhap	0	0.0%
Rasuwa	0	0.0%
Sindhupalchok	0	0.0%

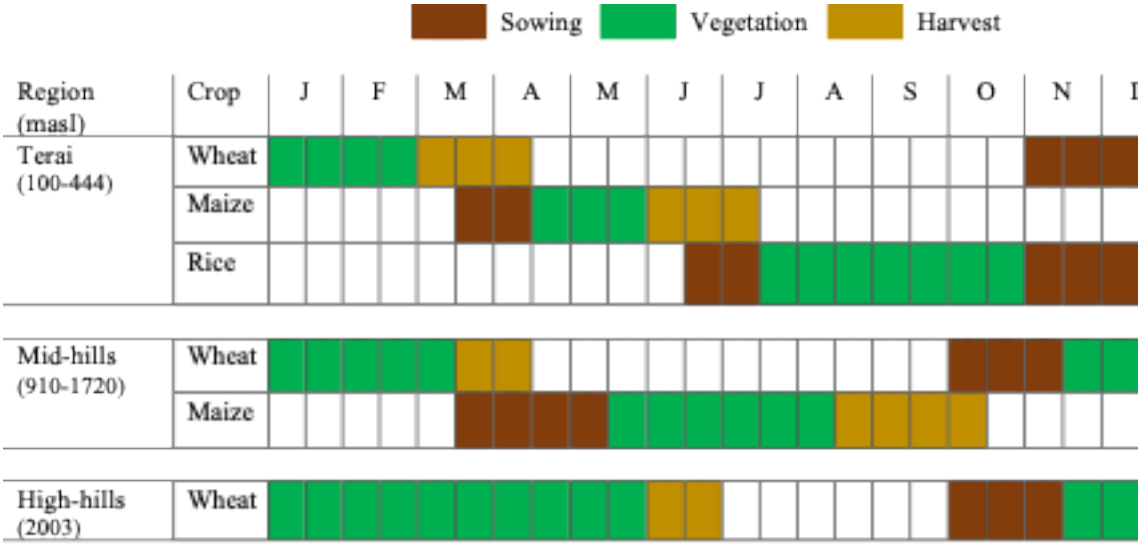
Figure 4: Flood occurrence over cropland in central Nepal[1]

Prepared by Laurence Cannings, Shrijwal Adhikari, Rutendo Mukaratirwa, Damien Beau and Matieu Henry for the GEF8 LDCF project. Food and Agriculture Organization of United Nations, Rome, Italy.
[1]Flood data were obtained from the change detection approach over Sentinel 1 imageries from 2018–2023
The boundaries and names shown, and the designations used on these map(s) do not express any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries. Dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

9. In the last decades, changes in climate have been experienced that include a) the shift or variability of seasonal concentration of rain with a reduction of winter rainfall; a significant increase in the pre-monsoon rains; and mixed trends in the monsoon seasons across districts; and b) the general increase of maximum temperatures in pre-monsoon and monsoon seasons against the 1976-2014 baseline (DHM, 2017). The same report by the Department of Hydrology and Meteorology (DHM) found a significant positive trend in Tmax across the country (0.56°C/decade), but a non-significant positive trend in Tmin (0.02°C/decade), increasing mostly over the summer months (DHM, 2017).
10. Monsoonal floods are an annual feature in June–September in the Terai (UNDRR, 2019), covering large areas of productive land and erosion reduces the potential of these lands (Bhushal, 2019). Hill slopes are prone to landslides which is aggravated after 2015 earthquake. The monsoon is the main rice growing season (June to November) in irrigated as well as rainfed areas whereas spring rice (April-July) is planted in limited areas that have assured irrigation facility.
11. **Key elements of the system:** In Nepal paddy is grown in the main season (July to November) and limited crop in spring season (April to June). In Terai plains of the country the main season paddy is grown after spring maize and before wheat crop in the winter (Figure 5). Over half of the agricultural land in Nepal (54%) is under rice production[1]. However, the rice-based cropping system is severely affected by climate change related events including drought, flood, cold and heat waves, and insect pests and diseases. Though the yield is higher for spring season rice than the main season rice, unavailability of irrigation facility during planting season in spring and lack of drying facilities at the time of harvest in rainy season limit the spring season rice plantation area. Paddy is also grown under rainfed conditions, but yield and cooking quality of such upland paddy is much lower than that of the main season paddy. The major areas for irrigated main season paddy production is the southern Terai region of Nepal (Figure 6).

[1] Main season paddy 1,130,360 ha, early paddy 71,586 ha and upland paddy 14,441 ha (NSO, 2023).

Figure 5. Selected growing calendars for rice and other major crops in the different agroclimatic zones of Nepal



Food and Agriculture Organization of the United Nations

Paddy area (proxy) in central Nepal (2022)

Source: United Nations. 2020. Map of the world [online]. [Cited September 2023]

District	Paddy area('000 ha)
Bara	61.7
Bhaktapur	2.6
Chitawan	42.2
Dhading	3.2
Dolakha	0.4
Kabhrepalanchok	3.3
Kathmandu	2.6
Lalitpur	2.0
Mahottari	51.4
Makawanpur	17.3
Parasi	40.5
Nuwakot	4.3
Parsa	49.5
Ramechhap	1.0
Rasuwa	0.1
Rautahat	56.3
Sarlahi	70.0
Sindhuli	14.2
Sindhupalchok	1.2
Total	**423.7**

Figure 6: Extent of paddy area (proxy) in central Nepal[1]

Prepared by Laurence Cannings, Shrijwal Adhikari, Rutendo Mukaratirwa, Damen Beau and Matieu Henry for the GEF8 LDCF project. Food and Agriculture Organization of United Nations, Rome, Italy.
[1]Paddy area were obtained as a proxy of annual crop obtained from ESA Worldcereal (2022)
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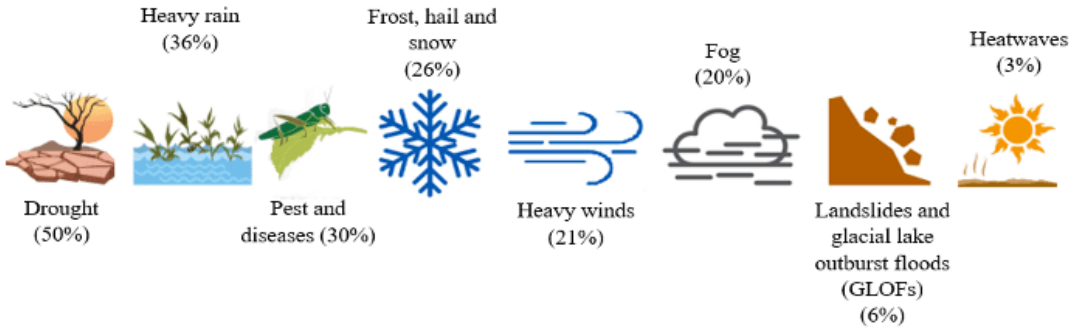
12. As a result of small holding size (0.55 ha per holding) and impacts of climate change, 55 percent of the 4.13 million farm holdings in Nepal report that their own food production is insufficient for household consumption (NSO, 2023). With a population of 29 million, 57.3% of Nepal's workforce (74% of the female workforce) is engaged in agriculture which contributes 23% of the gross domestic product (GDP). The fragile and climate-vulnerable farm ecosystem, water-resource scarcity, flood-risks and overexploitation of natural resources are the root-causes of the food insecurity The major hazards on agriculture in Nepal as perceived by the farmers are droughts and heavy precipitation (Figure 7) which are likely to be aggravated by the projected climate parameters.

Figure 7 Weather hazards affecting the development of agricultural activities in Nepal, as perceived by farmers



13. Exposure and vulnerability of paddy crop to climate change are assessed by some studies downscaling of future climate conditions across the different agroclimatic zones which allows us to better assess the effect of heat-stress conditions during crop's sensitive phenological phases. Although cultivars have a different heat-tolerance, pollen viability and production of rice begins to decline as daytime Tmax exceeds 33ºC, while high percentages of rice spikelet sterility occurs when temperatures exceed 35ºC at anthesis and lasts for more than 1h (Kim et al. 1996; Yoshida, 1981). For example, rice transplanted in mid-June across the Terai region is likely to experience an increase (mostly under RCP 8.5) in heat-stress conditions (Tmax >35ºC), whereas in the Mid-hills, this threshold is of approximately 0 days/year. A NARC study using climatic chambers shows an increase in rice yields of between 17 to 26% even at a 6-7ºC increase. However, panicle initiation, flowering, heading, milking stage and crop maturity period decreased by 7,4,4,4, and 6 days due to increasing temperatures. Karna (2014) found a positive relationship between higher temperatures and yield increases up to a critical threshold of 29.9ºC, however, when Tmax exceeds this threshold, yields start to decline. In addition, the maximum dry spell and number of dry days during the growing season provides useful information about the major drivers of soil moisture and ground water reduction, which are important water resources for agricultural activities. Furthermore, the incidence of pests and diseases is expected to be more severe and recurrent in low-lying areas than in the Mid-hills and High-hills (Malla, 2008). Some of the most common pests and diseases disorders in Nepal include blast, brown leaf spot, sheath blight, bacterial blight, among others. While many of these pests and diseases are widespread in Nepal, some of them are only found in specific agroclimatic zones (i.e., stem rot is distributed across the Terai).

14. Rice and other agricultural value chains remain fragmented due to low private sector investments and an unfavourable agribusiness environment. Information systems are inadequate, and critical value-chain infrastructure (rice collection, drying, storage and transport) remains weak and underdeveloped. Access to storage structures and drying facilities are limited, leading to inefficiencies in the value chain and high levels of post-harvest losses. Without any technological improvements along the value chain, increased humidity levels and erratic rainfall patterns are likely to increase post-harvest losses due to spoilage while also causing food safety concerns. The problem is more pronounced for spring rice and early rice maturity main season rice than late maturity rice. However, farmers want to plant early maturity main season rice so that the land can be vacated for other crops early. Limited capacity of value chain actors to comply with food quality and food safety standards is preventing Nepali producers from substituting imports of long grain and basmati rice. Milling is highly inefficient and distribution channels for milled rice are not well developed.

15. Pesticides (particularly insecticides) and herbicides are often used incorrectly due to lack of labelling in local language and insufficient extension services. Over-use and incorrect disposal of agricultural chemicals reduces their effectiveness and has a negative effect on the environment (particularly water and soil contamination).
16. Low yields of rice and pulses coupled with natural disasters contribute to food shortages at household level. Smallholder farmers are particularly vulnerable to climate impacts since (i) their hazard exposure is high, (ii) there is only one rice crop per year under rainfed conditions, and (iii) the per hectare agricultural production, particularly of rice, is significantly lower than in other South Asian countries.

17. Women in the project area have less access to land, water and other productive natural resources due to gender-discriminatory social and cultural norms and they often face greater barriers than men to accessing technical and financial opportunities and to participating in decision making processes.

18. National reports show that the precipitation projections are less consistent than that for temperature, although for south-east Nepal there is some consistency[1]. Average annual precipitation is expected to increase by 2–6% in the medium-term period and by 8–12% in the long-term period, except in the pre-monsoon season during which it may decrease by 4-5% (MoFE 2019).

19. Though the climate induced hazards are looming on the entire country, drought, floods and disease pests are the major hazards for farm production and overall productivity of the agricultural system in central Nepal in targeted four districts namely Mahottari, Sarlahi, Nuwakot and Parasi (formerly Nawalparasi West) (Table 2).

[1] World Bank Climate Change Knowledge Portal 2018

Table 2. Precipitation and temperature anomaly in the project districts (1981-2019)

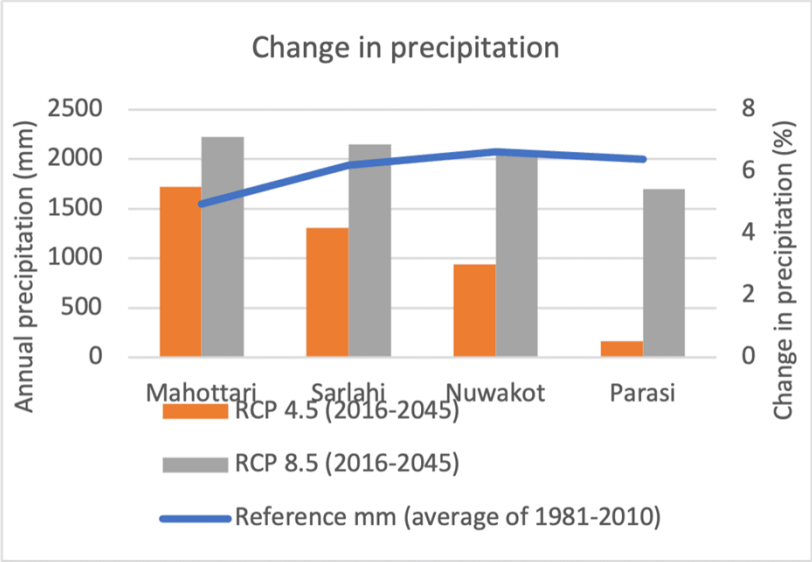
District	Mahottari	Sarlahi	Nuwakot	Parasi
Province	Madhesh	Madhesh	Bagmati	Lumbini
Precipitation anomaly (mm)	33.03	34.69	-22.41	-107.03
Mean temperature anomaly (°C)	0.37	0.29	0.38	0.27
Maximum temperature anomaly (°C)	0.62	0.55	0.61	0.39
Minimum temperature anomaly (°C)	0.75	0.78	0.80	0.63

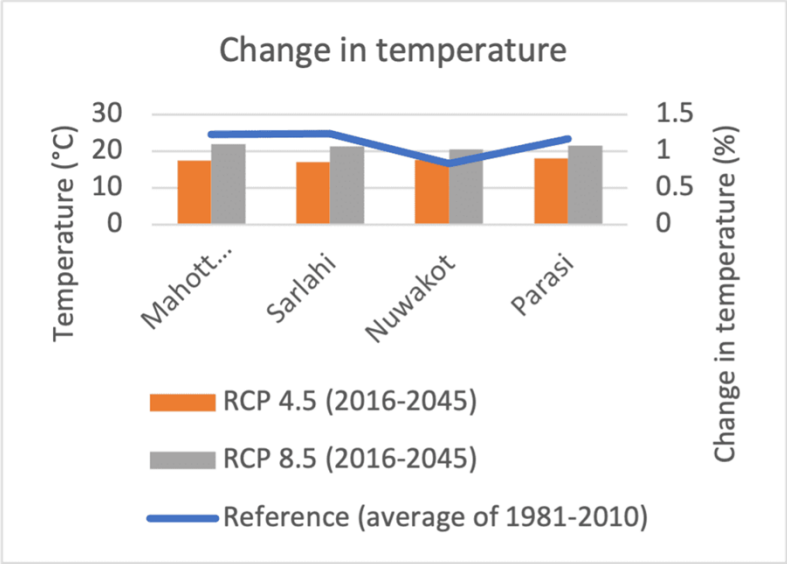
Source: Prepared by Rachata Arunsurat, Shrijwal Adhikari, and Damen Beau for the GEF8 LDCF project. Food and Agriculture Organization of United Nations, Rome, Italy. Note: Precipitation anomaly data were obtained from CHRIPS and temperature anomaly data from ECMEF between the periods of 1981-2019 and 2015-2019.

20. Climate change scenario for Nepal[1] indicates that average annual precipitation is likely to increase in the project areas for both the scenarios (RCP 4.5 and 8.5), particularly more prominent in Mahottari and Sarlahi (Figure 8) which may lead to flooding during wet season. However, the temperature is similar in all the project districts under both the scenarios.

[1] MOFE 2019

Figure 8. Change in precipitation and temperature in project area





21. **Key barriers to climate resilient development:** Under the baseline trajectory, crop productivity will decline, and food security and livelihoods of the rural poor will be aggravated due to effects of climate change. In the absence of this project, the key barriers to building climate resilience in the target region include:
    i. **Limited access to adaptation technology** compels farmers to adopt unsustainable land use practices leading to low productivity and degradation of farm ecosystems. Farmers have poor access to stress tolerant seeds and low capacity to identify suitable varieties. Seed systems are insufficient to supply good quality seeds of improved varieties. The quality and quantity of farm inputs remain insufficient while pest and disease management are increasingly inadequate. Irrigation facilities are limited, and farmers lack modern water management technologies. Many existing irrigation systems are unable to deliver water to the field or are not economically viable, are poorly maintained and managed. There is limited knowledge of optimum water use and a lack of integrated water management. In absence of mechanical weeders, farmers apply weedicides without knowing their proper use. Farmers lack effective weather forecasting, agro-met services, and early warning systems, resulting in planting rice at incorrect times and/or selecting maladapted seeds, leading to reduced yields. The lack of effective weather forecasting is a barrier to risk management practices and the introduction of crop insurance. Technological information for building awareness, informing farm-level decision-making, and providing an early warning of climate shocks is lacking. Farmers do not have the technical and/or financial capacity to establish cost-effective climate knowledge management systems. Traditional and indigenous technologies and practices are becoming inadequate in the face of increasing climate variability and extreme events. The technical capacity of newly formed local governments is insufficient to support farmers.

ii. **Weak crop value chain** with a proliferation of multiple layered inefficient middlemen and increasing marketing margins that result into low farmgate prices thereby discouraging farm production and resulting in high retail prices for consumers. Poor value chain development discourages farmers and value chain actors to i) use high-value climate-resilient seeds (which tend to be more expensive), ii) engage in climate-resilient and more sustainable practices (e.g., water conservation techniques such as land levelling) and iii) take up systems of internal control for rice cultivation. In most cases, rice mills do not buy rice directly from farmers. The farmers sell their harvest to itinerant traders at a low price, much lower than the government announced minimum support price. Mills purchase rice through commission agents, not directly through itinerant traders. As well as being a barrier to greater climate resilience, the absence of socially and environmentally sound contract farming is an obstacle to greater levels of domestic processing and import substitution, as well as cultivation of rice certified as organic and/or sustainable rice, representing a significant lost opportunity for farmers and processors to increase incomes. Market information is not collated or systematically transferred to farmers, other value chain actors and end-users. There is a lack of coherent, integrated, inter-sector approaches to manage crop production systems and coordinate production with value addition at different levels. Insufficient collaboration and coordination among farmer organizations and the private sector (input suppliers, traders and processors) limit smallholder rice producers and women in particular to access postharvest technologies, insurance, information, extension services and inputs. Banks and financial institutions are reluctant to invest in smallholder crop producers given their high level of risk to weather. Private sector investments in the agriculture sector remain low, including in value-adding activities despite their potential for enhancing rural economies.

iii. **Inadequate capacity of local level** government institutions to mainstream climate change adaptation measures into sectoral planning and implementation at local level. Although national level climate action-related policies, strategies and plans are in place, assistance is still needed to help sub-national level governments to translate these into local actions. Local governments require capacities and support in the design, adoption and implementation of policies and annual plans to effectively support farming communities to adopt climate resilient practices and technologies at landscape level. The recent transition to a federal system is taking time to align policy provisions and extension services in the three tiers of the government—federal, provincial and local. Limited access to credit - due to relatively high interest rates charged by micro-finance institutions contributes to the lack of uptake. Inadequate extension services and low financing retard the uptake of climate-resilient farm practices, technologies and value chain development. Limitations in government extension services at local government and village levels result in farmers having inadequate awareness and skills. Limited capability of non-state actors and limited engagement of the private sector are other barriers to achieve planned outcomes.

iv. **Limited climate risk information and education** weakens decision making on farming activities for climate change adaptation and disaster risk management. Existing climate and weather advisories for agriculture have significant room for improvement. Local communities do not have enough access to the knowledge, tools and network required to adopt climate resilient practices and technologies for the rice-based cropping system. Limited knowledge management is another barrier. Farmers and other value chain actors are unable to obtain climate resilient technologies and practices whereas promising local and indigenous knowledge and practices are not getting enough attention.

22. To address the barriers identified above, this project is proposed with the project objective to transform the rice-based production landscapes of central Nepal through climate resilient value chains and Nature-based Solutions (NbS) that improve agro-ecosystem function, food security and nutrition.

23. **The selection of this project** is based on the needs of local communities and country priorities:

a. Nepal's priorities for climate change adaptation for food security are reflected in the National Adaptation Programme of Action for Climate Change (2010). Reducing the vulnerability of the agriculture system has been prioritized by the NAPA as its second Combined Profile (page 29) proposes for enabling climate vulnerable communities to sustain livelihoods by improving access to agricultural services and increasing community climate adaptive capacity through improved production and marketing. The project fits the needs of vulnerable communities to improve food security and livelihoods in line with the highest priority of NAPA. Cropping system-focused technological interventions will reduce the impacts of climate change and make the cropping system more resilient to future climate change leading to food security of the vulnerable communities.

b. Other policies that support the selection of this project include the National Climate Change Policy (2019), Nationally Determined Contribution (2020) and National Adaptation Plan (2021), as well as in the

Agricultural Development Strategy (ADS 2015-2035). The Government of Nepal (GoN) has identified food security as a serious challenge. The Constitution of Nepal (article 36) provisions the right to food as one of fundamental rights of every citizen. Local level governments are required to prepare land use plans that provide the basis for integrating principles of sustainable land management, ecosystem restoration and biodiversity. In line with the Constitution, the Food Sovereignty Act (2018) ensures the right to access food to all citizens. The Government has formulated various policies and programmes and has committed to various international agreements for ensuring food and nutrition security, including the Sustainable Development Goals (SDGs). Several national policies, including the 15th periodic plan and Agriculture Development Strategy (ADS), emphasize food security. Agricultural growth provides the principal pathway to tackle the problem of food and nutrition insecurity and break the vicious circle of poverty and food insecurity. Additional investment is needed on climate resilient technologies and practices.

c. The whole of the society approach of the project is identified for transformation of the rice-based cropping system from subsistence to more commercial. The NbS will help to restore and improve degraded agro-ecosystems for improved functions and services thereby building resilience. Technological interventions help to enhance adaptive capacity of the farmers through increased productivity and resource use efficiency. Major stake of women, poor and indigenous peoples will enhance equity whereas active participation of private sector in the value chain will help in transformation of the farm and food systems leading to spillover effects to landscape level and sustainability of the project outcomes.

24. **Relevant stakeholders** include government agencies at federal, provincial and local levels, civil society organizations, private value chain actors and Indigenous Peoples and Local Communities (IPLCs) including women. The government implement the project with involvement of local farming communities for food production and involve private sector SMEs for value chain development. For this, the government gets supports of non-state actors. The non-state actors and private sector entities develop inclusive services and approaches to promote climate resilient value-chains and NbS. Capacity of non-state actors and private sector entities will be enhanced through multi-stakeholder dialogue for financial leverage, insurance, innovations and other services. The private sector engagement leverages funding and expertise to transform key economic systems in food and agriculture through integrated approaches for delivery of climate adaptation benefits. The NAP aims to build adaptive capacity and resilience of key natural, social and economic sectors vulnerable to and at risk of climate change, and service providers; proposes a programme to build the capacity of local peasants and local governments to cope with climate risks; and aims to create an enabling environment that promotes private sector engagement in the provision of insurance products in the agricultural sector that help farmers and communities cope with climate risks.

[1] World Economic Forum 2022. The Global Risks Report, 17th Edition.
[2] Economic Policy Incubator and UKaid 2020.
[3] World Bank Climate Change Knowledge Portal 2018

B. PROJECT DESCRIPTION

Project description

This section asks for a theory of change as part of a joined-up description of the project as a whole. The project description is expected to cover the key elements of good project design in an integrated way. It is also expected to meet the GEF's policy requirements on gender, stakeholders, private sector, and knowledge management and learning (see section D). This section should be a narrative that reads like a joined-up story and not independent elements that answer the guiding questions contained in the PIF guidance document. (Approximately 3-5 pages) see guidance here

1. The project aims to transform the low productive subsistence-based rice-based cropping systems to high commercial system by promoting climate resilient value-chains and nature-based solutions (NbS) to reduce vulnerability, improve adaptive capacity and strengthen food security and nutrition in target communities. This transformation will be achieved through partnerships with each level of governments, farming communities and private sector actors to enable a whole-of-society approach to removing institutional, technical and capacity barriers to climate resilient rice-based farming and food systems.

2. The project includes technology and capacity building interventions along the entire value chain supporting improved, climate resilient agronomic advisories and practices, investment in resilient value chain infrastructure, adoption of NbS (e.g., manage and restore agroecosystems through conservation agriculture, improved rice cultivation, cropland

nutrient management, etc.) to provide ecosystem function and services at the landscape level, and the creation of an enabling environment to promote and scale-up climate resilient value-chains of rice and NbS. Project activities will be underpinned through the establishment of systems to foster adaptive learning and knowledge management including a robust M&E system. The project addresses key barriers (identified above) through building transformation capacity and technology for a resilient rice-based cropping system, supporting climate resilient value chains, creating an enabling environment for scaling up sustainable interventions on climate resilient agri-systems, and establishing a knowledge management system.

Table 3. Climate-resilient practices for adapting paddy crop production to changing climatic conditions

Stage	Hazard	Climate-resilient practices
Soil & land management	Drought & rainfall variability	▪ Weather-informed agricultural advisories on when to start preparing the fields ▪ Market information on where to procure climate-resilient seeds ▪ Laser land levelling to reduce water requirements and weed infestations
	Extreme heat	▪ Increase application of organic matter in areas where the decomposition is likely to accelerate because of increasing temperatures
Transplanting	False start rainy season	▪ Adjusting transplanting date: (i) mid-June to mid-July (net irrigation) (ii) mid-June (rainfed conditions) ▪ Machine transplanting of nurse seedlings 12-15 days in advance reduces cultivation time and improves water use efficiency ▪ Weather-informed agricultural advisories on when to transplant seedlings
	Heavy rainfall	▪ Direct seeded fields are likely to be less affected by heavy rainfall
Production	Drought & rainfall variability	▪ Promotion of short cycle varieties ▪ Recommended climate-resilient varieties: Drought tolerant, flood tolerant, disease pest tolerant, etc. ▪ Weather-informed agricultural advisories on when to irrigate ▪ Apply climate and crop-water productivity models to identify abiotic and biotic constraints to crop production and forecast yields
Crop management	Irrigation	▪ Wet and drying techniques can reduce water requirements by 30%, minimize the development of weeds and reduce GHG emissions by 50%
	Pests & diseases	▪ Integrated Pest Management: (i) sampling, scouting, and monitoring, (ii) removal of diseased plants, (iii) mechanical methods (handpicking, vacuuming, and tillage), (iv) removal of weeds host to pest and diseases, (v) cultural practices (pruning, trellising, sticking traps) ▪ Weather-informed agricultural advisories on when to apply fertilizers and spray pesticides to avoid misuse and losses into the environment

Sources: Adhikari et al. 2015.

3. The technology and capacity for transformation will be built through the adoption of NbS to improve management of rice-based production landscapes (Output 1.1), dissemination of improved agronomic practices, technologies and farm management strategies at the landscape level to strengthen climate resilience, food security and nutrition (Output 1.2), and crop and location specific agro-advisory services disseminated to and used by farmers and other value chain actors (Output 1.3).
4. Climate resilient value chains will be developed through introducing climate-resilient post-harvest infrastructure including storage facilities and processing technologies (Output 2.1), and enhancing capacities of agricultural SMEs and farmers to manage climate risks in rice-based cropping system through climate resilient business planning and access to risk mitigation services including credit and insurance (Output 2.2).

Table 4. Climate-resilient practices for adapting food value chains to changing climatic conditions

All agricultural systems		
Stage	Hazard	Climate-resilient practices
Harvest	Drought & heavy rainfall	▪ Use proper harvest equipment and conduct training on harvesting methods and best timing to minimize losses caused by falling of fruit and food spoilages ▪ Strengthen the uptake of climate information services to avoid, for example, harvesting if raining
	Extreme heat & UV light	▪ Cover perishables to preserve them until they reach maturity ▪ Implement cold chains and ice cooling to remove heat from fresh fruit and vegetables quickly after harvesting ▪ Promote harvesting early in the morning to avoid heat-stress conditions and UV light and, therefore, obtain best quality products

		▪ Promote the use of bamboo crates or jute bags and cover them with wet clothes to minimize water losses from vegetables
	Storm/wind	▪ Use proper harvest equipment and conduct training on harvesting methods and best timing ▪ Strengthen early warning systems to prepare for storm and wind impacts and minimize losses caused by falling of fruit and food spoilage
	Pests & diseases	▪ Practice early harvest and conduct training on best harvesting time ▪ Use of immediate drying techniques such as sun-drying or heat-arid drying to prevent the spread of pests and diseases ▪ Strengthen weather-informed agricultural advisories to reduce impacts on food products caused by pests and rodents attacks, as well as by the spread of plant pathogens
	Relative humidity	▪ Use of immediate drying techniques such as sun drying, heated-air drying to reduce food moisture
Storage	Extreme heat	▪ Invest in renewable energies to support storage facilities ▪ Use cold rooms to prevent biological degradation ▪ Install efficient energy infrastructures to support temperature-controlled storage ▪ Reduce storage time to reduce risks of food spoilage ▪ Use temperature and relative humidity sensors to prevent food losses
	Heavy rainfall	▪ Strengthen early warning systems to prevent flood impacts to storage infrastructure and food products ▪ Store in wood pallets, maintaining distance with walls ▪ Build climate proof warehouses that meet sustainable structural requirements and standards
	Storm/wind	▪ Strengthen early warning systems to prevent storm and wind impacts to storage infrastructures and, consequently, food losses ▪ Build climate proof infrastructure for storing food products
	Pests & diseases	▪ Strengthen early warning systems to prevent impacts to food products caused by pests and rodent attacks, as well as by the spread of mycotoxins ▪ Store in jute bags and wool blankets to let the air circulate, or hermetic bags to decrease food contamination and spread of mold
	Relative humidity	▪ Improve storing conditions, including fan systems for ventilation and reducing air moisture ▪ Use dehumidifiers, roof ventilators and wall air vents
Processing & packaging	UV light	▪ Use UV lamps to preserve food quality and safety ▪ Switch from sun drying to other solar drying techniques
	Relative humidity	▪ Use mechanical drying techniques such as heated air-drying ▪ Implement modified atmosphere packaging ▪ Use temperature and humidity sensors to systematically monitor climate variables and prevent food spoilage
Refrigeration	Extreme heat & relative humidity	▪ Build cold chain infrastructures and technologies such as ventilation, pre-cooling and air conditioning ▪ Build sustainable energy infrastructure to support temperature-controlled storage
Transport	Heavy rainfall	▪ Strengthen early warning systems to prevent impacts on vehicles and reduce food losses ▪ Reduce transport speed and implement more efficient planning of transport routes ▪ Provide training and advice on food storage techniques to reduce losses during transportation
	Landslides	▪ Develop a landslide hazard assessment in current flash flood systems ▪ Use early warning systems to prevent impacts on vehicles and divert food trucks to new transportation routes
	Fog, dust and snow	▪ Use LED panels and appropriate lighting and planning to reduce road accidents
	Extreme heat	▪ Improve insulation of refrigerated trucks while reducing the energy consumption of vehicles ▪ Promote safe, efficient routes for transportation of fresh, perishable food to reduce time and, consequently, food losses and energy use
Markets & retail	Heavy rainfall	▪ Real-time market information on where to sell food products based on food prices ▪ Use ICTs to enhance communication and information sharing between actors along the food value chain ▪ Promote rainwater collection systems and use drying hangers

	▪ Build flood-proof infrastructures that meet structural requirements and standards
Pests & diseases	▪ Develop alert systems for food contamination and provide warnings on identified risks to consumers' health at market level ▪ Ensure immediate removal of contaminated products from markets, stopping further distribution and inform all actors along the value chain about the non-compliance with health safety requirements

Source: FAO 2021

5. An enabling environment will be created for scaling up climate resilient agri-systems through strengthening governance and regulatory systems to promote climate resilient value-chains and NbS enhanced at local, provincial and federal government levels (Output 3.1), and promoting multi-stakeholder dialogue with non-state actors and private sector entities to develop inclusive services and approaches to promote climate resilient value-chains and NbS (Output 3.2).
6. Knowledge management systems will be established and operated through adaptive learning and support programmes for collection and scaling up of innovations to drive climate resilient transformation in rice-based cropping systems (Output 4.1), and establishment of a robust M&E systems to track and evaluate adaptation and resilience in agriculture (Output 4.2).
7. **The Theory of Change assumes, IF** vulnerable farmers, including women and other value chain actors, in Nepal have access to technologies, early warning information, finance and infrastructure to develop climate resilient value chains and deploy nature-based solutions in rice-based cropping systems, **THEN** their adaptive capacity to cope with the impacts of climate change will increase significantly, enabling farmers to transform the rice-based cropping system, and improve their food security by increasing farm production and income while addressing climate risks and underlying socioeconomic vulnerabilities (Figure 1).

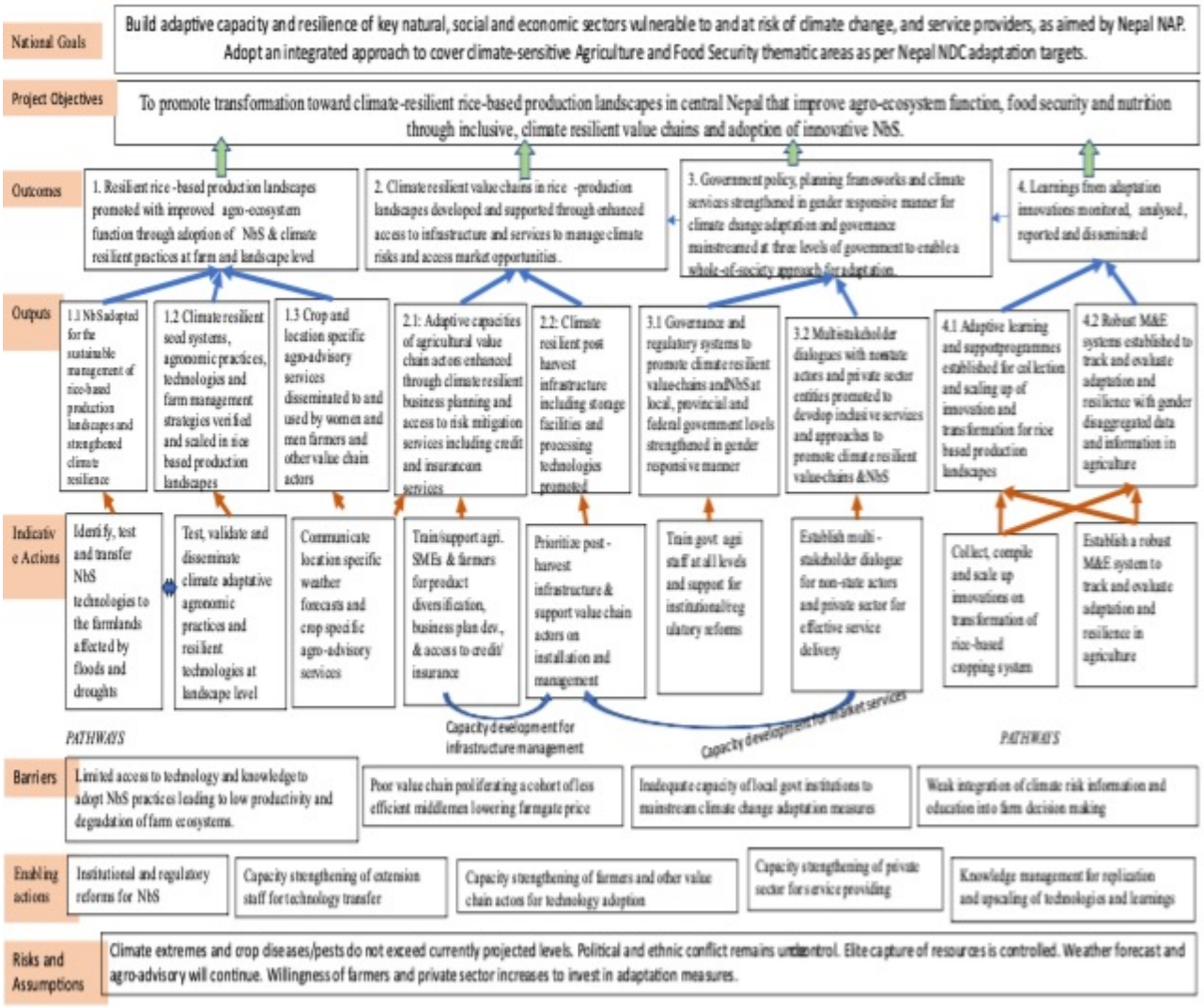
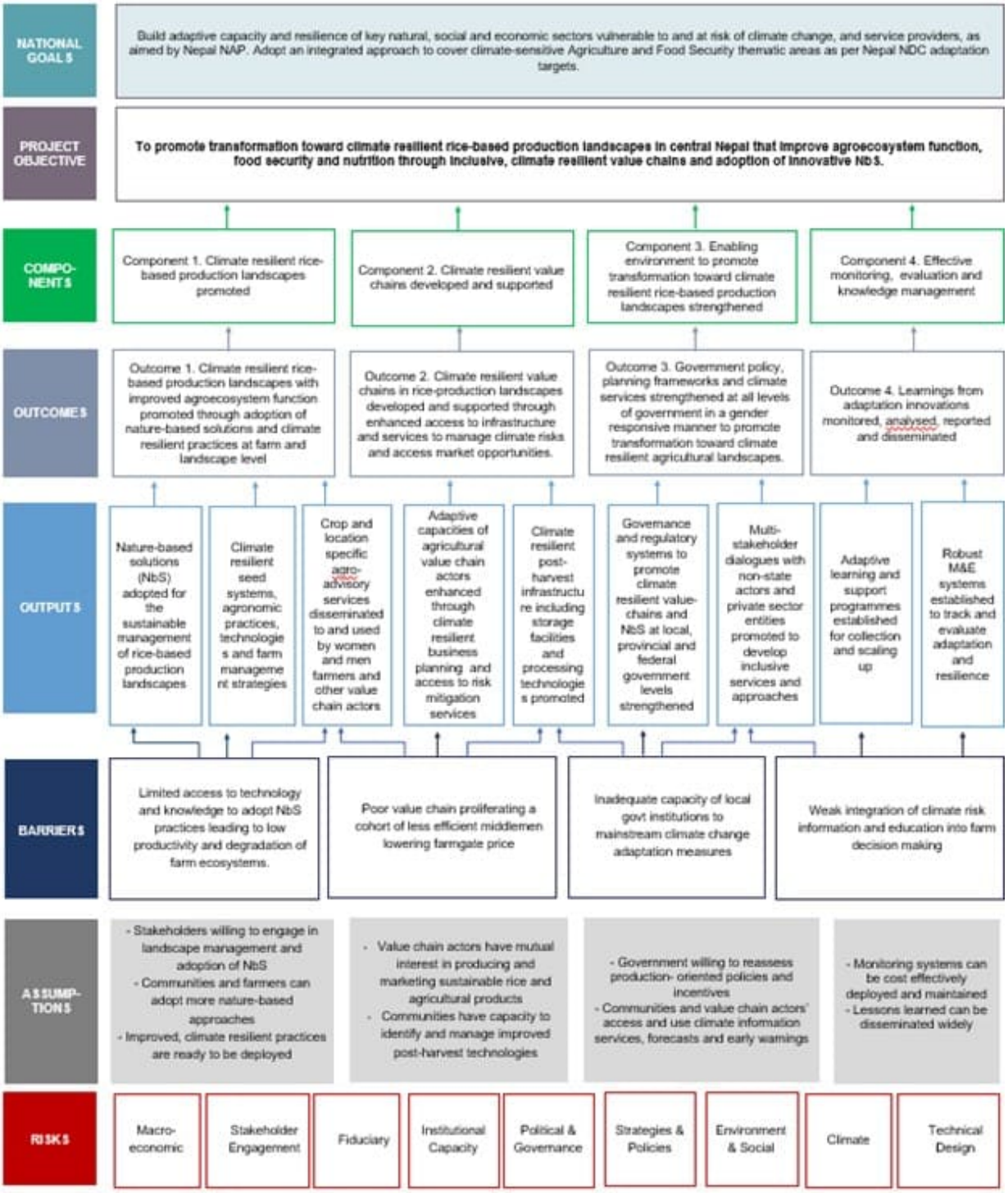


Figure 1 Theory of change (following STAP Advisory Document[1][3])



8. Creation of resilient and sustainable agrifood systems will best be achieved through a whole-of-society approach that enhances capacities of the government (at all the levels), farming communities and private sector in a coordinated and cohesive manner. Improved capacity will enable innovation in agriculture, leverage investment in infrastructure to reduce inequalities, improve early warning and early action systems, increase farm productivity and accelerate food marketing.
9. The project includes a focus on improving the conditions of women through access to resources, services, and opportunities to increase the effectiveness and sustainability of investments. Women targeted only and mixed FFSs will empower women to take decisions and be better represented in farmers groups and other decision-making bodies.
10. The project will follow the guidance of both the GEF's and FAO's Policies and Strategies on Gender Equality. Gender-responsiveness will be a guiding principle throughout the project life cycle including when selecting climate change adaptation interventions. The project will promote equal opportunities for women and men to participate in, contribute to and benefit from the project interventions. The project M&E system will collect sex-disaggregated data.

11. A gender analysis was conducted as a part of the project formulation process, including information on population and demographic and gender-disaggregated levels of knowledge on climate change impact and adaptation. Efforts were made to ensure that women are well represented and actively participated in the consultations undertaken as part of PIF preparation.
12. To ensure that women benefit from yield increases and improved climate resilience of cultivation of rice and other crops in the system, the project will include a requirement that at least 50% of participants in FFS and other training (seed production, climate-resilient on-farm practices (Component 1) are women. As part of Component 3, communication and educational materials will be prepared about the importance of women as economic actors in food security.
13. Consultations were done with indigenous people involved in rice farming during the PIF formulation process. The full funding proposal will develop a comprehensive stakeholder engagement plan including the requirement for FPIC with all targeted communities and Indigenous Peoples. Partnerships with vulnerable groups such as women and girls, youth, Indigenous Peoples, and local communities will be developed to improve responsiveness to climate risks. Local communities and Indigenous Peoples (subject to FPIC) will be invited to provide information on traditional knowledge relevant for adaptation interventions.
14. Private sector entities were consulted during the project formulation process. The private sector will play a key role in the project, which takes a market-based approach to improve climate resilience through the engagement of local private sector by enhancing the adaptive capacities and livelihoods of targeted communities. The project will catalyse involvement of the private sector to utilize their expertise and develop their capacity to innovate and produce new technologies for adaptation and create an environment for financial leverage and innovation. The private sector will be engaged through a platform for businesses so that they can contribute in a sustainable and profitable manner to a strong and effective response, both in their own adaptation efforts and, in those of the most vulnerable communities. Private sector engagement in climate change adaptation and resilience will be motivated through (i) reducing risk and strengthening their own resilience to climate impacts; (ii) selling profitable goods and services that enables adaptation and resilience of others; and (iii) delivering financial products and services to help others cope with climate change.
15. The project will create investment opportunities to bring in climate resilient technologies and innovations by identifying and incubating locally available promising techniques and private sector partners to better farm production through backward and forward linkages that also remove the constraint of access to capital for smallholder farmers and other local producers to bring in climate resilient technologies and innovations by identifying and incubating locally available promising techniques and private sector partners to better farm production through backward and forward linkages that also remove the constraint of access to capital for smallholder farmers and other local producers, as well as SMEs to invest in transitioning to more resilient practices. The project will seek to improve climate resilience of cultivation and processing of rice and other crops, which are essentially private-sector activities undertaken by smallholders, SMEs and processing/ exporting companies, respectively.
16. The project will develop measures to create enabling conditions for private sector action by addressing key barriers impeding their actions and investment in climate change adaptation and resilience. Similarly, the project will address the problem of limited availability and adoption of climate risk data and tools to make informed investment decisions by addressing their perceived lack of profitable investments in addressing climate change.
17. The project will help targeted farmers to realise the potential of NbS to contribute to resilience to the effects of climate change and climate-related natural disasters, such as sustainable land management, change in cropping patterns, crop species and varieties to protect from river flood impacts, small irrigation, green manuring and mulching to protect from droughts. The project will strategize actions for climate-resilient rice and other agricultural systems, improve the adaptive capacity of smallholders, marginalised and women-led households through early warnings and agro-advisories, increase skilled human resources including through improved extension services, improve access to adaptation technologies and practices at production level. The project will improve enabling conditions for climate change adaptation in the rice-based cropping system, including integrated water management, and national and provincial capacities in weather forecasting, agro-met services and early warning systems, as well as through diversification strategies.

Component I: Climate resilient rice-based production landscapes promoted

Outcome 1. Climate resilient rice-based production landscapes with improved agro-ecosystem function promoted through adoption of nature-based solutions and climate resilient practices at farm and landscape level

18.Technology transfer in agricultural value chain under this project involves a set of processes covering the flows of technical know-how, skill development, experience sharing and improvised equipment for farm production and its backward and forward linkages for adapting to the changing climate by vulnerable farmers

and private sector entities involved in agricultural SMEs through NbS and improved agronomic practices. The transformation will be triggered through strengthening capacity of farmers and government agencies at national and sub-national levels for sustainable land management, transfer adaptation technologies and climate information. This component will be supported by other components such as development of crop value chains (Component 2), strengthening governance for adaptation (Component 3), and knowledge exchange and collaboration (Component 4) which are related to and support this component. The outputs under this component include sustainable land management, climate adaptation agronomic practices and resilient technologies, and agro-advisory services to develop resilience to climate induced hazards like drought during pre-monsoon, post monsoon and winter season, floods during rainy season, and increased evapotranspiration and disease pests. Projected rise in future temperatures and increase in rainfall particularly during the monsoon season. This requires transformation of rice-based cropping system to ensure future food security of the smallholder farmers.

Output 1.1 Nature-based solutions (NbS) adopted for the sustainable management of rice-based production landscapes and strengthened climate resilience.

19. Under this output, project beneficiaries will engage in a participatory process to identify and implement nature-based solutions to reduce risks to rice production value chains arising from drought and flood as well as erosion and landslides upstream. NbS as defined by the United Nations Environmental Assembly (UNEA 2022) are "actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits." NbS in managed ecosystems – including agriculture, forestry, fisheries and aquaculture - consist of building upon natural processes, considering various spatial and temporal scales, to protect, sustainably manage or restore ecosystem functions to secure the production of food and non-food agricultural, forestry and fisheries products, now and in the long term.
20. In practice NbS in agricultural landscapes draw together a range of approaches for integrated management to enhance livelihoods and food security; mitigate and adapt to climate change; halt and reverse the severe ecosystem degradation trends caused by deforestation, agriculture expansion and unsustainable agricultural practices in current predominant agri-food systems. In the context of this project NbS interventions will focus on managing and restoring agroecosystems through conservation agriculture, improved rice cultivation, cropland nutrient management, deployment of green infrastructure for sustainable land and water management, amelioration of pollution and regeneration and/or protection of natural systems in and around production landscapes providing crucial agroecological services. Specific interventions including land reclamation and land improvements are needed for diversification of the rice-based cropping system to increase resilience. Terrace improvements and laser land levelling as well as canal and riverbank stabilization and the use of nature strips and buffers are necessary to improve water management and irrigation practices to increase efficiency in lands that are prone to drought and floods.
21. This output supports a strategy proposed by the National Climate Change Policy (2019) to promote development and use of climate-friendly traditional and nature-based technologies. NAP (2021) also proposed a programme on integrated soil and nutrient management for resilient agriculture which has objectives to increase productivity by improving soil fertility through adaptive agriculture interventions; and improve the soil nutrients that support the growth of all agricultural plants including stress tolerant varieties[2]. Indicative activities include vulnerability mapping and participatory NbS assessments including multi-criteria analysis of NbS options, identifying, testing and transferring sustainable land and soil management technologies to the farmlands affected by floods and droughts addressing soil erosion issues, flooding, potential for nature buffers and connectivity to enhance agroecosystem function. Other climate-resilient and innovative practices for rice production will be promoted via training, demonstrations and technical support. These will include pond improvement for rainwater harvesting, irrigation systems and integrated pest management at landscape level.

Output 1.2 ***Climate resilient seed systems, agronomic practices, technologies and farm management strategies verified and scaled in rice-based production landscapes.***

22. Specific risks of rapid and slow onset disasters (floods, droughts, cold waves and heat waves) affecting crop productivity need to be assessed. Continuity of business and identifying adaptive measures required (e.g. drought and heat resistant varieties, water-harvesting catchment, drip irrigation) can follow NbS and community-based adaptation through FFS to help farmers to adopt improved farm practices. and integrated nutrient management and conservation agriculture.
23. The basis for this output is NAPA combined profile 2 for enabling climate vulnerable communities to sustain livelihoods by improving access to agricultural services and NAP objectives for increased crop production through identification and adoption of good, climate resilient sustainable agricultural practices.
24. A range of on-farm practices can reduce rice farmers' vulnerability to climate risks and hazards and for that enhancing their capacities to engage in value chains is necessary, including water-saving practices such as System of Rice Intensification (SRI), integrated pest management (IPM), improved use of fertilizers, technologies to reduce post-harvest losses, use of high yielding and stress tolerant rice varieties, use of short duration varieties to fit with intensive cropping system, introducing other crops (pulses, oilseeds, vegetables and potato) and food systems for diversification (aquaculture in rice farm).
25. More than a half of the farmers are not using certified rice seeds. The certified seed is of higher quality (e.g., varietal purity, germination rates) than are home saved seeds. Varietal purity is a primary determinant of price from buyers (along with variety, maturity, grain integrity, contamination, and moisture content) and germination rates directly affect yields. Premium varieties (e.g., basmati/fragrant rice, long grain rice, etc.) have consistent market demand and garner higher market prices, leading to higher and more reliable income. Stress-tolerant varieties (such as drought tolerant, flood tolerant, photo-insensitive, and disease pest tolerant) are robust, tolerant, or otherwise adaptive to ecological stresses, many of which arise from climate change. Other rice varieties mature at different times within a growing season, increasing flexibility for growers (e.g., in response to annual variations in beginning or end of the rainy season), or mature quickly, limiting their exposure to hazards. However, no single variety offers all climate-adaptive properties, so selecting the appropriate variety is highly dependent on context, including local hazards and risks, local market conditions (up-stream and down-stream), and individual farmers' priorities.

26.These practices can be linked to broader value chains through product standards promoting sustainable practices such as GAP, sustainable rice platform standards and organic crops contributing to flagship programme of the Agricultural Development Strategy (ADS) outcome of profitable commercialization. The potential to derive additional value by linking resilient and sustainable practices to market opportunities associated with these standards will be explored in connection with Component 2.

[1] Variety refers to the specific type of rice grown, which affects yields and demand.

27. Indicative activities are i) identification and adoption of good, climate resilient sustainable agricultural practices, ii) exploring suitable rice varieties and perennial rice from neighbouring countries and supporting for conducting local adaptability trials, and supporting on registering the varieties and multiplying seeds, iii) changing cropping pattern incorporating legumes and other short duration crops to increase cropping intensity and soil fertility, v) replacing climate sensitive varieties with stress tolerant ones (flood- and drought-tolerant crop species), vi) multiplying seeds of stress tolerant crop varieties, vii) establishing and rejuvenating seed banks, viii) developing irrigation small infrastructure, ix) applying systems of rice intensification (SRI), x) establishing solar power-based irrigation, xi) applying on-farm water management (alternative wetting and drying) and conservation agriculture (direct seeded rice, residue retention, minimum tillage etc.), xii) promoting climate-resilient aquaculture in rice farms, and xiii) strengthening agricultural extension services. The supply and uptake of rice seeds with tolerance to climatic and biotic stresses will be done through training of farmer groups in seed production, conducting demonstrations of seeds' effectiveness in increasing yield and reducing the need for pesticide, and developing institutional capacities of local governments to implement seed certification.

Output 1.3 Crop and location specific agro-advisory services disseminated to and used by women and men farmers and other value chain actors.

28. The basis for this output is that the NDC proposes to establish and strengthen Public Weather Services (PWS), including the Agro-Meteorological Information System. The NAP also proposed a programme on strengthening climate services and agriculture information system.

29. For reducing climate risks, location specific weather forecasts and crop specific agro-advisory services will be provided to farming communities. Climate information, early warning and forecasts and weather-based location and crop specific agro-advisories will help to improve farm management practices reducing climate risks.
30. Indicative activities are i) enhanced institutional collaboration between NARC and MoALD and extension providers in the preparation and dissemination of agro-advisory services, ii) use ICT-based agro-advisory for transferring the 'last-mile' technologies for user groups, and establishment of pest and disease surveillance systems and iii) capacity building of the last mile to access, understand and use agro-advisory services.

Component II: Climate resilient value chains developed and supported

Outcome 2. Climate resilient value chains in rice-production landscapes developed and supported through enhanced access to infrastructure and services to manage climate risks and access market opportunities

31. The project will support value chain development through market-based solutions to improve value chain from seed supply to output marketing and increase climate investment including from private sources; strengthen the financing framework for climate-resilient rice. It will foster small and medium-sized enterprises (SMEs) and agribusiness development to transform the rice-based cropping system over time from being subsistence-oriented and farm centred into one that is more commercialized, productive and off-farm centred. This intervention is required to make agricultural value chain more resilient to hazards related to future rise in temperature, increased humidity and heavier precipitation particularly during the monsoon and other untimely rainfall affecting crop harvesting, drying, processing and transportation.

32. The outputs under the second component are climate-resilient storage facilities and processing technologies and enhanced capacities of agricultural SMEs and farmers.

Output 2.1: Adaptive capacities of agricultural value chain actors enhanced through climate resilient business planning and access to risk mitigation services including credit and insurance.

33. This output will enhance the adaptive capacity of local value chain networks comprising farmers, agricultural SMEs and other private sector actors to develop value chain specific climate change adaptation and risk mitigation plans to prioritize the transfer and deployment of adaptation technologies that improve value addition and supply chain infrastructure for rice and other important crops in rice-based systems. Plans will be targeted at mitigating risks through measures such as insurance and access to credit. In addition, business plans will consider the role that product standards such as good agricultural practices (GAP), sustainable rice platform (SRP), organic and others can play in improving market access and developing marketing systems for diversification of activities to enhance the climate resilience of SMEs, agro-industries and agribusinesses involved in multiplication and marketing of seeds, processing and marketing of rice and related products. Finally, the business plans will help to guide the identification and prioritization of climate-resilient post-harvest infrastructure under Output 2.2. 1. Capacity of rice seed entrepreneurs will be enhanced for supply of certified, premium, and stress-tolerant seeds. Whereas Output 1.2 supports farmers for the use of stress tolerant varieties of the crops for enhancing climate resilience, supply of such seeds is limited mainly due to low capacity of seed entrepreneurs. Though NARC has developed several stress tolerant varieties of rice and government released them in addition to the registration of imported rice varieties, production of foundation seeds is limited, seed multiplications is not enough, and farmers find hard time to get quality seed in the market. Building capacity of rice seed entrepreneurs can help farmers to access quality seeds of selected variety with stress-tolerance properties. Consultations with various stakeholders—including seed entrepreneurs, farmers, extension workers, agronomists, traders, processors, researchers, and policy-makers identified the constraints and problems in rice seed supply chain which need to be addressed.

[1] Nepal released 75 and registered 20 varieties of open pollinated rice and several of them are stress tolerant. Out of the registered varieties, 60% are imported varieties (AITC, 2023).

34. The basis for this output is the ADS which recognizes that transformation towards a more commercialized agriculture requires a set of measures that focus not only on farmers, but, fundamentally on agro-enterprises involved in the commercialization of agricultural products and services. The ADS recognizes that quality seed is an important diver of productivity enhancement and climate change adaptation. transformation towards a more commercialized agriculture requires a set of measures that focus not only on farmers, but, fundamentally on agro-enterprises involved in the commercialization of agricultural products and services

[1] ADS Outcome 2 (higher productivity) proposes implementation of seed policies through enhancing capacity of seed research stations; promoting private, cooperative, community-based seed production; enforcing quality assurance systems; promoting production of hybrids; establishing an information system on

seed demand and supply; implementing Biodiversity Policy; pilot voucher system for seeds; and promoting open pollinated, improved and local seed production system to address seed sovereignty.

35. Indicative activities include technical support to and capacity building of agricultural SMEs and producer organization groups in the development of climate-proofed business plans, custom hiring centres and marketing strategies for climate resilient rice, pulses and oilseeds (including product diversification, development of business plans, marketing strategies, market information and access to credit and insurance). Contract farming between farmers groups and rice mills will be demonstrated and upscaled to create further incentives for farmers to engage in climate-resilient rice production and reduce incentives for direct selling of paddy. . Training of seed entrepreneurs will help for production of quality foundation seeds, certified seeds, seed processing and packaging, and truthful labelling. These entrepreneurs will be linked to seed research stations of NARC and assist extension system to enforce quality assurance systems. Seed entrepreneurs and farmers will be linked through establishing information systems on seed demand and supply of stress-tolerant rice varieties. The SMEs will be linked with micro-credit institutions and supported to increase access to markets. The project will encourage the development of social safety nets such as crop insurance, and community and peasant friendly climate induced risk sharing models, and demand, supply and price information of inputs and outputs for major markets, demand forecasts. It will develop a suite of products for market information and market intelligence, and link farmer groups and organizations to banks and finance institutions.

Output 2.2: Climate-resilient post-harvest infrastructure including storage facilities and processing technologies promoted.

36. Government has policy of promoting summer rice which has high potential to expand areas and increase productivity. However, rainfall at its harvesting period creates big challenge for farmers to dry and store the produce. Drying and storage are problems for the main season rice crop as well. Introducing and upscaling post-harvest technologies will enhance the climate resilience of local supply chain infrastructure and promote innovations through value addition. The project will help to climate proof the supply chain through technology interventions along key stages of the chain. Involvement of value-chain stakeholders at various scales and with a commitment to environmental sustainability, food safety and quality, and economic benefits for smallholders will create incentives to encourage climate-resilient practices and investments in adaptation technologies along the value chain. This will also help to incentivize private sector investments, including for climate-resilient post-harvest technologies.
37. The basis for this output is the Agricultural Development Strategy (ADS 2015-35) which emphasizes value chain development by addressing the constraints in production, processing, postharvest, marketing, and policy and institutions, contributing to improved value addition and strengthening market-based business linkages.
38. The indicative activities include prioritizing climate-resilient post-harvest infrastructure identified in business plans under Output 2.1, supporting value chain actors on construction and management of climate-resilient drying and storage facilities and processing technologies for rice and other crops under the rice-based cropping system to improve value addition and reduce losses along the value chain.

Component III: Enabling environment for scaling up sustainable interventions on climate resilient agri-systems

Outcome 3. Government policy, planning frameworks and climate services strengthened in gender responsive manner for climate change adaptation and governance mainstreamed at three levels of government to enable a whole-of-society approach for adaptation.

39. The project will support the Government to mainstream climate resilience in policies, plans, and frameworks. It will train FFS facilitators at local level and organize FFSs. It will train government staff at all the three levels of the government to raise awareness and private sector enterprises will be engaged in climate change adaptation and resilient crop value chains. Effective engagement of stakeholders will help obtain diverse views that can enrich understanding of how the system works for climate adaptation and food security. Multi-stakeholder dialogue conducted for the PIF will be continued during design and implementation of the project.
40. This outcome focuses on a multi-governmental approach that involves national authorities, private sector and local communities and leaders. Targeted capacity building initiatives are necessary for relevant stakeholders to enable them to develop robust adaptation plans and interventions which prioritize the needs of the most vulnerable communities. Enabling environment needs to be developed to deal with the effects of projected rise in temperature and rainfall.

Output 3.1 Governance and regulatory systems to promote climate resilient value-chains and NbS enhanced at local, provincial and federal government levels strengthened strengthened in gender responsive manner

41. Strengthened governance at all scales can help adaptation actions. Inclusive governance structures, institutions, and infrastructure are needed for management and decision-making related. Engagement and collaboration among decision makers constitute an important part of strengthened governance which can be fostered through vertical integration (across governance levels) and horizontal integration (across sectors).
42. The basis for the output is the NAP (2021) that calls for gender equality and social inclusion (GESI), livelihoods and governance that includes integrated GESI and climate foresight in social protection and development interventions.
43. Indicative activities include i) conducting capacity/skill gap assessments on support to climate resilient cropping system, ii) develop/adapt training manuals, and iii) implement training to local, provincial and federal governments. Capacity building of Nepal Agriculture Research Council (NARC) for adaptation trials of imported stress tolerant crop varieties and production of breeders' seeds.
44. The basis for this output is that strengthening capacities in hydrological and meteorological services and agro-advisory will support systematic observation and location specific weather forecasts to complement Output 1.3.
45. Indicative activities include: i) institutional capacity building and ii) support for regulatory reforms. Training and infrastructure support (e.g., computers and data handling devices) will be provided to national-level institutions to deliver climate services for rice value chain actors.

Output 3.2 Multi-stakeholder dialogues with non-state actors and private sector entities entities promoted to develop inclusive services and approaches to promote climate resilient value-chains and NbS

46. Capacity of non-state actors and private sector entities will be enhanced through multi-stakeholder dialogue for financial leverage, insurance, innovations and other services. Financial leverage and innovations will be promoted through private sector engagement.
47. The basis for this output is that private sector engagement leverages funding and expertise to transform key economic systems in food and agriculture through integrated approaches for delivery of climate adaptation benefits. The NAP proposed a programme to build the capacity of local peasants and local governments to cope with climate risks; and create an enabling environment that promotes private sector engagement in the provision of insurance products in the agricultural sector that help farmers and communities cope with climate risks.
48. Indicative activities include i) public awareness on climate change issues, ii) dissemination of technology and information to none-state actors (local groups, NGOs, CBOs and faith-based organizations) on sustainable rice landscape, including climate information, robust metrics and standards (e.g., credit risk analysis), to motivate commercial investment in climate adaptation and resilience, iii) support to key stakeholders to develop bankable business cases for investing in adaptation and resilience, iv) develop and promote innovative financing and incentive mechanisms to enhance investment flows and generate adaptation impacts and, v) training of private entities and providing information on investment risk assessment and mitigation for financial and insurance services, and training of agro-vet and other service providers.

Component IV: Knowledge management system established and operated

Outcome 4. Learnings from adaptation innovations monitored, analysed, reported and disseminated

49. Promotion of key messages will help ensure stakeholders have a common understanding of the project's aims and activities. Successful approaches, practices and technologies will be shared to enable replication. Learning from the project will also be used to inform regional and global work on adaptation and resilience through engagement with other GEF and related adaptation projects and programmes such as the Sustainable Rice Landscapes Initiative. Documentation and sharing of the learnings from adaptation innovations of the project will be helpful in future to deal with climate related hazards due to the projected rising temperature and increasing rainfall.

Output 4.1 Adaptive learning and support programmes established for collection and scaling up of innovation and transformation for rice-based production landscapes.

50. Knowledge exchange will promote climate resilient innovation and technology transfer, sharing of best practices, and scaling-up of adaptation solutions, pioneering approaches and experiences.

51. The basis for this output is the ADS which identified knowledge gaps as a key technical challenge. Lack of knowledge and awareness in promising practices and technologies is a major challenge in climate change adaptation.
52. A knowledge management strategy will be formulated during the first year of project implementation, following close consultation with key stakeholders, including women and men farmers. The strategy will outline the main steps for operationalizing the learning and support programmes to ensure the effective delivery of the outputs and outcomes. The strategy will identify the most efficient ways to synthesize and effectively utilize the knowledge generated from the project to enable the exchange of lessons learned, scaling up, and adaptive management.
53. Indicative activities include i) collection and documentation of knowledge and learning, ii) ICT, data-driven digital technology transfer systems, Interactive Agriculture Apps, and iii) sharing of evidence based best adaptation practices/technologies for rice-based cropping systems.

Output 4.2 Robust M&E systems established to track and evaluate adaptation and resilience in agriculture with gender disaggregated data and information in agriculture

54. The project's M&E activities, including reporting and the organization of the mid-term and terminal evaluations, and a project-specific communication strategy and plan will be developed to ensure a common understanding of key project messages and activities, with project results and lessons captured and distilled and made available periodically.
55. Indicative activities include i) development of a well-structured monitoring, evaluation, and learning system to assess success and failure, and ii) promotion of organizational willingness to continually test assumptions and learn in a timely manner.

56. **Adaptation benefits –** The project contributes to the Climate Change Adaptation programming strategy of GEF-8 by facilitating transformational adaptation towards achieving the Paris Agreement's global goal on adaptation. The project will directly benefit 148,000 (female 87,000, male 61,000) and improve the management 10,000 ha of agricultural land for climate resilience.
57. **Knowledge generation and exchange**. Existing lessons and best practices from baseline projects (see Table 1) have informed PIF design and will be further used during project design and implementation. Whilst research at national and international levels has developed knowledge of climate information, farmers face difficulties in accessing knowledge. Scientific knowledge needs to be tested and validated to ensure it fits local farming contexts and complements local and indigenous technical knowledge. The project will act as a climate knowledge broker bringing scientific knowledge together with local and indigenous technical knowledge (subject to FPIC) so that various knowledge systems provide the greatest value to farmers
58. Knowledge management approaches to be followed by the project include:
    a. Review relevant projects, programmes, initiatives and evaluations to assemble, analyse, monitor and improve access of farming communities to information and technology related to climate change adaptation in rice-based cropping system;
    b. Coordinate closely with other initiatives to strengthen stakeholder-access to updated information, knowledge sharing and learning opportunities;
    c. Support government institutions at all levels and private entities through capacity development and knowledge sharing. The project outcomes will influence public and private investments in the agriculture sector by establishing methods, processes and guidance for mainstreaming climate-resilient production systems and value chains into policy processes (Output 3);
    d. Identify and integrate local and indigenous knowledge and practices (subject to FPIC) with Western science-based solutions and innovations for sustainable and context-specific climate resilience and adaptation solutions (Component 1);
    e. Build capacity of farming communities to organize FFSs and learn from them to test and validate technologies and develop confidence for their adoption (Component 1);
    f. Capture, assess and document information, lessons, best practice and expertise for closing global knowledge gaps in climate resilient agriculture. (Component 4);
    g. Knowledge platforms and websites of the government (at all levels) and FAO will be used for knowledge exchange, learning and collaboration. Technical briefs in local languages will be shared with farming communities through local media and printed papers. (Component 4);
    h. A strategic communication plan and M&E Plan will be developed during the inception phase and shared with stakeholders to promote their effective ownership.
59. **Policy coherence**. Nepal has a comprehensive policy framework and ambitious roadmap to promote economic development and poverty alleviation in the agriculture sector while also ensuring greater resilience to climate change. The Constitution of Nepal (2015) includes the right to food as a fundamental right of each citizen. The Right to Food

and Food Sovereignty Act 2018 identifies fundamental rights of citizens to food. The Agriculture Development Strategy (ADS) (2015-35) identifies the needs for improved food and nutrition security and proposes food and nutrition interventions. Provincial governments are committed to implement the ADS. The Zero Hunger Challenge National Plan of Action (2016-2025) aims to end hunger and malnutrition based on people's access to adequate, nutritious and affordable food all year round. It promotes sustainable food systems, targeting a 100% increase in the productivity and income of smallholders.

60. The National Climate Change Policy (2019) proposes improvement of food security, nutrition and livelihoods of impacted populations including vulnerable and marginalized farming communities by adopting climate-friendly agriculture system. The NAP (2021-2050) includes agriculture and food security as thematic areas. The Agriculture and Food Security (AFS) sector of the NAP has targets for its adaptation component on the second Nationally Determined Contribution (NDC) (2020). The Climate Smart Agriculture Investment Plan (CSAIP 2021) identifies climate risks and reductions in agricultural productivity, food and water security, and agro-biodiversity. Assessment report 6 (AR6) notes that on-farm options are insufficient to meet Sustainable Development Goal 2 (SDG2) on zero hunger, with climate change impacts interacting with other non-climatic drivers of food and nutritional insecurity.
61. **Consistency with National Priorities** The project is aligned with Nepal's commitment to the Paris Agreement through supporting adaptation actions related to Nepal's NAPA, NDC and NAP and the Agricultural Development Strategy. The project will support major policy provisions in climate resilient agriculture and food security and provide feedback to the government on the sufficiency of such policies. The project will enhance institutional capacities through the involvement of national institutions in project development and delivery.
62. **Scaling up** and impact will be achieved through catalysing innovation and private sector engagement for climate change adaptation, in partnership with a wide range of stakeholders, including through identifying and testing scalable and bankable investments, business models, and technologies. Wider adoption of climate-resilient practices and technologies will be encouraged through dissemination of learning about how technologies lead to increased farmer incomes, improved value chain efficiency and reduction in income variance.
63. Two strategies will support the upscaling of adaptation measures promoted by this project: i) the proliferation of private-sector links for farmer groups and SMEs to integrate with markets and industries that support sustainable practices and ii) the integration of such practices and technologies within national development programmes implemented by the Government and partners.
64. **Innovative approach** will be used to generate adaptation benefits through focusing on vulnerable farming communities for climate change adaptation using NbS and market-driven approaches that build resilience. Innovative technologies and practices will support the vulnerable communities to increase food production and access new market opportunities. This helps the vulnerable farmers adapt to hazards such as floods and droughts, and adopt climate-resilient production systems.
65. Innovations will include removing technical, information and institutional barriers, including through incentive mechanisms that ensure profits accrue to producers and others in the value chain. The project will develop and deploy innovative tools and approaches to produce more food, generate rural incomes and create jobs for vulnerable communities using innovations in agricultural inputs, such as stress tolerant seeds and precision dose of fertilizers, early warning information, agro-advisory, digital information and climate resilient technologies for food production and value addition. Innovative technologies across the supply chain add value to agricultural goods. Engagement of private sector innovators in crop value chain will help to reduce climate change impacts rice-based farming system.

[1] Stafford 2020.
[2] MOFE 2021.

Coordination and Cooperation with Ongoing Initiatives and Project.

Does the GEF Agency expect to play an execution role on this project?

Yes

If so, please describe that role here. Also, please add a short explanation to describe cooperation with ongoing initiatives and projects, including potential for co-location and/or sharing of expertise/staffing

1. The executing entity is the Ministry of Agriculture and Livestock Development (MOALD), Government of Nepal and the fund will flow to the executing entity through the Ministry of Finance (MOF) (Figure 10). In light of the recent transition of the government to the federal structure, and the limited capacities of and weak linkages among the three tiers of government specially to execute the project at the local level, Federal Government (the Executing Agency) has requested FAO to provide a targeted technical assistance for building institutional capacities in the areas of (a) climate resilient rice-based value-chains development (b) promotion of best NbS practices, (c) accessing global best practices and scaling up innovations for transformation of rice-based production systems, and (d) establishing and institutionalizing functional M&E systems at local level. The local level government is the responsible institution for planning and implementation of agriculture and natural resources management interventions at the community level.

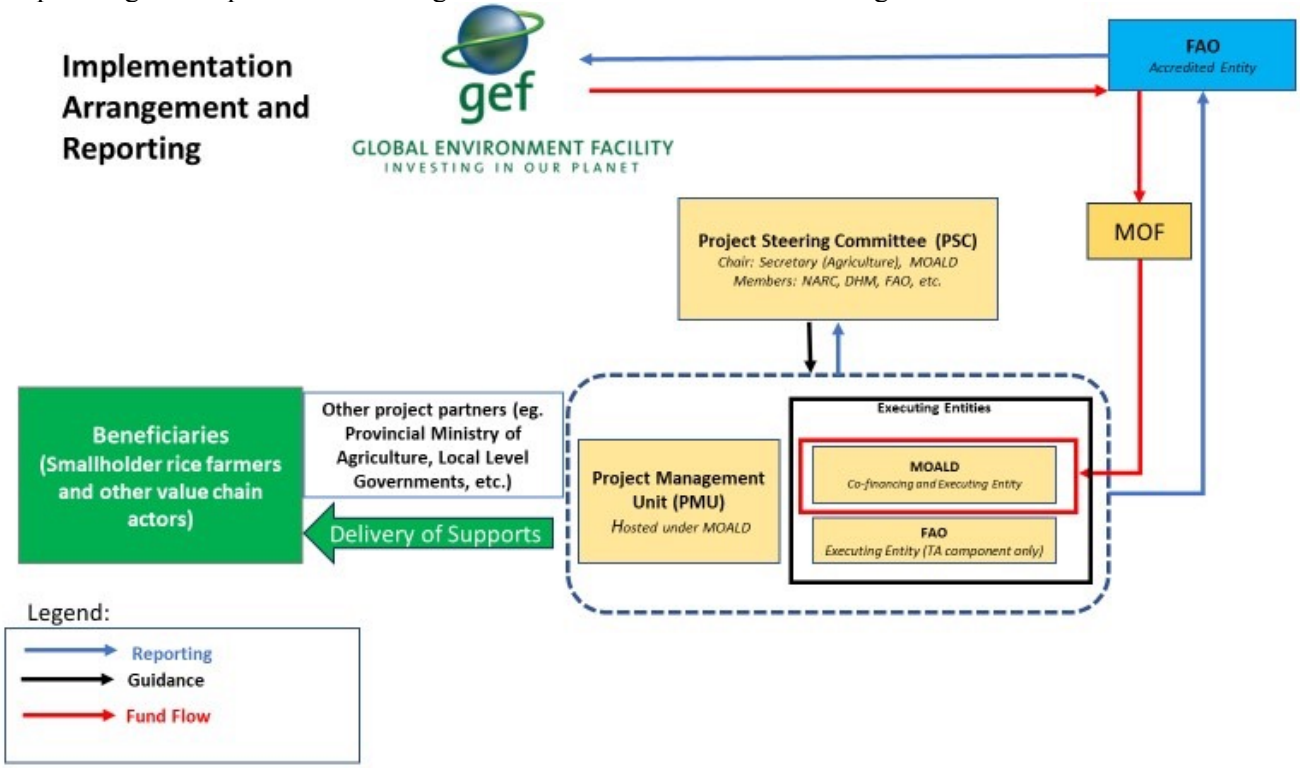


Figure 10: Schematic diagram of implementation arrangement and reporting. *Please note: FAO is the GEF implementing agency, not Accredited Entity as mentioned in the blue box

2. During the PPG Phase, the project will coordinate and collaborate with different relevant stakeholder and partners. Some of the stakeholders include the Department of Agriculture (DoA), Department of Hydrology and Meteorology (DHM), Nepal Agriculture Research Council (NARC), Provincial Ministry of Agriculture, local governments, Indigenous Peoples groups, NGOs, CBOs, women and other vulnerable groups to ensure that the proposed project is aligned with and complements the project's objective of enhancing the adaptive capacity of central Nepal's farming community.

3. Recently approved FAO Country Programming Framework (2023-27) streamlines FAO supports to the Government of Nepal for food security. In addition, the NAP established action plans to integrate climate change adaptation in the national and sectoral policy, planning, and decision-making process within all sectors to reduce vulnerability to the impacts of climate change.

4. The proposed project will coordinate with a range of relevant initiatives and projects in Nepal to share experiences to avoid overlap and double-spending of resources for maximum synergistic impact. Synergies and areas for collaboration with these other initiatives will be mapped during the PPG phase with agreement on common activities and cost-sharing explored and agreed. Cooperation with proposed second phase of FANSEP project will be complementarity for food security. The LDCF project focuses on farm level production and value chain development whereas the FANSEP-II emphasises on the promotion of household level food and nutrition security. Linkages among these two will be explored. Likewise, on-going project such as BRCRN project being implemented by Ministry of Forest and Environment (MoFE). Likewise, on-going project such as BRCRN will help establish complementarity with this project, thereby laying the ground for enhanced coordination with future GCF and GEF investments.

Coordination among projects will take into consideration the GCF vision to promote a paradigm shift towards climate resilient development pathways in the context of sustainable development and the GEF mission to safeguard the global environment by helping Nepal to meet its commitments to multiple environmental conventions[1]. Collaborative engagement processes among projects will be developed to promote shared goals, values, and policies while respecting their unique strengths[2]. This project will also benefit from the interventions of Prime Minister Agriculture Modernization Project focusing on commercialization and modernization of agriculture production in selected districts of Terai, Hills and Mountains.

5. Past projects provide lessons and experiences. The project is formulated based lessons learned from previous GEF/LDCF project "Reducing vulnerability and increasing adaptive capacity in response to the impacts of climate change and variability for sustainable livelihoods in the agriculture sector in Nepal (GCP/NEP/070/LDF)" implemented during 2015 to 2019. The project used farmers field school (FFS) to test and validate adaptation technologies. However, it did not specifically address alternative value chains. The adaptation technologies tested and validated by this project need scaling up. Lessons learned and best practices documented by the project provide a useful baseline for the proposed project. The proposed project will also utilize many stakeholder engagements, capacity development and communication tools and materials developed by this project. Moreover, the institutional capacities developed by the project, to provide climate-resilient extension services and develop and monitor climate-resilient responses will be enhanced and scaled up. The project also supported the Department of Hydrology and Meteorology (DHM) to establish three automatic weather stations (AWS) and also Nepal Agriculture Research Council (NARC) for developing location specific agro-advisory that will helpful for the proposed project. It was learnt from the past project that covering too many areas of agriculture with limited budget can generate knowledge and adopt technology but hard to scale up the technology. Considering this lesson, the proposed project focuses on crops only, that too in rice-based cropping system, for intensive efforts and larger impacts. In past project stress tolerant varieties were tested in FFS using cafeteria trial for their suitability to stressed conditions (like drought and flood) and farmers expressed interest in some of them. However, when the farmers were ready to adopt the varieties in wider scale volume of the seeds available was insufficient. Considering this lesson, capacity building of seed entrepreneurs is included in this project.

6. Building Resilience for Climate-related Hazards (BRCH) (Pilot Program for Climate Resilience (PPCR) (2013 to 2020) developed capacity of the DHM and NARC for the development of early warning and agro-advisory services which established 88 AWS and three weather radars and initiation of agro-advisory services. Early warning and agro-advisory services will be applied by the proposed project on location and crop specific cases. It is learnt from this project that capacity building of the farmers is necessary to retrieve and use agro-advisory services and provide feedback to improve the services. Considering this lesson, the proposed project focuses on capacity of farmers and extension workers to retrieve and use already available agro-advisory services and provide feedback on their usefulness.
7. **On-going efforts** have complementarity with the proposed project. The World Bank supported the Government of Nepal for development of Climate Smart Agriculture Investment Plan (CSAIP). This plan identifies critical capacity gaps in the legal, policy, institutional and operational areas concerning the scale-up of climate-smart agriculture. It emphasizes on creating an enabling environment for CSA adoption and action to strengthen local capacity to plan and implement engaging private sector. The capacity gaps and investment needs identified by the CSAIP will provide valid guideline to the proposed project, and experiences from implementing the proposed project will provide valuable lessons for the CSAIP too.
8. Prime Minister Agriculture Modernization Project (PMAMP 2016 to 2026) aims to boost agricultural productivity through adoption of modern farm techniques and improvement of value chains of agricultural products through enhanced productivity and commercialization of major cereals, livestock, fisheries, fruits and vegetables. It is learnt from the PMAMP project that not all the technologies delivered help to build resilience. Moreover, capacity of both extension workers and farmers are not enough to identify resilient technology and practices. These lessons have been taken into consideration when developing this proposal. The proposed project will coordinate with the PMAMP for replication of climate resilient interventions for cereals production. The project will leverage subsidized technologies being provided by PMAMP to farmers groups and coordinate in technological interventions.
9. GCF funder project "Building a Resilient Churia Region in Nepal" (BRCRN 2020-2027) aims for sustainable natural resources management and reduction of climate-driven natural hazards in the Churia watersheds by enhancing the resilience of ecosystems and vulnerable communities. It promotes climate-resilient land use practices to address deforestation and forest degradation and build resilience to climate-induced hazards. It builds capacities of governments, communities and other stakeholders for better management of natural resources under climate risks. It is learnt from the BRCRN project that local people emphasize more on their farm production and food security than environmental conservation at large that benefit them mostly indirectly. The proposed project will benefit from experiences and lessons learned from the project.
10. Food and Nutrition Security Enhancement Project (FANSEP) funded by Global Agriculture and Food Security Program (GAFSP) (2018-2023) aims to increase food and nutrition security and livelihoods of vulnerable households with a special focus on smallholder farmers, women and children. The technologies and lessons learnt will be useful for the proposed project. Proposed FANSEP-II project (2024-2027) aims to replicate successful interventions. The proposed GEF project

can benefit from sharing adaptation technologies and dissemination of climate and nutrition smart agricultural technologies, income generation and diversification, and improving nutrition security.

[1] GEF, 2021.
[2] GEF 2021.

Core Indicators

Explain the methodological approach and underlying logic to justify target levels for Core and Sub-Indicators (max. 250 words, approximately 1/2 page)

META INFORMATION – LDCF

LDCF **true**	SCCF-B (Window B) on technology transfer **false**	SCCF-A (Window-A) on climate Change adaptation **false**

Is this project LDCF SCCF challenge program?

false

This Project involves at least one small island developing State(SIDS).

false

This Project involves at least one fragile and conflict affected state.

false

This Project will provide direct adaptation benefits to the private sector.

true

This Project is explicitly related to the formulation and/or implementation of national adaptation plans (NAPs).

true

This project will collaborate with activities begin supported by other adaptation funds. If yes, please select below

Green Climate Fund **true**	Adaptation Fund **false**	Pilot Program for Climate Resilience (PPCR) **false**

This Project has an urban focus.

false

This project will directly engage local communities in project design and implementation

true

This project will support South-South knowledge exchange

true

This Project covers the following sector(s)[the total should be 100%]: *

Agriculture	50.00%
Nature-based management	30.00%
Climate information services	10.00%
Coastal zone management	0.00%
Water resources management	0.00%
Disaster risk management	0.00%
Other infrastructure	10.00%
Tourism	0.00%
Health	0.00%
Other (Please specify comments)	0.00%

Total	100.00%

This Project targets the following Climate change Exacerbated/introduced challenges:*

Sea level rise **false**	Change in mean temperature **true**	Increased climatic variability **true**	Natural hazards **true**
Land degradation **true**	Coastal and/or Coral reef degradation **false**	Groundwater quality/quantity **false**	

CORE INDICATORS – LDCF

	Total	Male	Female	% for Women
CORE INDICATOR 1 Total number of direct beneficiaries	148,000	61,000.00	87,000.00	58.78%
CORE INDICATOR 2 (a) Area of land managed for climate resilience (ha) (b) Coastal and marine area managed for climate resilience (ha)	10,000.00 0.00			
CORE INDICATOR 3 Number of policies/plans/ frameworks/institutions for to strengthen climate adaptation	22.00			
CORE INDICATOR 4 Number of people trained or with awareness raised	4,840	1,025.00	3,815.00	78.82%
CORE INDICATOR 5 Number of private sector enterprises engaged in climate change adaptation and resilience action	60.00			

Risks to Project Preparation and Implementation

Summarize risks that might affect the project preparation and implementation phases and what are the mitigation strategies the project preparation process will undertake to address these (e.g. what alternatives may be considered during project preparation-such as in terms of consultations, role and choice of counterparts, delivery mechanisms, locations in country, flexible design elements, etc.). Identify any of the risks listed below that would call in question the viability of the project during its implementation. Please describe any possible mitigation measures needed. (The risks associated with project design and Theory of Change should be described in the "Project description" section above). The risk rating should reflect the overall risk to project outcomes considering the country setting and ambition of the project. The rating scale is: High, Substantial, Moderate, Low.

Risk Categories	Rating	Comments
Climate	Moderate	The project design will include actions to increase the availability of early warning information and, as necessary, introduce resilient technologies (Component 1) and promote partnerships with disaster mitigation authorities and other partners (Component 3).

Environment and Social	Moderate	Indigenous peoples organizations will be engaged and this requirement will be continued during implementation and evaluation (Component 3)
Political and Governance	Moderate	During project design all three levels of the government, ethnic groups and farmers will be consulted (Component 3)
Macro-economic	Low	The project design will include training and awareness raising for Government staff at all three levels (Component 3)
Strategies and Policies	Moderate	The project design will include support for policy and regulatory improvements that mainstream climate change adaptation (Component 3)
Technical design of project or program	Moderate	Consultations will be held with Nepal Agriculture Research Council (NARC) and seed multiplying private entities during project preparation to identify supply capacity, and interventions agreed upon if capacity is low (Component 2).
Institutional capacity for implementation and sustainability	Moderate	Project design will include training of NARC staff (Component 3), training of trainers, and training pf local government level technical staff (Component 1)
Fiduciary: Financial Management and Procurement	Moderate	Project design will include requirements for financial management and procurement assessments, development of manuals (Component 4), and use of FFS at local level (Component 2)
Stakeholder Engagement	Low	The project design will include the need for engaging farmer groups with strong leadership, raising awareness about the benefits of climate change adaptation (Component 1), engaging reputable

		processors with a legitimate interest in socially and environmentally sound contract farming (Component 2), engaging private sector in project design and undertaking special needs assessment to understand barriers to private sector engagement in the project and developing joint mitigation measures.
Other		
Financial Risks for NGI projects		NA
Overall Risk Rating	Moderate	

C. ALIGNMENT WITH GEF-8 PROGRAMMING STRATEGIES AND COUNTRY/REGIONAL PRIORITIES

Describe how the proposed interventions are aligned with GEF- 8 programming strategies and country and regional priorities, including how these country strategies and plans relate to the multilateral environmental agreements.

Confirm if any country policies that might contradict with intended outcomes of the project have been identified, and how the project will address this.

For projects aiming to generate biodiversity benefits (regardless of what the source of the resources is - i.e., BD, CC or LD), please identify which of the 23 targets of the Kunming-Montreal Global Biodiversity Framework the project contributes to and explain how. (max. 500 words, approximately 1 page)

1. This project targets Theme 1: Agriculture and Food Security of the GEF/LDCF programming architecture for GEF-8. The project will connect the rice-based cropping system to the sustainable rice landscape initiatives in Nepal.
2. The project is aligned with the goal of the LDCF Programming Strategy, through its efforts to strengthen resilience and reduce vulnerability of farming communities to adverse impacts of climate change. The project will build on national priorities, and experience of LDCF. The project will promote NbS and market-driven approaches to build resilience of the rice-based cropping system.
    a. In relation to LDCF Objective 1: the project will reduce vulnerability and increase resilience of 148,000 people and 10,000 ha of farmlands across the four districts by promoting the use of socially and environmentally sound technologies as well as diversification.
    b. In relation to LDCF Objective 2: the project: at the rice farm and processing levels, adaptation and resilience will be mainstreamed by encouraging compliance good agricultural practices (GAP) and resilience measures; at the community level, efforts will be made to integrate community-based adaptation plans into investment and development plans; at the national level, the project will strengthen the capacity of the national institutions (particularly MOALD and NARC) to integrate climate change actions into their development and research programming. Lessons learned from the project will be disseminated via communications material, encouraging uptake of successful practices in other projects.
3. The project is aligned with the global adaptation goal of the Paris Agreement (article 7)[1]. It will catalyse the implementation of the NAPA and the NAP by addressing urgent adaptation priorities and medium- and long-term resilience priority actions such as enabling policies, supporting alternative livelihoods, and strengthening institutional capacities. This project is aligned with the LDC work programme 2018[2], more specifically supporting the process to implement the NAP and related relevant adaptation strategies; supporting the implementation of NDC; continue promoting public awareness programmes to ensure the dissemination of information on climate change issues; strengthening cooperative action on adaptation technology development and transfer; and strengthening the capacity of meteorological and hydrological services to collect, analyse, model, interpret and disseminate weather and climate information to support the implementation of adaptation actions[3].
4. The project will help improve food production and livelihoods through sustainable land management, reduce pressures on natural resources from competing land uses and increase resilience in the wider landscape. The project will

contribute to strengthening the management of agricultural chemicals and their wastes via promotion of integrated pest management, integrated plant nutrient management and precise use of chemical fertilizers.

5. No country policy contradicts with intended outcomes of the project. However, gaps remain in finance for adaptation in agriculture to reduce climate risks and protect farmers against climate impacts.

[1] UNFCCC, 2015.
[2] UNFCCC, 2018, Decision 16/CP.24.
[3] Decision 16/CP.24: Least developed countries work programme, Report of the Conference of the Parties on its twenty-fourth session, held in Katowice f\rom 2 to 15 December 2018

D. POLICY REQUIREMENTS

Gender Equality and Women's Empowerment:

We confirm that gender dimensions relevant to the project have been addressed as per GEF Policy and are clearly articulated in the Project Description (Section B).

Yes

Stakeholder Engagement

We confirm that key stakeholders were consulted during PIF development as required per GEF policy, their relevant roles to project outcomes and plan to develop a Stakeholder Engagement Plan before CEO endorsement has been clearly articulated in the Project Description (Section B).

Yes

Were the following stakeholders consulted during project identification phase:

Indigenous Peoples and Local Communities: Yes

Civil Society Organizations: Yes

Private Sector: Yes

Provide a brief summary and list of names and dates of consultations

Detailed stakeholder consultation report is uploaded the roadmap.

1. The PIF team consulted relevant stakeholders at national, provincial, local government and community levels including civil society organizations, private sector, women, indigenous people and farming communities.
2. Stakeholders have been engaged to enhance country-ownership and accountability of the project and to address social and economic needs of people affected by the project. Efforts have been made to forge strong partnerships with Indigenous Peoples, civil society, communities and private sector for harnessing knowledge and expertise of the stakeholders.
3. At the central-level government ministries a meeting in the offices of the Ministry of Agriculture and Livestock Development (MOALD) held on 14 October 2022 agreed the PIF in principle. It was decided that FAO should submit the PIF in the GEF format along with a formal letter to the MOALD and the MOALD shall forward the PIF to the Ministry of Finance for its consideration. Field level consultations will be organized after the general election in November 2022.
4. Informal meetings were held with the GEF Operational Focal Point (OFP)-Ministry of Finance (MoF), and Ministry of Forests and Environment (MoFE) at various dates to consider areas of cooperation under the GEF-8 Cycle and to encourage transformational shifts towards ecosystem restoration, climate change adaptation and transformation of agri-food systems.

5. At provincial level, stakeholder consultations were organized in the Ministry of Land Management, Agriculture and Cooperative (MOLMAC) in Madhesh Province on 22 December 2022 and in Ministry of Agriculture in Province 1 on 26 December 2022. The programmes were chaired by respective secretaries of the Ministry and involved by civil society organizations and private sector entities.
6. At local government level, meetings were organized in Laxminiya Rural Municipality in Dhanusha on 23 December 2022 and Ramgram Rural Municipality in Morang on 25 December 2022. The programmes were chaired by Chairpersons of the respective municipalities.
7. Community level consultations involving Indigenous people, women and other farming communities were organized in both provinces (in Hardinath Dhanusha on 22 December 2022 and in Ramgram Morang on 25 December 2022).
8. Private sector entities were consulted on 23, 25 and 27 December 2022 to identify their possible areas of engagement.
9. Full funding proposal will be developed with consultations with the governments at all the three levels, Nepal Agriculture Research Council and Agriculture Knowledge Centres. Consultations will be done with the vulnerable farming communities in project locations, private sector entities working in agricultural value chain, farmers cooperatives, non-government organizations, Indigenous Peoples and Local Communities (IPLCs) and civil society organizations. Government, vulnerable farming communities and private sector entities engaged in agricultural value chain will be involved in project implementations.

(Please upload to the portal documents tab any stakeholder engagement plan or assessments that have been done during the PIF development phase.)

Private Sector

Will there be private sector engagement in the project?

Yes

And if so, has its role been described and justified in the section B project description?

Yes

Environmental and Social Safeguard (ESS) Risks

We confirm that we have provided indicative information regarding Environmental and Social risks associated with the proposed project or program and any measures to address such risks and impacts (this information should be presented in Annex D).

Yes

Overall Project/Program Risk Classification

PIF	CEO Endorsement/Approval	MTR	TE
Medium/Moderate			

E. OTHER REQUIREMENTS

Knowledge management

We confirm that an approach to Knowledge Management and Learning has been clearly described in the Project Description (Section B)

Yes

ANNEX A: FINANCING TABLES

GEF Financing Table

Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	Grant / Non-Grant	GEF Project Grant($)	Agency Fee($)	Total GEF Financing ($)
FAO	LDCF	Nepal	Climate Change	LDCF Country allocation	Grant	8,932,420.00	848,580.00	9,781,000.00
Total GEF Resources ($)						**8,932,420.00**	**848,580.00**	**9,781,000.00**

Project Preparation Grant (PPG)

Is Project Preparation Grant requested?

true

PPG Amount ($)

200000

PPG Agency Fee ($)

19000

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	Grant / Non-Grant	PPG($)	Agency Fee($)	Total PPG Funding($)
FAO	LDCF	Nepal	Climate Change	LDCF Country allocation	Grant	200,000.00	19,000.00	219,000.00
Total PPG Amount ($)						**200,000.00**	**19,000.00**	**219,000.00**

Please provide justification

Sources of Funds for Country Star Allocation

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Sources of Funds	Total($)
Total GEF Resources					**0.00**

Indicative Focal Area Elements

Programming Directions	Trust Fund	GEF Project Financing($)	Co-financing($)
CCA-1-1	LDCF	8,932,420.00	10000000
Total Project Cost		**8,932,420.00**	**10,000,000.00**

Indicative Co-financing

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
Recipient Country Government	Ministry of Agriculture and Livestock Development	In-kind	Recurrent expenditures	10000000
Total Co-financing				**10,000,000.00**

Describe how any "Investment Mobilized" was identified

Not applicable. The project co-financing will be provided by the government in-kind through recurring expenditures from support provided to the project by Maldives government officials, office rental/space, and other in-kind support.

ANNEX B: ENDORSEMENTS

GEF Agency(ies) Certification

GEF Agency Type	Name	Date	Project Contact Person	Phone	Email
GEF Agency Coordinator	Jeffrey Griffin	10/17/2023	Lianchawii Chhakchhuak	91-9911340441	lianchawii.chhakchhuak@fao.org

Record of Endorsement of GEF Operational Focal Point (s) on Behalf of the Government(s):

Name	Position	Ministry	Date (MM/DD/YYYY)
Mr. Shreekrishna Nepal	Joint Secretary, International Economic Cooperation Coordination Division	Ministry of Finance	12/27/2023

ANNEX C: PROJECT LOCATION

Please provide geo-referenced information and map where the project interventions will take place

Particulars	Unit	Mahottari	Sarlahi	Nuwakot	Parasi
Total households	No	137,886	164,824	68,646	82,709
Total population	No	706,994	862,470	263,391	386,868
Male	No	349,159	435,131	128,998	188,182
Female	No	357,835	427,339	134,393	198,686
Farm holdings	No	87,062	105,230	56,915	55,098
Total holding area	ha	59,418	73,271	27,290	30,124
Holding area wetland	ha	55,851	69,674	13,415	29,452
Holding area dryland	ha	3,567	3,598	13,875	672
Cereal crops	ha	74,458	86,498	37,146	38,405
Leguminous grains	ha	7,853	5,843	627	2,927
Oil seeds	ha	822	1,532	1,524	6,229
Vegetables	ha	1,976	3,843	1,236	793
Early paddy	ha	1,156	2,492	2,814	286
Main paddy	ha	40,827	42,173	11,092	23,187
Wheat	ha	30,138	27,457	3,548	13,642
Spring/winter maize	ha	181	6,080	4,037	532
Summer maize	ha	1023	6,649	8,949	440
Winter potato	ha	323	867	3,010	512
Summer potato	ha	673	460	394	112
Holdings reporting CC impacts on agriculture	No	31,986	28,993	19,509	19,016
Food insufficient holdings	No	40,796	48,473	26,024	19,421

ANNEX D: ENVIRONMENTAL AND SOCIAL SAFEGUARDS SCREEN AND RATING

(PIF level) Attach agency safeguard screen form including rating of risk types and overall risk rating.

Title

Nepal_LDCF_FAO_ESS Screening

ANNEX E: RIO MARKERS

Climate Change Mitigation	Climate Change Adaptation	Biodiversity	Land Degradation
Significant Objective 1	Principal Objective 2	Significant Objective 1	No Contribution 0

ANNEX F: TAXONOMY WORKSHEET

Taxonomy sheet has been uploaded in the roadmap page