



Building climate resilient livelihoods in vulnerable landscapes in Bangladesh (BCRL)

Part I: Project Information

GEF ID

10207

Project Type

FSP

Type of Trust Fund

LDCF

CBIT/NGI

CBIT No

NGI No

Project Title

Building climate resilient livelihoods in vulnerable landscapes in Bangladesh (BCRL)

Countries

Bangladesh

Agency(ies)

FAO

Other Executing Partner(s)

Department of Environment (DoE) and Department of Agricultural Extension (DAE)

Executing Partner Type

Government

GEF Focal Area

Climate Change

Taxonomy

Focal Areas, Climate Change, Climate Change Adaptation, Complementarity, Mainstreaming adaptation, National Adaptation Programme of Action, Innovation, Climate finance, Livelihoods, Climate information,

Community-based adaptation, Least Developed Countries, Disaster risk management, Ecosystem-based Adaptation, Sea-level rise, Private sector, National Adaptation Plan, Climate resilience, Adaptation Tech Transfer, Influencing models, Strengthen institutional capacity and decision-making, Stakeholders, Civil Society, Community Based Organization, Local Communities, Communications, Private Sector, SMEs, Individuals/Entrepreneurs, Beneficiaries, Type of Engagement, Participation, Gender Equality, Gender Mainstreaming, Gender results areas, Capacity, Knowledge and Research, Knowledge Generation, Learning, Capacity Development

Rio Markers

Climate Change Mitigation

Climate Change Mitigation 0

Climate Change Adaptation

Climate Change Adaptation 2

Submission Date

4/9/2019

Expected Implementation Start

7/1/2021

Expected Completion Date

6/30/2026

Duration

60In Months

Agency Fee(\$)

848,580.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
CCA-1	Outcome 1.1: Technologies and innovative solutions piloted or deployed to reduce climate-related risks and/ or enhance resilience Outcome 1.2: Innovative financial instruments and investment models enabled or introduced to enhance climate resilience	LDC F	6,932,420.00	34,030,000.00
CCA-2	Outcome 2.1 Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience Outcome 2.2 Adaptation considerations mainstreamed into investments Outcome 2.3 Institutional and human capacities strengthened to identify and implement adaptation measures	LDC F	2,000,000.00	13,430,000.00
Total Project Cost(\$)			8,932,420.00	47,460,000.00

B. Project description summary

Project Objective

The overarching objective of this project is to improve the resilience of people, communities, and ecosystems to climate change, and improve livelihoods through increased value addition in the agricultural food systems of Bangladesh.

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing (\$)	Confirmed Co-Financing (\$)
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Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing (\$)	Confirmed Co-Financing(\$)
COMPONENT 1. STRENGTHEN NATIONAL CAPACITIES FOR INTEGRATION OF ADAPTATION MEASURES IN AGRICULTURE SECTOR PLANNING, BUDGETING, AND POLICY PROCESSES	Technical Assistance	OUTCOME 1. CCA considerations integrated into agriculture sector planning, budgeting and policy	<p>1.1. Strengthened mechanisms for improved cross-sectoral and ministerial coordination, covering all relevant government ministries or agencies, to ensure enhanced coordination on policies, plans, and investments on adaptation for agriculture</p> <p>1.2. Innovative financial instruments, investment models, and institutional setup promoted to mobilize climate finance for resilient agriculture in Bangladesh</p> <p>1.3. Strengthened inter-sectoral planning and investment prioritization processes at national and sub-national level for resilient agriculture in Bangladesh</p>	LDC F	784,547.00	4,430,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing (\$)	Confirmed Co-Financing(\$)
COMPONENT 2. DEMONSTRATE AND SCALE UP CLIMATE ADAPTATION SOLUTIONS IN TARGETED LANDSCAPES	Investment	OUTCOME 2. Increased resilience of agriculture-based livelihoods and landscapes	<p>2.1. Community climate vulnerability and risk assessments and adaptation prioritization exercises at the village / community level</p> <p>2.2. Strengthened mechanisms to improve farmer knowledge of climate-resilient agriculture through extension services and Farmer Field Schools</p> <p>2.3. Improved uptake by farmers of climate-resilient crops (prioritized in Annex M), varieties, and management practices through transfer of seed kits and other inputs</p> <p>2.4. Strengthened initiatives for Nature-based Solutions and community ownership of agricultural assets</p> <p>2.5. Improved capacity to use basic agro-meteorological information / agro-climatic</p>	LDC F	2,379,605.00	19,627,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing (\$)	Confirmed Co-Financing (\$)
COMPONENT 3. SCALE-UP INVESTMENTS FOR CLIMATE ADAPTATION IN SELECTED VALUE CHAINS	Investment	OUTCOME 3. Climate-resilient livelihoods through improved access to credit, markets, and technologies	<p>3.1 Value-chain networks mapped and investment opportunities for resilient agriculture identified in two regions (HBT, CHT, or waterlogging/salinity-prone areas).</p> <p>3.2 Strengthened capacities and performance of farmer organizations (producer groups, farmer cooperatives, common interest groups)</p> <p>3.3. Enhanced linkages between FOs and private sector to enable direct sale by farmers</p> <p>3.4. Improved access to technology in crop supply chains to generate value addition opportunities for entrepreneurs and MSMEs</p> <p>3.5. Innovative financial instruments for farmers, entrepreneurs, or MSMEs are designed, piloted, and scaled</p>	LDC F	4,626,716.00	15,030,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing (\$)	Confirmed Co-Financing (\$)
COMPONENT 4. ENABLE EFFECTIVE KNOWLEDGE MANAGEMENT, AND MONITORING, EVALUATION AND LEARNING (MEL)	Technical Assistance	OUTCOME 4. Project monitored and evaluated, information disseminated, and lessons from project implementation, progress monitoring, review, and evaluations codified and shared	4.1. Tools, methods and approaches for monitoring and evaluating project progress adopted 4.2 MEL framework, including outreach programs and local knowledge-sharing and learning networks on climate adaptation and resilience, developed and operationalized 4.3. Awareness raising of stakeholders through media dissemination of agriculture-related CCA options	LDCF	716,200.00	6,000,000.00
Sub Total (\$)					8,507,068.00	45,087,000.00
Project Management Cost (PMC)						
			LDCF	425,352.00	2,373,000.00	
			Sub Total(\$)	425,352.00	2,373,000.00	
			Total Project Cost(\$)	8,932,420.00	47,460,000.00	

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Recipient Country Government	Department of Agricultural Extension (DAE)	In-kind	Investment mobilized	16,430,000.00
Recipient Country Government	Department of Environment (DoE)	In-kind	Investment mobilized	4,000,000.00
GEF Agency	Food and Agriculture Organization of the United Nations (USD 1.9 million through IFAD, USD 5.9 million through Kingdom of Netherlands, USD 0.32 million through GCF, USD 1.5 million through EU, USD 0.15 million through Germany and 0.07 million through multi-donor)	In-kind	Investment mobilized	10,000,000.00
Other	Palli Karma-Sahayak Foundation (PKSF)	In-kind	Investment mobilized	17,030,000.00
Total Co-Financing(\$)				47,460,000.00

Describe how any "Investment Mobilized" was identified

The co-financing sources were identified by FAO through consultation with the government as well as other relevant agencies (IGOs, NGOs etc) operating across Bangladesh. Investment was mobilized based on the alignment and opportunities to enhance the achievement of mutual objectives between the LDCF project and the identified co-finance initiatives. PMC Co-finance The Govt. of Bangladesh will co-finance the PMC by recruiting one National Project Director for the entire duration of the LDCF-BCRL project. In addition, both DoE and DAE will separately recruit a Deputy Project Director each to support the project activities as a co-finance. DoE and DAE will provide the venue and logistics for meetings, workshops and trainings as co-finance. The time and technical contribution of officials in the project implementation committees and related activities for the entire duration of the project is also covered. Co-finance from Department of Agricultural Extension (DAE) is composed of the following initiatives: - Research, Extension and Popularization of Vegetable and Spices Cultivation on Floating Bed (US\$ 3,4 million), 2017-2022 - Year-round Fruit Production for Nutrition Improvement Project (US\$ 6.12 million), 2015-2023 - Safe Crop Production Project through Ecofriendly Approach (US\$ 2.22 million), 2018-2023 - Enhance Production of Oil Crops (EPOC) Project (US\$ 0.74 million), 2020-2025 - Enhancing Crop Production through Extension of Solar Energy and Modern Water Saving Technologies Pilot Project (US\$

3.95 million), 2017-2023 Co-finance from Department of Environment (DoE) is composed of the following initiatives: - HCFC Phase-Out Management Plan (HpMp Stage-II) for Compliance with the 2020 and 2025 Control Targets under the Montreal Protocol (US\$ 3 million), 2020-2026 - Implementation of 3R (Reduce, Reuse and Recycle) Pilot Initiative (Phase-1) (US\$ 4 million), 2010-2023 Co-finance from FAO is composed of the following initiatives: - The Smallholder Agricultural Competitiveness Project (SACP) (US\$ 1.7 million), 2018-2024 - Dhaka Food Systems (US\$ 12.5 million), 2018-2023 - Strengthening Bangladesh's NDA Secretariat, Enhancing Pipeline Implementation and Private Sector Engagement in Effective Climate Action (US\$ 0.32 million), 2021-2022 - Support to diversification of agriculture for improved nutrition and rural livelihoods in selected COVID-19 hotspot zones of Bangladesh (US\$ 0.16 million), 2020-2022 - Inclusive agriculture and agro-industrial value chain development as an enabler of poverty reduction (US\$ 0.2 million), 2019-2021 - SAFE PLUS: Strengthening of Market Linkages and Technical Capacity for Agricultural Groups to promote income generation in Cox's Bazar (US\$ 1.7 million), 2018-2021 - Sustainable soil management for nutrition-sensitive agriculture in Sub-Saharan Africa and South East Asia (US\$ 0.15 million), 2018-2021 - Sustainable Productivity in agriculture (in the context of CSA and Agroecology) (US\$ 0.07 million), 2019-2021 - Resilience Strengthening through Agri-Food Systems Transformation in Cox's Bazar (US\$ 1.5 million), 2020-2024 Co-finance from Palli Karma-Sahayak Foundation (PKSF) is composed of the following initiatives: - Microenterprise Development Project (MDP) (US\$ 13.23 million), 2019-2025 - Agricultural Technology Promotion Services under the Agricultural Unit (US\$ 0.23 million), Ongoing - PKSF's projects (US\$ 3.57 million), ongoing

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

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
FAO	LDC F	Bangladesh	Climate Change	NA	8,932,420	848,580
Total Grant Resources(\$)					8,932,420.00	848,580.00

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required **false**

PPG Amount (\$)

200,000

PPG Agency Fee (\$)

19,000

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
FAO	LDC F	Bangladesh	Climate Change	NA	200,000	19,000
Total Project Costs(\$)					200,000.00	19,000.00

Part II. Project Justification

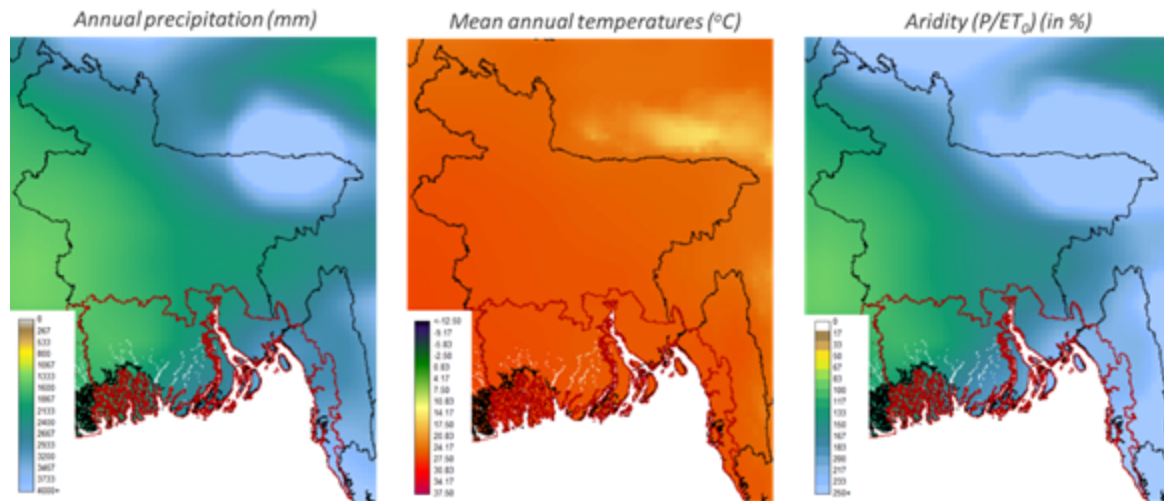
1a. Project Description

- 1) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description).

Country Context

Bangladesh is a deltaic country with a total area of 147,570 km², with about 23,170 km² of this as river and water (*beels*^[1], *boars* and ponds) area. Except the hilly regions in the northeast and the southeast, some areas of high lands in the north and north-western part, the country consists of low, flat and fertile land. Bangladesh has a sub-tropical monsoon climate with three prominent seasons in a year: winter, summer and monsoon. The mean annual temperature is about 25 °C. During winter (November-February) temperature ranges from 7 to 31 °C, and the maximum temperature in summer is often more than 40 °C. The average annual rainfall is 2,200 mm a year, and the monsoon (July-October) accounts for 80% of the total rainfall^{[2],[3]}. Aridity, or the ratio of precipitation and evapotranspiration (P/ET₀), is relatively low 168.4 in terms of the national average but some western areas experience moderately high aridity.

Figure 1: Annual precipitation, temperature and aridity in Bangladesh



The country has one of the highest population densities in the world (1,253 people per km²), with an estimated 163 million people and projected to grow to 192 million by 2050[4]⁴. Despite socio-economic and environmental challenges, in 2015, the country became a lower-middle income country (LMIC) and is eligible to eventually graduate from the United Nations LDC (Least Developed Countries) group. As a sign of its economic transition, the country has achieved over 6% Gross Domestic Product (GDP) growth during the last decade, with more than 7% growth between financial year (FY) 2015-18[5]⁵. Though the country has made tremendous advances, particularly in reducing extreme poverty[6]⁶ and in disaster risk reduction, the adverse impacts of climate change, increasing income inequality and vulnerability of the poor to shocks, along with environmental degradation and unsustainable use of natural resources remain major areas of concern, which may undermine its recent gains and future development trajectory.

Bangladesh Agricultural Sector

In 2018-19, Bangladesh's agricultural sector contributed 13.32% to country's GDP, and 7.12% of the GDP was attributed specifically to crops and horticulture[7]⁷. Crop production is heavily concentrated in rice, which ranks first in volume produced among crops. Rice cultivation occupies nearly 75% of all cropland, and the three main harvested crops (in terms of area) are winter rice (irrigated, Boro), monsoon-winter rice (Aman), and summer rice (Aus). Additional important staple crops include (in order of volume produced): potato, jute, vegetables, fruits, maize, onions, and wheat[8]⁸. Bangladesh is self-sufficient in rice but imports wheat, pulses, edible oil, and sugar to meet growing demands for these crops. Additionally, increasing income levels and rapid urbanization are driving dietary shifts in Bangladesh away from traditional staples such as rice and wheat to animal-source foods, fruits and vegetables. The demand for vegetables and fruits is expected to nearly double between 2018 and 2030 with concurrent changes in household diets and population growth[9]⁹.

Agriculture is a critical source of livelihoods and income, and thus an important driver of food and nutrition security. About 87% of rural households depend on agriculture for at least part of their income. Homestead production is a dominant feature of the rural, agricultural landscape in Bangladesh[10]¹⁰. Average farm sizes are small in Bangladesh - 84% of all farm holdings are between 0.05-2.5 acres in size, of which 61% are less than 1 acre[11]¹¹. Women's employment in agriculture (65.21% of working women, in 2013) is higher than that of men (51.81%), and increased feminization of agriculture is expected in the future.

Crop production, specifically rice, has experienced impressive growth since the country gained its independence in 1971, which has improved food security and poverty reduction. Rice production

tripled between 1971 and 2013, while food deficit during the same period halved. At the same time, the agriculture sector has shifted from subsistence production to semi-intensive systems. The area under irrigation and introduction of inputs (fertilizers, new seed varieties, etc.) has allowed farmers to increase the number of cropping seasons. Policy reforms in 1980s and 1990s further eased access to credit for farmers, enhanced extension systems, and promoted liberalization of trade in inputs^[12]¹². The link between food security and rural poverty reduction is illustrated by the fact that 90% of the fall in poverty rates in Bangladesh over 2005-2010 was attributed to increased farm income^[13]¹³. Despite progress in the agriculture sector recent decades, there have been unintended consequences of the Green Revolution era such as depleting groundwater, over-dependence on rice and lower soil fertility.

National Climate Trends

Overall, the magnitude and frequency of sudden and slow onset climate events have grown in recent years due to ongoing climate changes^[14]¹⁴. Historical mean annual temperature shows an increasing trend across Bangladesh, both during monsoons (0.07 °C per decade), and during early winter (0.12 °C per decade). On the other hand, a 1.7% decrease in monsoon rainfall and 3.4% increase in country-wide rainfall during the pre-monsoon summer season has been observed. Additionally, precipitation anomalies affect different parts of the country at different times, which make them difficult for farmers to prepare for (Box 1).

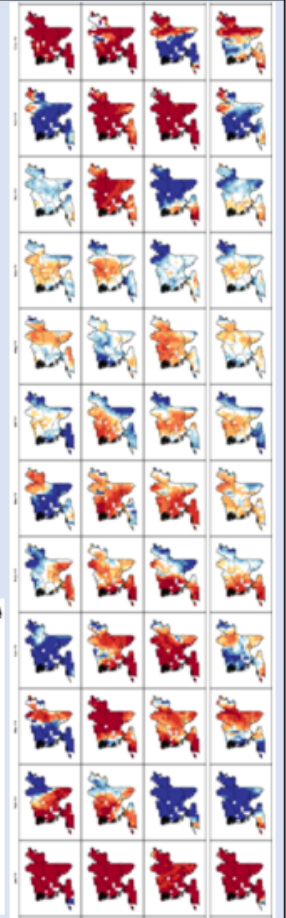
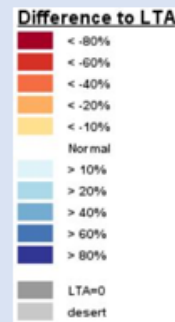
Box 1: Precipitation Anomalies, 2019

Based on recent precipitation anomalies, Bangladeshi farmers face increasing unpredictability in rainfall, a critical factor in agricultural livelihoods. For example, throughout 2019, farmers experienced rainfall levels significantly below and significantly above historical long-term averages (LTA).

In the image to the right, the top row is December 2019; the bottom row is January 2019. From left to right, the columns are anomalies for the first, second, and third dekads of the month, followed by the overall monthly anomaly.

In a normal year, the maps would be white, light red, and light blue. The prevalence of dark red (drought) and dark blue (heavy rainfall) reflect very large discrepancies from long-term climate patterns. These are often over 60% and touch almost every part of the country, which leads to very high levels of stress for crops and farmers.

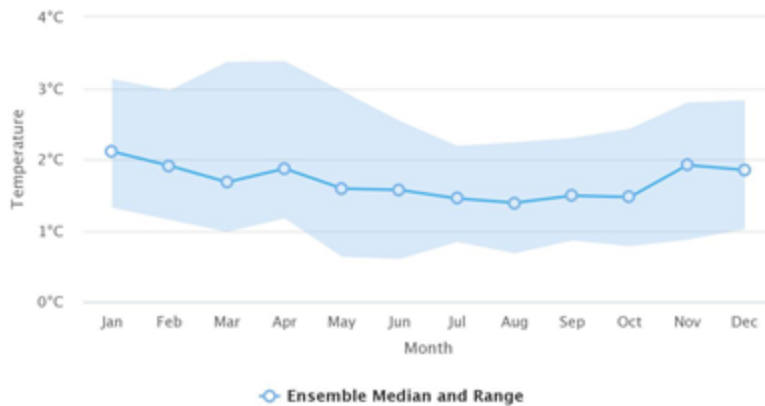
Source: FAO GIEWS



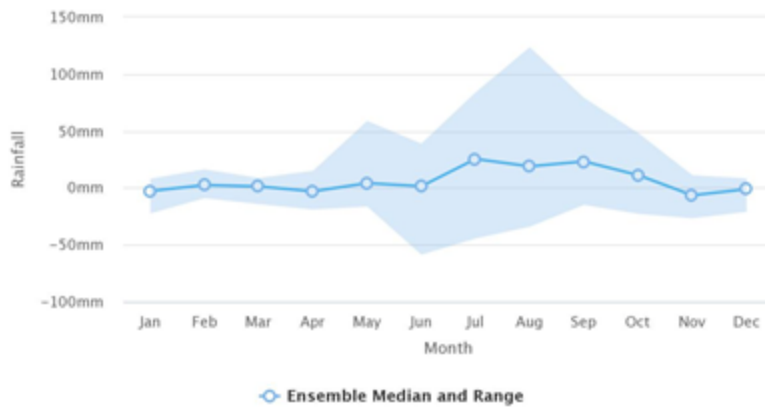
These trends are expected to continue under future climate change scenarios. Temperatures are projected to increase by 10%^[15], with higher changes in the winter months, by the year 2050^[16]. Precipitation is projected to increase by 5%^[17], with higher change and more variable rainfall occurring during the rainy season, by the year 2050 (Figure) ^[18]. The number of days with high (> 35 °C) and very high (> 40 °C) is projected to increase from 26 to 93 days and 1 to 8 days, respectively.

Figure 2: Projected change in temperature and precipitation in high emission scenario (RCP 8.5)

Projected Change in Monthly Temperature for Bangladesh for 2040-2059



Projected Change in Monthly Precipitation for Bangladesh for 2040-2059



High temperatures and heat stress already affect a significant part of the country's land area, and under 4 degrees Celsius of warming, northern Bangladesh is projected to shift to a new, high temperature climatic zone. Monsoonal precipitation (mean and extreme rainfall) is projected to increase under all climate change scenarios, but there will be an extended dry season ? increasing both the risk of floods and droughts. Crop production among some crops are projected to be impacted, with the length of growing season decreasing by 3% by 2050[19]¹⁹.

Project Site Context

Bangladesh's biophysical location, socio-economic profile, and environmental degradation implies that it faces significant challenges in adapting to climate change. Due in part to its low-lying geographical location, the country has been historically vulnerable to river flooding, storm surges, tropical cyclones, droughts, sea level rise, coastal erosion, and salinity intrusion. As a result of its biogeography and socio-economic conditions, Bangladesh ranks among the world's most vulnerable countries to the

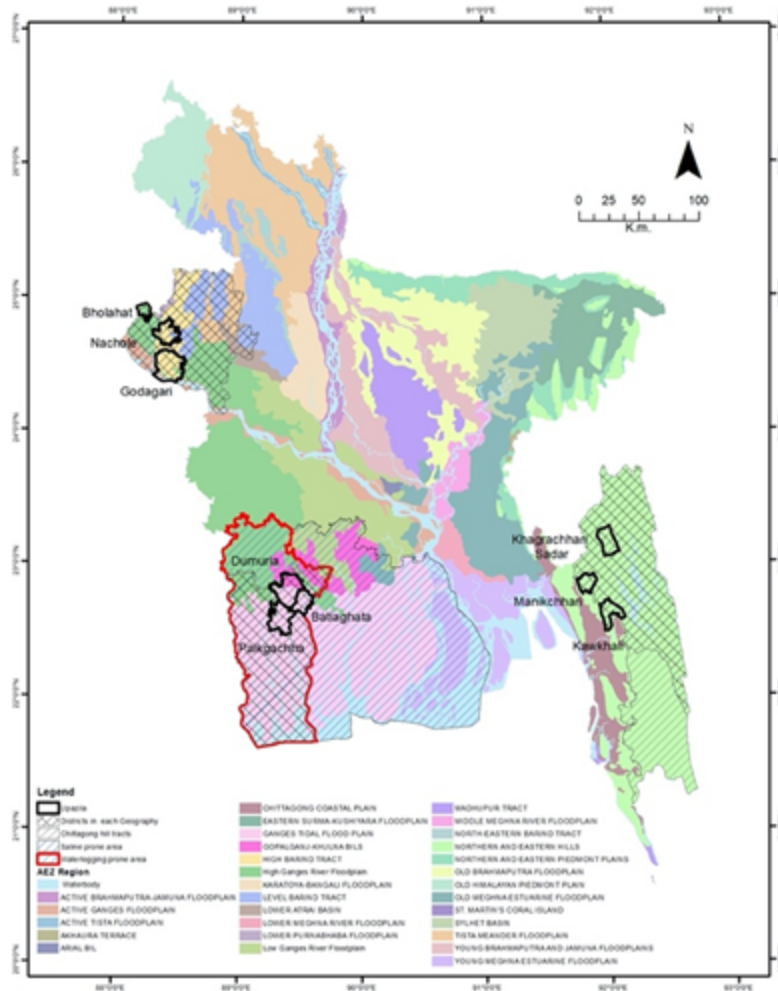
impacts of climate change. The magnitude and frequency of sudden and slow onset climate events have grown in recent years as climate change manifests^[20]²⁰. According to the Global Climate Risk Index 2019, Bangladesh was the seventh most affected country by extreme weather events, resulting in an annual loss of US\$ 2.4 billion PPP (purchasing power parity)^[21]²¹.

Within Bangladesh, each region faces different challenges, and adaptation strategies therefore need to be geographically specific. The project will target three different landscapes across some of Bangladesh's most vulnerable geographies, covering drought-impacted zone in the northwest, salinity- and waterlogging-prone coastal areas in the south-west, and extreme rainfall and erosion-prone areas in the south-east (see cross-hatched area in Figure 3). The targeted upazilas are (see Annex N for selection criteria):

- ? High Barind Tract: Nachole, Godagari, and Bholahat upazilas;
- ? Waterlogged/Saline: Paikgachha, Dumuria, and Batiaghata upazilas;

Chittagong Hill Tracts: Manikchhari, Khagrachari Sadar, and Kawkhali upazilas.

Figure 3: Nine selected upazilas within three geographies for the project, overlaid on the Agroecological zones of Bangladesh



In each of these landscapes, agricultural diversification strategies that increase resilience of livelihoods to climate change tend to have a low adoption rate and as a result, efforts to promote improved cropping patterns and management practices of high-value and traditional crops remain underexplored. Additionally, large-scale and sustained shifts towards sustainable agriculture are impeded by barriers of low productivity and income. Farmers and farmer organizations frequently report that they experience significant challenges in the areas of poor access to finance, access to markets for high quality inputs (improved seeds, machinery, fertilizers, pest and disease management tools), and post-harvest technologies (handling, cold storage, transport, processing). Local markets needed to provide high-quality inputs and post-harvest technologies are underdeveloped. Individual entrepreneurs and Micro, Small & Medium Enterprises (MSMEs) similarly lack access to credit, access to technologies, and sufficient knowledge and training to develop their agri-businesses and facilitate connections with larger agri-businesses and supermarket chains in urban centers.

The below descriptions summarize vulnerability of the target geographies based on three factors - *exposure*, *sensitivity*, and *adaptive capacity*. Information is drawn from independent evaluations in the preparation of this project along with results from the National Climate Vulnerability Assessment in Bangladesh and other studies.

Climate related vulnerabilities

Exposure

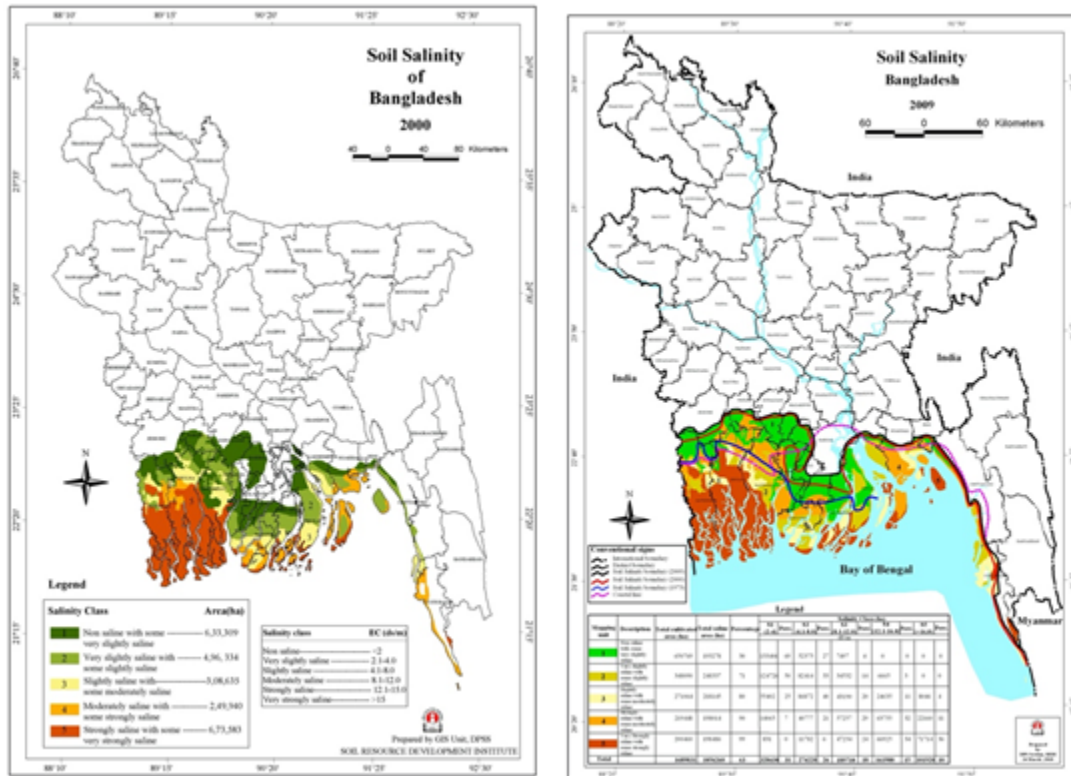
High Barind Tract (Northwest Bangladesh). This landscape is located between the floodplains of the Padma (Ganges) and the Jamuna (Brahmaputra) rivers, covering an area of 8,720 km². The climate of High Barind Tract (HBT) is sub-tropical humid monsoon and the area is considered semiarid and drought-prone. It is subject to very high summer temperatures, long dry periods, and low rainfall (annual average of 1,440 mm/year) compared to the national average (2,200 mm/year). As a result, HBT is experiencing increased impacts from high temperatures, changes in rainfall patterns and reduced recharge of groundwater. With climate change, expected rise in temperatures combined with lower and more erratic rainfall during the dry season, is projected to lead to an increase in droughts. Droughts cause soil dryness, hydrologic imbalance resulting in water shortage, groundwater depletion, and very low stream flows that result in reduced crop yields or crop failure. According to the National Vulnerability Assessment, the three upazilas selected in this project rank above the national average in the areas of heat stress, ground water depletion and available water vulnerability indices[22]²².

Waterlogging and salinity-prone areas (Southwest Coastal Bangladesh). This landscape comprises the coastal areas of the Ganges tidal plain and features highly productive agricultural systems. However, due to their low-lying topography and exposure, these systems are among the most climate-vulnerable agricultural landscapes in the world. The increase of waterlogged areas is a severe problem, particularly in the coastal districts of Jessore, Khulna, and Satkhira districts. Reduced river flows have resulted in drainage congestion and left vast areas waterlogged. Climate change has been identified as a key driver of waterlogging because it contributes to increased flooding through increased precipitation and sea level rise[23]²³. Indirect climate change related impacts include increased water demand and more extreme water flow patterns[24]²⁴ and cyclones, which are projected to become more frequent and intense[25]²⁵. These interact with local manmade impacts of poorly planned embankment and road construction, lack of water infrastructure maintenance, and unsustainable aquaculture practices[26]²⁶, which are the actual cause of the original waterlogging conditions. Considering these interactions together in a business as usual setting, waterlogging is projected to increase 25% by 2050 under a warmer and wetter climate scenario, precisely within the areas targeted in this project?. Crops and livelihoods will likely suffer from both an increase in the extent of waterlogging and also extended periods of waterlogging.[27]²⁷

Climate change induced sea level rise is also a driver for increasing salinity, which is perhaps an even more severe problem both nationally and especially within the project areas. Salinity in soils affects the growth and production of agricultural crops, including rice. Harmful soil and water salinity is mainly

attributed to rising sea levels when arable land is affected by tidal flooding during the rainy season, direct inundation by saline water, upward and lateral movement of saline groundwater during the dry season and lack of freshwater inputs[28]²⁸. There are 19 coastal districts, covering 32% of the country and accommodating more than 35 million people where primary production system, coastal biodiversity, and human health are at risk due to salinity intrusion. The rate of increase in salinity is accelerating: salinity affected land increased from 0.833 million hectares in 1973 to 1.02 in 2000, and then to 1.06 in 2009[29]²⁹,[30]³⁰ (Figure 4). Sea level is projected to rise by 0.2m, 0.5m, and 1m by 2020, 2050, and 2100 [31]³¹?. As a result, by 2050, the annual median change in soil salinity is projected to be 39%, with some areas in Barisal, Chittagong, and Khulna experiencing much larger increases. The Paikgachha and Batiaghata upazilas targeted in this project, have been identified as some of the most vulnerable upazilas to the effects of waterlogging/salinity in the country, and Dumuria similarly suffers from high water quality degradation [32]³²?. One model for the area projects a 28% decrease in rice production by 2050 as a result of increased salinity[33]³³.

Figure 4: Soil salinity map for Southern Bangladesh (2000 and 2009, Note: map scale varies)



Source: Soil Resources Development Institute (SRDI)

Chittagong Hill Tracts (CHT)

The Chittagong Hill Tracts (CHT) covers 13,295 km² in the South-eastern part of the country, constituting about 9% of Bangladesh. CHT comprises Khagrachari, Rangamati, and Bandarban districts, and two-thirds of the area is characterized by steep slopes and the remaining area encompasses undulating topography.

Steep topography and heavy seasonal rainfall are major reasons why only 5-6% area of the CHT is considered suitable for intensive cultivation^[34]³⁴. Soils in the elevated areas of CHT are well drained, but classified as moderately to strongly acidic, have low natural fertility, and are highly leached^[35]³⁵. The Khagrachhari Sadar and Manikchhari upazilas included in this project rank among the highest in the country in crop yield vulnerability index due to climate change and natural disasters^[36]³⁶.

A combination of topsoil and vegetation degradation and shifting patterns of rainfall (e.g., protracted and intense periods of rain) has increased the risks of landslides in CHT. Out of 1.26 mha of land in hilly areas of Bangladesh that was classified in 2005 as very highly susceptible to soil erosion, 85% (1.07 mha) is in the CHT region and comprises 80% of its total area^[37]³⁷. Nearly half a million people live in areas at high risk of landslides in the hilly regions^[38]³⁸. Traditional agricultural practices such as cultivation along the slope also contribute to erosion. Climate change is expected to increase the variability of rainfall during the dry period (November-May)^[39]³⁹. Another emergent issue is low rainfall during the dry period (October ? May), as in the Barind areas^[40]⁴⁰. This causes streams and other sources of water to dry up which affects drinking water and irrigation for agriculture.

Sensitivity

Agriculture-reliant communities in the targeted areas are highly sensitive to climatic trends due to their dependence on the sector for sustenance and livelihoods (yields, food security and wage labor). Thus, climate hazards typically directly result in harms to livelihoods and well-being (e.g., reduced production income, reduced wage income, food insecurity, reduced labor productivity). These sensitivities are particularly acute for rain-fed production, which accounts for the majority of smallholder production in the selected landscapes. Not only are rain-fed crop systems especially sensitive to variability in precipitation and temperature (evaporative losses), but they are also susceptible to flooding (leading to saline intrusion and water logging), given that rain-fed fields lack the drainage and pumping systems of irrigated fields.

Crop systems in these communities and landscapes are very poorly suited to recent and forecast climatic trends. For example, nearly all upazilas have very low levels of economic diversification, including very little diversification ? both in terms of varieties, crops as well as sub-sectors. Therefore, climate-related shocks often have widespread effects. Moreover, the most commonly grown crops and varieties are often not based on tolerances to climate-related stresses. For example, commonly grown varieties are generally not very tolerant of droughts or inundation. These variety-based sensitivities to climatic risks are greater for extensive producers (often poorer smallholders), who are generally more reluctant to adopt new varieties and have less access to improved seeds, technical assistance and advisory services, infrastructure, and marketing for adoption.

Additionally, these crop systems are highly sensitive to climate change because yields are comparatively low, particularly in rain-fed production, which is practiced by the majority of households in the targeted landscapes. Low yields and small land holdings mean that even relatively small climatic shocks can have significant consequences.

Communities across the targeted landscapes have very limited resources with which to absorb shocks. They have weak economic shock absorbers due to high levels of poverty (see table on human development indicators), high household indebtedness (along with high costs of credit), and limited household assets, including land tenure issues. Climatic hazards such as droughts and flooding typically have a direct and significant impact on household incomes and food security, particularly for poor households. Furthermore, communities have weak biophysical shock absorbers, because predominant land-use practices degrade soil and water quality. In fact, given that shock absorbers are already strained, impacts are transmitted to the environment, leading to further degradation of the natural resource base resulting in increased water logging, landslides, etc.

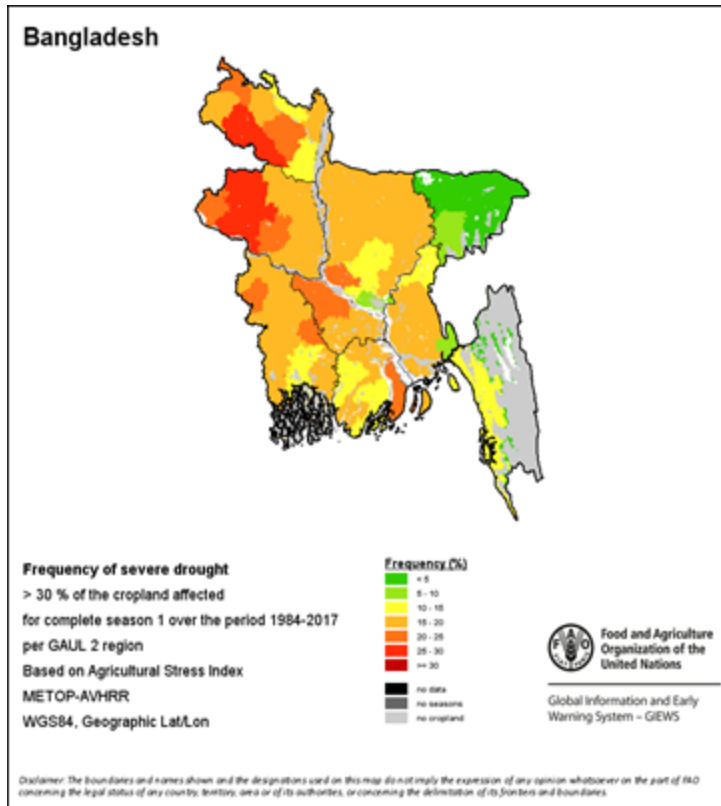
Economic shock absorption is also weak due to insufficient physical infrastructure (particularly in terms of linking to urban market hubs such as Dhaka and Khulna). For example, in many areas, farm-to-market roads are inadequate, thereby limiting or delaying the transport of produce and adding to overall production costs. Limited private-sector investment continues to result in fragmented value chains, resulting in information asymmetries, inefficient matching of supplies and demands, etc. Likewise, limited physical capital in these value chains continues to result in limited facilities for local storage and processing (e.g., thereby increasing post-harvest losses and degrading product quality). Without sufficient and appropriate technological improvements in these value chains, increased humidity levels and erratic rainfall patterns are likely to increase post-harvest losses due to spoilage while also increasing food-safety risks.

High Barind Tract (HBT): The HBT region is mostly dependent on subsistence agriculture with 80% (132,600 hectares-ha) of the land under crop cultivation, heavily dominated by paddy fields of high-yielding boro (winter) rice. Since 70% of Bangladesh's crop production over the dry winter is rice, this drives water demand^{[41]⁴¹}.^{[42]⁴²} and depresses dry season water availability. Intensive rice cultivation and lack of conservation measures such as cover cropping and returning crop residues to the soils, has

led to the depletion of organic inputs to the soil and therefore lower soil water holding capacity, further increasing pressure on water resources[43]⁴³. It is estimated that soil organic matter remains below 1% in HBT and throughout Bangladesh[44]⁴⁴. As a result, declining soil quality and ground water levels in the already drought-prone HBT are further exacerbating vulnerability to climate risks (Figure 5)[45]⁴⁵, while the predominant monocropping farming is leaving harvests vulnerable to pests and diseases. The high dependence on single crop markets also increases the economic vulnerability of farmers due to fluctuations, while the large national production of rice at scale diminishes individual farmers' margins in HBT.

As such, diversification is increasingly recognized as a driver for enhancing resilience to both environmental and market vulnerabilities. Diversifying HBT's rice cropping areas with high value non-rice crops such as maize and horticulture that require less water and varieties that are stress-tolerant to the environmental conditions of HBT will be key to climate change adaptation in the region. However, the economic benefits from shifting to new crops remain limited by poor market access (including food processing and value-adding facilities as well as physical infrastructure) and cooperative systems. Furthermore, smallholders who comprise 82% of HBT landholdings[46]⁴⁶ have insufficient access to inputs and extension services needed to improve soil quality and promote alternative cropping patterns in the production systems of HBT.

Figure 5: Historic Drought Frequency, >30% of cropland affected (1984-2017)[47]⁴⁷, location of HBT marked in blue



Waterlogging and salinity-prone areas (Southwest Coastal Bangladesh). Entire landscapes in this region are affected by waterlogging and reduced drainage in the coastal areas, forcing people to abandon homes, disrupting livelihood activities[48]⁴⁸, and reducing food production. Standing water persisting for any period up to 6 months after monsoons is not favorable to agriculture. Smallholder farmers and artisanal fishers constitute about 69% of the coastal population[49]⁴⁹, and waterlogging exacerbates their existing risk exposure and increases vulnerabilities. While alternatives in the form of crops and varieties better suited to waterlogged conditions are available and practices such as raised bed cultivation can improve water drainage in the agricultural plot, these have not been adopted widely[50]⁵⁰. As it stands, long standing waterlogging remains an issue in many polders and upazilas, and the disruptions to social and economic lives of the poor continue.

In saline-prone areas, saline intrusion affects soil chemistry and thereby has a number of effects on plant physiology that negatively impact agricultural productivity[51]⁵¹, [52]⁵², with resultant increase in cost of production and decrease in income. Gradual increases in soil salinity resulting in crop production losses is predicted to increase internal and international migration, and increase livelihood

diversification into aquaculture even more than inundation under climate change[53]⁵³. Since agriculture is the main occupation for a significant proportion of southern regional population (56% on average, compared to 47% nationally), these factors are taking a heavy toll on local livelihoods. While there is high potential for horticulture in the waterlogging and saline-prone region, insufficient agro-processing industry and transportation infrastructure has impacted farmer incomes. The number of intermediaries in the crop value chain is high, and farmers are often forced to sell their produce at low prices to local aggregators or bear the cost of high transport (which reduces their margins).

Chittagong Hill Tracts (CHT): Swidden or shifting cultivation (locally known as Jhum) is the foremost agricultural land-use in the CHT, and it is likely to remain the dominant practice. A heavy reliance on this system and lack of alternative and viable farming options has increased the local population's sensitivity to climate change impacts. For example, communities have reported decreases in crop production due to increased rainfall, higher temperatures, and water shortages. They also increasingly face food insecure periods, especially during rainy season months when many depend on depleting forest resources[54]⁵⁴. Furthermore, when there is excessive rainfall, there is increased soil erosion and nutrient depletion, partly due to traditional agricultural practices along steep slopes. The combination of topsoil and vegetation degradation and shifting patterns of rainfall (e.g., protracted and intense periods of rain) has also increased the risks of landslides and floods in CHT, often displacing families. The overall effect of these factors is compounded by issues of local political instability, limited market access and insufficient infrastructure linkages, lack of education, and poor socioeconomic conditions.

Adaptive capacity

Adaptive capacity refers to the ability of a system or population to respond to the exposure and sensitivities discussed above. In the context of the landscapes described, adaptive capacity can be evaluated in terms of *strategic*, *technical* and *operational functions*. The *strategic* function reflects the awareness and prioritization of climate-related issues, and establishment of legal and institutional arrangements that facilitate good governance. The *technical* function reflects decision-making frameworks (e.g., monitoring and data systems), coordination, and planning. The *operational* function reflects resources to execute a strategic direction and technical plans (e.g., infrastructure, equipment, monitoring stations, broadcast networks, funding, personnel, etc.). These functions for supporting agriculture-reliant livelihoods are summarized below in terms of conditions and capacities at the national and landscape levels. Relevant additional information about specific crop value chains is given in *Annex M: Selection of Value Chains: Synthesis piece*.

Supportive services to communities in the project sites

It is assumed that resilience of livelihoods to climate change in the targeted areas will depend strongly on agricultural diversification that promotes both high-value and traditional crops. This implies a change in the types of crops cultivated, cropping patterns, and/or management practices. A range of enabling environment measures are required for these changes to occur: extension and advisory services, access to finance, markets, high-quality inputs (improved seeds, machinery), and post-harvest

technologies (handling, cold storage, transport, processing). However, in all target landscapes, local markets to provide high-quality inputs and post-harvest technologies are underdeveloped, partly because of challenges that individual entrepreneurs and MSMEs face in terms of technology transfer and credit access. Farmer Organizations are available in some areas to help increase farmer's social and financial capital, but these too are somewhat limited. Below is a summary of the current conditions related to strategic, technical, and operational functions of climate change adaptive capacity in the country.

Extension and advisory services. Agricultural extension and advisory services in Bangladesh are primarily provided by the government (via the Department of Agricultural Extension-DAE) and NGOs. Despite substantial investment into extension systems across Bangladesh, the extension agent-farmer ratios remain unfavorable for the dissemination of new technologies and practices needed to scale up adaptation in the agriculture sector. DAE employs about 14,000 SAAO (Sub-Assistant Agricultural Officers) responsible for 800 to 2,000 households each, and extension is often poorly staffed and resourced. Furthermore, while national policies acknowledge the role of women in agriculture, only 9% of SAAOs are women emphasizing the gap in terms of strengthening gender-sensitive extension services. Private sector participation in extension systems is currently represented by around 3,500 individuals^[55] complementing public sector SAAOs. Although this number is relatively low, such public-private extension services can help to strengthen the link with input suppliers, contract farming businesses, local traders, and wholesale market dealers. The third type of extension and advisory service providers (about 2,500) work with NGOs, and are project focused. However, despite having a significant number of extension workers at the public, private and NGO levels, extension systems are generally not well coordinated, and public sector extension workers have historically been underfunded.

In Bangladesh, extension services have been mobilized to support Farmer Field Schools (FFS). The FFS approach was first introduced in the early 1990s and has since been utilized by a number of projects to promote topics as varied as vegetable gardening, integrated rice-fish farming, and integrated pest management (IPM). FFS have more recently been utilized for technology transfer and building climate resiliency among communities under the NATP, SACP, and other projects. Therefore, capacity to organize FFS at the government level exists, but training on gender issues, forming producer groups, and technical training on crop technologies, particularly in the context of climate change adaptation, continues to be in demand. These services stand in need of more organization and capacitation to meet the specific challenges of climate change.

The capacity for early warning and weather advisory systems in Bangladesh is emerging but remains variable. Agriculture-dependent households have very specific weather and climate information needs, be that in terms of the timing (regular 3-5 days forecasts, not just long-range seasonal forecasts) or the nature of advice (e.g., on specific measures to take to improve productivity or mitigate risks). Bangladesh has been long-recognized for its efforts in cyclone-related disaster preparedness and response and more recently government institutions have been able to provide basic, spatially disaggregated weather and climate advisories and multi-hazard warning systems through text messages (SMS). The key institutions that provide weather services in Bangladesh are the Meteorological

Department (BMD) and Space Research and Remote Sensing Organization (SPARRSO) under the Ministry of Defense, and the Flood Forecasting and Early Warning Center and Bangladesh Water Development Board (BWDB) under Ministry of Water Resources. Despite the success of SMS advisories, many farmers still have limited capacity to access and use the information due to a lack of network or inability to pay for the service.

Besides the extension and advisory systems described above, capacity exists at the national level for disseminating farm technology information through video materials. For example, the Agricultural Information Service (AIS) is responsible for providing farmers information on modern agricultural methods and is run by the Ministry of Agriculture. AIS has the mandate and responsibility to gather agricultural information on farming technologies and techniques and disseminate information in a form that is suitable and relevant to farmers. They have the capacity to produce video materials and have a number of programmes on agriculture on the state-run Bangladesh Television (BTV).

Access to finance. Farmers and individual entrepreneurs, small-scale and women farmers as well micro-SMEs in particular, have limited access to formal financial resources, which can be used to invest in adaptation technologies. About 92.5% of Bangladeshi households have no bank account^[56], and while 18.03% of household loans is for agricultural purposes and another 22.13% for business, only 8.31% of total loans borrowed are from private or public commercial banks, cooperative banks, or Krishi (farmer) banks. More than half of all loans borrowed are from three microfinance institutions-MFIs (Grameen Bank, ASA, and BRAC). Although Bangladesh has a long, well-recognized history of microfinance, there has been recent recognition that micro-credit repayment cycles are not aligned to agricultural seasons^[57], involve high interest rates, and are restrictive in loan sizes^[58].

In recognition of the access to finance challenges, Bangladesh has set lending norms and targets for its agriculture and rural sector, and these targets have been largely met or exceeded in the recent years^[59]. Further, in its 2019-20 Agricultural and Rural Credit Policy, the Bangladesh Bank instructed commercial banks to focus on climate-stressed areas such as waterlogging, salinity, and drought prone areas. However, consultation reveals that while the Bangladesh Bank has incorporated climate finance in its policies, it is not fully mainstreamed and monitored systematically. One challenge is that, typically, commercial banks have limited technical knowledge on climate resilient options (and costs associated therein) and their risk profile, both at the household and aggregator (producer group, entrepreneurs and MSMEs) levels^[60]. The micro, small, and medium enterprises (MSMEs) finance gap is around 20% of the country's GDP. A study by the Bangladesh Agro-processors Association (BAPA) of a sample of MSME agro-processors found that only 16% of respondents had accessed a bank loan. Though MSMEs generate employment opportunities for nearly 40% of workforce and contribute to a quarter of GDP, 50.2% of them consider access to finance a major constraint^[61].

Capacity at the farm and landscape level

Vulnerable groups. Observations about adaptive capacities among vulnerable groups throughout Bangladesh generally hold true within the selected landscapes of this project. Climate hazards disproportionately affect asset-poor communities because of their limited adaptive and coping capacities. This reality, in turn, worsens their livelihood outcomes. Because agriculture is still predominantly rainfed (pre-monsoon showers dependent *Aus* season) or dependent on monsoons (*Aman* season or monsoon) in Bangladesh^[62], any variation (timing, quantity) in South Asian monsoons is highly consequential to agricultural productivity (especially, for staples such as rice or wheat) and the national economy.

In areas where weather hazards are prevalent (waterlogging, cyclones, droughts, landslides, etc.) and livelihood strategies are limited, food insecurity persists from anywhere between one to seven months of the year. Women and children in such regions are especially affected, consuming inadequate, non-diversified diet, and more than half the population suffers from malnutrition. One-fourth of the population remain vulnerable to idiosyncratic (e.g., illness, unemployment) and systemic shocks (e.g., extreme weather, economic crisis). Furthermore, the COVID-19 pandemic related impacts have exacerbated the population's vulnerabilities, and this will stress household resilience as poverty is projected to increase from 2020 to 2022, partly due to limited increase in per-capita GDP (a contrast to the high GDP experienced in recent years).

As mentioned, women's employment in agriculture is higher than that of men. However, women's role in production and their contributions is not well recognized due to cultural norms, and these norms also prevent them from owning land and limits their access to and control over inputs, capital, markets, information and other agricultural assets. Additionally, while women are highly engaged in homestead agricultural activities, they have constrained access to high quality seeds, inputs, and to markets to sell surplus produce.

Table 1: Socio-economic conditions of the selected upazila of BCRL

Division Name	Landscape	Upazila Name	% poor	% w/o electricity	% literate	%pop below 40%	% under-weight child
CHITTAGONG	CHT	MANIKCHHARI	30%	5%	21%	46%	5%
CHITTAGONG	CHT	KHAGRACHHARI SADAR	20%	11%	32%	24%	4%
CHITTAGONG	CHT	KAWKHALI (BETBUNIA)	23%	9%	25%	35%	4%
KHULNA	WL/SP	BATIAGHATA	41%	10%	36%	54%	3%
KHULNA	WL/SP	DUMURIA	37%	14%	34%	50%	3%
KHULNA	WL/SP	PAIKGACHHA	42%	11%	34%	58%	3%
RAJSHAHI	HBT	BHOLAHAT	21%	10%	27%	23%	4%
RAJSHAHI	HBT	GODAGARI	44%	10%	27%	59%	4%
RAJSHAHI	HBT	NACHOLE	24%	11%	26%	29%	4%
		Bangladesh	31%	13%	32%	40%	4%

As illustrated in Table above, the majority of the targeted upazilas of this project perform poorly on human development indicators when compared to the national average, which adds to their low adaptive capacity. The CHT and HBT, for example, suffers notably from lack of electricity and low literacy rates, and the waterlogged/saline prone upazilas are among the poorest in the country.

Farmers in the High Barind Tract: Crop diversification has become highly recognized throughout the country as the key strategy for enhancing agriculture sector resilience to both environmental and market vulnerabilities. However, the specific approaches to diversification, and challenges in local value chains differs across the selected landscapes of this project. HBT farmers are starting to convert traditionally rice cropped area to horticulture crops or intercropping rice with mango, papaya etc. as an adaptation to uncertain rains and poor irrigation facilities[63]⁶³. Nonetheless, the economic benefits from shifting to new crops remain limited by poor market access (including, food processing and post-harvest transformation facilities). Furthermore, smallholders who comprise 82% of HBT landholdings[64]⁶⁴, and tenant farmers who comprise 10% of HBT's farmers are even less likely to adopt adaptation measures independently due in part to downside risks (increased input costs, risk of reduced yield in initial years after adoption, etc.). Despite a growing mango industry, poor farmers face difficulty accessing mango saplings and mango food storage and processing facilities, further complicating their ability to adapt to climate change.

Farmers in the Waterlogging and salinity-prone areas: In Southwestern Bangladesh and elsewhere, an estimated 15% of grains and between 25-40% of fruits and vegetables are lost to sub-standard post-harvest management (harvesting, handling, storage, processing, and marketing), with most losses occurring locally[65]⁶⁵. Farmers who would like to sell their produce immediately after harvest are forced to sell in local markets because of the remoteness and lack of good transportation networks in the southwest. Indeed, the Batiaghata and Paikgachha upazilas of this project both ranked above average in the road network vulnerability index of the National Vulnerability Assessment[66]⁶⁶. Nutrient content in produce, especially fruits and vegetables, can decline quite sharply after harvest reducing gains from dietary diversification efforts. Only high value crops such as mango and tomato are appropriately transported on crates[67]⁶⁷, with open trucks being the preferred means of transport. The use of cold storage, where reported, is also low: 8% of farmers use such a service for potato[68]⁶⁸. During local consultations in southwest Bangladesh, DAE and farmers reported fruits and vegetables perishing or deliberating choosing to not harvest vegetables (e.g., tomatoes). This is because the absence of storage or processing facilities, in a period of glut, forces them to sell produce at throwaway prices. While the food processing industry is growing, larger agri-businesses tend to setup operations in urban Dhaka and its surroundings where transportation networks are more developed. Concerted effort, particularly access to credit, is needed to promote micro-, small-, and medium agri-businesses that engage in processing, packaging, and other activities locally which can then link up with larger agri-

business or supermarket players elsewhere. Additionally, as in other regions, this area suffers from lack of high-quality seeds and improved seed varieties to cope with changing climatic and soil conditions.

Farmers in the Chittagong Hill Tracts: In the CHT, overall adaptive capacity is low, but there is growing potential to improve. The CHT region lags behind in nearly all development indicators and is considered one of the most vulnerable and disadvantaged in Bangladesh. CHT is also uniquely one of the areas in Bangladesh where dependence on agriculture as an occupation increased between 2000 and 2010 (14.9% to 47.9%), and the per capita income grew by only 3.3% lower than the national average of 10.5%^[69]⁶⁹. The area also has poor market infrastructure. Despite these apparent disadvantages, it is an area that supports relatively rich amount of natural resources and its temperature and climatic conditions can support a diverse mix of crops (spices, flowers, fruits, vegetables, coffee etc.). Such potential for diversification has been and is being promoted by a number of projects in CHT, even if they tend to target fewer farmers and land area compared to the rest of Bangladesh. Nonetheless, as the Delta Plan 2100 notes, the potential for crop diversification in CHT remains underexploited because of inadequate input use (e.g., high quality seeds or saplings), improper management practices (e.g., poor post-harvest management), and low access to markets and agro-processing facilities along with insecurity of land tenure^[70]⁷⁰.

Barriers and root causes to be addressed

Barrier 1 ? Limited capacity to mainstream adaptation measures into sectoral planning and implementation at various levels. Institutions and local communities in the targeted geographies need to have integrated adaptation practices and planning measures in order to adequately address climate change adaptation challenges. Local governments require capacity and support in the design, adoption and implementation of policies, to effectively support local farmers and MSMEs to adopt climate resilient practices and technologies. Local government representation and advisory services have very limited technical and financial capacity to provide the training and assistance required. The result is that national climate adaptation and agricultural policies, planning, and investments do not adequately address on-the-ground needs that can enable climate change adaptation in the crop sectors.

Barrier 2 - Low capacities to adopt and sustain climate resilient diversification strategies at community level. Local traditional adaptation mechanisms and strategies are becoming inadequate in the face of increasing climate variability and extreme events. Smallholder producers do not have enough access to the knowledge, tools, inputs and networks required to sustainably adopt climate resilient diversification strategies. Although smallholders are highly reliant upon extension services and systems, current support services are not organized or capacitated to assist producers to adequately adapt to climate change in the targeted landscapes.

Barrier 3 - Inadequate access to urban markets and post-harvest technology, and insufficient coordination among producer organizations and private sector actors such as input suppliers and processors. Smallholders and women, in particular, have limited access to post-harvest technologies, soft credit, information, extension services and inputs, whereas supply chain infrastructure and market linkages remain fragmented. Marketing systems are often informal and quality tends to be of

suboptimal standard. With limited access to post-harvest technologies (particularly for processing and cooling), smallholders often struggle to preserve their harvest until optimal market prices and profits are met. This is compounded by poor road networks and transportation options that link rural areas to urban areas such as Dhaka and other emerging urban centers where the demand for high-value commodities is high. Furthermore, without access to adequate storage facilities, increased impacts from climate change (changes in precipitation, humidity patterns and temperature) can result in food contamination as well as outbreaks of pests and diseases, and also accelerate the overall spoilage process in perishable products, particularly for horticulture and other high value commodities. As a result, value-addition and market access remain underdeveloped while post-harvest losses continue to negatively impact food security and livelihoods.

Barrier 4 ? Insufficient access to finance and an unfavorable investment climate. Smallholder farmers (women in particular) but also MSMEs in the targeted landscapes face significant barriers in accessing capital and other forms of finance as they often lack sufficient collateral, financial capacity and tend to be dispersed and disenfranchised. Bank lending is typically low and with high interest rates due to perceptions of the agriculture sectors as low profit generators that involve high risks and transaction costs. Moreover, these institutions are often reluctant to invest in smallholder producers or provide credit given their high dependence on unpredictable weather patterns and market price fluctuations. With the exception of micro-credit institutions, smallholders in the targeted geographies are not well linked to markets or novel financing mechanisms, making it very challenging for them to financially sustain their production over time. Private sector investments in these production systems therefore remain low, including for value-adding activities despite their potential for enhancing rural economies by transforming subsistence production into commercialization.

Barrier 5 - Inadequate information to inform and guide decision making on climate change adaptation. Government agencies, private sector and farmers need dependable information to assess vulnerabilities and determine what climate adaptation practices and technologies to adopt. Knowledge management and information sharing on available data, tools and methodologies remains largely uncoordinated and inaccessible at the landscape-level. In addition, the targeted geographies do not have the technical and/or financial capacity to establish a cost-effective knowledge management system. Information management is currently not well integrated into decision making for production and marketing activities in the project areas. Information is not collated and systematically transferred to private sector, smallholder producers, and other end-user to build awareness, inform landscape-level decision-making, and provide an early warning of climate shocks and hazards.

2) **The baseline scenario and any associated baseline projects.**

Several projects and programs implemented by DAE, DOE, and FAO comprise the baseline for this project, to the extent that they are well aligned with the project's objectives and form the basis for technical coordination, collaboration, and co-financing.

Highly relevant, co-financing projects are as follows:

Year-round Fruit Production for Nutrition Improvement Project, DAE, GOB, US\$ 54.12 million, 2015-2023.

The project aims to establish modern cultivation methods in three Chittagong Hill Tract districts, other rugged and mountainous areas in other districts, and the coastal areas, including unused lands and homesteads, and aims to increase the yield of home garden crops by 20 percent and ensuring the availability of other field crops in the flatlands. Overall, it targets 388 upazilas across 48 districts for poverty reduction through the empowerment of women, increasing their incomes, and creating job opportunities. To attain this goal, the project will extend modern fruit production technologies, processing and preservation facilities, and promote other sustainable methods of the horticultural crop cultivation. The project will also train producers on modern cultivation methods and new agricultural technology via the extension system. Since horticulture crops will be promoted in all three target geographies of LDCF-BCRL, the BCRL project can build on this DAE project experience and link with agro-processing facilities that have already been established. DAE has indicated a co-finance commitment of US\$ 6.12 million from this project.

Safe Crop Production Project through Ecofriendly Approach, DAE, GOB, US\$ 20.26 million, 2018-2023

The major objective of this project is to ensure food and nutrition security of the people through the enhancement of safe crop production. This project will provide technical training to the farmers on safe crop production and build their awareness about food safety and nutrition across 317 upazilas of 61 districts of Bangladesh. It will utilize farmer field schools and demonstration plots to illustrate safe crop production technologies and engage women in the project activities and create employment opportunities. Since the focus agricultural commodities for Safe Crop Production Project includes maize, vegetables and fruits, there are good opportunities to align or add to BCRL's FFS curriculum and ensure that technologies promoted via BCRL project incorporate 'safe food' principles. DAE has indicated a co-finance commitment of US\$ 2.2 million from this project to ensure collaboration and knowledge-sharing.

Enhance Production of Oil Crops (EPOC) Project, DAE with BARI / BINA / BADC, GOB, US\$ 32.74 million, 2020-2025

This project will support Bangladesh in meeting the internal demand for edible oils and reduce import dependency through the expansion of oil crop production and processing enhancement. Bangladesh Agricultural Research Institute (BARI), Bangladesh Institute of Nuclear Agriculture (BINA), and Bangladesh Agriculture Development Corporation (BADC) are implementation co-partners. By promoting improved oil seed varieties and farm technologies developed by BARI, BINA and BADC, the cultivation area of oil crops will be increased by 15-20%. Specifically, the production of mustard, sunflower, sesame, groundnut, and soybean as well as maize and jute will be enhanced in the 250 upazilas of 64 districts through 7572 farmer field schools (FFS). Besides FFS activities, since establishing strong market linkages (including, processing, storage, transport) is critical to success of EPOC and BCRL projects, this will be an area of coordination. DAE has indicated a co-finance commitment of US\$ 3.95 million from this project.

Enhancing Crop Production through Extension of Solar Energy and Modern Water Saving Technologies Pilot Project, DAE, GOB, US\$ 12.36 million, 2017-2023

The major goal of this project is to promote environmental sustainability by reducing the usage / extraction of groundwater resources, promote better utilization of surface water resources, and reduce farmers' irrigation cost by 25-30%. To do this, the project will promote solar irrigation / pump systems and other modern water management technologies (e.g., drip irrigation) which have the potential to substantially reduce energy consumption. It has already formed 200 FFS and 300 water user groups. Since freshwater resources are a constraint to production of crops in BCRL target geographies (e.g., horticulture crops in CHT and waterlogging/saline prone coastal areas), this project's experience in promoting water management technologies will be helpful and existing FFS / water user groups will be identified (where possible) for BCRL activities. DAE has indicated a co-finance commitment of US\$ 0.74 million from this project.

Research, Extension and Popularization of Vegetable and Spices Cultivation on Floating Bed, DAE and Bangladesh Agricultural Research Institute (BARI), GoB, US\$ 7.42 million, 2017-2022

The project intends to increase agricultural production through the promotion of floating bed agriculture, with a focus on women farmers, to improve productivity in waterlogged areas (including abandoned ponds and water bodies). By 2019, this project completed 130 demonstration activities, 50 farmer field schools, and trained 4,835 farmers in the process. In addition, DAE distributed 37,500 sex pheromone traps, and 28,000 insect killing traps to reduce pesticide/insecticide usage. 46 *upazilas* in 24 districts by DAE, and 25 *upazilas* in 13 districts by BARI. During the PPG phase, a number of farmers who had put up sex pheromone and insect killing traps were met, and this experience will influence Integrated Pest Management activities under Component 2 of LDCF-BCRL. Component 3 activities will also benefit from this project's experience of linking farmers to markets, and though no specific co-finance amount is identified from this project, complementary activities for FFS, IPM, and market linkages will be promoted.

Increasing Access to Finance for Farmers' Organizations in Bangladesh (Missing Middle Initiative), Ministry of Agriculture with technical support from FAO, GAFSP-Global Agriculture and Food Security Program, US\$ 2.48 million, 2018-2021

The major goal of the MMI project is to strengthen 55 farmers organizations (FO) and 10,000 farmers through capacity building on financial / organizational management, governance, and leadership / negotiation skills; market linkages with private sector (bulk buying of inputs and selling produce); access to finance (FOs as bank agents or being an FO member reduces credit risk); access to technology (safe vegetable production, improved varieties); and, establishment of collection points for vegetables, fruits, and milk with cleaning, sorting, grading, and packaging facilities. FOs will also prepare activity plans, which will be translated into Letter of Agreements (LoAs) between the project and FOs, and the project provide finances to FOs according to LoA. The project provides a conditional matching grant, subject to FO's performance rating, of about US\$ 15,000-20,000 to FOs in developing a sustainable enterprise, besides a learning grant of US\$ 500 and a pilot grant for collective business of US\$ 1,500 conditional on registration and banking activities. Rangpur and Barisal Divisions (31 *upazilas*, 16 districts). The LDCF-BCRL Components 2 and 3 will draw on lessons / experiences of MMI project in designing financial instrument and strengthening FOs, including FO training manuals, FO performance assessment tools, and MOUs developed. Discussions have been held with FAO's Implementation Support Unit during the PPG phase, and it is clear that substantive handholding of FOs

is required to ensure institutional sustainability and maturity. Finally, MEL activities under Component 4 will benefit from FAO's experience in designing and implementing a web-based M&E system for MMI Results-based Management.

The Smallholder Agricultural Competitiveness Project (SACP), *Ministry of Agriculture with technical support from FAO, IFAD, US\$ 109.8 million, 2018-2024*

SACP aims to significantly increase incomes, and food and nutrition security by helping smallholder farmers to be more responsive and competitive in producing diverse, high-value crops and marketing fresh and processed agricultural products. The project will take farmer groups as entry points for such production and value chain activities in southern districts of Bangladesh. Besides production and processing / marketing activities, the project aims to promote climate resilient surface water management through surface water irrigation technologies and formation of water user groups (789 in number). 294 km of small-sized canals, and 190 km of medium-sized canals will be excavated and 250 km of buried pipes for new irrigation scheme will be installed under this project. The project has already mobilized 10,400 SACP groups (to be renamed as farmer market linkage groups, farmer mutual marketing organization, or farmers marketing collective) against the target of 10,000 groups, with the membership of 260,000 against the target of 250,000. Of these, only 210 are female groups with some female members in the remaining male-dominated groups. Therefore, female participation in early stage of the project is 45,000 against a target of 75,000. As SACP focuses on saline-prone and waterlogging-prone areas as well as CHT, LDCF- BCRL project will work together / coordinate in the promotion and marketing of high value crops in these areas under Components 2 and 3. During the beneficiary selection process, there is opportunity for DAE to utilize the approach adopted for SACP as well as the value chain mapping study.

Dhaka Food Systems, *Ministry of Local Government with technical support from FAO, Government of Netherlands, US\$ 12.5 million, 2018-2023*

Dhaka Food System (DFS) project intends to develop a safe, sustainable, and resilient food system for the Dhaka metropolitan area through an iterative action learning approach. This will be achieved through development of food distribution models, development of a strategic food agenda 2030, and interventions to improve the performance of the food system of Dhaka. The project will give special attention on the role of women and indigenous peoples to explore and evaluate alternative strategies to improve access to safe, healthy, nutritious food. During the LDCF-BCRL PPG phase, national consultants participated in a workshop on sustainable food systems and prioritizing value chains that was designed and facilitated by the Dhaka's Food System project. Component 3 of LDCF-BCRL will benefit from DFS experience in implementing post-harvest and market development activities.

HCFC Phase-Out Management Plan (HpMp Stage-II) for Compliance with the 2020 and 2025 Control Targets under the Montreal Protocol, *DoE, Montreal Protocol Multilateral Fund (MPMF), US\$ 5.34 million, 2020-2026*

Bangladesh ratified the Montreal Protocol in 1987, and since then has taken up several programmes / initiatives and recorded progress in successfully phasing out Ozone Depleting Substance (ODS). The hydro chlorofluoro carbons-HCFC Phase out Management Plan-II (HPMP-II) project will help

Bangladesh to further phase out Ozone Depleting Substances (ODS) through conversion of technologies in the domestic air-conditioners and chilling /cooler manufacturing sector. GoB envisages the adoption of non-ODS and low-global warming potential alternatives in air conditioner and chilling/cooler sector, and intends to reduce 17.09 ODP tons (310.78 metric tons) of HCFC (1.7 million tons of CO₂-equivalent) emissions through this project. In total, 67.5% HCFC will be phased out by 2025. There is scope for BCRL project to collaborate with this project in the areas of institutional co-ordination, stakeholder engagement, capacity building, and knowledge exchange, and ensure that any food storage systems (cooling / chilling) setup under BCRL are compliant with GoB goals for ODS in addition to being climate resilient. DoE is providing US\$ 3 million co-finance from this project to enhance the effectiveness of both projects, and create project level coordination opportunities.

Implementation of 3R (Reduce, Reuse and Recycle) Pilot Initiative (Phase-1), DoE, Bangladesh Climate Change Trust (BCCT), US\$ 2.47 million, 2010-2023

The major objective of this project is to promote 3R initiatives throughout Bangladesh, reduce the amount of waste in landfill areas; and take measures for the management and recycling of waste by using public-partnership mechanism. This project will also raise public awareness on the concept and practices of 3Rs, including the benefits of waste segregation at source and recycling. In addition, this project will prepare a database on solid waste and its management practices in Bangladesh, map the stakeholders in solid waste management-SWM and recycling trade chain, and conduct a study to identify feasible technological options for integrated SWM. US\$ 1 million co-finance is allocated from this project to ensure effective collaboration on food and agricultural inputs waste reduction, and natural resource use efficiency in farming, post-harvest and processing levels as well as knowledge sharing, stakeholder engagement, coordination of capacity building and awareness raising activities between these two projects.

Microenterprise Development Project (MDP), PKSF, GOB, US\$ 50.5 million, ongoing

Microenterprise development program is one of the core programmes of PKSF. To further enhance this programme, PKSF has launched a new nationwide project titled 'Microenterprise Development Project (MDP)'. MDP is designed to assist microentrepreneurs throughout the country by providing training, credit support, mobile-based microenterprise finance application, and online business platform. The project aims to include an additional 40,000 microentrepreneurs under PKSF's enterprise development program, which has a program participant base of 1.3 million microentrepreneurs (at the end of 2017). This project has been designed with PKSF's business cluster development approach. PKSF is providing US\$ 13.23 million co-finance from the MDP project. By aligning and coordinating microenterprise development related activities with PKSF, the BCRL project could leverage the credit lines extended by MDP to microenterprises and farmers, for their productive activities, to ensure sufficient uptake of adaptation measures and agri-business activities.

Agricultural Technology Promotion Services under the Agricultural Unit, PKSF, GoB, ongoing

PKSF established the Agriculture Unit (AU) as one of its core programmes in June 2013. The major goal of this unit is to extend sustainable agricultural technologies and capacity building support at farmers' doorstep with a view to increase crop productivity, farming efficiency, and ensuring food

security. The AU has designed its work plan and implementation strategy for the crops sub-sector, and functions as a supplementary and additional service provider of the government. Each year, PKSf allocates substantial resources to promote agricultural technology in rural Bangladesh. For instance, in fiscal year 2019-20, PKSf allocated US\$ 0.7 million for this activity which is implemented through 31 partner organizations across 55 upazilas and 25 districts (covering 25 Agro-ecological Zones (AEZs)). PKSf has indicated a co-finance commitment of US\$ 0.23 million from AU activities. BCRL Component 2 and 3 activities related to crop technologies, mechanization, and post-harvest processing will utilize lessons from AU experience, including on farmers' preference of climate-resilient crop varieties, effective delivery of Good Agriculture Practice (GAP) and safe crop cultivation training modules, and where feasible incorporate AU-established demonstration plots in FFS curriculum.

In addition to the above programmes and projects, PKSf is providing US\$ 3.57 million co-finance from multiple, ongoing projects related to poverty alleviation, rural development, climate resilience, and agricultural development in recognition of complementarities between BCRL and its work. The intention is to, throughout BCRL implementation period, align selection of target geographies and activities to strengthen priority value chains. Such coordination and alignment is appropriate considering the scope and breadth of PKSf's work: it currently reaches 12 million people through 10,160 branch offices of around 278 partner organizations in 64 districts of Bangladesh on activities ranging from health services and education to enterprise and livelihood development.

Other key baseline projects that are on-going or concluded during the PPG phase are detailed below:

National Adaptation Planning, *UNDP and DoE*, Green Climate Fund-GCF, US\$ 2.8 million, 2019-2022

This project aims to (a) strengthen institutional coordination and climate change information and knowledge management for medium-to long-term planning; (b) appraise and prioritize adaptation options, and formulate NAP; (c) develop and pilot, at planning and development departments at national and sectoral levels, climate-risk informed decision making tools; and (d) set up nationally appropriate participatory adaptation investments tracking mechanism and financial plan for mid- and long-term climate change adaptation (CCA) implementation. . Component 1 of LDCF-BCRL will provide inputs to the NAP project on medium- and long-term adaptation measures in the agricultural sector, and cost-benefit analysis of such measures.

Strengthening Capacity for Monitoring Environmental Emissions under the Paris Agreement in Bangladesh (CBIT), *FAO and DoE*, Global Environment Facility's Capacity Building Initiative for Transparency (GEF-CBIT), US\$ 1 million, 2020-2023

The project aims to build national capacity and a mechanism for Bangladesh to prepare reports to the UNFCCC (United Nations Framework Convention on Climate Change) under the Paris Agreement Enhanced Transparency Framework (ETF) for AFOLU (agricultural and other land use), waste, energy, and IPPU (industrial processes and product use) sectors, with strengthened AFOLU components, including inventories of emission sources and information necessary to track progress against priority actions identified in Bangladesh's NDC (Nationally Determined Contributions). Component 3 of the CBIT project focuses on strengthening capacities to monitor and report adaptation activities and

investments, and this component will form a source of information for LDCF-BCRL Component 1 work on strengthening agriculture sector considerations in NAP process.

Ecosystem-based approaches to Adaptation (EbA) in the drought-prone Barind Tract and Haor "Wetland" Area, DoE with technical support from UN Environment, GEF, US\$ 5.2 million, originally 2016- 2019

The project aims to reduce the vulnerability of communities (6,000 beneficiaries) to climate change impacts in the Barind Tract and Haor Area using Ecosystem-based Approaches to Adaptation (EbA). The project will build the capacity of government institutions to plan and implement effective local-level EbA for adaptation, undertake EbA interventions, and provide an evidence base of best practice for these approaches. During PPG phase, FAO and UN Environment had a preliminary conversation about coordinating efforts and have decided to exchange lessons on soil and water conservation interventions (particularly in Barind Tract). As of now, it appears that EbA will focus on Level Barind Tract whereas LDCF-BCRL targets High Barind Tract ? so, there is not an overlap in project area per se.

Establishing National Land Use and Land Degradation Profile toward mainstreaming SLM practices in sector policies (ENALULDEP/SLM), UNEP, DoE, GEF, US\$ 0.73 million, 2017-2021

The major objective of the project is to reduce pressures on natural resources by managing competing land uses in the broader landscape to the enhanced cross-sector enabling environment for integrated landscape management in Bangladesh. More specifically the project aims at: (a) increasing understanding of land use and state of land degradation in the country; (b) SLM mainstreaming and adoption across sectors; (c) setting SLM Monitoring and Evaluation indicators and establish DLDD cell at DoE; and (d) assessing the proportion of land that is degraded over total land area of the country. Knowledge materials, data and information of this project and documented SLM practices can be used as based line information for component 2 of the BCRL project.

Rural Microenterprise Transformation Project (RMTP), Palli Karma-Sahayak Foundation (PKSF), US\$ 200 million, 2020-2025

The project will support farmers and micro-entrepreneurs as well as agribusinesses, within selected value chains, to improve their operations and increase linkages. PKSF's network of microfinance institutions-MFIs will provide loans (average loan size of BDT 120,000 ? US\$ 1450) to micro-enterprises, and non-banking financial institutions (NBFIs) will be encouraged to provide commercial finance to small and medium agribusiness companies as well as larger micro-enterprises. The project will support 100,000 microenterprise borrowers through micro-credit, and another 345,000 households through value chain development activities. Producers will be assisted to organize themselves, and provided technical and business advisory services on efficient production, compliance with food safety and traceability standards, and strong market linkages. While the project intends to cover crop, livestock and aquaculture value chains, during the PPG phase, IFAD and LDCF-BCRL discussed aligning target value chains in selected geographies to enhance synergies. There is also scope to align business and technical training to farmer organizations, and for LDCF-BCRL to leverage RMTP's credit linkage activities.

National Agricultural Technology Project (NATP-II), Ministry of Agriculture (lead implementing agency) and Ministry of Fisheries and Livestock (including Bangladesh Agricultural Research Council-BARC, Krishi Gobeshona Foundation-KGF, Department of Agricultural Extension-DAE, Department of Livestock Services-DLS, Department of Fisheries-DoE, Hortex Foundation), World Bank and USAID, US\$ 214.00 million, 2015-2021 (DAE has confirmed US\$0.13 million co-finance from this project)

The objective of the Phase-II of the NATP is to increase the agricultural productivity of smallholder farmers and improve their access to markets. Both phases focused / focus on agricultural research and multiple agricultural sub-sectors (crops, livestock, fisheries). NATP-I (2009-2014), co-funded by IFAD and USAID, facilitated the development of new technologies, increased the effectiveness of extension systems, and the development of supply chains. NATP-I was funded by both World Bank and IFAD, and some key lessons from that project were the need to go beyond increased productivity and facilitate market linkages for farmers and farmer groups (especially, producer organizations). Therefore, NATP-II (funded by World Bank and USAID) prioritizes multiple goals (increasing production, food security, supporting adaptation to climate change, and enhancing nutrition through safe and diversified food). NATP-I organized farmers into about 19,000 CIGs (common interest groups), and NATP-II will form an additional 21,000 CIGs while continuing to engage with the first generation CIGs. Of these, 11,880 were crop-focused CIGs in Phase-I and 15,200 will be crop-focused CIGs in Phase-II. CIGs receive training and participate in demonstration activities related to rice yield gap, AWD-alternate wetting and drying, improved mustard and lentil cultivation, or take part in activities such as composting and seed preservation. CIGs have and will benefit from training and matching grants (up to US\$ 4,500 per CIG) as well as NATP support to agri-businesses (local processors, seed multipliers, exporters). SAAOs will be provided technical training and equipped with mobile tablets. NATP-I targeted 107 of 493 rural sub-districts (*upazilas*), and its Phase-II (US\$ 176 mn), which is under implementation, targets an additional 163 *upazilas*.

Relevant NATP CIGs were consulted with (Annex M and Annex P) during LDCF-BCRL project's PPG phase, and some of their successes (particularly women CIGs) in managing vermicompost pits or in exchanging weather/climate information has informed project design. Similarly, many farmers who are benefiting from NATP-II efforts on watermelon and other crop cultivation were consulted with, and helped identify systemic changes (e.g., machinery for raised bed planting and mulching, targeted crop advisories, post-harvest market linkages) which could transform cropping systems and enable upscaling of adaptation options. The establishment of fruit orchards in Rajshahi district (HBT), and multiple maize related practices (early planting in Patuakhali (WP/SP prone), introduction of maize in saline zones, and zero tillage maize) are listed among major achievements in NATP-I^[71], offering potential to build on these interventions in LDCF-BCRL. Because NATP-II is a co-financing project, where project-selected *upazilas* overlaps with NATP-II and CIGs exist, this project will strengthen existing CIGs (for instance, by linking them to agri-businesses or providing business training). In that sense, LDCF-BCRL Components 2 and 3 will complement NATP's efforts to have farmer organizations as the main interlocutors for extension and advisory services. NATP-I had substantive value chain linkage

efforts in 20 of the 120 *upazilas* and there are similar ratios involved for NATP-II, which is also indicative of gaps that remain.

Bangladesh Agrometeorological Information System Development Project (AMISDP), Bangladesh Meteorological Department (BMD), Bangladesh Water Development Board (BWDB) and DAE, World Bank, US\$ 113 million, 2016-2021 (DAE has confirmed US\$14 million co-finance from this project)

The major objective AMISDP is to provide agro-meteorological services to farmers to increase agricultural productivity and assist farmers in coping with weather and climate extremes. Establishment of web-based Agro-Meteorological Information System, development of IT infrastructure and enabling services, and preparation of *upazila*-level Agromet databases are the major expected outputs. The project is in the process of installing 4,051 Automatic Rain Gauges and 4,051 Agro-met (Analog) Display Boards in all districts of Bangladesh. The project is already providing advisories based on crop-weather calendars for a limited number of priority crops (rice, wheat, maize, chickpea, green gram, groundnut, jute, lentil, mustard, potato, and sugarcane). As of November 2019, the project has sent SMS to 7,144 Lead Farmers (5,948 Male and 1,196) of 16 districts. This indirectly benefits an additional 107,160 farmers within the group. By the end of the project, 30,000 lead farmers will be receiving SMS and have been registered on the project database.

During the PPG phase, the potential to expand the number of crop weather calendars (especially to non-traditional crops) and allocate budget for text messages (SMS) to directly reach the farmers / farmer organizations or encourage the SAAO to communicate with the farmer organization in areas with poor network was discussed with DAE officials who manage a AMISDP component termed BAMIS (Bangladesh Agro-meteorological Information System). Discussions were also held with SAAO and lead farmers about their experience with the weather information they have received. Farmers appreciate the advisories but require more specific ones given the diversity of cropping systems in the country. LDCF-BCRL Component 2 intends to use BAMIS platform / infrastructure to disseminate crop. In doing this, it will first expand the crop-by-season models to customize crop advisories to value chains of interest to LDCF-BCRL project farmers. Some members of a women's common interest group in Batiaghata *upazila* (waterlogging/salinity prone area) were observed, during PPG phase visits, as having installed weather applications, which is then disseminated to neighbors ? illustrative of the potential to scale up efforts through LDCF-BCRL project's Component 2. Besides farmers, actors further up the agricultural value chain need meteorological data to manage product quality and safety. While large agri-businesses are able to generate the weather/climate forecasts they require to manage their value chains, individual entrepreneurs and MSMEs involved in agricultural and agro-processing lack support. This will be an additional activity of focus under Component 2 and 3. Given its nascent development stage, AMISDP information and delivery systems are yet to be evaluated for understanding, adequacy, timeliness, and relevance at farmer level. Such feedback mechanisms (especially from farmers) are emphasized by the World Meteorological Organization's Agrometeorology Division[72]⁷², and Component 4 MEL activities will conduct process evaluations which will inform both AMIDSP and LDCF-BCRL.

Enhancing adaptive capacities of coastal communities, especially women, to cope with climate change induced salinity, *UNDP, GCF, US\$ 33 million, 2019-2025*

The GCF-funded project aims to empower communities, particularly women, to plan, implement and manage resilient livelihoods and drinking water solutions. It will help communities increase their livelihood resilience to climate change induced salinity by promoting a diversification from currently non-adaptive, freshwater-reliant livelihoods of small-scale farmers, fishers, and agri-labourers towards climate-resilient agricultural livelihoods. It will target communities in Khulna and Satkhira districts in the southern Bangladesh. LDCF-BCRL Components 2 and 3 will align with UNDP project activities to ensure co-benefits from salinity control structures financed by the GCF project, and to ensure synergies with livelihoods activities promoted via Women Livelihood Groups.

Agricultural Growth and Employment Programme (AGEP), *DAE, UNDP and Swisscontact, US\$ 58 million (Danish government US\$ 47.7 million and GoB US\$ 10.3), 2013-2018*

The major objective of AGEP was to increase and diversify the agricultural production of female and male landless, marginal and smallholder farming households, and to enhance the competitiveness of the agricultural and agro-business sectors. It consisted of three components: Integrated Farm Management (IFM)-implemented by DAE, the Agriculture and Food Security Project (AFSP) in CHT-implemented by UNDP, and the Agro Business Development Component (ABDC) aka Katalyst. IFM was implemented in seven regions: Dhaka, Rajshahi, Rangpur, Barisal, Khulna, Chittagong and Sylhet. Both IPM and AFSP used FAO's Farmer Field Schools (FFS) approach, but AFSP was a smaller programme. That is, AFSP was implemented in pilot modality and farmer organizations (FOs) were not formed in CHT (in contrast to IPM). In IPM, FOs were formed out of participants in FSS. An evaluation of AGEP notes that the focus on marginal and landless farmers complemented DAE's usual approach of targeting medium-scale and small-scale farmers. An evaluation of the project notes that the combination of a wide number of subjects (rice, vegetable, poultry, cows, fish, nutrition etc.) into the FFS curriculum made it challenging to cover them in a participatory and experiential manner. LDCF-BCRL PPG phase, therefore, utilized these lessons to design a more focused approach for FFS to ensure that farmers are engaged in areas of their experience. The evaluation also underlines the intensive level of training that is required for FOs to be functional ? including intensive training of DAE field staff to ensure they can assist FOs, and emphasized that FO leaders should be selected through a participatory process. This has influenced design and budgeting of Component 2 activities.

Cereals System Initiative for South Asia (CSISA) and CSISA Mechanization and Irrigation (CSISA-MI), *CIMMYT, IRRI-International Rice Research Institute, and IFPRI-International Food Policy Research Institute, USAID, Budget information is not available, 2009-2020 (third phase 2015-2020 under implementation)*

CSISA aims to transform agriculture in Bangladesh by promoting widespread adoption of resource-conserving practices, technologies, and services that increase crop yields with lower water, input and/or labour costs. It also aims to generate and disseminate evidence on cropping systems that can withstand climate change effects. At the policy and institutional level, it supports mainstreaming innovations in programs at national and sub-national levels and improving the policy environment to facilitate adoption of sustainable intensification technologies. Phase III focuses on direct seeding of rice,

recommendations to reduce wheat blast risk, rice-fallows development in coastal Bangladesh, early wheat sowing for combating heat stress, and agronomic messages on better-best technologies through private sector and agri-dealers.

CSISA-MI supports productivity through increased surface water irrigation and efficient agricultural machinery ? all of which is based on the development of local service provider-LSP network. The project has enabled / will continue to enable service providers to receive credit to buy agricultural machinery through linkages to microfinance institutions. CIMMYT, and IRRI have also been collaborating with the Bangladesh National Agricultural Research System institutions to develop improved machinery (e.g., reapers for jute harvesting, direct drill maize seeder and fertilizer, axial field pumps etc.).

During the LDCF-BCRL PPG phase, a detailed discussion with held with CIMMYT scientists in Bangladesh to solicit inputs on upscaling CSISA / CSISA-MI's most promising interventions, and potential engagement of CIMMYT in LDCF-BCRL activities. The research and implementation experience of CSISA and CSISA-MI are critical to LDCF-BCRL implementation, particularly in upscaling conservation agriculture in HBT through Component 2 and 3. While CSISA and CSISA-MI have established proof-of-concept, farmers consulted with during the PPG phase expressed interest in expanding cultivation under conservation agriculture (CA) or raised bed cultivation and requested technical and market support. It is recognized, by both CIMMYT and FAO, that market and policy barriers have held back widespread adoption of CA. There are clear links between the LSP network developed under CSISA, and LDCF-BCRL Component 3 activities that aim to expand the agricultural machinery LSP network to remove barriers to adoption of climate resilient and sustainable intensification practices. CIMMYT has also worked with BMD in developing early warning systems for various crop diseases and pests as well as weather risks, and Component 2 activity on advisories for farmers will benefit from this experience. Finally, LDCF-BCRL will directly benefit from CSISA / CSISA-MI engagement with machinery manufactures, such as Janata Engineering, Advanced Chemical Industries, Chittagong Builders, and The Metal Private Limited, for testing and modification of existing machines. Some of these private sector actors have been identified as the most promising suppliers of agricultural machinery under Component 3 of LDCF-BCRL.

Promoting Climate Resilient Agriculture and Food Security, *MoEFCC*, IFC (International Finance Corporation), US\$ 3.86 million, 2014-2019

This PPCR (Pilot Program for Climate Resilience) funded project focused on agriculture in polder areas, i.e., coastal areas of Bangladesh, and promoted several crops (rice, oilseeds such as sunflower, pulses, chili, vegetables such as eggplant and bottle gourd, and watermelon) suitable to adverse climatic conditions (salinity, low freshwater availability). It also provided support to strengthen contract farming capacity, trained farmers on post-harvest processing and storage, and strengthened farm-to-market linkages where the LDCF-BCRL activity will directly benefit from this PPCR experience. More specifically, the components 2 and 3 under LDCF-BCRL will benefit from experience and lessons learned on farm-to-market linkages and implementation of post-harvest management activities.

Integrated Agricultural Productivity Project (IAPP), Ministry of Agriculture and Ministry of Fisheries and Livestock, World Bank, US\$ 63.55 million, 2011-2016

The project objective was to enhance the productivity of agriculture (crop, livestock, and fisheries) in specific agro-ecologically constrained and economically depressed areas. It targeted southern Bangladesh i.e., salt-affected and tidal surge areas, and the drought-prone areas in the north. The project supported 250,170 milk, fish, and paddy farmers to increase productivity, and disseminated improved technologies to the 300,000 farmers. It brought 27,750 ha of land under improved irrigation and released 24 improved crop (15) and fish (9) varieties.

5 districts in northern and 4 districts in southern Bangladesh. FAO provided technical assistance for the IAPP project, including the establishment and strengthening of farmer organizations. A practice that could be replicated in LDCF-BCRL was the inclusion of two farmers in the Project Steering Committee, and approval will be sought from PSC and PIC chairs during LDCF-BCRL project implementation. FAO identified one of the farmer organizations, Sara Bangla Krishok Jote, which represents farmers across Rangpur and Barisal districts to receive a grant from a new project (Missing Middle Initiative) in 2016 to continue strengthening activities. Efforts will be made, under LDCF-BCRL Components 2 and 3, to identify similar farmer organizations created under IAPP for strengthening. Another lesson from the project was to have a gender specialist for effectively reaching out to women, considering the low representation of gender specialists in government departments. This is reflected in the technical personnel budgeted across Components 2 and 3 of LDCF-BCRL project. Finally, a World Bank DIME (Development Impact Evaluation) study of IAPP found that while project farmers adopted mustard, higher rates of adoption for wheat or lentils among project beneficiaries were not found, even when higher yields were observed for wheat in demonstration plots. This is indicative of other constraints that need to be addressed further up the value chain. These lessons have influenced LDCF-BCRL project design.

Local Government Initiative on Climate Change (LoGIC), Ministry of Local Government Rural Development and Cooperatives, UNDP, UNCDF, EU and SIDA, US\$ 20 million, 2016-2025

This project is supporting around 200,000 households across seven districts of Bangladesh such as Khulna, Bagerhat, Patuakhali, Barguna, Bhola, Kurigram and Sunamganj to support adaptation to the climate change. Considering the grassroots approach, this project emphasis on community empowerment, and community-led adaptation and decision-making. To attain this objective, a small grant (up to US\$350) to households of vulnerable areas is provided to enable them to undertake proven, incremental, 'low-regret' adaptation activities with immediate benefits for their income, food security and well-being. Using this grant the household engaged themselves in sheep-rearing in saline and drought-prone areas, crab cultivation and poly-fish culture in saline areas, watermelon in river basin areas. As some of the crops and adaptation of LOGIC project is similar to the intervention of BCRL project, their success stories and experience can be utilized during implementation period of BCRL.

3) **The proposed alternative scenario with a brief description of expected outcomes and components of the project and the project's Theory of Change.**

COMPONENT 1. STRENGTHEN NATIONAL CAPACITIES FOR INTEGRATION OF ADAPTATION MEASURES IN AGRICULTURE SECTOR PLANNING, BUDGETING, AND POLICY PROCESSES

OUTCOME 1. Climate change adaptation considerations integrated into agriculture sector planning, budgeting and policy

The objective of this component is to ensure climate change adaptation is fully integrated into agriculture sector (particularly crop sub-sector) related planning and budgeting processes, and that all relevant ministries effectively coordinate at national and sub-national levels. (1.1) The PSC and PICs will function as mechanisms for coordination and inform Annual Development Plan (ADP). (1.2) Project activities will develop and capacitate innovative financial instruments, investment models, and institutional setup to mobilize climate finance for resilient agriculture in Bangladesh. (1.3) Project activities will strengthen inter-sectoral planning and investment prioritization processes at national and sub-national levels for resilient agricultural sector.

1.1 The Project Steering Committee and the two Project Implementation Committees will function as a mechanism for improved cross-sectoral and inter-ministerial coordination on agricultural sector and adaptation. Given PSC and PICs will include representatives from the Ministry of Agriculture and Department of Agricultural Extension, the Ministry of Environment, Forest and Climate Change and its Department of Environment, the Ministry of Finance, and the Ministry of Planning, it offers an opportunity to utilize lessons and evidence from the LDCF-BCRL project to shape agriculture adaptation agenda in Bangladesh's Annual Development Plan (ADP). This is important because the ADP is currently the primary mechanism for agricultural sector adaptation measures.

1.2 With the need to scale up adaptation measures in the agricultural sector, and the growing focus on private sector participation in adaptation finance, it is important that innovative financial instruments, investment models, and institutional setup is designed, developed, and capacitated to successfully access international climate funds. Bangladesh needs to consider new market instruments (e.g., green bonds, municipal bonds) and investment models and institutional setup (e.g., risk sharing facilities, impact investors) to raise funds for climate change projects. Three consultations (US\$ 52,500 in total) will bring together a range of relevant stakeholders (government, agri-businesses, civil society, banks) to discuss agriculture sector adaptation investment opportunities and how to build on different existing programs and previous initiatives (e.g., CSAIP, CIP for EFCC, the Delta Plan). Options to expand the range of investment models and financial instruments currently deployed, suitable institutional setups, and barriers to their utilization will be discussed, and emergent policy recommendations will be placed for consideration to senior government officials of MoEFCC. The proceedings and results will be summarized into a strategy document with government partner inputs.

1.3 DOE will also facilitate national and sub-national workshops (US\$ 66,000) aimed at senior mid-career government officials to strengthen inter-sectoral planning and investment prioritization processes for a resilient agricultural sector. Investment decisions for the agricultural sector is a complex process and requires gathering information on priorities and opportunities at the national, local, and sectoral level as well as a range of climate scenarios and timelines. During these workshops, recommendations from DOE-UNDP NAP project on agricultural sector adaptation actions, CSAIP investment packages and other relevant reports will be presented. The workshops will then present and discuss the type of data analysis, scenario development tool, and prioritization criteria was used in

these projects and provide guidance to government officials on how best to improve credibility and impact of investment decisions. It will also seek their recommendations on alternative consultative approaches to improve decision-making to address any gaps that participants identify. In addition, a number of introductory and advanced trainings (US\$ 176,500) will be provided to mid-career and early-career government officials on the range of plausible adaptation measures in agriculture, how to assess climate risks, and select and prioritize such adaptation measures suitable to local contexts. This will enable them to successfully provide oversight to new investment projects and guide their field-level colleagues.

Table 2: Overview of the BCRL interventions across the target landscapes

Target geographies (climate change related drivers)	Target upazilas (land area and beneficiaries)	Adaptation technologies specific to the value chain and geography	Supporting interventions across all geographies
<p>High Barind Tract-HBT</p> <p><i>(drought, variable rainfall, soil dryness, declining groundwater table)</i></p>	<p>1. Nachole 2. Godagari 3. Bholahat</p> <p><i>(total 8000 ha, 15,000 farmers and approx. 60,000 household members, 260 Farmer Organizations-FOs)</i></p>	<p><u>Wheat:</u></p> <ul style="list-style-type: none"> ? Stress-tolerant (drought, heat) seeds ? Conservation agriculture or raised bed planting machinery <p><u>Mango agro-forestry (low or high density mango, inter-cropping):</u></p> <ul style="list-style-type: none"> ? High-quality or new varietal mango saplings ? Good Agricultural Practices-GAP for mangoes, including on-farm mango bagging ? Integrated Pest Management-IPM: pheromone traps, sticky traps ? Mango storage and processing facilities, including plastic crates, heat treatment machinery, and secondary product production (e.g., juice, pickle) 	<ul style="list-style-type: none"> ? Farmers field schools ? Grants and training for farmer organizations-FOs ? Vermicompost pits (source of fertilizer) and seed banks ? Nature-based Solutions: Rainwater catchment structures (mini-ponds, desilt or excavate existing ponds), slope stabilization or erosion prevention (planting grasses or trees) where needed in CHT

<p>Waterlogging-prone/ Saline-prone Southwest coast</p> <p><i>(salinity, waterlogging, cyclones, storms, river flooding, sea level rise)</i></p>	<ol style="list-style-type: none"> 1. Paikgachha 2. Dumuria 3. Batiaghata <p><i>(total 5200 ha, 8000-10,000 farmers and between 32,000-40,000 household members, 150 FOs)</i></p>	<p><u>Watermelon:</u></p> <ul style="list-style-type: none"> ? High-quality seeds / new varieties ? Raised bed planting, plastic mulching machinery ? Integrated Pest Management-IPM: pheromone traps, sticky traps ? Processing facilities (e.g., juice), refrigerated trucks <p><u>Maize:</u></p> <ul style="list-style-type: none"> ? Stress-tolerant (salinity) seeds ? Conservation agriculture or raised bed planting machinery ? Corn sheller and threshing machinery ? Maize packaging, processing and marketing facilities (e.g., livestock and poultry feed) <p><u>Dragon fruits:</u></p> <ul style="list-style-type: none"> ? High-quality, new varieties ? Integrated Pest Management-IPM: pheromone traps, sticky traps ? Support structures (in cement and bamboo) for Dragon Fruit plants ? Refrigerated truck 	<ul style="list-style-type: none"> ? Integrated pest management: pheromone traps, ? Early warning and crop advisory SMS ? Credit linkage to commercial banks, individually or FO ? Market linkages via contract farming, commodity procurement, certification etc.
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<p>Chittagong Hill Tracts-CHT</p> <p><i>(heavy rainfall, low rainfall in winter, vegetation degradation and landslide)</i></p>	<ol style="list-style-type: none"> 1. Manikchhari 2. Khagrachari Sadar 3. Kawkhali <p><i>(total 3000 ha, 2000-4000 farmers and between 8,000-16,000 household members, 60 FOs)</i></p>	<p><u>Cashew nut (backyard, agricultural plots):</u></p> <ul style="list-style-type: none"> ? High-quality planting material, new varieties ? GAP for cashew: spacing, soil preparation, mulching, pruning etc. ? Machinery for post-harvest processing: drying, peeling, shelling, packaging <p><u>Mango agro-forestry:</u></p> <ul style="list-style-type: none"> ? High-quality or new varietal mango saplings ? Good Agricultural Practices-GAP for mangoes, including on-farm mango bagging ? Integrated Pest Management-IPM: pheromone traps, sticky traps ? Mango storage and processing facilities, including plastic crates, heat treatment machinery, and secondary product production (e.g., juice, pickle) 	
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COMPONENT 2. DEMONSTRATE AND SCALE UP CLIMATE ADAPTATION SOLUTIONS IN TARGETED LANDSCAPES

OUTCOME 2. Increased resilience of agriculture-based livelihoods and landscapes

The objective of this component is to build climate-resilience in agricultural production systems and landscapes by engaging farmers and communities. This component will focus on (2.1) working with communities to ensure buy-in for project activities and complete community-based adaptation (CBA) assessments i.e., increasing their awareness of the project and receive inputs on project activities; and later, complete detailed vulnerability risk assessments (VRAs); (2.2) training extension agents (UAOs and SAAOs) on climate-resilient agriculture, so they can in-turn conduct Farmer Field Schools; (2.3) scaling-up adoption by farmers of climate-resilient crops (diversification), improved varieties, or management practices customized to the adaptation problem (e.g., that which can improve soil organic matter, improve water use efficiency or recharge, increase vegetation cover - trees on farm, increase yields, and/or reduce cost of production or yield loss); (2.4) improve availability of water, organic fertilizer and seeds at farm or agricultural landscape level; and finally, (2.5) provide agro-meteorological and agro-climatic advisories for farmers to reduce yield and post-harvest loss. Because the intensity of efforts needed to demonstrate and scale interventions, due to contextual challenges in target landscapes, will vary and considering baseline projects and stakeholder feedback, this project proposes to target (as direct beneficiaries) about 15,000 farmers in HBT, 8,000-10,000 farmers in south-western waterlogging- and salinity-prone areas and between 2,000-4,000 farmers in CHT (target numbers for south-western areas and CHT to be confirmed during implementation).

2.1 The project will begin with Community-based Adaptation (CBA) assessments (300 assessments, US\$ 200 per assessment ? US\$ 60,000 in total) in target villages of selected upazilas in HBT, CHT, and waterlogging/salinity-prone areas by DAE officials. This will allow target farmers to self-assess, in a participatory manner, their livelihood-climate vulnerabilities, factors that influence these vulnerabilities, and actions that can promote adaptation. These CBAs will be the entry point for initiation of project activities to promote agricultural diversification activities. Another key objective will be to ensure that participation of women in project activities is encouraged and enabled from the beginning by taking their unique challenges and needs into account. Later, over the second and third project year, a series of Vulnerability Risk Assessments-VRAs will be completed (300 assessments, US\$ 250 per assessment and US\$ 45,000 for expert consultant support). VRAs also incorporate elements of Participatory Rural Appraisals (PRAs) in soliciting community perception of climate risks and vulnerabilities, experiences and locally-developed adaptation measures, and an assessment of adaptation capacity. In contrast to initial CBAs, this VRA exercise will be more comprehensive, go beyond project activities, and is anticipated to take longer (1-2 days). It will help communities strategize not just medium-term but also long-term actions, and at both community and individual levels as well as enable communities to put systems in place to monitor their evolving climate vulnerabilities. Finally, communities will develop the knowledge / awareness to engage with government agencies and private sector actors, which will support them to identify priorities that will strengthen selected value chains based on their project experience. An expert consultant with experience in conducting VRAs or PRAs on climate change will train (in Bangla) regional coordinators (who will function as Master Trainers and observers), UAOs, and SAAOs on effectively conducting such assessments at the village level. The GIZ supported national level VRA provides useful general information in the proposed project areas. However, VRAs specific to local value chains and farmer adaptation needs are needed. Both CBA assessments and VRAs could function as a baseline and increase accountability to the

community i.e., by comparing the change in scores or qualitative feedback at the end of project implementation to baseline (pre-implementation) scores and perceptions.

2.2 LDCF investment will be used to strengthen the technical capacity and coordination of extension and advisory services, and 400 extension agents at the upazila and sub-upazila level (UAOs and SAAOs) will be trained and retrained (16 sub-national trainings, US\$ 7,500 per training targeting 400 UAOs and SAAOs) on diversification for climate-resilience (non-rice crops, stress-tolerant varieties, management practices such as raised bed planting, conservation agriculture, strip tillage, fruit tree agroforestry, good agricultural practices-GAP for produce handling, traceability etc.) and associated input as well as post-harvest management (e.g., plastic mulching, pest management, mango bagging, etc.). Because SAAOs are underfunded and currently spend money out-of-pocket for transport and mobile phone costs, the project includes a budget of US\$ 2,000 for five years to compensate up to 90 SAAOs (in total, US\$ 180,000 over five years). This will occur before the start of Farmer Field School-FFS activities.

Farmer Field Schools-FFS have been found to be highly effective mechanism to promote farmer learning and knowledge sharing and are widely used in Bangladesh (as well as project areas) in the context of agricultural adaptation and development projects. While farmers cultivate a diversity of crops and engage in livestock/fish production, past evaluations of baseline projects found that FFS that are focused / in-depth are more effective than FFS that promote broad-based agriculture knowledge. Therefore, LDCF-BCRL FFS curriculum delivered by UAOs and SAAOs will be highly focused and choose a package of crop and management interventions suitable to each geography. CBA assessments will enable the identification of those farmers who are willing and able to participate in FFS or FFS that LDCF-BCRL project can engage with (where it already exists), and UAOs and SAAOs will facilitate the FFS (800 FFS, US\$ 1,000 per FFS targeting 32,000 farmers) via experiential learning on priority cropping system diversification strategies. The curriculum for extension and advisory services will be designed with the support of agricultural research institutions such as BARI, SRDI, BINA, and BWMI as well as the Department of Agricultural Marketing-DAM. The scientist-extension system collaboration is important because some (potential) priority practices such as conservation agriculture require specialized knowledge, and farmers will need to be encouraged to persist with the practice over multiple seasons to experience benefits?scientists who have successfully tested this in other geographies or on a small scale within the same geography will be better positioned to help farmers understand viability. Training will also be provided on integrated pest management (IPM) as appropriate to the local agroecological and climatic context.

2.3 and 2.4 The adoption and scaling-up of climate-resilient crops (diversification), improved varieties, and management practices will be promoted through transfer of seeds and other inputs to those farmers participating in FFS. Seed kits (US\$ 0.814 million for 27,280 farmers) will typically be sufficient to cultivate 1 acre of land and will be provided for the initial two years (i.e., each direct beneficiary farmer will receive seed kit sufficient to cultivate 1 acre of land twice during the five-year project period). At least 10,000 of the 27,280 farmers targeted by the project will be women farmers, and the Gender Expert in PMU is expected to extensively engage with sub-national gender champions, regional coordinators, UAOs and SAAOs to ensure targets are met. Stress-tolerant seeds of crops (where available) and/or high-quality seeds will be procured through a competitive tender. Specific management practices promoted will vary by the geographical area, priority value chains, and associated climatic challenges. For instance, conservation agriculture, raised bed, or strip tillage are considered three effective practices to increase soil organic matter, water retention capacity (as introduced under 2.2), and could make cultivation of heat- or drought-

tolerant wheat or maize even more viable in a drought-prone area (HBT). Similarly, cultivating high-yielding, commercially-attractive watermelon varieties on raised beds with plastic mulching would help address waterlogging and secondary salinity issues. Because on-farm freshwater availability is an issue in all three geographies (HBT, WP/SP areas, CHT), the project will finance Nature-based Solutions (NbS) such as the construction of rainwater catchment structures such as mini-ponds, equivalent recharge structures or desilt existing community ponds. In case of CHT, given the topography, this may take the form of drip irrigation or sprinkler systems instead to promote efficient water use and/or slope stabilization and erosion prevention management practices (e.g., grass or tree planting) or structures on hilly slopes (150 structures or systems, unit cost of US\$ 2,000 ? a total of US\$ 300,000). Farmers? access to seeds will be ensured through seed banks^[73] (100 seed banks, US\$ 1,800 per bank ? a total of US\$ 180,000) established and maintained by women at the community level, and project will also finance vermicompost pits (300 pits, US\$ 750 per pit ? a total of US\$ 225,000) to ensure organic fertilizer availability at the local level (and this becomes a source of income for women). Finally, because farm mechanization is important and can reduce onerous labor (freeing up own labor for other activities or reduce hired farm labor costs), farmers will have access to such machinery through their own Farmer Organizations or local service providers (entrepreneurs) as outlined in Component 3. Component 4 includes activities to audit the quality of input support to farmers.

<p>18 September 2019</p> <ul style="list-style-type: none"> • Harvest the aus paddy before 21st September as low to moderate rainfall is likely on 21st & 22nd September and keep it in safe and dry place. • Since there is possibility of getting low to moderate rainfall in the coming 5 days, it is advised to repair the bunds in the aman paddy fields to conserve rain water. Apply irrigation, if required, & maintain 5-7 cm standing water up to maximum tillering stage. At panicle initiation stage, 2-5 cm water level should be maintained. • Provide mechanical support to young banana and vegetables to prevent the crops from lodging due to strong winds
<p>19 June 2019</p> <ul style="list-style-type: none"> • Significant rainfall is likely for next few days • Arrange for drain out excess water from vegetable & Jute field • Start transplanting of Aus Paddy • Start preparation of seedbed for Aman Paddy • Avoid application of fertilisers, pesticides and irrigation • Provide mechanical support to banana and horticultural crops due to expected gusty wind
<p>27 March 2019</p> <p>Sow jute seed after 2nd April under adequate soil moisture: Agromet Advisory Project, DAE</p>
<p>27 March 2019</p> <p>There is chance of rainfall from 31st March to 2nd April. Harvest wheat before that. Avoid irrigation, application of fertilisers and pesticides: Agromet Advisory Project, DAE</p>

Example of SMS advisory sent to the Lead Farmers by the BAMIS project of DAE, Source: www.bamis.gov.bd/home/

2.5 Agro-meteorological and agro-climatic advisories can enable farmers to make informed decisions about crop management ? from plot preparation, planting, fertilizer application or pest control measures, and irrigation through harvesting. This project will finance the cost of short-messaging service (estimated to be 2 messages-SMS a week, costing US\$ 95,480 over five years targeting 27,280 farmers) to reach farmers directly, and in the absence of service, to reach as many

members of the farmer organization or FFS as feasible. DAE, through the World Bank AMIDSP project, has been collaborating with BMD, BWDB, BARI, BRRI etc. to integrate weather, water, and climate data. LDCF-BCRL project will encourage the development of a further 7 (seven) advisories for new crop-by-season combinations not already developed under AMISDP (BAMIS) and is derived from priority value chains for this project. Additionally, AMISDP (BAMIS) has not currently developed advisories for downstream / upstream value chain actors at the sub-national level. LDCF-BCRL project will explore the possibility to develop advisories targeted towards these actors (e.g., to reduce risk of humidity-induced spoilage or food toxicity by ensuring actors can take pre-emptive actions?e.g., targeted fungicide or pesticide spraying?for weather and climate-mediated pest, insect and disease outbreaks). Component 4 includes budget for a process evaluation survey to help assess farmers' understanding of advisories, and their adequacy, timeliness, and relevance.

COMPONENT 3. SCALE-UP INVESTMENTS FOR EFFECTIVE ADAPTATION IN SELECTED VALUE CHAINS

OUTCOME 3. Climate-resilient livelihoods through improved access to credit, markets, and technologies

The objective of this component is to enhance the potential for effective adaptation by scaling-up investments all along the priority value chains. To ensure that production system resilience is enhanced, cropping systems are diversified, and value addition occurs, this component will focus on (3.1) map value-chain networks, and identify investment opportunities strengthen supply chain development; (3.2) strengthening the capacities and performance of farmer organizations through training on business development, marketing, and managerial skills; (3.3) link the farmer organizations to private sector for commodity procurement, contract farming, certification etc.; (3.4) support and train entrepreneurs / MSMEs by enabling their access to technologies (know-how, equipment, machinery) for delivery of inputs to farmers or better produce handling, aggregation, processing, and marketing; and (3.5) design, pilot, and scale credit products.

3.1 Over the third and fourth year of the project, in two of the three project regions and for two commodities (wheat, maize, mango, etc.) or commodity groups (horticulture crops), value-chain networks will be mapped, market opportunities assessed and quantified, and investment opportunities prioritized and identified for resilient and sustainable agriculture (US\$ 108,000 budgeted for value chain expert consultant support). This activity will leverage data and analyses from DOE-GIZ's National Climate Vulnerability Assessment, and the Climate Smart Agriculture Investment Plan (CSAIP) for landscape-specific climate scenarios and investment strategies. Since these analyses will need to reflect needs and priorities of all stakeholders in the value chain, the design of VRAs (Component 2) will anticipate information needs from farmers and communities into account. It is anticipated that the expert consultant who will undertake this analysis will engage with the full range of stakeholders including, Bangladesh's agricultural research system (BARC), BADC-Bangladesh Agricultural Development Corporation, CGIAR centers and programs such as CIMMYT, IRRI, CCAFS, and WorldFish with extensive history of research and partnerships in Bangladesh, and private sector agri-business confederations (e.g., Bangladesh Agro-Processors Association).

3.2 Farmers' Organizations are recognized as a mechanism to mobilize farmer social capital and collective action. A number of agricultural development projects have promoted farmers' organizations-FOs (producer groups, farmer cooperatives, common interest groups-CIG) in Bangladesh, and this project will build on the outcomes of these baseline projects. Training,

provided to 180 project-supported FOs (of which, 60-70 are women-led and managed FOs), on governance and financial management, establishing and negotiating market linkages, and business development will heavily draw on work of the co-finance projects as well as NATP-II. There are especially opportunities to coordinate with IFAD-funded SACP and RMTP projects which will foster market linkages through 'buyer mapping and assessment', microcredit for micro-enterprises, and commercial finance for SMEs and larger micro-enterprises. Based on past project experience, it is evident that developing FOs into organizations that will self-sustain beyond the project period and will be sufficiently market-oriented and capable of taking initiative is challenging. Therefore, the project aims to enhance the capacity and performance of 180 FOs (on an average about 30 members each, resembling a CIG), of which 50% will be existing FOs and 50% will be new, and has allocated a grant of US\$ 4,000 (per FO) a total of US\$ 720,000. Access to these grants will be facilitated through a letter of agreement (LOA) between FAO and each individual FO, as was done for the MMI project. FOs will be able to utilize these grants towards capital investments or technical and business training, with the assistance and advice of DAE officials and FO facilitators (12 FO Facilitators, each managing 18 FOs). A budget of US\$ 396K has been allocated towards the FO Facilitators' salaries, and a further US\$ 2,000 per year per FO facilitator (US\$ 180K in total) for their communication and travel expenditure. Furthermore, it is possible that a specific FFS evolves into an FO and this will slightly expand the budget per FO to US\$ 5,000 or that an FO will consist of about 100-120 members (in some senses, federated structures) resulting in a substantive grant of US\$ 12,500-15,000 that they can tap into. FOs that are more advanced will be linked to activity 3.3 and could function as local service providers for other farmers (thereby, increasing their financial sustainability and viability). Of the 180 FOs, about 95 FOs will be formed in HBT, 55 FOs in waterlogging/salinity-prone areas, and 30 FOs in CHT. The HBT FOs are likely to focus on wheat and mango, waterlogging/salinity-prone area FOs will organize around maize, watermelon and/or dragonfruit, and CHT FOs will organize around horticulture crops. FOs may also decide to offer bulk input purchase or negotiation and marketing services for sale of produce in return for a service fee (from non-member local farmers). For existing FOs, using criteria/process developed by the MMI project, the profiling and capacity assessment will be done and will form the basis of further trainings. Both existing and new FOs will be assessed regularly on the evolution of their capacity and performance. Through activity 3.3, FOs will be assisted in developing formal linkages with the private sector and enter into agreements for contract farming or buyback arrangements (e.g., for wheat, maize), certification (e.g., for mangoes, sweet oranges-Malta), bulk input procurement, produce sale - price negotiation, and accessing credit.

3.3 Farmer organizations that have more capacity or are more mature / advanced will be linked to the markets and private sector through pilot activities (US\$ 90,000 budgeted for expert consultant to support DAE in linking FOs to markets and credit). Since FOs will be encouraged to form around a specific value chain, this will enable the project to work together with the FO to address critical linkages that would alleviate barriers and capitalize on enhanced access to markets. There is scope to intensify and strengthen existing FOs that were formed under NATP Phase I and Phase II, AGEP and SACP projects, including FOs that are not currently active and can be revived. These FOs in the past focused on developing both food grain and cash crops which can be aligned with the current project's commodities (see Annex M). Since the nature of the FO-private sector linkage is expected to comprise a wide range of activities depending on its maturity, rating and interests, instead of large agri-business actors, FOs may also be linked with local MSMEs through trainings and business model development or supermarket chains in urban markets. For instance, in the case of mango, dragonfruit or watermelon for which there is substantive demand in urban markets like Dhaka, Chittagong and Mymensingh, FOs may enter into direct purchase agreements with

supermarket chains and other horticulture vendors. Commodities like wheat and maize are more amenable to bulk procurement and contract farming agreements. Where FOs decide on input provision to farmers, in the form of renting out direct seeders / combine harvesters / raised bed planters, they will be assisted in setting up or accessing (equipment) service guarantee. The BCRL project will coordinate with RMTP on support for value chain crop related FOs and MSMEs.

3.4 Lack of access to machinery, post-harvest handling / storage / processing facilities, and transport options are significant barriers to adoption and viability of value chain interventions. This activity will focus on improving access to technologies (agricultural machinery, storage, processing, trucks, etc.), and where feasible or necessary, finance (US\$ 2.07 million budgeted) the establishment of handling and cold chain / storage facilities (including through linkage with financial institutions for seed investment or working capital loans, activity 3.4) by promoting local entrepreneurship and MSMEs. To enhance impact, throughout the project implementation, DAE will identify opportunities to pool technical and financial resources from the NATP-II and LDCF-BCRL projects in HBT and CHT, and FAO will work closely with DAE to do the same in SACP areas in southern Bangladesh as well as coordinate with RMTP where feasible.

3.5 Access to formal credit can encourage farmers to investment in adaptation technologies and enable them to continue farming practices even after extreme climate events (i.e., it functions as *ex post* risk management). Therefore, this activity will focus on enhancing the quality and depth of linkages between farmers, farmer organizations, and financial service providers. It will facilitate access to credit for various on- and off-farm activities of farmers and farmers' organizations (the MMI project, for instance, is trying to make a case for the farmer group substituting as collateral for banks, a principle that underlines group lending by microfinance institutions). Because entrepreneurs and MSMEs along the agricultural value chains are equally credit constrained, the activity will design and pilot mechanisms to improve seed funding and working capital access (US\$ 60,000 budgeted for a vendor to support credit product design) for instance, combining a grant instrument with formal credit product for technology upgradation or equipment purchase. There are a number of consulting firms that can provide expert advice and support to DAE in designing innovative financial inclusion products, such as BRAC's consulting and research divisions, BFA Global (Bankable Frontier Associates), Center for Financial Inclusion of Accion, LightCastle, MicroSave, Nathan Associates, etc. Such financial inclusion efforts will be carefully documented to create business models for further dissemination under Component 4 i.e., it will ease MSME project formulation and business planning and hence enable faster turnaround for entrepreneurial credit access.

COMPONENT 4. ENABLE EFFECTIVE KNOWLEDGE MANAGEMENT, AND MONITORING, EVALUATION AND LEARNING (MEL)

OUTCOME 4. Project monitored and evaluated, information disseminated, and lessons from project implementation, progress monitoring, review, and evaluations codified and shared

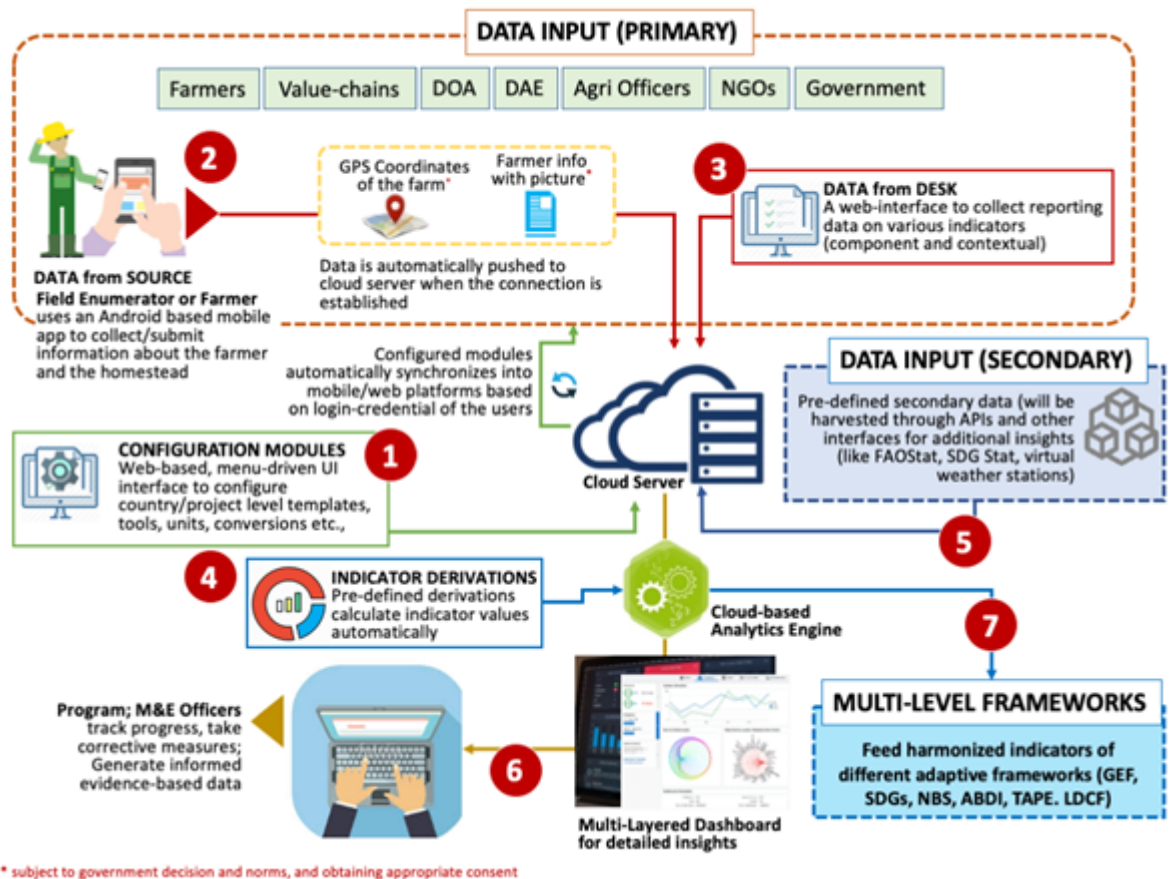
This component will primarily finance project monitoring, evaluation, and learning (MEL) as well as knowledge management (KM) and dissemination activities. It will ensure that (1) a MEL framework is developed and systems are operationalized; (2) national and sub-national government officials benefit from knowledge exchange and peer-to-peer learning visits, which can impact project activities in the near-term or influence how this project is further scaled up (potentially to a GCF project on climate smart agriculture); and, (3) ensure effective dissemination of lessons learnt to a range of stakeholders, particularly farmers on climate change adaptation options for diversification.

Section 9 describes the plans, deliverables, budgets, and timelines for proposed MEL activities in detail, and a robust MEL framework will underpin such work. FAO is also collaborating with ICRISAT (International Center for Research on Semi-Arid Tropics) to design and set up IT systems in place, which can be customized by the country, to enable systemic MEL (US\$ 150,000 budgeted).

The project's knowledge management approach will harmonize and integrate across resilience concepts, measures, levels, geographies, and interventions. During implementation, the MEL platform will capture adoption of on-farm practices through SAAOs and UAOs as well as monitoring of FFS and FO activities. The MEL framework of the project, which will underline the MEL platform, will utilize FAO's existing tools and framework. For instance, FAO's climate adaptation tracking tool provides a technical framework for sector-specific resilience. This tool has the advantage of pragmatic expediency because it can combine publicly available datasets with field data. Besides, FAO's TAPE (Tool for Agroecology Performance Evaluation) provides a mechanism to link the project's M&E with broader national and sub-national KM systems and provides a structure for linking multiple dimensions of climate resilience (e.g., economic, social, ecological). TAPE may be combined with additional frameworks (e.g., FAO's SHARP-Self-Evaluation and Holistic Assessment of Climate Resilience). In the PPG Phase, the project adapted the Food Systems, Land Use, and Restoration (FOLUR) survey instrument to Bangladesh / project context and undertook interviews of farmers in target geographies. The three rounds of surveys (baseline, mid-term, and final) included in the implementation phase will improve upon this questionnaire and incorporate questions from TAPE and SHARP survey tools.

FAO has been working with ICRISAT to develop a MEASURE-based platform for several GEF-7 regional projects in order to facilitate data comparability and improved regional coordination and learning. MEASURE (Monitoring and Evaluation of Agri-Science Uptake in Research and Extension) has been used by ICRISAT and other CGIAR centers to collect real-time, geo-tagged data about farmers, farmlands, on-field interventions, and other key indicators of agricultural research and extension. Leveraging this experience, the BCRL project will develop a web-based (cloud) and mobile-based (applications-apps) data collection and management platform. This will enable real-time collection of geo-referenced data from farmers, farmer organizations, and other project beneficiaries (extension agents, MSMEs, etc.) for successfully monitoring and reporting against GEF-7 indicators, and actionable insights on project progress and performance that can inform initiation of corrective actions (where needed). The platform is designed for both primary and secondary data input. As explained above, secondary datasets such as poverty maps, soil health maps, and tree cover have the potential to both inform this project's targeting and help monitor outcomes and impacts in project areas over a period of time (after project termination). The project MEL framework will identify field staff (potentially UAOs and SAAOs) who will enumerate data on their mobile phones via an app and define user roles for the MEL platform. Primary data will be geo-tagged and time-stamped, with adequate privacy safeguards and the option to record consent of respondents. Since much of this data will be collected through a mobile app, in case of low/no connectivity, the collected data will be stored on the phone and synchronized with the web platform when connectivity is reestablished. For instance, at the farmer level, data on plot area, inputs used, management practices adopted, and crops grown and yields can be collected; farmer field schools' participation can be tracked; and location and pictures of rainwater catchment structures and seed banks can be geo-tagged. At the FO level, information on prices, contracts with agri-businesses, etc. can be regularly updated. For events, photos and data from evaluations surveys can be archived.

It is anticipated that this platform will be able to automatically calculate and track metrics for key performance indicators outlined in the Results Framework, and the annual work plan and budget (developed during implementation). This data will be presented in a project dashboard and will allow spatial and temporal visualization of MEL data. The functional architecture of the proposed system is shown below.

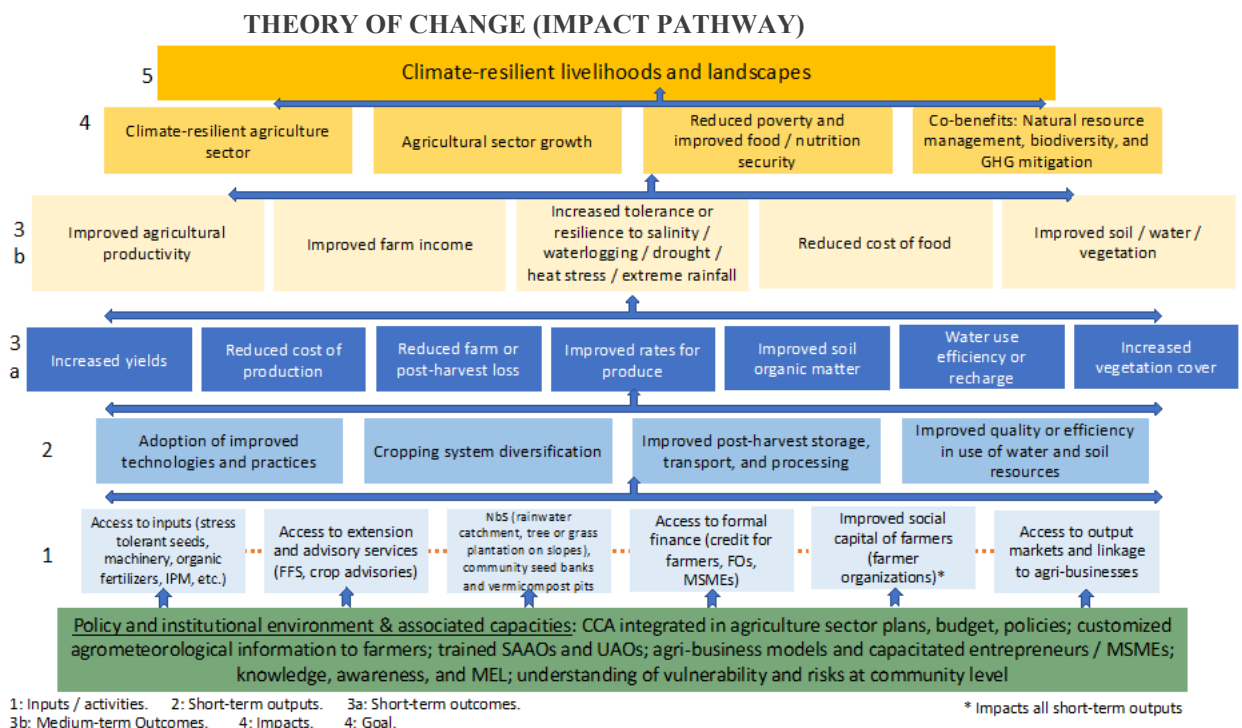


Functional architecture of the digital M&E system

At first, the MEL system will establish a knowledge base for actors at various levels to understand whether and how the project's interventions are contributing to farming system outcomes at different levels. Second, it will allow a range of decision makers ?e.g., farmers, FOs, extension workers at landscape level, MoEFCC, MoA, Planning Commission, DAE and DoE at national level, etc.?to access information relevant to their respective roles and thereby develop an understanding of system risks and vulnerabilities as well as the effectiveness of different measures over time. Third, it will provide a feedback mechanism and adaptive learning tool that can allow for periodic input from technical experts to engage with beneficiaries at various levels to suggest different measures and alternative approaches to improve system performance.

Field visits by 15 national and sub-national government officials (US\$ 48,000) to GEF-, GCF-, or other international donor (e.g., GIZ funded climate finance projects at NABARD) supported projects in South / South-east Asian region can enable rapid learning and knowledge sharing, particularly on how best to leverage lessons from a GEF-funded project to very significantly upscale by accessing GCF finance in the future. Increasing the awareness (US\$ 50,000 budgeted) of local stakeholders (especially, neighboring farmers/villagers) about climate change vulnerability

and options for resilient livelihoods is a critical pathway to influence indirect beneficiaries. To attain this goal, horizontal and vertical exchange of information and knowledge of the lessons learned will be shared with the national and local stakeholders through publications, workshops, and media (US\$ 50,000 budgeted for case study development and US\$ 10,000 for associated travel costs). As stated elsewhere, a key channel for such communication is the Agricultural Information Service-AIS run by the Ministry of Agriculture. It has the mandate and responsibility to gather relevant information on farming technologies and techniques and disseminate information in a form that is understandable to farmers. Since AIS has the capacity to broadcast and produce video materials, plausibly as part of the *Mati-O-Manush* TV show, Component 4 includes budget for the same (US\$ 35,000 budgeted for videos). The emphasis in such videos will be on how innovations can help address specific ecological and climatic risks, and the costs and benefits (in yield or income terms) to farmers.



4) Alignment with GEF focal area and/or Impact Program strategies.

The proposed project is directly aligned with the GEF 2018-2022 Programming Strategy on Adaptation to Climate Change for the LDCF, specifically its first two objectives.

Objective 1 of LDCF (*Reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation*): Project activities are designed to support Bangladesh in transformational shifts to climate-resilient livelihoods and landscapes. To attain this objective, the project will demonstrate and transfer context-specific diversification approaches across target areas. It will strengthen and diversify sources of agricultural income through improved cooperative systems (agreements between farmer organizations and agri-business entities), enhanced access to markets and finance, and delivery of climate information services. Social and institutional innovations (e.g., federating / registering common interest groups or producer groups) is also emphasized. Moreover, agri-business entrepreneurs and MSMEs will be supported through training, technology transfer (e.g., tractor-operated zero-till seed drill, heat

treatment equipment for mangoes, setting up effective cold storage facility, juice / pulp processing units), and financial support. This recognizes the challenge that entrepreneurs and MSMEs face in identifying adaptation technologies and formulating / implementing business plans.

Objective 2 of LDCF (*Mainstream Climate Change Adaptation and Resilience for Systemic Impact*): Overall, the project will result in climate-resilient livelihoods. It will enhance institutional coordination, support the mapping of supply chain networks and identify opportunities for resilient agriculture in two regions, and strengthen the capacity and awareness of stakeholders (national and sub-national government officials, private sector, banks, etc.) on how best to identify and prioritize adaptation options in the agricultural sector (drawing on prioritization tools, local knowledge, and research evidence). It will also promote South-South knowledge transfer and learning through meetings and field visits, raise general awareness through media, and knowledge dissemination through case studies.

The proposed project is also aligned with the GEF-7 Programming Directions and is expected to deliver co-benefits across multiple GEF focal areas. Sustainable land management practices such as conservation agriculture (minimum or zero tillage, residue retention), introduction of fruit trees (high value mango in HBT), diversification of cropping systems (e.g., watermelon cultivation), and slope stabilization and erosion prevention measures (grass or tree planting in CHT slopes) are highly likely to offer co-benefits related to Land Degradation focal area (due to improved soil quality, increased organic matter, or improved water retention and reduced run-offs). Besides, the setting up of vermicompost units in all target landscapes, and the adoption of crop residue retention as a management practice could potentially reduce the use of synthetic fertilizers and help avoid use of pesticides/weedicides due to related co-benefits^[74] ? this is in line with objectives in the Chemicals and Waste focal area. Most importantly, while mitigation benefits will be context specific, the adoption and scaling up of practices such as conservation agriculture, non-rice crops that are less water intensive (e.g., dragon fruit), and improved storage and transport options for better post-harvest management and decreased food waste could all result in reduced GHG emissions in the food system.

5) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF,

Despite Government of Bangladesh's commitments to climate change adaptation, livelihoods and landscapes remain highly vulnerable to climate stress, and the diffusion of innovations remains limited (see Annex M for more information on existing constraints for selected value chains). The Bangladesh Delta Plan 2100 (BDP 2100) notes that experience on adaptation against drought, salinity, and heat stress as well as livelihood protection in ecologically critical areas remains limited^[75]. Even where some agricultural innovations have been introduced or demonstrated, this is limited in diversity ? i.e., farmers do not systematically incorporate other interventions which can enhance climate resilience. Additionally, there are emerging initiatives (climate advisory services, soft credit, business models and market linkage) which are yet to be deployed as a package of interventions at the local level. At the same time, due to larger policy, regulatory and socio-economic environment (e.g., historical systems of tenure), the degradation of land, mining of soil nutrients and soil erosion, lowering of water tables, salinity intrusion, excessive utilization of synthetic chemicals etc. continues with increasingly evident effects on productivity, incomes, ecosystem services, and coping capacity. The future projections of climate change indicate a worsening of these outcomes, in the absence of initiatives such as this LDCF-BCRL project. The siloed nature of governance in Bangladesh implies that inter-ministerial and departmental coordination is insufficient to carefully select, prioritize, test, demonstrate, and upscale adaptation measures suitable to diverse climatic, socio-economic, and landscape challenges. The extension

system is also resource poor (human and financial), and in the light of evidence on effectiveness of farmer-to-farmer learning, alternatives to traditional extension are essential.

The proposed project will build on baseline activities discussed in the baseline section. Under Component 1, GCF incremental cost will support project oversight activities undertaken by the Project Steering Committee and Project Implementation Committee, workshops on inter-sectoral planning and investment prioritization towards resilient agriculture, a strategy document on investment models, financial instruments, and institutional setup to mobilize climate finance for the same, the training of 1280 national and sub-national officials on assessing climate risks, adaptation measures in agricultural sector and promoting gender-inclusive value chains, and regular project monitoring costs. Costs pertaining to technical personnel (climate-smart agriculture expert) will also be covered. GEF-LDCF finance will be used to train agriculture extension workers as well as 32,000 farmers via 800 Farmer Field Schools on the skills and knowledge needed to demonstrate, test, adapt, and sustain adaptation measures such as drought- and salinity-tolerant crops or varieties (wheat, watermelon, maize), mango agroforestry combined with sustainable land management practices, conservation agriculture, rainwater catchment / water management, raised bed planting, mulching, and use of vermicompost. The implementation of Vulnerability Risk Assessments will help 300 communities assess their adaptation needs, and grants to 180 Farmer Organizations will allow them to engage in collective value chain activities. Additionally, 27,280 farmers will also receive inputs (seeds, planting material) as well as crop advisories based on agro-metrological/agro-climatic information, and in total 550 rainwater catchment structures, vermicompost pits and seeds will be established. In this process, the GEF-LDCF incremental finance is also likely to deliver multiple environmental co-benefits and food security / nutrition benefits, particularly for the most vulnerable among the 120,000 direct beneficiaries or around 27,280 households.

Under Component 3, GEF-LDCF will finance the cost of establishing linkages between farmer organizations and input and output markets. 180 farmer organizations will be trained on managerial, business development, and agricultural product marketing skills. The project recognizes that rural / youth employment initiatives and the linkage and integration of MSMEs into the formal sector remains tenuous, LDCF finance will be deployed to incubate (through training activities, financing technology transfer), and strengthen individual entrepreneur and local MSMEs i.e., to establish custom hiring services for machinery, and storage, processing and transport enterprises. This experience in incubating entrepreneurs / MSMEs will be used to develop 10 (ten) illustrative bankable business models. Finally, GEF-LDCF incremental cost will finance the design of credit products for farmers, entrepreneurs or MSMEs.

6) Adaptation benefits-(LDCF/SCCF);

The proposed project is directly aligned with the GEF 2018-2022 Programming Strategy on Adaptation to Climate Change for the LDCF. The potential adaptation benefits from the project span resilient livelihoods (agriculture-based), including increasing coping capacity or faster recovery from climatic shocks; higher agricultural productivity; increased savings or increased investments in agriculture; reduced negative impacts on ecosystems; improved farm incomes; job and enterprise creation through incubation support (technology transfer, access to finance, and training); and, enhanced social capital and collective action by farmers (particularly women) through farmer field schools and farmer organizations, and will impact households, communities, and institutions. At the household level, project investments in promoting higher value crops (wheat, mango, maize, etc.), and enhancing their production through access to appropriate inputs and linkages to output markets will result in diversification of cropping systems (i.e., away from rice systems) as well as household incomes. Additionally, (a) enabling access to higher quality seeds with stress tolerance or other traits that farmers prefer (e.g., higher yield, short duration, etc.), (b) encouraging the use of vermicompost, (c) supporting the adoption of management practices

such as conservation agriculture^[76] or raised bed planting, (d) providing climate/weather advisories and/or credit, and (e) improved post-harvest management, access to markets (e.g., collective bargaining through farmer organizations), and value addition activities will result in decreased variance in productivity and improved on-farm income^[77] for 27,280 households (120,000 people, assuming 4.4 members per household). An additional 250,000 people will benefit from spillover effects in the local economies.

Some project benefits, particularly ecosystem benefits, will vary by the target landscape.

- ? In HBT, the adoption of conservation agriculture (minimal or zero disturbance ? tillage, residue retention) or mango agroforestry is expected to improve soil organic matter, protect the soil from erosion, and reduce surface evaporation. The project will also promote the construction and maintenance of rainwater catchment structures (e.g., mini-ponds). This in turn should result in improved water retention capacity over a period of time and help improve the status of HBT's declining groundwater tables. While the magnitude of the benefit of diversifying from water-intensive rice cultivation will depend, to an extent, on existing irrigation practices (e.g., some farmers may already be adopting water conservation techniques), the new crops that will be promoted (e.g., wheat) are less water demanding^[78]. This, in combination with drought-tolerance seed varieties, will further enhance water savings.
- ? In the waterlogging- and salinity-prone areas, cropping system diversification and higher farm returns will come from transition to new, higher value crops (e.g., maize and watermelon that are ?moderately sensitive? to salinity^[79]). The use of raised beds and mulching will further reduce soil salinity. Further, rainwater catchment structures will help conserve freshwater for agricultural production, thus mitigating effects of increasing salinity in water, and may have other co-benefits (e.g., if farmers choose to intensify crop production and experience additional income).
- ? In CHT, higher farm returns from the introduction of horticulture crops will promote growth in the local agricultural sector and offer new employment opportunities for women and youth. Water conservation systems (e.g., sprinkler or drip irrigation, water drums) and erosion prevention and control structures for slopes will reduce soil erosion and risk of landslides, particularly during periods of intense rainfall. Such practices could also spare additional forested land from being brought under cultivation by making water available in the dry season and increase cropping intensity, and/or reduce extraction of forest resources because of alternate non-forest income streams.

The project will support the formation or upgrading of 800 farmer field schools as well as 180 farmer organizations (producer groups, common interest groups, cooperatives) ? the latter (FOs) involving between 9,600 and 16,800 individual farmers. Financial support and capacity development from the project will strengthen their bargaining power and collective action, as stated earlier, and may result in increased income or savings/asset accumulation. In the process of implementing activities with FFS and FOs, Bangladesh's crop extension system ? particularly the technical capacity of and resources available to Upazila Agricultural Officer-UAO and Sub-Assistant Agricultural Officer-SAAO (90 individuals) ? will be enhanced.

Female-headed households account for about 12.5% of all Bangladesh households, although these numbers are much higher among the poor or in communities with significant male out-migration. Women do not play a significant role in agricultural production, with some exceptions such as

CHT, and will generally benefit from an increased focus on their roles via the project activities. Vermicomposting pits and seed banks (400 in total) supported during project implementation will be fully owned and managed by women. The project will also support the formation and formalization of women-only or women-led farmer organizations. Agro-processing MSMEs will be encouraged to employ more women in their post-harvest processing activities (as in the case of Akij Fruit Processing Company in HBT), thereby increasing women's labor force participation. Social inclusion is another aspect that will be fully considered and will be a cross-cutting theme at project and individual component level.

One hundred and fifty (150) individual entrepreneur and MSMEs will be able to establish or further develop markets (e.g., demand for inputs, cold storage, farm machinery service), and will benefit from training and technology transfer for the same ? thereby deriving higher incomes. The selection of individual entrepreneurs will emphasize creating employment opportunities for the poor, especially the landless and youth. Agri-business firms (be that MSMEs or large businesses) will benefit from direct access to farmers' produce via farmer organizations (producer groups, CIGs, etc.) ? potentially increasing firm profit margins.

At the macro level, there will be indirect co-benefits related to resilient supply chains (adaptation plans for specific commodities), dietary diversification, reduced imports (e.g., of wheat), increased employment opportunities (particularly for women and youth), and improved ecosystem services (e.g., freshwater supply) resulting in higher contribution of agricultural sector to GDP and food security. More importantly, strengthening the resilience of livelihoods and landscapes will lower adaptation costs. Private sector interest (and investment) in climate-resilient agricultural innovations may also increase as a result of project activities. Such co-benefits are expected to grow and strengthen over the project timeframe and beyond.

To summarize, the adaptation and livelihood resilience measures supported by the project will increase capacity for designing and implementing climate adaptation projects (for agriculture-dependent livelihoods), increase climate resilience of specific crops, increase diversity of livelihood options and enhance food security/dietary diversity, increase ecosystem services, and reduce vulnerability across the targeted landscapes.

7) **Innovativeness, sustainability, potential for scaling up and capacity development**^[80]⁸⁰ ?

Innovation:

The project's innovation is in using information on climatic, socio-economic, and ecological challenges in target landscapes to identify adaptation measures needed at the household, community, and local market level. It will enable transfer of know-how, technology, and experience between agricultural extension and research institutions, the private sector and farmers / local communities; exchange of experience and knowledge between GoB and other public and private sector institutions within Bangladesh and in Asia-Pacific.

Rice has historically received most of Bangladesh's research, extension, and advisory systems' focus, and while there has been some shift towards livestock, fisheries, and other crops, rice continues to dominate. There are also other significant development projects that primarily focus on rice production (and to an extent, on wheat), e.g., CSISA. However, the focus on rice not only discourages diversification but also increases the vulnerability of the sector to climate shocks. Diversification away from water-intensive *Boro* rice, i.e., expanding cultivation of non-rice and horticulture crops, is seen as a necessary step to increase resilience of farmers' income and landscapes. Despite this, past efforts to diversify crops have seen low adoption due to lack of

technical know-how at the community and field extension level, and the lack of robust supply chain linkages (inputs, post-harvest storage, processing, and transport facilities, etc.). As such and in line with Bangladesh's vision for a climate-resilient and nutrition-sensitive agricultural sector, this project focuses on diversification of crops.

The project also recognizes that a range of adaptation options have been developed in Bangladesh by farmers themselves, scientists, and development partners (e.g., stress-tolerant seeds, institutional innovations such as common interest groups), but these are not widely adopted. Scaling-up requires intensive efforts to demonstrate adaptation measures, facilitate farmer learning, and investment in supply chain infrastructure for sustained adoption. Additionally, by bundling multiple interventions, the project will reduce the risk of any single intervention failing to mitigate the full range of climate impacts^[81].^[82] That is, it takes an integrated approach and identifies adaptation options throughout selected value chains to facilitate long-term, transformative shift towards resilient livelihoods and landscapes.

Sustainability, capacity development, and potential for scaling up:

At the farmer and community level, prioritization of activities to finance and provide technical support for field interventions are intended to be a mechanism to foster ownership and continuity beyond project implementation. For instance, from the third year onwards, the objective is to have seed banks fulfil community demand for stress-tolerant crop or seeds^[83]⁸³ since seed kits will be provided for the initial two years. The formalization of farmer organizations through registration or federated structures, initiating agreements between FOs and the private sector, support the establishment of revolving funds, and training on managerial, financial / business, and administrative functions is expected to increase their likelihood of functioning beyond the project. The development of business models is intended to signal viability and spur interest and investment by the private sector. Additionally, FAO and the Economic Relations Division (ERD) have submitted a GCF Readiness project in December 2019, one objective of which is to enhance private sector engagement in climate action in the agriculture, forestry, and land-use sectors. The project could both complement and benefit from the Readiness project.

Community participatory assessments will be a mechanism to enable knowledge sharing and peer-to-peer learning between project farmers and non-project groups, and the intention is for communities to leverage outcomes of the assessment to engage in continued dialogue with local government on their adaptation support needs. Knowledge management products generated, particularly videos dissemination through Ministry of Agriculture's Agricultural Information System (AIS)'s TV programmes, also have the potential to expand reach beyond project areas. Value chain adaptation plans will identify specific actions that GoB (and its development partners) will need to undertake for long-term sustainability of the value chain ? this will likely result in an integration of these considerations into national policies and programmes. Finally, trainings at national and sub-national level as well as MEL activities will systematically strengthen in-house capacity of GoB to replicate or implement similar interventions in non-project areas. It could ultimately lay the groundwork for the establishment of a 'Climate Smart Technology Dissemination Center', one of the priorities identified as a part of the TNA (2012) process.

8) Summary of changes in alignment with the project design with the original PIF

Substantial changes in project design as compared to the original PIF have been made. The PIF contained a large number of outcomes and outputs. This has been streamlined to reflect the flow and intensity of project activities, and where there was duplicative work, outputs and associated activities have been combined. The wording of the four project outcomes, and the flow of the logical framework, outputs, indicators have been revised based on the inception workshop, technical workshop, sub-national stakeholder consultations, and individual meetings with Government of Bangladesh (i.e., MoEFCC, DoE, DAE). However, the underlying approach and principles remain the same. The following table contains the specific changes in each of the project component.

Approved PIF	Current CEO Endorsement document
Component 1. Strengthen national institutional capacities for climate change adaptation and resilience.	Component 1. Strengthen national capacities for integration of adaptation measures in agriculture sector planning, budgeting, and policy process.
Outcome 1.1 Strengthened cross-sectoral collaboration through Institutional capacity building to mainstream climate change adaptation and resilience.	Outcome 1. CCA considerations integrated into agriculture sector planning, budgeting and policy.
Output 1.1.1. National stakeholders engaged through climate vulnerability reduction platform and cross-sectoral coordination mechanism covering government, local stakeholder and the private sector.	Output 1.1. Strengthened mechanisms for improved cross-sectoral and ministerial coordination, covering all relevant government ministries or agencies, to ensure enhanced coordination on policies, plans, and investments on adaptation for agriculture.
Output 1.1.2. Cross-sectoral country action plans developed to address climate change vulnerability and climate resilient livelihood and land management.	Dropped as an activity, and intensified focus on Component 3, Output 3.5 on value chain adaptation plans.
Output 1.1.3. Collaboration with global/regional and national initiatives enhanced.	Addressed under Component Outputs 1.1 & 1.3, and Component 4, Output 4.2.
Outcome 1.2. National institutional capacities strengthened to benefit from climate finance and implement adaptation and climate resilient livelihoods measures.	Dropped as an independent outcome and combined Component 1, Outcome 1.
Output 1.2.1. Updated climate change vulnerability and adaptation related information and existing investment gap addressed in the national country investment plan (CIP) for the environment, forest, and climate change (EFCC) sectors.	Output 1.2. Innovative financial instruments, investment models, and institutional setup developed and capacitated to mobilize climate finance for resilient agriculture in Bangladesh.
Output 1.2.2. Institutional coordination and public-private partnerships enhanced for the implementation of the adaptation action plan in four climate vulnerable landscapes (3.1.3)	Output 1.3. Strengthened inter-sectoral planning and investment prioritization processes at national and sub-national level for resilient agriculture in Bangladesh.
Output 1.2.3. Enhanced capacity of national entities to develop, plan, implement and monitor climate-resilient and adaptation projects and update national policies and plans.	Combined with Output 1.2.
Component 2. Climate-resilient livelihoods and adaptation decision-making processes strengthened.	Component 3. Scale-up investments for effective adaptation in selected value chains.

Outcome 2.1. Climate-resilience and adaptation knowledge enhanced by stronger climate vulnerability decision-support services.	This Outcome is reflected in Component 1 activities on integrating CCA considerations in agriculture sector planning, budgeting and policy.
Output 2.1.1. Transparent access to climate vulnerability related information enhanced through data sharing policies, documentation and data collection, and analysis protocols.	Dropped as an independent output since this is addressed in NAP, NDC and other projects, and LDCF-BCRL will draw on existing datasets and analysis.
Output 2.1.2. A Combined Early warning system (EWS) operationalized for disaster risk and loss and damage reduction.	This is now Component 2, Output 2.5.
Output 2.1.3: Long-term value chain adaptation plans developed to manage anticipated shifts in the suitability and viability of key farming systems in targeted landscapes based on integrated climate and agroecological zone models.	Output 3.1. Value-chain networks mapped and investment opportunities for resilient agriculture identified in two regions (HBT, CHT, or waterlogging/salinity-prone areas).
Outcome 2.2 Innovative financial instruments and investments models developed and piloted.	Outcome 3. Climate-resilient livelihoods through improved access to credit, markets, and technologies.
-	Output 3.2 Strengthened capacities and performance of farmer organizations (producer groups, farmer cooperatives, common interest groups).
Output 2.2.1. Innovative financial instruments and investment models developed and piloted in four climate vulnerable landscapes.	Output 3.3. Enhanced linkages between FOs and private sector to enable direct sale by farmers. Output 3.5 Innovative financial instruments for farmers, entrepreneurs, or MSMEs are designed, piloted, and scaled.
Output 2.2.2. Innovation incubator created in close collaboration with research, academia, NGOs, private sector, and Government entities.	Output 3.4. Improved access to technology in crop supply chains to generate value addition opportunities for entrepreneurs and MSMEs.
Component 3. Scaling-up investments in targeted landscapes to reduce vulnerability and increase resilience.	Component 2. Demonstrate and scale up climate adaptation solutions in targeted landscapes.
Outcome 3.1 Local participatory adaptation plans formulated.	Combined with Outcome 2. Increased resilience of agriculture-based livelihoods and landscapes.
Output 3.1.1. Established local consultative groups in four (4) climate change vulnerable landscapes.	Output 2.1. Community climate vulnerability and risk assessments and adaptation prioritization exercises at the village / community level.
Output 3.1.2 Participatory integrated biophysical and socio-economic resource mapping of the selected four (4) climate vulnerable landscapes conducted.	
Output 3.1.3 Participatory gender responsive four (4) vulnerable community resilience and adaptation bottom-up action plans considering water, soil and vegetation for selected vulnerable areas established.	
Outcome 3.2 Implementation of adaptation technologies and innovations.	Outcome 2. Increased resilience of agriculture-based livelihoods and landscapes.

Output 3.2.1 Established public-private partnership agreements to finance climate resilient and adaptative solutions in the four (4) selected areas based on the action plan developed in 3.1.3 (emphasizing storage, processing, transportation, value chain, market access, and local MSMEs).	Moved to Component 3, Output 3.3 and 3.4.
Output 3.2.2 Climate resilient livelihood strategies piloted and alternative income generating activities in the selected vulnerable areas implemented by relevant Govt. depts. such as DoE, DAE, BFD, DoF, SRDI, BMDA, and CHT board.	<p>Output 2.2. Strengthened mechanisms to improve farmer knowledge of climate-resilient agriculture through extension services and Farmer Field Schools.</p> <p>Output 2.3. Improved uptake by farmers of climate-resilient crops (prioritized in Annex M), varieties, and management practices through transfer of seed kits and other inputs.</p> <p>Output 2.4. Strengthened initiatives for Nature-based Solutions and community ownership of agricultural assets.</p>
Output 3.2.3 Create market opportunities by linking private investments and superstore chain.	Moved to Component 3, Output 3.2 and 3.3.
-	Output 2.5. Improved capacity to use basic agro-meteorological information / agro-climatic advisories for farmers? decision-making and risk management
Component 4. Effective knowledge management, monitoring, and evaluation at the local and national level.	Component 4. Enable effective knowledge management, and monitoring, evaluation and learning (MEL)
Outcome 4.1 Project monitoring and evaluation ensured.	Outcome 4.1. Project monitored and evaluated, information disseminated, and lessons from project implementation, progress monitoring, review, and evaluations codified and shared.
Output 4.1.1 Monitoring and evaluation framework developed and implemented.	Output 4. MEL framework developed and operationalized.
Outcome 4.2 Enhanced knowledge management and shared learning of information.	
Output 4.2.1 Knowledge management and monitoring strategies and tools for adaptation are tested, validated and operationalized at the landscape level.	
Output 4.2.2 Multi-level and south-south cooperation established for knowledge and innovation sharing and technology transfer.	-
Outcome 4.3 Awareness about resilient livelihoods and adaptation enhanced.	Output 4.3. Awareness raising of stakeholders through media dissemination of CCA for agriculture options.
Output 4.3.1 Horizontal and vertical exchange of information and knowledge of the lessons learned to national and local stakeholders through seminars, conferences, consultations, workshops, and media.	Output 4.2. Capacity building of national and sub-national government officials? through peer-to-peer learning and knowledge exchange visits?on agriculture or AFOLU change climate adaptation initiatives.

Output 4.3.2. Information dissemination and awareness raising on climate resilient livelihood technology and finance availability conducted through partnership arrangements with digital media houses and the private sector.	Combined with Output 4.3.
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[1] *Beels* and *boars* are local names for static water bodies.

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[5] GED (2018a). *Sustainable Development Goals: Bangladesh Progress Report*. General Economics Division, Bangladesh Planning Commission, Ministry of Planning: Dhaka, Bangladesh.

[6] Poverty (head count rate) declined from 31.5% to 24.3% between 2011 and 2016 according to Household Income and Expenditure Survey (2016), and while urban poverty fell from 21.3% to 18.9%, rural poverty declined from 35.2% to 26.4%.

[7] BBS (2019). Table 2, Sectoral Share of GDP at Current Prices, 2015-16 to 2018-19. http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/057b0f3b_a9e8_4fde_b3a6_6daec3853586/2019-12-12-11-55-26007214ee20f95f34bf0446aa81e646.pdf

[8] BBS (2019).

[9] That is, assuming that Bangladesh's population grows to 190 mn, and that vegetable consumption increases from 166 gms per capita per day in 2018 to 300 gms per capita per day and fruits from 45 gms per cap per day to 100 gms per cap per day. Gupta et al., (2019).

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[18] Ibid.

[19] Ibid.

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- [40] Goosen et al., (2018).
- [41] Chowdhury, N.S. (2010). *The Relative Efficiency of Water Use in Bangladesh Agriculture*. Working Paper No. 49-10. South Asian Network for Development and Environmental Economics: Kathmandu, Nepal.
- [42] As the CSISA-MI report notes "Decreasing water availability both in terms of quantity and quality suggest that the unchecked expansion of dry season rice cultivation is probably not a long-term option for Bangladesh.". Qureshi, A.S., Ahmed, Z.U., and Krupnik, T.J. (2015). *Groundwater Management in Bangladesh: An Analysis of Problems and Opportunities*. Research Report No.2, Cereal Systems Initiative for South Asia "Mechanization and Irrigation (CSISA-MI): Dhaka, Bangladesh.
- [43] BGS (2001). *Groundwater Quality: Bangladesh*. British Geological Survey (BGS), National Environment Research Council (NERC): London, UK.
- [44] SOM has been influenced by agricultural practices: intensification, low or no residue retention, higher organic matter decomposition because of hot and humid weather, declining use of organic manure, and imbalance in fertilizer use. Imamul Huq, S.M. and Nazmul Hasan, S.M. (2015). Sustainable Management and Protection of Soil resources. *Asian Soil Partnership Workshop, Bangkok, Thailand, 13-15 May 2015*. <http://www.fao.org/globalsoilpartnership>
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- [50] FAO (2015) identified a list of potential crops and varieties, including rice, mustard, lentils, and jute as well as options for value addition in nontraditional fisheries.
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[55] Huber, S. and Davis, K. (2017) *Bangladesh: Desk Study of Extension and Advisory Services*. Developing Local Extension Capacity (DLEC) project.

[56] Another study reported a much higher penetration, and that only 70% of population have no bank account. BFB-B (2018a). *Feasibility Study on Transformation of MFIs into Specialized Banks/Finance Companies: Bangladesh Perspective*. Business Finance for the Poor-Bangladesh: Dhaka, Bangladesh.

[57] That is, micro-credit requires regular weekly or monthly repayments, but agricultural returns are concentrated in certain parts of the year and households face difficulty in maintaining regular loan repayments. Similarly, loan sizes have stagnated, and remain too small to enable technology investments.

[58] See, for instance, *Smallholders? Access to Finance Through Bank*, as a part of the USAID Agricultural Extension Support Activity (AESA) project.

[59] BB (2019). *Agricultural and Rural Credit Policy and Program for the FY 2019-20*. Bangladesh Bank: Dhaka, Bangladesh.

[60] This project does not aim to setup systems to track what percentage of a bank's portfolio is towards climate smart or climate resilient innovations, but it will demonstrate through project activities and through trainings and awareness-raising components what these climate resilient or climate smart options are to commercial bank officials, not limited to Bangladesh Bank (the central bank).

[61] BFP-B (2018b). *A Study on Cluster and Value Chain Financing for MSMEs in Bangladesh: Current Status and Way Forward*. Policy Study, Catalyzing Business Upscaling. Business Finance for the Poor-Bangladesh: Dhaka, Bangladesh.

[62] 72.5% (102,790 ha) of cultivated area is rainfed in hills, and 52.4% (7.8 mha) is rainfed in the plains. Scott, C.A., et al., (2019).

[71] BIDS (2014). *Impact Evaluation Study of National Agricultural Technology Project (NATP)-Phase I?*, Bangladesh Institute of Development Studies: Dhaka, Bangladesh.

https://imed.portal.gov.bd/sites/default/files/files/imed.portal.gov.bd/page/e773d5bf_182e_4fc5_a856_dfd3c8d05ced/Impact%20Evaluation%20Study%20of%20NATP_without_question.pdf

[72] Skype conversations during PPG Phase. WMO's AMD also found the LDCF-BCRL focus on non-traditional crops such as wheat and watermelon appealing for agricultural adaptation.

[73]

http://www.fao.org/fileadmin/user_upload/fao_ilo/pdf/Other_docs/FAO/Community_Seed_Banks.pdf

[74] A few interviewed farmers in HBT reported lower rodent infestation in their conservation agriculture plots with line sowing.

[75] GED (2018d). *Bangladesh Delta Plan 2100, Baseline Studies: Volume 2, Disaster and Environmental Management*. General Economics Division, Bangladesh Planning Commission, Ministry of Planning: Dhaka, Bangladesh.

[76] Yields from conservation agriculture adoption is context-specific, may take time to become evident, and will depend on climate variance experienced during any single cropping season. See, for instance, Michler et al., (2019). Farmers may in fact experience yield penalties in 'normal' rainfall years. This is especially so when land leasing or sharecropping is dominant or significant land management practice, and farmers may not manage the same piece of land over multiple years. Michler, J.D., Baylis, K., Arends-Kuenning, M., and Mazimavi, K. (2019). Conservation Agriculture and Climate Resilience. *Journal of Environmental Economics and Management*, 93:148-169.

[77] Because of lower cost of inputs ? including labour costs, higher productivity, or increased output prices or lower post-harvest loss.

[78] The intention is also to provide extension services and enabling environment which allows farmers to cultivate wheat to take advantage of residual soil moisture (in rice fields ? just before or just after rice harvest).

[79] Tanji, K.K. and Kielen, N.C. (2002). *Agricultural Drainage Water Management in Arid and Semi-Arid Areas*. FAO Irrigation and Drainage Paper 61. Food and Agriculture Organization of the United Nations: Rome, Italy. <http://www.fao.org/3/y4263e/y4263e0e.htm>

[80] System-wide capacity development (CD) is essential to achieve more sustainable, country-driven and transformational results at scale as deepening country ownership, commitment and mutual accountability. Incorporating system-wide CD means empowering people, strengthening organizations and institutions as well as enhancing the enabling policy environment interdependently and based on inclusive assessment of country needs and priorities.

- Country ownership, commitment and mutual accountability: Explain how the policy environment and the capacities of organizations, institutions and individuals involved will contribute to an enabling environment to achieve sustainable change

- Based on a participatory capacity assessment across people, organizations, institutions and the enabling policy environment, describe what system-wide capacities are likely to exist (within project, project partners and project context) to implement the project and contribute to effective management for results and mitigation of risks.

- Describe the project's exit / sustainability strategy and related handover mechanism as appropriate.

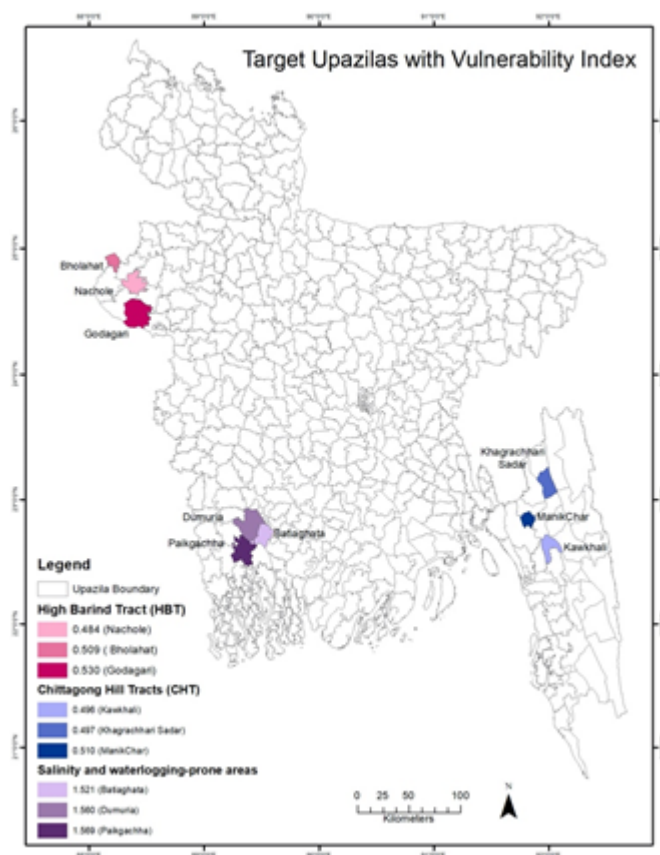
[81] Farmers may be reluctant to experiment with new innovations if there are high upfront costs, and sustained adoption over multiple seasons may not occur if, say, the returns from conservation agriculture are positive only for specific crop-by-severity of drought combination.

[82] See, for instance, Speranza (2010), Carter et al., (2017), and Carter et al., (2019) for other contexts. Speranza, C.I. (2010). *Resilient Adaptation to Climate Change in African Agriculture*. German Development Institute: Bonn, Germany. Carter et al., (2019). *Bundling Innovative Risk Management Technologies to Accelerate Agricultural Growth and Improve Nutrition*. Feed the Future Innovation Lab for Markets, Risk and Resilience: Davis, USA. Carter, M., de Janvry, A., Sadoulet, E., and Sarris, A. (2017) Index Insurance for Developing Country Agriculture: A Reassessment. *Annual Review of Resource Economics*, 9: 421-438.

[83] Of course, GoB may need to invest in replenishment of seed or planting materials in seed banks since erosion of genetic traits will occur.

1b. Project Map and Coordinates

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



The selected upazilas for the project as outlined in the map include the following: **High Barind Tracts** ? Nachole, Godagari, and Bholahat; **Saline/waterlogging** - Paikgachha, Dumuria, and Batiaghata; **Chittagong Hill Tracts** - Manikchhari, Khagrachari Sadar, and Kawkhali.

1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities Yes

Private Sector Entities Yes

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

Please refer to the attached Stakeholder Engagement Matrix.

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement

During the PPG phase, stakeholders were engaged via an inception workshop, three sub-national consultations, and one technical workshop. Of the 321 participants across these five events, only 53 (16%) were women. Stakeholders consulted include NGOs (e.g., BRAC, Winrock), agri-businesses (e.g., ACI, Janata Engineering, Mango Foundation), development partners (e.g., UNDP, UN Environment, GIZ, IFAD), financial institutions (e.g., Bangladesh Bank, Rajshahi Krishi Unnayan Bank), universities and research institutions (e.g., Bangladesh Agricultural University, CIMMYT, BARI), and of course, government departments and agencies. More importantly, both during the sub-national consultations and through field visits, farmers (205 in total, of which 41 were women) were surveyed or engaged in Focus Group Discussions-FDGs.

For further details on stakeholder engagement, please refer to the attached.

Select what role civil society will play in the project:

Consulted only; Yes

Member of Advisory Body; Contractor;

Co-financier;

Member of project steering committee or equivalent decision-making body;

Executor or co-executor;

Other (Please explain) Yes

Train SAAOs and UAOs as well oversee vulnerability risk assessments-VRAs, enable linkage between Farmer Organizations-FOs and agri-business actors, provide technical assistance for the design of credit products.

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

3.1 Analysis of broader context:

Bangladesh made significant progress in Millennium Development Goal (MDG) targets related to gender equality and women empowerment: women's labor force participation in nonagricultural sector increased from 19.1% in 1990-91 to 31.6% in 2013[1]. Typically, women are engaged in homestead production, pre-production and post-harvest stages for field crops, and maintain livestock and poultry. In 2014, 12.5% of households in Bangladesh were headed by women[2], and this proportion is higher in poorer regions of the country where seasonal or permanent migration by men to urban areas as a coping or risk management strategy is common. The Living Standards Measurement Survey (LSMS)-Integrated Household Survey reported that 22.6% of all landholdings are legally in a woman's name and they own about 10.1% of all agricultural land area. However, only about 4.6% of landholdings in 2008 were primarily managed by women (i.e., decision making)[3]. Because of the aforementioned outmigration, intra-household dynamics are changing and evolving, and women are taking on greater roles in production and marketing of crops. Rural employment in agriculture for women increased from 58.27% in 2000 to 65.21% in 2013 and declined for men (from 63.28% to 51.81%, in 2000 and 2013 respectively)[4]. However, despite contributing equally or to a higher proportion of agricultural labor, women are frequently excluded from high value/market-oriented activities,[5] and as a result have reduced access to or control over income streams. Such exclusion also extends to access to productive assets, information, modern technologies, and MSME finance. In 2019, for instance, only 0.7% of females employed were *employers* (compared to 6% for males), that is working on their account or with one or two partners (self-employment jobs)[6]. A

significant difference in agricultural daily wages for male and female labourers continues to exist [7] and there are fewer non-agricultural employment opportunities in the lean season in some areas[8]. While gender equality and women's empowerment have been identified as one of the top 10 priorities by GoB, much remains to be done since women's formal sector employment (8.2% of total employment) remains lower than men's (17.9%)[9].

One review of key climate change adaptation policies revealed that differentiated gender impacts of climate change are not recognized in, among others, BCCSAP (2010), National Plan for Disaster Management 2010-2015, or the Health Policy 2011[10]. Hence, it is important to recognize and address the underlying structural causes for persistence in gender inequality, and the gendered dimensions to climate vulnerability, livelihoods and employment opportunity, participation and decision-making.

Traditionally, MFIs and NGOs in Bangladesh have tended to target women for lending activities, even if the size of these loans are relatively small but access to banks finance is constrained. All the same, some recent policies and programs illustrate how progress can be made and this project will draw on lessons therein and leverage associated projects. MoWCA (2019) notes that 1.58 million borrowers of the 3.96 million farmers who received agricultural and rural credit in 2017 were women. Between 2014-19, the Department of Agricultural Extension specifically targeted women in its trainings on high-yielding varieties, food processing, packaging and preservation, and ICT, as a result of which 621,020 women are reported to have been trained. Bangladesh Bank has set interest rates for women entrepreneurial borrowers at 9%, and the 2016 National Industrial Policy categorized and redefined industries to facilitate women's access to institutional finance. The Income Generating Activities (IGA) project 2017-20 is targeting 20 million rural women for entrepreneurial development activities. And finally, 45% of the 45,324 entrepreneurs provided with credit to develop agri-businesses by the Department of Agricultural Marketing are women[11].

An impact evaluation of Bangladesh Agribusiness Development Project[12] noted that the project considered gender in three stages (economic, social and political empowerment of women), and that the project was able to improve women's participation and decision making in setting up new enterprises and utilization of loans. It recommended trainings on production, processing, disaster management, and overall marketing at all levels, including at the village level individually or collectively to increase participation of women entrepreneurs. Another evaluation study[13], of the Northwest Crop Diversification Project, found that the project was able to successfully target women in groups for cultivation and marketing of high value crops, and that it set aside space for women entrepreneurs to setup shops in newly established markets. Despite these measures, women's corner operated in only 2 of the 15 *upazilas* because of local social and cultural norms (security concerns, scarcity of buyers, lack of restrooms etc.). Because division of work along gender lines is high in agriculture, it recommended that training and involvement of women should be promoted in

post-harvest, seed processing and credit management rather than just field-oriented activities (such as cultivation, where women are typically involved).

At the policy level, the government has taken affirmative action to promote gender equality and women's empowerment as defined in, among others, (1) Seventh Five Year Plan FY2016-FY2020 (gender and inequality identified as a national priority); (2) National Women Development Policy 2011 (ensure full and equal participation of women in mainstream socioeconomic development, and provide overall assistance in ensuring the growth of women entrepreneurs); (3) Climate Change and Gender Action Plan (2013); (4) the Gender Policy of DoE, MoEFCC[14]; (5) 2018 National Agriculture Policy (identifying activities for development of women's involvement in the agricultural sector, including technical support on post-harvest activities and agricultural businesses, separate extension programs for women, and initiate measures to eliminate wage differentials for women workers in agriculture); and (6) the way gender perspectives have been incorporated in comprehensive manner in the National Adaptation Programme of Action (NAPA).

Synthesis of findings on women in agriculture for target landscapes

Activity domains	Findings on roles, from household surveys and group discussions (see Annex M)
Production	<p>Women are by and large involved in homestead production. Engagement in field crop production is in the form of labor, for the household's own agricultural plot, for preparing pit, to planting/transplanting seeds/seedlings, manuring and fertilizing, watering, fencing, weeding, and harvesting. Women are responsible for threshing and proper storage of agronomic and horticultural crops (vegetables, mangoes, guavas etc.) as well as priming of seeds (chickpea, rice) as in the HBT region.</p> <p>However, in Khulna region (waterlogging and salinity prone), it was found that women are playing more intensive role in crop production on dikes and on lands adjacent to the household. They are exclusively involved in compost production, land preparation, seed collection and storage, seedling collection and plantation, irrigation, weeding, pest management, fertilizer application, harvesting for household consumption /sale, and seed storage for future production. Similarly, in CHT, women play a wider role.</p> <p>In general, because of cultural practices and local traditions, women typically do not engage in agricultural daily wage labor. Some exceptions being women of ethnic or minority communities (e.g., Santal community in HBT, indigenous groups in CHT). Similarly, since women's labor is less expensive compared to men in HBT and Khulna, women from landless/marginal households engage in all crop production activities (from land preparation to post-harvesting) based on demand.</p>

<p>Access to agricultural inputs</p>	<p>Across all locations, women have limited access to agricultural inputs. Moreover, the women have limited knowledge on the variety, quality, source, and correct technical application of inputs. They depend on suggestions of agricultural extension service providers from government or local NGOs.</p> <p>In Batiaghata upazila of Khulna district, women groups (as a part of the World Bank funded National Agricultural Technology Project - NATP2) have been organized to produce vermicompost at the household level and sell it at the community level as an enterprise. The project provided training to the women groups, and necessary earthworm to setup one vermicompost ring. The group of 12 women then purchased their own rings and constructed sheds to start vermicompost production. Observing the success of this group, other women/households developed interest, and currently, 85 families produce vermicompost in the village for their own use and sale.</p> <p>In general, women maintain household level seed banks. They collect vegetable seeds from their own field/homestead and store it for the next season, and exchange seeds with neighbors. In some cases, women collect quality seeds from the local office of DAE.</p>
<p>Post-harvest activities and access to output markets</p>	<p>Women do not engage in harvesting or picking activities, unless it is homestead production. Women are responsible for post-harvest activities such as threshing, winnowing, and drying and storing of grains/produce^[15]. They usually carry the harvested crops from the field to the house for either storage or (light) post-harvest processing.</p> <p>Value addition activities are minor in nature across target geographies, unless supported by a project or initiated by agri-business facilities. For instance, a number of women work in the Chapai Agro-processing Company (Gomastapur upzaila, Nawabganj district, HBT) to process and pulp mango and tomato. Akij Fruit Processing Company in Bholarhat upazila of HBT exclusively involves only women to produce pulp from mango and tomato.</p> <p>However, women do produce pickles from mango, tamarind, plum, and chili for their household consumption ? i.e., even if they are not involved in commercial post-harvest activities.</p>
<p>Access to finance</p>	<p>The microfinance model in Bangladesh primarily targets women, one reason being their lower risk profile (i.e., repayment of loan is higher and defaults are lower for women compared to male borrowers). Women, irrespective of location, are generally the main borrowers of microfinance loans but male members of the family make decisions and use the credit. Microfinance Institutions (TMSS, PROVA) report that women's access to commercial banking for agricultural purposes is very low. Their limited ownership of assets contributes to this situation. The situation in CHT is different from other parts of the country since women here do not draw loans from either banks or MFIs.</p>

Access to extension information	<p>The situation is same as access to inputs, but projects are starting to make a difference. In Batiaghata upazila of Khulna division, most of the women of a common interest group (CIG, 20 members), supported by the NATP2 project of the DAE, have a smartphone where BAMIS apps are installed (requires internet). Women regularly check the weather updates from BAMIS, and if critical information is received from DAE, they immediately disseminate to the neighboring households/farmers. In addition, the same CIG has formed a Facebook messenger group wherein the SAAO provides weather information and crop advisory. Women use this information in their agriculture related activities and pass on the same to other women/households in their area who do not have online access, paying special attention to farmers who have standing crops.</p>
Leadership and role in decision making	<p>In most cases, women are not involved in the decision-making for field crop selection, marketing, adoption of technologies/inputs, or agricultural mechanization. However, women are playing a key role in decision making for small-scale crop production in homesteads (for household consumption) on a regular basis. The women of the previously mentioned CIG group run their vermicompost business independently and take their own decisions. They also playing crucial role in disseminating weather information in the community.</p> <p>Overall, women are starting to get more involved in decision making day-by-day with a gradual improvement of their agricultural knowledge through participating in various capacity building activities of the government.</p>

3.2 Gender responsiveness in project activities:

The potential to promote women's empowerment / gender equality is one of the criteria, in FAO's Sustainable value chain prioritization matrix, that was used to analyze and prioritize value chains for this project. In that sense, gender is well-integrated into the design of the project and is a part of its theory of change. **To ensure that the project is inclusive and gender-responsive, the following measures will be adopted during project implementation:**

- Identify entry points for women in selected value chains or market orientation/value addition activities, considering their differential constraints and access to resources. Project activities will go beyond targeting women farmers or women associations (producer groups, cooperatives, MSMEs), even as this remains a good approach to strengthening women's social capital/bargaining power and collective action.
- Recognizing that women have unequal access to and control over assets and resources, the project will earmark certain productive assets for management by women (e.g., vermicompost pits, seed banks).
- Specify (and monitor targets) mandatory minimums (to be determined in consultation with local stakeholders, typically 40%) for women's participation and engagement in decision-making/leadership roles and management committees (if any are formed), training activities, and knowledge-sharing events, and addressing underlying constraints to effective participation (e.g., low mobility, negotiation skills).
- Ensure adequate participation of women, particularly female-led households, in the participatory assessment/appraisal of climate change challenges, and identification of adaptation actions with explicit attention to the unique challenges women face and their needs.
- Monitoring, Evaluation, and Learning activities to pay special attention to any changes in intra-household allocation of labor, resource, and decision-making as a result of project activities. Such MEL is necessary to avoid reinforcing or exacerbating existing inequalities. For instance, if the adoption of a technology or management practice promoted by the project increases the demand for women's unpaid labor.

- Mid-term Review (MTR), Terminal Evaluation, process evaluations, and surveys will pay special attention to the project's gender mainstreaming strategy, evaluate the adequacy of measures and actions taken during implementation, and make recommendations for course correction (if any).
- Include a training for all key project staff on gender analysis in agricultural value chains, and best practices to promote gender and social inclusion (with inputs from the Ministry of Women and Children Affairs, including the Upazila and District WID Coordination Committee). FAO and UNDP have recently developed a 'Gender in adaptation planning for the agriculture sectors: Guide for trainers'[16]. This and other materials will be adapted to Bangladesh context.
- Identify men (SAAOs, Upazila Agricultural Officers, DAE officials at the upazila or district level, DoE or MoEFCC gender focal points etc.) who can be engaged as 'agents of change' during implementation and function as 'champions for gender equality'.
- The project team will be gender balanced i.e., women will be employed in not just in administrative or support functions, but adequately represented in technical functions. Based on evaluation learnings and recommendations from other significant agricultural adaptation projects, a gender expert role has been created under DAE for 36 months.
- The following gender action plan specified the interventions of the project to enhance the resilience and empowerment of women.

Gender Action Plan and Budget

Key Findings from the gender analysis (or equivalent socio economic analysis)

1. While the GoB has taken affirmative action to promote gender equality and women's empowerment, persistence in gender inequality remains.
2. Limited involvement of women in crop production, outside of homestead agriculture (exceptions in CHT and some areas of Khulna). Role increasing because of out-migration by males.
3. Limited knowledge of or access to improved technologies and agricultural inputs.
4. Engagement in post-harvest activities is limited to light processing and transforming produce for household consumption. However, institutions have successfully integrated women fully or significantly into workforce of agri-business companies
5. Women have good access to finance through microfinance institutions ? but do not control the use of loans. Access to commercial banks by women for agricultural production is very low. The situation is starkly different in CHT where women do not access MFI loans either.

Project activities to respond to the identified gaps	Indicators and Targets	Timeliness	Responsibilities	Budget
1.3. Strengthened inter-sectoral planning and investment prioritization processes at national and sub-national level for resilient agriculture in Bangladesh				

<p>1. Training to national and sub-national government officials (mid-career and early career) as well as master trainers on designing and implementing gender-sensitive value chains (this will build on FAO's comparative advantage on gender in agriculture, the guidelines developed for practitioners in 2016 and 2018 on developing gender-sensitive value chains, and draw on the 2019 joint FAO-UNDP guide for trainers on gender in adaptation planning for agriculture sectors; this activity recognizes that gender-based discrimination undermines women's productive capacity and entrepreneurial potential).</p> <p>2. Women are adequately represented among participants in trainings on selection, prioritization, and implementation of climate-resilient interventions.</p>	<p>Government officials trained on gender-sensitive value chains</p> <p>- <i>Baseline: N/A; Target: 100 Government officials are trained at national and sub-national level on practical tools and examples of successful approaches/mechanisms to foster gender equality along the value chain. One (1) focused training in Dhaka. All 14 other trainings at the national or sub-national level targeting government officials or trainers will include gender-sensitive value chains module</i></p> <p>Male government officials nominated to be 'agents of change' and will function as champions for gender equality</p> <p>- <i>Baseline: N/A; Target: In total, 9. 3 government officials from MoEFCC, DOE, and DAE, and 6 government officials at the sub-national level</i></p> <p>Number of women government officials participating in trainings related to selection, prioritization, and implementation</p>	<p>By Project Year 1</p>	<p>PMU Ministry of Environment, Forest and Climate Change, particularly its Department of Environment & Ministry of Agriculture, particularly its Department of Agricultural Extension will nominate officials to attend the training on gender-sensitive value chains, and formalize nomination of gender champions</p>	<p>USD 12,000 (USD 5,000 for thematic training, USD 7,000 to support FAO HQ/RAP personal travel for thematic event training) and included in regular budget for other trainings.</p>
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2.1. Community climate vulnerability and risk assessments and adaptation prioritization exercises at the village / community level

<p>1. CBA assessments and VRAs will explicitly consider women's differential vulnerabilities and needs, and decisions on actions to be taken at household or community level will be gender-sensitive.</p> <p>2. Manual, on facilitating VRAs, will identify actions and approaches to ensure women's participation in the processes, and ensure their voice in adaptation option identification, prioritization and decision-making.</p>	<p>Gender mainstreaming in participatory assessments /appraisals</p> <p><i>Baseline: N/A; Target: adequate participation of women, particularly women-led households, in the participatory appraisal/assessments, and identification of adaptation actions with explicit attention to women-specific challenges and needs</i></p> <p>Gender mainstreaming in manual on facilitating assessments /appraisals</p> <p><i>Baseline: N/A; Target: adequate attention is paid to actions and approaches that can (a) foster women's participation in the participatory appraisal/assessment, (b) ensure their voice is heard, and (c) promote adaptation options that prioritize women's unique vulnerabilities and needs</i></p>	<p>By Project Year 3</p>	<p>PMU</p>	<p>Included in regular budget.</p>
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3.1 Strengthened capacities and performance of farmer organizations (producer groups, farmer cooperatives, common interest groups)

<p>1. Women leadership and management of farmer organizations (common interest groups, producer groups, cooperatives etc.), which will be created or enhanced through the project, is promoted and delivered.</p>	<p>Number of women-led and managed farmer organizations created or enhanced</p> <p><i>Baseline: N/A; Target: 160 women-led and managed farmer organizations will be created or enhanced through facilitated development of their managerial, technical, and business management/market ing capacities</i></p>	<p>By Project Year 5</p>	<p>PMU</p>	<p>USD 336,000 for creation/enhancement of women-led and managed farmer organizations.</p>
<p>2.2. Strengthened mechanisms to improve farmer knowledge of climate-resilient agriculture through extension services and Farmer Field Schools &</p> <p>2.3. Improved uptake by farmers of climate-resilient crops, varieties, and management practices through transfer of seed kits and other inputs</p>				

<p>1. Female farmers are specifically targeted and trained by the project and adopt climate resilience innovations and experience socio-economic benefits to their livelihoods.</p> <p>2. Women farmers who receive high quality seeds or saplings to promote climate resilience/stress tolerance crop/variety production.</p>	<p>Number of women farmers who receive training and adopt climate resilience innovations at plot- or household-level</p> <p><i>Baseline: N/A; Target: 12,000 women farmers are trained via the Farmer Field Schools, and 10,000 women adopt climate resilience innovations at plot- or household-level</i></p> <p>Number of women farmers who receive high quality seeds or saplings and engage in climate resilient/stress tolerant crop/variety production</p> <p><i>Baseline: N/A; Target: 10,000 women farmers receive high quality seeds or saplings for production</i></p>	<p>By Project Year 5</p>	<p>PMU</p>	<p>Included in regular budget.</p>
<p>2.4. Strengthened initiatives for Nature-based Solutions and community ownership of agricultural assets</p>				

<p>1. Women farmers or women-led and managed farmer organizations are supported in the establishment and management of seed banks (with stress tolerant seed varieties) and vermicompost production (at household or village level).</p>	<p>Number of women farmers or women-led and managed farmer organizations supported to establish and manage vermicompost production and/or seed banks</p> <p><i>Baseline: N/A; Target: 300 vermicompost units and 100 seed banks are established and managed by women or women-led and managed farmer organizations</i></p>	<p>By Project Year 5</p>	<p>PMU</p>	<p>Included in regular budget. USD 330,000 to support vermicompost unit and seed bank establishment.</p>
<p>COMPONENT 4. ENABLE EFFECTIVE KNOWLEDGE MANAGEMENT, AND MONITORING, EVALUATION AND LEARNING (MEL)</p>				
<p>1. All MEL activities (surveys, case studies, key respondent interviews, process evaluations) mainstream gender i.e., collect sex-disaggregated data and intra-household allocation of labor, access to and control over resources, and participation in decision-making</p>	<p>Gender mainstreaming in all MEL activities</p> <p><i>Baseline: N/A; Target: All MEL activities (surveys, case studies, key respondent interviews, process evaluations) collect sex-disaggregated data, and include an evaluation of changes in intra-household allocation of labor, women's access to and control over resources, and women's participation in decision making</i></p>	<p>By Project Year 5</p>	<p>FAO</p>	<p>Included in regular budget.</p>
<p>Project Management Unit</p>				

1. Women are represented adequately in national technical project management positions	Number of women in technical roles (at the national level) paid from project budget <i>Baseline: N/A; Target: At least 50% of the national staff/consultants hired in technical positions for the project are women</i>	By Project Year 5	PMU	Included in regular budget.
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[1] GED (2016). Millennium Development Goals: End-period Stocktaking and Final Evaluation Report (2000-2015). General Economics Division, Bangladesh Planning Commission: Dhaka, Bangladesh.

[2] NIPORT, Mitra and Associates, and ICF International. (2016). *Bangladesh Demographic and Health Survey 2014*. National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International: Dhaka, Bangladesh, and Rockville, Maryland, USA.

[3] FAO Gender and Land Rights Database. http://www.fao.org/gender-landrights-database/data-map/statistics/en/?sta_id=982&country=BD.

[4] Table 4, Chapter VI. World Bank (2019).

[5] FAO (2016). *Developing Gender-Sensitive Value Chains ? A Guiding Framework*. Food and Agriculture Organization of the United Nations: Rome, Italy.

[6] Source: <https://databank.worldbank.org/source/gender-statistics>. Indicator: Employers, male (% of male employment) (modelled ILO estimate) (SL.EMP.MPYR.MA.ZS).

[7] GED (2015). Seventh Five Year Plan FY 2016-FY2020: Accelerating Growth, Empowering Citizens. General Economics Division, Planning Commission, GoB: Dhaka, Bangladesh.

[8] WFP (2012). *Bangladesh Food Security Monitoring Bulletin*. Issue No. 11. World Food Programme (WFP): Dhaka, Bangladesh.

[9] MoWCA (2019). *Comprehensive National Review Report, for the Beijing 25+ Implementation of the Beijing Declaration and Platform for Action 1995*. Ministry of Women and Children Affairs, GoB: Dhaka, Bangladesh.

[10] Shabib, D. and Khan, S. (2014). Gender-sensitive Adaptation Policy-making in Bangladesh: Status and Way Forward for Improved Mainstreaming. *Climate and Development*, 6(4): 329-335.

[11] MoWCA (2019).

[12] IMED (2016). *Impact Evaluation Study of Bangladesh Agribusiness Development Project (1st revised)*. Evaluation Sector, Implementation Monitoring and Evaluation Division (IMED), Ministry of Planning, GoB: Dhaka, Bangladesh.

[13] IMED (2010). *Impact Evaluation of Northwest Crop Diversification Project*. Evaluation Sector, Implementation Monitoring and Evaluation Division (IMED), Ministry of Planning, GoB: Dhaka, Bangladesh.

[14] DoE (2016). *Gender Policy*. Department of Environment, Ministry of Environment and Forests, GoB: Dhaka, Bangladesh.

[15] Alam and Khan (2017) also report on engagement in farm activities by gender, with women's labour dominating the post-harvest processing.

[16] Nelson, S. and Hill, C. (2019). *Gender in Adaptation Planning for the Agriculture Sectors: Guide for Trainers*. Rome, Italy.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources;

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women Yes

Does the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

Given the value chain orientation of the project, engagement of the private sector is critical to delivery of outputs and outcomes related to.

- Mapping value chain networks and identifying investment opportunities (*as stakeholders*), and facilitate private sector technology and service delivery mechanisms
- Dissemination of technologies (seeds, machinery, etc.) to promote climate-resilient livelihoods and landscapes (*as both service providers and beneficiaries*)
- Establishment of agreements between farmers/farmer collective organizations and private sector institutions for processing and marketing of produce (*as both service providers and beneficiaries*)
- Design, piloting, and scaling financial instruments (*credit*) for farmers, entrepreneurs, or MSMEs in target landscapes (*as service providers and beneficiaries*)

- Development and dissemination of climate and weather information services for farmers and value chain actors (*as SMS service providers and beneficiaries?private sector institutions*)

During the preparation of the full proposal (as well as PIF) extensive consultations were done with private sector, both in the target geographies and in Dhaka. The choice of project interventions for climate resilience were derived from an extensive scoping and consultative exercise ([Annex M](#), [Annex N](#)), and these consultations and individual meetings ([Annex I2](#)) included private sector actors. For each of the interventions proposed, there is a clear case to be made that private sector linkage could be transformative: for instance, the potential provision of high quality CA machinery and repair/maintenance services would enable the service provider to reach more farmers in any given season, and farmers to increase the land cultivated under CA (e.g., with wheat, maize, or mustard); similarly, access to cold storage and transport services could significantly increase market opportunities and reduce post-harvest loss for farmers cultivating, say, watermelon in waterlogging- and salinity-prone areas. The ability to store and transport produce without loss in quality / quantity would, of course, allow farmers to access more distant urban markets and benefit from higher rates. As the CSAIP notes, lack of adequate facilities to store perishable agricultural commodities limits farmer's ability to bring them to markets. Introducing refrigerated transport or storage systems can help ensure smallholder farmers can sell their produce without loss in quality and creating such systems will require access to credit ? combining it with substantive grant from LDCF-BCRL could reduce business risks. Farmer organizations, individual entrepreneurs, and MSMEs interested in such instruments are constrained by lack of access to technical know-how and physical collateral for loans. To summarize, identifying business opportunities for the private sector agribusinesses, carefully screening for manageable risks, and potential for active post-project phase interest?to ensure project establishes ?proof-of-concept??was an integral part of project development.

The project will support local entrepreneurs to deliver services to farmers related to crop production (e.g., farmers will be able to hire a raised bed planter) and post-harvest transport or storage, and MSMEs who will engage in aggregation, agro-processing, or specialized input provision (e.g., bags to enable ?fruit bagging? of mango). It will also link with large agri-business firms for a range of services along the value chain. Such entrepreneurs and MSMEs will receive incubation support (in the form of grants) and technical assistance (from the project's Agribusiness Expert and through a vendor who will design the credit product). Farmers and producer organizations will receive assistance to setup agreements with MSMEs/large agri-businesses for input provision and procurement. That is, the project will support the development of local private sector capacity and leverage this investment to engage with large agri-businesses to establish the business case and nurture interest in commercialization and upscaling initiatives.

Finally, to promote private sector investment (i.e., in finance, technology, services) in innovations to enable climate-resilient livelihoods and landscapes,

the project will develop businesses models based on MSMEs established or strengthened through project activities. Such a business model could include an assessment of investment gaps at a sub-national or national level, economic/financial impact of these investment gaps, technology/service solutions to address the gaps (e.g., cold storage, crop advisories via SMS, multiple machinery options for CA), capital (finance, human, land) requirements, business viability ? including, options by firm size, and technical requirements. Much like NABARD?s ?model bankable projects? which play a pivotal role in increasing flow of credit to farmers and the agriculture sector[1], making these publicly available (open access) would address the information asymmetry commercial banks and large agri-business firms tend to experience and spur investments by strengthening their internal business case.

FAO and the Economic Relations Division (ERD) have submitted a GCF Readiness proposal to strengthen NDA Secretariat capacity, GCF pipeline implementation, and enhance private sector engagement in climate action. The project is expected to begin in late 2020 and continue for 2 years. A key deliverable for that project is to make recommendations on financial and non-financial mechanisms to crowd-in private sector investments in climate action, by identifying barriers. The national dialogues will serve as an opportunity for highlighting opportunities and priority investment in climate-smart/climate-friendly technologies in agriculture, forestry, and land-use sectors. The GCF Readiness project activities can hence strongly complement LDCF-BCRL project.

[1] <https://www.nabard.org/info-centre-model-bankable-projects.aspx?cid=506&id=24>

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Section A: Risks to the project

The project was developed using a consultative / participatory approach to ensure a thorough understanding of potential risks involved. The PSC (Project Steering Committee), PIC (Project Implementation Committee), and the PTF (Project Task Force) will review this initial risk assessment, and monitor risks and mitigation measures throughout the project implementation.

Description of risk	Probability of occurrence [1]	Impact [2]	Mitigation actions	Responsible party

Description of risk	Probability of occurrence [1]	Impact [2]	Mitigation actions	Responsible party
<p><u>Execution Risk:</u> Disruptions and delays in implementation project activities due to restrictions on movement (national, international transport) and/or alternate working arrangements due to COVID-19 pandemic.</p>	M	H	<p>- FAO will continue working closely with the Government of Bangladesh and the United Nations Resident Coordinator's office to monitor COVID-19 related developments, and implement business continuity plans. In case of in-person meetings, activities will be planned to consider government sanitary restrictions put in place. At the same time, GoB has quickly developed and scaled up capacities to organize meetings and workshops online. For e.g., the validation workshop for LDCF-BCRL PPG phase was conducted online with high-level participation from MoEFCC, DAE, and DOE.</p>	PMU

Description of risk	Probability of occurrence [1]	Impact [2]	Mitigation actions	Responsible party
<p><u>Execution Risk:</u> Changes in senior government officials (because of GoB policies) or limited availability of time from key officials can hamper decision making, the implementation of project activities because of delays in approval, and coordination between FAO and GoB or between various GoB ministries / departments because of lack of buy-in and affect institutional memory. Stakeholders are unable to agree on their roles in the project implementation</p>	M	H	<ul style="list-style-type: none"> - The validation workshop and project inception workshop will reiterate the SEP and seek concurrence on roles and responsibilities of each stakeholder. - The coordination and reporting arrangements between various line ministries and departments, especially DoE and DAE, will be clearly defined. Adequate support in the form of project staff is built into the project budget. - The PSC and PICs are mandated by the GoB to provide adequate support and oversight to all project activities. MoEFCC, DAE, and DOE will attempt to provide continuity by ensuring that project staff are retained throughout the project implementation period. Regular meetings of the PSC and PICs, at least once every quarter for PICs and twice a year for PSC, will further ensure buy-in and ownership. Alternatives to all PSC and PIC members will be identified and invited to project training events and monitoring visits to ensure continuity. - Training activities will strengthen across-the-board institutional capacity to avoid over-reliance on a limited number of government officials for implementation. Trainings and re-trainings will be completed at national and sub-national levels. 	PSC / PIC

Description of risk	Probability of occurrence [1]	Impact [2]	Mitigation actions	Responsible party
<p><u>Implementation Risk:</u> Wide geographical coverage makes coordination between sub-national and national partners challenging, and poses a challenge for effective implementation and MEL</p>	L	H	<ul style="list-style-type: none"> - During inception workshop as well as follow-up PPG Phase meetings, DOE, DAE, and KGF expressed an interest in retaining focus across all PIF-identified geographies. As outlined in Section 2, a careful analysis has been done to identify highly vulnerable <i>upazilas</i> (between 30,000-70,000 households), and the project will emphasize intensification of activities within those <i>upazilas</i>. The number of target beneficiaries for each vulnerable geography has been determined in consultation with GoB to ensure feasibility and impact potential. - DAE has significant experience ? such as through NATP ? of implementing projects in disparate locations of Bangladesh. To the extent possible, these efforts will be built on (for instance, strengthening existing CIGs). - Regional Project Coordinators will be appointed and located within DAE and will closely coordinate with the National Project Director / Deputy Project Directors and attend PIC meetings (where feasible). - Since SAAOs do not receive government reimbursement for fuel or communication costs, the project will mitigate the risk of non-delivery through a small compensation for such recurring costs each month (this is one of the lessons from NATP-I implementation). 	PMU

Description of risk	Probability of occurrence [1]	Impact [2]	Mitigation actions	Responsible party
<p><u>Implementation Risk:</u> Inability or risks involved in management of project funds and assets, and accurate and timely reporting, or ineffectiveness of control systems to protect assets and resources as per GEF and FAO OPA requirements</p>	L	H	<p>- Capacity assessment conducted by other UN agencies within the past five years was used as the basis of the Operational Partner Agreement (OPA). The overall risk rating was 'low' for DoE, and 'low' for DAE. During project implementation, safeguards measures such as assurance activities (audits, spot checks) and their frequency will take the capacity assessment subject area risk rating into account.</p>	PTF / PSC
<p><u>Environmental Risk:</u> Extreme weather events in target geographies (severe drought, floods, cyclones, landslides) affect farmer's willingness or their ability to adopt and scale project interventions. Such events may erode project benefits or investments (seed banks, vermicompost pits), or affect access to project sites</p>	M	M	<p>- Project activities have been designed taking into consideration the potential climatic risks and the resultant delayed accrual of benefits.</p> <p>The project will monitor developments and develop contingency plans where necessary and work closely with disaster / humanitarian assistance agencies where needed.</p> <p>- The project will co-opt local communities, through participatory assessments, in identification and implementation of site-specific adaptation measures.</p>	PTF & PMU
<p><u>Political Risk:</u> Inadequate access to communities because of changes in political environment, particularly indigenous communities of the Chittagong Hill Tracts</p>	L	H	<p>- As was done during project preparation, project implementation will involve close coordination and engagement of indigenous communities' governance structures to ensure buy-in and enable continuity.</p> <p>- FAO has long experience of working in CHT in line with government regulations on travel and approval for meetings. It will monitor developments and develop contingency plans where necessary.</p>	PMU

Description of risk	Probability of occurrence [1]	Impact [2]	Mitigation actions	Responsible party
<p>Implementation Risk: Project created guidelines or manuals are not utilized or updated. Quality of extension and advisory services does not improve over the implementation period, including due to constrained human or financial resources</p>	M	H	<ul style="list-style-type: none"> - All guidelines and manuals will be developed or adapted to the Bangladesh context, and will be available in both Bangla and English to ensure uptake and ease of use. - The project budget includes extensive trainings and re-trainings that will reiterate the utility of these knowledge management products in policymaking and programming. It also places substantive emphasis on ?training of trainers?. - Farmer organizations and lead farmers will be viewed as equal partners in awareness raising and promoting learning. A substantive body of emerging impact assessment evidence shows the effectiveness of such peer-to-peer learning networks, sometimes exceeding changes fostered by the extension system. 	PMU
<p>Implementation Risk: Project activities impact women differently or exacerbate existing inequalities</p>	M	H	<ul style="list-style-type: none"> - See Gender Action Plan. - See Indigenous Peoples Plan 	PMU

The project is designed to promote climate resilience and sustainable management of target landscapes with explicit recognition, during the PPG phase, of landscape-scale issues. It aims to improve the resilience of livelihoods, particularly of smallholder farmers in vulnerable areas i.e., areas vulnerable to climate risks, facing diverse ecological issues, and with poor socio-economic development status. In the High Barind Tract, it will promote activities that will increase resilience to drought and water stress, improve soil quality, and contribute to recovery of groundwater tables (through rainwater catchment structures and improved soil quality). Additionally, practices such as residue retention and mulching are uniquely suited to lower the risk of damage from frost during HBT winters. In the Southern Bangladesh, within areas that are salinity- and/or waterlogging-prone, the project will promote activities that mitigate salinity risks in crop production through promotion of crops and varieties with salinity tolerance and supporting rainwater conservation for freshwater availability. Management practices that can help avoid or reduce the

impact of low- to moderate- waterlogging (e.g., raised bed planting) will also be simultaneously promoted. In doing this, the project recognizes that such measures may be inadequate, and significant landscape-scale infrastructural measures may be necessary (e.g., tidal or riverbank management) but that is not within the scope of this project. In the Chittagong Hill Tracts, the project will demonstrate and pilot activities that reduce the risk of soil erosion/loss, flashfloods and landslides stemming from vegetation degradation, low soil organic matter, and heavy rainfall incidence.

In order to enhance targeting of smallholder farmers, and taking onboard the emergent impact assessment evidence on short-run trade-offs (e.g., yield loss in the initial years) upon shift to practices such as conservation agriculture^[1] or the time lag before a fruit tree becomes productive, the project will provide seed kits to farmers over two years and support the setup of seed banks and vermicompost units thereby reducing initial cost of production. Further, across all geographies, bundling of interventions i.e., combination of on-farm management practices with provision of crop advisories, access to markets (e.g., reduction of post-harvest loss via improved storage, handling or transport capabilities) will further contribute to reduced agricultural risks and to improved farm income. Finally, farmers will not just be trained by extension agents on project innovations but will have the opportunity to mobilize and build social capital through farmer organizations.

[1] Giller, K.E., Witter, E., Corbells, M. and Tittonell, P. (2009). Conservation Agriculture and Smallholder Farming in Africa: The Heretics? View. *Field Crops Research*, 119 (2009): 23-34.

[1] H: High; M: Moderate; L: Low.

[2] H: High; M: Moderate; L: Low.

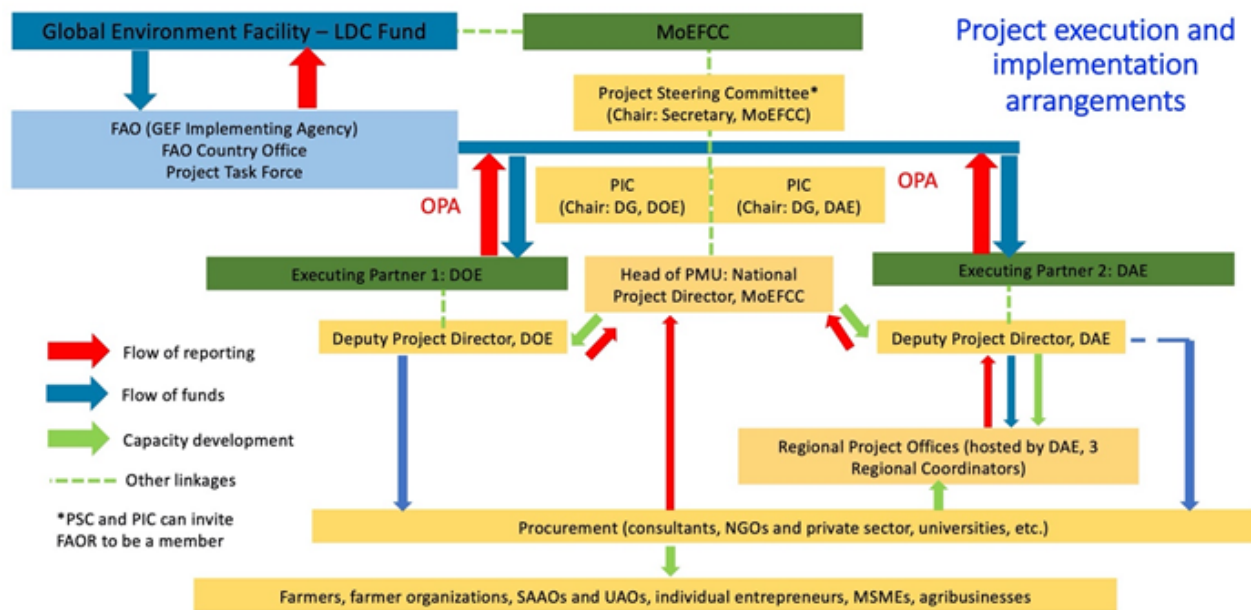
6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

.a Institutional arrangements for project implementation.

The Department of Environment-DoE and Department of Agricultural Extension-DAE will have the overall executing and technical responsibility for the project, with FAO providing oversight as GEF Agency as described below. DoE will act as the led executing agency and will be responsible for the day-to-day management of project results entrusted to it in full compliance with all terms and conditions of the Operational Partnership Agreement signed with FAO. As Operational Partner-OP of the project, both DoE and DAE are responsible and accountable to FAO for the timely implementation of the agreed project results, operational oversight of implementation activities, timely reporting, and for effective use of GEF resources for the intended purposes and in line with FAO and GEF policy requirements. The

government will designate a National Project Director (NPD). Located in the Project Management Unit, and nominated by the Ministry of Environment, Forest, and Climate Change (MoEFCC), the NPD will be responsible for coordinating the activities with all the national bodies related to the different project components, as well as with the project partners. He will also be responsible for supervising and guiding the Deputy Project Director, nominated by DOE and Deputy Project Director, nominated by DAE (see below) on the government policies and priorities. The project organization structure is as follows:



The Secretary of the Ministry of Environment, Forest, and Climate Change will chair the Project Steering Committee-PSC which will be the main governing body of the project. The PSC will approve Annual Work Plans and Budgets on a yearly basis and will provide strategic guidance to two Project Implementation Committees-PICs, Project Management Team and to all executing partners. Per the GoB gazette notification, the PIC is responsible for (1) giving necessary assistance or suggestion for implementing project activities; (2) giving necessary decision to resolve problems that arise during project implementation; (3) meeting at least once in three months; and (4) co-opting members, where necessary. In line with GoB norms, there will be two PICs for this project. One PIC will be headed by Director General, DoE, and the other PIC will be headed by Director General, DAE, and will provide oversight for activities under DOE and DAE project components respectively. The members of the PSC and PICs will each assure the role of a Focal Point for the project in their respective agencies. Hence, the project will have a Focal Point in each concerned institution. As Focal Points in their agency, the concerned PSC members will: (i) technically oversee activities in their sector; (ii) ensure a fluid two-way exchange of information and knowledge between their agency and the project; (iii) facilitate coordination and links between the project activities and the work plan of their agency; and (iv) facilitate the provision of co-financing to the project.

The National Project Director (see below) will be the Secretary to the PSC and the two PICs. The PSC will meet at least twice per year to ensure: i) Oversight and assurance of technical quality of outputs;

ii) Close linkages between the project and other ongoing projects and programmes relevant to the project; iii) Timely availability and effectiveness of co-financing support; iv) Sustainability of key project outcomes, including up-scaling and replication; v) Effective coordination of government partner work under this project; vi) Approval of the six-monthly Project Progress and Financial Reports, the Annual Work Plan and Budget; vii) Making by consensus, management decisions when guidance is required by the PICs and National Project Director of the PMU. Per the GoB gazette notification, the PSC reviews recommendations of the PICs to provide recommendations and for making decisions.

A Project Management Unit (PMU) will be funded by the GEF and established within the city of Dhaka in a rented office. The main functions of the PMU, following the guidance of the PSC and PICs, are to ensure overall efficient management, coordination, implementation and monitoring of the project through the effective implementation of the annual work plans and budgets (AWP/Bs). The PMU will be composed of a National Project Director (NPD) who will work full-time for the project lifetime. In addition, the PMU will include two Deputy Project Directors-DPD, six subject experts (Climate Change Adaptation Coordinator, Climate Smart Agriculture Expert, Agribusiness Expert, Gender and Inclusion Expert, Value Chain Mapping Expert, Communications Expert), and six administrative and support staff (two Finance/Accounts Officers, three Office Assistants/Messengers, one Data Processing Officer). In addition, for each of the three project regions (HBT, CHT, and waterlogging and salinity-prone areas), a Regional Coordinator will be hired and hosted by DAE sub-national offices in the respective region. These three Regional Coordinators will manage project activities at the sub-national level and provide oversight to the work of DAE's UAOs and SAOs.



The NPD will oversee daily implementation, management, administration and technical supervision of the project, on behalf of the Operational Partner and within the framework delineated by the PSC. S/he will be responsible, among others, for:

1. coordination with relevant initiatives;
2. ensuring a high level of collaboration among participating institutions and organizations at the national and local levels;
3. ensuring compliance with all OPA provisions during the implementation, including on timely reporting and financial management;
4. coordination and close monitoring of the implementation of project activities;
5. tracking the project's progress and ensuring timely delivery of inputs and outputs;

6. providing technical support and assessing the outputs of the project national consultants hired with GEF funds, as well as the products generated in the implementation of the project,;
7. approve and manage requests for provision of financial resources using provided format in OPA annexes;
8. monitoring financial resources and accounting to ensure accuracy and reliability of financial reports;
9. ensuring timely preparation and submission of requests for funds, financial and progress reports to FAO as per OPA reporting requirements;
10. maintaining documentation and evidence that describes the proper and prudent use of project resources as per OPA provisions, including making available this supporting documentation to FAO and designated auditors when requested;
11. implementing and managing the project's monitoring and communications plans, and to prepare and submit project terminal report
12. coordinate and support FAO's risk mitigation and assurance activities for audits, spot checks and field visits.
13. organizing project workshops and meetings to monitor progress and preparing the Annual Budget and Work Plan; (AWP/B) for FAO clearance and eventual approval by PSC
14. submitting six-monthly Project Progress Reports (PPRs) and financial statements, for FAO review and clearance as per the approved (AWP/B);
15. preparing drafts of the Project Implementation Review (PIR) annually in a timely manner;
16. supporting the organization of the mid-term and final evaluations in close coordination with the FAO Budget Holder and the FAO Independent Office of Evaluation (OED);
17. submitting cash request to FAO on the basis of cleared six-monthly progress and financial reports to FAO and actual delivery, following the rules and procedures as outlined in the OPA;
18. inform the PSC and FAO of any delays and difficulties as they arise during the implementation to ensure timely corrective measure and support.

The Food and Agriculture Organization (FAO) will be the GEF Implementing Agency (IA) for the Project, providing project cycle management and support services as established in the GEF Policy. As the GEF IA, FAO holds overall accountability and responsibility to the GEF for delivery of the results. In the IA role, FAO will utilize the GEF fees to deploy three different actors within the organization to support the project (see [Annex J](#) for details):

- the Budget Holder, which is usually the most decentralized FAO office, will provide oversight of day-to-day project execution;
- the Lead Technical Officer(s), drawn from across FAO will provide oversight/support to the projects technical work in coordination with government representatives participating in the Project Steering Committee;
- the Funding Liaison Officer(s) within FAO will monitor and support the project cycle to ensure that the project is being carried out and reporting done in accordance with agreed standards and requirements.

FAO responsibilities, as GEF agency, will include:

1. Administrate funds from GEF in accordance with the rules and procedures of FAO, and transfer project fund as per the work plan and project actual delivery;

2. Oversee project implementation in accordance with the project document, work plans, budgets, agreements with co-financiers, Operational Partners Agreement(s), and other rules and procedures of FAO;
3. Provide technical guidance to ensure that appropriate technical quality is applied to all activities concerned;
4. Participate in PSC as one of the PSC members;
5. Conduct at least one supervision mission per year; and
6. Reporting to the GEF Secretariat and Evaluation Office, through the annual Project Implementation Review, the Mid Term Review, the Terminal Evaluation and the Project Closure Report on project progress;
7. Financial reporting to the GEF Trustee.

6.b Coordination with other relevant GEF-financed projects and other initiative

The project has been specifically designed to target climate vulnerable areas in Bangladesh and their adaptation priorities, as identified in Bangladesh Delta Plan, Bangladesh National Climate Vulnerability Assessment, and National Agricultural Plan. The project draws on lessons from the GEF-funded Decision Support for Mainstreaming and Scaling Out of Sustainable Land Management (DS-SLM) project^[1] and Establishing National Land Use and Land Degradation Profile toward mainstreaming SLM practices in sector policies (ENALULDEP/SLM) project which documented SLM practices in Bangladesh in the context of its commitments to the United Nations Convention to Combat Desertification (UNCCD).

The GEF-financed Capacity Building Initiative for Transparency-CBIT project with Component 3 focused on adaptation in AFOLU, waste, energy, and IPPU (Industrial Processes and Product Use), and the GEF-financed NAP and Biannual Update Report (BUR) projects (NAP is being implemented, BUR is being conceptualized) could provide data and analysis on adaptation priorities, investments, and specific climate vulnerabilities / risks. This project could, in turn, inform NAP priorities?the feasibility and impact potential based on assumptions about investments and activities. Similarly, significant synergies are anticipated with private sector focused activities of the GCF Readiness project (first submitted in December 2019) on ?Strengthening Bangladesh?s NDA Secretariat, Enhancing Pipeline Implementation and Private Sector Engagement in Effective Climate Action? as well as one of the concept notes that might developed under the same umbrella on Climate-Smart Agriculture. The BCRL project will also collaborate with the following GEF-funded adaptation project in Bangladesh during implementation and build synergy to avoid any duplication of efforts: Implementing Ecosystem-based Management in Ecologically Critical Areas in Bangladesh.

The GEF6 project ?Integrating Climate Change Adaptation into Sustainable Development Pathways of Bangladesh? was recently approved. The geographic and technical scope of this project is relevant to the BCRL project. As the Barind Tract and CHT intervention areas overlap in both projects, there is opportunity to synergize activities for larger impact, especially in climate change adaptation capacity building and knowledge sharing activities. For example, the value chain adaptation plans developed in the BCRL can be included in the local adaptations plan of action of the GEF6 project. These options will be further explored with UNDP (the implementing agency of the former project) as the two initiatives take shape.

Similarly, significant synergies are anticipated with private sector focused activities of the GCF Readiness project ?Strengthening Bangladesh?s NDA Secretariat, Enhancing Pipeline Implementation and Private Sector Engagement in Effective Climate Action?. An analysis of barriers (with emphasis on MSME?s), and several dialogues and conferences will be dedicated to addressing private sector

engagement in climate action, specifically in the agricultural sector. These outputs, depending on their nature, may help to develop business models, identify technical challenges, strengthen market access for MSMEs, among other activities mentioned in 4. Private Sector Engagement. On the other hand, the GCF Readiness activities will benefit from the extensive consultations conducted with private sector for the preparation of the BCRL project.

The proposed project will also align, where appropriate and feasible, with the Green Climate Fund (GCF) supported project 'Enhancing adaptive capacities of coastal communities, especially women, to cope with climate change induced salinity' to ensure complementarity and avoid duplication of activities in the salinity-prone area. This GCF supported project, under preparation, aims to reduce the adverse impacts on agricultural livelihoods that are freshwater dependent, and to address the availability and quality of drinking water in vulnerable coastal communities. The project will be particularly focused on community-based approaches in planning and managing climate-resilient water supply targeting the highly vulnerable, specifically women and girls.

[1] <http://www.fao.org/gef/projects/detail/en/c/1056803/>.

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

The proposed project is well aligned and consistent with Bangladesh's national strategies, plans, and targets, for climate change adaptation and sustainable development, as outlined in its NAPA, NDC, TNA, and PRSP as well as other key policy and plan documents.

The target geographic landscapes are explicitly identified as three of the six main hotspot areas in the **Bangladesh Delta Plan 2100** and require sustained efforts to produce or enhance ecosystem services for the local communities and to allow communities and ecosystems better cope with impacts of climate change and other stresses. Similarly, **2018 Bangladesh National Climate Vulnerability Assessment**^[1] identifies prominent climate change impacts per region, and includes the risk of droughts in northwest, multiple threats in southern coastal areas, and landslides and water shortages in eastern hilly region. In the **National Agricultural Plan 2013**, delivering **appropriate technologies in Barind Tract, hilly areas, and waterlogging areas** are identified as a priority^[2]. The revised **National Agricultural Extension Policy (NAEP)**^[3] **2012** also lists six geographic zones of the country as prone to natural disasters and ecologically constrained, including: (1) persistent droughts from erratic rainfall in north western and western parts; (2) salinity intrusion in south western and south central part; (3) erratic rainfall in Chittagong Hill Tracts; and (4) tropical cyclone and storm surges in coastal areas. The **2012 Environment and Climate Change Outlook (ECCO)** also identified the following major challenges

for Bangladesh: (1) land degradation in Chittagong Hill Tracts due to demographic changes, short rotation shifting cultivation practices, and development of roads and other infrastructure; (2) land degradation due to cultivation of high-yielding rice varieties with excessive use of groundwater for irrigation, chemical fertilizers, and pesticides in Barind Tract; (3) depleting groundwater tables and deterioration of water quality because of population growth, industrialization, and agricultural intensification[4]; and (4) threats to biodiversity from loss of species, genetic and ecosystem diversity[5]. Since climatic risk is a function of hazard, exposure, and vulnerability, and because the intensity or recurrence of adverse climatic events are partly determined by environmental degradation and human intervention in natural ecosystems, the challenges identified for different landscapes by ECCO are equally important to consider in vulnerability analyses and determining mitigation actions.

At the policy and institutional level, Bangladesh has a number of climate change related strategies, policies, and plans. The **Bangladesh Climate Change Strategy and Action Plan (BCCSAP, 2009)** outlines Bangladesh's overarching strategy and set the direction for its climate policy. It supports Bangladesh's objective towards climate resilience and low-carbon development. Out of six thematic areas (TA) of BCCSAP, the LDCF-BCRL is aligned with TA1: Food Security, Social Protection and Health and TA6: Capacity Building and Institutional Strengthening of the BCCSAP. In the first iteration of BCCSAP, 9 programs were identified under thematic area 1 and this project will contribute to ?P2: Development of climate resilient cropping systems?, ?P3: Adaptation against drought?, ?P8: Livelihood protection in ecologically fragile areas?, and ?P9: Livelihood protection of vulnerable socio-economic groups?. Under thematic area 6, five programs were identified and this project will contribute to ?P2: Mainstreaming climate change in national, sectoral and spatial development programs?, ?P3: Strengthening human resource capacity?, ?P4: Strengthening gender consideration in climate change management?, and ?P5: Strengthening institutional capacity for climate change management?. While short-to-medium term actions proposed in BCCSAP (2009) such as a national climate vulnerability assessment and the identification of areas vulnerable to drought, flood and salinity have occurred, transitions related to ?adaptive cultivars, cropping patterns, land and water management practices, and effective dissemination to farmers? is lagging.

The **Country Investment Plan Environment, Forestry and Climate Change (CIP for EFCC, 2016-2020)** is a strategic document to increase the contributions of the EFCC sectors to sustainable development of Bangladesh through enhanced ecosystem services. CIP for EFCC reflects the measures and targets submitted by the country to the UNFCCC as well as 10 of the 17 Sustainable Development Goals. Among the four pillars identified by CIP, pillar 3 is focused on adaptation and resilience to, and mitigation of, climate change. Pillar 4 includes human and institutional capacity development as well as gender. A number of priority investments associated with pillar 3 sub-programmes are well reflected in LDCF-BCRL design: e.g., ?promoting, and raising awareness about, existing drought adaptation technologies?, ?low-irrigation systems (small reservoirs, mini-ponds) for water storage?, ?developing water-efficient crops and cropping systems and new cropping patterns to make best use of rainwater and reduce dependency on groundwater extraction?, and ?supporting and building capacity of communities and extension officers to manage ecosystems so as to prevent degradation and enhance carbon sequestration?.

The BCRL project is also aligned with the country's **Nationally Determined Contribution (NDC) 2015**, which outlines the two-fold strategy for climate action. The primary focus is increasing resilience to impacts of climate change because it

already affects the lives and livelihoods of people. Agriculture, along with water, forestry, and health, is a priority adaptation sector. Among the priorities identified for adaptation are: improved early warning system for tropical cyclone, flood, flash flood, and drought; stress tolerant variety improvement and cultivation; biodiversity and ecosystem conservation; and adaptation on local level perspective. These four priorities are well reflected in LDCF-BCRL, be that through community level vulnerability risk assessments, promoting of stress-tolerant seeds and cultivation practices, or providing crop advisories to farmers for specific crop-growth-stage-by-season advisories.

Further, the **Technology Needs Assessment (TNA, 2012)** identified and prioritized sector-specific adaptation technologies that have synergies with the long-term development priorities of the country. As stated earlier, it prioritized the development of climate-smart agriculture technology development and dissemination (see 1a.7.1) and suggested a farmer- or community-oriented approach to improve efficiency and effectiveness of agricultural extension (see 1a.2.7). That is, to deliver training on improved farming practices for crops, irrigation and water management, and soil fertility management (conservation and restoration of soil quality), which LDCF-BCRL proposes, it recommends a farmer/community-oriented approach such as farmer field schools and farmer organization?which is once again an approach this project takes.

LDCF-BCRL project is also aligned with **Bangladesh's National Adaptation Programme of Action (NAPA, 2009)**, which identified immediate adaptation priorities for Bangladesh. Such short-term and medium-term priorities included a) food security, b) water security, and c) livelihood security (including right to health) and respect for the local community on resource management and extraction. Funded under GCF's Readiness window, Bangladesh is currently formulating National Adaptation Plan (NAP) with a focus on identifying medium-term and long-term adaptation priorities and investment requirements across multiple sectors, and this project will also enhance national capacity for integration of climate change adaptation in planning, budgeting and fiscal management processes. LDCF-BCRL activities, particularly under Component 1, can inform the drafting of NAP sections on adaptation in agriculture (crop sub-sector).

The **National Agriculture Policy (2018)** gives importance to investments in diverse areas including quality seed production, fertilizer and irrigation management, farm mechanization, agriculture cooperative and marketing, women empowerment in agriculture, natural resource management, and use of information and communication technology. This policy also prioritized enhancement of productivity, coordination of different ministries and organizations with the agriculture ministry and use of knowledge and expertise both in private and public sectors. These elements are well-captured in the LDCF-BCRL results framework. It also mentions the coastal areas, CHT, and Barind as particularly vulnerable to effects of climate change. The Bangladesh Agricultural Research System was also consulted^[6] to identify high potential, climate resilient agricultural interventions (crop, soil or water management, agro-forestry etc.) suitable for scaling in target landscapes. These recommendations were systematically refined through local stakeholder consultations (workshops, interviews with farmers) and the use of Sustainable Food

Systems (SFS) value chain matrix (FAO) to rank value chains by their feasibility and potential for impact. The list of all adaptation/resilience innovations initially considered, and prioritized during the PPG phase can be found in [Annex M](#).

NAEP (2012) defines its mission as providing efficient and effective decentralized, demand-responsive, integrated extension services to all categories of farmers, producers, and MSMEs through farmers groups (FGs) and their federations (Farmers Organization-FO). NAEP (2012) noted that the lack of timely supply of adequate quantities of quality seeds, degrading soil health, shortage of working capital (noting that microfinance activities are not adequate or friendly towards poor farmers), slow mechanization, insufficient use and scarcity of irrigation water, and a skewed focus on cereal crops or extension activities? focus on productivity ? not market access ? as some of the fifteen critical issues in Bangladesh agricultural sector. Many of the nine principles of NAEP (2012) are relevant to this project design: (1) adaptation to climate change and development of specialized extension services for climatically distressed areas; (2) targeting and mobilizing FGs and FOs; (3) development of agri-business and contract farming; and, (4) broad based extension support (in-time input support and subsidies, credit etc.).

Most recently, GOB and the World Bank published the **Bangladesh Climate Smart Agriculture Investment Plan** (CSAIP, 2019) highlighting the potential investments in Climate Smart Agriculture (CSA) to achieve GoB's vision of a climate-resilient growth path for the agriculture sector. CSAIP lays out strategic initiatives for the agriculture sub-sectors in support of the Bangladesh Delta Plan 2100, to be implemented under the 8th Five Year Plan, and provides inputs into the ongoing update of Bangladesh's NAP. It provides a 2040 vision for agricultural development with defined quantitative targets across the three CSA dimensions. Of particular relevance to LDCF-BCRL are the adaptation/resilience goals, which are to 1) increase value and profitability of production; 2) meet nutritional requirements after post-harvest losses; 3) decrease income dependence on rice; and 4) decrease water use in irrigation. It identifies and prioritizes five investment packages, of which two are fully aligned with and directly corresponds to thematic and geographical scope of LDCF-BCRL.

The **Seventh Five Year Plan (7FYP, 2016-2020)** recognized that economic growth needs to be inclusive, pro-poor and environment friendly, and that this will create the foundation for achievement of Bangladesh's SDG targets by 2030 (along with two more FYPs). 7FYP (pg. 98) specifically mentions the twelve southern districts, the impacts of climate change (flooding, increased peak monsoon river flows, sea level rise), and the importance of promoting seeds and practices that are stress tolerant and can grow under these conditions. It also mentions the North-Western districts as being prone to drought, and the need to prioritize inputs that would help them tackle drought. Commercialization of agriculture, farm mechanization, management of land and water resources (?rainwater catchment and water use efficiency deserve higher priority?) in the light of soil degradation and erosion, diversification to high value crops, and agro-processing are all proposed as high priority measures^[7]. It recognized the importance of private sector involvement in SDG implementation. LDCF-BCRL is will aligned with these objectives, and also targets key geographies that are mentioned as climate vulnerable by 7FYP.

In view of pressing environmental, economic, and social challenges brought on by climate change, Bangladesh Bank is enabling the shift to a greener and inclusive

financial system. The central bank has implemented a range of policies, guidelines and strategic plans to mainstream sustainability and green banking in the financial landscape.

The **Agriculture and Rural Credit Policy-ARCP (2018)** of Bangladesh Bank promotes the cultivation of climate resilient crops such as stress tolerant crops and vegetables (tomato, mustered, peanut, wheat and jute). Because LDCF-BCRL will promote the landscape-specific crops or practices through value chain approach, and will complement this through access to credit initiative for farmers, farmer organizations, entrepreneurs, and MSMEs, it is well-aligned with the objectives of ARCP.

[1] Goosen, H., Hasan, T., Saha, S.K., Rezwana, N., Rahman, M.R., Assaduzzaman, M., Kabir, A., Dubois, G., and Scheltinga, C.T. (2018). *National Climate Vulnerability Assessment in Bangladesh*. Final Draft, November 2018. MoEF and GIZ.

[2] GED (2018d). *Bangladesh Delta Plan 2100, Baseline Studies: Volume 4, Agriculture, Food Security and Nutrition*. General Economics Division, Bangladesh Planning Commission, Ministry of Planning, Government of People's Republic of Bangladesh: Dhaka, Bangladesh.

[3] MoA (2012). *National Agricultural Extension Policy (NAEP)*. Ministry of Agriculture: Dhaka, Bangladesh.

[4] CSISA-MI (2015) notes 79% of the total cultivated area in Bangladesh is irrigated by groundwater, whereas the remaining is irrigated by surface water. Compared to other parts of the country, the area under groundwater irrigation is considerably higher in the north-western, mid south-western, and north-central regions. It also notes that unchecked expansion of dry season rice cultivation (*boro* rice between January and June, constituting 70% of crop production in winter) is probably not a long-term option for Bangladesh, given the increase in *boro* rice production between 1991 and 2013 was largely due to extensive exploitation of groundwater.

[5] DoE (2012). *Bangladesh Environment and Climate Outlook*. Department of Environment, MoEF: Dhaka, Bangladesh.

[6] Arfanuzaman, M., Krishnan, L., Rahman, A., and Chakma, N. (2019).

[7] Increase productivity and real income of farm families in rural areas on a sustainable basis, Promote science-led agriculture technology systems and encourage research and adoption of modern agricultural practices for development of drought, submergence and saline prone agriculture considering water and time economy, adaptation to climate change, proper use of genetically modified technology in agriculture, and promote adoption of modern agricultural practices in dry land, wetland, hills and coastal areas including use of environment friendly green, and Ensure sustained agricultural growth through more efficient and balanced utilization of land, water and other resources, and encourage more use of surface water for irrigation and reduction of pressure on ground water while expanding irrigation facilities through improving existing irrigation system and related infrastructures. Renewable energy (solar and wind power) is given more importance in the 7th FYP. Installations of solar panels for small scale irrigation in rural areas will be given priority. being three of the eight 7FYP objectives.

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

Knowledge management is an integral part of the project activities across all components and is not limited to Component 4. The project's KM approach is in line with FAO's Knowledge Strategy^[1]. Implementation experiences, challenges encountered and lessons generated by the project will be documented and disseminated will include (but not limited to) the following

- MEL framework and IT system (web-based) that will illustrate how best to document and track the adoption of climate resilience innovations, and the change in adaptive capacity at household, community, and institutional levels.
- Value chain network mapped and investment opportunities identified in adaptation plans (in English), which can function as a template for new plans.
- Knowledge and learning exchanges, South-South and peer-to-peer, on climate resilience and climate finance with regional entities (e.g., with NABARD, CIMMYT, ICIMOD, FAO's other GCF/LDCF/FOLUR projects in Asia-Pacific on agriculture, as discussed with non-FAO actors during stakeholder consultations).
- A strategy document summarizing financial instruments, investment models, and institutional setup to mobilize climate finance.
- A "Training of Master Trainers" module, and PowerPoint presentations (in English and Bangla) on how to assess climate risks, on how to identify, select, and prioritize climate adaptation measures for agricultural sector (including cost-benefit analysis).
- Manual (in English and Bangla) on facilitating vulnerability risk assessment of biophysical, climatic, and socio-economic vulnerabilities to enable the communities to identify adaptation measures and plausible solutions (e.g., Nature Based Solutions), with special attention paid to gender and inclusion aspects as well as monitor the effectiveness of the project activities.
- Report (in English) from VRA undertaken at the community level, including traditional knowledge on climate change and innovations developed bottom up and community perception of project effectiveness.
- Manual (in Bangla) on establishment, training, formalization, and other related activities as well as agreement templates from project activities linking farmer organizations (producer groups, common interest groups, cooperatives etc.) to agri-businesses.
- Technical protocols for Upazila Agriculture Officer (UAO) and SAAO (in English and Bangla) on climate-resilient innovations (e.g., what are the best practices for wheat in conservation agriculture) to enable them to provide advisory services to farmers and their organizations through farmer field schools.
- Brief, illustrative business model^[2] (in English and Bangla) for MSMEs established or strengthened during the project.
- Crop advisories (in English and Bangla) for new crop-season combinations uploaded to the BAMIS website.
- Technical report (in English) on design of credit products.
- Survey instruments (questionnaires, in English and Bangla) used during baseline, mid-term, and endline surveys.
- Policy briefs from project evaluations (2 policy briefs) and process evaluations (4 policy briefs) targeting, in particular, GoB policymakers, in addition to technical reports.

- Twenty (20) case studies (in English) documenting anecdotal stories of project beneficiaries (farmer, entrepreneur, MSME, SAAO etc.), climate resilience innovations (e.g., conservation agriculture, watermelon cultivation on raised beds) or institutionalization aspects (e.g., farmer organizations).
- Ten (10) videos (in Bangla, with English sub-titles) on innovations at the farmer or community level for dissemination through popular media as well as other general awareness raising materials.

The target audience for these KM outputs will vary from farmers and SAAOs to civil society organizations and the private sector to sub-national and national government ministries and departments. The objective is to develop capacity and strengthen institutions for sustained learning and engagement, and to ensure climate resilience innovations continued to be disseminated and upscaled beyond the project termination.

The knowledge products will be disseminated through trainings, workshops, FAO/DAE/DoE website and social media platforms, and the Ministry of Agriculture's Agricultural Information System channels (radio and TV) for wider reach and impact. It is noted that AIS in itself received technical assistance and support from FAO in its infancy. Finally, the project experiences will be highlighted in wider FAO fora, including seminars and conferences.

Table 3. Knowledge management activities: key deliverables, budget, and timeline

KM activity	Key deliverable	Entity(ies) responsible	Timeframe	Budget (US\$)
Value chain actors mapped and investment opportunities identified	1. 2 plans will be developed for 2 of the 3 project regions, and 2 high priority value chains	PMU	Within 42 months of the project inception	108,000
Knowledge sharing and learning trips (South-South or peer-to-peer) by government officials, international out-bound	1. Back-to-office Reports (BTOR) which captures lessons learned and recommendations for incorporation in project or future activities. BTOR Annex should contain program and list of stakeholders / organizations met with. FAO is responsible for organizing the trips, but BTOR will be submitted by government officials.	FAO	Within 48 months of OPA signing	48,000

KM activity	Key deliverable	Entity(ies) responsible	Timeframe	Budget (US\$)
?Training of Trainers? module for on climate risk assessment and how to identify and prioritize agricultural adaptation measures	<ol style="list-style-type: none"> 1. Training of Trainers module 2. PowerPoint presentation (in English and Bangla) 3. Two (2) Training of Master Trainers, and 13 basic and advanced workshops at national and sub-national level 	PMU	<ol style="list-style-type: none"> 1. Within 8 months of project inception 2. All workshops to occur within 54 months of OPA signing. The first Training of Master Trainers and at least 1 national and 2 sub-national workshops must occur within 18 months of OPA signing 	176,500 as cost of workshops
CBA assessments and VRA-Vulnerability Risk Assessments at community / village level	<ol style="list-style-type: none"> 1. Manual on VRA (Bangla and English) 2. Report at the end of village level participatory assessments / appraisals documenting traditional knowledge on climate change and bottom-up adaptation innovations, and at the end of project period on community's perception of project effectiveness 3. LoA with partner i.e., BRAC / BCAS / ICCCAD / ICIMOD 	PMU	<ol style="list-style-type: none"> 1. Within 48 months of signing the LOA 2. Within 3 months of LOA end date 3. Within 12 months of OPA signing 	180,000 (of which, 45,000 is for consultant)
Training, formalizing and strengthening / upgrading of farmer organizations	<ol style="list-style-type: none"> 1. Manual on establishment, training, formalization, and agribusiness linkage activities as well as agreement templates between farmer organizations and agri-businesses 	PMU	Within 48 months of OPA signing	1,296,000 (of which 720,000 will be spent by 180 farmer organizations, and the rest is costs associated with FO facilitation)

KM activity	Key deliverable	Entity(ies) responsible	Timeframe	Budget (US\$)
Training SAAO and UAO on climate resilience innovations for onward transmission to farmers and communities via FFS-Farmer Field Schools	<ol style="list-style-type: none"> 1. Technical protocols (in English and Bangla) targeting SAAO and UAO for dissemination via FFS on specific agricultural adaptation options 2. PowerPoint presentations from trainings, along with agenda, list of participants, and evaluation form and raw data from evaluation of training 	PMU	<ol style="list-style-type: none"> 1. Within 6 months of OPA signing 2. Within 36 months of OPA signing. The first 8 trainings must occur within 18 months of OPA signing. 	120,000 for 16 training and retraining events (the cost of FFS implementation 800,000 is included in regular budget)
Business models on MSMEs established or strengthened by the project	<ol style="list-style-type: none"> 1. Illustrative business models (in English and Bangla) for establishing or strengthening MSMEs 	PMU	Within 48 months of OPA signing	Included in regular budget (technical assistance from FAO)
Crop advisories to farmers in target project areas	<ol style="list-style-type: none"> 1. Seven (7) crop advisories for new crop-season combinations uploaded to BAMIS website / portal 2. Raw (anonymized) data and survey instrument (in Bangla) from 4 rounds of surveys (500 farmers and 50 UAO/SAAO) 3. Analysis of relevance and effectiveness of project's crop advisories, and recommendations for design of advisories 	PMU	<ol style="list-style-type: none"> 1. Within 12 months of OPA signing 2. Starts the 2nd year, and continues till end of project (4 rounds) 3. Reports will be peer reviewed, finalized and approved within 4 months of each process evaluation (four reports in total) 	<ol style="list-style-type: none"> 1. Included in regular budget (technical assistance from FAO) 2. 27,500 for surveys 3. Included in regular budget (technical assistance from FAO)

KM activity	Key deliverable	Entity(ies) responsible	Timeframe	Budget (US\$)
Credit product for farmers / farmer organizations / in target project areas	1. Technical report on design of credit product	1. PMU (DAE via contract or LOA)	1: Within 12 months of OPA signing	1. 60,000 for vendor who will design credit product and produce report
MEL Framework Development	1. Project's MEL framework document reviewed by PIC and approved by PSC / PTF. The framework will identify robust and cost-effective ways to track adoption of climate resilience innovations, and track evolution of 'adaptive capacity'.	FAO	Within 6 months of OPA signing	Included in regular budget (see Section 9 on MEL)
Project Evaluation and Process Evaluations (peer reviewed)	1. Survey instruments and raw (anonymized) data from baseline, mid-term, and endline surveys (900 households interviewed thrice) as well as Component 2 and Component 3 related process evaluation 2. Policy briefs (2 pages), aimed at policymakers and drawing on technical analysis reports (of survey data) on the project's outcomes (and anecdotal evidence on impacts)	FAO	While anonymized data will be available within 3 months of each survey round for GoB and FAO use, the full dataset will be published within 6 months of project completion on Harvard Dataverse or a similar website Policy briefs (2 pages) will be prepared within 2 months of finalization of each technical analysis report	Included in regular budget (see Section 9 on MEL)

KM activity	Key deliverable	Entity(ies) responsible	Timeframe	Budget (US\$)
Case studies on success stories and climate resilient innovation (peer reviewed)	1. An open access book publication with 20 case studies from project areas.	FAO	Publication within 48 months of OPA signing, after peer review and approval	50,000 (40,000 for vendor to develop case studies; 10,000 for associated travel)
Awareness raising	1. A total of 10 videos at (in Bangla, with English sub-title) for dissemination of climate resilience innovations through popular media	PMU	Within 52 months of OPA signing	85,000 (35,000 for videos; 50,000 for awareness raising material)

[1] [FAO's Knowledge Management Strategy](#) requires formulators and implementers to consider sound knowledge management practices throughout the project cycle.

[2] See, for instance, <https://www.nabard.org/info-centre-model-bankable-projects.aspx?cid=506&id=24>

9. Monitoring and Evaluation

Describe the budgeted M and E plan

As the GEF implementing agency, FAO will be responsible for the oversight of the project, including its delivery in line with GEF and FAO guidelines.

9.1 Overview:

Monitoring, evaluation and learning activities will be based on the MEL framework developed for the project and will have two objectives: (1) provide data and information (particularly to PTF, PICs, and PSC) to assess the status and effectiveness of project implementation, and highlight problems for course correction; and (2) build local capacity to develop and implement a robust MEL framework for climate change adaptation projects. The project's logical framework includes a clear description of the impact, outcome and output indicators / targets as well as data sources and assumptions.

The project will ensure transparency in the preparation, conduct, reporting, and evaluation of its activities. This includes full disclosure of all non-confidential information, and consultation with major groups and representatives of local communities. The disclosure of information shall be ensured through publications on FAO or GoB websites, and dissemination of findings through knowledge

products and events. Project reports will be broadly and freely shared, and findings and lessons learned made available publicly.

9.2 Reporting:

FAO's GEF Coordination Unit (Rome, Italy) will complete Project Implementation Reviews (PIRs), on an annual basis, for submission to the GEF Secretariat and GEF Evaluation Office (Washington, DC, USA). The project's performance will be assessed based on the timely delivery of outputs and outcomes as defined in the logical framework and workplan and budget. PIRs are informed by technical and operational backstopping missions and explain adjustments that have been made to the project logical framework or budget in order to accommodate emerging circumstances. PIRs will provide information on gender-responsive measures, including progress on sex-disaggregated targets.

The PMU will prepare the following reports in FAO template, with technical and financial information, for review and inputs. Reports are prepared in consultation with all relevant stakeholders, including the National Project Director and Deputy Project Directors

- **Project Inception Workshop Proceedings:** Once the two Operational Partners Agreements (OPA) – one between FAO and DOE, and another between FAO and DAE – are signed, DoE will organize the project inception workshop with support from FAO on the annotated agenda and participants. Prior to the workshop, the first detailed Annual Workplan and Budget (AWP&B) will be prepared and shared with potential participants as a background document for review and comments. The workshop will also feed into the drafting and design of the project's MEL framework. Within one month of completion of the workshop, the PMU will draft and finalize the proceedings / workshop report, including comments from workshop evaluation. The PMU will also revise the AWP&B based on inputs, and request PIC, PSCs, and PTF (in that order) for clearance. This initial AWP&B will also include information on the roles and responsibilities of the main project team/partners, plan and schedule for PSC and PIC meetings, and review the risk management plan submitted to GEF Secretariat.
- **Biannual Project Progress Reports (PPR):** These reports, prepared by the PMU and submitted to FAO in the name of the OP, will summarize progress on project activities against workplan and LF-defined indicators and targets. The report will include information on the project's risk mitigation plan and the environmental and social commitment plans and identify and anticipate factors that have or will impede project's effective implementation. The report will then propose appropriate remedial or mitigation actions for review by the PICs, PSC, and PTF (in that order) for comments and clearance. Finally, FAO's GEF Coordination Unit will review and upload the PPR in FAO's Field Programme Management Information System (FPMIS).
- **Annual Workplan and Budget (AWP&B):** AWP&B are prepared by the PMU, and submitted for clearance and comments by PICs, PSC, and PTF (in that order). It lists the activities and corresponding budgets and targets for the upcoming year and provides a list of all MEL activities. The first AWP&B will be prepared prior to the inception workshop for discussion, and incorporate comments received. These reports will also summarize progress on project activities against workplan and LF-defined indicators and targets, budget utilization and disbursement for the previous year. Following clearances, the AWP&B is also uploaded to FPMIS.
- **Co-financing Reports:** The PMU will support FAO in reporting on co-financing, as required by FAO's GEF Coordination Unit and GEF Secretariat. Information received from co-financing projects on expenditures and activities will be compiled and transmitted at the end of each project year. The Budget Holder will ensure that the co-financing report is incorporated into the PIR.
- **Independent Mid-term Review and Management Response:** This report, to be drafted within thirty four (34) months after OPA is signed (or a suitable timeframe adjusted to project progress and to be agreed to by PSC), will be submitted to FAO for review and clearance. It will evaluate various

dimensions of project execution and implementation, document challenges observed, and make recommendations for course corrections and adjustments/revisions to the project's logical framework and budget (see 9.3.c). The Budget Holder will share the report with the government and major stakeholders.

- **Independent Terminal Evaluation Report and Management Response:** This report, to be drafted within three (3) months after project completion, will be submitted to FAO and Government of Bangladesh for review and clearance. It will clearly illustrate to GEF how funds were utilized during the project period. It will summarize the project activities undertaken, achievements against logical framework and workplan, and lessons learnt and recommendations for future activities and interventions (see 9.3.c). The Budget Holder will share the report with the government and major stakeholders.
- **GEF Project Implementation Reviews (PIR):** Every year, the PMU will draft the PIR, and share with LTO and FLO for review and inputs. The PIR will draw on AWP&B, PPRs, co-financing reports, and other MEL reports or publications. The quality rating of previous year's PIR will inform the preparation of subsequent PIRs. Upon clearance from PSC and PTF, the GEF Coordination Unit will submit the PIR to GEF Secretariat and GEF Evaluation Office, as previously mentioned. The process of preparing PIR is initiated at the end of December and completed in mid-April.
- **Terminal Report:** At least three months before the project's actual NTE date, the Terminal Report will be drafted by PMU, reviewed by PICs, and to be finalized by FAO's PTF. The Terminal Report is a report to the donor and the government the results of the project activities as well as the recommendations arising from them, which will also reflect the conclusion of the Independent Terminal Evaluation report. The project terminal report will be prepared in close consultation with the relevant government departments, particularly the two key government execution agencies, i.e. Department of Environment (DoE), and Department of Agricultural Extension (DAE).
- **GEF Tracking Tool:** The PMU will update the project tracking tool at the project implementation midpoint and in preparation for its terminal evaluation. The GEF Coordination Unit will upload the submitted tool to FAO's FPMIS, and submitted to GEF along with MTR and Terminal Report. The LTO will ensure technical accuracy of the submission.

In addition to these reports, a number of focused MEL activities have been planned to inform oversight of the project via PSC, PICs, PTF, and FAO's GEF Coordination Unit, Legal Department, and Office of Evaluation. Any resulting reports or publications will need to be subject to project oversight mechanisms.

9.3 Overarching MEL activities:

As noted under Component 4, the MEL framework will be developed through local consultations and a meeting in Dhaka with key project implementation partners. An analysis tool / system will then be made operational to implement this framework (US\$ 150,000). During such consultations, beneficiary selection process will also be discussed and finalized. MEL framework and activities will be in line with requirements defined by the Implementation Monitoring and Evaluation Division (IMED) of the Ministry of Planning. All data collection activities will not simply collect sex-disaggregated data but focus on and evaluate changes in intra-household allocation of labor, access to and control over resources, and participation in decision-making. This is essential to avoiding exacerbation of existing gender inequalities. The development of MEL framework will also consider the ways in which LDCF-BCRL data collection and documentation could complement feasibility studies and information requirements for a potential GCF project on 'climate-smart agriculture'.

It is anticipated that National Project Director, Deputy Project Directors, and/or DAE and DoE officials based in Dhaka will perform 200 monitoring field visits, spanning 3-4 days, over 5 years. DAE, DoE or other relevant GoB officials based in the district/upazila headquarters will also engage in

regular monitoring visits (US\$ 100,000 in total), the frequency and objectives of which will be defined in the MEL framework.

The project will commission an independent, full mid-term review ? MTR (US\$ 90,000) and a terminal evaluation (US\$ 100,000) to evaluate various dimensions of project implementation: (1) beneficiary selection and targeting; (2) social and financial capital built by the project through its activities with farmer organizations, individual entrepreneurs, and MSMEs; (3) outcomes (quantified, to the extent possible) and impacts (even if anecdotal) of the project against pre-defined indicators and targets; (4) cost effectiveness of delivery; (5) project partnership strategy and implementation; (6) project management ? structure, effectiveness, challenges faced, and remedial actions taken; (7) adequacy of and environmental and social safeguards strategies (including, gender[1], local stakeholder engagement), and its implementation effectiveness; and (8) lessons and recommendations for follow-up interventions. MTR and terminal evaluation will present a full picture of the legitimacy, relevance, efficiency, effectiveness, and sustainability of project activities, and will be able to draw on internal MEL activities. The assessment of project outcomes, impacts, and sustainability will be in line with IMED Standards and Policy, GEF Guidelines and FAO?s Evaluation Standards and Policy. MTR findings will be reviewed by PSC and PICs and will function as the frame of referenced for course corrections, and adjustments/revisions of the logical framework and budget (if and where necessary).

Terms of Reference (TOR) for MTR and terminal evaluation will be prepared by Budget Holder three months prior to conduct of activities, to be agreed by PSC and PTF, and approved by FAO?s OED. The Budget Holder, in consultation with FAO?s OED, will launch the independent MTR and terminal evaluation. Typically, such an evaluation process includes consultations with stakeholders, preparation of TORs, recruitment of evaluators, conduct of mission(s), collection of secondary data, analysis and preparation of report(s), briefings/debriefings of stakeholders, review and clearance of the report(s), and the preparation of a management response by the Budget Holder. Selection will be through an open competitive process, and consultants hired for the MTR and Terminal Evaluation will be independent and not have conflict of interests with organizations that were involved in the design, preparation or execution of this project.

9.4 MEL activities as integrated into project components:

All activities described in Section 9.4 will be subject to peer review because of their evaluative nature. Peer reviewers will be required to submit written reports.

At project inception (within six months of the start date), a baseline survey of 900 households (US\$ 13,500)?representative of the project locations in the 4 target landscapes, with gender and inclusion (ultra-poor, marginal farmers etc.) paid sufficient attention?will be completed with a view to document household?s livelihood and adaptation strategies. These same households will be revisited in the 3rd (US\$ 13,950, with inflation) and 5th year (US\$ 14,400, with inflation) of project activities[2]. It is now well-recognized in impact assessments of agricultural interventions that farmer practices evolve over a period of time[3]: they dis-adopt innovations, they modify ?recommended? practices to suit their needs, etc., and that the adoption of innovations by farmers result in heterogenous outcomes (e.g., returns vary substantially). Revisiting the same households over a period of time can help discern patterns and inform the process evaluation of Component 2. That is, while the household-level surveys may not allow an analysis of causality (i.e., whether changes observed are due to project activities[4]), they will enable evaluation and learning from project implementation and course corrections (where needed).

The introduction of process evaluation (two rounds, US\$ 10,000 each) for Component 2 activities was influenced by experience from other projects where it was found that inputs (seeds, machines, etc.) distributed were sometimes/often of sub-standard quality. Such a process evaluation will include input audits (seeds/machines etc.), key informant interviews with field-level implementers (SAAO, DoE or DAE officials, etc.), and focus group discussions with project beneficiaries (farmers, farmer organizations, agro-processors etc.) to understand beneficiary selection and targeting, extension activities, and input transfers. These evaluations will be completed well before mid-term review and

terminal evaluations and may high challenge or problem areas that the MTR or terminal evaluation should focus on. It is anticipated that the process evaluations will be performed by Masters or PhD students in agronomy/economics from one of the university departments that FAO has previously partnered with (for other projects) and supervised by national MEL/socio-economics expert (with adequate oversight from the international MEL expert). In that sense, it will contribute to in-country capacity development.

Similarly, an evaluation of weather/climate-related advisory services (Component 3), provided through the project, will be undertaken each year. That is, 500 farmers and 50 SAAOs will be interviewed (US\$ 27,500) with a view to understanding the timeliness, adequacy, and understandability of, and gaps in advisories provided. Simply put, this will evaluate if the right information is being provided to the right user at the right time[5]. This evaluation activity will be informed by and draw on instruments developed and tested by another FAO project (*Strengthening agro-climatic monitoring and information systems ? SAMIS ? to improve adaptation to climate change and food security in Lao PDR*).

Finally, FAO will develop 20 detailed case studies (US\$ 50,000[6]) of 5-10 pages each constructed around either project beneficiary (farmer, entrepreneur, MSME, SAAO etc.), intervention type (by project components), climate- resilience innovation (e.g., conservation agriculture, watermelon cultivation) or institutionalization aspects (e.g., farmer organizations) for knowledge management and dissemination.

Table 4. MEL activities, outputs, timelines and budget

Type of MEL activity	Output(s)	Entity(ies) responsible	Timeframe	Budget (US\$)
Inception Workshop	<ol style="list-style-type: none"> 1. Project Inception Workshop Proceedings/Report 2. 1st Annual Workplan and Budget 3. Program agenda and list of participants 4. Evaluation form and raw data from workshop evaluation 	PMU	Within one month of OPA signing	15,000
Project Steering Committee meetings	<ol style="list-style-type: none"> 1. Approve Annual Work Plans and Budgets on a yearly basis 2. Provide strategic guidance to two Project Implementation Committees-PICs, Project Management Team and to all executing partners 3. facilitate provision of co-financing to the project 	PMU	Twice a year for entire project duration	20,000

Monitoring and evaluation officer	<p>1. Collect and compile data on project activities to monitor and report on targets and milestones</p> <p>2. Contribute to the production of project reports; support operational and financial closure of the project</p> <p>3. Participate in development and monitoring of DAE's project activities, and provide technical or administrative assistance, identify problems/issues to be addressed, and propose corrective actions;</p>	PMU	Entire project duration	66,000
Biannual Project Progress Reports	<p>1. Biannual reports, summarizing progress on project activities against WP&B and LF-defined indicators and targets, approved by FAO's GEF Coordination Unit and uploaded to FPMIS. It will include updates on risk mitigation and environmental and social commitment plans, and propose remedial or mitigation actions (where needed)</p>	PMU	Every six months (i.e. two reports per year)	Included in regular budget
Project Implementation Reviews (PIR)	PIR approved by FAO's GEF Coordination Unit submitted to GEF Secretariat and GEF Evaluation Office	FAO	For each project year, process is completed by mid-April	Included in regular budget
Project Terminal Report	To be prepared during project closure by the independent evaluation office of FAO	FAO	Once	6550
Annual Workplan and Budget (AWP&B)	AWP&B reviewed by PIC, and approved by PSC and PTF	PMU	For each project year (The first one will be prepared prior to the inception workshop)	Included in regular budget

Co-financing Reports	<ol style="list-style-type: none"> 1. Co-financing reports received from DoE, DAE, and KGF at the end of each financial year 2. Co-financing reports included in PIR by Budget Holder 	PMU (DoE and DAE) and FAO	At the end of each financial year	Included in regular budget
Monitoring field visits by Dhaka-based or district/upazila level DoE/DAE officials	<ol style="list-style-type: none"> 1. For Dhaka officials: Back-to-office Reports (BTOR) within one week of completing a field visit (including trip agenda and list of participants/stakeholders met) 2. Short Back-to-office Reports (BTOR) (including trip agenda and list of participants / stakeholders met) within two weeks of completing a field visit. The BTOR should highlight challenges encountered and any success stories. 	PMU (DoE and DAE)	<ol style="list-style-type: none"> 1. Within one week of each field visit, included in monthly reports 2. Within two weeks of each trip, included in monthly reports 	Included in regular budget
Independent Mid-term Review	<ol style="list-style-type: none"> 1. ToR for independent MTR approved by FAO's OED 2. MTR report, with management response from Budget Holder 	FAO	Within 40 months of OPA signing	90,000
Independent Terminal Evaluation (Final Evaluation)	<ol style="list-style-type: none"> 1. ToR for independent Terminal Evaluation approved by FAO's OED 2. Terminal Evaluation report, with management response from Budget Holder 	FAO	Within three months after end-of-project	100,000

<p>Project Evaluation (peer reviewed)</p>	<p>1. Survey instruments and raw (anonymized) data from baseline, mid-term, and endline surveys of 900 households (2,700 households across rounds)</p> <p>2. Baseline report (with summary statistics), and two technical reports analyzing changes in outcome or impact variables between baseline and mid-term, and baseline, mid-term, and endline surveys. The report will be reviewed by PIC, approved by PSC and PTF, and uploaded to FPMIS.</p> <p>3. Three (3) policy briefs (2 pages) capturing main findings and recommendations</p>	<p>FAO</p>	<p>1. Surveys: 1st year (within six months of the OPA signing), in the 3rd year and in the 5th year. Anonymized datasets to be uploaded to FPMIS within 6 months of each survey round</p> <p>2. Baseline and first technical report to be finalized within 9 months of end-of-surveys; Second technical report draft to be ready within 3 months of endline survey, and finalized within 12 months of endline survey</p> <p>3. Within 2 months of finalization of each technical report</p>	<p>41,850 for survey costs</p>
<p>Project Closing Workshop</p>	<p>1. See PIR on Project Terminal Report</p> <p>2. Project Closing Workshop Proceedings/Report</p> <p>3. Program agenda and list of participants for Closing Workshop</p> <p>4. Evaluation form and raw data from workshop evaluation</p>	<p>PMU</p>	<p>Project closing workshop within 2 months of project completion.</p>	<p>17,500</p>
<p>Total M&E cost</p>				<p>356,900</p>

[1] As stated elsewhere, all data collection activities will not simply collect sex-disaggregated data, but focus on and evaluate changes in intra-household allocation of labor, access to and control over resources, and participation in decision-making. This is essential to avoiding exacerbation of existing gender inequalities.

[2] Please note that such an approach, a before-after comparison of project beneficiaries, will not allow an analysis of causality (i.e., whether the changes observed are due to project activities). One option (to be explored at project inception, during the development of MEL framework) is to select the 1,200

households from both project and non-project villages, and conditional on the household survey being completed before project-related activities begin in any given village, use the baseline data to match households ? constructing a ?treatment/project? and ?comparison/non-project? group.

[3] Stevenson, J. R. & Vlek, P. 2018. *Assessing the Adoption and Diffusion of Natural Resource Management Practices: Synthesis of a New Set of Empirical Studies*. Independent Science and Partnership Council (ISPC): Rome, Italy.

[4] Since GEF projects are often intended by design to be complemented by other projects in the area, such a causal analysis may not be called for.

[5] <http://www.wamis.org/tools/dissemin/ContentsAgMetBull.pdf>.

[6] This includes an estimation of technical assistance involved.

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCE/SCCF)?

The major objective of the project is to improve local livelihoods and socio-economic conditions in climate vulnerable landscapes and among the country?s poorest populations. This will mainly be achieved through scaling-up climate resilient adaptation options, technology transfer, capacity building at local and national level, establishing market linkage and value chains, developing innovative financial instruments, and crop specific early warning advisories. These activities support decent work and emphasizes women participation.

Decent work can be considered to include ?opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men.?[1]

The specific ways individuals, farmer organization, MSME?s and the government will benefit from the project can be summarized by the four pillars of Decent Rural Employment as described in FAO?s guidance materials (table below).[2]

Table 5. Project Support to Decent Rural Employment

Prioritized Groups	
-	Small-holder farmers
-	Individual entrepreneurs and micro, small, and medium enterprises (MSMEs)
-	Farmer organizations (FOs ? common interest groups, producer groups, etc.)
-	Women within the above categories

Pillar 1: Employment-creation and enterprise-development

- Job and enterprise creation through incubation support (technology transfer, access to finance, and training)
- Priority value chains supported for creating local employment, including the initiation of Local Service Provider-LSP models for agricultural machinery (targeting FOs and individual entrepreneurs)
- Ensure that relevant groups within the targeted rural areas are involved effectively in consultations
- Access to credit supported
- Women and men small-holder farmers and forest producers, and their FOs supported in accessing sustainable value chains
- Women and men small-holder farmers and forest producers, and their FOs supported in accessing training, financial services, and other productive assets, with priority to rural businesses owned or managed by women
- Support women to establish vermicomposting pits and seed banks
- Support FOs to develop suitable climate-resilient production options for diversified farm products
- Direct access to farmers' produce (via FOs) to agri-business firms
- MSMEs supported to establish or further develop markets
- Implement training for government agencies to strengthen inter-sectoral planning and investment prioritization processes for a resilient agricultural sector

Pillar 2: Social protection

- Empowering FOs that directly represent the poor to achieve scale efficiencies in markets
- Assess, document and disseminate good practices of organized collective action, including through FOs, with strong inclusion of social protection

Pillar 3: Standards and rights at work

- Socially responsible agricultural production supported, specifically to reduce gender discrimination
- Address the constraints of women and ethnic groups (CHT) in getting organized, notably through FOs

Pillar 4: Governance and social dialogue

- Promote the inclusive participation of local people, particularly women, in sustainable climate-resilient crop agriculture
- Build capacity of extension services address key issues that build a resilient agricultural sector
- Undertake knowledge exchange visits for DAE, DOE, and local stakeholders on agricultural adaptation measures
- Support FOs to expand, associate and federate so that they spread best practice in access to finance and markets

Benefits to green recovery in the COVID-19 context

The adaptation nature of this project lends itself well to responding not only to climate change, but also shocks to the agricultural system, such as COVID-19. For example, the project will apply lessons learned from recent success in farmer adaptation to COVID from the Missing Middle Initiative (MMI) project. During 2020, FO's under MMI used different technologies such as mobile phones, web-based messaging service, digital money transfer, and online meeting platforms, to not only continue, but also prosper during government shutdowns/restrictions. These experiences will be expanded into the activities of this project, specifically Activity 3.3. Enhanced linkages between FOs and private sector to enable direct sale by farmers, and Activity 3.4. Improved access to technology in crop supply chains to generate value addition opportunities for entrepreneurs and MSMEs. These skills and technologies will remain after COVID-19 and continue to benefit livelihoods connected to the value chains addressed in this project.

The project is well aligned with Bangladesh's post COVID-19 recovery plan. The country is keenly aware of the impacts of COVID on farmers and is positioning itself to respond strongly. Specific actions in this direction are outlined in the Eighth Five Year Plan (2021-2026) and can be paired with the outputs of this project. Under the 8 FYP, agricultural value chains will be strengthened to ensure food security post-COVID and this project similarly addresses the inclusion of women in economic recovery and critical gaps among several value chains distributed in the most affected areas. For example, COVID response will naturally be adopted into the development of FO field materials for developing women-led businesses (Component 2). The vermi-compost and seed banks business promoted through training under this project will put participating women in a good position to take early advantage of emerging green economy opportunities.

Furthermore, the government will provide a stimulus package for farmers, including cash and seeds. This project also aids in green recovery by strengthening sustainable value chains with similar inputs of cash, climate resilient seeds, and machinery for conservation agriculture (Component 2). The grants provided to FO's will come at a good time, as they will be enabled to understand new opportunities and risks and make collective decisions about adopting green technologies (i.e. conservation agriculture). This will be complemented by FO sessions that will emphasize conservation agriculture. These measures are expected to protect incomes, reduce risk, and improve purchasing power of the most impacted farmers.

[1] <https://www.ilo.org/global/topics/decent-work/lang--en/index.htm>

[2] FAO, 2010. Rural Employment, Guidance Material #1: Guidance on How to Address Decent Rural Employment in FAO Country Activities (2nd ed.).
<http://www.fao.org/3/i1937e/i1937e.pdf>

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approva I	MTR	TE
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Medium/Moderate

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

Environmental and Social Risks from the project

Risk identified	Risk Classification	Mitigation Action (s)
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Risk identified	Risk Classification	Mitigation Action (s)
<p>Transfer of seed and planting material undermine local production or supply systems, introduce pest or disease risks in target landscapes, or disrupt traditional practices.</p> <p>(Note: The project does not include activities related to seed research, and the focus will be on climatic and abiotic stress tolerant seeds developed by the Bangladesh's National Agricultural Research System (NARS) including Bangladesh Agricultural Research Institute).</p>	<p>M</p>	<p>? Government of Bangladesh will undertake procurement (domestic or imported) of seeds and planting materials in line with its laws and regulations, including compliance with its commitments to Convention on Biological Diversity (CBD) on Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (PGFRA), International Plant Protection (IPP) Convention, and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).</p> <p>? Information on procurement will be shared with AGPMC for clearance. This is particularly important if GoB proposes chemical treatment of seeds or planting materials prior to distribution to farmers.</p> <p>? Project will support <i>in situ</i> conservation, in the form of women-owned/managed seed banks, to ensure farmers and their communities are able to grow, save, use, and exchange farm-saved seeds (as defined under Bangladesh's Plant Variety and Farmer's Rights Protection Act^[1]).</p> <p>? Prior to procurement of seeds/planting materials, an assessment of farmer (and consumer) preferences for traits will be undertaken to ensure appropriateness and acceptance of introduced crops and varieties. FAO will closely work with GoB in drafting procurement plans through technical assistance, and to ensure compliance with FAO guidance on safeguards and principles, where applicable.</p> <p>? Process evaluation of Component 2 activities and farmer surveys (three rounds) will include questions / report on wider scale disruptive impacts.</p>

Risk identified	Risk Classification	Mitigation Action (s)
<p>Project activities increase the use of pesticides, insecticides, weedicides etc. through intensification or expansion of production. Project will not engage in procurement of pesticides, insecticides or weedicides.</p>	<p>M-H</p>	<p>? On the basis of PPG phase, it is considered possible but unlikely that project activities will include the procurement of pesticides. This would occur, if at all, in the context of small-scale demonstrations within the framework of farmer field schools. Since FFS are demand-driven and based on participatory analyses of needs by farmers, it is not possible to discount the possibility that (in some cases) such needs will include pesticides for crop management. However, as described below, the overall emphasis is on agroecological alternatives and integrated pest management. Where pesticides are procured, FAO's clearance procedures will be followed according to guidance provided under ESS5 in the FAO ESM guidelines.</p> <p>? The criteria for identification, prioritization, and selection of innovations (to promote climate resilience) included avoidance of or low adverse ecological impacts. The project will also distribute pheromone traps and sticky traps (for insects) where suitable. There is scientific evidence that practices such as conservation agriculture and fruit tree-based agroforestry will, in the long term, reduce pest incidence because of enhanced soil macrofauna activity (e.g., earthworms). However, it is also recognized that reduced tillage or residue retention can, in some contexts, increase disease/ pest/ weed incidence (particularly in the short term). Hence, the project will develop a management plan and promote the use of ecological pest management, mechanical, or biological pest control tools as appropriate to the local agroecological and climatic context and in line with farmers' preference.</p> <p>? While the scope of crop advisories has not been developed in detail, it is anticipated (based on current BAMIS experience) that climate/weather parameters that increase pest or disease risks for a specific crop-season combination can be modelled. Providing this information to farmers and advising them on a timely basis on preventive/control measures will contribute to lower pest/disease incidence, thereby reducing the need for synthetic chemicals.</p> <p>? Process evaluation of Component 2 activities and farmer surveys (three rounds) will include questions / report on wider scale disruptive impacts. ToR for Independent MTR will emphasize evaluation of unintended consequences.</p>
<p>Project activities increase groundwater extraction for agricultural through intensification or expansion of production.</p>	<p>M</p>	<p>? The criteria for identification, prioritization, and selection of innovations to promote climate resilience included avoidance or low adverse ecological impacts. The project will actively promote construction or upgrade of rainwater catchment structures, which could offset any increased demand for water from intensification or expansion of production.</p> <p>? Process evaluation of Component 2 activities and farmer surveys (three rounds) will include questions / report on wider scale disruptive impacts. ToR for Independent MTR will emphasize evaluation of unintended consequences.</p>

Risk identified	Risk Classification	Mitigation Action (s)
In salinity-prone areas, the use of polythene sheets for mulching creates waste management issues and adds to plastic pollution.	H	<p>? FAO will closely consult with GoB to identify best practices in the recycling or disposal of polythene sheets used for mulching.</p>
Transfer of technology (e.g., machines) to farmer organizations, entrepreneurs or MSMEs undermines local supply systems and employment opportunities. Technology transfer is inappropriate for the local socio-economic-environmental context or is of low quality.	L	<p>? Government of Bangladesh will undertake procurement (domestic or imported) of all technology to be transferred to farmer organizations, individual entrepreneurs or MSMEs in line with its laws and regulations.</p> <p>? All procured machinery/equipment will be required to comply with environmental and social commitment plan to ensure efficiency i.e., to reduce energy wastage and ensure safety i.e., it does not risk human health and safety.</p> <p>? The choice of technology (machinery/ equipment) will be determined, to the extent possible, considering positive spillover effects (e.g., raised bed planter can be used for watermelon but also other crops, tractors can be used to transport produce to markets, cold storage infrastructure can benefit multiple fruit and vegetable value chains).</p> <p>? FAO will closely work with GoB in drafting procurement plans through technical assistance, and to ensure compliance with FAO social and environmental performance safeguards.</p> <p>? Information on procurement will be shared with AGPMC for clearance.</p>
Post-harvest management or mechanization activities may increase air and water pollution, loss of vegetation (where physical infrastructure is needed), or raise occupational safety issues.	M	<p>? FAO guidelines and GoB laws and regulations related to site selection, management of wastes, and occupational safety will be followed.</p> <p>? Sites for post-harvest activities are not expected to be <i>within</i> internationally recognized conservation area or World Heritage Site, or nationally important habitats. If project established sites are located <i>near</i> such sensitive areas, guidelines and norms outlined in the ESM Framework will be followed.</p>

Risk identified	Risk Classification	Mitigation Action (s)
<p>Adverse impacts on, insufficient inclusion of, or inadequate benefit flows to indigenous peoples, particularly in Chittagong Hill Tracts or to poor farmers.</p>	<p>M</p>	<p>? During PPG, multiple local stakeholder consultations were held locally, and these included farmer representatives and field-level extension agent in recognition of the fact that potential beneficiaries in project areas are not uniform ? i.e., recognizing the diversity of resource endowments, climatic challenges and vulnerabilities, and needs.</p> <p>? Stakeholder consultation in CHT included representatives from local governance structures to ensure adequate consideration of unique challenges and needs, and prioritizing activities which can ensure engagement / participation of indigenous people and promote flow of benefits during project implementation. An Indigenous Peoples Plan has been developed (attached).</p> <p>? Stakeholder consultations in all geographies included farmer groups, individual farmers, and extension workers to ensure that marginal/poor farmers? vulnerabilities and needs are considered.</p> <p>? It is anticipated that the increased opportunities for collective action and enhanced social capital/bargaining power through formation or upgrading of farmer organizations will have positive impacts on inclusion, particularly of indigenous peoples.</p> <p>? During participatory assessments and formation/upgrading of farmer organizations, due representation from poor/marginal farmers and indigenous peoples (where applicable) will be mandated, particularly in decision-making roles.</p> <p>? Through MEL activities (two process evaluations, three survey rounds, twenty case studies, independent MTR and terminal evaluation), the project will consistently track and report on inclusion.</p>
<p>Project activities exacerbate existing gender disparities or worsen their socio-economic outcomes by increasing demand for unpaid labor or excluding them from benefits.</p>	<p>M</p>	<p>? See Gender Action Plan.</p>

[1] The Act (Establishment of Plant Variety Protection Authority, Plant Variety Protection, Registration, Breeder's and Farmer's Right Protection and Policy to Enact Law/Rule for other Related Issues) was passed in the Bangladesh parliament on May 9, 2019.

Supporting Documents

Upload available ESS supporting documents.

Title	Module	Submitted
ESMP	CEO Endorsement ESS	

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<p>Objective: The overarching objective of this project is to improve the resilience of people, communities, and ecosystems to climate change, and improve livelihoods through increased value addition in the agricultural food systems of Bangladesh.</p>							
<p>Component 1: STRENGTHEN NATIONAL CAPACITIES FOR INTEGRATION OF ADAPTATION MEASURES IN AGRICULTURE SECTOR PLANNING, BUDGETING, AND POLICY PROCESSES</p>							
<p><u>Outcome 1:</u> CCA considerations integrated into agriculture sector planning, budgeting and policy</p>	<p>Number of national and sub-national government officials trained</p>	<p>No training has occurred</p>	<p>750 national and sub-national government officials trained</p>	<p>1280 national and sub-national government officials trained</p>	<p>- PIR and PPR - Mid-term and Terminal Review - Proceedings and list of participants in trainings events; summaries from participant evaluation of trainings</p>	<p>National and sub-national government officials will effectively participate in training events and use the acquired knowledge in agricultural adaptation planning, budgeting and policy</p>	<p>PMU, DoE</p>

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<u>Output.1.1:</u> Strengthened mechanisms for improved cross-sectoral and ministerial coordination, covering all relevant government ministries or agencies, to ensure enhanced coordination on policies, plans, and investments on adaptation for agriculture	Number of ministries/departments represented in PSC / PIC Number of meetings for cross-sectoral and ministerial coordination held	No meetings for cross-sectoral and ministerial coordination on adaptation for agriculture held	5 Project Steering Committee meeting and 20 Project Implementation Committee meeting organized (10 DOE, 10 DAE)	10 Project Steering Committee meeting and 40 Project Implementation Committee meeting organized (20 DOE, 20 DAE)	- Meeting minutes - PIR and PPR - Mid-term Review - Terminal Review	Government officials from all relevant ministries are willing to participate in meetings, and use lessons/experience from project implementation to ensure coordination on policies, plans, and investments on adaptation for agriculture	PMU, DoE
<u>Output.1.2:</u> Innovative financial instruments, investment models, and institutional setup promoted to mobilize climate finance for resilient agriculture in Bangladesh	# technical workshops and 1 strategy document on financial instruments, investment models, and institutional setup to better mobilize climate finance	-	2 technical workshops on financial instruments, investment models, and institutional setup to better mobilize climate finance	3 technical workshops and 1 strategy document on financial instruments, investment models, and institutional setup to better mobilize climate finance	- PIR and PPR - Mid-term and Terminal Review - Proceedings and list of participants in trainings events; summaries from participant evaluation of trainings	Stakeholders will realize the needs for innovative financial instruments, and play role in the mobilization of climate finance for resilient and sustainable agriculture in Bangladesh	PMU

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<p><u>Output.1.3:</u> Strengthened inter- sectoral planning and investment prioritization processes at national and sub-national level for resilient agriculture in Bangladesh</p>	<p># national and sub-national consultations for inter- sectoral planning and investment prioritization towards resilient and sustainable agriculture sector</p> <p># Training on climate risk assessment, and selection and prioritization of adaptation measures in agricultural sector, agribusiness linkage and gender- and inclusion- sensitive agricultural value chains</p>	<p>No such plans exist</p> <p>No baseline</p>	<p># 2 national and # 8 sub- national consultations for inter- sectoral planning and investment prioritization towards resilient and sustainable agriculture sector</p> <p># 7 Training on climate risk assessment, and selection and prioritization of adaptation measures in agricultural sector, agribusiness linkage and gender- sensitive agricultural value chains</p>	<p># 3 national and # 9 sub- national consultations for inter- sectoral planning and investment prioritization towards resilient and sustainable agriculture sector</p> <p># 16 Training on climate risk assessment, and selection and prioritization of adaptation measures in agricultural sector, agribusiness linkage and gender- sensitive agricultural value chains</p>	<p>- PIR and PPR</p> <p>- Mid- term Review</p> <p>- Terminal Review</p> <p>- Published cross- sectoral value chain adaptation plans</p> <p>- Proceedings and list of participants in trainings events</p>	<p>Stakeholders will have enhanced capacity and able to effectively prioritize the inter- sectoral planning and investment, sound knowledge on agribusiness linkage and gender- sensitive agricultural value chains</p>	PMU

COMPONENT 2. DEMONSTRATE AND SCALE UP CLIMATE ADAPTATION SOLUTIONS IN TARGETED LANDSCAPES

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<p><u>Outcome 2:</u> Increased resilience of agriculture-based livelihoods and landscapes</p>	<p>Land (ha) under climate-resilient crops, varieties and/or practices</p> <p># of beneficiaries, dependent on agriculture for livelihoods, with increased resilience</p> <p># of SAAOs and UAOs trained on adaptation measures</p> <p># farmers trained through Farmer Field Schools (FFS) on crop production adaptation measures</p>	<p><1% of the land in project area under climate-resilient crops, varieties and/or practices due to activities of baseline projects.</p> <p>0</p> <p>0</p> <p>0</p>	<p>10,000 ha</p> <p>63,000 beneficiaries with improved resilience</p> <p>200 UAOs and SAAOs</p> <p>400 FFS; 16,000 farmers trained</p>	<p>16,000 ha of land under climate-resilient crops, varieties and/or practices</p> <p>120,000 beneficiaries</p> <p>400 UAOs and SAAOs</p> <p>800 FFS; 32,000 farmers trained</p>	<p>- LDCF Core Indicator worksheet</p> <p>- PIR and PPR</p> <p>- Mid-term Review</p> <p>- Terminal Review</p> <p>- Project evaluation report</p> <p>- Process evaluation of Component 2</p> <p>- Monthly field implementation reports compiled by PMU</p> <p>- List of participants in trainings events; summaries from participant evaluation of training;</p>	<p>Assuming that average land area associated with each project targeted farmer is between 0.5-1 acre.</p> <p>Methodology to assess and monitor land under climate-resilient crops, varieties and/or practices is developed by FAO and DAE in a participatory manner with project communities.</p> <p>Each of the targeted 27,280 farmers represent one household with an average of 4.4 members</p> <p>Weather risks or COVID-19 related restrictions do not disrupt training-of-trainers, and travel of SAAO/UAO to receive trainings. SAAO and UAOs have the time and interest in participating in trainings</p>	<p>PMU, FAO</p>

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<u>Output 2.1:</u> Community climate vulnerability and risk assessments and adaptation prioritization exercises at the village / community level	# of CBAs and VRAs conducted at community or village level	No CBAs or VRAs completed	300 CBAs completed 200 VRAs completed	300 CBAs completed 300 VRAs completed	- PIR and PPR - Mid-term Review - Terminal Review - Synthesis report on VRAs by vendor / contract firm - Monthly field implementation reports compiled by PMU - Process evaluation of Component 2	CBAs are conducted prior to commencement of project activities. VRAs will follow CBAs and be completed over a period of time. Weather risks or COVID-19 related restrictions do not delay or disrupt community / village gatherings for VRAs or the travel of VRA facilitators.	PMU
<u>Output 2.2:</u> Strengthened mechanisms to improve farmer knowledge of climate-resilient agriculture through extension services and Farmer Field Schools	Captured as a Outcome level indicator						

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<p><u>Output 2.3:</u> Improved uptake by farmers of climate-resilient crops (prioritized in Annex M), varieties, and management practices through transfer of seed kits and other inputs</p>	<p># farmers cultivate stress-tolerant crops/varieties or adopt management practices that promote climate resilience</p> <p># farmers cultivate commercial, diversified, stress-tolerant crops</p>	No farmers have received support	<p>10,000 farmers ? 3,000 women farmers</p> <p>4,280 farmers ? 3,000 women farmers</p>	<p>19,000 farmers (4,000 women) cultivate stress-tolerant varieties or adopt management practices for cereals that promote climate resilience</p> <p>8,280 farmers (6,000 women) cultivate commercial, diversified stress-tolerant horticulture crops</p>	<p>- PIR and PPR</p> <p>- Mid-term Review</p> <p>- Terminal Review</p> <p>- Reports submitted by vendor (SMS sender)</p> <p>- Monthly field implementation reports compiled by PMU</p> <p>- Self-reporting by farmers during project evaluation</p> <p>- Process evaluation of Component 2</p>	<p>Seeds are procured without delays, are of high quality, and are distributed in sufficient quantities (to cultivate 1 acre of land, twice over).</p> <p>Mid-term targets require quicker rate of achievement on target related to women farmers to avoid beneficiary recruitment in the later stages of the project, which would then imply that women benefit from a disproportionately lower amount of training and inputs over the project period.</p>	PMU

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<p><u>Output 2.4:</u> Strengthened initiatives for Nature-based Solutions and community ownership of agricultural assets</p>	<p># of rainwater catchment structures constructed or revived through excavation, or # of erosion control and slope stabilization initiatives in CHT</p>	<p>No structures constructed or revived, no slope stabilization or erosion control measures in target communities / villages</p>	<p>150 functional structures or new initiatives</p>	<p>150 functional structures or new initiatives</p>	<ul style="list-style-type: none"> - PIR and PPR - Mid-term Review - Terminal Review - Reports submitted by vendor (SMS sender) - Monthly field implementation reports compiled by PMU - Self-reporting by farmers during project evaluation - Process evaluation of Component 2 	<p>All targets for rainwater catchment structures (constructed or renewed) or water use efficiency equipment should be achieved by mid-term ? since this is an enabling resource for crop diversification, stress-tolerant crop or varietal cultivation, and improved on-farm management. Budget assumed that each 16X16X3 meter mini-pond (as an example) would cost US\$ 1,500. The area of land for slope stabilization / erosion control is not specified at this point, and target will be defined at implementation.</p>	<p>PMU</p>

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
	# women-owned or women-led vermicompost pits established (a ?unit? defined as having 20 rings)	Less than 10 vermicompost units in project area supported by baseline projects	150 units functional and in use	300 units functional and in use	<ul style="list-style-type: none"> - PIR and PPR - Mid-term Review - Terminal Review - Reports submitted by vendor (SMS sender) - Monthly field implementation reports compiled by PMU - Self-reporting by farmers during project evaluation - Process evaluation of Component 2 	A 2-ring vermicompost pit costs US\$ 35, and it is assumed that each village has the space and is willing to setup about 42 rings (US\$ 750 per unit).	PMU

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
	# of women-owned or led seed banks	No seed banks	50 seed banks established	100 seed banks	<ul style="list-style-type: none"> - PIR and PPR - Mid-term Review - Terminal Review - Reports submitted by vendor (SMS sender) - Monthly field implementation reports compiled by PMU - Self-reporting by farmers during project evaluation - Process evaluation of Component 2 	<p>Communities are willing to provide space for seed bank establishment, and women are willing and able to participate / lead this activity. In the absence of seed banks (each costing US\$ 1,800), farmers will not be able to conserve their seeds from the initial production. It is recognized that seed banks will need frequent replenishment because genetic potential in seeds does erode / decay over a period of time. And local DAE officials will continue facilitate replenishment as a part of their normal outreach measures.</p>	PMU

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<p><u>Output 2.5:</u> Improved capacity to use basic agro-meteorological information / agro-climatic advisories for farmers? decision-making and risk management</p>	<p># of new crop-by-season combinations for which crop advisories are developed (early warning, climate information services)</p>	<p>0 new advisories developed</p>	<p>7 new advisories developed for project specific crop-by-season combinations</p>	<p>7 new advisories developed for project specific crop-by-season combinations</p>	<ul style="list-style-type: none"> - PIR and PPR - Mid-term Review - Terminal Review - Reports submitted by vendor (SMS sender) - Monthly field implementation reports compiled by PMU - Crop advisories uploaded on BAMIS portal (hosted by DAE) in English and Bangla. - Process evaluation report 	<p>During PPG phase, a discussion was held with BAMIS on the plausibility and relevance of developing new crop advisories, and there was concurrence of interest. DAE and BAMIS project officials continue to coordinate and identify project-specific crop-by-season combinations for which advisories can be issued based on agro-metrological / agro-climatic information.</p>	<p>PMU</p>

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
	# of farmers who receive 2 SMS a week (crop advisories based on agro-meteorological / agro-climatic data)	Very few farmers receive crop advisories or do not receive advisories from BAMIS that are customized to their cultivation practice	27,280 farmers all receive timely and relevant information twice a week	27,280 farmers all receive timely and relevant information twice a week	<ul style="list-style-type: none"> - PIR and PPR - Mid-term Review - Terminal Review - Reports submitted by vendor (SMS sender) - Monthly field implementation reports compiled by PMU - Findings from process evaluations of 500 farmers, and 50 extension agents each project year 	Since the identification of farmers occurs through VRAs and FFS, target should be achievable by mid-term. Farmers are willing to share phone numbers to receive SMS, and DAE is able to compile such information in a timely manner at project commencement.	PMU
COMPONENT 3. SCALE-UP INVESTMENTS FOR CLIMATE ADAPTATION IN SELECTED VALUE CHAINS							

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<u>Outcome 3:</u> Climate-resilient livelihoods through improved access to credit, markets, and technologies	# of farmers with access to formal credit # of FOs that benefit from managerial, business development, and agricultural product marketing training	0 0	7,280 farmers (representative of 7,280 households) have access to formal credit 100 FOs, comprising at least 3000 farmers, receive training	17,280 farmers (representative of 17,280 households) have access to formal credit 180 FOs, comprising at least 5400 farmers, receive training	- PIR and PPR - Mid-term Review - Terminal Review - Reports submitted by vendor (SMS sender) - Monthly field implementation reports compiled by PMU		PMU
<u>Output 3.1:</u> Value-chain networks mapped and investment opportunities for resilient agriculture identified in two regions (HBT, CHT, or waterlogging/salinity-prone areas).	# of plans identifying investment opportunities developed based on value-chain network mapping	No comprehensive plans exist	1 value chain network mapped and investment opportunities identified; 1 other value chain finalized for mapping	2 value chain networks mapped and investment opportunities identified	- PIR and PPR - Mid-term Review - Terminal Review - Publication of plans		PMU

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<u>Output 3.2:</u> Strengthened capacities and performance of farmer organizations (producer groups, farmer cooperatives, common interest groups)	# Trainings on managerial, business development, and agricultural product marketing skills for 180 project-supported farmer organizations, each with at least 30 members, of which 60 are women-led and managed	No trainings have occurred	100 FOs, of which 40 are women-led and managed receive training	180 FOs, of which 60 are women-led and managed receive training	- PIR and PPR - Mid-term Review - Terminal Review - Training agenda, materials, and list of participants - Monthly field implementation reports compiled by PMU	Farmers who are part of FOs have the time and are willing / interested in receiving training.	PMU
<u>Output 3.3:</u> Enhanced linkages between FOs and private sector to enable direct sale by farmers	# Tonnes of produce sold through agreements between FOs and private sector	<5% of farmer produce sold under contracts between FOs and private sector	17,000 tonnes of produce sold through agreements between FOs and private sector	45,000 tonnes of produce sold through agreements between FOs and private sector	- PIR and PPR - Mid-term Review - Terminal Review - Copy of FO agreements - Monthly field implementation reports compiled by PMU	Private sector is willing to engage with FOs, and FOs can aggregate produce (cereals, vegetables, fruits ? differs by geography) in quantities and qualities needed by private sector actors.	PMU

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<p><u>Output 3.4:</u> Improved access to technology in crop supply chains to generate value addition opportunities for entrepreneurs and MSMEs</p>	# of entrepreneurs / MSMEs receive business training	Entrepreneurs / MSMEs receive no business training in target upazilas	70 entrepreneurs / MSMEs receive business training	100 entrepreneurs / MSMEs receive business training	- PIR and PPR - Mid-term Review - Terminal Review	Farmer organizations, individual entrepreneurs, or local MSMEs express interest in formulating a business plan and establishing activities. DAE can effectively support their training, transfer technology, provide grants and / or mobilize additional funding from baseline projects, and link them to banks for credit.	PMU
	# business models documented	0 business models available for reference	6 business models documented and available for reference	10 business models documented and available for reference	- PIR and PPR - Mid-term Review - Terminal Review - Business models published on DAE / FAO website	?Bankable? projects are established, and entrepreneurs / MSMEs / FOs are willing and able to share financial and operational information needed to develop a business case.	PMU

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
	# FOs, MSMEs, or individual entrepreneurs who receive direct seed drill, laser land leveler, mango picker and bags, pheromone traps, heat or vapour treatment unit - without infrastructure, raised bed planter / plastic mulching machine, corn sheller, etc.	150 FOs, MSMEs or individual entrepreneurs benefit from access to modern technologies and setup a business	100 FOs, MSMEs or individual entrepreneurs receive technologies and establish a business	150 FOs, MSMEs or individual entrepreneurs receive technologies and establish a business	- PIR and PPR - Mid-term Review - Terminal Review	DAE can effectively in identify the quality technology, vendor, and appropriate beneficiary, and provide grants and / or mobilize additional funding from baseline projects.	PMU
<u>Output 3.5:</u> Innovative financial instruments for farmers, entrepreneurs, or MSMEs are designed, piloted, and scaled	Number of farmers accessing and adopting either formal credit	<10% project farmers have access to formal credit	5,000 farmers	10,000 farmers (50% women)	- PIR and PPR - Mid-term review - Terminal Review - Report on design of credit product	There is interest from a national or local commercial bank to provide agricultural credit to farmers.	PMU
COMPONENT 4. ENABLE EFFECTIVE KNOWLEDGE MANAGEMENT, AND MONITORING, EVALUATION AND LEARNING (MEL)							

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
<u>Outcome 4:</u> Project monitored and evaluated, information disseminated, and lessons from project implementation, progress monitoring, review, and evaluations codified and shared	# of non-project farmers who are aware of project-supported agricultural adaptation options	0	60,000 farmers	200,000 farmers	- LDCF Core Indicator worksheet - PIR and PPR - Mid-term Review - Terminal Review	FAO and AIS agree to partner and disseminate information via its television programs. AIS can report on viewership.	PMU, FAO
<u>Output 4.1:</u> Tools, methods and approaches for monitoring and evaluating project progress adopted	1 MEL/KM tool designed, tested, validated, and operationalized	0	MEL/KM tool is operationalized and is in use to monitor outcomes, outputs, and activities	Timely and robust monitoring of project outcomes, outputs, and activities via MEL/KM tool	- PIR and PPR - Mid-term Review - Terminal Review	At project implementation, FAO can develop and deploy the MEL/KM tool in-house or through a vendor, and communicates the purpose of MEL/KM tool effectively with DAE and DOE to obtain buy-in.	FAO, PMU

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
	900 households surveyed for project evaluation	0	900 households surveyed at baseline and at project midline to track adoption and household level outcomes / impacts	900 households surveyed thrice during the project period to track adoption and household level outcomes / impacts	<ul style="list-style-type: none"> - PIR and PPR - Mid-term Review - Terminal Review - Anonymized datasets - Survey instruments - Policy briefs and project evaluation reports 	Weather or other risks (COVID-19) do not disrupt data collection activities.	FAO
	2 process evaluations of Component 2 completed	0	1 process evaluation	2 process evaluations	<ul style="list-style-type: none"> - PIR and PPR - Mid-term Review - Terminal Review - Process evaluation report / 2 policy briefs 	Weather or other risks (COVID-19) do not disrupt input audits, key informant interviews and focus group discussions with project beneficiaries for Component 2.	FAO

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
	4 process evaluations of crop advisories based on agro-climatic / agrometeorological data	0	2 process evaluations	4 process evaluations	<ul style="list-style-type: none"> - PIR and PPR - Mid-term Review - 2 policy briefs / process evaluation reports - Anonymized datasets - Survey instruments 	Weather or other risks (COVID-19) do not disrupt data collection activities.	FAO
<u>Output 4.2:</u> MEL framework, including outreach programs and local knowledge-sharing and learning networks on climate adaptation and resilience, developed and operationalized	# of government officials trained through knowledge exchange visits	0	10 officials	15 officials	<ul style="list-style-type: none"> - PIR and PPR - Mid-term Review - Terminal Review - Back-to-Office Reports (BTOR) 	COVID-19 travel restrictions do not disrupt knowledge exchange and peer-to-peer learning visits. Both national and sub-national officials are nominated by DAE and DOE, and there is interest in engaging in such visits.	PMU, FAO
<u>Output 4.3:</u> Awareness raising of	# case studies	0	10 case studies developed	20 case studies developed	- 20 case studies published		FAO, PMU

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection
stakeholders through media dissemination of agriculture-related CCA options	# videos produced	0	3 videos produced and aired	5 videos produced and aired	- AIS report on viewership (television programme) for specific videos and/or tracking views on social media accounts		PMU

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

STAP, 28 May 2019

<p>Overall assessment. Given the diversity of project activities, STAP believes the project would benefit from a Strengthened Theory of Change, that clearly articulates how the activities listed which range from early warning systems to livelihood activities and financial support will clearly result in increased resilience in each of the landscapes listed. It is therefore strongly recommended that the project team clearly identify how this project will fill gaps or build on the already innovative work in the country. Further justification should also be given for the choice of landscapes and how the project will truly use a landscape approach, tailoring action around landscape preservation or restoration, which are listed as indicators. In this context, the work on Early Warning System (2.1.2) seems out of place. Questions that should be answered include: Who are the users of EWS? What hazards will be included in the combined system? How will it build on current systems? How will it be maintained after the end of the project? How will it add value to the existing early warning systems in the country?... Other items that require improvements include: specifying results in the form of more quantitative indicators, innovations (their nature, sources, complementarity) beyond the few mentioned, risk assessment and management, and knowledge management.</p>	<ol style="list-style-type: none"> 1. Theory of Change: the TOC is described and an impact pathway diagram is now included in Section 1a.3. 2. Building on Bangladesh's many adaptation and disaster risk reduction projects, led by the government, civil society and research organizations such as ICCCAD: key adaptation and risk management projects are listed in Section 1a.2 and Annex P, with the final column clearly indicating the link between the ongoing or completed project and LDCF-BCRL (adjustments in project design, alignment or coordination during implementation phase). 3. Choice of landscapes and fit with national priorities: Section 1a.1 and Section 7 now describes the choice of vulnerable landscapes and fit with Bangladesh's policy priorities. It also presents some of the climatic risks as well as socio-economic and environmental challenges (increasing exposure and vulnerability) unique to each landscape. Finally, Section 1b goes beyond identifying project map and geo-coordinates to illustrate the geographic selection and prioritization process (for the <i>upazilas</i> within each landscape). 4. Early warning system: Section 12.a describe how the EWS is now focused on crop advisories to farmers, and how it builds on existing efforts such as AMISDP (to promote further ownership and sustainability). The primary users of the advisories will be farmers, and the hazards will vary by the landscape and crop-by-season combination. This is likely to be drought, heavy rainfall, frost, heavy or excessive rainfall, and heat waves (and of course cyclones and heat waves). Where feasible, i.e., where weather variables are well correlated with disease or pest risk, disease or pest related advisories will be issued. Annex M illustrates the demand for weather/climate related information from such end users, as captured during PPG Phase field visits. The project includes a small pilot budget which will target the development of advisories for agricultural entrepreneurs and MSMEs. 5. Quantitative indicators and innovative actions: Annex A1: Project Results Framework 6. Risk assessment and management: Section 5 captures both risks to and from the project and includes a mitigation plan. 7. Knowledge management: Section 8 responds to this.
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<p>1. Are global environmental benefits / adaptation benefits likely to be generated? GEBs are possible, but they are not specified.</p> <p>Are the benefits truly global environmental benefits, and are they measurable? Some GEBs are possible, but not a single core indicator is quantified. This leaves some uncertainty about GEBs and should be corrected.</p>	<p>GEBs are now described in Section 1a.6</p>
<p>2. A description of the products and services which are expected to result from the project. Is the sum of the outputs likely to contribute to the outcomes? Proper descriptions. But unclear if outputs will contribute to outcomes. The project should further justify and elaborate why the outputs are needed, how these relate to the landscapes selected and how they will deliver resilience. STAP recommends using the RAPTA guidelines to further design the project.</p> <p>What is the sequence of events (required or expected) that will lead to the desired outcomes? The planned outputs may lead to the intended outcomes and thus achieve the aims specified for the individual components. But they may not. Further, it is not clear that they will achieve landscape resilience which is the purported project objective. Many of the outputs or indicators are at the national or community level rather than the landscape level.</p>	<p>The purpose of the outputs is described in section 3: The proposed alternative scenario with a brief description of expected outcomes and components of the project. The quantitative indicators of each outputs are defined in Annex A1: Project Results Framework.</p> <p>How the outputs will contribute to the outcome and component are described in Section 1a.3 and illustrated by the Impact Pathway diagram. The quantified indicators will help to measure the impact at the landscape level.</p>

<p>3. A simple narrative explaining the project's logic, i.e. a theory of change. No formal theory of change. STAP strongly recommends that this is developed. See recommendation above with further details of how to develop a Theory of Change.</p> <p>What is the theory of change? Regrettably, no formal theory of change is presented.</p> <p>Is there a recognition of what adaptations may be required during project implementation to respond to changing conditions in pursuit of the targeted outcomes? No such concerns are presented. They should be considered and proper fallbacks developed. Tying the specified sequence of actions and events together in a theory of change would also enable this kind of contingency planning.</p>	<p>An impact pathway diagram is now presented in Section 1a.3. Flexibility has been built into design of project activities and budget to allow for adjustments, particularly based on farmer and community feedback.</p> <p>A sequence of activities, including community-level CBAs and VRAs, FFS, and activities with FOs, will allow for adjustments during project implementation based on changing conditions and feedback received from target beneficiaries. This will be completed by MEL activities, including process evaluations and surveys of farmers.</p>
<p>4. Does it provide a feasible basis for quantifying the project's benefits? Baseline is a feasible basis but no data is provided for quantifying benefits.</p>	<p>Quantitative indicators (Annex A1: Project Results Framework), MEL and beneficiary survey will help to measure the benefits quantitatively.</p>
<p>5. Have gender differentiated risks and opportunities been identified, and were preliminary response measures described that would address these differences? Improving gender equality is declared several times as an objective of the project. Gender risks and opportunities are identified, possible response measures mentioned, but little information is provided about them.</p> <p>Do gender considerations hinder full participation of an important stakeholder group (or groups)? If so, how will these obstacles be addressed? No such hindrances are mentioned.</p>	<p>Section 3 includes a gender analysis, specifies how project activities will be gender responsive, and includes a Gender Action Plan and Budget.</p>

<p>6. What overall approach will be taken, and what knowledge management indicators and metrics will be used? KM is one of the weak points. Useful ideas are presented in a short paragraph under Point 8, but a lot more would be needed. No overall KM plan is presented. The ideas presented under Point 8 are useful but they are mediocre and need substantial improvements to allow all results and benefits of the project to be disseminated and scaled up.</p>	<p>Section 8 responds to this, and now contains a full-fledged Knowledge Management Plan identifying activities, deliverables, and budgets.</p>
<p>7. Are the identified risks valid and comprehensive? Are the risks specifically for things outside the project's control? The identified risks are valid but their scope is somewhat limited (5 altogether); most are outside the project's control. STAP welcomes the probability and impact rating provided but a scale for these ratings would have been useful.</p>	<p>Section 5 captures both risks to and from the project and includes a mitigation plan. The proposal also outlines how lessons from other projects have informed the design of LDCF-BCRL.</p>
<p>JUNE 2019 LDCF/SCCF WORK PROGRAM: COMMENTS FROM COUNCIL MEMBERS (REFERENCE: LDCF/SCCF.C.26)</p>	

<p>Canada Comments:</p> <ol style="list-style-type: none"> 1. The project aligns with the climate change adaptation (CCA) strategies of the country's Seventh Five Year Plan (7FYP). The 7FYP identifies districts that are most vulnerable to climate change. Chittagong Hill Tracts (CHT), however, was not identified as one of the most vulnerable zones. 2. Inclusion of CHT as one of the project locations should have a strong justification backed by evidence-based research. 3. The 7FYP puts emphasize on promoting gender sensitivity to disasters and climate change and reducing violence against women through programs and policies. 4. Gender equality considerations should be mainstreamed into the entire project cycle to enhance the efficacy of the project. 5. The project's intention to implement gender-responsive adaptation plans should be reflected in the results framework/logical framework. 6. Indicators should include sex disaggregated numbers. 7. There are opportunities to complement and coordinate with the following initiatives: (BCCTF, GCF projects). 	<ol style="list-style-type: none"> 1. While 7FYP does not identify CHT, the Delta Plan 2100 and nearly all other climate change as well as development strategies and plans identify CHT as a climate/disaster vulnerable area. This is now clarified in the proposal. 2. While CHT has the highest extent of forest cover in Bangladesh, the disruptions to traditional practices (<i>jhum</i> or shifting cultivation) has resulted in vegetation degradation, particularly along slopes. The increased frequency / risk of excessive rainfall under climate change has led to serious landslide risks. In fact, this is the focus of an ICIMOD project https://www.landslidebd.com. In addition to the evidence presented in Section 1a, the Local Consultative Group of donors in Bangladesh completed a stocktaking of development projects, and in the summary presentation ? despite the identification of 72 projects and US\$ 1.2 billion of investments spanning eight government ministries ? both HBT and CHT were found to have investment gaps and were proposed (informally) as priorities. 3 / 4 / 5. A gender analysis, including Bangladesh's gender equality priorities as outlined in 7FYP, its commitments to Beijing Platform for Action, and Climate Change and Gender Action Plan (2013) has been completed, and a Gender Action Plan is now included, which identifies how the project will be gender responsive (Section 3). 6. This is complete. A review of other project evaluation reports indicates significant challenges in delivering benefits to an equal number of men and women (50-50). Therefore, this project proposes a more conservative 40% (but this is higher than targets set by other GoB projects which are not designed exclusively for women). 7. The ways in which the project will complement and coordinate with GCF, GEF, and other GoB (including BCCTF) projects is outlined in Section 2: The baseline scenario and any associated baseline projects, and in Annex P: Brief Description of Other Relevant Baseline Projects
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Germany Comments:

1. Germany appreciates the consideration of Gender in the project proposals throughout the project cycle and inclusion of the GEF Gender Implementation Strategy. However, the proposal is lacking on clear Gender indicators and inclusion of specific Gender activities throughout all the Components, therefore Germany would like to suggest the inclusion of clear Gender measurable indicators and a better description of intended Gender activities.
2. Furthermore, Germany asks to duly consider the importance of linkages with urban areas within the concept. Due to the fact that (i) in the event of natural disasters/climate impact, cities serve as a temporary or permanent shelter for internal climate- and or disaster-migrants, and (ii) are critical factors in the overall value-chain of economic activities of the rural areas.
3. Nonetheless, Germany notes the broad foreseen geographical coverage and extensive list of activities. It would therefore recommend to clearly identify the risks for project sustainability associated to covering too broad a range of project activities, as well as potential mitigation measures.
4. Germany further welcomes the intended efforts of creating synergies with existing government programs and donor-supported programs. However, Germany strongly recommends to consider stronger coordination with other initiatives and to further explore potential synergies with ongoing international, bilateral and national programs and activities such as:
 - a. The EU Bangladesh Resilient Livelihoods Programme? (BRLP),
 - b. Support for the

1. A gender analysis has been completed, and a Gender Action Plan is now included, which identifies how the project will be gender responsive (**Section 3**). Sex-disaggregated targets are now presented for all core indicators and targets, and gender-responsiveness is reflected in results/logical framework.
2. The project will provide grants to the farmers organization in each target geography to enable them to engage with urban markets, agro-processors and agro-SMEs. In addition, the project will carry out several capacity building program at district and sub-district level on gender inclusive agricultural value chains, assessment of climate risk, prioritization and implementation of adaptation measures in agriculture where rural-urban linkage and resilient food supply will get importance. Besides, the project will produce a good number of communication materials and disseminate them to wide range of people including urban markets and consumers. In addition, the project will collaborate with an ongoing FAO's project on 'Dhaka Food System' to increase the rural-urban linkage for sustainable crop value chain.
3. This is included in the risk mitigation plan (**Section 5**).
4. Synergies with NAP, NDC, and other EU-funded initiatives is now specified in Section 2: The baseline scenario and any associated baseline projects, and in Annex P: Brief Description of Other Relevant Baseline Projects. GIZ-DOE's Nationwide Climate Vulnerability Assessment was a critical part of the data analysis undertaken to prioritize target geographies (the data was extracted from the draft report, as reflected in Section 2).

<p>United States Comments:</p> <ol style="list-style-type: none"> 1. Provide additional information on how the 4 targeted landscapes were chosen; 2. Consider outreach and coordination with universities and other educational entities; 3. Consider outreach and coordination with USAID's Asia Bureau on sustainable landscape programs; 4. Expand on the modalities for how this project will ensure that local stakeholders have the necessary skills and knowledge to develop resilient livelihood practices; 5. Expand upon how FAO will cross-reference the work outlined in this PIF with similar or related programs and projects that are being carried out by other implementers and / or funding, and how FAO will adjust this project to make sure that it is complimentary and not duplicative of ongoing activities; and, 6. Expand on ways in which Ministries involved in this project and the various existing programs and projects will coordinate with other, including through planned institutional arrangements between Ministries. 7. Provide more information on how beneficiaries, including women, have been involved in the development of the project proposal and will benefit from this project; 8. Engage local stakeholders, including community-based organizations, environmental non-governmental organizations and the private sector in both the development and implementation of the program; and, 9. Clarify on how the implementing agency and its partners will communicate results, lessons learned and best practices identified throughout the project to the various stakeholders both 	<ol style="list-style-type: none"> 1. The information on choice of landscapes is provided in Section 1a.1. This project builds on another GEF-funded global project on Decision Support for Sustainable Land Management (DS-SLM), which targeted HBT, CHT, and salinity-prone areas. Based on priorities in Delta Plan 2100, the Nationwide Climate Vulnerability Assessment, NAEP (2012) and so on, waterlogging prone areas were also included. Section 2 then describes how the PPG Phase further prioritized target <i>upazilas</i> within these four vulnerable landscapes. The stakeholders and project executing entities also urged to keep the project focus on these four landscapes. 2. Universities and other educational institutions were a part of the stakeholders consulted with during the inception workshop, sub-national consultations, and validation workshop (Annex N). 3. During project formulation the project discussed with USAID officials, and engaged the experts from USAID funded ongoing projects in the national and sub-national consultation. During project implementation, the project will coordinate with USAID's Asia Bureau on sustainable landscape programs. 4. Section 1a.3 captured how local stakeholders will be engaged through CBAs and vulnerability risk assessments, farmers trained on adaptation and business development through farmer field schools and farmer organization (FO) related trainings. A number of workshops have been designed for extension officials (UAOs and SAAOs) to ensure they have adequate capacity to support implementation, and sub-national / local government officials will also be encouraged to participate in workshops on the range of plausible agriculture adaptation measures, assessing climate risks, and selecting and prioritizing adaptation measures suitable to local contexts. 5. As Annex P and Section 1a.1 indicates, DOE, DAE, and FAO have already cross-referenced the activities proposed under this project with similar or related programs / projects to ensure it is not duplicative. Where efforts overlap, the additionality has been explained. 6. The project engaged Ministry of Environment, Forest and Climate Change and Ministry of Agriculture and their Agencies in the project as executing entities. In the PSC and PICs, representatives from other Ministry and Division such as Planning Ministry, Economic Relation Division etc. will be included. During the capacity development events, the project will involve officials from relevant Ministries and govt. agencies for enhancing coordinated effort. Finally, Section 2 and Annex P described a list of relevant ongoing project and how BCRL will collaborate with them during implementation. 7. The project formulation team undertook a number of field visits during which farmers and farmer organizations were interviewed (individually, or focus groups), and sub-national consultations involved a consensus building exercise which included farmers' representatives as well. Women, including women farmers, from different govt. organizations, NGOs, universities, and research organizations were engaged in the inception workshop, sub-national consultations, and validation workshop (Annex N). Interaction with women
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Summary of changes in alignment with the project design with the original PIF

Substantial changes in project design as compared to the original PIF have been made. The PIF contained a large number of outcomes and outputs. This has been streamlined to reflect the flow and intensity of project activities, and where there was duplicative work, outputs and associated activities have been combined. The wording of the four project outcomes, and the flow of the logical framework, outputs, indicators have been revised based on the inception workshop, technical workshop, sub-national stakeholder consultations, and individual meetings with Government of Bangladesh (i.e., MoEFCC, DoE, DAE). However, the underlying approach and principles remain the same. The following table contains the specific changes in each of the project component.

Approved PIF	Current CEO Endorsement document
Component 1. Strengthen national institutional capacities for climate change adaptation and resilience.	Component 1. Strengthen national capacities for integration of adaptation measures in agriculture sector planning, budgeting, and policy process.
Outcome 1.1 Strengthened cross-sectoral collaboration through Institutional capacity building to mainstream climate change adaptation and resilience.	Outcome 1. CCA considerations integrated into agriculture sector planning, budgeting and policy.
Output 1.1.1. National stakeholders engaged through climate vulnerability reduction platform and cross-sectoral coordination mechanism covering government, local stakeholder and the private sector.	Output 1.1. Strengthened mechanisms for improved cross-sectoral and ministerial coordination, covering all relevant government ministries or agencies, to ensure enhanced coordination on policies, plans, and investments on adaptation for agriculture.
Output 1.1.2. Cross-sectoral country action plans developed to address climate change vulnerability and climate resilient livelihood and land management.	Dropped as an activity, and intensified focus on Component 3, Output 3.5 on value chain adaptation plans.
Output 1.1.3. Collaboration with global/regional and national initiatives enhanced.	Addressed under Component Outputs 1.1 & 1.3, and Component 4, Output 4.2.
Outcome 1.2. National institutional capacities strengthened to benefit from climate finance and implement adaptation and climate resilient livelihoods measures.	Dropped as an independent outcome and combined Component 1, Outcome 1.
Output 1.2.1. Updated climate change vulnerability and adaptation related information and existing investment gap addressed in the national country investment plan (CIP) for the environment, forest, and climate change (EFCC) sectors.	Output 1.2. Innovative financial instruments, investment models, and institutional setup developed and capacitated to mobilize climate finance for resilient agriculture in Bangladesh.
Output 1.2.2. Institutional coordination and public-private partnerships enhanced for the implementation of the adaptation action plan in four climate vulnerable landscapes (3.1.3)	Output 1.3. Strengthened inter-sectoral planning and investment prioritization processes at national and sub-national level for resilient agriculture in Bangladesh.

Output 1.2.3. Enhanced capacity of national entities to develop, plan, implement and monitor climate-resilient and adaptation projects and update national policies and plans.	Combined with Output 1.2.
Component 2. Climate-resilient livelihoods and adaptation decision-making processes strengthened.	Component 3. Scale-up investments for effective adaptation in selected value chains.
Outcome 2.1. Climate-resilience and adaptation knowledge enhanced by stronger climate vulnerability decision-support services.	This Outcome is reflected in Component 1 activities on integrating CCA considerations in agriculture sector planning, budgeting and policy.
Output 2.1.1. Transparent access to climate vulnerability related information enhanced through data sharing policies, documentation and data collection, and analysis protocols.	Dropped as an independent output since this is addressed in NAP, NDC and other projects, and LDCF-BCRL will draw on existing datasets and analysis.
Output 2.1.2. A Combined Early warning system (EWS) operationalized for disaster risk and loss and damage reduction.	This is now Component 2, Output 2.5.
Output 2.1.3: Long-term value chain adaptation plans developed to manage anticipated shifts in the suitability and viability of key farming systems in targeted landscapes based on integrated climate and agroecological zone models.	Output 3.1. Value-chain networks mapped and investment opportunities for resilient agriculture identified in two regions (HBT, CHT, or waterlogging/salinity-prone areas).
Outcome 2.2 Innovative financial instruments and investments models developed and piloted.	Outcome 3. Climate-resilient livelihoods through improved access to credit, markets, and technologies.
-	Output 3.2 Strengthened capacities and performance of farmer organizations (producer groups, farmer cooperatives, common interest groups).
Output 2.2.1. Innovative financial instruments and investment models developed and piloted in four climate vulnerable landscapes.	Output 3.3. Enhanced linkages between FOs and private sector to enable direct sale by farmers. Output 3.5 Innovative financial instruments for farmers, entrepreneurs, or MSMEs are designed, piloted, and scaled.
Output 2.2.2. Innovation incubator created in close collaboration with research, academia, NGOs, private sector, and Government entities.	Output 3.4. Improved access to technology in crop supply chains to generate value addition opportunities for entrepreneurs and MSMEs.
Component 3. Scaling-up investments in targeted landscapes to reduce vulnerability and increase resilience.	Component 2. Demonstrate and scale up climate adaptation solutions in targeted landscapes.
Outcome 3.1 Local participatory adaptation plans formulated.	Combined with Outcome 2. Increased resilience of agriculture-based livelihoods and landscapes.
Output 3.1.1. Established local consultative groups in four (4) climate change vulnerable landscapes.	

Output 3.1.2 Participatory integrated biophysical and socio-economic resource mapping of the selected four (4) climate vulnerable landscapes conducted.	Output 2.1. Community climate vulnerability and risk assessments and adaptation prioritization exercises at the village / community level.
Output 3.1.3 Participatory gender responsive four (4) vulnerable community resilience and adaptation bottom-up action plans considering water, soil and vegetation for selected vulnerable areas established.	
Outcome 3.2 Implementation of adaptation technologies and innovations.	Outcome 2. Increased resilience of agriculture-based livelihoods and landscapes.
Output 3.2.1 Established public-private partnership agreements to finance climate resilient and adaptative solutions in the four (4) selected areas based on the action plan developed in 3.1.3 (emphasizing storage, processing, transportation, value chain, market access, and local MSMEs).	Moved to Component 3, Output 3.3 and 3.4.
Output 3.2.2 Climate resilient livelihood strategies piloted and alternative income generating activities in the selected vulnerable areas implemented by relevant Govt. depts. such as DoE, DAE, BFD, DoF, SRDI, BMDA, and CHT board.	Output 2.2. Strengthened mechanisms to improve farmer knowledge of climate-resilient agriculture through extension services and Farmer Field Schools. Output 2.3. Improved uptake by farmers of climate-resilient crops (prioritized in Annex M), varieties, and management practices through transfer of seed kits and other inputs. Output 2.4. Strengthened initiatives for Nature-based Solutions and community ownership of agricultural assets.
Output 3.2.3 Create market opportunities by linking private investments and superstore chain.	Moved to Component 3, Output 3.2 and 3.3.
-	Output 2.5. Improved capacity to use basic agro-meteorological information / agro-climatic advisories for farmers? decision-making and risk management
Component 4. Effective knowledge management, monitoring, and evaluation at the local and national level.	Component 4. Enable effective knowledge management, and monitoring, evaluation and learning (MEL)
Outcome 4.1 Project monitoring and evaluation ensured.	Outcome 4.1. Project monitored and evaluated, information disseminated, and lessons from project implementation, progress monitoring, review, and evaluations codified and shared.
Output 4.1.1 Monitoring and evaluation framework developed and implemented.	Output 4. MEL framework developed and operationalized.
Outcome 4.2 Enhanced knowledge management and shared learning of information.	

Output 4.2.1 Knowledge management and monitoring strategies and tools for adaptation are tested, validated and operationalized at the landscape level.	
Output 4.2.2 Multi-level and south-south cooperation established for knowledge and innovation sharing and technology transfer.	-
Outcome 4.3 Awareness about resilient livelihoods and adaptation enhanced.	Output 4.3. Awareness raising of stakeholders through media dissemination of CCA for agriculture options.
Output 4.3.1 Horizontal and vertical exchange of information and knowledge of the lessons learned to national and local stakeholders through seminars, conferences, consultations, workshops, and media.	Output 4.2. Capacity building of national and sub-national government officials? through peer-to-peer learning and knowledge exchange visits? on agriculture or AFOLU change climate adaptation initiatives.
Output 4.3.2. Information dissemination and awareness raising on climate resilient livelihood technology and finance availability conducted through partnership arrangements with digital media houses and the private sector.	Combined with Output 4.3.

**ANNEX C: Status of Utilization of Project Preparation Grant (PPG).
(Provide detailed funding amount of the PPG activities financing status in the table below:**

PPG Grant Approved at PIF: US\$ 200,000			
<i>Project Preparation Activities Implemented</i>	<i>GETF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Consultants (national and international)	134,490	155,764	0
Contracts	0	0	4,250
Travel	39,500	11,704	0
Training (PPG consultation, Inception and validation workshops etc.) and stationary	24,000	25,525	0
Expendable procurement for office small equipment	0	167	0
General operating expenses	2,010	2,590	0
Total	200,000	195,970	4,250

ANNEX D: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

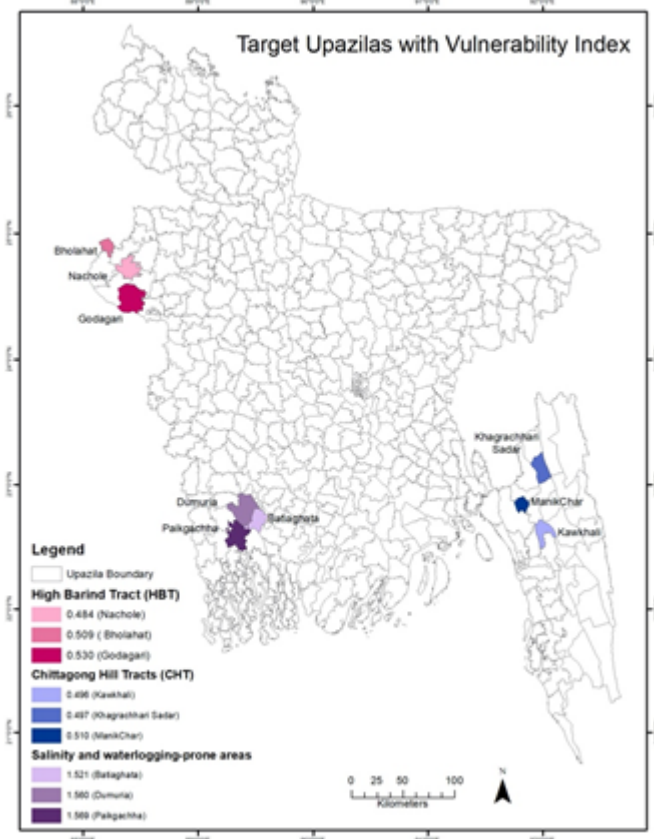
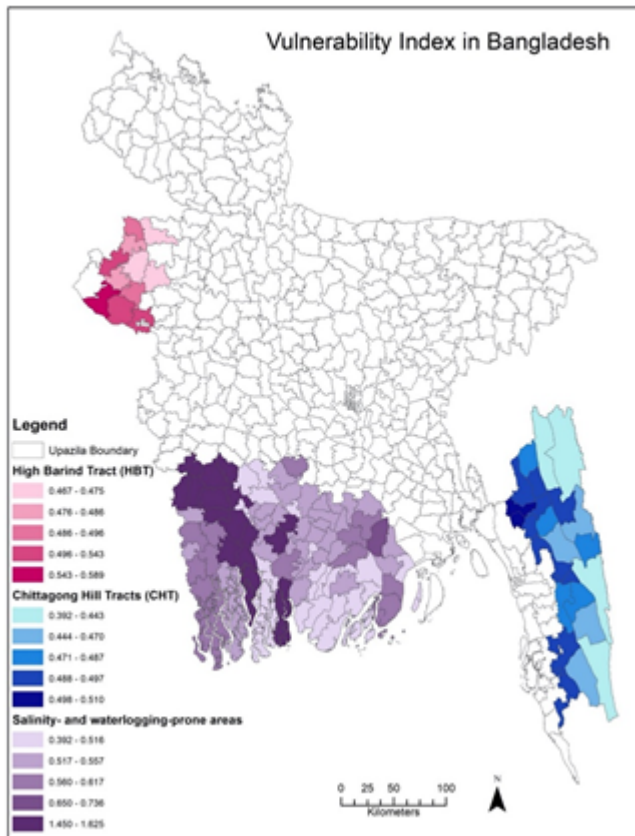
The areas of interest for the project are (1) High Barind Tract in the north-west, (2) overlapping waterlogging- and salinity-prone areas in the south-west, and (3) Chittagong Hill Tracts in the south-east as marked in Figure 1. The locations of the upazilas were selected based on an analysis that considered indicators of adaptive capacity and the presence of the farmers organizations established by the NATP project. The criterion of the presence of the farmers organization was included for efficiency in using those as resources for the current project.

Selection of upazilas within the targeted geographies

The following indicators were used to estimate upazila (Sub-district) wise vulnerability index in Bangladesh.

1. Number of rural households
2. Number of poor
3. Households with electricity
4. Population in bottom 40%
5. Literate population
6. Number of underweight children
7. 2014 tree cover
8. 2014 single or multi-crop land area

Figure: Vulnerable upazilas in target geographies



Methodology and data Source: Data on socio-economic characteristics was derived from World Bank's Interactive Bangladesh Poverty Maps, which in itself uses the 2010 Bangladesh Poverty Maps, 2012 Undernutrition Maps of Bangladesh, and the 2011 Population Census. The Bangladesh Forest Inventory was used to generate tree cover, and agricultural land use (single/multi-crop) area.

A upazila (sub-district) vulnerability index was constructed using, among others, indicators below using min-max normalization (i.e., where each measure is scaled from 0 to 1). Then, each standardized indicator simply averaged (equal weight to all indicators) to derive an overall vulnerability score for each upazila.

$$z = \frac{x - \min(x)}{\max(x) - \min(x)}$$

Next, the National Agricultural Technology Project (NATP) Phase II proposal was used to determine whether the upazila was targeted under Phase I, and higher priority was assigned such upazilas to build on baseline activities (Left Figure). Finally, high priority upazilas were presented during the validation workshop, and finalized based on participant feedback. The upazilas finally selected were: **High Barind Tracts** - Nachole, Godagari, and Bholahat; **Saline/waterlogging** - Paikgachha, Dumuria, and Batiaghata; **Chittagong Hill Tracts** - Manikchhari, Khagrachari Sadar, and Kawkhali (Right Figure). The final weighting and results are given in the table below.

Region	District	Upazila Name	Total Population (N)	Total Rural Population (N)	Rural Population (N)	Number of Households (N)	Number of poor (N)	Literacy with Electricity (N)	Households population (18 years and older) (N)	Population in bottom 40% (N)	Number of underweight children (N)	Tree Cover 2014	Single-Multi crop	NATP-II	NATP-I	Average index with NATP-I	long_value	Lat_value	Selectec upazila
CHT	KHAGRACHHARI	MANIKCHHARI	61700	26520	43	13340	18577	3240	12680	28114	3306	4368	2482	0	0	0.511	91.82	22.84	X
CHT	KHAGRACHHARI	KHAGRACHHARI SADAR	112740	42984	38	24320	22004	12780	35800	27079	3985	11998	3683	1	0	0.498	91.99	23.13	X
CHT	RANGAMATI	KAWYHALI (BETULUNIA)	60320	50620	84	12860	14131	5540	15060	21237	2117	12630	2148	1	0	0.497	92.01	22.62	X
CHT	KHAGRACHHARI	RAMGARH	71140	34680	49	14920	23185	5340	17560	32451	3722	10636	2741	1	0	0.506	91.83	22.93	
CHT	KHAGRACHHARI	MATIRANGA	125220	101440	81	27260	35419	8060	28120	52501	5759	26717	6076	0	0	0.499	91.85	23.1	
CHT	RANGAMATI	LANGADU	86880	75335	87	17980	25446	3100	17700	38562	3778	17701	6571	0	0	0.496	92.21	22.95	
CHT	RANGAMATI	RAJASTHALI	26980	23400	87	6020	5541	2440	6580	8117	875	7170	1288	0	0	0.495	92.24	22.38	
CHT	BANDARBAN	NAKHONGOHARI	62480	44680	72	12220	28770	1940	10020	40453	4297	27260	3466	1	0	0.493	92.23	22.47	
CHT	KHAGRACHHARI	MAHALOHARI	50420	40500	80	11280	10767	3260	12040	16680	2107	11303	3543	1	0	0.493	92.02	22.95	
CHT	RANGAMATI	KAPTAI	59060	45620	77	13520	7219	8760	20180	11304	1807	12617	920	0	0	0.493	92.19	22.46	
CHT	KHAGRACHHARI	LAKSHMIOHARI	28080	26122	93	6060	8693	1000	3760	12093	1256	12178	1602	0	0	0.493	91.93	22.79	
CHT	BANDARBAN	LAMA	112180	92876	83	22440	45938	5220	17840	63573	5022	36970	5564	0	0	0.492	92.21	21.82	
CHT	RANGAMATI	NANARCHAR	43740	37460	86	9480	9289	2460	10800	15527	1648	16555	2222	0	0	0.488	92.07	22.82	
CHT	BANDARBAN	BANDARBAN SADAR	87180	47400	54	18980	26856	10260	22100	32438	3186	26058	2810	1	0	0.487	92.22	22.17	
CHT	RANGAMATI	JURAI OHARI	28940	22843	79	6100	5584	2060	6260	8488	1131	17149	1819	0	0	0.484	92.42	22.63	
CHT	KHAGRACHHARI	PANCHHARI	62740	40120	64	14160	14689	3980	15220	21560	2485	20719	4623	0	0	0.482	91.91	23.32	
CHT	BANDARBAN	ROWANGOHARI	26880	22060	82	6280	8847	1540	3940	12947	1261	25572	1298	0	0	0.478	92.34	22.21	
CHT	RANGAMATI	BARKAL	45240	43520	96	9400	11813	2380	10500	19884	1576	32163	2515	0	0	0.472	92.34	22.85	
CHT	RANGAMATI	RANGAMATI SADAR	127520	42009	33	26880	9367	20280	46780	12639	3063	27715	2106	1	0	0.470	92.27	22.64	
CHT	BANDARBAN	RUMA	29120	29080	100	5940	12319	1980	4180	17353	1315	36191	665	0	0	0.470	92.43	22.01	
CHT	BANDARBAN	ALI KADAM	51020	36492	72	9380	21878	1460	7360	31019	3207	51579	2493	0	0	0.460	92.38	21.6	
CHT	KHAGRACHHARI	DIGHINALA	101040	86819	86	22440	22770	6620	25360	35444	3770	62171	5939	0	0	0.444	92.05	23.4	
CHT	BANDARBAN	THANCHI	23000	21460	93	4860	12201	620	3300	16732	1586	67926	797	0	0	0.434	92.53	21.64	
CHT	RANGAMATI	BELAI OHARI	28520	25740	90	6080	9900	1540	4900	14865	1148	65364	1702	0	0	0.432	92.49	22.3	
CHT	RANGAMATI	BAGHAIOHARI	95540	76740	80	20180	23693	6040	21860	39248	3839	109789	5070	0	0	0.393	92.23	23.37	
HBT	CHAPAI NABAGANI	BHOLAHAT	103420	89780	87	24480	21535	10900	27760	23539	3708	715	6051	0	0	0.510	88.21	24.9	X
HBT	RAJSHAHI	PABA	314340	229080	73	76600	104992	51700	93600	127498	9228	1699	14696	0	0	0.543	88.6	24.41	
HBT	RAJSHAHI	GODAGARI	326660	268100	82	72200	144208	33060	88120	194263	12182	160	38419	1	0	0.531	88.41	24.48	X
HBT	CHAPAI NABAGANI	CHAPAI NABAGANI SADAR	529920	351140	66	112760	134401	63300	140800	163935	20343	1715	19025	0	0	0.589	88.26	24.57	
HBT	CHAPAI NABAGANI	GOMASTAPUR	276700	217257	79	62920	72085	26980	63760	88191	10001	1139	21285	0	0	0.524	88.36	24.86	
HBT	NAOGAON	SAPAHAR	161060	148565	92	36220	34406	9040	39780	40905	5502	54	19101	0	0	0.496	88.53	25.12	
HBT	NAOGAON	MANDA	362020	350540	97	97240	53220	31660	101220	47743	10158	2894	29999	0	0	0.495	88.71	24.74	
HBT	NAOGAON	BADALGACHHI	201400	195380	97	54020	30295	16060	63860	28536	5257	2029	17029	0	0	0.495	88.94	24.97	
HBT	RAJSHAHI	TANORE	191840	138880	72	47420	68430	28520	55540	85467	5332	145	23631	0	0	0.494	88.53	24.62	
HBT	NAOGAON	POKSHA	130360	118739	91	30760	28339	8420	33140	34079	4541	88	19503	0	0	0.487	88.52	24.99	
HBT	CHAPAI NABAGANI	NACHOLE	146860	129520	88	32920	35480	16000	38580	42300	5222	196	22129	0	0	0.484	88.4	24.73	X
HBT	NAOGAON	DHAMOIRHAT	184820	167900	91	49040	32996	13820	58140	34744	5333	1473	23754	0	0	0.479	88.82	25.13	
HBT	NAOGAON	MAHADEBPUR	289380	273960	95	76100	45207	29620	94340	45219	8045	1692	31398	0	0	0.476	88.76	24.92	
HBT	NAOGAON	PATNITALA	230920	209247	91	58640	42848	20600	80280	46174	6730	1202	29555	0	0	0.474	88.72	25.08	
HBT	NAOGAON	NIAMATPUR	248300	242059	97	61800	48289	21260	68820	54843	7623	148	37209	0	0	0.468	88.55	24.83	
Saline & waterlog	KHULNA	PAIKGACHHA	247520	230700	93	59880	104941	26700	84500	143999	6880	1782	5658	0	1	1.570	89.34	22.59	X
Saline & waterlog	KHULNA	DUMURIA	303340	283980	94	71920	112941	41900	102220	151090	8651	2206	12457	0	1	1.561	89.4	22.81	X
Saline & waterlog	KHULNA	BATIAGHATA	169920	162180	95	40780	68880	16660	61940	92119	4520	530	13727	0	1	1.521	89.52	22.71	X
Saline & waterlog	KHULNA	DACOPE	152860	139141	91	36580	68012	10040	54440	92368	3527	51026	17783	0	1	1.451	89.52	22.39	
Saline & waterlog	SATKHIRA	SHYAMNAGAR	318940	301501	95	72280	160076	21460	89460	220098	10302	378	10170	0	0	0.611	89.18	22.06	
Saline & waterlog	SATKHIRA	SATKHIRA SADAR	468140	354276	76	109020	201987	63460	162080	256331	12009	2803	14738	1	0	0.604	89.04	22.72	
Saline & waterlog	SATKHIRA	ASSASUNI	271320	262340	97	62040	131351	20280	79720	178837	8071	819	6337	0	0	0.593	89.19	22.52	
Saline & waterlog	SATKHIRA	KALIGANI	277980	260820	94	64920	133305	21360	91560	177723	8174	2789	7547	0	0	0.587	89.06	22.45	
Saline & waterlog	SATKHIRA	TALA	299300	289660	97	72460	135425	31400	95500	179365	7791	4845	8518	1	0	0.581	89.21	22.74	
Saline & waterlog	SATKHIRA	KALAROA	239140	210080	88	59280	109890	26440	73560	144104	6477	2990	10210	1	0	0.556	89.03	22.88	
Saline & waterlog	KHULNA	KOYRA	192580	181560	94	45760	94626	11240	56760	135260	5900	154	10373	0	0	0.555	89.38	22.14	
Saline & waterlog	KHULNA	RUPSA	176960	176960	100	41880	65268	31580	64840	83679	4460	1587	2558	0	0	0.542	89.64	22.82	
Saline & waterlog	SATKHIRA	DEBHATA	125200	122640	98	29820	53992	13640	42620	66765	3356	679	1373	0	0	0.538	89.02	22.6	
Saline & waterlog	KHULNA	DIGHALIA	117220	117220	100	26780	46034	16900	38420	58537	3239	729	2526	0	0	0.530	89.56	22.93	
Saline & waterlog	KHULNA	TEROKHADDA	116500	104500	90	26340	57788	11600	31380	80158	4534	644	9761	0	0	0.525	89.65	22.91	
Saline & waterlog	KHULNA	KHULNA SADAR	228600	0	0	53660	81081	51020	117120	91399	3922	3	37	0	0	0.521	89.57	22.8	
Saline & waterlog	KHULNA	KHALISHPUR	162920	0	0	39540	66885	37880	79300	75804	2949	10	0	0	0	0.520	89.54	22.85	
Saline & waterlog	KHULNA	PHULTALA	84720	53860	64	19580	28517	16320	32540	34886	2244	1585	779	0	0	0.515	89.44	22.96	
Saline & waterlog	KHULNA	KHAN JAHAN ALI	79280	74040	93	18760	25274	16980	35640	26734	1774	463	268	0	0	0.515	89.49	22.92	
Saline & waterlog	KHULNA	DALUATPUR	455020	49486	11	27000	18179	25520	52580	6271	2087	156	44	0	0	0.503	89.51	22.88	
Saline & waterlog	KHULNA	SONADANGA	168640	0	0	38820	32551	37440	81400	27229	2862	2	41	0	0	0.501	89.54	22.82	

ANNEX E: Project Budget Table

Please attach a project budget table.

Equipment to set up vermicompost units: construction material for shed; wheel barrows and trolleys; water pipes and drip irrigation equipment; farm equipment such as shovels, hoes, spades, dung fork, rags or cement to construct vermi-beds; earthworms as start-up stock; weighing scales or platform; etc.)	Per unit	300	750			225,000	225,000												225,000
LDAs with Farmer Organizations	Per unit	180	4,000					720,000	720,000										720,000
Inputs for farmers (improved seeds, planting material)	Lumpsum	1	846,301					846,301	846,301										846,301
5024 Sub-total expendable procurement						800,480	800,480	3,702,091	3,702,091	40,000	40,000							4,502,571	
6100 Non-expendable procurement																			
<i>Detailed: show identified procurement type</i>																			
Colour Printer	Lumpsum	1	3,397	3,397	3,397														3,397
Colour Printer (Regional Offices)	Per unit	3	500			750	750	750	750										1,500
DSLR Video Camera (Regional Offices)	Per unit	3	500			750	750	750	750										1,500
Furniture (PMU)	Lumpsum	1	7,500															7,502	7,502
Rent and utilities	Monthly Cost	53	1,000															53,000	53,000
Computers and laptops	Per unit	20	1,500															30,000	-
6100 Sub-total non-expendable procurement				3,397	3,397	1,500	1,500	1,500	1,500									90,502	66,899
6107 Technical Support Services (TSS)																			
<i>(Lump sum) misc. expenses</i>																			
Preparation of Project Terminal Report	Lumpsum	1	6,550															6,550	6,550
6111 Sub-total reporting cost																		6,550	6,550
6108 GOE budget																			
<i>(Lump sum) misc. expenses</i>																			
6100 Sub-total GOE budget																			
TOTAL																			
				752,047	752,047	2,379,605	2,379,605	4,626,716	4,626,716	391,800	391,800	356,900	425,352					8,629,920	

ANNEX F: (For NGI only) Termsheet

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

ANNEX G: (For NGI only) Reflows

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agency is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

ANNEX H: (For NGI only) Agency Capacity to generate reflows

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies' capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).