

# Funding Proposal

---

## **FP069: Enhancing adaptive capacities of coastal communities, especially women, to cope with climate change induced salinity**

Bangladesh | United Nations Development Programme (UNDP) | B.19/12

16 March 2018





# Funding Proposal

Version 1.1

**The Green Climate Fund (GCF) is seeking high-quality funding proposals.**

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title: Enhancing adaptive capacities of coastal communities, especially women, to cope with climate change induced salinity

Country/Region: Bangladesh/ Asia and the Pacific

Accredited Entity: United Nations Development Programme

Date of Submission: 25 January 2018

## Contents

Section A	<b>PROJECT / PROGRAMME SUMMARY</b>
Section B	<b>FINANCING / COST INFORMATION</b>
Section C	<b>DETAILED PROJECT / PROGRAMME DESCRIPTION</b>
Section D	<b>RATIONALE FOR GCF INVOLVEMENT</b>
Section E	<b>EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA</b>
Section F	<b>APPRAISAL SUMMARY</b>
Section G	<b>RISK ASSESSMENT AND MANAGEMENT</b>
Section H	<b>RESULTS MONITORING AND REPORTING</b>
Section I	<b>ANNEXES</b>

### *Note to accredited entities on the use of the funding proposal template*

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

**Please submit the completed form to:**

[fundingproposal@gcfund.org](mailto:fundingproposal@gcfund.org)

Please use the following name convention for the file name:

"[FP]-[Agency Short Name]-[Date]-[Serial Number]"

A.1. Brief Project / Programme Information		
A.1.1. Project / programme title		Enhancing adaptive capacities of coastal communities, especially women, to cope with climate change induced salinity
A.1.2. Project or programme		Project
A.1.3. Country (ies) / region		Bangladesh/ Asia and the Pacific
A.1.4. National designated authority (ies)		Secretary, Economic Relations Division, Ministry of Finance
A.1.5. Accredited entity		United Nations Development Programme (UNDP)
A.1.5.a. Access modality		<input type="checkbox"/> Direct <input checked="" type="checkbox"/> International
A.1.6. Executing entity / beneficiary		EE: Ministry of Women and Children Affairs (MoWCA) Beneficiary: Total 719,229 direct and indirect beneficiaries
A.1.7. Project size category (Total investment, million USD)		<input type="checkbox"/> Micro ( $\leq 10$ ) <input type="checkbox"/> Medium ( $50 < x \leq 250$ ) <div style="float: right;">           x Small (<math>10 &lt; x \leq 50</math>)  <input type="checkbox"/> Large (<math>&gt; 250</math>)         </div>
A.1.8. Mitigation / adaptation focus		<input type="checkbox"/> Mitigation <input checked="" type="checkbox"/> Adaptation <input type="checkbox"/> Cross-cutting
A.1.9. Date of submission		25 September 2017; 1 <sup>st</sup> Re-submission 14 November 2017; 2 <sup>nd</sup> Resubmission 11 December 2017; 3 <sup>rd</sup> Resubmission 25 January 2018
A.1.10. Project contact details	Contact person, position	Srilata Kammila; Regional Technical Specialist - Adaptation
	Organization	United Nations Development Programme
	Email address	<a href="mailto:srilata.kammila@undp.org">srilata.kammila@undp.org</a>
	Telephone number	+66 2 304 9100 ext. 5264
	Mailing address	United Nations Service Building, Rajdamnern Nok Avenue, Bangkok 10200 Thailand

A.1.11. Results areas (mark all that apply)	
<p><b>Reduced emissions from:</b></p> <p><input type="checkbox"/> Energy access and power generation (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)</p> <p><input type="checkbox"/> Low emission transport (E.g. high-speed rail, rapid bus system, etc.)</p> <p><input type="checkbox"/> Buildings, cities and industries and appliances (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)</p> <p><input type="checkbox"/> Forestry and land use (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)</p>	
<p><b>Increased resilience of:</b></p> <p><input checked="" type="checkbox"/> Most vulnerable people and communities (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)</p> <p><input checked="" type="checkbox"/> Health and well-being, and food and water security (E.g. climate-resilient crops, efficient irrigation systems, etc.)</p> <p><input type="checkbox"/> Infrastructure and built environment (E.g. sea walls, resilient road networks, etc.)</p> <p><input type="checkbox"/> Ecosystem and ecosystem services</p>	

(E.g. ecosystem conservation and management, ecotourism, etc.)

## A.2. Project / Programme Executive Summary (max 300 words)

1. Climate change, manifesting in the form of intensified cyclones, storm surges, and sea-level rise (SLR), is accelerating saltwater intrusion into the fresh water resources of the coastal belt of Bangladesh. Climate change-induced soil and water salinity is projected to adversely impact freshwater dependent agricultural livelihoods (leading to loss of productivity or livelihoods) as well as the availability and quality of drinking water in the vulnerable coastal communities. Furthermore, given the crucial role that women play in water security and household level resilience, and their socio-economic marginalization, the climate change-induced threat to agricultural livelihoods and drinking water security of the affected coastal communities disproportionately affects women and girls.
2. Therefore, the key **objective** of the proposed project is to support the Government of Bangladesh (GoB) in **strengthening the adaptive capacities of coastal communities, especially women, to cope with impacts of climate change-induced salinity on their livelihoods and water security**. GCF resources will be combined with GoB co-financing to address information, technical, financial and institutional barriers to implementing and managing resilient livelihoods and drinking water solutions for the vulnerable communities in the Southwestern coastal districts of Khulna and Satkhira. An estimated 719,229 people (about 245,516 direct and 473,713 indirect) will benefit from the proposed project interventions.
3. The proposed project will empower target communities, especially women, as 'change-agents' to plan, implement, and manage resilient livelihoods and drinking water solutions. The project will enable those communities to address climate change risks on livelihood and drinking water security to promote synergistic co-benefits. It will enhance the adaptive capacities of these communities in the face of worsening impacts of climate-change induced salinity on their freshwater resources which in turn adversely affect livelihood and drinking water requirements. GCF resources will be invested in promoting a diversification from currently non-adaptive, freshwater-reliant livelihoods of small-scale farmers, fishers, and agro-labourers towards climate-resilient agricultural livelihoods. GoB co-financing is leveraged to support adoption and scale of these alternative, climate-resilient agricultural livelihoods through strengthened value-chains and market linkages for their long-term viability in the face of increasing salinity and extreme weather. The project also utilizes GCF and GoB resources to support investments in and management of climate-resilient drinking water solutions to secure year-round, safe drinking water supplies for the targeted communities. Access to reliable, safe drinking water enables the communities, especially women and girls in targeted households, to invest the resulting time and cost savings and health co-benefits in enhanced livelihoods and income generating and/or educational opportunities. In turn, the enhanced incomes and livelihoods will enable the communities to sustain the investments in the drinking water supply solutions in the long-term. Finally, through investments in institutional capacities, knowledge dissemination and evidence-based learning, the project will enable pathways for replication and scale of project impact to secure livelihoods and drinking water across the vulnerable districts of the southwest coast of Bangladesh. The project yields significant environmental, social (including gender), and economic co-benefits including enhanced integrity of coastal ecosystems and freshwater resources; improved gender norms and women empowerment; and increased income and health benefits, estimated at USD15 million and USD4 million respectively over the project lifetime.
4. The project contributes towards GoB's achievement of priorities outlined in the Nationally Determined Contributions (NDC) and its climate change strategies. The project objective speaks to the top five key **near-term areas of intervention** identified by the INDC to address adverse impacts of climate change<sup>1</sup> including: 1) Food security, livelihood and health protection (incl. water security); 2) Comprehensive disaster management, 3) Coastal Zone Management, including Salinity Intrusion control, 4) Flood Control and Erosion protection, 5) Building Climate Resilient Infrastructure. Directly aligned to six of the fourteen<sup>2</sup> **broad adaptation actions** prioritized by INDC, the

<sup>1</sup> The remaining are: 6) Increased Rural Electrification, 7) Enhanced Urban Resilience, 8) Ecosystem based adaptation (including forestry co-management), 9) Community based conservation of wetlands and coastal areas, and 10) Policy and Institutional Capacity Building.

<sup>2</sup> The remaining are (in priority order): ii) Disaster preparedness and construction of flood and cyclone shelters; iv) Inland monsoon flood-proofing and protection; vi) Climate resilient housing; vii) Improvement of Urban resilience through improvement of drainage

project is implementing improved EWS, supporting climate resilient infrastructure, Tropical cyclones and storm surge protection, stress-tolerant variety improvement and cultivation, and Capacity Building at Individual and institutional level to plan and implement adaptation programmes and projects.

5. The proposed project is prioritized for inclusion in the country's GCF Country Work Programme, currently under development and is part of UNDP's Work Programme as an Accredited Entity of the GCF. The project is designed through extensive stakeholder consultations, including with civil society, bi-lateral donors, and communities, which informed the project design. The current design of the project was reviewed as per GoB's internal process led by the NDA, involving relevant government ministries, civil society, and representatives of key donors<sup>3</sup>. The NDA has issued a no-objection letter.

### A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	N/A
Expected financial close (if applicable)	TBD (date of agreement on the FAA between UNDP and GEF)
Estimated implementation start and end date	Start: <u>01/07/2018</u> End: <u>30/06/2024</u>
Project/programme lifespan	6 years

system to address urban flooding; viii) River training and dredging (including excavation of water bodies, canals and drains); x) Research and knowledge management; xi) Adaptation on local-level perspectives, etc.; xii) Adaptation to climate change impacts on health; xiii) biodiversity and ecosystem conservation and xiv) Capacity Building at Individual and institutional level to plan and implement adaptation programmes and projects in the country.

<sup>3</sup> Including: Australia, Canada, Denmark, France, Germany, Japan, Netherlands, Norway, Sweden, UK, and USA.

## B.1. Description of Financial Elements of the Project / Programme

6. For this project, GoB seeks maximum concessionality in the form of grant financing from the GCF which will leverage and build upon GoB co-financing (USD8 million). During a project duration of six years, the financing will be used to invest in and sustain resilient livelihoods and drinking water solutions for vulnerable communities across Khulna and Satkhira districts, two of the most extremely vulnerable districts to climate change induced salinity of freshwater resources in Bangladesh. In addition to co-financing the investments during the six-year lifetime of the project, GoB (DPHE) has also affirmed its commitment (USD4 million) to post-project O&M of project infrastructure for drinking water supply systems. See Annex IVa and IVb for the co-financing and O&M commitment letters.
7. **Co-Financing:** GoB has committed to a total of US\$ 8 million as co-finance (24 per cent of total project costs) with USD7 million as in-cash and USD1 million as in-kind contribution over the project duration of six years. This new and additional co-financing is leveraged to: (i) complement GCF resources for investments in resilient livelihood assets and inputs and support business skills development (Activity 1.1, Output 1); (ii) finance value-addition, market access, and access to finance linkages (Activity 1.2, Output 1); (iii) support adaptive management of resilient livelihoods (Activity 1.3, Output 3); (iv) contribute to the infrastructure investments for drinking water supply systems (Activity 2.2, Output 2); (v) finance operation and maintenance costs for water supply solutions (Activity 2.3, Output 2); (vi) complement GCF resources to enhance institutional technical capacities for climate-risk informed design and implementation of livelihoods and drinking water solutions (Activity 3.1 and 3.2, Output 3); and (vii) support knowledge and learning to build long-term adaptive capacities (Activity 3.3, Output 3). The USD1 million in-kind co-financing is the form of staff time (institutional staff across Ministry of Women and Children Affairs (MoWCA), Department of Women Affairs (DWA), Department of Public Health Engineering (DPHE), and Local Government Institutions (LGIs)) for various Training of Trainers (ToT) based capacity building activities across the project and to support effective implementation of the project activities across all outputs.
8. **Other financing leveraged:** The project crowds in community and private sector (value-chain and market actors) engagement and financing during project implementation. The project financing will invest in livelihood inputs and assets, skills development, and business and market linkages to support women and adolescent girls to adopt diversified, climate-resilient livelihoods. Beneficiaries will be supported to graduate from utilizing project funds to using their own investments to replenish inputs (and any minor costs for asset repair) within two years of project implementation (while there is contingency built in to the project and budget for extended assistance). The average financial contribution per woman beneficiary to uptake full responsibility of livelihood management through input purchase is estimated at USD160 per year throughout the project's lifetime. Discussions with Financial Intermediaries (FIs), including Micro Finance Institutions (MFIs), have indicated that for the project livelihood groups, both household and group level credit would be feasible given the collateral and income enhancements supported by the project. (See Annex XIIIc for details on these Stakeholder Consultations) Therefore, the proposed project is expected to leverage continuous financing for the outcomes of the project through facilitating access to credit for the women producer groups, especially for input provision and scale beyond the project support. The FIs and MFIs (not financed by the project) will be linked to the project through networking activities including through the project-established Public-Private Initiative platforms (PPIs) at the sub-district level. These linkages and technical assistance to enhance access to markets and finance, is also expected to leverage community and private sector financing during and post-project implementation. Finally, provision of year-round, safe drinking water is also designed to catalyse community engagement and investment (estimated at USD635,000), primarily through the nominal fee contributions to O&M of the water supply systems. See Annex XIIIb for details on the O&M plan and Annex XIIIc for relevant stakeholder (including communities) consultations related to O&M plan and the financing.

**Table 1: Financial elements per project outputs<sup>4</sup>**

Output	Activity	GCF funding (USD)	Total co-financing (USD)	Amount (for entire project) (USD)	Amount (for entire project) (BDT)*
<b>OUTPUT 1. Climate resilient livelihoods, focusing on women, for enhanced adaptive capacities of coastal agricultural communities</b>	Activity 1.1 Enterprise- and community-based implementation of climate-resilient livelihoods for women	6,060,530	947,850	7,008,381	569,255,732
	Activity 1.2 Strengthened climate-resilient value-chains and market linkages for alternative, resilient livelihoods	926,270	1,925,000	2,851,270	231,594,373
	Activity 1.3 Community-based monitoring and last-mile dissemination of EWs for climate-risk informed, adaptive management of resilient livelihoods	1,515,150	107,300	1,622,449	131,783,444
	<b>Total OUTPUT 1</b>	<b>8,501,950</b>	<b>2,980,150</b>	<b>11,482,100</b>	<b>932,633,549</b>
<b>OUTPUT 2. Gender-responsive access to year-round, safe and reliable climate-resilient drinking water solutions</b>	Activity 2.1 Participatory, site-specific mapping, beneficiary selection, and mobilization of community-based management structures for climate-resilient drinking water solutions	883,445		883,445	71,757,851
	Activity 2.2 Implementation of climate-resilient drinking water solutions (at HH, community, and institutional scales)	8,366,055	3,300,384	11,666,439	947,606,475
	Activity 2.3 Community-based, climate-risk informed Operation & Maintenance (O&M) and management of the resilient drinking water solutions	644,880	786,751	1,431,631	116,284,235
	<b>Total OUTPUT 2</b>	<b>9,894,380</b>	<b>4,087,135</b>	<b>13,981,515</b>	<b>1,135,648,562</b>
<b>OUTPUT 3. Strengthened institutional capacities knowledge and learning for climate-risk informed management of livelihoods and drinking water security</b>	Activity 3.1 Strengthen MoWCA's technical and coordination capacities for design and implementation of gender-responsive, climate-resilient coastal livelihoods	1,271,085	43,670	1,314,755	106,790,984
	Activity 3.2 Strengthen DPHE capacities for climate-risk informed innovation and management of drinking water solutions across the Southwest coast	1,137,385	146,175	1,283,560	104,257,171
	Activity 3.3. Establish knowledge management, evidence-based learning, and M&E mechanisms to promote long-term, adaptive capacities of coastal communities	1,318,380	108,740	1,427,120	115,917,826
	<b>Total OUTPUT 3</b>	<b>3,726,850</b>	<b>298,585</b>	<b>4,025,435</b>	<b>326,965,981</b>
	<b>Project Management Cost</b>	<b>2,856,820</b>	<b>634,130</b>	<b>3,490,950</b>	<b>283,552,409</b>
<b>Grand total</b>		<b>24,980,000</b>	<b>8,000,000</b>	<b>32,980,000</b>	<b>2,678,800,500</b>

\* Using UN official exchange rate as of 1 September 2017, one US dollar = 81.225 Bangladeshi Taka

<sup>4</sup> The Accredited Entity (AE) Fee for the proposed project is US\$2,248,200. The budget figures presented in this proposal exclude the fee.

Please see Annex V for the budget breakdown by expenditure type (project staff and consultants, travel, goods, services, etc.) and disbursement schedule.

## B.2. Project Financing Information

	Financial Instrument	Amount	Currency	Tenor	Pricing		
<b>(a) Total project financing</b>	<b>(a) = (b) + (c)</b>	32.980	million USD (\$)				
<b>(b) GCF financing to recipient</b>	(i) Senior Loans	.....	Options	( ) years	( ) %		
	(ii) Subordinated Loans	.....	Options	( ) years	( ) %		
	(iii) Equity	.....	Options		( ) % IRR		
	(iv) Guarantees	.....	Options				
	(v) Reimbursable grants *		Options				
	(vi) Grants *	24.980	million USD (\$)				
<p>* Please provide economic and financial justification in <a href="#">section F.1</a> for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in <a href="#">section E</a>.</p>							
	Total requested (i+ii+iii+iv+v+vi)	24.980	million USD (\$)				
<b>(c) Co-financing to recipient</b>	<b>Financial Instrument</b>	<b>Amount</b>	<b>Currency</b>	<b>Name of Institution</b>	<b>Tenor</b>	<b>Pricing</b>	<b>Seniority</b>
	Grant	7.000	million USD (\$)	Government of Bangladesh (cash)		( ) %	Options
	Grant	1.000	million USD (\$)	Government of Bangladesh (in-kind)	( ) years	( ) %	Options
	Options	.....	Options	.....	( ) years	( ) % IRR	Options
	Options	.....	Options	.....			Options
Lead financing institution: .....N/A.....							
* Please provide a confirmation letter or a letter of commitment in section I issued by the co-financing institution.							
<b>(d) Financial terms between GCF and AE (if applicable)</b>	<p>In cases where the accredited entity (AE) deploys the GCF financing directly to the recipient, (i.e. the GCF financing passes directly from the GCF to the recipient through the AE) or if the AE is the recipient itself, in the proposed financial instrument and terms as described in part (b), this subsection can be skipped.</p> <p>If there is a financial arrangement between the GCF and the AE, which entails a financial instrument and/or financial terms separate from the ones described in part (b), please fill out the table below to specify the proposed instrument and terms between the GCF and the AE.</p>						

	Financial instrument	Amount	Currency	Tenor	Pricing
	Choose an item.	.....	<u>Options</u>	( ) years	( ) %
Please provide a justification for the difference in the financial instrument and/or terms between what is provided by the AE to the recipient and what is requested from the GCF to the AE.					

### B.3. Financial Markets Overview (if applicable)

9. The project supports creation of assets, uptake of tools, practices, and skills for resilient livelihoods, and strengthening of value-chain/market linkages to enable the livelihood beneficiaries to access finance from FIs including MFIs. The support under Output 1 (with leveraged GoB co-financing) on training on business development, O&M, etc. as well as the establishment of platforms to facilitate linkages between the livelihood groups and value-chain actors and FIs will allow the beneficiaries to obtain credit finance from the financial sector. Consultations during project preparation with Financial Intermediaries (FIs), including Micro Finance Institutions (MFIs), have indicated that for the project livelihood groups, both household and group level credit would be feasible given the collateral and income enhancements supported by the project. (See Annex XIIIc for details on these Stakeholder Consultations)

## C.1. Strategic Context

### Country Background:

#### Geographical context and climate change related vulnerabilities

10. The hydro-geophysical features of Bangladesh significantly contribute to its high vulnerability to climate change induced disasters. While the country's landmass constitutes only 7 per cent of the combined catchment area of the Ganges-Brahmaputra-Meghna river basin system, this region must drain over 92 per cent of rainfall runoff generated in the combined GBM catchment, within a period of four and a half months (June to mid-October)<sup>5</sup>. Bangladesh is predominantly flat and low-lying<sup>6</sup> and apart from hilly regions in the northeast and southeast, it is mostly less than 10m above sea level (ASL). It is one of the most disaster-prone countries in the world affected by floods, tropical cyclones, storm surges, and droughts. It is highly vulnerable to cyclonic disasters<sup>7</sup>, with coastal areas frequently hit by cyclones. Floods remain the key natural disaster; approximately 25 per cent of the country is flooded each year and a severe flood occurs every 4-5 years, sometimes inundating up to 60 per cent of the country.
11. The coastal zone is especially vulnerable to climate change, extreme events and their impacts on the salinity of soils and availability of freshwater. It encompasses a total of 19 districts along a 710-kilometre coastline and is home to 38.52 million people<sup>8</sup>. The coastal zone ranges between 1-2 m ASL and 4-5 m ASL in the southeast and this low-lying, flat topography, combined with a dynamic morphology, significantly contributes to its vulnerability to sea level change; small rises in sea level combined with high tides and/or storm surges lead to more frequent seawater flooding and salinization of soils and freshwater, as well as increasing saltwater intrusion into groundwater resources. Climate change is also expected to further increase salinity levels through increases in temperatures and associated evaporation/drying, particularly towards the end of the dry season. It is less clear how rainfall changes will affect surface salinities; potential increases during the core of the monsoon season may provide a local source of freshwater, whereas river flows are largely dependent on rainfall in the Himalayas/India and Nepal, with releases by upstream barrages controlled through international treaties. The coastal zone, furthermore, constitutes 32 per cent of the country and 28 per cent of the total population<sup>9</sup>. The southwest region of the coast has an estimated 2.5 million poor (including 1.4 million ultra-poor), many of whom suffer an acute shortage of potable water, a scarcity of fresh water for agriculture, and experience significant changes in coastal aquatic ecosystems, threatening a range of livelihoods. These impacts are compounded by climate change risks, including slow-onset SLR and intensified cyclonic events. The Intergovernmental Panel on Climate Change (IPCC) reports that by the year 2050 approximately 27 million people in the coastal areas will be at risk due to SLR. Pender et al. (2008)<sup>10</sup> further project that by 2080, assuming SLR of 62 cm, up to 17 million, 12 million and 14 million people are expected to be at low, medium and high risk, respectively. That is, the southern coastal districts not only have a higher percentage of the population living in extreme poverty compared to the rest of the country, but those communities are also most likely to suffer a wider range of and intensification of impacts from climate change, including SLR, increased storm surges from cyclones and tropical storms, changes in rainfall and temperature, which will further exacerbate the risks they face.
12. Climate change impacts are not gender-neutral and many of the consequences of climate-induced impacts are more severe for women and adolescent girls, and other socio-economically marginalized groups, given their specific livelihood circumstances, their socio-political isolation perpetuated by unequal power dynamics, and related information asymmetry and constraint in decision making processes<sup>11</sup>. Women and girls importantly lack access to productive resources, as well as decision-making power, and this has impacts on their health, food security, and

<sup>5</sup> Ahmad, & Rasheed, 1994, 'Resources, Environment and Development in Bangladesh with Particular Reference to the Ganges, Brahmaputra and Meghna Basins', Academic Publishers, Dhaka;

<sup>6</sup> <http://unfccc.int/resource/docs/natc/bgdnc2.pdf>

<sup>7</sup> Ali, A. 1999. Ghurnijhar (Cyclone), Bangla Academy, Dhaka. 19PP

<sup>8</sup> Bangladesh Bureau of Statistics (BBS) 2011. Population and housing census report 2011. Bangladesh Bureau of Statistics, Ministry of Planning, Dhaka.

<sup>9</sup> Islam, M. R., and Ahmad, M., 2004, Living in the coast: problems, opportunities and challenges. Program Development Office for Integrated Coastal Zone Management Plan Project. Water Resources Planning Organization. Dhaka, Bangladesh

<sup>10</sup> Pender, J.S. 2008. What Is Climate Change? And How It Will Affect Bangladesh. Briefing Paper. (Final Draft). Dhaka, Bangladesh: Church of Bangladesh Social Development Programme

<sup>11</sup> Alam, K., Fatema, N., & Ahmed, W. B. 2008. Gender, climate change and human security in Bangladesh. Dhaka

safety. Constraints in accessing natural resources, and additional socio-cultural barriers limiting participation and movement outside the household sphere, are worsened by phenomena such as flooding, drought and erratic rainfall.

13. Relevant GoB climate change strategies: The GoB is committed to tackling climate change in the context of its overall development framework. In line with the Vision 2021, the Seventh Five Year Plan (SFYP, 2016-2020) of GoB boldly articulates the country's commitment to addressing climate change and equitable development and prioritizes integration of gender and climate change into the plan. In September 2015, the country submitted its INDC (now National Determined Contributions (NDC)), which, besides its mitigation targets, also states the key areas of work to address climate change adaptation priorities, including promotion of climate resilient livelihoods, water security, early warning systems, and cyclone shelters, among others. The Bangladesh Climate Change Strategy and Action Plan (BCCSAP), formulated in 2008 and revised in 2009, provides an overall framework for climate change action and forms the basis for climate investments in Bangladesh. Furthermore, the Climate Change Gender Action Plan (ccGAP), articulates the country's commitment to ensuring gender equality in climate change related policies and interventions. The project is prioritized for inclusion in the GoB's GCF Country Work Program, under development. (refer to Section E.5.1 for further details on relevant climate change strategies and plans) as well as UNDP's Work Programme as an Accredited Entity to the GCF.

## C.2. Project / Programme Objective against Baseline

### *Climate vulnerability baseline*

14. Given its location, dependence on monsoon systems, transboundary rivers, and the low coping capacity of its population, Bangladesh is vulnerable to the impacts of climate change. In particular, an increase in the intensity of cyclones and storm surges, as well as ongoing SLR and temperature increases, are increasingly affecting low-lying coastal communities and ecosystems. Saltwater intrusion into fresh water resources, induced by SLR, storm surge and cyclones, is a major risk affecting the lives and livelihoods of coastal communities, disrupting agricultural productivity and drinking water security.

#### Key climate change hazards driving salinity

15. (i) Storm surges and cyclones: Between 1961 and 2013, a total of 61 cyclones hit Bangladesh, with the south-western zone affected by 28 per cent of these cyclones<sup>12</sup>. Storm surge flooding due to cyclones penetrates deeper inland, and causes extensive damage, especially when a cyclone makes landfall during high tide. Historically, cyclones have had associated storm surges ranging from 1.5 to 10.0m<sup>13</sup>. Under climate change projected increases in surface sea temperatures are expected to increase the intensity of tropical cyclones resulting in higher wind speeds and storm surge. According to the IPCC, tropical cyclone frequency in Bangladesh is likely to decrease or remain the same, but the number of intense cyclones will likely increase. Dynamic and regional climate models<sup>14</sup> project increased intensities of tropical storms by 2100 for the North Indian Ocean and increased frequencies of highest storm surges across the Bay of Bengal. Combined with SLR, the country is expected to face increasing tidal surge and inundation of coastal areas. By 2050, an additional 15 per cent of the coastal area of Bangladesh is projected to be inundated with storm surges during cyclones. Storm surge from a 10-year return period cyclone (such as Sidr) would inundate an area 80 per cent greater than the present flooded areas, with a total of 9.7 million people (compared to 3.5 million in the no climate change scenario) are expected to be exposed to severe inundation (>3m)<sup>15</sup>.
16. (ii) Sea Level Rise: Observations along the coast of Bangladesh (1980-2012) demonstrate SLR increases of 6-21 mm/ year<sup>16</sup>. The water level in the Ganges tidal floodplain was found to have risen by 7-8 mm/yr, in the Meghna Estuary by 6-10 mm/ year and in the Chittagong coastal plain areas by 11-21 mm/ year (Figure 1). These observed SLR trends are much higher than the global mean/average of <4 mm/yr<sup>17</sup>. Under climate change the country is

<sup>12</sup> Quadir and Iqbal Tropical Cyclones: Impacts on Coastal Livelihoods. Investigation of the Coastal Inhabitants of Bangladesh. IUCN. December 2008

<sup>13</sup> Brammer, H., 2014, Climate Change, Sea-level Rise and Development in Bangladesh, (Dhaka: University Press Ltd)

<sup>14</sup> Unnikrishnan, A. S., et. al. (2006). Sea Level Changes along the Indian coast: Observations and Projections Current Science India, 90: 362-36, Emanuel, K. 2005. Increasing destructiveness of tropical cyclones over the past 30 years. Nature 436:686-688

<sup>15</sup> World Bank 2010, Vulnerability of Bangladesh to Cyclones in a Changing Climate: Potential Damages and Adaptation Cost. Policy research working paper 5280, The World Bank, Washington, D.C

<sup>16</sup> Climate Change Cell (CCC) (2016). Assessment of Sea Level Rise on Bangladesh Coast through Trend Analysis. Department of Environment. Ministry of Environment and Forests

<sup>17</sup> Ibid.

expected to experience further SLR of 14cm, 32 cm, and 88cm by the year 2030, 2050, and 2100 respectively<sup>18</sup>, assuming only small contributions from melting ice sheets (implying these estimates are conservative). Critically, both the historical increases noted above and the projected increases due to climate change are expected to raise the salinity of freshwater sources<sup>19</sup>.

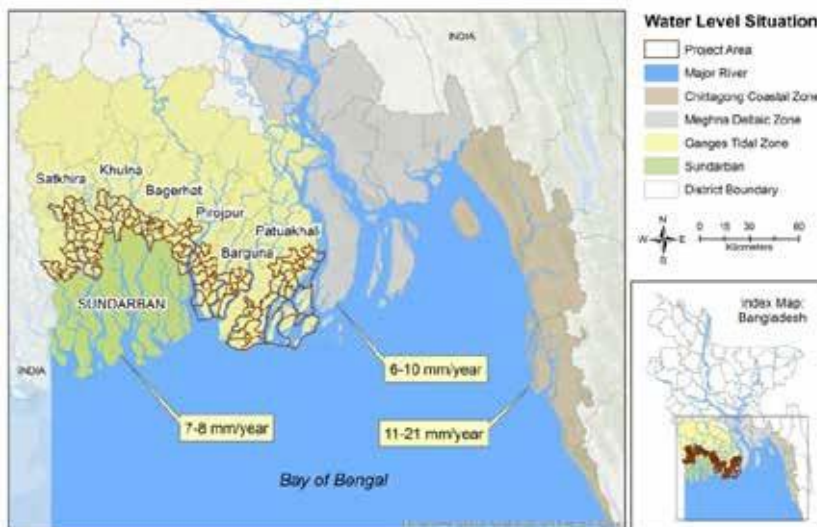


Figure 1. Water level trends for the coastal sub zone of Bangladesh based on the data of the last 30 years<sup>20</sup>

17. iii) Rainfall and temperature: Mean annual temperatures have been increasing in Bangladesh<sup>21</sup>, and several studies have noted increases in surface temperatures, with higher trends during drier periods<sup>22</sup>. Climate models simulate that this trend will continue to accelerate<sup>23</sup>. Furthermore, future simulations of the climate suggest higher than average monsoon rainfall in the future<sup>24</sup>, with winter months becoming warmer and drier while monsoon months become warmer and wetter. Increased monsoon rainfall may lead to frequent occurrence of high intensity floods over the floodplains<sup>25</sup> and prolonged monsoon flood duration will lead to an increased extent and depth of the inundation<sup>26</sup>. However, warmer and drier winter months will lead to more intense dry seasons, placing further pressure on surface freshwater sources of water and increasing the intrusion of salinity from saltwater (see below).
18. For further details on climate change risks (observed and projected) refer to Chapter 1, Section 1.2 of the Feasibility Study (Annex IIa).

#### Cyclone and SLR induced saltwater intrusion into fresh water resources

<sup>18</sup> NAPA (National Adaptation Programme of Action, Bangladesh) (2005). NAPA Information Pack developed by the NAPA Bangladesh project, Dhaka

<sup>19</sup> Bhuiyan, M. J. A. N., & Dutta, D. (2012). Analysis of flood vulnerability and assessment of the impacts in coastal zones of Bangladesh due to potential sea-level rise. *Natural Hazards*, 61(2), 729–743. doi:10.1007/s11069-011-0059-3

<sup>20</sup> Ibid.

<sup>21</sup> CDMP 2013. Local Level Hazard Maps for FLOOD, STORM SURGE & SALINITY. STUDY REPORT. Comprehensive Disaster Management Programme (CDMP II). Ministry of Disaster Management and Relief

<sup>22</sup> Agrawala S, Ota T, Ahmed A, Smith J, Aalst Mv (2003) Development and climate change in Bangladesh: focus on coastal flooding and the Sunderbans. Organisation for Economic Co-operation and Development (OECD; Mondal M. S., 2013, Development of Four Decade Long Climate Scenario & Trend: TEMPERATURE, RAINFALL, SUNSHINE & HUMIDITY. Institute of Water and Flood Management Bangladesh University of Engineering & Technology. Comprehensive Disaster Management Programme (CDMP II). Ministry of Disaster Management and Relief.

<sup>23</sup> Mondal M. S., Islam A.K.M. S., Madhu M. K. 2013, Development of Four Decade Long Climate Scenario & Trend: TEMPERATURE, RAINFALL, SUNSHINE & HUMIDITY. Institute of Water and Flood Management Bangladesh University of Engineering & Technology

<sup>24</sup> NAPA (National Adaptation Programme of Action, Bangladesh) (2005). NAPA Information Pack developed by the NAPA Bangladesh project, Dhaka

<sup>25</sup> Ministry of Environment and Forest (MOEF), Government of the People's Republic of Bangladesh (GOB), Dhaka. 2005

<sup>26</sup> A. U. 2006. Bangladesh: Climate Change Impacts and Vulnerability a Synthesis. Climate Change Cell, Department of Environment, Component 4b, Comprehensive Disaster Management Programme, Bangladesh.

19. A major concern resulting from intensified cyclones, higher storm surge, and rising sea levels is saltwater intrusion into the freshwater resources of the coastal belt of Bangladesh, affecting drinking water resources and agricultural livelihoods. Salinity intrusion varies by season, with more salinity observed during the dry season owing to reduced freshwater flows.
20. *Upstream river flows (non-climate change factor) and salinity:* While transboundary flows and land use changes have an impact on fresh water availability, climate change risks such as sea level rise, storm surges and tidal flooding have increased salinity levels in water and soils, with saltwater intrusions extending further inland. The contribution of reduced upstream freshwater flows to salinity increases has stabilised since 1996, due to the Ganges Treaty, wherein agreement with India guaranteed stable freshwater flows. However, since then salinity levels have continued to increase due to other climate change related factors mentioned above. The saline area in 10 of the most vulnerable coastal districts of the country has increased by 27 per cent between 1973 and 2009<sup>27</sup>. Furthermore, extensive modelling of most climate change related factors (SLR, rainfall, temperature, altered river flows from the Himalayas, land subsidence and upstream abstraction), though not including storm surge related inundation, has shown that by 2050 there will be a probable reduction in slightly saline (<1dS/m, from 22% to 13%) and slight to moderately saline (1–5dS/m, from 35% to 21%) river areas, whereas there will be an increase in moderate to high saline (5–10dS/m, from 8% to 27%) and highly saline (> 10dS/m, from 35% to 40%) river areas. In particular, freshwater river areas (0–1ppt) decrease from 40.8% to 17.1% and river areas suitable for agricultural irrigation (with salinity less than 2ppt) decrease by 29.7 percent<sup>28</sup>.
21. Further studies show that highly saline areas are extending inland and that soil salinity, along with surface and coastal river water salinity is gradually increasing<sup>29</sup>. The present dry season saline front (2 ppt) is projected to move 30 km to 70 km north, affecting most of Khulna, Jessore, Barisal, Patuakhali, and Noakhali (greater) districts by 2050<sup>30</sup> (see Figure 2). In particular, with a 1m SLR, the saline front is projected to move much further north in districts further east. Any increases in storm surge and related inundation will further increase these surface water salinity estimates. Currently, nearly 6 million people are exposed to high salinity surface waters (>5 ppt) and climate change is expected to increase this number to 13.6 million in 2050 and 14.8 million in 2080, most directly affecting the coastal district populations in Khulna, Satkhira, and Bagerhat<sup>31</sup>. Refer to Section 1.3.1 of the Feasibility Study (Annex IIa) for further discussions on observed and projected soil and water salinities in Southwest Bangladesh.

<sup>27</sup> Miah, M. M. U. 2010, Assessing long-term impacts and vulnerabilities on crop production due to climate change in the coastal areas of Bangladesh (Final Report PR #10/08).

<sup>28</sup> Dasgupta S., et al. (2014). River Salinity and Climate Change. Evidence from Coastal Bangladesh. World Bank Policy Research Working Paper No. 6817

<sup>29</sup> Dasgupta S., Hossain M. M., Huq M., Wheeler D., 2015. Climate change and soil salinity: The case of coastal Bangladesh. Ambio. DOI 10.1007/s13280-015-0681-5

<sup>30</sup> Dasgupta S., et al. (2014). Facing the Hungry Tide: Climate Change, Livelihood Threats, and Household Responses in Coastal Bangladesh. World Bank Policy Research Working Paper No. 7148.

<sup>31</sup> Khan, A., et al. (2011). Climate Change, Sea-Level Rise, & Health Impacts in Bangladesh. Retrieved from:

[http://www.environmentmagazine.org/se/util/display\\_mod.cfm?MODULE=/se-server/mod/modules/semod\\_printpage/mod\\_default.cfm&PageURL=/Archives/Back%20Issues/2011/September-October%202011/bangladesh-climat-change-full.html&VersionObject=92C46D6A76EEAB8328C00BB7F09E23BF&Template=590DB1352F1E17A42A2BD1D5F197578B&PageStyleSheet=30649E3FEA4E0343D76DA1B99596656A](http://www.environmentmagazine.org/se/util/display_mod.cfm?MODULE=/se-server/mod/modules/semod_printpage/mod_default.cfm&PageURL=/Archives/Back%20Issues/2011/September-October%202011/bangladesh-climat-change-full.html&VersionObject=92C46D6A76EEAB8328C00BB7F09E23BF&Template=590DB1352F1E17A42A2BD1D5F197578B&PageStyleSheet=30649E3FEA4E0343D76DA1B99596656A)

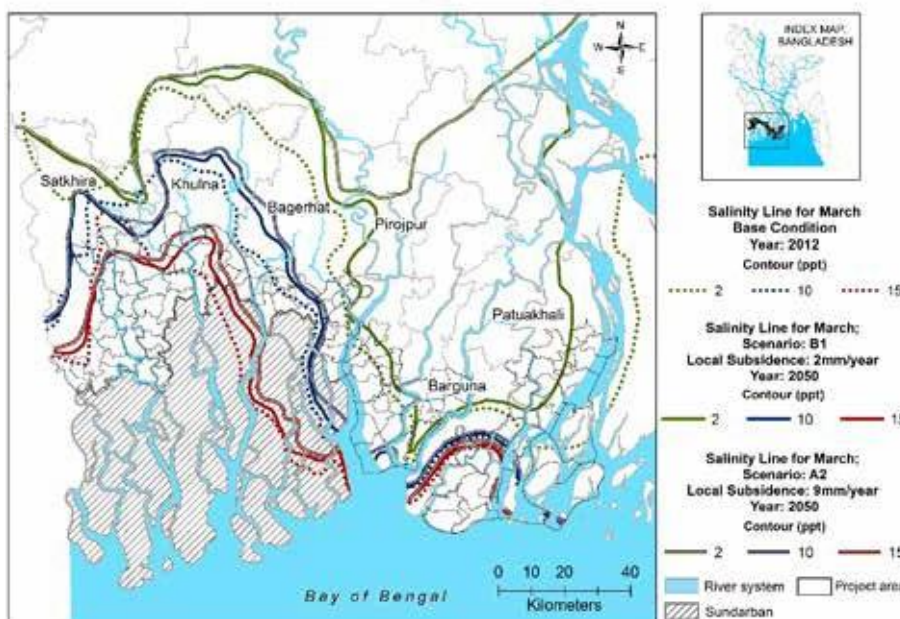


Figure 2: Projected river salinities in 2050 under two different climate change scenarios (A2 and B1)

Key Impacts of CC induced salinity – disruption to agricultural livelihoods and drinking water security

*Salinity impacts on agricultural livelihoods:*

22. Local communities are already experiencing direct damages to crops, decreasing fresh water fish stocks, and income loss, leading to increased vulnerability. Over 1 million hectares of cultivable land are already affected by salinity intrusion caused by slow- and rapid-onset events<sup>32</sup> e.g. the net cultivated area in Satkhira decreased by 7 per cent from 1996 to 2008<sup>33</sup>. Crop losses due to SLR-induced salinity intrusion have been estimated as 200,000 metric tonnes<sup>34</sup>, with salinity (+5 ppt) of irrigation water expected to further reduce farm productivity by up to 50 per cent<sup>35</sup>. Storm surge inundation under climate change is estimated to cause an additional loss of 422,642 tons of *Aman* rice, 156,928 tons of *Aus* rice, and 116,060 tons of *Boro* rice, which will have profound impacts on both the country's economy and the food security of its citizens<sup>36</sup>.
23. Salinity intrusion and tidal flooding have already prevented the expansion of agriculture in the coastal region, with land used for agriculture gradually decreasing between 1980 and 2010. The Livelihoods Assessment Report (Annex IIb) presents GIS maps on land use patterns in the targeted project Unions for the years 1995, 2005, and 2015 (see Section 6 of the Livelihoods Assessment Report (Annex IIb) for further discussion). These demonstrate that the targeted districts of Khulna and Satkhira have experienced a shift from agricultural land to aqua-cultural land (mainly shrimp farms), partly related to increasing soil salinity levels due to inundation after cyclones Sidr in 2007 and Aila in 2009. Shrimp farming, widely adopted as a way to deal with the increasing salinity of soil and water, has had significant negative impacts on salinity levels of surrounding lands, as well as on the livelihoods of vulnerable households. Furthermore, weak governance and land-tenure arrangements, as well as value chain structures, has created a situation where expanded shrimp farming has primarily benefited middle-class and wealthy landowners and large-scale enterprises, affecting the labour and income opportunities of the poor, especially for women.

<sup>32</sup> Soil Resource Development Institute (2010). Saline Soils of Bangladesh. Government of the People's Republic of Bangladesh

<sup>33</sup> Bangladesh Bureau of Statistics (BBS) (2010) Yearbook of Agricultural Statistics of Bangladesh, Statistics Division, Ministry of Planning, Government of Bangladesh

<sup>34</sup> Mainuddin et al. 2011, 'Planning and costing agriculture's adaptation to climate change in the salinity prone cropping system of Bangladesh,' Bangladesh Center for Advanced Studies.

<sup>35</sup> Clarke, D., 'Projections of on-farm salinity in coastal Bangladesh,' Royal Society of Chemistry, 2015.

<sup>36</sup> Dasgupta S., Hossain M. M, Huq M., Wheeler D. (2014). Climate Change, Soil Salinity and the Economics of High-Yield Rice Production in Coastal Bangladesh. Policy Research Working Paper (forthcoming), Development Research Group, World Bank.

24. Increasing climate-induced salinities will also adversely impact small-scale fishers. The reproductive cycle and capacity, spawning area and feeding, breeding and longitudinal migration of many fish species have been impacted and a combination of anthropogenic and climate factors have led to dramatic declines in fish biodiversity<sup>37</sup>; fresh water species decreased by 59 per cent in the highly saline Paikgacha Sub-District within a 30-year period. This dramatic loss in biodiversity is a serious threat to the local ecosystem and the national food supply. Climate change scenarios used to extrapolate salinity trends in coastal rivers between 2012 and 2050 projected losses across 83 different fish species which are integral to the current nutrition and livelihoods of local, poor communities in the coastal districts<sup>38</sup>.

*Salinity impacts on drinking water:*

25. Despite Bangladesh's abundant supply of water resources, drinking water quality is greatly affected by monsoon patterns and salinity. While the monsoon is expected to bring fresh subsurface water, groundwater recharge is variable, and water supply options are very limited in many coastal areas as freshwater aquifers at reasonable depths are not available<sup>39</sup>. Climate change induced salinities (associated with changes in precipitation patterns and inundation) compound dry season water scarcity and deteriorated water quality due to over extraction, salinization, arsenic and other contamination, which compels people to avail themselves of multiple drinking water sources to meet basic personal needs<sup>40</sup>.
26. Tubewells that access groundwater are the main source of drinking water for 73 per cent of the population living in the rural areas of Bangladesh<sup>41</sup>. On the coast, most of the groundwater is pumped from above 150 m below the surface, but much of this water is saline<sup>42</sup> due to salt water intrusion from the Bay of Bengal, which has accelerated due to sea level rise and percolation of saline surface water resulting from storm surge and unsustainable land use practices. These shallow coastal aquifers are highly saline and as such water supply wells must penetrate 250 metres or more to find water of acceptable quality<sup>43</sup>. Data from Bangladesh Water Development Board (BWDB)<sup>44</sup> indicates that the groundwater salinity in several key coastal districts is already beyond the limit for potable and irrigation use (>2500 uS/cm) and that surface water is beyond this acceptable limit in Satkhira district and parts of Khulna district<sup>45</sup>. Due to the high salinity of groundwater a substantial number of coastal people also rely on pond water<sup>46</sup> and the collection of rainwater is often the primary source of drinking water in many communities<sup>47</sup>. With an additional 15 per cent of the coastal area of Bangladesh projected to be inundated by 2050, the quality of water resources in this area is expected to further deteriorate. Cyclones also damage water supply infrastructure – tubewells and ponds – with many ponds becoming saline subsequent to inundation. Saltwater intrusion due to high tidal surges during Cyclone Aila, for instance, affected surface water sources such as ponds further intensifying the

<sup>37</sup> Ibid.

<sup>38</sup> Dasgupta S., Huq M., Mustafa M. G., Sobhan M. I., Wheeler D. (2016). Impact of Climate Change and Aquatic Salinization on Fish Habitats and Poor Communities in Southwest Coastal Bangladesh and Bangladesh Sundarbans. World Bank Policy Research Working Paper No. 7593. March.

<sup>39</sup> Kamruzzaman, A. K. M., and Ahmed, F. (2006), 'Study of performance of existing pond sand filters in different parts of Bangladesh', 32nd WEDC International Conference, Colombo, Sri Lanka, November, Loughborough, Leicestershire, UK, WEDC Loughborough, Pp. 377-380; Islam, M. M., Chou, F. F., Kabir, M. R., and Liaw, C. H., 2010, Rainwater: A potential alternative source for scarce safe drinking and arsenic contaminated water in Bangladesh. Water resources management, 24(14), 3987-4008; Islam, M.A., Hiroyuki, S., Karim, M. R., and Masahiko, S. (2013). Potable water scarcity: options and issues in the coastal areas of Bangladesh. Journal of Water and Health, 11(3), 532-542

<sup>40</sup> Ansari, M., Islam, H., Roy, K. 2011. Functionality and social acceptance of safe water, technology pond sand filter (PSF) and rainwater harvesting system (RWHS) in the southwest coastal region of Bangladesh. Saarbrücken: VDM Verla

<sup>41</sup> ACDI/VOCA 2015 <http://www.acdivoca.org/news/by-country/bangladesh/>

<sup>42</sup> Chowdhury, NT., 2010. Water management in Bangladesh: an analytical review. Wat. Policy., 12, 32-51.

<sup>43</sup> Ahmed MF, Ahuja S, Alauddin M, Hug SJ, Lloyd JR, Pfaff A, Pichler T., Saltikov C, Stute M. 2006. Epidemiology: ensuring safe drinking water in Bangladesh. Science. 314:1687–1688

<sup>44</sup> Unnayan Shamannay (2016) Policy Brief Issue 2016 Policy brief on Water Management in Bangladesh. Retrieved from: [http://www.cuts-citee.org/SDIP/pdf/Policy\\_Brief\\_on\\_Water-Water\\_Management\\_in\\_Bangladesh.pdf](http://www.cuts-citee.org/SDIP/pdf/Policy_Brief_on_Water-Water_Management_in_Bangladesh.pdf)

<sup>45</sup> Ibid.

<sup>46</sup> ACDI/VOCA 2015 <http://www.acdivoca.org/news/by-country/bangladesh/>

<sup>47</sup> Kamruzzaman, A. K. M., and Ahmed, F. (2006), 'Study of performance of existing pond sand filters in different parts of Bangladesh', 32nd WEDC International Conference, Colombo, Sri Lanka, November, Loughborough, Leicestershire, UK, WEDC Loughborough, Pp. 377-380; Islam, M. M., Chou, F. F., Kabir, M. R., and Liaw, C. H., 2010, Rainwater: A potential alternative source for scarce safe drinking and arsenic contaminated water in Bangladesh. Water resources management, 24(14), 3987-4008; Islam, M.A., Hiroyuki, S., Karim, M. R., and Masahiko, S. (2013). Potable water scarcity: options and issues in the coastal areas of Bangladesh. Journal of Water and Health, 11(3), 532-542

freshwater crisis. A district-wise assessment of water infrastructure damage by Cyclone Aila (conducted by DPHE) indicated that Khulna and Satkhira were the worst affected, including damage to 278 pond sand filters.

27. The availability of fresh water is also projected to decrease due to changing rainfall patterns which affect the regular recharge of groundwater sources. This will increase drinking water insecurity during the dry season, which is expected to be prolonged under projected climate change scenarios. Compounded by water infrastructure damage due to cyclones and storm surges, year-round access to safe drinking water will be further diminished, increasing the recurrent costs of water supply as well as associated health costs. The situation is all the more pressing, given that Bangladesh's annual water demand is expected to increase by 200 per cent by 2050 from current levels. These climate change induced impacts on drinking water sources will impact the entire population of the coastal districts, but will be particularly severe for socio-economically marginalized groups, such as women, adolescent girls, children, the elderly, and ethnic and religious minorities. For further details on salinity impacts on drinking water, refer to Section 1.3.4, of the Feasibility Study (Annex IIa).

## Disproportionate impacts of salinity induced loss of agricultural livelihoods and reduced water security on women

28. ActionAid in collaboration with the Australian Government and The Economist Intelligence Unit, conducted comprehensive studies on gender-specific vulnerabilities associated with climate-change, and have developed the South Asia Women's Resilience Index to quantify the relative resilience of women. The index demonstrates that countries across South Asia fare poorly in supporting women's resilience to disasters and in Bangladesh there are significant economic and social barriers to women's empowerment that increase their vulnerability during disasters. Gender inequality in Bangladesh arises from societal and cultural norms that impact woman's daily activities, as well as their overall adaptive capacity to climate change. Participation of women in agriculture has declined between 2001 and 2011<sup>48</sup>, partly due to increasing disruption to agricultural production from cyclones and salinity that renders agricultural production more difficult, and compels women to take on other domestic burdens, such as walking increasing distances to fetch viable water for domestic use. The shift to shrimp farming has also impacted the economic opportunities available to women, as it requires less labour than traditional rice paddy farming.
29. Climate change exposure, sensitivity and adaptive capacity of women and girls were also examined in a report by UN Women and were shown to be certain of exposure to salinity in all areas of their lives, and high sensitivity. Women's livelihoods were deemed vulnerable due to a lack of diversity of livelihoods; reduced options for on-farm livelihoods; cultural barriers in employment in the industry sector; limited SMEs to absorb women labourers; poor capacity to enter into skilled service sectors; domestic responsibility; lack of incentives for skilled jobs; and sole responsibility of child care. Drinking water related vulnerability was reported to be due to a limited number of safe and salinity free water-points in public and private spheres; lack of available water sources; lack of economic ability for poor women and women headed households to install salinity free water sources; long hours to collect water from distant sources; and threat of sexual harassment during long walkway to collect water from distant sources. Focus group discussions during the proposed project development yielded findings related to gender relationships at the household and community level. These are presented in Chapter 1, Feasibility Study, Annex IIa.
30. Land use changes due to salinity significantly impact women's livelihood options due to fewer on-farm and post-harvest employment opportunities. The overall reduction in livelihood options in coastal regions has also led to the increased migration of men to find work, and this also greatly increases women's burden of unpaid and undervalued household work. Climate-change induced migration has also meant that income from women's productive labour becomes critical for families' survival, and also creates a situation where women are often forced to provide labour at any cost to supplement household income, sometimes earning only USD0.91 a day<sup>49</sup>. This is equally true for adolescent girls, forced to marry early and discontinue their education in order to supplement household income. Women and married adolescent girls who are left behind face exploitation and become even more exposed to unsafe and unjust workplace conditions and gender-based violence<sup>50</sup>. Furthermore, increasing salinity has also led to a decline in the production of assets under their control, such as cattle and paddy. These assets are rapidly being

<sup>48</sup> Bangladesh Bureau of Statistics (BBS) (2010) Yearbook of Agricultural Statistics of Bangladesh, Statistics Division, Ministry of Planning, Government of Bangladesh

<sup>49</sup> Belton, B. (2016). Shrimp, prawn and the political economy of social wellbeing in rural Bangladesh. *Journal of Rural Studies*, 45, 230-242

<sup>50</sup> Pouliotte J., Smit B., Westerhoff L. 2009, Adaptation and development: Livelihoods and climate change in Subarnabad, Bangladesh. *CLIMATE AND DEVELOPMENT* 1, 31-46. doi:10.3763/cdev.2009.0001

replaced by economic activities such as shrimp, prawn, and fish aquaculture value chains, and rents from leasing out land, all of which tend to be dominated by men.

31. Climate change pressures on drinking water security, both current and projected also has a disproportionately negative impact on women and girls. A recent Gender Water Alliance study for the Bagerhat district, reveals how salinity-induced water stress in the region impacts the lives of women. The study details how the burden of collecting safe drinking water primarily falls on women and girls, and how declining access to suitable water compels them to walk long distances to secure water for the household, additionally jeopardizing their safety. Moreover, it is estimated that, in the most affected coastal areas of Bangladesh, women and girls spend an average of 2.5 hours to collect water, adding to their unpaid burden of work and monopolizing time that could otherwise be used for income generating activities<sup>51</sup>.
32. Poor water quality also directly affects the health of women and adolescent girls, in specific ways. In south-western coastal Bangladesh, the average intake of sodium far exceeds the World Health Organization (WHO) limit<sup>52</sup>. Although high levels of sodium intake affect the health of the entire population, a survey in 2008 found that pregnant women living in this coastal area had much higher rates of pre-eclampsia and gestational hypertension than pregnant women living in non-coastal areas<sup>53</sup>, likely due to the high sodium intake. Given that women and girls are not prioritized in terms of family health expenditures, and that this also has implications for maternal mortality, and the survival rate of infants at birth, this salinity exposure had multiplier effects on the health of women and their families. These secondary impacts of climate-induced salinity further reduce women's adaptive capacity. For further details on salinity impacts on women and children, refer to Section 1.3.5 of the Feasibility Study (Annex IIa).

#### **Baseline efforts and investments**

33. Over a period of 15 years (2001-2015), USD3.4 billion was spent on development projects in the two targeted districts of Khulna and Satkhira. Additionally, USD513 million has been spent to address salinity, waterlogging, and coastal inundation in these districts over the last 15 years. The majority of the spending came from the Bangladesh Water Development Board (BWDB) (for water and irrigation infrastructure), the Local Government Engineering Departments (LEGD, on cyclone centres, rural roads, culverts, irrigations, and market development), the Department of Disaster Management (DDM) (for safety net programmes, disaster risk reduction, and cyclone centres), the DPHE (for drinking water and sanitation infrastructure), the Department of Agriculture Extension (DAE) (for crop extension), and the Department of Fisheries (DoF) (for extension work on fisheries). In addition, the GoB is developing a Delta Plan 2100 for the coastal areas including support to ensure safety from floods and climate change related disasters; water security and efficiency of water usage; sustainable and integrated river systems and estuaries management; preservation of wetlands and ecosystems and promotion of their wise use; and integrated use of land and water resources. The priority activities include the Construction of the Ganges Barrage, the Coastal Embankment Improvement Programme, and the Tidal River Management Programme for the southwest region. The estimated cost of these three investments is USD4 billion.
34. GoB is undertaking many initiatives, with support from donors, multi-lateral partners and NGOs, related to infrastructure, disaster preparedness and response, water and sanitation, agriculture, and social protection. The Coastal Embankment Improvement Project (2002-2013, USD400 million) supported agricultural production by reducing saltwater intrusion into polders; the Southwest Area Integrated Water Resources Planning and Management (ADB, USD32.5 million) project supports flood control, drainage, and irrigation schemes; the Emergency 2007 Cyclone Recovery and Restoration Project (2013-present, USD140 million) aims to support restoration and recovery from the damage to infrastructure and livelihoods caused by Cyclone Sidr; the Humanitarian Preparedness and Response, a USD25 million DFID-funded programme, aims to save lives and reduce risk amongst people affected by disasters; the Comprehensive Disaster Management Programme (CDMP) (USD76 million) has introduced adaptation interventions and early warning community management; the Rural Water Supply and Sanitation Project (World Bank funded, USD75 million) aims to provide safe drinking water and sanitation for areas

<sup>51</sup> Bashawjed 2011hk

<sup>52</sup> Alam, and Khan. Sodium Concentration in Potable Ground Water in Coastal Belt of Bangladesh Due to the Effect of Global Warming: A Potential Health Risk. IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) e-ISSN: 2319-2402, p- ISSN: 2319-2399. Volume 8, Issue 6 Ver. I (Jun. 2014), PP 21-30 [www.iosrjournals.org](http://www.iosrjournals.org)

<sup>53</sup> Khan A, Mojumder SK, Kovats S, Vineis P. 2008. Saline contamination of drinking water in Bangladesh. Lancet 371:385.; doi:10.1016/S0140-6736(08)60197-X [Online 2 February 2008]

near contaminated shallow aquifers; the Blue Gold Programme (EUR 57.5 million) supports participatory water management and farmer field schools; the UNICEF supported Rural Water Supply, Sanitation and Hygiene in Difficult and Hard-to-Reach Areas of Bangladesh project focuses on addressing arsenic contamination of water supply; the USAID funded Nobo Jatra, a Food for Peace program in Khulna and Satkhira districts and the European Union (EU) supported DIPECHO projects focus on resilient agricultural production practices as part of disaster preparedness efforts in the south-east region; the Creating Opportunities for the Poor and Excluded in Bangladesh (COPE) (UK-DFID funded) programme supports the poorest communities through advocacy, assets, and economic opportunities; and the Empowerment and Livelihood Improvement project, Ultra-Poor (DFID funded) project, the Stimulating Household Improvements Resulting in Economic Empowerment (DFID funded) project, and the SHOUHARDO (CARE implemented) project support livelihoods for the poor. Refer to Section 3.1 Feasibility Study (see Annex IIa) for detailed list of investments.

35. Despite these considerable investments, especially in the past decade, there has been limited explicit consideration of climate change related impacts, and the related vulnerabilities on women and girls, in their design and implementation. Climate change has also served to undermine many of the development investments, and is increasing the burden on GoB, as development gains are repeatedly jeopardized by sudden-onset events, such as cyclones, as well as the slow erosion of environmental productivity through salinity increases. In turn, these impacts further exacerbate the vulnerabilities of the poor and extreme poor populations, the very target of the government and donor support. The GoB has also invested in building climate change resilience through support from projects such as the Bangladesh Pilot Programme for Climate Resilience (PPCR) to support climate-smart technologies, climate-proofing of infrastructure, and improving coastal connectivity; the Coastal Climate Resilient Infrastructure Project (USD150 million) for investments in roads, bridges, shelters, and markets; the Climate Resilient Agriculture and Food Security project (IFC, USD344 million); the Livelihood Adaptation to Climate Change (LACC) (FAO supported) for farmers' resilience; the "Jolobayoo-O-Jibon" (UK funded, USD15 million) project for climate risk reduction and adaptation; and the Climate-Resilient Ecosystems and Livelihoods (CREL) project (USAID, USD32.6 million) to support diversified, resilient livelihoods.
36. Whilst the majority of projects aimed at addressing climate change, address development challenges to build resilience to climate change, only a few focuses on specifically addressing climate change induced risks, both observed and projected, to support incremental or full adaptation solutions. Furthermore, there has been no systematic assessment of cyclone and SLR risks leading to the saltwater intrusion crisis that has disrupted freshwater resource dependent lives and livelihoods in the coastal zones. While there have been a number of localized interventions, coordinated solutions that address community and system capacities (particularly governing bodies, civil society, and the private sector) for gender-targeted, adaptive responses to salinity, at the required scale, are still limited. For further details on projects addressing the salinity impacts on drinking water, refer to Chapter 3, Feasibility Study (Annex IIa) for further discussion.

### **Adaptation Solution**

37. The project will empower communities, especially women, as 'change-agents' to plan, implement, and manage resilient livelihoods and drinking water solutions in the face of worsening climate change impacts on their freshwater resources. The **paradigm shift** is to move away from focus on short-term responses and technology-led interventions towards community-centric solutions that build ownership and capacities across multiple stakeholders to sustain and scale up adaptive responses to safeguard livelihoods and water security. Community-centric awareness, skills building, value-chain and market linkages support can promote a transformational switch from current, non-adaptive livelihoods to climate-resilient livelihoods that can, in turn, reduce the vulnerabilities of the extreme poor against future climate change risks. Climate-resilient water technologies, such as rainwater harvesting and pond water systems, provide the communities with a means to shift away from their dependence on ground-water to surface water systems that can address seasonal variability and cope with slow- and sudden-onset changes. Within the same communities, the benefits of the livelihoods and water security are synergistic and can mutually reinforce the resilience of the populations in coping with climate change-induced salinity impacts on their freshwater resources. Strengthened capacities across the government, Non-Governmental Organisations (NGOs), and private sector to incorporate climate change risks into implementation and management of livelihood and drinking water solutions are critical support long-term adaptive capacities of the coastal communities. Strengthening MoWCA's capacity to integrate gender and climate change into policies and programs particularly improves social targeting and climate-risk informed development across other sectors. Engaging national, sub-national, and local

institutional structures in provision of these solutions creates an enabling environment for communities, particularly, women as 'change-agents' to adapt to climate change.

### **Gaps and Key barriers**

#### ***Limited awareness, technical, and financial capacity among coastal communities, especially women, to diversify to climate-resilient livelihoods:***

38. Lack of awareness and access to tools to practice resilient agriculture-based livelihoods: A large share of the poor and extreme poor communities in Bangladesh's coastal areas have been experiencing disruptive impacts of climate change on their economic activities and livelihoods, particularly through increasing salinization of soil and freshwater bodies eroding farming and fishing productivity. However, while communities are aware of the salinity-induced disruption to their livelihoods, there is limited understanding of the evolving risks and worsening impacts due to climate change and how to respond to these risks to safeguard their livelihoods. Climate change affects the environmental conditions (such as salinity and temperature) under which agricultural livelihoods are practiced. Traditional farming practices will only provide a reliable source of income for a limited time, depending on shifting climate influenced variables (rainfall, temperature, evaporation, soil salinity, water salinity/availability) and management options (irrigation)<sup>54</sup>. Progressive farming techniques involve using short cycle crops and shifting away from low salinity tolerant crops such as Boro rice, to those vegetable crops which are less affected by salinity and have a higher market price. However, there is a limited knowledge of, and access to those crop varieties, particularly among women, climate-resilient practices and livelihoods that could reduce communities' vulnerability to the evolving risks. Reliable information on climate resilient practices is generally not available, preventing farmers from switching to resilient agriculture inputs, approaches and techniques (crop diversification, saline/drought/submergence tolerant crop varieties or early maturing varieties etc.) or resilient livelihoods away from fresh-water dependent agriculture, given the projected increases in salinity. Many of the recent livelihood changes (within the last 5-10 years), such as shifting to shrimp farming (which lead to further salinization) or cultivating highly freshwater dependent watermelons, have been maladaptive. These have exacerbated vulnerabilities indicating that there is a limited awareness and knowledge of how to respond to climate change impacts among local households, particularly women (see Livelihoods Assessment Report, Annex IIb, section 5.1).
39. Gender-specific constraints: This knowledge gap and lack of agricultural extension support services is particularly acute among women, with many extension services and training being geared towards men. This is compounded by the fact that women's participation in activities such as trainings can be greatly limited, both due to norms and attitudes about the abilities of women, what is considered appropriate work, and due to restrictions on movement and time. Training and extension services are often not designed in a manner that will allow women's full participation (e.g. mixed groups, male trainers, far from homestead) and can be compounded by the fact that many women in the coastal districts of south-western Bangladesh have limited literacy. When labour opportunities are created, women are often involved in work with lower pay, and limited from positions that require more technical skills or leadership and their bargaining power is limited in regards to negotiating fair working conditions<sup>55</sup>.
40. Limited technical and financial capacities to switch to climate-resilient livelihoods: Closely linked to the lack of awareness, are a range of constraints, both technical and financial, to diversify the portfolio of livelihood options and adopt climate-resilient livelihoods. Diversification to climate-resilient agricultural practices (e.g. adapting saline tolerant crop varieties), technologies (e.g. drip irrigation, hydroponics, aqua-geoponics), and livelihoods (such as crab farming) requires specific knowledge, skills, and technology transfer that is limited, as communities lack the technical assistance and support owing to limited capacities among peers and local extension staff. Extremely poor households are often unable to invest in risk management strategies, given that they are continuously coping with new shocks and stresses and have limited space and ability to think about and act on choices that will make a positive difference in their future (relative to households that are relatively more resource endowed). Lack of collateral constrains the capacity of many agricultural based households to access finance and invest in the necessary switch to resilient livelihoods, but also their marginal asset base and financial resources are continually undermined by repeated saltwater inundations and cyclone impacts, which lead to significant crop and asset losses.

<sup>54</sup> Lazar A. N., et al. 2015, Agricultural livelihoods in coastal Bangladesh under climate and environmental change – a model framework. Environ. Sci.: Processes Impacts, 17, 1018

<sup>55</sup> FAO Aquaculture Newsletter (FAN) March 2016. #54 Retrieved from: <http://www.fao.org/3/a-bc866e.pdf>

The livelihoods support and assistance provided by the GoB as part of 'business-as-usual' development does not incorporate current and projected climate risks to enable transformation to resilient livelihood and market systems. Any development gains through existing governmental support programs, particularly for women, are jeopardized by these climate change-induced losses. Thus, GoB's own limited financial resources are also further stressed as they cope with sudden onset changes. Furthermore, there is limited capacity within the government to incorporate the evolving climate-risks, which undermines the effectiveness of support to enable the poor to deal with worsening climate change impacts, including slow-onset changes in salinity.

41. Gender specific constraint: Extremely poor women, and girls, in the target unions are even more vulnerable to climate shocks and stresses, and are often unable to meet their basic requirements (nutrition, health, education, and shelter) due to their socio-economic marginalization. The impact of climate change combined with specific vulnerabilities experienced by women, such as restricted technical/financial knowledge, limited or no access to resources and assets, markets and services puts women at even greater risk. Furthermore, as they have limited decision-making power and little control or household assets, they are unable to engage in capital and asset accumulation or other forms of risk mitigation. Other factors may also limit their adoption of climate resilient livelihoods, including adoption of technologies that may present physical constraints (type of aquaculture with heavy cages that are difficult to move, or require women entering deep water) and promoting livelihood activities that add to women's work burden without addressing their heavy burden of unpaid household responsibilities (water collection, cooking, child rearing etc.). See Section 4.2, in the Feasibility Study for further detail.
42. Limited capacities to invest in value-chains associated with climate-resilient livelihoods: Since a switch to alternative, climate-resilient livelihoods is necessary to cope with climate-change induced salinity, full adaptation solutions require that associated value-chains are created or enhanced to ensure long-term viability of the introduced resilient livelihoods. The existing value chain structures are not usable due to changes in livelihood patterns caused by climate change-induced salinity and new value chains are necessitated for the alternative, resilient agriculture and aquaculture options. However, given the constrained financial and technical capacities, among both communities and the government, the value-chain development required for newer, climate-resilient practices and technologies is limited, which suppresses opportunities for enhanced incomes and scale-up of these resilient livelihoods. Several climate-resilient agricultural and aquaculture production options such as, crab farming and vegetables grown in hydroponics systems, show great promise in providing opportunities for enhanced incomes, but comprehensive value-chain development is required to scale-up access to the associated inputs, create high value products, and to spur incentives and market linkages for a vibrant adaptive market place. Increased scale, coupled with rising demands can then attract further investments, leading to improved value-chains, creating more competitive prices for goods and services related to alternative, resilient livelihoods.
43. Gender-specific constraint: Compounding the existing lack of market linkages are the currently limited capacities and skills of women in Bangladesh to incubate, manage, and grow their businesses and leverage market linkages. Given that women are often constrained by religious and social beliefs to household tasks, and may face restricted access to markets, the gendered division of labour and constraints in controlling financial assets, they often lack knowledge and skills related to marketing, sales, income/expenditure, and accounting, all of which further contributes to their vulnerability.

***Limited access to freshwater sources and technical capacity and means for communities to plan for, implement, and manage resilient drinking water solutions in the light of a changing climate:***

44. Limited access to freshwater sources and limited capacities for planning and implementing drinking water solutions in the light of climate-induced salinity: Given the deterioration of surface and ground water sources due to climate change-induced salinity, access to fresh water sources for drinking is becoming increasingly constrained. The technological means to capture and store freshwater entail prohibitive costs for the poor, vulnerable communities and requires awareness, skills, capacities, and behavioural change. Coastal households, currently, also have a limited planning horizon to adequately consider incremental climate change impacts on fresh-water resources and identify resilient solutions for year-round, safe drinking water supply. This can be related to a limited understanding of climate change induced salinization processes and an inadequate exposure to adaptive technological solutions to follow best practices. Adaptive technologies, such as rainwater harvesting at different scales, collection of pond

water, and Reverse Osmosis (RO) require technical skills, and an understanding of hydrological characteristics of flow regimes, climate variability (including changes in monsoon patterns and intensity), and water treatment options. Options such as RO also have significant environmental impacts and financial costs, constraining adoption by the coastal poor. Provision of water to households is fairly decentralized and where access to piped water is unavailable, communities, local authorities, and NGOs often apply disparate approaches, as there is limited common understanding and technical skills to plan and implement drinking water provision with climate risks incorporated.

45. Gender-specific constraint: Water scarcity and lack of access to clean water is disproportionately borne by women in these communities. Men are generally unwilling to collect water and the issue of drinking water security is not given the importance that it warrants. This has become a gender stereotype and as this is not men's problem therefore, the importance is less from the powerful cohorts of the society. Access to information, skills, and technical capacity is extremely limited among extremely poor women, preventing investment in and adoption of climate-resilient technologies. The consequence of exclusion from water distribution and planning processes is that women are further marginalized.
46. Limited additional financial means to expand water solutions in increasingly cyclone and salinity-stressed areas: Government and donor investments in drinking water supply have been repeatedly eroded by asset destruction due to cyclones and increasing salinity, which has rendered ground water unsafe to drink. Compounded by an inadequate understanding of and planning for these climate risks, these investments are further inhibited in the most vulnerable areas, as extreme poor are unable to pay for costs of expansion, new technologies, or treatment options. The abundance of rainwater is the most dependable source of drinking water in the salinity affected coastal rural areas, but affordability for low-income groups is a major concern, given the capital cost of available rainwater tanks in the market is often beyond their reach. In addition, there is no specific yearly budget allocation for water supply from the government to support people living in water scarce areas. In some unions, a few households from higher income brackets have been able to adopt climate resilient water technologies including RO. However, income divisions create an enormous barrier for the poor and extreme poor households to follow suit, given their economic means in the face of the high capital and operating costs of such technologies. The current price of clean water in saline-prone areas restricts access to safe, year-round supplies of drinking water for households, particularly those living under the poverty line.
47. Gender-specific constraint: Not only do women have less income overall, female-headed households are also consistently poorer, and hence less able to invest in clean water. By not having the financial means to access safe water, year-round, women are further marginalized. Drinking unsafe water also has adverse health impacts, which can further undermine their income generating capacities.
48. Limited technical, financial and organizational capacities for sustained O&M of the drinking water technologies: Where government or other donor investments have been made to secure water for the poor, the lack of capacities among beneficiaries to operate and maintain these technologies in the face of climate-change impacts, has rendered many such investments non-functional. In many instances, technologies are designed without climate change risks taken into consideration. For instance, shallow tube wells are subject to saline intrusion and Pond Sand Filter (PSF) technology alleviates water scarcity by securing surface water in ponds, but without raising the level of the pond embankments, cyclone inundation can render ponds unfit for use due to increased salinity. Furthermore, the sustainable operation and maintenance of water technologies in coastal districts in southwest Bangladesh have also proved to be difficult. Adaptive technologies required to deal with increased salinization of water sources, such as rain water harvesting, PSF, ponds with filtration treatment and RO, require technical skills for both operations and maintenance (including knowledge of basic carpentry and plumbing), as well as an understanding of evolving climate risks, including changes in precipitation, salinity, and intensification of cyclone events. However, often there is a lack of capacity in these technical skills at the local level, including among community members, local staff, and NGOs in regard to sustained operation and maintenance in light of evolving climate risks. An inadequate level of training and capacity building, and a general lack of awareness on the long-term benefits of freshwater storage or treatment technologies, results in limited technical knowledge and neglect among local users. Finally, community involvement in design and water management has been sporadic and limited. A major constraint is the lack of consultation with and involvement of the marginalized and poor, leading to a reduced sense of ownership, which in turn limits the willingness and interest of beneficiaries to participate in required O&M activities.

49. Gender specific constraint: The collection of water for drinking and other household purposes (including cooking, cleaning, bathing and household gardening) are primarily a women's responsibility, are a major contribution to women's unpaid burden of work. Community consultations revealed that women spend on average 2.5 hours collecting water for household use, having to walk long distances. Rooftop and local rainwater harvesting systems would reduce this burden on women by being able to store water at or near their houses. Screening of common practices showed that water management committees, and women involvement within them, exists on a conceptual level, but that their functionality, consistency of meetings, and transparent decision-making processes are questionable. This stems from unequal power dynamics on the local level and weak organizational structures to empower women and other marginalized community members. This constraint leads to a reduced sense of ownership, which, consequently, can limit the sustainability of the interventions. Mechanisms to strengthen the position of the local communities and women in design processes for drinking-water supply and livelihood planning are needed. That is, it is imperative that women participate in the design and sustainability of solutions, including location, access protocols and maintenance, as they are the main-user group of the system. Women should be included during the project design phase and any system should provide easy access to the water collection point for women, and other marginalized groups (people with disabilities, ethnic and religious minorities) who may face additional constraints in water access. See Chapter 4, Feasibility Study (Annex IIa) for further details.

***Limited institutional capacities, coordination, and knowledge and learning mechanisms for climate-risk informed planning and implementation of resilient livelihoods and drinking water solutions***

50. Low technical skills, knowledge, and capacities to innovate, plan for, and implement resilient solutions to cope with rising salinity impacts on drinking water and livelihoods: Despite the prioritization of climate change issues and relevant strategies and plans to support climate action at the national level, evidence-based design and the implementation of solutions that target climate-induced salinity impacts on coastal freshwater resources is limited. The burden of maintaining research capacity, knowledge sharing, and technical skills with regard to climate risks, is very high for national, sub-national and local government institutions that are already fiscally constrained, as well as for partners' institutions such as NGOs and the private sector. For example, the technical knowledge and capacities to design and implement resilient technologies to support diversification of agricultural livelihoods is not yet systematized, nor positioned to evolve as climate risks evolve. Similarly, understanding of salinity risks, consequent projected changes to the ground and surface water profiles, changes in precipitation patterns, as well as the technical capacities to innovate and evolve drinking water solutions to cope with these projected risks is limited. This is partly due to limited knowledge and technology transfer, but also due to financial constraints to build these incremental costs of climate change responses into development planning, which limits the design of public good solutions targeted to support vulnerable coastal communities. Thus, while considerable investments are being made in climate-smart agriculture, resilient livelihoods, water supply solutions, and coastal development, the practices, efforts, and approaches are not institutionalized to promote technical capacities among the relevant ministries. There is limited knowledge exchange and evidence-based learning to support upscale of resilient livelihoods and drinking water solutions to cope with climate change induced salinity and extreme weather events.
51. Gender specific constraint: Given the multiple intersections between building community resilience in the face of shifting livelihoods and water scarcity, and the need for gender responsive solutions to these challenges, it is imperative to strengthen the long-term capacity of MoWCA, along with DPHE and LGIs, and relevant technical and civil society organizations to incorporate climate change risks into the planning and implementation of gender empowerment strategies national and locally.
52. Weak coordination across agencies and sectors to support coastal communities in coping with evolving climate risks and impacts on drinking water and livelihoods: The GoB recognizes the lack of coordination among sectors and ministries as one of the major limitations of the current institutional set up to address climate change issues<sup>56</sup>. Limited vertical and horizontal coordination is a barrier for addressing climate change risks such as slow-onset salinization, as it requires an integrated, evidence-based approach to planning and supporting resilient interventions to address cross-sectoral impacts of deterioration of freshwater resources. When these impacts are especially devastating for

<sup>56</sup> MOEF-GOB, 2009. Bangladesh Climate Change Strategy and Action Plan 2009, Ministry of Environment and Forest (MOEF), Government of the People's Republic of Bangladesh (GOB), Dhaka

women and girls' lives and livelihoods and collectively affect a community's adaptive capacity, coordination is critical to ensure long-term, gender responsive, integrated solutions. Climate-risk reduction of coastal communities is a complex process demanding a systemic approach and a multitude of expertise. The communal and household level acceptance of empowering women in pursuing new livelihoods and managing climate-smart water solutions requires comprehensive support from government institutions with mandates and capacity to coordinate across interventions and actors. Furthermore, the interventions themselves require coordination across technical domains, gender-responsiveness and support that takes women specific climate vulnerabilities into account. Currently, such coordination is weak and can lead to planning failures and short-lived support, without resulting in transformational changes to improve the climate-resiliency of water security and livelihoods of coastal people. The designation of climate change focal points in each ministry and relevant agencies and training by the Ministry of Environment and Forests (MOEF) to better integrate climate change into activities is a step in this direction. However, the human resource capacity is still being built and the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) has duly highlighted capacity building as a fundamental requirement towards addressing climate change nationally<sup>57</sup>.

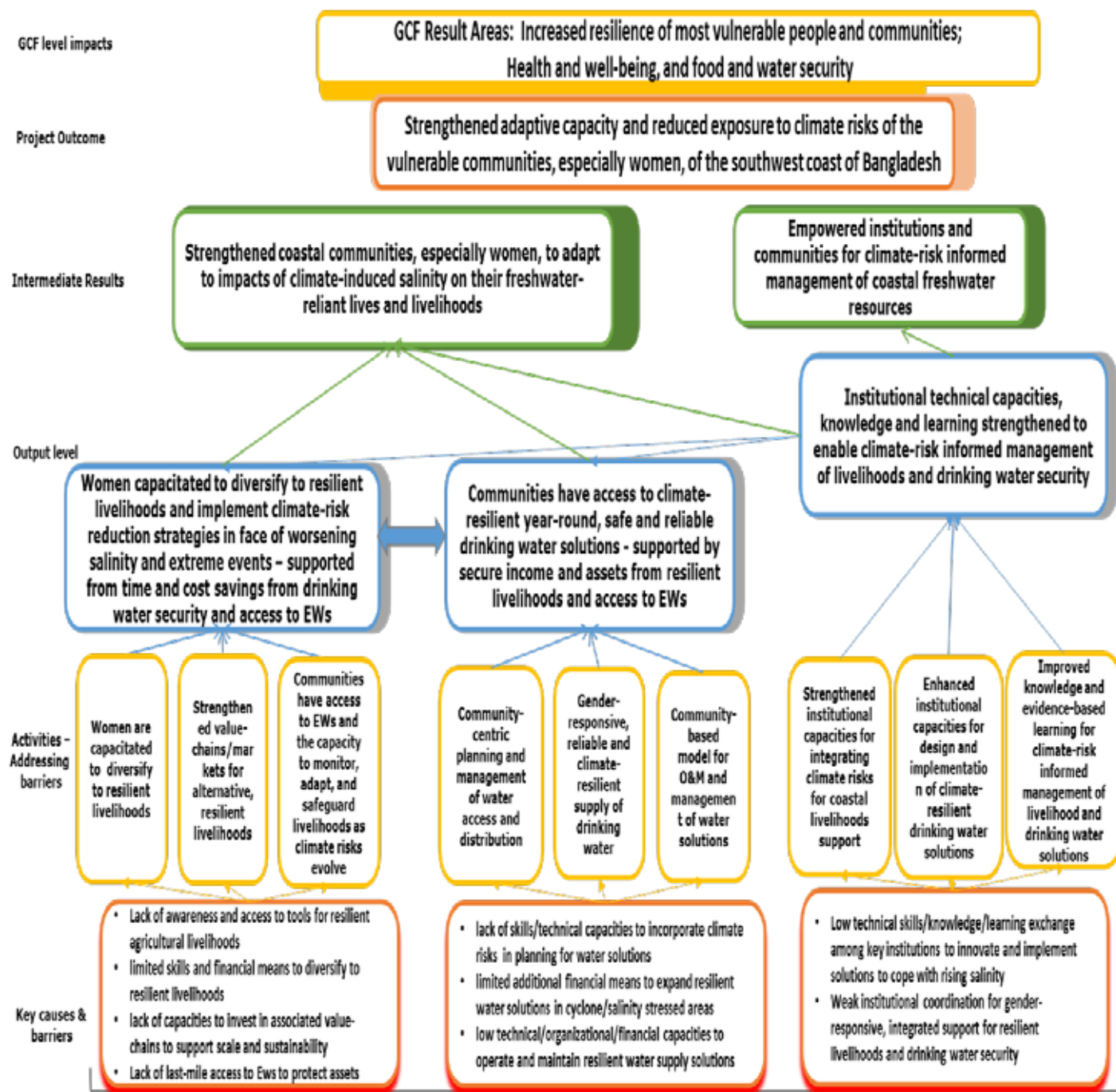
53. Gender-specific constraint: Many projects implemented by GoB agencies do not have any theoretical construct to address gender sensitivity in the project design. The MoWCA, under the Bangladesh Climate Change Trust Fund (BCCTF), has helped other ministries to integrate gender considerations, whilst NGOs have similarly taken initiatives to train gender focal points to include gender sensitivity in project design and monitoring. Even so, progress has been slow and gender is often a neglected aspect in many projects. Weak institutional capacities and coordination can further marginalize women as the opportunities for women to address the impacts of salinity on freshwater resource-based livelihoods might be lost in design of primarily technical, sectoral solutions. Institutional mandates define the processes and rules that govern and regulate access and entitlement to assets and this can inadvertently create winners and losers if the marginalized and the vulnerable, including women and children, are not targeted in a coordinated manner.

### Project objective, outcomes, and impacts

54. The key problem the project proposes to address is the threat to agricultural livelihoods and drinking water security of coastal communities, especially women, from impacts of climate change-induced salinity on the communities' freshwater resources.
55. The **objective** of the proposed project is to support the Government of Bangladesh (GoB) in **strengthening the adaptive capacities of coastal communities, especially women, to cope with impacts of climate change-induced salinity on their livelihoods and water security**. The Fund level impacts of the project are increased resilience and enhanced livelihoods of the most vulnerable communities and increased resilience of health and well-being, and food and water security of the coastal communities, especially women, in Bangladesh. The **GCF Results Framework outcome** that this project fits under is *strengthened adaptive capacity and reduced exposure to climate risks of the vulnerable communities, especially women, of the southwest coast of Bangladesh*. Recognizing the crucial role that women play in water security and household level resilience, and the layered socio-economic marginalization that leads to their increased vulnerability, the proposed solution will empower target communities, especially women, as 'change-agents' to plan, implement, and manage resilient drinking water solutions and livelihoods in the face of worsening impacts on their freshwater resources. The **paradigm shift** is to move away from a focus on short-term responses and technology-led interventions towards community-centric solutions that build ownership and capacities across the system to design, implement, manage, and evolve adaptive responses to safeguard livelihoods and drinking water security.

<sup>57</sup> Ibid.

56. The project is underpinned by the Theory of Change depicted below.



**Problem Statement** Deterioration of freshwater resources due to climate change-induced salinity threatening agricultural livelihoods and drinking water security of vulnerable, coastal communities, especially women

57. Firstly, the project will address the barriers related to low awareness of and access to resilient livelihood practices, lack of technical and financial capacities, and limited adoption and scalability hindering the small-scale farmers, fishers, and agro-laborers to diversify to climate-resilient livelihoods and implement adaptive livelihood strategies. GCF resources, combined with leveraged GoB co-financing, will ensure that (i) communities, especially women, adopt and implement climate-resilient livelihoods; (ii) value-chains/market linkages for these alternative, resilient livelihoods are strengthened to ensure their adoption, sustainability, and scale; and (iii) communities have

knowledge and capacity to continue to monitor, safeguard and adapt livelihoods and livelihood strategies to evolving climate risks. The proposed project facilitates the formation of peer-to-peer support groups (Women Livelihood Groups – WLGs) to empower women to identify, plan for, and implement climate-resilient livelihoods through awareness raising, skills development, knowledge transfer, and investments into livelihood assets. GoB resources will be directed towards enabling value-chain and market linkages development to spur adoption, sustainability, and scale of these alternative, resilient livelihoods. The proposed project will build the capacities of beneficiaries to implement climate risk reduction strategies (including through improved last-mile dissemination of EWs) and continually adapt and safeguard their livelihoods and assets as climate risks evolve. The project will, thereby, capacitate women to diversify to resilient livelihoods and implement adaptive livelihood strategies in face of worsening salinity. These investments are enabled by the time and cost savings and health co-benefits resulting from drinking water security promoted by the project.

58. Secondly, the project will address the barriers of limited understanding and, technical know-how and the constraints on vulnerable communities to safeguard against the deterioration of their drinking water resources due to climate change-induced salinity. Particularly, the project supports women and girls who are burdened with providing water for their families and additionally suffer from drinking water insecurity. GCF resources will be used to invest in (i) formulating and facilitating establishment of women-based, Water User Groups (WUGs) to support participatory, gender responsive planning for distribution of and access to safe, year-round water supply; (ii) implementing gender-responsive, reliable and climate-resilient drinking water solutions including rainwater harvesting systems (at household, community, and institutional scales) and pond water systems; and (ii) strengthen community-centric capacities to plan for, operate, and manage the provision of drinking water as climate risks evolve. Community and GoB resources are leveraged to ensure sustained O&M of the resilient water supply systems, including a commitment to co-manage the systems beyond the project lifetime. The Project promotes synergistic benefits between the livelihood and water user groups as the same communities will be targeted for the interventions to jointly address climate change-induced salinity risks to the community freshwater resources. Access to reliable, year-round, safe drinking water enables the communities, especially women (including those supported through livelihood interventions) and girls in targeted households, to invest the resulting time and cost savings and health co-benefits in income generating and/or educational opportunities further reducing their vulnerabilities to climate change.
59. Finally, GCF resources will be invested in building technical and coordination capacities of MoWCA and DPHE; facilitating knowledge generation and exchange; and establishing learning frameworks to sustain, replicate, and scale resilient livelihood and drinking water solutions for coastal communities. The project will: (i) strengthen institutional capacities for integrating climate risks in coastal livelihoods support efforts – the MoWCA will benefit from technical capacity to support coastal communities in adaptive livelihood planning and implementation along with coordination capacities to integrate climate change and gender into cross-sectoral socio-economic activities. This will directly support the continued planning and effective implementation of the livelihood interventions in the targeted communities. It will also enable upward linkages to ensure that MoWCA, in coordination with key ministries, is able to support replication and scale of climate-resilient livelihoods across the climate change affected communities along the Southwestern coast; (ii) enhance institutional capacities for technical innovation, design and implementation of climate-resilient drinking water solutions – the project will support DPHE in building their technical capacity for innovation, design, and implementation of climate-resilient drinking water solutions for the Southwestern coast of Bangladesh. The enhanced technical capacities will ensure that DPHE is able to directly support the targeted communities and local government staff with the implementation and sustained O&M of the project investments in the light of evolving climate risks. Improved institutional capacities to assess and incorporate climate risks will also enable DPHE to replicate and scale project interventions across the southwest coast; and (iii) improve knowledge management and learning for gender-based, climate-resilient livelihood and water security – the project will promote knowledge codification and dissemination and evidence-based learning through generation of knowledge related to climate risks and gender-responsive management of livelihood and drinking water solutions and impact evaluation designed to enable systemic learning, replication and scale of project impact. The project will also foster adaptive capacities of youth (boys and girls) through targeted behavioural change and awareness raising campaigns.

60. *Building on best practices and coordination with key initiatives:* The proposed project builds on various best practices and lessons learned from past and on-going efforts related to coastal development and resilience in Bangladesh, with a particular focus on livelihoods, drinking water, climate resilience, and disaster management. These include best practices from efforts such as: ActionAid and partner NGO supported projects on women-led emergency response, livelihoods, and water, CIDA funded RVCC project (CARE implemented), USAID Food For Peace (FFP) projects, Oxfam<sup>58</sup> project in southwest coast, DFID funded Chars Livelihood Project (CLP), EU-funded LoCAL project<sup>59</sup>, the Government of Netherlands supported Blue Gold program, GIZ supported REEEP project, Danish government funded Climate Change Adaptation Pilot Project, and UNICEF-funded rural water supply projects. Project also builds on experiences of many CSOs/NGOs such as ActionAid, An Organization for Socio Economic Development (AOSED), Asia Pacific Forum on Women, Law and Development (APWLD), Bangladesh Centre for Advanced studies (BCAS), BRCS, CARE, Centre for Participatory Research and Development (CPRD), Initiative for Right View (IRV), Jagrata Juba Shangha (JJS), RainForum, and Rupantar. These efforts and the best practices and lessons the project benefits from are detailed in Chapters 3 and 5 of the Feasibility Study (Annex IIa).
61. In addition to building on these past and on-going efforts, the project has been designed in coordination with and to complement the following ongoing and planned initiatives:
- The **Cyclone Preparedness Programme (CPP)**, jointly managed by Ministry of Disaster Management and Relief (MoDMR) and the Bangladesh Red Crescent Society (BDRCS) and various NGOs, has been engaged in large-scale public awareness and capacity development activities for pre-disaster preparedness at the household and community levels. The CPP disseminates cyclone early warning messages through its extensive radio network (130 stations) to districts along the coastal belt. The official mandate of the BDRCS as stated in the Standing Orders on Disaster (SOD) is to complement the government's efforts in case of emergency response, emphasizing the development of disaster preparedness related plans and programs. The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009 also emphasize the role of BDRCS to enhance the cyclone preparedness programme. The CPP covers 37 Upazilas of 13 districts in the coastal areas. The success of the CPP is largely attributed to the robustness of the Early Warning System (EWS), the issuance of warnings through a unified signalling system, and the dissemination of information through approximately 62,000 volunteer groups. Volunteers have been trained to play a crucial role in the dissemination of cyclone warnings, evacuation, rescue, first aid emergency relief and in the usage of radio communication equipment. The CPP relies on technical skills and volunteers' commitment to ensure that potential victims of an approaching cyclone are given sufficient warning, enabling them to move to safe sites. CPP receives the meteorological data and cyclone early warnings from the Bangladesh Meteorological Department (BMD), which issues regular bulletins that are transmitted to the six zonal offices and the 32 upazila (sub-district) offices over high frequency (HF) radio. The upazila office in turn, passes it to unions (village level) through very high frequency (VHF) radios. The unit team spreads out in villages and issues cyclone warnings. Volunteers deliver the messages to most at risk villages and assist especially the weakest members of communities to seek refuge in cyclone shelters. Cyclone Preparedness Volunteers also get involved in Rescue, First Aid activities and the distribution of relief items. Outside the 4 months cyclone season they run public awareness activities such as staging educational dramas and simulation exercises. The proposed project will coordinate with the CPP to equip and train women and girl volunteers from targeted households to support gender-responsive dissemination and use of EWSs for safer lives and livelihoods.
  - **O'Harijan drinking water project (implemented by LEDARS)** has initiated two projects to enhance adaptive livelihood capacity and income of target beneficiaries. To reduce climate induced migration, the project is introducing integrated water resource management models through excavated mini ponds and canals in paddy land, establishing deep tube-wells, and supporting households to preserve the daily use of waste water for dry season cropping. The project also increases awareness of the beneficiaries on how to maximise use of their conserved rainwater, what varieties are growing in less water, which varieties can grow in brackish water, introduce tools and techniques for adaptive agriculture. **USAID's Nobo Jatra project** works in 40 Unions including in Kaliganj in Satkhira District and Dacope in Khulna District<sup>37</sup>. The project is designed to reduce food

<sup>58</sup> Oxfam (2012) "bangladesh\_NEW.pdf" Retrieved from: <http://www.oxfam.org.uk/what-we-do/countries-we-work-in/bangladesh>

<sup>59</sup> CCCA+, EU. Retrieved from: <http://www.gcca.eu/multi-country%20programmes/local-climate-adaptive-living-facility-local>. Access date: July 2017

insecurity and vulnerability for 856,116 households in 4 Unions and includes activities related to Installation of water systems and to promote livelihoods of the poor. It will establish Climate Smart Agriculture plots and engage with local producer groups. It will activate or reactivate Water, Hygiene, and Sanitation (WASH) Committees and community support groups and engage in behavioural change communication activities. The project will install 1-2 water options and 23-25 sanitation options per village. Water interventions mainly focus at the community-level whilst sanitation more at the household level. The proposed project is coordinating with both these initiatives on targeting and coverage to address supply gaps (see Section C.3 on 'Targeting'). The project also aims to coordinate with these efforts during implementation on institutional capacity building efforts to support systematic, climate-risk informed planning and implementation of these solutions.

- **GoB started implementation of the Local Government Initiative on Climate Change (LoGIC) with support from EU-SIDA-UNCDF-UNDP.** The project will be implemented in seven districts of which 5 districts (Khulna, Bagerhat, Patuakhali, Bagruna and Bhola) are in the coastal area and it will support climate and disaster proofing rural infrastructure and household based adaptation and Disaster Risk Reduction (DRR) measures. The project will invest around USD1.5 million in the Khulna District to climate-proof small-scale rural infrastructure and households. The project will build on the experience of LoGIC in strengthening vulnerable communities' capacities, local government institutions and civil society organizations for planning. Therefore, the actions at various levels will bring about climate change adaptation by scaling up through local government institutions incorporating high quality accountability and participation of the most vulnerable people.
- **GIZ's planned "Solar Powered Drinking Water Supply in Selected Coastal Areas of Bangladesh"** is conceptualized as a GCF project to support GoB in addressing the high demand and insufficient supply of drinking water. The project would include technologies such as PSF, RO, and Managed Aquifer Recharge (MAR) and is expected to meet the water demand of approximately 0.16 million households. Discussions with GCF have led to identifying potential complementarities (in technologies and target areas) that will also be taken into account as both projects advance.
- **The National Resilience Programme (NRP)** is a joint programme implemented by the Ministry of Disaster Management and Relief (MoDMR), Ministry of Women and Children Affairs (MoWCA), Local Government Engineering Department (LGED) and the Programming Division of the Planning Commission. Considering growing government annual development budgets, its extensive portfolio of social safety nets and the likelihood of declining international aid, the NRP does not just aim to implement local risk reduction activities at scale but will provide strategic support to enhance government capacity to do so through its own structures and programmes. Among its key focus areas is enhancing women's leadership in disaster management and developing capacity for gender-responsive disaster risk reduction. This will include capacity development of Disaster Management Committee Members and women volunteers in particularly vulnerable areas to act as local change agents for gender equality and responsiveness in disaster response, early warning, preparedness and recovery initiatives. The NRP will also include activities building up the resilience skills and providing livelihood support of women in climate hotspots, and work with MoWCA to use the learning from these activities to build MoWCA capacity for adaptive social safety programming and skills development programmes. The proposed GCF project will coordinate with NRP on EWs and policy and coordination capacity building activities for MoWCA.

### C.3. Project / Programme Description

#### **Rationale and methodology for targeting of the project areas and populations**

62. The project targets areas most vulnerable to climate change induced salinity impacts and the beneficiaries, especially women and adolescent girls that are solely responsible for household income who are disproportionately affected by the consequent loss of productivity, livelihoods and drinking water insecurity. The targeting is anchored in identifying Districts and Union Parishads (aka Unions) most exposed to observed and projected salinity impacts.

#### **Identification of target Districts, Union Parishads (Unions), and Wards**

63. A total of six districts (namely Satkhira, Khulna, Bagerhat, Pirojpur, Barguna and Patuakhali) across the Southwest Coast were initially identified as priority areas by the GoB due to their high exposure to climate induced salinity and disasters. The districts of Satkhira, Khulna, and Bagerhat face higher observed surface water salinities, highlighting that districts to the west are currently the most vulnerable to salinity risks (Figure 3(a)). However, Figure 3(b) shows

that future increases in salinity intrusion and cyclone-induced inundation will also occur in districts to the east; Patuakhali, Barguna, and Pirojpur, with disruptive impacts on livelihoods and drinking water.

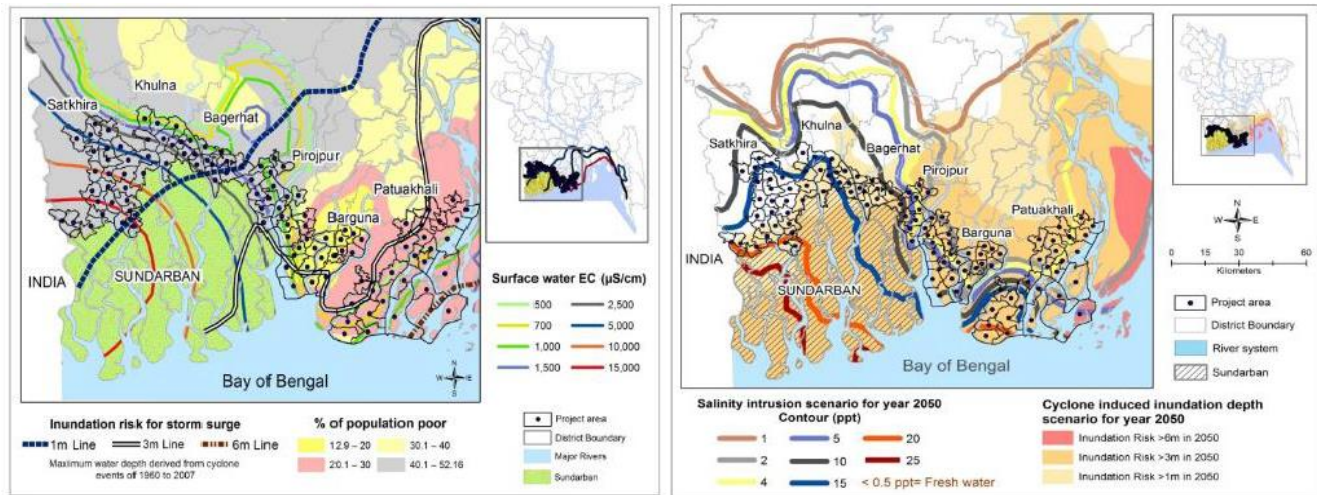


Figure 3: (a) Current poverty, inundation risk and surface salinity; (b) future (2050) modelled salinity intrusion and cyclone induced inundation risk

64. In view of site-specific assessments and data required to target and plan for climate-resilient livelihoods and drinking water solutions, GoB aims to adopt a phased approach to supporting adaptation investments for the coastal resilience of the six high-priority vulnerable districts. Therefore, for Phase I (for which this proposal seeks funding), **Khulna and Satkhira** have been prioritized, given their salinity exposures are the highest among the priority districts, with the goal to expand and scale the solutions to the remaining four districts (Bagerhat, Pirojpur, Barguna, and Patuakhali) in a subsequent planned request for GCF funding.
65. In Khulna and Satkhira a total of **39 Unions (18 in Satkhira and 21 in Khulna)** were selected. These Unions were chosen based on the level of exposure to salinity, including projected salinization, and the percentage of extreme and ultra-poor populations most vulnerable to negative climate change impacts. Further prioritisation of the wards within the 39 Unions was undertaken based on the following criteria:
  - Current and projected salinity levels: Maps of soil salinity were used to detect those wards most affected by and vulnerable to climate-induced salinization processes. Additionally, land-use change data (1995, 2005, and 2015) were considered to identify wards where major shifts from agricultural towards aquaculture livelihoods took place, as a potential indicator of salinization.
  - High levels of poverty: Maps were produced that detected particularly poor people based on a poverty index constituted by the indicators of: (i) income poverty; (ii) percentage of day labourers; and (iii) a satellite imagery analysis of housing structures (see Feasibility Study, Annex IIa for more details on poverty indexing).
  - High exposure of beneficiaries to salinity intrusion due to low elevation: Wards with a low elevation were considered as being particularly vulnerable to projected salinity intrusion through SLR and storm surges.
66. Through this process a total number of **101 out of the 350 wards in the targeted 39 Unions of Khulna and Satkhira districts** were identified as potential project areas.

#### Targeted beneficiaries and criteria for final selection of beneficiary HHs during implementation

67. Target beneficiaries were identified based on current livelihood practices, water supply availability, poverty levels, location of housing and coordination (based on coverage gaps) with on-going or future efforts by other government or donor projects taken into account i.e. avoiding those already covered by existing projects. The selection of the direct beneficiaries of the livelihood interventions was based on a Participatory Rapid Appraisal (PRA) process during which households, women and indigenous people engaged in non- and/or maladaptive livelihoods, that require support to shift towards climate-resilient livelihoods, were identified. Targeted beneficiaries for water, within the climate change impacted wards, were identified based on assessing the demand and supply gap (for year-round access to safe water, accounting for baseline coverage), water source mapping and availability, and

consideration of other water supply investments in the targeted areas (especially the USAID funded, World Vision supported 'Nobo Jatra' and the 'O'Harizan' programmes). Detailed methodology for the identification and estimation of target beneficiaries is presented in Section E.1.2.

### Beneficiary Selection criteria

68. During the start-up phase of implementation, the final selection of beneficiaries will be based on the intersectional vulnerability of the households including a prioritisation of female-headed houses, prioritization of those households where an adolescent girl is solely responsible for household income, households of indigenous people, and households with people with disabilities. In addition, the selection will proportionally reflect the percentage of ethnic and religious minority households, to ensure that those with additional barriers in access to resources are not further marginalised. Special care will be taken to incorporate the perspective to adolescent girls, but to only target those adolescent girls that have been forced into early marriage and are solely responsible for earning. Attention will also be given to access distance for households, in order to reduce women and girls time burden of unpaid work. As such, participatory livelihood planning; identification of households to benefit from water provision, and siting of water interventions at the institutional and community levels will incorporate the perspectives of beneficiaries and take into account accessibility (based on recipient needs). For accessibility to water supply, selection will ensure that the water access points are within a 1km distance of beneficiary households.
69. The final selection will prioritize the following beneficiaries:
- Gender: Female;
  - Age: Women between 18-49 years old, responsible for water collection and/or able to adopt a climate resilient livelihood strategy; Adolescent girls that are married early and are solely responsible for household income generation;
  - Income: Households with incomes less than USD1.25 per person per day, having few or no assets, and beneficiaries who are compelled to accept employment at low wage rates;
  - Household Status:
    - Women-headed households (including those widowed, divorced, or separated/abandoned);
    - Women and girl beneficiaries from households, where there are no able male members to earn livelihood;
    - Women from those households where there are a greater number of dependent members on the women (household members chronically ill, physically, mentally and visually impaired or disabled);
    - Indigenous ("Adivasi") households.
  - Land: The household possess less than 30 decimals (1,214 m<sup>2</sup>) in previously usable agricultural land, and possess less than 50 decimals (2,023 m<sup>2</sup>) total land; and
  - Other requirements to assess eligibility:
    - Hindu minority households will be represented in proportion to their overall population in the wards
    - The women beneficiary cannot have been a recipient of a GoB's or any NGO's schemes of similar nature and/or quantity of support within the last two years.

### Project Description

70. The project will combine GoB and GCF resources to achieve the project objective through three inter-related Outputs:
- Output 1. Climate-resilient livelihoods, focusing on women, for enhanced adaptive capacities of coastal agricultural communities (responsible party for execution of the activities is DWA, department of MoWCA)
  - Output 2. Gender-responsive access to year-round, safe and reliable climate-resilient drinking water solutions (responsible party for execution of the activities is DPHE)
  - Output 3. Strengthened institutional capacities, knowledge and learning for climate-risk informed management of livelihoods and drinking water security (responsible parties for execution of the activities are DWA and DPHE)

**Output 1.** Climate-resilient livelihoods, focusing on women, for enhanced adaptive capacities of coastal agricultural communities

71. This Output focuses on enabling the targeted vulnerable, female smallholder farmers, fishers, and agro-labourers to adopt diversified, climate-resilient livelihoods, in the light of projected salinity risks and climate change impacts. GCF resources will be used to provide awareness, technical, and financial support in the form of skills development, training, and investments into assets to promote the switch to (or phasing in of) resilient livelihoods. Recognizing that resilience is enabled through peer-to-peer engagement, interventions will focus on enterprise-based approaches through group-based and community-scale investments supporting targeted households. In order to enable adoption, sustainability, and scalability of the alternative, climate-resilient livelihoods, the project leverages GoB co-financing to strengthen value chains and market linkages with focus on building women's capacities to engage in enterprise-based livelihood models. The value-chain and market analysis conducted for the targeted livelihoods (see the Livelihood Assessment Report, Annex IIb) informed the identification of value-addition activities as well as market linkages relevant for the scale and sustainability of the resilient livelihoods, while also taking into account gender-transformation potential and environmental sustainability. This Output will also promote public private platforms, called public private initiatives, as part of the exit strategy for the climate-resilient livelihood interventions. Finally, this Output focuses on strengthening the capacities of women and the communities for sustained adaptive livelihood strategies and planning, as well as climate and disaster risk management, to safeguard and adapt their livelihoods in the face of a changing climate. Institutional capacities will be strengthened across LGIs/MoWCA and relevant technical institutes to provide climate-risk informed, technical, and operational support for effective implementation, monitoring, and management of the resilient livelihood interventions. This Output targets the same communities as Output 2 (Drinking Water), with priority given to provide access to year-round, safe water to livelihood support beneficiaries. The women groups formed under the two Outputs will be linked through the formulation and planning efforts so the investments yield reinforcing benefits across Output 1 and 2. Adoption of climate-resilient livelihoods result in improved incomes and assets enabling sustained management of the drinking water provision and assets established under Output 2. Overall, this Output results in strengthened capacities of women to diversify to climate-resilient livelihoods and implement climate-risk reduction strategies in face of worsening salinity and extreme events.

***Activity 1.1 Enterprise- and community-based implementation of climate-resilient livelihoods for women***

72. Detailed Union-specific assessments (see Chapter 7, Livelihoods Assessment Report Annex IIb) were undertaken to map the potential portfolio of climate-resilient livelihood options to be promoted by the project. The options were screened for their resiliency to climate change, in particular to observed and projected salinity and cyclone impacts. (See option analysis in Chapter 6 of the Feasibility Study, Annex IIa). Subsequently, an analysis for gender-responsiveness, environmental impacts, cultural acceptability, and profitability/market potential was undertaken and combined with Union-specific data yielded a specific portfolio of livelihood options for each of the 39 unions. The project will promote climate-resilient livelihoods including: (i) crab farming; (ii) crab nursery; (iii) aqua-geoponics; (iv) hydroponics; (v) plant nursery; (vi) sesame cultivation; (vii) crab and fish feed processing; and (viii) homestead vegetable gardening. Based on the union profiles' particular contexts (including characteristics such as poverty, elevation, salinity levels, existing skills, capacity, and market potential), a total formation of 198 fisheries-based and 819 agriculture-based livelihoods specific women groups were proposed. While the distribution of livelihoods, based on Union level profiles, has been undertaken as part of project design, and a budget estimated accordingly, this activity will support participatory beneficiary mapping and livelihood planning during the first year of the project. This is critical to ensure that beneficiary preferences, socio-economic profiles, and equity considerations are taken into account in supporting adoption of climate-resilient livelihoods. A contingency of 10% has been built into the budget to allow for flexibility and participatory distribution of livelihoods supported across the targeted households. Chapter 6 of Livelihoods Assessment Report Annex IIb provides a detailed options analysis and the rationale underpinning the proposed shift towards climate-resilient livelihoods.
73. GCF resources will be used to fund the adaptation costs associated with the switch from non-adaptive livelihoods to adaptive livelihoods. This activity will support the implementation of these resilient livelihoods through organized groups of women, Women Livelihood Groups (WLGs), facilitating peer-to-peer learning for adoption, knowledge transfer, skills development, financial management, and capacity building for long-term viability of the resilient livelihoods. This community-based approach to livelihood support through clustering of HHs into groups, and supporting interventions at individual as well as the group levels, ensures cost-effectiveness and enables economies of scale to build bargaining power to engage across value-chains and markets. Women would be organized into about 1,017 WLGs who will receive assets to implement a portfolio of resilient livelihoods. The project will,

furthermore, secure land lease for ponds and lots for entire project lifetime to enable the WLGs to start their operations and cover the lease for the duration of the project. This support will ensure the poorer households (with limited land) will benefit from the project through community- and group-based management of the inputs and production. During the first year of implementation, village and community-specific mapping and participatory livelihood planning will be undertaken, building on the Union-wise profiles identified during project design. This Activity will be closely coordinated with Activity 2.1 under Output 2 to promote capacities across the WLGs and Water User Groups (WUGs) for synergistic planning and implementation to jointly address the climate change impacts to the community's freshwater resources.

74. GCF resources will support initial investments into inputs and assets (with GoB co-financing leveraged for inputs for additional production cycle(s)); however, a phased approach will be supported to build the financial capacity of the WLGs to procure their own inputs through the subsequent production cycles. GCF and GoB resources will be blended to support technical training and community sensitization campaigns for skills transfer; promotion of best practices and norms; and awareness raising including on fair working conditions, land tenure arrangements and negotiation for the women. Sustainable management of inputs and production will be promoted including management of wild stocks in carb farming and crab fry, use of hatchery stock and alternatives to mangrove fuel wood, and effluent management. The technical training will be undertaken in coordination with the government entity called Brackish Water Centre of Bangladesh Fisheries Research Institute (BFRI) for support on resilient, aquaculture based livelihoods. BFRI would be providing in-kind support through their staff time to support effective backstopping and implementation support for the aquaculture livelihoods.
75. GoB co-financing is leveraged to support training and sensitization of WLGs in O&M, financial planning, and marketing with links facilitated across value-chain actors to engender sustained uptake and viability of the resilient livelihoods, reducing dependence on project support. In each of the Unions, these WLGs would be supported by 'Women Standing Committees' (WSCs), which are established structures that operate at the Union level and comprise of local extension support (LGI) staff. The WSCs will support them in addressing institutional barriers and enhancing vertical coordination linkages with Upazilas and Districts.

The key inputs for this activity include:

- 1.1.1 Participatory mapping for the portfolio of climate-resilient livelihood options;
- 1.1.2 Development of livelihood profiles based on the community livelihood risk and adaptation assessment and selection of beneficiaries (Utilize ActionAid resilience index);
- 1.1.3. Formation and reactivation of 1,017 Women Livelihood Groups (WLGs) based on the livelihood profiles (coordinating with Water User Groups – WUGs – under Output 2);
- 1.1.4. Procurement of inputs, assets, and tools for community-based management (through WLGs) of climate-resilient livelihoods;
- 1.1.5 Training of Trainers (ToT) based approach and community sensitization/awareness for WLGs (involving WSCs/LGIs/MoWCA staff in 39 Unions) on skills development on climate resilient technologies, best practices and norms, sustainable management practices, and O&M of resilient livelihoods (in coordination with BFRI for aquaculture interventions);
- 1.1.6 ToT approach for WLGs to support business skills development resulting in marketing and financing plans for the resilient livelihoods.

## ***Activity 1.2 Strengthened climate-resilient value-chains and market linkages for alternative, resilient livelihoods***

76. This Activity focuses on leveraging economies of scale and ensuring that the switch to the alternative, resilient livelihoods (supported by Activity 1.1) is viable in the long-term and has a sustained impact beyond the project lifetime. Given that the diversification to resilient livelihoods is necessitated in the light of climate risks, investments in value-chains and market linkages for these livelihoods are critical for transformative impact that goes beyond asset creation for the resilient livelihoods.
77. GoB co-financing (with incremental support from GCF resources on incorporating climate risks) will invest in climate-resilient value-chain and market development activities for those climate-resilient livelihoods that can leverage economies of scale, promote linkages across value-chains from production through market access, and enhance private sector engagement through establishment of public-private platforms. These linkages will enable

knowledge sharing for improved technologies, practices, and management for resilient production and scale of the resilient livelihoods. Combined with the capacity building across value-chain actors (Activity 1.3) on climate risk reduction strategies, these linkages engender adaptive capacities across communities and support the exit strategy for the project.

78. In particular, GoB resources are leveraged to fully finance the upgrading of an existing crab hatchery to ensure a sustainable up-scaling of the crab-farming and crab-nursery related resilient livelihoods introduced by the project. The crab hatchery to be supported is currently operated by the Bangladesh Fisheries Research Institute (BFRI) – a government entity with experience in operating hatcheries for the aqua-cultural sector. Based on consultations with BFRI, the crab hatchery will be upgraded to ensure biosecurity and environmental risk management of the facilities, as well as expanded to ensure the sustainability of this climate-resilient livelihood pathway over time. This expansion is in line with the production model of the hatchery. MoWCA will enter into a Memorandum of Understanding (MoU) with BFRI to affirm their commitments to a secured, prioritized (on a ‘first-customer’ basis) supply of crablets to the project’s women beneficiaries throughout the entire project’s lifetime. (See Stakeholder Consultations and Engagement Plan, Annex XIIIc and XIIId as well as the co-financing letter, Annex IVa). In addition to the upgrades, codes of practice to reduce adverse environmental stresses of the aquaculture value-chains will be developed under this project in coordination with key government organisations such as BFRI, Department of Fisheries, and Department of Agriculture Extension (DAE).
79. This activity will also support strengthening of market linkages through the formulation of public private platforms, termed ‘Public Private Initiative’ (PPI), which is based on a best practice emerging in Bangladesh. GoB funds are leveraged to establish PPIs at the Upazila level to support adoption and scale of the resilient livelihoods. PPIs enable the women beneficiaries to interact with relevant value chain actors and contribute to market development and strengthening of market linkages for the livelihoods promoted by the project. There will be 20 to 25 representatives per PPI (8 WLG representatives, 6 value chain actors, 6 stakeholders comprised of DAE, fisheries department, MoWCA, Bank and financial institutions, and relevant local Union level staff and facilitating NGOs). The platform will be hosted by MoWCA to facilitate public sector support to the PPIs whereas the decision making and governance of the platforms is retained by the private sector actors and WLGs. PPIs also serve to provide vertical coordination across wards, unions, and Upazilas, and can act as a conduit for promotion of climate-resilient and sustainable technologies, standards and best practices. They will also serve to empower women through decision-making and bargaining power to safeguard their livelihoods in the light of evolving climate risks.
80. Finally, this activity will also enable access to finance linkages between the WLGs and value-chain actors and the financial intermediaries. For the diversification to resilient livelihoods to be sustained, GoB co-financing is targeted to build on the collateral and financial capacities supported through investments in resilient livelihoods and connect the beneficiaries with financial intermediaries such as Micro Finance Institutions (MFIs). Specifically, this Activity will support business and financial planning for beneficiaries, awareness, and training for financial intermediaries on climate risks and resilient livelihoods, and networking through workshops and forums to connect lenders and borrowers. Consultations (see Stakeholder Consultations, Annex XIIIc) during project design have identified potential Financial Intermediaries (FIs) and their need and priorities and have yielded expressed interest in participation during project implementation and in post-project engagement to invest in replication and scale of the resilient livelihoods and value-chains. For instance, PKSf and local FIs<sup>60</sup> have been consulted on their potential role in financing the diverse, climate-resilient livelihoods supported under this project. Two key risks were identified related to providing credit financing to the targeted, extreme poor women, for climate-resilient livelihoods: the uncertainty of the diversified livelihoods (production and income generation capacity) and the lack of collateral to cover repayment risks. Therefore, given the project support for upfront investments, skills transfer, technical training, creation of collateral, and capacity building on financing, marketing and business plans, the MFIs indicated that there is strong potential for the WLGs to be initially enrolled with the MFIs under a savings scheme; and thereafter, graduating to the ‘micro-enterprise financing’ schemes.

Key inputs under this Activity include:

- 1.2.1. Participatory, climate-risk informed, value-chain development planning among WLGs, linking with value-chain actors;

<sup>60</sup> Shamaj Unnayan Shangstha (SUS), Nawabeki Ganomukhi Foundation, (NGF), UNNAYAN, Rural Reconstruction Foundation (RRF), NABOLOK, PRODIPAN, Jagrata Juba Shangha (JJS), etc.

- 1.2.2. Climate-risk informed, value addition investments for resilient livelihoods (upgrading of 2 existing crab hatcheries);
- 1.2.3. ToT based technical training, incorporating climate risks, for operation and management of value-addition technologies and facilities (hatcheries);
- 1.2.4 Development of a Codes of Practice for sustainable production and management of small aquaculture as climate change risks evolve;
- 1.2.5. Establishment and facilitation (through workshops and networking events at union level to form PPIs) of the PPIs at Upazila level to enable replication and scale of resilient livelihoods;
- 1.2.6. Training of Upazila and District level staff (MoWCA, Department of Agriculture, Department of Fisheries, LGIs) on supporting PPIs to upscale resilient livelihoods;
- 1.2.7. Capacity building workshops and networking events for WLGs, value-chain actors, and FIs to promote access to finance linkages for sustained climate-resilient livelihood and value-chain investments.

**Activity 1.3 Community-based monitoring and last-mile dissemination of EWs for climate-risk informed, adaptive management of resilient livelihoods**

- 81. This Activity focuses on building capacities for women, value-chain actors, and institutional support staff (WSCs/LGIs/MoWCA) in adaptive planning and management of the new livelihoods in the light of evolving climate risks including slow- and sudden-onset climate change events. Envisioned to support the resilient livelihood and value-chain investments under Activity 1.1 and 1.2, this Activity invests in awareness raising and training, especially among women, to plan for, implement, and manage livelihoods in the long-term in the face of climate change. This Activity will also be implemented in close coordination with activities under Output 2 to ensure that the communities supported are able to implement climate risk reduction strategies for improved resilience in light of evolving climate risks.
- 82. To reduce vulnerabilities of the targeted beneficiaries to increasing climate change impacts, this Activity will strengthen the awareness and understanding among WLGs and value-chain actors as well as local WSC/LGI staff in use of climate risk reduction strategies to safeguard their livelihoods and assets. GCF resources will also be invested in capacitating and equipping women and girls to support last-mile dissemination of Early Warnings (EWs) and preparedness information to facilitate timely and effective response to extreme events. The proposed project will establish women early warning volunteers in the selected wards. In coordination with the 'Cyclone Preparedness Program' (CPP), GCF resources will be used to train women and girl volunteers, targeting those under the WLGs and associated HHs, to invest in proven community-based and gender targeted messages and dissemination mechanisms that ensure timely delivery and use of the information to safeguard lives and livelihoods.
- 83. The project will also train the Union-level Disaster Management Committees (DMCs) to incorporate the gender-responsive messages and mechanisms co-developed with the women and girl volunteer groups. The training will facilitate the dissemination of the gender-responsive EWs and last-mile dissemination approaches developed in each of targeted wards to other non-targeted wards in the 39 Unions. Learning exchange will be promoted between the project women and girl volunteer groups and the CPP volunteer groups established at the Union level to enable replication to other wards. MoWCA will also support advocacy with CPP, Bangladesh Red Crescent Society (BRCS), and Ministry of Disaster Management and Relief (MoDMR) and coordinate with the NRP to scale up these women and girls volunteer groups and mechanisms for last mile dissemination of EWs to the remaining Unions across the two districts.
- 84. This Activity will also support the development of climate-risk informed, social audit protocols and training of the targeted beneficiaries as well as institutional staff (LGIs/MoWCA) in social auditing approaches to ensure that women are empowered to monitor their livelihoods, assess the effectiveness of the results, and adapt the implementation of the livelihoods to manage evolving climate change risks. This Activity closely links with Output 3 in which the institutional capacities and knowledge are promoted to create an enabling environment for climate-risk informed livelihood planning. Therefore, the capacity building under this Activity will foster upward linkages among communities, NGOs, and Government institutions to support evidence-based, community-driven adaptation planning for resilient livelihoods.

Key inputs under this Activity include:

- 1.3.1. Awareness and training through 101 workshops for women groups, value-chain actors, and WSC/LGI staff on implementation of climate risk reduction strategies;
- 1.3.2. Formation of women and girl volunteer groups and (one per ward) and ToT based training on dissemination and delivery of actionable early warnings (in coordination with CPP);
- 1.3.3 ToT based training, learning exchange, and advocacy for DMC staff, Union level CPP volunteer groups, BRCS, and Ministry of Disaster Management and Relief (MoDMOR) staff to enable replication of the volunteer mechanisms across other wards and Unions
- 1.3.4 Development of climate-risk informed social audit protocol and toolkits for participatory monitoring and evaluation of resilient livelihoods;
- 1.3.5 ToT based training for WLGs and institutional staff (LGIs/DWA) on results monitoring of livelihoods in the light of evolving climate risks.

**Output 2. Gender-responsive access to year-round, safe and reliable climate-resilient drinking water solutions**

85. This Output will invest in ensuring that capacities of vulnerable coastal households, especially women, are enhanced in planning for, implementing, and managing climate-resilient drinking water solutions. GCF resources will be invested in building climate resilient water supply solutions, community-based approaches for planning and management of these systems (backstopped by GoB), and capacities for households and communities on climate risk management and adaptive planning to ensure drinking water security. Leveraged GoB co-financing will be used to support O&M of the systems during the project under a three-tier O&M model described below (Activity 2.3). DPHE has committed to provide continued technical backstopping and post-project O&M financing (see O&M commitment letter, Annex IVb). By ensuring drinking water security and water supply solutions in proximity to the houses of beneficiary women and girls, GCF resources will be gender-transformative in reducing the unpaid burden of work which so importantly inhibits the resilience of women and girls. This Output will also create linkages to the activities under Output 1 particularly building the beneficiary assessment and livelihood profiles which will be used for putting up the appropriate community management structures and ensuring that the most climate vulnerable beneficiaries are targeted to gain access to drinking water. Planning under both outputs is to be mutually reinforcing, since drinking water provision will lead to reduced unpaid time burdens, improved health and thus also the time required to pursue climate-resilient livelihoods. As a priority, this Output will target the women and the HHs supported under Output 1, to ensure they have access to safe, year-round drinking water supply. These combined investments will save women and girls' time and resources as well as safeguard their health and safety, improving their opportunities to invest in livelihoods (and/or education) thereby increasing their adaptive capacities in the face of a changing climate. Furthermore, the promotion of last-mile access to EWs under Output 1 will also enhance preparedness of the communities and mitigate damage to drinking water systems caused by intense cyclones and storm surges.

**Activity 2.1 Participatory, site-specific mapping, beneficiary selection, and mobilization of community-based management structures for climate-resilient drinking water solutions**

86. Based on the PRA process involving participatory community consultations at the ward and union levels, combined with and assessment of existing and planned coverage information, (triangulated with LGIs and DPHE), a portfolio of climate-resilient technologies and solutions has been proposed under this project. Selection of appropriate technologies for the communities in the targeted districts was based on current availability and usage of options, current and projected availability and quality of water (taking into account projected climate change risks), climate-resiliency of the sources and technologies, accessibility, ease of operation and maintenance and technical complexity, affordability, health and environmental impacts, gender-responsiveness, and social acceptability. The recommended options include Household based rainwater harvesting systems (RWH), Community-scale (small and medium) RWH systems, Institutional-scale (large and very large) RWH, and community freshwater pond systems with supporting embankments for storm surge protection and filtration treatment. Details of the options analysis is presented in Chapter 7, Drinking Water Assessment Report (Annex IIc).
87. The proposed drinking water supply solutions were designed and prioritised for the target households based on accessibility and cost-effectiveness, focusing on community level freshwater pond systems with filtration treatment technology (and including raising embankments); institution-scale RWH defined as large (covering 75 households) and very large (covering 100 households) RWH systems at existing public institutional buildings (primarily in

institutions such as schools, colleges, Union Councils and other government institutions); community-scale RWH systems defined as small (covering 25 households) and medium (covering 50 households) RWH systems at existing community buildings (primarily at community buildings such as mosques, temples, cyclone centres, community clinics and other private owned buildings used for community purposes) and existing institutional buildings; and Household level RWH systems for people with no access to community or institution based RWH or pond treatment systems, especially people living far away from these systems, women and adolescent girl headed households, people with disabilities and minority groups. At least 20 per cent of the target households in each ward will be covered by household based systems. The Union-wise portfolios are referenced in Chapter 6, Feasibility Study (Annex IIa).

88. The institutional-scale large and very large tanks have been identified and sited and detailed technical designs have been developed for each of the sites. In addition, the small and medium community-scale tanks have been mapped and potential sites have been identified accompanied by prototypical designs (see Chapter 7 in the Drinking Water Assessment Report, Annex IIc). Building on this mapping, final siting (for community-scale RWH tanks and pond treatment systems), finalization of targeted beneficiaries, and grouping (for access and distribution) will be undertaken during the first year of implementation. The formulation of Water User Groups (WUGs) and Water Management Committees (WMCs) will enable sustained planning and management of the proposed water solutions. The WUGs group will be comprised of women members from each of the targeted household and will be clustered based on their access to the identified drinking water solution sites. The WUGs will also include members of school management committees where the WUG covers institution based RWH systems. The formulation will be done in coordination with the formation of the WLGs under Output 1 for leveraging synergies and mutually reinforcing planning and use of freshwater resources in a changing climate. In each of the targeted wards in 39 Unions, one WMC will be formed whose main responsibility will be to look after the water supply technologies provided to ensure proper management of the systems. The WMCs will be formed at the ward level and will comprise Local government representatives (Ward Councilor and representative from the Watsan standing committee -WatSC), Representative from Union level DPHE staff, representatives from associated WUGs, owners/representatives (at least 2) from the institutional/community buildings/facilities and technician/caretaker representatives for the cluster of water solutions.

Key inputs under this Activity include:

- 2.1.1 Consultations, in light of the selection criteria, to finalize beneficiaries HHs, raise awareness, and plan for distribution of access to proposed drinking water solution systems in light of climate change risks;
- 2.1.2 Participatory mapping, vetting, and siting of drinking water supply systems (based on site-specific assessments conducted during design);
- 2.1.3 Formulation/reactivation/facilitation of WUGs and WMCs (synergizing with WLGs in Output 1);
- 2.1.4 Detailed assessment including water quality testing at applicable sites to support customized design of the water supply systems.

**Activity 2.2 Implementation of climate-resilient drinking water solutions (at HH, community, and institutional scales)**

89. GCF resources, supported by GoB co-financing, will be invested in the implementation of the portfolio of climate-resilient drinking water technologies in each of the 39 Unions of the targeted districts of Khulna and Satkhira. Each of these supply options and their designs take into account projected climate change risks including irregular rainfall patterns and intensified storm surges. The RWH systems, comprising the catchment, conveyance, storage, and the delivery, have been designed to support year-round access to safe drinking water (with the tanks sized for the estimated worst-case scenario of a 180-day dry period with no rainfall). Apart from construction of storage tanks (for the varied scales), combined GCF resources will be invested in rehabilitating/constructing catchments, conveyance systems including gutters, downpipes, and pre-storage filtration devices and 'first-flush' mechanisms, and delivery system to control flow to end use and managing distribution. The household level RWH systems will include a new roof catchment (10' X 6' size corrugated iron sheet), and a 2,000-litre capacity plastic rainwater storage tank with a cement platform as well as the conveyance systems etc. The institution-scale RWH and

community-scale RWH rainwater storage tanks will be made of reinforced concrete. Detailed technical specifications for the proposed technologies are provided in Drinking Water Assessment Report (Annex IIc). Based on the expressed concerns of the communities and experiences of local NGOs, simple filtration and/or disinfection methods would be used to mitigate contamination of stored rainwater, along with improved maintenance of the roof catchment. Awareness would also be raised for beneficiaries on end-use storage and safety measures to mitigate any residual health risks. The household rainwater tanks will be constructed on a raised cement platform that provides protection for the RWH system during cyclonic events. The household rainwater tanks are also expected to be at least partially full of water during cyclone events which will increase their cyclone resistance. The implementation success of the household level RWH systems will be ensured through community mobilization, WUG formation for clusters of households with household level RWH, and ongoing institutional support from DPHE.

90. The water supply gap in the target wards (for year-round, safe drinking water) is too large to address solely through installing RWH systems at existing community and institution buildings. The existing surface water ponds are an alternative and popular option of potable water supply in the coastal belt and arsenic prone areas. Ponds typically do not dry up during the dry season and can provide a viable additional safe water source after treatment. The existing Pond Sand Filters (PSFs) are a simple low-cost technology using slow sand filtration, but most existing PSFs have been unable to fully remove microbiological contamination. In addition, inadequate O&M arrangements and inundation of the ponds during high storm surges and damage to filters have left many PSFs in the area unusable. To improve climate-resiliency and prevent saltwater intrusion during intense cyclonic events, selected fresh water ponds (not in the vicinity of/exposed to shrimp farming or other aquaculture), will be supported by raised embankments. The pond selection will also focus on existing ponds that are not saline and can provide year-round water availability. Furthermore, filtration treatment systems will be installed at these sites to provide water that meets GoB drinking water standards and World Health Organisation (WHO) guidelines for drinking water (treatment technology options will be selected for each freshwater pond site based on water quality testing results, options include an improved PSF design and membrane filtration options). Filtration modules are also installed in a well-protected superstructure, which are resilient to disaster shocks.

The key inputs under this Activity include:

- 2.2.1. Customization and detailed design for each of the sites and water supply systems;
- 2.2.2. Site preparation and construction of 13,308 household RWH systems including storage tanks, roof catchments, and conveyance elements;
- 2.2.3 Site preparation and construction of 228 community-scale RWH systems including storage tanks, roof catchments, and conveyance elements;
- 2.2.4 Site preparation and construction of 19 institutional-scale RWH systems including storage tanks, roof catchments, and conveyance elements;
- 2.2.5 Site preparation and construction of pond embankments and installation of filtration systems at 41 ponds;
- 2.2.6. Water quality testing/verification of fresh water sources after installation and prior to commissioning.

### **Activity 2.3 Community-based, climate-risk informed Operation & Maintenance (O&M) and management of the resilient drinking water solutions**

91. The drinking water systems will be managed through a community and tier-based approach comprising of the WUGs, WMCs, and LGI/DPHE staff. This Activity will support capacity building for all the stakeholders in participatory, community-based water access, distribution, and delivery planning and implementation to ensure gender-targeted, inclusive, and equitable access to year-round, safe drinking water. WUGs will be facilitated to meet, discuss, and plan for water supply for their households in light of climate change, including continuous monitoring of water availability and quality as well as peer-to-peer learning on efficient and sanitary practices for water collection and use.
92. The provision of and access to water will be anchored in a fee-based model (based on existing practices and DPHE's mandate) that will engender ownership and commitment to securing drinking water for the targeted households. The

fee would be based on affordability considerations and financing available. The average annual operations and maintenance cost contribution (excluding major repairs and infrastructure replacement) per household across all water supply technologies is estimated at USD5 (the nominal fee, per annum). In addition to this nominal fee, households with household level RWH will also be encouraged to pay an amount of US\$19 per year as a set-aside to cover the household contribution to the major repairs/replacements for the short life assets of household roof catchment and conveyance elements. The scale of this fee has been endorsed through discussions in the field conducted in with households, Union Parishads and institutional stakeholders. GoB resources will be leveraged to support O&M costs beyond the household fee contributions as well as post-project as outlined in the O&M plan and supported by DPHE's O&M commitment letter (see Annex XIIIb and Annex IVb resp.)

93. The fee will be standardized according to the water supply technology with one fee per HH for HH RWH, one fee per HH for Community/Institution-scale RWH and one fee per HH for treated pond water (the fee could be different from one ward to another but not from one RWH site to another RWH site within the same ward). The fee supports basic operation needs including simple cleaning and minor repairs and will be used as an O&M fund to collectively contribute to the staffing of a technician/caretaker maintained as part of each WMC. RWH systems entail low operation and maintenance costs; however, the pond-based solutions entail higher technical complexity and a need for robust O&M support. The pond-based solutions will be maintained by a local caretaker and managed by a third-party service contract provider with a contract jointly signed by the Union Parishad and DPHE.
94. The project, therefore, will promote a three-tiered O&M system (based on community consultations as well as discussions with LGIs and DPHE) endorsed by DPHE (see O&M plan and O&M Commitment Letter, Annex XIIIb and Annex IVb respectively). The three-tiered O&M management system has been endorsed through discussions in the field conducted in 2017 through the PRA process as well as targeted consultations undertaken with households, Union Parishads and institutional stakeholders. Please refer to Annex XIIIc for the outcomes of stakeholder consultations with community representatives and Unions on the proposed O&M system and willingness to pay. There is proven experience of two-tier community involvement for water supply points from water interventions implemented by NGOs (e.g. WaterAid) in Satkhira and Khulna. The WaterAid approach has been to have regular maintenance supervised by a Management Committee (Tier 1 equivalent to the proposed WUG) with oversight and strategic decisions regarding the water point provided by the Ward Development Management Committee (Tier 2 equivalent to the proposed WMC). Furthermore, the proposed mechanism below is aligned with DPHE's mandate requiring household and community contributions towards O&M.
95. Tier 1: WUGs will need to be responsible for daily and/or monthly monitoring of the water supply systems, in particular, the HH RWH, community-scale RWH systems and the daily operations of the pond treatment systems. The beneficiary households of the HH RWH will need to undertake the minor maintenance themselves (for example cleaning the household roof catchment) with support from the caretakers for the more technical tasks such as replacing the tap. The project will initiate and facilitate the monitoring, through capacity building and peer-to-peer learning activities, continued monitoring of the availability and quality of the systems, simple O&M needs, household-level sanitation and hygiene practices, and collecting the nominal fee as a set-aside for minor repairs that can be undertaken by the caretaker. In case of institutional based rain water harvesting systems, the system will be co-managed by school management committee and community users group. Therefore, the two committees determine the O&M strategy and cost sharing of each committee for operation and maintenance of the water supply system.
96. Tier 2: WMCs (at the ward level) will staff a technician/caretaker for each ward. The WMC have backstopping support from the Watsan Standing Committee (WSC) at the Union Level. The caretaker will need to be responsible for an associated cluster of WUGs including WUGs for nearby household RWH systems. Co-financed by the WUG (through the nominal fees collected from every beneficiary household), and the Union Parishad contributions, this resource would be available to support daily operations and minor repairs including maintenance of pond treatment systems (excluding any annual third party module maintenance, which is included under Tier 3) and of RWH systems including roof catchment cleaning, tank cleaning and minor repairs of taps, joints, gutters, and pipes.

97. Tier 3: DPHE (from GoB co-financing) will phase in to backstop and cover the O&M costs related to replacement of community and institution system infrastructure (e.g. conveyance systems including gutters and downpipes which have an expected life of 5 years), and potentially full system rehabilitation in case of unanticipated cyclonic shocks. For the pond-based treatment systems requiring package filtration plants, installation with warranty would be procured to ensure robust technical support for long-term viability of these solutions. DPHE will also be responsible for any third-party contract for the treatment systems (e.g. an annual module maintenance cost to change membrane and filter materials for filtration plants with membranes). Third-party contracts for membrane filtration package plants will need to include a fixed rate for the supply of replacement parts over the full lifecycle of the membranes. Post-project O&M would continue to be supported through community and DPHE financing and the commitment letter indicates the O&M costs to be covered by DPHE beyond the project lifetime.
98. This Activity will build the capacity of all stakeholders (including LGI and DPHE) to develop and implement O&M plans and sustain, continuous adaptive planning in the light of evolving climate risks. This will enable LGIs and DPHE to incorporate climate-risk informed, community-centric O&M approaches into their service provision in other non-targeted unions and districts across the southwest coast. In particular, the Activity will facilitate, through the WMCs, adaptive water distribution planning and management of drinking water solutions including: planning of adaptive operation and maintenance of water options, including water quality monitoring, development of fee-based model and financial management system, resolution of the problems/issues raised by WUGs, staffing and monitoring of caretakers' performance to maintain the community/institution based water options, identify the suppliers and take necessary steps for system troubleshooting, any repair or maintenance works, and periodic renewal of the committee itself. DPHE capacities will also be strengthened to provide backstopping and major O&M support as outlined in the O&M plan (see O&M Plan, Annex XIIIb). DPHE has Upazila level engineering staff who oversee diploma engineers assigned to each of the Union Parishads as support under LGIs.

The key inputs under this Activity include:

- 2.3.1 Facilitation of WUG and WMC meetings for yearly, adaptive water distribution and management planning in the face of a changing climate;
- 2.3.2 Awareness raising and capacity building (through workshops) for HHs, water user groups, WMCs on climate change and disaster risk management for water solutions;
- 2.3.3 Development of fee-based, three-tier O&M plan including identification of O&M needs, financing sources, and technical support;
- 2.3.4 ToT based technical training, incorporating climate risks, on operations, maintenance and use (including water quality monitoring, system condition assessment, end-point quality control) for HHs, water user groups, WMCs, technicians/caretakers, LGIs/DPHE staff;
- 2.3.5 Implementation of community-based and three-tier system for water availability and quality monitoring and operations & maintenance (including provision of water quality test reagents, caretaker costs, and O&M support).

### **Output 3. Strengthened institutional capacities, knowledge and learning for climate-risk informed management of livelihoods and drinking water security**

99. This Output will build the technical capacities of MoWCA, DPHE, and LGIs to integrate climate risks and impacts into design and implementation support in a manner that is responsive to community needs and priorities, especially those who are marginalized (including women, girls, people with disabilities, elderly, and minority communities). GCF resources will be used to invest in increasing knowledge and technical skills for the technical support staff, research and development staff, implementation support staff (including LGI staff), gender focal points to provide enabling support to the interventions implemented under Outputs 1 and 2. As the government agency with the mandate to support integration of gender and climate change across sectoral activities, MoWCA's capacity for coordination would be improved to support other relevant ministries in incorporating gender-based approaches to adaptation responses. Using a ToT approach, and coordinated by the Department of Environment (DoE), MoWCA will be equipped with the skills and knowledge to carry out climate adaptive programmes, compile lessons, and raise issues for policy planning. A knowledge portal will also be hosted at MoWCA on gender responsive climate change adaptation, in coordination with existing initiatives including those of DOE's climate change cell.

100. A key focus of this Output is also on facilitating knowledge generation and management, evidence-based learning, and improved coordination for gender-responsive solutions to secure water and livelihoods for the vulnerable, coastal populations. The strengthened technical capacities combined with knowledge and learning will boost the replicability and scalability potential of output 1 and output 2. Knowledge generated through project activities including climate risk analyses and modelling, decision-making tools, best practices and lessons learned will be codified and institutionalized for dissemination as training modules through institutional platforms, technical training institutes, and academia. A targeted "Learning" plan will be developed and implemented that extend learning beyond the standard project monitoring elements. This activity will focus on young girls and boys, as the agents of future change to achieve enhanced climate change resilience through transformative adaptation. The targeted capacity building will be interlinked with evidence-based learning through impact evaluation to assess the adaptive capacities built as the result of the project and facilitate further scale and replication of the project impact based on lessons derived. This Output will also support the development of a replication roadmap, in coordination with relevant ministries, donor community, private sector, and other GCF Accredited Entities, to support replication and scale of the project activities and impacts.

**Activity 3.1 Strengthen MoWCA's technical and coordination capacities for design and implementation of gender-responsive, climate-resilient coastal livelihoods**

101. GCF resources and GoB co-financing will be invested in building institutional and technical capacities of MoWCA and DWA staff to assess climate change risks and scenarios and undertake design and implementation of climate-resilient livelihoods and adaptive livelihood strategies. GCF resources would be invested in development of climate change risks and livelihood scenarios to inform design of resilient livelihood interventions for the coastal communities. In addition, a tool kit will be developed to support targeted, on-the-ground livelihood interventions in communities across the Southwest coast. The toolkit will include modules on climate risks and impact scenarios related to various livelihoods, climate-risk informed livelihood planning, cost-benefit models, programme design and management, and M&E approaches to assess adaptive capacities and impacts of livelihood programs. A Training of Trainers (ToT) approach would build MoWCA and DWA's capacities to develop and implement solutions utilizing the scenarios and the tool-kit. Furthermore, MoWCA's cross-sectoral coordination capacity will be improved to support integration of gender and climate change concerns into other socio-economic activities through development and dissemination of a 'Gender Sensitive Climate Change Adaptation' training module and training of staff in mainstreaming gender and CC across sectoral policies and programs. The climate risks and scenarios, toolkits, and institutional knowledge related to livelihood security will be developed in coordination with Activity 2 so as to promote synergistic planning and benefits of resilient livelihoods and drinking water solutions in the same communities facing deterioration of freshwater resources due to climate change.

Key inputs under this Activity include:

- 3.1.1. Development of and training (ToT approach) on climate risks and livelihood scenarios for coastal livelihoods;
- 3.1.2 Development of and training (ToT approach) on tool kit for gender-responsive, climate-resilient livelihoods design and implementation for the Southwest coast;
- 3.1.3 Development of 'Gender Sensitive Climate Change Adaptation' Training Module and ToT for gender focal persons across key ministries;
- 3.1.4 Training of MoWCA and DWA staff to integrate gender and climate change across policies (policy forums such as PEC, ECNEC, NDA Advisory Committee) and programs across sectors.

**Activity 3.2 Strengthen DPHE capacities for climate-risk informed innovation and management of drinking water solutions across the Southwest coast**

102. This Activity will invest in technical capacities for DPHE and LGIs to integrate climate change risks and projected impacts on the freshwater resources and water supply infrastructure of the coastal communities into planning and implementation support. DPHE will be capacitated to assess climate risks and model drinking water needs in light of climate change. A regional database would be established, co-financed, by GoB to map water supply sources and infrastructure to support effective coordination across various implementation efforts and investments. Technical capacity of the Research & Development (R&D) wing of DPHE will be strengthened through training and field based work (in coordination with engineering institutes and ongoing efforts such as

UNICEF's support to research on MAR and other climate-resilient technologies) to support technical excellence, innovation, and implementation of solutions for climate-resilient water supply. This would include supporting a shift to climate-resilient solutions (PSF, Managed Aquifer Recharge (MAR), river based solutions, RO, etc.) for year-round, safe drinking water for coastal populations in light of projected slow- and sudden-onset climatic events.

Key inputs under this Activity include:

- 3.2.1. Development of and training (ToT) on climate risks and scenario modelling for drinking water needs across the southwest coast;
- 3.2.2. Establishment of a regional database for mapping of water supply sources and existing/planned water supply infrastructure;
- 3.2.3 Technical capacities for Research and Development (R&D) wing of DPHE (training and field-based studies) for innovation and design of climate-resilient water solutions across the coast, in coordination with technical institutes.

**Activity 3.3 Establish knowledge management, evidence-based learning and M&E mechanisms to promote long-term, adaptive capacities of coastal communities**

- 103. GCF resources will be used to address the barriers related to awareness and knowledge and learning that constrain continuous adaptation and long-term capacities to cope with climate change, and in particular, with deteriorating impacts of salinity on coastal freshwater resources threatening livelihoods and drinking water security. This Activity will contribute to the long-term sustainability of the project impact and create pathways for continued learning and evidence-based replication and scale of project impact. GCF resources will be used to codify and integrate knowledge products, such as climate risk and scenario analyses, design and implementation tools and products for climate-resilient livelihood and drinking water solutions, and best practices and lessons learned into institutional platforms, training modules for academic institutes, and a web-portal for wider dissemination.
- 104. A targeted 'Adaptive Learning' activity will be undertaken to focus on young girls and boys in targeted coastal areas to build their long-term adaptive capacities. This will be achieved by integration of project intervention support (under Outputs 1 and 2) with targeted awareness raising, behavioural change, and peer-to-peer learning support related to various aspects of climate change such as causes of climate change, potential future changes, and adaptation technologies. Learning will be augmented by providing insights from ongoing project activities, with a focus on collecting and using data in a rigorous manner. This learning will be evaluated as part of broader project impact evaluation (see below). The learning will also focus on their rights and resources and provide access to information and knowledge on social, economic, and health risks and benefits in a changing climate.
- 105. GCF resources will also be used to establish longitudinal impact monitoring mechanisms for gathering valuable data and lessons to enable evidence-based policy, planning, and implementation of climate-resilient programs for secure water and livelihoods. In addition, an impact evaluation (quasi-experimental) will be designed and executed to quantify project impacts (subject to constraints imposed by the extent to which beneficiary selection can be feasibly modified). Output 1 and 2, as well as activities under Output 3 for learning induced adaptive capacity of youth, will be evaluated using rigorous impact evaluation techniques.
- 106. This Activity will also support the development of a replication roadmap, building on the analytical groundwork, knowledge, and learning established under this project, to support the GoB to replicate and scale project impact to other districts of the Southwest Coast. The roadmap, developed in coordination with relevant ministries, donor community, private sector, and multi-lateral partners, will identify priority districts and financing mechanisms (such as enhance micro-credit for livelihoods, private sector engagement for water provision) to support replication and scale of the project activities and impacts.

Key inputs under this Activity include:

- 3.3.1. Codification of knowledge, good practices, tools, and approaches such as climate risk and scenario analyses, tools for climate-resilient livelihood and drinking water solutions, and best practices and lessons
- 3.3.2 Integration of knowledge and tools into training and informational modules of government and technical institutes;
- 3.3.3 Establishment of a web-portal, co-hosted by MoWCA, for dissemination of climate and gender related knowledge, tools, and adaptation practices
- 3.3.4 Design and implementation of 'Adaptive Learning' for young boys and girls through school- and community-based behavioural change communications;
- 3.3.5 Implementation of monitoring and evaluation framework including: (i) baseline climate risk and vulnerability assessments (Incorporate ActionAid resilience index); and (iii) impact evaluation to quantify project impacts;
- 3.3.6 Development of a Replication Roadmap for replication and scale or climate-resilient livelihood and drinking water solutions, coordinating with donors, ministries, and multi-laterals.

#### **C.4. Background Information on Project / Programme Sponsor (Executing Entity)**

- 107. The Ministry of Women and Children Affairs (MoWCA) is the sponsor of the project. MoWCA is a GoB Ministry mandated to develop and implement policies and programmes to establish and preserve legal and social rights of women and children. Given the disproportionate impacts of salinity of women's lives and livelihoods, GoB has underscored the need to prioritize women-led, community-centric solutions that build ownership and capacities of women over technology-centric interventions. Therefore, given the explicit focus of the project to empower women as 'change-agents' to plan, implement, and manage resilient drinking water solutions and livelihoods in the face of worsening impacts on their freshwater resources, and MoWCA's mandate to integrate gender and climate change in across socio-economic activities, GoB has selected MoWCA as the key sponsor of the project. In addition, MoWCA's experience in providing livelihoods support through DWA and track record of coordinating with DPHE on provision of drinking water solutions will be replicated in the proposed project.
- 108. With an annual budget of roughly USD321 million, it implements various programmes aiming to support the most marginalized and poor women and children in all districts of the country. These include the country's oldest and largest social protection programme - Vulnerable Group Development (VGD) programme - with an annual expenditure of about USD190 million, aiming to enhance the livelihoods of the most disadvantaged women. The MoWCA delivers six major functions: (i) Formulation and implementation of the National Women's Advancement Policy and National Child Policy; (ii) Initiation of programmes for the welfare and development of women and children; (iii) Establishment and preservation of legal and social rights of women and children; (iv) Initiation of programmes for the empowerment of women including the creation of employment opportunities for women; (v) Formulation of law for eradication of violence against women and children; and (vi) Coordination and monitoring of the activities of different ministries relating to women's advancement through the Focal Points of Women in Development (WID).
- 109. The Department for Women's Affairs (DWA), the operational wing of the MoWCA, is responsible for programme implementation as per GOB's rules of business. The DWA has nation-wide operational set-up in 469 sub-districts and working arrangements with local government institutions. It implements a range of vital social safety net support programs at scale, including the VGD programme, Working Lactating Mother Assistance fund and Maternity Allowances for ultra-poor pregnant mothers. The VGD programme is designed to address the marginalization of vulnerable women and lactating mothers; food security of unprivileged women; maternal health and nutrition; and capacity development. The DWA is also implementing an innovative livelihood programme targeting extreme poor women through the initiative – Investment Component of VGD – supporting 7,000 extreme poor women in two of the most vulnerable districts. As of 2017, the programme covers 5.6 million vulnerable and ultra-poor women in all 64 districts of Bangladesh (Ahmed et al., 2004; GoB, 2017).
- 110. The DWA is also implementing activities to:
  - Provide technical, vocational and income generating training, equipment/materials and microcredit for the self-employment of 7.9 million women;
  - Provide training for the empowerment and enhancing the efficiency of women entrepreneurs and create accommodation facilities for 1.5 million women;

- Create opportunities for 2,650 women and children to access modern information technology;
- Provide hostel facilities for 2.65m working women and day care facilities for 4.5 million children of working women;
- Provide medical treatment, legal assistance and counseling to 1.89m abused women and children; and
- Provide life skills training to 10.9m adolescent girls.

111. In addition, MoWCA (through DWA) has implemented two climate change projects funded by Bangladesh Climate Change Trust Fund (BCCTF) in 2009-10 Financial Year (FY) and 2013-14 FY related to drinking water. These projects supported drinking water provision for vulnerable women and their communities in the areas most affected by climate change. To implement the project, as done for any project with a multi-ministerial engagement, according to GoB rules, the DWA entered into a Memorandum of Understanding (MoU) with DPHE, which is the main technical agency for the drinking water investment in Bangladesh. The first project – entitled “Ensure potable water and social protection of women and girls living in extreme climate vulnerabilities and environmental adversities” - was implemented in the coastal Bhola district, with a cost of USD400,000, successfully benefiting 1000 households. The project innovated and scaled up rainwater harvesting technologies at the community and household levels. The second project - entitled “Social protection of women and girls living in climate change impacted disaster-prone areas in Bangladesh” - was implemented in different parts of the coastal Barisal Division in the year 2013-14 with a budget of USD625,000, benefiting 1300 households with climate resilient drinking water systems.

### C.5. Market Overview (if applicable)

112. In Bangladesh, the market for rainwater harvesting tanks comprises of two kinds: plastic tanks and reinforced concrete tanks. Ferro-cement tanks and earthen tanks are also found in few areas, but not very popular due to their relatively lower life span. There are other types of rainwater tanks available in different parts of the world (e.g. timber, HDPE and steel), but considering absence of those types of tanks in local market, they were not considered as sustainable or cost effective options. The cost of construction of ferro-cement tanks is lower (USD120-150 for 2,000 L capacity tank) than the cost of a plastic tank of the same capacity (about USD200 for 2,000 L capacity tank), however ferro-cement tanks have a lower life span than plastic tanks. In addition, in ferro-cement tanks, cement absorbs water and iron expands when it rusts and cracks the cement, which would be a major threat in saline-prone coastal areas where salinity would affect the iron. The weak point with the rendered embedded steel and mesh is that the mesh and steel, when embedded in the cement, eventually corrodes and expands, causing cracks and leaks.
113. Reinforced concrete is concrete in which reinforcement bars ("rebars"), reinforcement grids, plates or fibers have been incorporated to strengthen the concrete in tension. Reinforced concrete is concrete that contains embedded steel bars, plates, or fibers that strengthen the material. Concrete is strong in compression, but weak in tension, thus adding reinforcement increases the strength in tension. The capability to carry loads by these materials is magnified, and because of this, RCC is used extensively in all construction. In fact, it has become the most commonly utilized construction material. Reinforced materials are embedded in the concrete in such a way that the two materials resist the applied forces together. The compressive strength of concrete and the tensile strength of steel form a strong bond to resist these stresses over a long span. Plain concrete is not suitable for most construction projects because it cannot easily withstand the stresses created by vibrations, wind, or other forces.
114. The project has proposed plastic tanks for household-scale tanks and reinforced concrete (RCC) tanks for the community-scale and institution-scale tanks. For households, plastic tanks were preferred over RCC tanks. Plastic tanks are very rigid, do not get affected by salinity, sunlight or high temperature, and leakage can only happen due to severe damage. Plastic tanks are portable, hence can be relocated which is useful as the rural households in cyclone affected areas often need to be rebuilt after large cyclones or storm surges. RCC tanks, once constructed, cannot be relocated. The ease of installation and maintenance were the main reasons why plastic tanks were chosen over RCC tanks for the household-scale tanks. Plastic tanks are not available in market if the volume requirement exceeds 10,000 L and for large size tanks, RCC tanks are more cost effective than plastic tanks. Also, plastic tanks are circular, therefore, several large plastic tanks would take up more land area than a rectangular RCC tank for the same volume. Therefore, for large size community and institution scale tanks, reinforced concrete tanks were selected. The RCC tanks are durable because of using reinforcement which is protected by concrete layers, hence less chance of getting affected by salinity or moisture. The structure is good

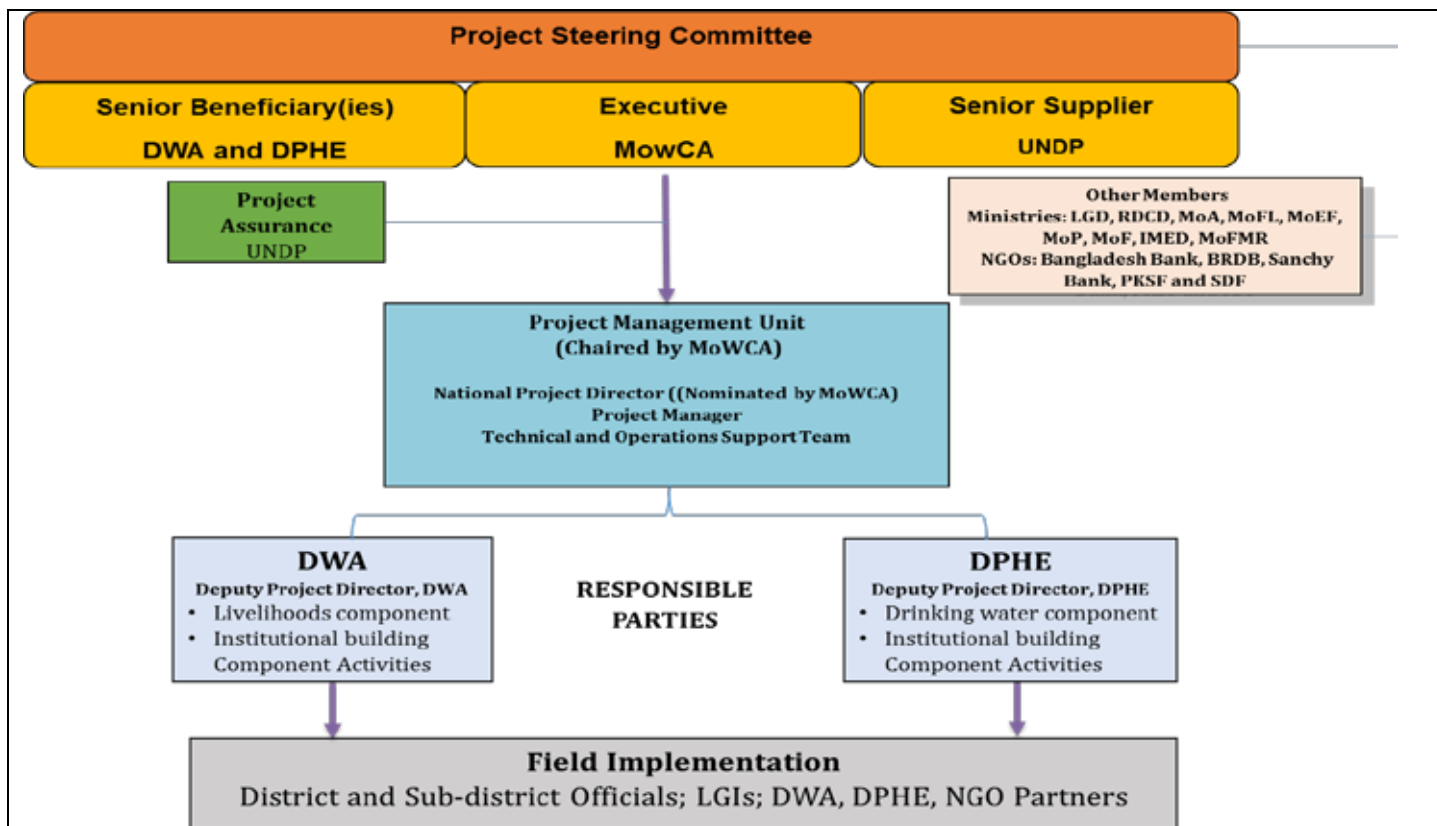
enough to resist cyclones or heavy impacts. Protection of water quality is good inside RCC tanks. RCC tanks may develop small leaks as they age but these can be sealed and repaired. RCC tanks will take longer to construct and implement than plastic tanks.

#### **C.6. Regulation, Taxation and Insurance (if applicable)**

115. There are no applicable licenses or permits for the implementation of the project. In addition, there are no tax implications or regulations applicable for resilient livelihood interventions and drinking water supply through rain water harvesting systems. As DWA and DPHE are the 'Responsible Parties' supporting implementation, the planned interventions will comply with GoB's rules and regulations. Following Public Procurement Regulation of the Government of Bangladesh Value Added Tax and Income Tax will be applicable for the government procured activities of the project. UNDP enjoys VAT and Tax exemptions which will be applicable for the part of the procurement plan implemented by UNDP.

#### **C.7. Institutional / Implementation Arrangements**

116. The project will be implemented following UNDP's National Implementation Modality (NIM), according to the Standard Basic Assistance Agreement between UNDP and the Government of Bangladesh, the Country Programme Document (CPD), and as policies and procedures outlined in the UNDP Programme and Operations Policies and Procedures (POPP) (see [here](#)). The national executing entity - also referred to as the national 'Implementing Partner' in UNDP terminology - is required to implement the project in compliance with UNDP rules and regulations, policies and procedures (including the NIM Guidelines). In legal terms, this is ensured through the national Government's signature of the UNDP Standard Basic Assistance Agreement (SBAA), together with a UNDP project document, which will be signed by the Implementing Partner to govern the use of the funds (once the funds are secured). The Standard Basic Assistance Agreement (SBAA) was signed with the GoB in 1986.
117. The **Implementing Partner** for this project is Ministry of Women and Children Affairs (MoWCA). MoWCA is accountable to UNDP for managing the project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of UNDP resources. UNDP, in agreement with the Government of Bangladesh, will provide implementation support (support to NIM) as agreed in the letter of agreement (LOA)<sup>65</sup> signed between MoWCA (on behalf of the GoB) and the UNDP. UNDP will also provide oversight through UNDP Country Office in Bangladesh, and BPPS/UNDP Global Environmental Finance Unit in Bangkok Regional Hub and Headquarters in New York.
118. UNDP provides a three-tier oversight and quality assurance role involving UNDP staff in Country Offices and at regional and headquarters levels. The quality assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project assurance must be independent of the Project Management function; the Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. The project assurance role is covered by the Accredited Entity fee provided by the GCF. As an Accredited Entity to the GCF, UNDP is required to deliver GCF-specific oversight and quality assurance services including; (i) Day-to-day oversight supervision, (ii) Oversight of the project completion, (iii) Oversight of project reporting.
119. The following parties will enter into agreements with MoWCA to assist in successfully delivering project outcomes and are directly accountable to MoWCA as outlined in the terms of their agreement: Department of Women Affairs (DWA) (under MoWCA) and the Department of Public Health and Engineering (DPHE) (under Ministry of Local Government, Rural Development and Co-operatives) will serve as the '**Responsible Parties**' for the execution of the livelihood and drinking water related activities of the project respectively.
120. DWA would be responsible for the implementation of the activities under Output 1 including the promotion of diversified, resilient livelihoods, associated value-chains and market linkages, and awareness and training on climate-risk reduction strategies and continued monitoring for sustained livelihoods and assets. Jointly with MoWCA, DWA is also responsible to implement the institutional capacity building activities under Activity 3.1.
121. DPHE will be responsible for the implementation of all activities under Output 2, including the installation and O&M of the drinking water solutions. It will also be responsible for Activity 3.2 aimed at enhancing its technical and innovation capacities to sustain and scale resilient drinking water solutions across the coast. Jointly, DWA, DPHE, and MoWCA would support implementation of Activity 3.3 aimed at establishing knowledge management and learning mechanism for sustained impact of the project.
122. The implementation and the management arrangements (as per UNDP NIM modality) for this project are summarized in the chart below: (where Executive is MoWCA as the Executing Entity in GCF terminology, Senior Beneficiaries are DWA and DPHE as the 'Responsible Parties', and Senior Supplier is UNDP as the Accredited Entity)



123. **Governance Arrangements:** The project will be governed by a **Project Steering Committee**. The Committee will consist of a group of representatives responsible for making consensus-based strategic, policy and management decisions for the project. Further, it will oversee the project implementation; review compliance with GoB, UNDP and GCF requirements; and ensure implementation of the management plan for the risks identified. The Committee will be responsible for the approval of the Annual Work Plan (AWP), budget allocation and revisions when required. It will meet once every six months and/or upon a call by the National Project Director (see below) if urgent strategic decision is to be made.

124. The PSC will be comprised of:

- An Executive (role represented by National Implementing Partner) that holds the project ownership and chairs the Board. The Executive will be Secretary who is the Chief Accounts Officer of MoWCA;
- A Senior Supplier representative providing guidance regarding the technical feasibility of the project, compliance with donor requirements, and rules pertaining to use of project resources. This role will be fulfilled by UNDP in its capacity as GCF AE;
- Senior Beneficiary representatives from DWA and DPHE who ensures the realization of project benefits from the perspective of project beneficiaries;
- The National Project Director (NPD), nominated by MoWCA, is responsible for overall direction, strategic guidance, and timely delivery of project outputs.
- Other representatives will include Local Government Division, Rural Development and Cooperatives Division, Ministry of Agricultural, Ministry of Fisheries and Livestock, Ministry of Environmental and Forest, Ministry of Planning, Ministry of Finance, Implementation Monitoring and Evaluation Division, Ministry of Disaster Management and Relief, BFRI, Bangladesh Bank, National Designated Authority, BRDB, Sanchy Bank, Palli Karma-Sahayak Foundation (PKSF) and Social Development Foundation (SDF).

## Implementation and Management Arrangements

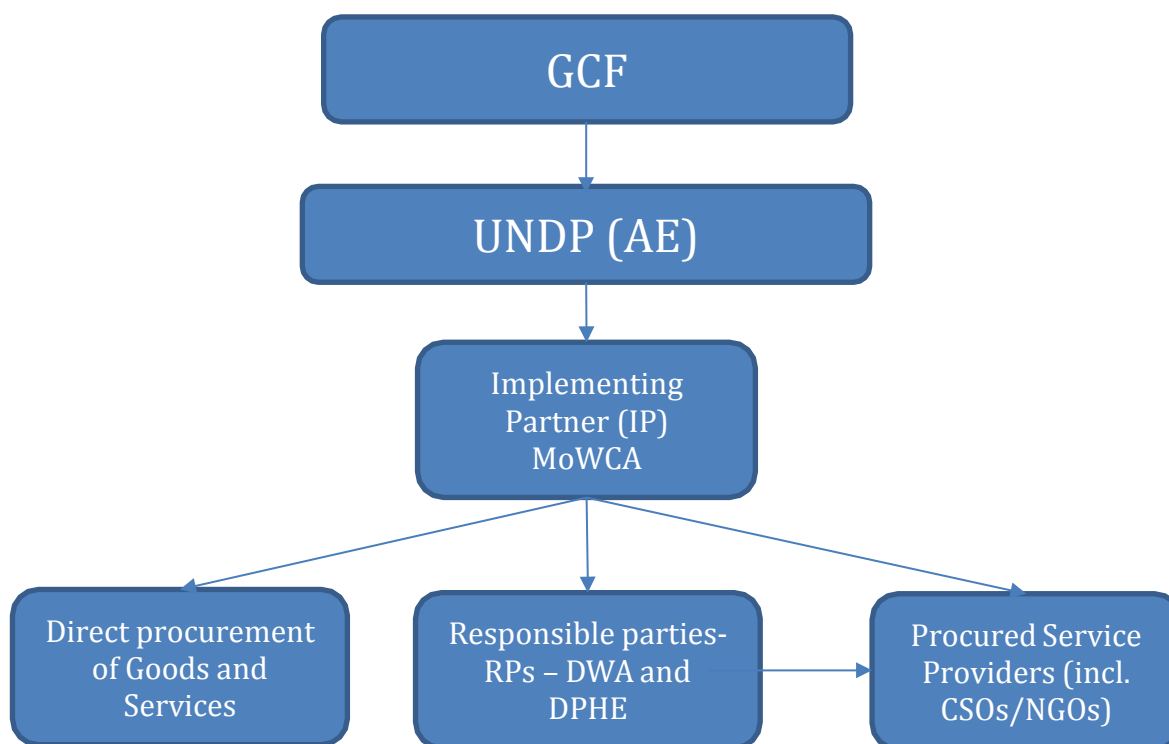
125. The **PSC** will be supported by the **Project Management Unit (PMU)**. The PMU will be responsible for preparing the quarterly work plan, quarterly progress report, annual work plan and annual progress report. It will supervise the overall project implementation and day-to-day management of the project. The PMU will be led by the NPD and his/her responsibilities will follow NIM/National Execution manual as mentioned below. The AWP will be the main management instrument for the implementation of the project. The RPs will prepare their AWP with well-defined result indicators, using the standard format UNDP programmes, which will be approved by the PSC. The human resource and procurement needs are integral part of the AWP. Through the AWP, the NPD and DNPDS of the RPs may request UNDP to provide various technical and operational support, which may include procurement and recruitment done by UNDP. These will be directly spent by UNDP and be included into the quarterly and annual financial and narrative reports sign off by NPD.
126. National Project Director: Using established practice under NIM (aka National Execution – NEX), GoB will designate a National Project Director (NPD) who will be a Senior Official from MoWCA and not below the rank of Joint Secretary. The NPD will be responsible for setting out overall direction, strategic guidance, and timely delivery of project outputs. The major roles of the NPD will be the following:
  - Coordinate the DNPDS DWA and DPHE to ensure that the objectives of the programme are met;
  - Coordinate project's components using coherent approach for synergy in implementation, calling the meetings of the PSC and implement decision made by the committee;
  - Carry out advocacy based on evidence generated by the project - for government decision-making;
  - Submission of AWP, narrative reports, mid-term evaluation and final evaluation to the PSC;
  - Ensure that the project is implemented in coordination other development partners whose support is critical to achieving the outcomes of the programme
  - Supervise the work of the Project Manager and other staff at PMU.
127. The **Project Manager (PM)**, recruited by UNDP, will manage the implementation of the project under the supervision of NPD. UNDP will recruit all staff of the PMU responsible for day-to-day operations and the management. This arrangement has been in place with a high degree of effectiveness in approximately 30 of UNDP's ongoing projects in Bangladesh.
128. The PMU, comprised of technical and operational support teams, will be responsible for development and implementation of all programme component of the project. The PM will implement the project with the support of the two teams. The Technical team will work on (i) development of programme standards, (ii) provide technical guidance to implementation team at the field level and contractors and NGOs, (iii) implement policy research, dialogue and advocacy component of the project, (iv) guide implementation of and monitor social, gender, and environmental safeguards plans, (v) implement knowledge management and communications activities; and (vi) monitor project progress and support project M&E. The Operations team will manage finance, general administration, internal auditing and risk management functions of the project. UNDP will play the Project Assurance Role in line with the requirements outlined in the Accreditation Master Agreement (AMA) signed with GCF. This includes management of funds, programme quality assurance, fiduciary risk management, timely delivery of financial and programme reports to GCF and other requirements as per the AMA.
129. The MoWCA will enter into specific "Letter of Agreement" (LoA) with relevant agencies for the implementation of the project. UNDP will manage the funds from GCF, and will disburse quarterly in advance against agreed work plans, to a project account managed by the MoWCA, DWA, and DPHE. The MoWCA will deliver reporting, auditing and M&E requirements of the government to UNDP, in line with UNDP requirements.
130. Deputy NPDs at DWA and DPHE: The DWA and DPHE will nominate Deputy NPDs from its Senior Officials to assist the NPD in the implementation. These directors will be accountable to the Secretary of their respective ministries and the NPD. These positions are not remunerated by GCF resources but are Government financed positions. The role of each Deputy Project Director is to:
  - Assume financial and results accountability of the respective component and resources, including FAPAD audit;
  - Ensure that the project is well coordinated with the programme as a whole, by formally meeting with the NPD; ensure the PSC endorsed the annual work plan and meet with PMU and PSC to jointly review progress once per quarter/by annual;
  - Exercise overall technical, financial and administrative oversight of the project they are responsible for;
  - Ensure timely submission of work plans, financial reports and narrative reports to the NPD; and

- Supervise work of sub-project staff and consultants.

131. The DPHE and DWA will be technically and operationally supported by dedicated staff of PMU based in respective project offices set up by each RP. Work of these staff will be supervised by DNPDs on a day-to-day basis and will report to the PM. They will be responsible for the implementation of the project activities, monitor and supervise quality of the work by contractors, suppliers and NGOs, prepare annual work plan and prepare reports for PMU.

#### Field-level execution

132. At the district and sub-district level, the officials of the DWA and DPHE will support day-to-day implementation of the project activities undertaken by PMU. DWA and DPHE will work closely with the **Local Government Division (LGD)** which has its offices at the district level to monitor the functioning of Local Government Institutions (LGIs). The **Local Government Engineering Department (LGED)** is the engineering arm of LGD to support all LGIs in Bangladesh in all engineering-related rural and urban infrastructures development e.g. roads, culverts, markets, and small irrigation infrastructure. DPHE is the main technical agency of LGD to support all LGIs in fulfilling their responsibilities in relation to drinking water supply and sanitation infrastructure. The **Union Parishad (UP)** Act of 2009 is the main legal basis of the LGIs to operate. UPs consist of a chairman, nine members, and three women members, elected through direct local votes. They govern their functions through 14 standing committees to deal with, agriculture and other development works, cottage industries and co-operatives, women and children welfare, culture and sports, fisheries, livestock and rural water supply and sanitation.
133. The RPs will enter into contractual agreements with competent engineering companies and NGOs specialized in implementing livelihood projects and drinking water solutions. The selection will be based on a competitive process approved by the Board. The LGIs will be closely engaged in co-management and oversight of the project interventions. The livelihood interventions for the women livelihood groups are supported through the engagement of the UP staff and the Women Standing Committee. The drinking water related interventions are co-managed with the support of the ward level, Water Management Committees and the UP level Watsan Standing Committees. The implementing contractors and NGOs will work under the supervision of the committees and with technical monitoring by the staff of DPHE, DWA, and PMU.
134. Construction and operational arrangements: Contractual services will be procured by the RPs to construct and commission all the water supply systems proposed under the project. DPHE will enter into agreements with all Unions to transfer assets to Unions post-construction. The proposed drinking water infrastructure will be established in public land, and does not entail any use of private land. The infrastructure in institutions will be primarily owned by school/ college and they will register that as their asset; however, as the community will also use (consent has been established during preparation of the project) the infrastructure, the infrastructure will be registered as an asset by the Union Parishad for co-management including for operation and maintenance. The community-scale RWH systems and the pond-based systems will be owned by the Union Parishads. As such, the communities have right of access to the water and land. This is established and working practice in Bangladesh.
135. For the value-chain facilities, the crab hatcheries, MoWCA will sign an MoU with the Bangladesh Fisheries Research Institute (BFRI) for the upgrading of the existing facilities and will outline the roles and responsibilities of each parties under the MoU. BFRI is the official fisheries, aquatic resources and aquaculture research agency, with experience in operating hatcheries for the aqua-cultural sector. Its primary aim is to assist fisheries development by conducting and coordinating nationwide research efforts, standardizing techniques to maximize production and improve resource management, identifying and cultivating new production opportunities and providing trainings and disseminating important skills and technologies to relevant actors within the fisheries sector.
136. The following diagram depicts the flow of funds from GCF to UNDP onwards to IP/RPs/and other service providers.



### C.8. Timetable of Project/Programme Implementation

The project will be implemented over a period of six years to ensure capacities are built up for effective operation and management of the livelihood and water investments, knowledge and learning mechanisms are developed and applied, and an enabling environment is advanced to ensure sustained impact of the project beyond its lifetime. The implementation schedule is presented in Annex.

### D.1. Value Added for GCF Involvement

137. Without GCF involvement to complement ongoing efforts and address gaps, GoB cannot take adequate steps to help vulnerable coastal livelihoods facing increasing threats from climate change induced salinity to their freshwater resources, affecting agricultural livelihoods and drinking water security. The planned interventions target the most climate vulnerable segment of the population. As described in Section C.2, low awareness of climate risks and responses to climate-change induced salinity impacts on coastal freshwater resources, weak technical and financial capacities to assess and adopt adaptation measures, inadequate institutional capacities to enable climate-risk informed, planning and implementation of resilient solutions are some of the key barriers that hinder community as well as government investments for drinking water and livelihood security. Specifically, GCF's value-add is in:
138. **Funding, at scale, of primarily public good investments for resilience of extreme poor coastal communities:** Alternative financing options to address transformative change for the most vulnerable populations are limited, as the planned interventions do not yield aggregate, large-scale financial reflows. Where private sector engagement and markets are present for alternative livelihoods, barriers related to lack of awareness, technical capacities, and financial limitations in investing in alternative, climate-resilient livelihoods inhibit the extreme poor from investing in and accessing these opportunities. Therefore, while the project delivers a positive economic return, the interventions targeted at the most vulnerable would not be financially viable without public sector financing. Private sector investment is limited in provision of drinking water supply for the extreme poor whose affordability and willingness to pay is extremely low owing to their socio-economic vulnerabilities that are further compounded by repeated climatic impacts. While GoB has and continues to benefit from donor aid, these development investments do not typically consider evolving climate change threats, and could be undermined by climate change impacts. While there have been government and donor initiatives aiming to provide solutions in relation to provision of drinking water and some elements of livelihoods, the impact of climate induced salinity and how it manifests to disrupt livelihoods and water security have not been considered in its full scope previously.
139. **Investing in the additional costs of switching to adaptive livelihoods and resilient water solutions to cope with climate-induced salinity:** Coastal communities have devised coping mechanisms and alternative productive options to deal with the adverse consequences of salinity risks including shifting to non-farm, meagre day labour and maladaptive practices. The intensity of cyclones as the result of climate change has left coastal communities with very little means to recover and secure safe water or livelihoods. The marginalized populations who are worst affected and eke out a subsistence-level livelihood clearly have insufficient resources to invest in addressing the incremental costs of adaptation to salinity risks. In spite of significant development investments by GoB and partners into drinking water security, coastal development, and livelihoods support, the slow- and sudden onset climate change impacts continued to jeopardize and wash away development gains. Therefore, investments are needed at scale to ensure climate-risks are taken into account in the planning and implementation of interventions to secure lives and livelihoods of the coastal communities. GCF resources will leverage GoB co-financing to jointly fund the costs of switching from currently, non-adaptive (or mal-adaptive) livelihoods to resilient livelihoods and climate-resilient drinking water solutions. Funding of these adaptation measures and long-term adaptive capacities for climate- risk informed planning and implementation will also ensure that underlying developmental investments are themselves safeguarded and not further undermined due to climate change.
140. **Crowding in public and private sector financing and mobilizing community-level investments:** GCF resources are critical in catalyzing household, community, government, and private sector engagement and investments to safeguard drinking water and livelihoods for the vulnerable coastal communities. By building awareness, technical and financial capacities and empowering communities, especially women as the 'change-agents', GCF resources remove the barriers for household and communities to switch to adaptive solutions. In view of the (i) non-climate drivers that exacerbate water and livelihood insecurity and (ii) the co-ownership and management of solutions the project entails, including for sustained impacts post-project, GCF resources will be complemented by new and additional co-financing leveraged from the Government of Bangladesh (see Section B.1 for the details on GoB contributions). Proposed project will also leverage co-investments from targeted HHs and communities towards drinking water and livelihoods. Based on the surveys and the studies conducted, beneficiaries are likely to phase in their own capital investments for livelihood assets and inputs as project implementation progresses (estimated at USD160 per year) and support in the O&M of established water supply

infrastructure through collective financial support (estimated at USD635,000 over the project duration), all as a result of the skills, assets, knowledge, and capacities developed through the implementation of the proposed project. GCF resources enable beneficiaries to leverage credit finance for expansion of activities owing to the technical support and access to finance linkages promoted through the project. Furthermore, establishment of PPIs and the capacity building across value-chains on climate risks and impacts enable private sector engagement for resilient livelihood support.

141. **Reaching the most vulnerable:** Coastal communities in the targeted districts are extremely vulnerable to climate change risks, especially rising salinity levels and intensified cyclones that severely impact their freshwater dependent lives and livelihoods through heightening drinking water insecurity and loss of agricultural productivity and livelihoods. Underlying socio-economic vulnerabilities are further compounded by the climate stresses and shocks leaving pushing these communities into deeper poverty and socio-economic and political marginalization. The climate-change induced salinity, combined with non-climatic drivers, is worsening the availability and quality of ground water resources thereby increasing the time and resource pressures on women and girls who are primarily responsible for securing drinking water for their households. Cyclonic impacts also destroy the water infrastructure and assets stressing the already limited resources of the poor households and communities. GCF resources will add value by targeting the small-scale farmers, fishers, and agri-labourers and supporting a switch to resilient livelihoods in light of projected climate-change induced salinity risks. They will also secure year-round, safe and reliable supply of drinking water in light of evolving climate change impacts on water supply and increase the health and safety of the households, especially women and girls.

## D.2. Exit Strategy

142. The proposed project was designed through consultation with government agencies, NGOs, Community Based Organisation (CBOs), donor and partner agencies, and local communities, particularly targeting women and marginalized populations. Findings from household surveys, focus group discussions, key informant interviews, transect walks and participatory rapid appraisals (PRA) were combined with secondary research and analysis of past and ongoing efforts, best practices and lessons learned to inform project design. Based on this analytical groundwork and the pathways to replication and scale established by this project, GoB aims to sustain and scale the project impacts under Phase II, targeting the remaining prioritized vulnerable coastal districts. (See discussion on Targeting, Section C.3).
143. In particular, the following elements of the project design encompass the Exit Strategy for the proposed project:
144. **Enterprise- and community-based climate-resilient livelihoods and value-chains:** Through the investments in assets, tools, knowledge and skills development, awareness of climate-risks and capacities to continuously monitor and adapt livelihoods, the project enables ownership, co-investment, enhanced income generation, and social empowerment of the vulnerable women and marginalized households. Moreover, the group-based livelihood and value-chain development support (through WLGs) promotes a peer-to-peer support system and cost-effective investments resulting from the economies of scale. Capacity building in understanding and assessing climate risks and undertaking social auditing of the livelihood interventions empower women to assess the results of the interventions and adapt their livelihoods. Supported by the institutional capacities (of WSCs, staff of LGIs, DWA, MoWCA) strengthened under each of the Outputs; and, particularly, the institutional framework for planning and coordination promoted under Output 3, these measures ensure long-term capacities among the beneficiaries for adaptive livelihood planning beyond the project lifetime.
145. **Participatory approaches and co-management of drinking water supply investments:** The project proposes the formulation of WUGs and WMCs to support participatory, adaptive planning for water access and distribution and O&M support that can be managed at the community level, backstopped by O&M support by DPHE. Participatory mapping, vetting, and siting of drinking water supply systems in consultation with the communities will promote buy-in, building on site-specific consultations undertaken during project design. Households will also contribute a nominal fee to ensure access to water and minor upkeep and maintenance of the water systems. WUGs, with support from WMCs, will be able to identify O&M and financing needs and plan for them for sustained operation of the systems. WUGs will be trained in water quality monitoring, simple O&M skills, and measures for end-point storage and quality control along with awareness of climate risks and climate and disaster risk reduction

strategies so that the benefits from safe and reliable water supply are evident and incentivize long-term community commitments in the face of climate change.

146. **GoB co-financing leveraged for ownership and sustained impact:** The project has leveraged USD8 million in cash co-financing from GoB to support investments in technologies and capacities for communities and institutions to safeguard livelihoods and water security of the targeted coastal communities. GoB resources will support skills transfer including business skills development, value-chain development and market linkages, and access to finance for the resilient livelihoods promote by the project. They will also support continued monitoring and implementation of adaptive livelihood strategies through participatory social auditing for the livelihoods. GoB co-financing will support implementation of resilient drinking water solutions, especially shouldering the cost of project and post-project O&M (USD4million commitment for post-project O&M), with contributions from the communities (see paragraph below). GoB co-financing, including USD1 million in kind, is also leveraged to support technical and coordination capacities of local, sub-national, and national level government institutions to ensure that project impact is sustained during and beyond the project lifetime (see Section B.1 for details on the activities co-financed by GoB resources).
147. **Project and post-project operations and maintenance.** O&M of the project established infrastructure will be undertaken through a community-centric tiered support system, with backstopping by GoB. In case of O&M of livelihood assets, beneficiaries will be fully responsible for maintaining tools and equipment provided by the project, with technical assistance from local support staff and BFRI (for aquaculture). Beneficiary investments are facilitated by enhanced income generation supported by the interventions as well as the support for access to finance. For the water supply infrastructure, the project establishes a three-tiered O&M system (see Activity 2.3) that involves a fee-contribution and training for WUGs on upkeep and maintenance and GoB co-financing for both the minor repairs through staffed technicians in each WMC and for major repairs/part or full system replacements during the project. Community and GoB financing will be fully responsible for post-project O&M, as also indicated in the O&M Commitment Letter issued by DPHE (see Annex IVb). This model of O&M and co-ownership and management will maximize the likelihood of continued operational and financial viability of project investments beyond the project implementation period. In addition, as GoB's main technical agency dealing with rural water supply and sanitation, DPHE has the mandate to provide DPHE has demonstrated a strong track record in working with several development partners to install rural water technologies having implemented around 1300 development projects since its inception and currently implementing several relevant drinking water and sanitation projects in rural Bangladesh. DPHE's presence (offices and technical staff) in each Upazila (sub-districts) and districts in Bangladesh including outreach staff at Union Level and the project support to further strengthen its capacities in addressing climate change-induced salinity impacts on drinking water supply for the coastal communities will enable sustained impact post-project.
148. **Sub-national and national Institutional capacity building for climate-risk informed implementation and management of livelihoods and water security:** Technical knowledge and capacities for implementation support among the local support staff (WSCs/WMCs/LGIs) are strengthened through training, along with communities, in Outputs 1 and 3 to ensure long-term viability of planned interventions. In addition, Output 3 of the project creates an enabling environment to sustain the community-centric, gender-responsive investments during the project and enable replication and scale of the impact beyond the project period. By building technical capacities of MoWCA on climate risks and livelihood scenarios and climate-risk informed implementation of livelihoods, the project ensures adaptive management of the project interventions for livelihoods. DPHE's capacity to innovate and implement resilient drinking water solutions and livelihoods, helps safeguard the project investments as climate risks evolve. This ensures that the project interventions do not remain short-term responses rather can be sustained and scaled beyond the project lifetime. ToT approaches to technical training further institutionalize these skills so as to build long-term, continued capacities across the agencies. Moreover, broadening the capacity building to include sub-national and national level government staff as well as partner NGOs creates synergistic approaches to support for coastal communities that can also ensure that impacts last beyond the project.

**149. Incentivizing private sector engagement:** The proposed project catalyses private sector engagement in the adoption and up-scaling of climate-resilient livelihoods and value-chains. Output 1 support to enterprise- and community-based livelihoods through initial upfront investments into assets and tools to switch to resilient livelihoods and skills development for financing and marketing facilitates economies of scale to attract private sector investment. Value-addition and value-chain linkages will crowd-in upstream and downstream value-chain and market actors (including for further investments in crab hatcheries, production and processing). Project facilitates public-private platforms (PPIs) at the Upazila level to broaden the market access and create linkages across value-chain actors to support the financial viability and sustained scale of alternative climate-resilient livelihoods. The collateral expansion of the WLGs, business skills, and value-chain development will also enable access to finance. The proposed project will also build awareness of the FIs in understanding climate risks and financing resilient livelihoods for long-term financial viability of project interventions. Private sector engagement is nascent in the provision of drinking water for the extreme poor communities. With the institution of a fee-based model and co-management of water supply systems, there is a potential to create community-based enterprises that would co-invest in capital costs and distribute water at a cost.

## E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

### E.1.1. Mitigation / adaptation impact potential

150. The project will contribute to following GCF Fund-Level Impacts for adaptation: (i) "increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions" through the promotion of climate-resilient, sustainable and diversified livelihoods for 25,425 women in targeted coastal districts (Fund-Level Impact A1.0) and (ii) "Increased resilience of health and well-being, and food and water security" for vulnerable coastal communities through provision of year-round, safe and reliable drinking water supply benefiting 136,110 people. (Fund-Level Impact A4.0).
151. Overall, the project will benefit 719,229 direct and indirect beneficiaries in vulnerable coastal districts of Khulna and Satkhira (about 16.25 per cent of the total population of the two districts) with 245,516 people directly benefiting from the project interventions in building resilience across water and livelihoods through household, community, government, and partner capacities. The interventions will provide indirect benefits to 473,713 people to the nearby communities in the targeted Wards and other unions in the 5 Upazilas through integration of climate change concerns into planning and implementation of the mandated agencies as well as the pathways established for replication to other communities through knowledge and learning mechanisms. Specifically:
  - 25,425 women will directly benefit from the interventions to switch to (or phase in) climate-resilient livelihoods with associated 500 people benefiting from capacity building and support to value-chain and market actors.
  - 245,516 people benefit from timely, gender-responsive early warning information and climate risk reduction strategies, facilitated through the women and girl volunteer groups established by the project at each of the targeted wards.
  - The project benefits 68,327 females and 67,783 males through year-round access to safe and reliable drinking water improving their health and safety, and significantly decreasing the unpaid time burden of women in regards of water collection and thereby creating opportunities for education and/or enhanced income generation.
  - 525 number of Government staff benefit from improved capacities for climate-risk informed planning and implementation of resilient solutions for water and livelihood security.
  - The project support to women groups for climate resilient livelihoods options in aquaculture and agriculture yields increased income benefits and enables participation in the formal economy, for a total expected increase in income of USD15 million (over the full life of the project). By providing an alternate higher quality source of water, salt intake by the population in the target communities will substantially decrease deaths and averting quality adjusted life years (the rainwater harvesting technologies have sufficient capacity to provide for basic drinking water needs even in times of low precipitation), for net benefits measuring USD4 million.
152. The project outcome will strengthen the adaptive capacity and reduce exposure of vulnerable coastal households, especially women, to climate change induced salinity risks and impacts on their freshwater-dependent lives and livelihoods through a switch to climate-resilient livelihoods for enhanced capacities of communities, focusing on women and those adolescent girls who are solely responsible for household income generation; gender-responsive access to year-round, safe and reliable climate-resilient drinking water solutions; and strengthened institutional capacities, knowledge, and learning for climate-resilient drinking water and livelihoods security. *The project directly benefits 245,516 women and men through use of gender-responsive livelihoods and water security strategies and activities to respond to climate change and variability.*

153. The project has significant impact positively by reducing the vulnerability of the targeted population whose agricultural livelihoods have been affected by declines in productivity and, in some cases, loss of livelihoods entirely (of agriculture, fisheries, and aquaculture) due to increasing climate-change induced salinity. By catalysing a switch to resilient livelihoods, resilient in the face of evolving climate risks, the project supports households, especially women, in adopting and scaling variety of livelihood strategies. Investments in assets, skills development, and capacities for awareness and continuous monitoring of the livelihoods create robust adaptation benefits yielding enhanced incomes and resulting in reduced vulnerabilities to climate change. Group- and community-based interventions across the resilient livelihood value-chains promote economies of scale and sustainability of the impact beyond the project. The project also invests in risk reduction strategies for the targeted communities by empowering women and girls to access and use EWs to safeguard their lives and livelihood assets. Women and girl volunteer groups, established per ward, will be capacitated to disseminate actionable, gender-responsive EWs, supported by participatory preparedness activities for the communities. Specifically, *245,516 people benefit from timely, gender-responsive early warning information. About 25,425 women directly benefit from adoption of diversified, climate- resilient livelihood options (including in fisheries, aquaculture, and agriculture).*
154. The project has significant impact on increasing the drinking water security of the extremely poor populations and enhancing their health and safety, especially for women and girls who are disproportionately affected by limited access to safe and reliable drinking water. The project invests in 13,308 household level RWHs, 228 community-scale RWHs, and 19 institutional-scale RWS, and 41 pond based solutions to support year-round supply of water (estimated 180 days). Gender-responsiveness, accessibility and social acceptance, projected demand and climate change risks have been taken into account to ensure that the solutions are inclusive, targeted, and viable in the long-term to safeguard drinking water security as climate risks evolve. The project builds the capacities of over 600 WUGs and LGI and DPHE staff to enhance community ownership and adaptive management of the drinking water solutions, with enabling support from local, sub-national, and national institutions, including on O&M, to ensure sustained impacts beyond the project lifetime. These climate-resilient solutions will benefit HHs, including those supported through adaptive livelihood investments and lacking existing drinking water coverage, with improved health, safety, and time and cost savings that can be invested in income generating or educational opportunities (particularly for women and girls). *The project benefits 68,327 females and 67,783 males with year-round access to reliable and safe drinking water.*
155. The project builds the technical capacities of MoWCA in assessing climate risks and adaptation scenarios for climate-risk informed coastal livelihood planning and integrating gender and climate change concerns across policies and programs for coastal development. An estimated 405 government staff will be trained to support climate risk and livelihood scenarios and tool-kit for design and implementation of livelihood interventions among the vulnerable districts of the Southwest coast. The project also invests in innovation and implementation capacities of DPHE through training on climate risks and drinking water needs and building technical capacities of the DPHE staff (R&D wing) for innovation and design of climate-resilient water solutions across the coast, in coordination with technical institutes. An estimated 120 DPHE staff would be trained to effectively support climate-risk informed management of sustained drinking water supply and security for coastal communities. Impact potential beyond the project is catalysed through investments in knowledge codification and dissemination; targeted learning to build adaptive capacities of young girls and boys; and monitoring and evaluation to promote evidence-based planning and implementation of solutions for coastal communities in the face of a changing climate. A 'Replication Roadmap' is developed to assist GoB in identifying needs and financing mechanisms to replicate and scale the project impact. *The project benefits 525 government staff (local, regional, and national) with capacities to implement gender-responsive, climate-resilient solutions for water security and livelihoods for coastal communities.*

## E.1.2. Key impact potential indicator

Provide specific numerical values for the indicators below.

		Annual	
--	--	--------	--

GCF core indicators	Expected tonnes of carbon dioxide equivalent (t CO <sub>2</sub> eq) to be reduced or avoided (Mitigation only)	Lifetime	
	<ul style="list-style-type: none"> <li>Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);</li> <li>Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)</li> </ul>	Total	<p>719,229 direct and indirect beneficiaries</p> <p>245,516 direct beneficiaries of which 50.2% are women</p> <p>473,713 indirect beneficiaries of which 50.2% are women</p>
		Percentage (%)	<p>About 16.25% of the total of the two District populations of which 50.2% women</p> <p>About .44% of the national population (162,951,560, in 2016) of which 50.2% are women</p>
Other relevant indicators	N/A		

**156. Direct Beneficiaries:** The calculation of beneficiary numbers are based on ward-level population statistics and needs-based identification of the beneficiaries for livelihoods and water. The total population of the two targeted districts (Khulna and Sathkira) is 4,427,662 people, of which 50.2% are female, a ratio that was used for all beneficiary calculations as outlined below. The total number of direct beneficiaries of the project include those households that were identified as being in need of support to shift towards alternative, resilient livelihoods, those receiving access to the climate-resilient drinking water supply, as well as people reached through the EWS in the targeted wards. The following table provides an overview of the beneficiary figures for all relevant outputs and activities with key calculations and assumptions. A snapshot of the calculations by ward is shown in Table 3 below. The full table for the 101 wards is provided in Annex XIII(h).

**Table 2: Methodology for beneficiary calculations**

	Methodology/Calculations	Target	Male	Female	Assumptions/References
<b>Output 1:</b> Livelihood interventions (Activity 1.1)	<ul style="list-style-type: none"> <li>The target is based on identifying the number of agricultural/aquacultural HHs for each of the 101 wards.</li> <li>The distribution of women and households currently engaged in non-adaptive livelihoods, e.g. fisheries, agriculture, agriculture day</li> </ul>	25,425	0	25,425	<ul style="list-style-type: none"> <li>Female ratio of 50.2% applied, based on census data and PRA process.</li> <li>An average of 4.4 people per HH used.</li> </ul>

	<p>labourers ranged between 15-70 per cent of the entire ward population.</p> <ul style="list-style-type: none"> <li>• The highest distribution was used as the percentage to be targeted for that particular ward.</li> <li>• Using this percentage figure on each of the ward populations, combined with the portfolio of livelihoods to be supported, the populations were grouped as Women Livelihood Groups</li> <li>• With this method, around 1017 groups were identified, with 25 women per group yielding 1017*25 – 15,425 women.</li> </ul>				
<p><b>Output 1:</b> Early Warning Systems (Activity 1.3)</p>	<ul style="list-style-type: none"> <li>• The CPP program has established a Union level EWs volunteer group, comprised of 3 males from each ward, which functions as the early warning dissemination arm of the Disaster Management Committee (DMC).</li> <li>• The volunteer groups of the three members lead sub-groups such as the Shelter Group, Search and Rescue Group, and Warning Dissemination.</li> <li>• The proposed project strengthens both the content and gender responsiveness of the EWs by establishing women and girl volunteer groups (one per ward, 15 members per group).</li> <li>• Therefore, the total beneficiary numbers of the last-mile Early Warnings (EWs)</li> </ul>	245,516	122,267	123,249	<ul style="list-style-type: none"> <li>• The population of the entire 101 wards is 245,516, based on census data.</li> <li>• Female ratio of 50.2% applied, based on census data and PRA process.</li> <li>• Through training, equipment, and participatory preparedness exercises, the project ensures that 100 per cent of the targeted wards are reached by timely, actionable, and gender-responsive EWs.</li> </ul>

	through women and girl volunteer groups is estimated to reach the entire ward population of the 101 selected wards of 245,516 people.				
<b>Output 2:</b> Water Interventions	<ul style="list-style-type: none"> <li>The first step for calculating the number of target direct beneficiaries for water supply interventions was to subtract the baseline coverage of year-round, non-saline drinking water supply from the number of households in the ward to determine the water supply gap. A total of 57,737 people were identified to already have a secure year-round, non-saline water supply in the 101 targeted wards.</li> <li>The second step was to identify the gap in coverage based on two key initiatives: USAID/WV supported Nobo Jatra program and the O'Harizan initiative.</li> <li>Based on coverage by other efforts; the wards were divided into: i) Zone 1(Paikghacha and Assassuni upazilas), where there is no overlap with other efforts (ii) Zone 2 (Dacope, Shyamnagar, and Koyra upazilas), where 50 per cent of the water supply gap in these upazila will be covered by Nobo Jatra and O'Harizan projects.</li> <li>Based on this, in Zone 1 Upazailas, 100% of each of the wards and in Zone 2, 50% of each of the ward populations</li> </ul>	136,110	67,783	68,327	<ul style="list-style-type: none"> <li>An estimated 61% people have access to some quality water sources (but not year round), and only 23% of the people have access to year round quality drinking water. (Source, BBS 2011, DPHE 2016 and PRA survey 2017). This leads to the baseline coverage.</li> <li>An average of 4.4 people per HH used.</li> <li>Female ratio of 50.2% applied, based on census data and PRA process.</li> </ul>

	(minus the baseline populations) was targeted.				
	<ul style="list-style-type: none"> <li>The target populations for each of the 101 wards in shown in Table in Annex XIII(h)</li> </ul>				
<b>Output 3: Capacity Development</b>	<ul style="list-style-type: none"> <li>405 number of MoWCA/DWA and 120 number of DPHE staff would have undergone both initial and refresher trainings and engaged in the planning, monitoring, and implementation of the livelihoods and water solutions.</li> </ul>	525	368	157	<ul style="list-style-type: none"> <li>Female ratio of 30% applied, based existing staffing ratios.</li> </ul>
<b>TOTAL Direct Beneficiaries</b>	<ul style="list-style-type: none"> <li>The total direct beneficiaries is the aggregate of the 3 Outputs, avoiding duplication.</li> <li>Since the EWs interventions (Output 1, Activity 1.3) cover the entire population, this number is used as the total, with each output functioning as a sub-set of this figure.</li> </ul>	<b>245,516</b>	<b>122,267</b>	<b>123,249</b>	<ul style="list-style-type: none"> <li>An average of 4.4 people per HH used.</li> <li>Female ratio of 50.2% applied, based on census data and PRA process.</li> </ul>

**Table 3: Snapshot of table showing calculations for water, livelihoods, aggregate, and overlap. (Full table with targeted % for all 101 wards in Annex XIII(h))**

Upazila	Union	Selected Wards	HH in targeted Wards	Baseline water coverage	HHs with non-sustainable water access	% targeted HHs for water	Final targeted HHs for water	% targeted HHs for livelihoods	Targeted HHs for livelihoods	Nr of targeted Women livelihood groups	Highest of livelihoods and Water chosen to identify aggregate	TOTAL TARGETED HHs for water and livelihoods	Intensity - to assess overlap - based on lower % of water and livelihoods	HHs benefiting from BOTH livelihoods and water
Shyamnagar	Atulia	Ward-4	829	125	704	50%	352	67%	555	22	67%	555.43	50%	415
		Ward-5	550	45	505	50%	253	25%	138	6	50%	275	25%	138
		Ward-7	356	167	189	50%	95	60%	214	9	60%	213.6	50%	178
		Ward-8	650	114	536	50%	268	70%	455	18	70%	455	50%	325

**Note:** To assess the intensity of interventions that benefit populations with both livelihood and drinking water interventions, a conservative approach was chosen to identify the overlap between Output 1 and 2. In the wards from Zone 2 for water provision, where 50 per cent of the ward (minus the baseline) is targeted for water supply, the lower of the livelihoods and water % is selected to estimate HHs benefiting from both. In the wards under Zone 1, where drinking water is provided for 100% of the ward (minus the baseline), the distribution percentage for livelihood support was selected to reflect the overlap, with the assumption that those targeted with livelihoods would also be benefiting from water provision. With this methodology, we arrive at about 107,570 benefiting from both livelihood and water interventions.

157. **Indirect beneficiaries:** The indirect beneficiary number is comprised of:

- water users- including the existing baseline population with functioning water supply as the quality and quantity of their water supply could be improved (depending on water source, for example saline intrusion into groundwater could decrease when the extraction rate decreases). The baseline for the existing safe drinking water supply is based on the people supplied by non-saline drinking water sources (e.g. deep tube wells rather than shallow tube wells) that provide year-round access of at least 2 LCPD drinking water to recipients. The baseline does not include water sources that are being used but are saline. Current baseline is 13,122 households ( $13,122 * 4.4 = 57,737$ ) in the target wards out of a total of 56,298 households as measured through the PRA process. This is equivalent to 23 per cent of the households in the target wards.
- EWs beneficiaries – which include 80 per cent of the remaining population of the non-targeted wards of the targeted 39 unions as the project builds capacities of the Union level DMCs to support last-mile dissemination of EWs to the remaining wards. Through learning exchange and advocacy, the CPP volunteer groups will be capacitated to build on the gender-responsive, actionable EWs promoted under the targeted wards of the targeted unions. The effectiveness of the EWs is expected to improve for the 80 per cent estimated to be receiving EWs. Therefore, the beneficiaries of EWs are estimated at 719,229 people (including direct beneficiaries).

158. In aggregate, the indirect number of beneficiaries is, 473,713, which is the total number of EWs beneficiaries minus the direct number of beneficiaries. ( $719,229 - 245,516 = 473,713$ ).

## E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

### E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

159. The paradigm shift for the project is to move away from focus on short-term responses and technology-led interventions towards community-centric solutions that build ownership and capacities for sustainable, long-term adaptive responses to safeguard water security and livelihoods. Awareness, enhanced livelihood asset base, skills building, value-chain and market linkages will promote a transformational switch from current, non-adaptive livelihoods to climate-resilient livelihoods that can, in turn, reduce the vulnerabilities of the extreme poor against future climate change risks. Climate-resilient water technologies provide the communities with a means to shift away from their dependence on ground-water to surface water systems that can address seasonal variability and cope with slow- and sudden-onset changes. Institutional capacities, knowledge, and learning builds capacities across a variety of stakeholders for evidence-based implementation of adaptive solutions and creates an enabling environment to support communities, particularly, women as 'change-agents' for climate action. The Theory of Change for the project is presented in Section C.1.
160. The proposed project integrates sustainability strategies and pathways for replication and scale to catalyse impacts beyond the project lifetime. GoB aims to build on this project to replicate and scale resilient livelihoods and drinking water solutions to the other vulnerable coastal districts prioritized for Phase II. (See discussion on Targeting, Section C.3). In particular, the following activities advance the potential for transformative impact beyond the project:

- Supporting diversification to climate-resilient livelihoods through formation of Women Livelihood Groups (WLGs) and linkages across value-chain actors promotes community-based enterprises, economies of scale, and an adaptation market place for resilient technologies, products, and services (Activities 1.1 and 1.2). Investments in capacities for income generation and collateral building can support scale-up of the livelihoods through micro-credit and other inclusive finance mechanisms. The project spurs access to finance linkages to promote graduation of the supported livelihoods away from grant financing to enable further scale.
- The ToT and peer-to-peer learning approaches for promotion of resilient technologies, business development, and livelihood management skills as well as establishment of PPIs at the Union level can support replication of adaptive livelihood approaches to rest of the wards across the targeted Unions. Development of MoWCA and LGI capacities (including Women Standing Committees) for climate-risk informed implementation and management of resilient coastal livelihoods can enable replication of the livelihood interventions, through improved service provision and crowding in external financing, to other districts, building on the codified climate risk and livelihood scenarios and the implementation took-kit (Activity 3.1). (Multiple is 25 – project reaches about 100,000 people with livelihood benefits - about 250,000 additional people can be reached as the agricultural populations across the non-targeted wards in the targeted Unions; times an additional 10 unions across the targeted districts).
- The establishment of women and girl volunteer groups at the ward level enables last-mile dissemination of EWs for enhanced resilience of supported livelihoods and water interventions to climate-change induced disasters. By training and promoting learning exchange for the Union level DMCs and CPP volunteer groups as well as advocacy with relevant NGOs and MoDMR (Activity 1.3), the project enables replication of the women and girls volunteer mechanisms to other wards of the targeted Unions as well as non-targeted unions of the two districts. (Multiple is about 4 – project reaches about 250,000 people directly with EWs; another 650,000 can be reached across targeted Unions; and there are 10 additional non-targeted Unions of the targeted districts with 240,000 population).
- Community-centred investments in resilient drinking water technologies, co-managed by WUGs and WMCs at the Ward levels, have the potential to be replicated to other communities across the non-targeted wards of the 39 Unions as Output 2 strengthens the capacities of HHs, communities, and local support staff in adaptive water supply management, operation and maintenance, and climate and disaster risk management to safeguard drinking water. Moreover, the project invests in DPHE's national and sub-national technical capacities on climate risks and drinking water impacts, design of resilient technical solutions (connecting with engineering institutes), and community-centric management of drinking water solutions (Activities 2.3 and 3.2). Through climate-risk informed service provision and enhanced technical support, DPHE would be able to replicate the project interventions to other communities, building on the community-centric planning and O&M approaches promoted by the project. It will also be able to better coordinate investments and ensure climate-risks are incorporated in the planned water supply investments the coast. (Multiple is 30 – project reaches about 130000 people with water; assuming 50 per cent coverage for non-targeted wards, impact can be replicated to about 300,000 people; another 100,000 people in the 10 non-targeted unions; times 10 for coverage across the additional 10 districts across the coast vulnerable to climate change).
- The pathways to knowledge and learning promoted in Activity 3.3, including through codification of knowledge generated and its dissemination through integration into a web-portal (hosted by MoWCA), institutional platforms, and research and academic institutes; learning for long-term adaptive capacities of youth; and impact evaluation enable transformative impact beyond the project.

161. Building on the analytical groundwork and knowledge established by the project, the project supports the development of a 'Replication Roadmap' to assist GoB in identifying key needs and sustainable financing mechanisms. In coordination with other ministries, donors, private sector, and multi-lateral partners, the project will support further replication and scale of climate-resilient livelihoods and drinking water solutions across the coastal communities facing climate-change induced salinity impacts on their freshwater resources. Overall, the project contributions can be replicated and scaled to 250 wards and 10 unions, and across 10 additional vulnerable districts of the southwest coast (with an aggregate multiple of 30 – based on wards and unions population data and number of districts) to promote climate-resilient development of Bangladesh.

### E.2.2. Potential for knowledge and learning

162. The project enhances institutional capacities, knowledge, and learning to support GoB in increasing the resilience of its coastal communities to evolving climate risks through gender-responsive, community-centric approaches. Output 3 of the project codifies knowledge related to climate-risks and scenarios for livelihoods and water, technological solutions and implementation tools, and training modules for livelihood and water security (generated under Activities 3.1 and 3.2). It also codifies best practices, lessons learned, and an evidence-base generated by the community-centric interventions, focused on women, under Outputs 1 and 2. A web-portal, co-hosted by MoWCA and potential partners, would support wide reach of the knowledge and learning facilitated by the project. Integration of customized modules for government, academic and research institutes into their respective platforms will advance multi-stakeholder capacities for continued adaptation responses in the face of a changing climate. MoWCA's capacity for institutional coordination would also be enhanced to support integration of gender and climate change, in coordination with Minister of Environment and Forest (MoEF), into cross-sectoral policies, plans, and investments. ToT approaches will be implemented to institutionalize knowledge and technical skills across MoWCA, DWA, DPHE and LGIs, with support from Department of Environment (the technical agency deals with scientific part of the Climate Change in Bangladesh).
163. The project promotes peer-to-peer learning among communities to invest in adaptation solutions and risk reduction strategies by enhancing knowledge, awareness, and capacities of WLGs, value-chain actors, WUGs, LGIs and volunteer teams for dissemination of EWs. PPIs serve as a knowledge exchange and learning platforms to support scale up climate-resilient livelihoods and catalyse private sector engagement. The interventions under Outputs 1 and 2 will be supplemented with a targeted 'Adaptive Learning Plan' (under Output 3) for young boys and girls that is envisioned to create transformative change for future communities. This would include awareness on climate risks and impacts, learning on adaptation scenarios and best-practices, and behavioural change focused on secure lives and livelihoods in a changing climate. Learning will be augmented by providing insights from ongoing project activities, with a focus on collecting and using data in a rigorous manner. The project will also promote evidence-based learning through the establishment of longitudinal impact monitoring mechanisms for gathering valuable data and lessons to inform implementation of climate-resilient interventions for secure water and livelihoods. An impact evaluation (quasi-experimental) will be designed and executed to quantify project impacts under Outputs 1 and 2, as well as the 'Adaptive Learning' activities under Output 3.
164. Finally, the gender-responsive approaches to adaptation solutions and knowledge generated will be a significant asset for Bangladesh as well as to other south Asian countries. The knowledge and learning mechanisms can promote the project as replicable model for gender and climate change adaptation action in least developed

### E.2.3. Contribution to the creation of an enabling environment

165. Enabling effective and sustained participation of private and public-sector actors: The project invests in communities, especially women, as 'change-agents' to ensure ownership and sustained engagement. WUGs are capacitated to invest in livelihoods, after an initial period of capital cost support, and their scale-up through group-based skills support and development. Engagement and technical support for value-chain actors and networking linkages for market and financial access also incentivize community-based enterprise development and markets for alternative, climate-resilient livelihoods. The project will crowd-in private sector investment into value-addition facilities such as crab hatcheries with project financing easing the barriers for investment and enhancing the productive capacity of women groups. Supported by PPIs (comprised of WUGs, Value-chain actors, LGIs, MoWCA) at the Upazila level, this will leverage sustained private sector participation across market actors and FIs. The project also enables community buy-in and ownership of the drinking water supply investments under Output 2. By participatory mapping and formulation of WUGs and WMCs, the project creates community-centric structures that institutionalize drinking water solutions beyond a HH-level intervention. Improving the technical capacity and knowledge of the communities, especially the women groups, in adaptive water distribution planning, O&M of water solutions, and climate risk reduction strategies will ensure their sustained engagement.

A fee-based model for access to and O&M of the drinking water solutions will be sustained underpinned by these capacities and secured impact of drinking water security for these communities, potentially creating the environment for nascent enterprise-based models for drinking water provision. Furthermore, the strengthened institutional capacities among government, including local extension staff (WSCs, Watsan standing committees (WatSCs), LGIs) and sub-national and national MoWCA and DPHE staff (such as ToT based technical training for planning and operations, knowledge and skills related to climate risk management, implementation tools, and capacities for O&M of water and livelihood solutions) enables sustained engagement of public sector institutions. GCF resources also leverage GoB co-financing for sustained commitment to secure water and livelihoods for the coastal communities during and beyond the project.

#### Innovation, market development, and transformation

166. Resilient adaptation technologies, such as aqua-geoaponics and hydroponics, will be introduced and up-scaled along with innovative, sustainable practices in crab farming, sesame, etc. Women producer groups (WLGs) will engender economies of scale and consequent value-addition and financing to promote market development. Project investments in climate-resilient livelihood assets; technical, financial and business skills of communities; and community and government capacities for climate-risk informed livelihood planning and implementation will facilitate transformative impact to secure coastal livelihoods. The targeted markets of vegetable, plants, and crab (see Section C.5.) were identified as having a substantive development potential due to sustained local and national demand for vegetables, and increasing demand for sesame and crabs in international markets. GoB identified crab production as a feasible, climate-resilient and environmentally friendly sector that is transformative in its potential to provide coastal communities sustained livelihood options in the light of increasing climate-induced salinization processes. The project also up-scales innovative platforms (PPIs) for private sector engagement, based on best practices, across resilient livelihood value-chains. PPIs will help spur market development through the facilitation of skills and knowledge exchange as well as linking producers to market actors and investors. The skills and collateral building among the WLGs and value-chain actors will enable access to finance further advancing scale and market expansion.
167. The project also supports scaling up resilient drinking water solutions (including innovative RWH and pond-based storage and filtration systems) introducing an innovative approach for community-based planning and management of water supply for year-round access to safe and reliable drinking water. The three-tiered O&M system, complimented by the fee-based model for access to drinking water, allows community ownership while easing the burden of major costs through government support and financial commitment. Project investments in DPHE's capacity for innovation, design and implementation of resilient drinking water solutions for the southwest coast will also enable a transformative shift away from ground water dependence to secure drinking water for the vulnerable coastal communities.
168. GCF resources – combined with GoB co-financing – will be used to catalyse a switch from currently, non-adaptive livelihoods to diversified, climate-resilient livelihoods and a shift away from worsening ground water resources to resilient surface water solutions for enhanced drinking water security. The transformative impact is achieved through the inter-related support provided by the project to empower communities, focusing on women, in securing drinking water and agricultural livelihoods disrupted by climate-change induced salinity.

#### E.2.4. Contribution to regulatory framework and policies

169. The project specifically supports the implementation of adaptation priorities identified in the National Adaptation Programme of Action (NAPA) and the NDC with focus on agricultural and water resources. It also contributes to the climate investment framework under Bangladesh Climate Change Strategy and Action Plan (BCCSAP) and supports integration of climate change into development, focusing on the poor and vulnerable. With the focus on gender-responsiveness, the project also contributed to the commitments under Climate Change and Gender Action Plan (ccGAP) to ensure gender equality in climate change relates policies and programs. Particularly, the interventions under Output 3 promote climate-responsive planning through the development of climate scenarios and modelling for coastal livelihoods and drinking water security, adaptive livelihood planning tool-kits, and climate-risk incorporated master plan for drinking water supply for the Southwest coast. Innovation capacities are strengthened for GoB to invest in resilient livelihoods and drinking water solutions beyond the project lifetime and target areas.
170. This project also contributes to national policies including the Sixth Five Year Plan (SFYP) of GOB which articulate the country's commitment to addressing climate change and equitable development, and the forthcoming Seventh Five Year Plan (2016-20)<sup>61</sup> which puts emphasis on "Accelerating Growth, Empowering Every Citizen". The draft plan recognizes that poor people's choices are extremely limited because of lack of assets and income, and that the priority objective of 7th Plan is to reduce poverty. Strategic goals include employment generation, skills development, and reducing vulnerability. The project also contributes to the sectoral policy priorities of the National Water Policy, 1999, which called for institutional changes in enhancing the role of women in water management. The project particularly advances the rights of women as enshrined in the Constitution of Bangladesh and supported under a number of policies and sectoral strategies.
171. Recognizing the adverse impacts of climate change induced salinization on coastal biodiversity and the increasing pressure of scaling up climate resilient aquaculture interventions in the target districts, the project will also invest in improving environmental management of clustered small-scale aquaculture interventions in mud crab farming, particularly in regards to effluent management and bioremediation, through the development of an appropriate code of practice. Furthermore, recognizing the essential role of mangrove integrity for the climate change resilience of target communities in terms of weathering SLR, storm surges and cyclones, additional capacity building and support will be aimed towards enforcement of existing regulations prohibiting aquaculture pond expansion, fuel wood collection from mangrove areas, and other livelihoods activities within the Sundarbans Protected Forest, with appropriate support at the community and institutional levels, which will be included in the aforementioned code of practice. The project will similarly address the unsustainable dependence on wild crab stock required to expand crab farming activities and hence will also develop the GoB expertise and capacity in producing hatchery stock, while supporting a code of practice which reduces, and eventually eliminates, the practice of collecting of wild fry from mangrove areas. Finally, the project will address the issue of by-catch use for aquaculture feeds by also supporting the development of a code of practice which reduces the pressure on marine fish stocks, by developing plan-based aquaculture feeds. Institutional capacity and policy/regulatory support in in regards to managing wild stocks, appropriate aquaculture effluent management from farms and hatcheries, water quality monitoring and biosafety protocols, and sustainable feed supply will be essential in ensuring the sustainability of climate-resilient livelihoods over the coming years.
172. Overall the project also contributes to the implementation of identified priorities such as agricultural and water sector resilience, coastal resilience, and reduced vulnerabilities of the poor, focusing on women and marginalized groups. Development of GoB capacities (MoWCA, DWA, DPHE, LGIs) in planning for and managing climate-risks on freshwater resources and coastal lives also drives in public and private sector investment into livelihoods and drinking water supply through the support to PPIs for climate-resilient livelihoods, O&M investments, and

<sup>61</sup> Presentation by Prof Shamsul Alam, Member, General Economics Division, 9 July 2015

### E.3. Sustainable Development Potential

#### Wider benefits and priorities

##### E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

#### Environmental co-benefits

173. Maladaptive livelihoods, in particular, the poorly regulated large-scale switch to shrimp farming in the coastal districts of Bangladesh has had serious impacts on mangrove integrity, and has further exacerbated the salinization of soil. The environmentally sustainable adaptation measures financed by GCF will have the added benefit of changing baseline practices for the better. Recognizing that these development pathways in response to changing environmental conditions must be regulated and controlled to maintain ecosystem integrity, the project takes a proactive approach to shifting livelihood strategies while also building community and institutional capacity in sustainable agricultural and aquaculture practices. The crab-farming livelihoods will make use of existing shrimp farms, modified according to international best practice in aquaculture to control for salinity seepage, while building the capacity of local government institutions to control unregulated expansion of farms. The introduction of plant-based improved feed, and research into Integrated Multi-trophic Systems (IMS) where a polyculture system of crab farmed with aquatic weeds to uptake waste, will be used for improved management of effluents. The project therefore presents an opportunity to improve the environmental management of small-scale clustered aquaculture interventions in terms of using sustainable polyculture systems, siting farms to minimize impact, effluent and water quality management, salinity seepage, fish/crab feed quality and sustainability and biosafety protocols, which currently present significant challenges in the coastal districts. The ensemble of these techniques will provide a significant opportunity to improve environmental management of small-scale aquaculture at the local and national levels.
174. Current small-scale traditional methods of crab aquaculture depend on wild stocks of crab fry for profitability and sustainability, and these resources have already been greatly depleted. The indiscriminate collection of crab fry from mangroves has serious impacts on biodiversity and can lead to human wildlife conflicts in the Sundarbans Protected Forest, threatening species of critical importance, such as the Bengal Tiger. Reliance on the mangrove for wild fry also encourages mangrove deterioration through unregulated aquaculture expansion and use of mangrove trees for fuel wood. In order to promote a switch from the current dependence on wild crab stock, the project has included the infrastructure for crab hatcheries, which will produce all of the fry necessary to support crab farming livelihoods supported by the project. The hatcheries will also be among the first commercial scale hatcheries in Bangladesh and will provide the foundation for scale-up to eliminate reliance on wild stocks in the long-term. The climate-resilient livelihoods support at the community level will include appropriate environmental awareness and environmental protection measures at the implementation level for beneficiaries, as well as build institutional capacity in environmental management of small-scale aquaculture, and mangrove conservation regulation and enforcement, and the switch to hatchery stock through the development of appropriate codes of practice. Finally, the promotion of aqua geaponics systems and hydroponics systems, and the use of low input cultivation of homestead gardens, plantations and sesame, will also have significant environmental benefits and will include training in sustainable cultivation techniques and integrated pest control to reduce community reliance on pesticides and fertilizers.
175. In regards to the water provision interventions, RWH systems have been selected based on their appropriateness for the local context, both environmentally and socially, and promoting their use in the coastal districts of Bangladesh, will have significant and transformative environmental benefits, given that it will help to shift communities away from over-extracted and contaminated ground water resources to surface water solutions. Since the primary source of drinking water currently within the target districts is groundwater extraction, and although there is insufficient information on the quality and quantity of groundwater aquifers, current research indicates that groundwater aquifers are becoming increasingly saline, and unsuitable for potable water use. As such, the use of purification technologies such as reverse osmosis and desalination would be required to provide good quality drinking water. However, these types of water treatment solutions have significant economic, environmental and social costs, due to very high energy demands and operating costs, and further risk polluting groundwater aquifers (from brine discharge). Therefore, among the alternatives considered, the proposed solution with GCF financing is for RWH systems, which will be transformative in reducing this reliance. As

highlighted above, the proposed RWH solution at the institutional, community and household levels and pond-based solutions, is a win-win-win economically, environmentally and socially, and has community buy-in (including willingness to pay for the O&M costs). These solutions are transformative for Bangladesh that has previously relied only upon small (2,000 litre) rainwater harvesting tanks, and extraction of contaminated and increasingly scarce ground water. The Environmental and Social Risk assessment has taken the range of risks associated with both the water provision and livelihood interventions into account, and the Environmental and Social Management Framework has been developed for this project, to both avoid and mitigate these risks, promote enabling regulation and policy, and build capacity to enhance the environmental benefits of the project.

**Social and gender co-benefits:**

176. The project has been structured to focus mainly on women and adolescent girls with all project activities addressing gendered climate resilience from the community level up to the institutional level. The interventions not only address immediate barriers to women's resilience and unequal access to resources and climate resilient livelihood options for extreme poor women and adolescent girls, but also take a multi-dimensional approach by addressing additional institutional constraints, knowledge gaps and capacities. Investing in better access to water, not only aims to address women and girls' burden of unpaid work, and the disproportionate impacts on the health of women and girls in the face of salinity ingress and extreme weather events, but developing mechanisms for women's community management of essential resources and livelihood assets, aims to transform the role of women in their communities, at the intra-household level and at the community level. These interventions will thus be gender-transformative in changing women's role in water management and climate-resilient livelihoods, but also transforming the norms within communities around women and girl's agency, mobility, and productivity. Livelihood interventions have been designed to not only recognize women's central importance in ensuring household nutritional security, but also their growing role in aquaculture value chains, drawing on lessons learned from similar interventions to address barriers and challenges. The project will be careful to target only those adolescent girls as direct beneficiaries that have been married early and are solely responsible for household income, so as not to create an incentive for adolescent girls to pursue secondary education. The central importance of livelihood diversification and the adaptive capacity of the livelihoods options supported in the target districts, has also been refined by applying a barriers and opportunities analysis with a gender lens, and aims to strike a balance between interventions which account for women's preferences and existing social constraints due to cultural norms and beliefs, while providing transformative opportunities for women to more meaningfully and fully participate in climate resilient value chains. Although men and adolescent boys are not part of the principle beneficiaries' for the livelihoods support, the project recognizes, and has put emphasis on gender relations at the household and community levels, with interventions and trainings designed to change norms around women's mobility and the shifting community perceptions around 'appropriate' work for women, and will take a continuous learning approach to challenges encountered and lessons learned through gender sensitive project evaluations. The interventions aim to challenge the beliefs and norms which contribute to women and girls' marginalization and hence disproportionate vulnerability to climate shocks. The project aims not only at empowering women and adolescent girls through the proposed interventions, that will increase women's agency, voice in and decision-making capacity within their households and communities, but also to support ministries of the GoB to breach the silos in which they operate to develop more gender responsive approaches to both DRR and resource use.
177. Since, the climate resilient livelihoods intervention targets women by forming Women's Livelihood Groups, we can expect increases in women's autonomy and empowerment. By engaging in climate resilient livelihoods activities, women will generate their own stream of income. With an increase in autonomy and income, it is very likely that they will allocate a greater portion of their budgets for education and health consumption for their households. Furthermore, increases of autonomy and income for women within households will provide a positive example for adolescent girls within those households to do the same. Moreover, as women and girls become more empowered members of their communities they will be in a position to demand community level improvements of infrastructure and institutions to better serve their needs, which can be seen as a way to increase adaptive capacity of those communities. This support also strengthens the value chains that the trained women's groups will utilize to sell their products. Not only will directly trained women benefit from a strengthened

value chain but other entrepreneurs and producers may benefit too. A strengthened value chain may see positive spill-overs.

178. The project interventions will help to transform existing gender norms around women's capacity to manage resources such as drinking water, as well to work in certain roles within the fisheries value chain. In Bangladesh, there is also a pressing need to address underlying gender norms and constraints, which contribute to women's vulnerability, as well as help to ensure that women have the basic assets, training and decision-making power to better face the increasing risks of climate change. Importantly, the development of the rainwater harvesting tanks will provide free safe drinking water to not only extremely poor and vulnerable people but to the broader population. This will lessen the impact on local areas through reduced public health impacts such as sickness from drinking unsafe water and the disproportionate impacts on women, such as hypertension. This will result in an increase in productivity through a reduction in illness-related downtime.
179. Improving drinking water quality will result in improved health benefits for the coastal communities of the targeted districts. Currently, the vast majority of people in the target communities rely on saline water for drinking and this salinity problem will be exacerbated as the climate changes (seawater intrusion into groundwater aquifers and surface inundation). High salt intake is associated with hypertension and cardiovascular disease, which is the leading cause of death globally <sup>62</sup>. Moreover, there is complementarity between simultaneously improving livelihoods resilience and the resilience of drinking water supply. As the time dedicated to collecting and cleaning water by women is reduced, the amount of time they can dedicate to participation in the formal economy will increase through climate resilient livelihood options.

### Economic co-benefits:

180. The economic co-benefits of the project include increased income benefits, increased assets, job and enterprise creation, and benefits of enhanced productivity from improved health. The project support to 1017 women's groups (25,425 women) for climate resilient livelihoods options in aquaculture and agriculture yields increased income benefits and enables participation in the formal economy, for a total expected increase in income of \$15 million (over the full life of the project). Project support increases the economic assets of the women and their households and spurs enterprise-development in the communities. The support to value-chain and market development creates income enhancing opportunities for upstream and downstream market actors and provides opportunities for job creation across the value-chains. Investments in drinking water supply also contribute to community-managed asset creation, jobs (such as caretakers for O&M), increases opportunities for private sector engagement in drinking water provision, and improves the overall health and resilience of the beneficiary communities. The health benefits are estimated at \$4 million over the project lifetime.
181. The project also yields indirect economic co-benefits at the macro-level derived by the contribution to livelihood, food security and self-sufficiency in the production of fish, shrimp and crab along with agricultural outputs, potentially saving on imports. Shifting women's livelihoods to climate resilient options will reduce the likelihood of the need for social protection and social safety net pay outs. Provision of safe drinking water will reduce the potential costs of water-related illness, both for the household, and the country's health system. High salinity in drinking water leads to increased cardiovascular disease incidence and intensity. This places a distinct financial burden on Bangladesh's health system. By improving drinking water quality through rainwater harvesting systems, the incidence and intensity of cardiovascular disease in the targeted populations will decrease thus reducing the burden on the health system, freeing up government resources for other priority areas. Overall, the livelihoods and drinking water interventions will improve the socio-economic status of the coastal communities and contribute to the local economies and long-term climate-resilient development of the country.

## E.4. Needs of the Recipient

<sup>62</sup> World Health Organization. Global status report on non-communicable diseases 2010. Geneva: WHO; 2011.

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

182. An estimated 2.5 million poor people live along the southwest of Bangladesh, already suffering from shortage of drinking water, scarcity of water for agriculture, and significant changes occurring in the coastal aquatic ecosystems. Slow- and sudden-onset climate change impacts including SLR and intensified cyclonic events are further compounding the vulnerabilities of the coastal poor. IPCC reports estimate that by 2050, another 27 million people living in the coastal areas will be at risk from SLR. The coastal zone experiences devastating tropical cyclones originating in the Bay of Bengal and during 1961-2013, 61 cyclones hit Bangladesh of which 28 per cent hit the southwest coast. Every three years a severe cyclone strikes the area and causes havoc in the lives and livelihoods of people living by the coast. In 2007, the tropical cyclone Sidr caused a financial loss of USD1.7 billion according to an estimate by GoB (2008). Combined with projected SLR, the country is expected to face intensified cyclones and higher tidal surges that could potentially inundate an additional 15 per cent of the coastal area by 2050, exposing and additional 9.7 million people (compared to 3.5 million in the no climate change scenario) to severe inundation.
183. Climate change-induced saltwater intrusion is compounding the non-climatic drivers for deterioration of freshwater resources causing a significant shift in coastal livelihoods and exacerbating drinking water insecurity. Worsened by cyclones and flooding and rainfall variability, communities have experienced direct damage of crops, decreasing fresh water fish stocks, and income loss, which leads to an increased vulnerability. Crop losses due to SLR-induced salinity intrusion have been estimated to be approximately 200,000 metric tonnes<sup>63</sup> with salinity (+5 ppt) of irrigation water expected to lead to reduced farm productivity by up to 50 per cent<sup>64</sup>. Tidal surge inundation is estimated to cause an additional loss (above the baseline - without climate change) of 422,642 tons of *Aman* rice, 156,928 tons of *Aus* rice, and 116,060 tons of *Boro* rice, which will have impacts on both the country's economy and food security<sup>65</sup>. Increasing climate-change induced salinity is also expected impact the reproductive cycle and capacity, spawning area and feeding, breeding and longitudinal migration of many of the fish species<sup>66</sup> adversely impacting the aquaculture-based livelihoods.
184. Climate change induced salt water intrusion has also compounded the issues of water quality and accessibility among the coastal communities. The World Health Organisation recommends that adults and children, including pregnant women, should have no more than 2g/day of sodium (5g/day salt)<sup>67</sup>, whereas in southwest Bangladesh studies have shown average levels of sodium of 3.4 g/ day, up to 7.7 g/day<sup>68</sup>. Additionally, women who source their drinking water from shallow tube wells have the highest levels of sodium, corresponding to an estimated salt intake of 5-16g/day during the dry season. Many groundwater sources have become unsafe and unreliable with projected rainfall variability expected to worsen water scarcity during the dry season. Cyclones have also damaged water supply infrastructure – tubewells and ponds – with many ponds becoming saline due to inundation. Many coastal communities also rely on surface water –pond based or rain water harvesting – solutions but continue to face challenges with accessing year-round safe and reliable drinking water.
185. Overall reduction of agricultural livelihoods and the prevalence of maladaptive livelihoods have marginalized women further due to loss of land and fewer on-farm and post-harvest employment opportunities. Migration of men due to cyclones and asset losses have increased the burden of household care and livelihood tasks for women. As the burden of collecting safe drinking water primarily falls on women and girls, the declining access

<sup>63</sup> Mainuddin et al. 2011, 'Planning and costing agriculture's adaptation to climate change in the salinity prone cropping system of Bangladesh,' Bangladesh Center for Advanced Studies

<sup>64</sup> Clarke, D., 'Projections of on-farm salinity in coastal Bangladesh,' Royal Society of Chemistry, 2015.

<sup>65</sup> Dasgupta S., Hossain M. M., Huq M., Wheeler D. (2014). Climate Change, Soil Salinity and the Economics of High-Yield Rice Production in Coastal Bangladesh. Policy Research Working Paper (forthcoming), Development Research Group, World Bank

<sup>66</sup> Ibid.

<sup>67</sup> WHO (World Health Organization) and UNICEF (United Nations Children's Emergency Fund) (2010). Estimates for the Use of Improved Drinking Water Sources and Improved Sanitation Facilities. World Health Organization and United Nations Children's Fund, Joint Monitoring Program for water supply and sanitation, Geneva, Switzerland

<sup>68</sup> Alam, and Khan. Sodium Concentration in Potable Ground Water in Coastal Belt of Bangladesh Due to the Effect of Global Warming: A Potential Health Risk. IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) e- ISSN: 2319-2402, p- ISSN: 2319-2399. Volume 8, Issue 6 Ver. I (Jun. 2014), PP 21-30 www.iosrjournals.org

to freshwater resources also exposes them to safety and health hazards as well as loss of income generation and/or educational opportunities. Women and adolescent girls are usually required to obtain drinking water from distant sources, up to 5 to 6 kilometres each day in some south-western districts. Young girls often sacrifice their academic activities to fulfil these responsibilities and face the prospects of an early arranged marriage due to it. Even during their pregnancy women are forced to fetch water irrespective of the distance between the source and their dwellings. Premature birth, abortion and still birth are reported in alarmingly high numbers in these areas. In the absence of freshwater, adolescent girls and women cannot maintain hygienic reproductive health care and often report perinea rashes and urinary tract infections. The spread of diarrheal diseases, cholera and dengue fever as an aftermath of a coastal flood event often leads to loss of employment. Ethnic and religious minorities are particularly vulnerable, given their marginalization from social and political processes, and are among the poorest household in the study area. The main minority groups are Hindu households (up to 30 per cent of the population in the target districts) and the Indigenous group, known locally as 'adivasi', belonging to the Munda tribe. These groups are often subjected to severe discrimination, repression, and exclusion and experience additional constraints in accessing potable water, as well as employment. Overall, indigenous groups are also more heavily on the environment and natural resources for their living, making them doubly vulnerable to changing climatic conditions and water scarcity.

#### E.4.2. Financial, economic, social and institutional needs

186. While Bangladesh has made considerable progress over the past decades in growing the country's economy, which is shifting from an agro-economy into a mixed economy, with an average GDP growth rate of 5.72 per cent in 1994 to 7.05 per cent in 2016, the exposure to climate change risks and impacts on its economy will continue to undermine the development gains invested in by GoB, donors, and communities. The agricultural sector employment remains high with many rural poor populations dependent on the sector for their livelihoods. About 50 million people, or 31.5 per cent of total population, are still poor, with one a quarter in extreme poverty. Coastal zone constituting 28 per cent of the total population has a slightly higher percentage of the population living below the absolute poverty line compared to the country as a whole (52 per cent vs 49 per cent). The GoB has labelled the coastal zone as an "agro-ecologically disadvantaged region" (GoB, 2005) owing to pressures in the region from scarcity of drinking water, land erosion, waterlogging, soil salinity and various forms of pollution (Islam and Ahmad, 2004).
187. The extreme poor coastal communities targeted by the project lack awareness of climate risks and impacts on their lives and livelihoods and have limited technical and financial capacities to invest their limited resources to support additional adaptation costs. These rural coastal communities also have limited access to markets, basic public services and infrastructure. Marginalized groups within the communities, including women, children, elderly, and IPs, suffer disproportionately from poverty, social exclusion, lack of access to resources such as land and other assets, and limited decision-making power. Climate change impacts compound these vulnerabilities by putting the same people at extreme risk, devastating their limited assets, and steeping them further into poverty and social exclusion. Many households have limited access to markets and inadequate provision of basic infrastructure and services. Given the factors described above,
188. Despite GoB's significant financing, climate change is increasing the burden of the GoB as invested development gains are repeatedly jeopardized by the sudden-onset climate change events such as cyclones as well as slow-onset SLR and saltwater intrusion. External and public sector financing is, therefore, critical to address the financial needs of the country and the coastal communities. According to the BCCSAP (2009) estimate, overall, more than USD1 billion is needed to address the additional stresses and risks brought on by climate change in the coastal region of Bangladesh.
189. The fiscal constraints of relevant ministries addressing water and livelihood insecurity and the related gendered impacts impede their ability to fund the additional costs associated climate change. For instance, MoWCA has limited financial capacity to address incremental costs associated with reducing climate change vulnerabilities of extremely poor women and children. Consequently, they are unable to allocate money for additional investments to climate proof their investments, by introducing resilient livelihood support and training from their own budget allocations. MoWCA has a baseline budgetary commitment in the two target districts for the next 6 years of approximately USD25 million, though this is earmarked to provide grants to women to address development needs. Similarly, DPHE has a total annual budget of USD69.60 million to address basic water

and sanitation supplies to rural and urban areas. DPHE has an allocation of USD10 million over the next 6 years in the two districts to provide water supply and sanitation systems. While there is significant coverage and drinking water provision, climate change stresses continue to render these development investments unreliable to supply safe, year-round drinking water. DPHE does not have the fiscal space to fully address the incremental costs of adaptation.

190. Financial constraints are further compounded by limited institutional capacities to assess, plan for, and incorporate the evolving climate-risks into policies and programs for coastal resilience, which undermines the effectiveness of support to enable the poor to deal with worsening climate change impacts. There is limited awareness of current and predicted climate changes and technical capacity to promote adoption of resilient technologies and practices (such as saline resistant crops, hydroponics, and resilient aquaculture practices) for climate-resilient coastal livelihoods. Institutional capacities are limited to incorporate the projected climate risks and scenarios affecting freshwater resources and drinking water supply. There is nascent understanding of salinization processes, projected rainfall variability, and cyclone risks to develop effective and climate-resilient technological and community-based solutions such as rainwater harvesting at different scales, pond-based supply and filtration systems, river water-based systems, etc. Limited vertical and horizontal coordination and evidence based learning also constraint climate-risk informed planning results in short-term responses to immediate and observed risks.

## E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

### E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

191. The project contributes towards GoB's achievement of priorities outlined in the Nationally Determined Contributions (NDC) and its climate change strategies. The primary goal for adaptation in Bangladesh, according to the NDC, is to protect the population, enhance their adaptive capacity and livelihood options, and to protect the overall development particularly by promoting climate resilient livelihoods, water security, early warning systems, and cyclone shelters. The project objective speaks to the top five key **near-term areas of intervention** identified by the NDC to address adverse impacts of climate change.<sup>69</sup> Namely, they are 1) Food security, livelihood and health protection (incl. water security); 2) Comprehensive disaster management, 3) Coastal Zone Management, including Salinity Intrusion control, 4) Flood Control and Erosion protection, 5) Building Climate Resilient Infrastructure. Directly aligned to five of the fourteen<sup>70</sup> **broad adaptation actions** prioritized by NDC, the project is implementing improved EWS, Tropical cyclones and storm surge protection, stress-tolerant variety improvement and cultivation, adaptation on local-level perspectives and biodiversity and ecosystem conservation. The proposed project will contribute to achieve the adaptation target in 39 Union Parishad, in two coastal districts. The proposed project is also prioritized for inclusion in the country's GCF Country Work Programme, currently under development.
192. Bangladesh signed the United Nations Framework Convention on Climate Change (UNFCCC) in June 1992 and ratified it in April 1994. The country also ratified the Kyoto Protocol in October 2001. GoB submitted its Initial National Communication (INC) to UNFCCC in October 2002, its second national communication in October 2012, and is now developing its third national communication, scheduled to be submitted to the UNFCCC in 2017. In April 2016, Bangladesh signed the Paris Agreement on Climate Change. The country's Intended National Determined Contribution (INDC), beside its mitigation targets, also highlights adaptation

<sup>69</sup> The remaining are: 6) Increased Rural Electrification, 7) Enhanced Urban Resilience, 8) Ecosystem based adaptation (including forestry co-management), 9) Community based conservation of wetlands and coastal areas, and 10) Policy and Institutional Capacity Building.

<sup>70</sup> The remaining are (in priority order): ii) Disaster preparedness and construction of flood and cyclone shelters; iv) Inland monsoon flood-proofing and protection; v) Climate resilient infrastructure and communication, vi) Climate resilient housing; vii) Improvement of Urban resilience through improvement of drainage system to address urban flooding; viii) River training and dredging (including excavation of water bodies, canals and drains); x) Research and knowledge management; xii) Adaptation to climate change impacts on health; and xiv) Capacity Building at Individual and institutional level to plan and implement adaptation programmes and projects in the country.

priorities including the promotion of climate resilient livelihoods, water security, early warning systems, and cyclone shelters, among others. The GoB also adopted the Hyogo Framework for Action (HFA) in 2005 and has recently committed to adopt Sendai Framework of Action's priority action, guiding principles and practical means for achieving disaster resilience for vulnerable communities in the context of sustainable development. The Bangladesh National Adaptation Programme of Action (NAPA) and Bangladesh Climate Change Strategy and Action Plan (BCCSAP) were formulated in 2005 and 2009. Furthermore, the Climate Change Gender Action Plan (ccGAP), National Plan for Disaster Management (NPDM), and Seventh Five Year Plan (2016-2020) of GoB boldly articulate the country's commitment to addressing climate change and equitable development, while the National Plan for Disaster Management (NPDM) also specifies the need to address Disaster Risk Reduction (DRR) and climate change adaptation (CCA) in all development plans, programmes and policies.

193. The BCCSAP is the key climate change national plan and current basis for climate investment in Bangladesh. The strategy is to integrate climate change challenges and opportunities into the overall development plan and programmes involving all sectors and processes for economic and social development and provides an overall framework for action recognizing the need for adaptation with a priority focus on poor and vulnerable including women and children. The BCCSAP incorporates a multi-pronged approach supporting general awareness raising, capacity building, and project implementation in vulnerable regions, with special focus on agriculture and water resources.
194. The project is strongly aligned with BCCSAP, ccGAP, NPDM, and SFYP. The project is designed to meet the two specific priority areas of BCCSAP investment in: Theme 1 - "Food Security, Social Protection and Health (T1)", Programme "Livelihood protection of vulnerable socio-economic groups (including women) (T1P9)", and "Water and Sanitation programme in climate vulnerable areas (T1P7)"; Theme 2 - "Comprehensive Disaster Management" (T2), Programme "Improvement of flood and cyclone storm surge early warning (T2P1, T2P2), Risk Management against loss on income and property (T2P4); and Theme 6 - "Capacity Building and Institutional Strengthening (T6)" Programme "Strengthening Gender Consideration in Climate Change Management (T6P4). The specific objectives of ccGAP that the project is going to address are "Introduce innovative agriculture and aquaculture technologies for female farmers and entrepreneurs", "Enhance women knowledge and access to financial instruments", "Ensure women's involvement in efficient water management", and "Improve social security/protection of women, adolescent, and children pre, during and post-disaster and emergency situation" under Priority Sector I. Similarly, in Priority Sector 2 of ccGAP, the project is going to contribute to following objectives, "develop gender responsive policy based on disaster management, climate change and sustainable development", "allocate adequate financial resources to address gender and DRR issues", "ensure participation of women in community risk assessment (CRA) vulnerability and capacity assessment activities", "develop adequate communication facilities to ensure movement of women to reach safe places in response to early warning", "equip women and men in providing first aid and primary health care as first responders", and "equip women and community with Disaster Risk Reduction (DRR), Climate Change Adaptation (CCA), and Sustainable Development (SD) nexus in building the framework for resilience".

#### E.5.2. Capacity of accredited entities and executing entities to deliver

##### **Experience and track record of the accredited entity**

195. UNDP is one of the world's largest brokers of climate change grants for developing countries, with a current portfolio of USD1.34 billion in mitigation and adaptation grant-financed projects in over 140 countries, supported by co-financing of USD6.7 billion. In Bangladesh, UNDP has a strong track record of delivering results in partnership with the government. It has worked closely with the GoB for the last four decades in supporting its development efforts. We have jointly collaborated in various programmes and projects in the areas of disaster risk management, climate change, poverty reduction, better governance and environmental management with technical and capacity building support. UNDP has focused on capacity building, policy and community interventions, targeting the poorest and most marginalized women, men, girls and boys. The UNDP Bangladesh country programme (2012-2016), the second largest in the Asia and the Pacific region has been prepared jointly with the government to meet its development priorities. UNDP currently manages 30 programmes with GoB

using funds committed by bilateral, multilateral and global funds such as Global Environment Facility (GCF) with an annual average delivery of USD70 million.

196. The proposed project is built upon UNDP Bangladesh's extensive track record in implementing climate change adaptation, social protection and disaster risk management work. UNDP has been implementing the world's largest disaster management programme, the comprehensive disaster management programme (CDMP) in Bangladesh with 13 ministries, which has a budget of USD78 million. The CDMP has contributed GoB's effort to make a paradigm shift from a disaster response centric approach to a more comprehensive management of disaster and climate change risk. UNDP supported over 50 million people with various adaptive livelihood activities. UNDP has been supporting government in formulating key national policies and strategies including: National Disaster Management Plan, National Social Security Strategy, National Adaptation Plan, Seventh Five Year Plans, etc.

***Experience and track record of the 'Implementing Partner' and 'Responsible Parties'***

197. MoWCA (as the Executing Entity - 'Implementing Partner' in UNDP terminology) is engaged in the formulation and implementation of policies and programmes related to the welfare and development of women and children. The MoWCA coordinates development activities related to women (Women in Development – WID) of different Ministries. Overall, the MoWCA works for the establishment and preservation of legal and social rights of women and children. Ministry has significant knowledge and capacity in implementing social development programme for the poor and marginalized women and girls. The current annual budget of MoWCA is roughly USD200 million. The programme has been implemented through DWA that manages district and sub-districts offices throughout the country. UNDP has experience working with MoWCA on violence against women programme, which have made a measurable progress in the lives of women and girls and received a high rating as per the final programme evaluation. MoWCA has track record of supporting the livelihood of extreme vulnerable women, they have implemented UPVGD Programme of European Union, ICVGD programme of WFP, Micro-finance support to extreme poor women. The DWA ('Responsible Party for the proposed project) is implementing these projects for last 20 years all over Bangladesh. Since 2013, DWA is also working with DPHE to implement climate resilient water supply projects in southern Bangladesh under Bangladesh Climate Change Trust Fund.
198. DPHE ( as a 'Responsible Party' for the proposed project) is the GoB's main technical agency deals with rural water supply and sanitation. DPHE was established in 1936 with the purpose of provide drinking water to rural inhabitants. DPHE has worked with several development partners to install rural water technologies since its origin. It has so far implemented around 1300 development projects since 1971. Currently, DPHE is implementing several relevant drinking water and sanitation projects in rural Bangladesh. These include: Bangladesh Rural Water Supply and Sanitation Project (July 2012-December 2017, implemented in 33 districts of Bangladesh, USD 48 million), Ground Water Investigation & Development of Deep Ground Water Source In Urban & Rural Areas in Bangladesh (July 2013- June 2019, implemented in non-coastal areas of Bangladesh, where ground water is available for drinking purpose, USD 13 million), Water, Sanitation and Hygiene (WASH) Project (January 2015 -June 2018, implementing in 28 districts, where DPHE is mitigating arsenic risks in the water supply system including in the GCF project districts, USD 51.75 million), and the Project for Improvement of Comprehensive Management Capacity of DPHE on Water Supply (November 2014-October 2018, implemented in 5 technically challenged areas for arsenic contamination, USD 4.5 million). DPHE has offices and technical staff in each Upazila (sub-districts) and districts in Bangladesh including outreach staff at Union Level. The DPHE investments currently focus on addressing the challenges of arsenic contamination and have financial and technical constraints in tackling climate change challenges in the water supply system. This proposed project will build strong capacities complementing current mandate and capacities to support DPHE in addressing climate change-induced salinity impacts on drinking water supply for the coastal communities.
199. Field execution will be supported by local government institutions (LGIs), in coordination with NGOs who would be procured through a tendering process. The Union Parishad is the lowest tier of the Local Government

Mechanism in rural Bangladesh. It is the closest government service point for citizens. It serves as a decentralized point for delivering social protection, rural livelihoods, water and sanitation, rural social cohesion, local environmental protection, and basic service delivery.

#### E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

200. The proposed project builds on past community consultations, comprising of several rounds of stakeholder discussions on adaptation priorities, including climate-resilient livelihoods and drinking water solutions. Stakeholder discussions took place over the period of 2014-2017, initiated and led by the Ministry of Women and Children Affairs (MoWCA) as main implementing partner, as well as the Economic Relations Division (ERD) of the Ministry of Finance as the NDA.
201. Following the first submission and in response to detailed review comments from the GCF Board and its Independent Technical Assessment Panel (ITAP), the project has been redesigned, informed by continued consultations and engagement of the key stakeholders. Multi-stakeholder consultations included National Designated Authority (NDA), MoWCA, DWA, DPHE, relevant national government agencies, international partners including donors and multi-lateral agencies, Civil Society Organizations, NGOs, Indigenous people's organizations, the Private Sector, and the communities in the Khulna and Satkhira.
202. Led by MoWCA and the NDA, technical meetings with relevant ministries and major donors took place over the period of 2015-2017. The project re-design included consultations with and engagement of key bilateral partners for GoB. In June 2017, representatives from the Canadian High Commission, Royal Norwegian Embassy, Embassy of France, Embassy of Japan, UK's Department for International Development (DFID) were consulted to reassess the revised proposal and to gather additional feedback. The consultations yielded recommendations for the design and implementation of the proposed interventions and long-term sustainability of the project, based on best practices and lessons learned from previous engagements in Bangladesh.
203. Civil Society Organizations (CSOs) were consulted with the objective of gathering feedback, particularly on gender considerations and gender empowerment strategies in Bangladesh, as well as on the full design of the project and the proposed activities, including the exit strategy. Discussions included the greater responsibility and ownership to Union Parishads, with DPHE as an implementing partner for the water component. Several rounds of discussions with NGOs and CSOs have shaped the detailed design of the project. A list of detailed consultations with CSOs is included in Annex XIIIc.
204. The project, through stakeholder consultations with women's group, extreme poor women and youth groups, has integrated gender considerations through increased women's participation in decision-making through contingency planning for disaster and resilient livelihoods, water provision, disaster preparedness committees and early warning systems. Field consultations with women and adolescent girls, led by MoWCA and the NDA were carried out in 12 locations and first-hand data was collected aiming to utilize key findings to prioritize adaptation actions. Baseline development needs were also discussed and will be addressed throughout project implementation, including diversified employment opportunities for women and youth. In addition, as part of the preparation of the feasibility study, six Focus Group Discussions (FGDs) were conducted aiming to understand the impact of climate resilient grants, improved drinking water supply and disaster preparedness on gender relationships at the household level.
205. Indigenous communities (the Munda community) were extensively consulted on their most preferred adaptation option to enhance their adaptive capacity. In the southern part of Khulna and Satkhira district, areas of key vulnerabilities were identified during stakeholder consultations with the Munda community. These include reduced access to safe drinking water, lack of employment opportunities, food insecurity, limited access to markets, natural resources and to medical facilities and lack of participation in Disaster Management Committee (DMC). To cope with these challenges, the Munda community has suggested undertaking strategies for livelihood enhancement and resilience to climate change, including fish culture, livestock rearing, support for crab culture and fish culture, rain water harvesting, rehabilitation of existing pond and reservoirs and others.

206. The Private Sector has been equally involved in stakeholder consultations, as well as local Financial Intermediaries including SUS, NGF, UNNAYAN, RRF, NABOLOK, PRODIPAN and JJS consulted with the aim of identifying a possibility in financing the adaptive livelihoods of targeted women beneficiaries, discussing the risks related to credit financing and microfinance schemes. Moreover, the Nawabeki Ganomukhi Foundation (NGF) was consulted in regard to upgrading crab hatcheries and assistance in the supply of crab-lets for the proposed project. Value chain actors were consulted through FGD (187 interviews), including 34 interviews with farmers, 17 interviews with Union Parishad Chairmen and multiple interviews with government officials including representatives from MoWCA, DAE, Livestock Officials, Statistical Officials and other key stakeholders. Value actors involved in the discussion provided information on bottlenecks in the value chain, savings and access to loans, factors in the enabling environment, potential for upgrading value chains and the impact of climate change on the selected value chains.
207. Community consultations were carried out in 39 unions and 5 Upazilas of Khulna and Satkhira district, both at Ward and Union level, aimed at identifying potential climate-resilient livelihoods as well mapping potential climate-resilient drinking water sources at a household, community and institutional level. Coastal livelihoods-related issues were informed through a household survey carried out in the target areas. Information on socio-economic and bio-physical context, household income structures and market structures were collected through participatory rapid assessments (PRAs), both at community and union level. Additional consultations were also taken with Unions and communities to discuss and gather feedback on the O&M plan for the drinking water solutions. The proposed three-tier O&M plan has been endorsed by the communities, Unions, and DPHE. Please refer to the Stakeholder Consultations annex (Annex XIIIc) for detailed information on the various stakeholder consultations.
208. Following a multi-stakeholder approach, the project would engage with numerous stakeholders, both at a national and local level in implementation activities. These include the implementing partner, and Civil Society Organizations (CSOs), NGOs, Indigenous people's organizations, Private Sector organizations, Academia, Bangladesh fisheries research institute, Bangladesh livestock research institute, Department of Agriculture Extension and Upazila Nirbahi Officer (UNOs) and extension officers of DPHE and DWA. The roles and responsibilities of the various stakeholders are detailed in the Stakeholder Engagement Plan, Annex XIIId.

### E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

#### E.6.1. Cost-effectiveness and efficiency

##### **Adequacy of the financial structure**

209. GoB seeks grant financing to address the information, technical, financial, and institutional barriers impeding long-term adaptation solutions to secure lives and livelihoods of extremely poor, vulnerable coastal communities, especially women, who are disproportionately affected by the adverse impacts of climate-change induced salinity. GCF and GoB resources will be combined to address the barriers to achieving the project objective (see Section C.2 for detailed discussion of barriers).
210. While project investments in livelihoods do yield incomes to the beneficiaries, the expected small-scale financial returns will accrue to the poor households and promote nascent private sector engagement that will underpin the financial viability and sustainability of these climate-resilient livelihoods in the long-term. The adaptation interventions to be implemented through this project for ensuring drinking water security are primarily public goods. Private sector investment is limited in provision of drinking water supply for the extreme poor whose affordability and willingness to pay is extremely low owing to their socio-economic vulnerabilities that are further compounded by repeated climatic impacts. Therefore, the project does not yield large-scale generation of revenue or recovery of costs to justify non-grant financial structures for the project. Grant financing will not crowd out private investment due to the barriers described above; rather, by removing these barriers, it would incentivize private sector engagement, especially in support of livelihood diversification. Grant financing would also ease the financial constraints of the MoWCA, DWA, DPHE, and LGIs in addressing adaptation costs additional to baseline development investments.

## **Cost-effectiveness**

211. Project investments have been designed to leverage existing initiatives and take advantage of lessons learnt through past experiences, in order to provide cost-effective solutions and address recognized barriers to implementation. The project is built on several best practices as detailed in Chapter 5, Feasibility Study, Annex IIa.
212. The selection of climate-resilient and sustainable community livelihoods was done after detailed surveys and assessments for each location and livelihood group, based criteria which assess their resilience to the ongoing and expected impacts of climate change (particularly elevated salinity levels), the added value they provide to incomes, how well they link to existing markets, and ability to access finance where necessary. Importantly, a cost-benefit analysis was applied to each livelihood and identified the total cost and benefits of each production cycle, including potential total revenues, profit margins and cost-benefit ratios (see Section E.6.3). Switching to climate-resilient livelihoods has a transformative impact not only on the beneficiary households but also on the surrounding communities, whose overall resilience is strengthened with project support to resilient production, value-chain, and markets. The project support to group-based, enterprise development, with focus on women, yields sustained income benefits as well as jobs across the value-chain.
213. Drinking solutions will be implemented in collaboration with the local government and the private sector, with direct involvement of community groups. These solutions have been carefully surveyed and assessed for each location, ensuring that drinking solutions are sustainable and cost effective. The criteria for drinking-water supply solutions included preferences to preserve and protect what already exists (i.e. ponds from increasing storm surges) and to bring existing potable sources nearer to vulnerable populations. This includes economic aspects related to O&M (including replacement of parts), which was part of the options analysis and involved prioritizing community-level solutions over household where possible, while ensuring accessibility. The project will support O&M of the technology and three-tier, community-centric O&M mechanism, and establish a link between O&M service providers. Both community and government contributions are leveraged to ensure long-term viability of the interventions, thereby enhancing the benefits resulting from the investments. These include health co-benefits (estimated at USD 4 million during the project lifetime) and creation of jobs related to drinking water provision, operation, and maintenance (such as the caretakers in the WMCs). It should be noted that, with the activity designed to ensure participatory, site-specific (ward and community level) vetting, mapping, and final selection of technologies, (Activity 2.1), there is flexibility ensured to allow the technical experts (from DPHE – both national and Union level staff as well as project procured experts) to select the most effective and efficient choices for the particular communities/areas. There is contingency built in as well in the budget to allow for adjustments.
214. Moreover, the benefits of the livelihoods and water interventions accrue to the same communities (with significant overlap between the beneficiary HHs) ensuring that the benefits are synergistic and promote cost-effectiveness of the interventions.
215. At the national level, several projects can be used to assess the cost-effectiveness of this project. While not entirely comparable in terms of technologies or geographical coverage, some of these provide rough estimates for comparison. The cost of comparable projects in the coastal districts of Bangladesh in water and livelihood sectors range from US\$ 15 (Nobo Jatra) and US\$ 1714 (O'Horizon) per direct beneficiary. Nobo Jatra has both a water and livelihoods component, valued at US\$ 15 and US\$ 67 per beneficiary respectively. However, the Nobo Jatra project primarily rehabilitates existing water-supply facilities such as deep tubewells and pond sand filters, both of which cost significantly less than the varied scales of rainwater harvesting and pond based systems with filtration treatment, proposed under the GCF project for their climate-resiliency. Furthermore, the US\$ 15 per beneficiary calculation includes 167,000 beneficiaries for the water component and the remaining beneficiaries (approximately 108,000) for the less costly sanitation component. The proposed GCF project costs per beneficiary are USD88 and USD102 for livelihoods and drinking water respectively, not accounting for EWs beneficiaries. The costs are comparable to other GCF projects worldwide. (US\$ 20-80 for water and from US\$ 59 to US\$ 452 for livelihoods projects) It is important to note that the costs for water reflect the costs

of providing household level RWH systems to ensure accessibility for marginalized households and that the distance to water source is less than one kilometer.

## E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

N/A

## E.6.3. Financial viability

216. The public good nature of the project's Output for drinking water implies that there is no revenue generation or cost recovery from the project's direct and indirect beneficiaries of water provision during the project duration. In addition, the implementation of climate-resilient livelihoods do not yield large-scale revenue flows back to the project financiers and only results in small-scale income generation for the targeted, extremely poor women beneficiaries. Therefore, a comprehensive financial analysis of this project is not deemed pertinent.
217. The climate-resilient livelihoods supported by the project have been assessed, first, for their resilience in light of projected climate change. In addition, the livelihoods proposed are selected for their potential for income generation, market potential, and long-term sustainability and scale. A Cost-Benefit Analysis (CBA) was undertaken for each of the livelihoods (see Livelihoods Assessment Report, Annex IIb). Based on these CBAs, Table below provides an overview about the profitability potential of the different livelihoods per production cycle for one female beneficiary.

Table 1: Profitability overview of proposed livelihoods per production cycle

Climate change resilient livelihood	Net profit per production cycle for 1 Woman <sup>71</sup>
Homestead gardening	4 months – (USD82.58) BDT 6,671.00
Sesame	3.5 months – (USD235.38) BDT 19,014.00
Hydroponics	4 months – (USD51.52) BDT 4,162.00
Aqua-geoponics	4 months – (USD127.90) BDT 10,332.00
Plant nursery	annual – (USD156.63) BDT 12,652.48
Crab farming	3 months – (USD69.19) BDT 5,588.95
Crab nursery	1.33 months – (USD20.70) BDT 1,672.10
Crab feed	1 months – (USD89.71) BDT 7,246.67

218. The proposed drinking water supply systems will be implemented through WUGs and community-based management structures. In addition to building beneficiary and community capacities for climate risk-informed planning and sustained management of systems, institutional capacities across the Ward, Union, and National levels are also strengthened (through Outputs 2 and 3) to ensure sustained use and O&M in the long-term. Mobilization of community and GoB co-financing (as outlined in the O&M plan and the Commitment Letter) also ensures that the project interventions will continue to be operationally and financially viable post-project.

## E.6.4. Application of best practices

219. The project design builds upon best practices identified through an extensive screening of past and ongoing projects (see Chapter 3, Feasibility Study, Annex IIa), conducted in comparable contexts and similar project areas in southwest Bangladesh, to design activities which address the disruption of livelihoods and drinking water security through climate-change induced salinity. The technological approaches and design build on traditional knowledge and practices, combined with innovative and proven technological solutions, e.g. for water-filtration or hydroponic planting systems, and management practices and organizational structures that are proved to facilitate and promote the sustainability of interventions beyond the projects lifetime, e.g. community-level interventions or the establishment of PPPs and water user groups.

<sup>71</sup> Based on a conversion rate of USD1 = 80.78 BDT

220. In the design of the livelihood interventions, the positive experience of using saline-resilient plant varieties with a low irrigation demand will be scaled up. The cultivation of such plants, in combination with advanced agriculture growing technologies such as aqua-geoponics and hydroponics (as identified through best practice analysis), appeared to be the most feasible solution to enable local people to adopt climate-resilient livelihoods. The design of crab cultivation activities is built on best practice examples of piloted production entities in coastal Bangladesh and international best-practices to ensure environmental sustainability. Another incorporated best-practice is the community level intervention for livelihood support in adaptation projects (see Canadian International Development Agency (CIDA) funded project Reducing Vulnerability to Climate Change (RVCC) project outlined in Annex IIb) to enhance the resilience of women to climate change. Another best practice for sustainability and promotion of private sector engagement, applied in this project, is the formation of PPIs to give small producers a common voice and interact with relevant key stakeholders in their sector.
221. Saline- and drought-tolerant crop varieties have been used in Khulna and Satkhira and learning from best practices, the project proposes to scale-up climate-smart agricultural practices to enhance the adaptive capacity of smallholder farmers and fishers to drought and floods. Projects have demonstrated positive results in changing farmer behaviour in relation to saline-resistant seeds that includes local varieties that have been adapted to the Bangladesh coast. Based on best practices, efforts to diversify incomes and introduce more women into the workforce, especially agriculture, will give women a greater say in household expenditure and decision-making and ultimately reduce poverty levels and improve better nutrition and health outcomes. Ongoing efforts, such as the LoGIC project, show that livelihood support to vulnerable women and their families should be maintained over sufficient time to enable their economic growth to be sustained, including follow-up activities to ensure the productive use of skills and knowledge.
222. The project design also applies best practices and lessons from recent projects that have been tested in the coastal districts for water provision. Past project's experience in collecting seasonal rainfall, which is becoming increasingly unpredictable due to climate change, inform the technical designs of the water collection technologies and to ensure tank capacities store sufficient water for the dry period as well as protecting the water source. If not, people will look for other, poorer quality sources of drinking water, such as saline groundwater or ponds. Likewise, different structures for O&M have been trialled in coastal communities. These prove that household and community-based drinking water solutions can be successful when using village structures, including with RWH systems that were run effectively, and involved high community participation in operations and development. The Reducing Vulnerability to Climate Change Programme (REEEP) experience with rural water schemes illustrated that they are better managed through empowered local women who have a strong stake in obtaining clean drinking water and climate resilient crops.
223. Best practices from the coastal region show that there is a higher chance of success if community-level interventions are accompanied with building the capacity of individuals in climate hotspots, resulting in reduced climate-induced impacts by enabling them and their communities to deal with slow- and sudden-onset disasters. Through building capacity, awareness and empowerment, local communities and local government will contribute to emergency and development plans and to funds for maintenance of community assets. The effectiveness of applied best practices are discussed in Chapter 5 of the Feasibility Study (see Annex IIa).

## E.6.5. Key efficiency and effectiveness indicators

<i>GCF core indicators</i>	Estimated cost per t CO <sub>2</sub> eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)
----------------------------	---

	(a) Total project financing	US\$_____
	(b) Requested GCF amount	US\$_____
	(c) Expected lifetime emission reductions overtime	_____tCO <sub>2</sub> eq
	<b>(d) Estimated cost per tCO<sub>2</sub>eq (d = a / c)</b>	US\$_____ / tCO <sub>2</sub> eq
	<b>(e) Estimated GCF cost per tCO<sub>2</sub>eq removed (e = b / c)</b>	US\$_____ / tCO <sub>2</sub> eq
	Expected volume of finance to be leveraged by the proposed project/programme and as the result of the Fund's financing, disaggregated by public and private sources (mitigation only)	
Other relevant indicators (e.g. estimated cost per co-benefit generated as the result of the project/programme)		n/a

## F.1. Economic and Financial Analysis

### *Approach and Methodology*

224. The economic efficiency of the investment was determined by computing the economic net present value (NPV) with an assumed 10% discount rate, and the economic internal rate of return (EIRR). Economic values (benefits and costs) are all measured in real 2017 US dollars. Economic costs of the project are net of taxes, duties, and price contingencies. Furthermore, the analysis assumes a shadow wage rate of 1.00 for unskilled and semi-skilled labor in Bangladesh. Given that the economic cost of labor in Bangladesh is likely lower than the market wage rate (financial cost), this assumption leads to significantly over-estimating the economic cost of the project, and under-estimating the true net economic value of the project.
225. As is common when undertaking the economic analysis of investment projects, numerous assumptions were used to delineate the “with project scenario” from the “without project scenario”. These assumptions are presented and discussed below. Conservative assumptions were made to under-estimate the true net economic value of the proposed investment project. The analysis period is 25 years, including implementation (though, Output-2 is limited to run for 10-years post-implementation).
226. The economic analysis of the project centered on: (for full analysis including references for the assumptions, refer to Economic Analysis, Annex XII)
- Output-1 – climate resilient livelihoods for women. Women will be provided support for climate resilient aquaculture and agricultural livelihoods options through a range of training, institutional and material support. 25,425 women in 1,017 women’s groups will be targeted by this intervention. The core benefit from this activity is an increase in household income from the climate resilient livelihoods adopted by women, which is sustained for the duration of project implementation and a 19-year post-implementation period. This output also incorporates an early warning system which will protect the livelihoods investments made (the potential benefit of deaths and property damage averted are not being considered).
  - Output-2 – climate resilient water supply. To reduce the reliance on saline water available to coastal communities, the project will invest in rainwater harvesting infrastructure at the household and community level. 136,110 people will be targeted by this intervention. The core benefit from this activity is improved water quality which encompasses a range of benefits including (but not limited to) health benefits and a reduced burden for acquiring and processing water for consumption. The benefits stream is measured in terms of deaths-averted from improved water quality and is sustained for a 10-year post-implementation period.
  - Output-3 and project management costs are not amenable to economic analyses on their own. However, the total cost of these two project expenditures cannot be ignored. For purpose of the economic analysis, it is assumed that this cost is distributed across Output-1 and Output-2 proportional to their respective annual direct costs.
227. The economic analysis included sensitivity analysis, subjecting the project to conservative assumptions to determine if the net present value and economic internal rate of return remained acceptable.

### Output-1: Climate Resilient Livelihoods

228. The gain in income from activities in Output-1 used in the base case economic analysis is 15%. The World Bank’s Bangladesh Integrated Agricultural Productivity Project (IAPP) project provided a range of institutional and material support to farmers in Bangladesh. The project evaluation suggests that “income levels of crop and fisheries households increased by 15% and 37% respectively, compared to non-IAPP households”. Given that the focus of the activities in Output-1 is on aquaculture, we are in a position to legitimately choose the IAPP income gain of 37% for fisheries as the primary estimate of income gain used. However, we choose to use the more conservative estimate of 15%. These estimates are confirmed by the International Food and Policy

Research Institution's evaluation of four poverty-alleviation interventions on the poorest segments for a number of welfare outcomes including income. The two support programs evaluated by IFPRI that come closest to the interventions in Output-1 are the Income-Generating Vulnerable Group Development (IGVGD) and Rural Maintenance Program (RMP), with gains in income of 28% and 31% respectively.

#### Output-2: Climate-Resilient Water Supply

229. High sodium intake increase substantially the risk of cardio vascular disease. The project's target population has high exposure to saline drinking water which contributes to hypertension and cardiovascular diseases, and mortality, especially among vulnerable groups such as expecting mothers, young children and young adults. Output-2 activities eliminate reliance on saline water, especially for drinking. Therefore, we expect to see a reduction in cardiovascular disease incidence in this population along with associated deaths.
230. Bangladesh's all-cause mortality rate is 0.57%. Of these deaths, 27% are expected to be from cardiovascular disease i.e. this is the population average of deaths from cardio-vascular disease (which is, by definition, an underestimate for the project's target population, since the target population has high exposure to sodium through saline drinking water). Assuming an 11% reduction in deaths from the project, about 5.25 deaths will be averted each year from the beneficiary population.

#### **Outcome of Economic Analysis**

231. The base case analysis for the project has a positive net present value of \$16 million with an economic internal rate of return of 20% over a presumed 25-year project life span (which includes 6 years of project implementation and 19 years of post-implementation operation for Output-1 and 10-years of post-implementation operation for Output-2) using a 10% discount rate (all values in 2017 terms). This result should be seen as a conservative lower bound on the net present value of the project since a limited subset of benefits was considered along with a conservative set of assumptions on benefit generation. Both Output-1 and Output-2 individually have positive net present values with economic internal rates of return that exceed the 10% discount rate used in the economic analysis. The net present value from the base case of Output-1 is \$15 million with an economic internal rate of return of 30%. The net present value from the base case of Output-2 is \$4 million with an economic internal rate of return of 17%.
232. The economic analysis was subjected to sensitivity analysis through the construction of three scenarios which entailed basic variations to benefits and cost, namely a 20% decrease in gross benefits generated by Output-1 and Output-2, a gross increase in all costs (i.e. Output-1, Output-2, Output-3 and project management costs) and both a 20% reduction in benefits coupled with a 20% reduction in costs. The table below shows the results of these scenarios.

Scenario	Elements Modified	NPV	EIRR
<i>Base Case</i>	<i>None.</i>	<b>\$16 million</b>	<b>20%</b>
<i>Scenario-1</i>	<i>20% Decrease in Benefits</i>	<b>\$7 million</b>	<b>14%</b>
<i>Scenario-2</i>	<i>20% Increase in Costs</i>	<b>\$9 million</b>	<b>15%</b>
<i>Scenario-3</i>	<i>20% Decrease in Benefits + 20% Increase in Costs</i>	<b>\$0 million</b>	<b>10%</b>

233. Overall, the three sensitivity scenarios we construct provide validation of the core result that this project has positive net present value and an economic internal rate of return greater than the 10% discount rate chosen.

### ***Conclusion from Economic Analysis***

234. Each project output individually delivers positive net present values. Even under a range of conservative assumptions pertaining to the benefits (sensitivity analysis), the overall project is attractive from a benefit-cost perspective. The project level net present value is \$16 million with an economic internal rate of return of 20%. Please refer to Annex XII for a detailed description of the benefit-cost analysis and the underlying model used.

## **F.2. Technical Evaluation**

### **Climate-resilient Livelihoods**

235. A multi-criteria screening and filtering of livelihood options was conducted to identify alternative, climate-resilient livelihoods for farmers, fishers, and agri-labourers in the vulnerable coastal communities in Khulna and Satkhira (see chapter 6 of Livelihoods Assessment Report, Annex IIb). The screening process was based on three steps: (i) stock take of existing and potential livelihood options; (ii) screening the portfolio of livelihood options against a 1st filter addressing their climate change resiliency potential; and (iii) screening the livelihood options against a 2nd filter in perspective to their gender responsiveness and their contextual feasibility. The portfolio of options was created through information gained through the PRAs on existing livelihoods in the wards as well as a targeted research analysis of best practices related to potential climate-resilient livelihoods. The latter were already tested and practiced in other regions of Bangladesh or in a comparable context. The most weighted filter applied for the livelihood options considered their resilience to the projected climate change impacts including salinity tolerance and cyclone. The assessment also considered the livelihoods that could potentially become or are maladaptive. For instance, shifting to shrimp farming (which leads to further salinization of surrounding area due to the release of highly saline water after each growing cycle) or cultivating highly freshwater dependent watermelons, have been maladaptive, leading to exacerbated vulnerability. This indicates that there is a limited awareness of climate change impacts by local households, particularly for the women within them, and capacity to incorporate climate change risks in strategic livelihood choices. Certain livelihoods such as household level handicraft production (as being practiced in neighbouring countries where there is a high middle class or extensive tourism sector) seemed to have a limited market demand, high transportation cost to relevant markets, and limited potential for up-scaling. The production of more relevant products, such as mat (mat-making) was dismissed as a feasible option due to the low salt resilience of the input plant Mele. This initial screening yielded 14 potential climate resilient livelihoods that were further assessed for their (i) gender responsiveness; (ii) profitability potential and market/ value-chain access; (iii) socio-economic considerations and community acceptance; and (iv) environmental impacts.
236. Environmental and Social Safeguards (ESS) assessment (see Section F.3) were rigorously applied to identify best design and implementation practices to promote sustainable, inclusive climate-resilient livelihoods and value-chains. For instance, ESS considerations also ruled out promotion of brackish water fish farming as an aquaculture-based livelihood due to the invasiveness potential of species such as Tilapia and the high risk of creating incentives for the local population to catch fish seedlings in the sensitive Sundarban mangrove forest, leading to fish stock depletion.
237. Two major categories of climate-resilient livelihoods and value-chain chains have been identified for the project: (i) plant cultivation through resilient livelihoods such as homestead gardening, hydroponics, aqua-geoponics, sesame cultivation, and plant nursery and (ii) aquaculture through the resilient livelihoods such as crab nurseries, crab farming, and crab feed processing. The vegetables and plants produced would make use of salt resilient crop varieties that are not highly fresh water dependent. To enhance their resilience against cyclones, mostly low-growing crops were considered and the locations will carefully be selected during the implementation phase of the project to ensure some shelter through existing building, embankments, and

vegetation. For most of the crops, there is a market demand in the targeted districts and they can contribute to income generation as well as food availability (security) of households and the local population. Sesame is considered due to its low demand of irrigation, salt resilience, and high market potential as being up-marketed into sesame oil and sold in larger cities or exported.

238. The crab production is identified as a priority to promote in the coastal region by GoB due to its salt resilience, increasing market demand. To promote adoption and upscale, with environmental sustainability as a key factor, two existing crab hatcheries in the project area will be upgraded to meet international environmental and biosecurity standards and to provide the crab nurseries and crab farms promoted through this project with sufficient non-natural crab lets. Similarly, the formation of 1,017 women groups to produce crab feed, based on an overly plant-based mixture, reduces potential risks to depend on wild fish stocks for nutrition of the crabs. The beneficiaries will be able to take up the proposed livelihoods within proximity of their households and won't need to commute for more than 2 km.
239. The promotion of group-based interventions enables peer-to-peer learning, cost-effectiveness, and economies of scale for sustainability and financial viability of the introduced climate-resilient livelihoods. In addition, the women groups will benefit not only from initial, upfront investments to implement these livelihoods, they will also be providing technical assistance to enable skills and knowledge transfer and capacity building to plan for, implement, monitor and continue to adapt their livelihoods to evolving climate risks.

#### **Climate-resilient Water Supply**

240. A long-list of water supply options was developed from the water supply technologies currently in use in the target coastal communities (as identified through the Participatory Rural/Rapid Appraisal (PRA) consultation process). The long-list of water supply options were assessed using a Multi-Criteria Assessment (MCA) including resilience to increased salinity, provides safe drinking water, environmental impacts, sustainability of operations and maintenance, social acceptability, proven local technology etc.<sup>72</sup> Lessons learned from other installations and best practices were examined and utilized in the comparison of the technology options. The technical evaluation process identified the preferred options as RWH and freshwater pond based systems with embankment raising and filtration treatment. Three levels of RWH were designed, the household level and at community and institution buildings to supply clusters of households. RO desalination would be the most resilient option against climate change induced salinity increases; however, it did not pass the critical success factors of environmental impacts or cost concerns. Lower impact desalination technologies exist (such as zero liquid discharge RO and solar distillation) but they have not been proven in the local area and would not address the affordability concerns. Development of improved technical capacities for innovation and design of climate-resilient surface water options such as RO is included in Output 3.
241. The water supply gap was calculated using information gathered during the PRA process on the existing functioning (non-saline and providing year-round, safe drinking water) water supply resources in each ward and the households served (the baseline). The objective of the project is to ensure that the target households have access to safe non-saline drinking water throughout the year. The water consumption rate will not change as a result of the project, but the beneficiaries will get safe non-saline drinking water from the project interventions. As a result of the project, each target beneficiary will have access to safe non-saline drinking water of at least 2 L/person/day which they could not have due to scarcity of fresh water in the project areas.

<sup>72</sup> Cost per capita of supplying safe drinking water with each of the 8 assessed technologies is: Shallow Tubewell (STW) – USD4 per family/year; Deep Hand Tubewell (DHTW) – USD9 per family/year; Piped Water System (PWS) – USD45 per family/year; Pond Sand Filter (PSF) - USD14 per family/year; Rainwater Harvesting (RWH) System – USD70 per family/year (for HH systems) to USD24 per family/year (for institutional 100 HH systems); Reverse Osmosis (RO) Plant – USD22 family/year; Managed Aquifer Recharge (MAR) – USD40 per family/year; Pond water treatment using filtration technology – USD20 per family/year

The water supply gap was calculated in each ward by subtracting the baseline from the number of households and taking the combined drinking water programmes from World Vision and Oh Horizon into consideration. The RWH systems were designed at the three levels of household; community; and institution. The available rainfall data records were analysed and the worst-case scenario was found to be 180 consecutive days of dry period with no rainfall. Based on the expressed concerns of the communities and experiences of local NGOs, simple filtration and/or disinfection methods would be used to mitigate contamination of stored rainwater, along with improved maintenance of the roof catchment.

242. To enable accessibility, in each ward, at least 20 per cent of the target households will be provided household based RWH systems to provide coverage for people with no access to community or institution based RWHS, especially people living far away from these systems, people with disabilities and ethnic minority groups. The community and institution RWH locations were identified and defined. A building database was developed of community and institution buildings in the target districts. The key parameters recorded included the location name, roof area and the condition of the building and roof structure. The building database was used to identify four sizes of RWH storage tanks based on the roof catchment area.
1. Small tank volume of 45m<sup>3</sup> requiring a roof area of at least 75m<sup>2</sup>
  2. Medium tank volume of 90m<sup>3</sup> requiring a roof area of at least 150m<sup>2</sup>
  3. Large tank volume of 135m<sup>3</sup> requiring a roof area of at least 225m<sup>2</sup>
  4. Very large tank volume of 180m<sup>3</sup> requiring a roof area of at least 300m<sup>2</sup>
243. Site surveys were undertaken at institution buildings targeted for the installation of large and very large rainwater tanks (supplying 75 to 100 households). The site surveys included preparation of a site map and data collection on key design parameters including the building dimensions, condition assessment, roof materials, site boundaries, per cent of roof with existing guttering, roof shape, roof slope, number of households within 1km of the building, area of land available for construction of tanks, soil types, site elevation above mean sea level, existing power supply accessibility and availability and preliminary consultation undertaken with stakeholders on installation of RWH. Detailed technical discussion and design specifications for the proposed portfolio of options are summarized in the Drinking Water Assessment Report (see Annex IIc) and Chapter 6 of the Feasibility Study (see Annex IIa).

### F.3. Environmental, Social Assessment, including Gender Considerations

244. The residual risk level of the project has been categorized as **medium** in relation to the level of impact and probability of a range of environmental and social risks. The project has mainstreamed environmental sustainability, social equity and gender considerations into the design of the project, the structuring of individual project activities, as well as in the implementation structure, monitoring plan, and budget. The livelihood interventions have been chosen and designed to provide integrated benefits, not only for climate resilience and women's empowerment, but also to enhance environmental sustainability and social equity benefits, while carefully considering the adverse impacts that may arise as a result of project activities. Having identified the lack of potable water as a major constraint to the resilience of beneficiary communities, and to women's unpaid time burden, the potential water provision options were then ranked and chosen based on their economic, environmental and social feasibility. RWH is identified not only as one of the potable water solutions with the least adverse environmental impacts, but an option with significant environmental benefits. Potential risks identified in regards to implementation of RWH include potential issues with Operation & Maintenance (O&M), cyclone proofing, and minimizing construction impacts. These risks are further outlined below and thoroughly addressed in the Environment and Social Management Framework (ESMF). (See Annex VIb)
245. The livelihood interventions have also been screened for environmental and social risks. The portfolio of climate resilient livelihood options proposed includes production of vegetables in hydroponic systems at the community level, homestead gardening, sesame cultivation and plantations, all of which has limited adverse environmental and social impacts. The use of pesticides and fertilizers will be prohibited, and training in integrated pest management will be used to enhance environmental benefits. Recent innovations in coupled aqua-geoaponics systems for simultaneous plant and fish cultivation, will be used to enhance, household resilience and food security, while using a sustainable method for cleaning of pond water. The aquaculture interventions, including crab farming, and brackish water fish in coupled aqua-geoaponics systems, have a range of potential significant adverse environmental impacts, including salinity seepage, water quality deterioration, effluents resulting in eutrophication, unintended pressure on wild stocks, disease outbreak, and impacts on local biodiversity and ecosystem integrity. These risks are also outlined in more detail below, as well as in the ESMF. Managing these impacts in a sustainable manner is a focus of the project and will require strict regulation and monitoring by project staff and government institutions, ideally not only to minimize any adverse impacts of the project activities themselves, but also to build the overall capacity of GoB, LGIs and communities to manage these impacts going forward. That is, the project presents an opportunity to regulate climate-resilient livelihoods in a manner that does not lead to maladaptation or effect ecosystem integrity, and to improve environmental management in the target districts. Threats to mangrove conversion and pressure on existing fisheries resources will be addressed through the building of crab hatcheries and through community awareness programs and the development of a code of practice. The development of sustainable crab feed that reduces reliance on wild fish stocks, and the necessary training in aquaculture environmental management, biosafety protocols and water treatment will be given at both the community (beneficiary level) as well as the institutional level. Interventions also consider the ecosystem impacts that the expansion of shrimp agriculture has had on the coastal districts of Bangladesh and address these through the promotion of best practices in aquaculture and careful siting in already tidally inundated, saline areas. That is, while recognizing that increasingly saline conditions and market demands, as well as climate constraints of other agriculture based livelihoods have created a demand for more salinity resilient livelihoods, such as mud crab farming and brackish water fish, the ESMF strived to ensure that these livelihoods will not result in further maladaptation.
246. In order to avoid significant irreversible impacts, the aquaculture interventions will be kept small-scale, and semi-intensive, and will be appropriately geographically dispersed as to avoid cumulative impacts of effluent releases on receiving estuary rivers. All crab farms will be strictly sited away from sensitive mangrove areas, but within the tidal zone, which is already subject to salt water inundation and hence will not contribute to salinization of water and soil. The project will introduce protocols to limit inputs (chemicals, antibiotics) and carefully manage feed, in order to manage the impacts on water quality in ponds and receiving waters. Water quality and soil will be regularly tested as part of the environmental monitoring program. Crab farms will use rehabilitated and improved shrimp ponds, and polyculture with aquatic weeds will be developed for improved sustainability of systems. The project recognizes the essential role of mangrove habitats in the climate change resilience of coastal communities, and hence will be particularly strict about managing potential degradation of mangrove

habitats, will respect national legislations which limits activities within a 10 km buffer zone of the Sundarbans Protected Forest, and furthermore will include support for institutional capacity building, enabling policy and enforcement for mangrove preservation. Finally, the pressure on wild stocks both in terms of crab seed and for the production of fish feed, will be addressed by building crab hatcheries to meet the demand for crablets and will support enabling policy and enforcement in regard to the sustainable management of wild stocks.

247. In regards to social risks, there are risks associated with beneficiary selection exacerbating existing social tensions, particularly in regard to marginalized minorities, such as the Hindu religious minority population in target districts (up to 30 per cent of the population), as well as for ethnic minorities, such as the Munda ethnic group. Measures to address these potential impacts are included in the ESMF and a separate Indigenous Peoples Planning Framework (IPPF) has been prepared to address the specific needs of the indigenous population in the target areas.
248. This project goes beyond simply considering gendered impacts of a climate change adaptation project, and puts the Fund's Gender Policy at the centre of the project. That is, this is a gender-focused programme that will deliver project assistance by not only addressing the gendered vulnerability of women and girls, in a highly hierarchical social structure, but also addressing multi-faceted constraints to climate resilience from the household level, through the community and institutional levels. The project is aimed at extreme poor households where women are doubly marginalized, unequal, and vulnerable to climate change impacts due to their socio-economic constraints. The clear objective of the project is thus to work towards establishing social equity and justice through targeting women and girls from the most disadvantaged families, while helping to alleviate the gendered impacts of climate change through the proposed water provision and livelihood interventions (see Gender Analysis and Action Plan, Annex XIIIe).

#### F.4. Financial Management and Procurement

249. The financial management and procurement of this project will be guided by UNDP financial rules and regulations available [here](#). Further guidance is outlined in the financial resources management section of the UNDP Programme and Operations Policies and Procedures (POPP) available [here](#). UNDP has comprehensive procurement policies in place as outlined in the 'Contracts and Procurement' section of UNDP's POPP. The policies outline formal procurement standards and guidelines across each phase of the procurement process, and they apply to all procurements in UNDP (see here: <https://popp.undp.org/SitePages/POPPSubject.aspx?SBJID=211&Menu=BusinessUnit>)
250. The project will be implemented following the National Implementation Modality (NIM) following these guidelines [here](#). UNDP will ascertain the national capacities of the implementing partner by undertaking an evaluation of capacity following the Framework for Cash Transfers to Implementing Partners (part of the Harmonized Approach to Cash Transfers - [HACT](#)). All projects will be audited following the UNDP financial rules and regulations noted above and applicable audit guidelines and policies.
251. The NIM guidelines are a formal part of UNDP's policies and procedures, as set out in the UNDP POPP. The NIM guidelines were corporately developed and adopted by UNDP, and are fully compliant with UNDP's procurement and financial management rules and regulations.
252. The national executing entity MoWCA (also referred to as the national 'Implementing Partner' in UNDP terminology) is required to implement the project in compliance with UNDP rules and regulations, policies and procedures (including the NIM guidelines). In legal terms, this is ensured through the national Government's signature of the UNDP Standard Basic Assistance Agreement (SBAA), together with a UNDP project document, which will be signed by the Implementing Partner to govern the use of the funds. Both document require compliance. Prior to signature of the project document, Ministry of Women and Children Affairs

(MoWCA) as the national Implementing Partner, needs to have undergone a Harmonized Approach to Cash Transfer (HACT) assessment by UNDP to assess capacities to implement the project. During implementation, UNDP will provide oversight and quality assurance in accordance with its policies and procedures, and any specific requirements in the Accreditation Master Agreement (AMA) and project confirmation to be agreed with the GCF. This may include, but is not limited to, monitoring missions, spot checks, facilitation and participation in project board meetings, quarterly progress and annual implementation reviews, and audits at project level or at implementing partner level on the resources received from UNDP.

253. The Harmonized Approach to Cash Transfer (HACT) framework consists of four processes, namely: i) macro assessments; ii) micro assessments; iii) cash transfers and disbursements; and iv) assurance activities. Assurance activities include planning, periodic on-site reviews (spot checks), programmatic monitoring, scheduled audits and special audits. During micro-assessment, there can weaknesses identified for which actions are required to addresses the gaps. When a spot check finds that the gaps are not addressed it will mean that the level of assurance activities will have to remain higher and modalities of engaging with that implementing partner will have to be reviewed if necessary. All details are available here: <https://popp.undp.org/SitePages/POPPSubject.aspx?SBID=167&Menu=BusinessUnit> .
254. The project will be audited in accordance with UNDP policies and procedures on audits<sup>73</sup>, informed by and together with any specific requirements agreed in the AMA. According to the current audit policies, UNDP will be appointing the auditors. In UNDP scheduled audits are performed during the programme cycle as per UNDP assurance/audit plans, on the basis of the implementing partner's risk rating and UNDP's guidelines. A scheduled audit is used to determine whether the funds transferred to the implementing partner were used for the appropriate purpose and in accordance with the work plan. A scheduled audit can consist of a financial audit or an internal control audit.
255. All GCF resources will be provided to the executing entity, less any agreed cost recovery amount. Under UNDP's national implementation modality, UNDP advances cash funds on a quarterly basis to the executing entity for the implementation of agreed and approved programme activities, in accordance with UNDP standard policies and the NIM Guidelines. The executing entity reports back expenditure via a financial report on quarterly basis to UNDP. Any additional requirements will be as in accordance with the AMA.
256. A draft procurement plan (which will be further discussed and revised prior to UNDP Project Document signature) is provided in Annex XIIIa.

<sup>73</sup> All UNDP projects are subject to audit following UNDP Financial Rules and Regulations and applicable audit guidelines and policies. Office of Audit and Investigation (OAI) will monitor the compliance of audit process and assess the results of project audits on annual basis. OAI also issues specific TOR for the audit that has specified scope of audit services to be carried out in accordance with International Financing Reporting Standards (IFRS). The audit also covers the overall management of the project's implementation, monitoring and supervision.

## G.1. Risk Assessment Summary

257. Livelihood interventions related risks include the limited capacity of government officials and community members to plan and adopt resilient livelihoods, which is linked to the potential resource constraints or inability of beneficiaries to re-invest and self-sustain their running business (livelihood) costs, such as seeds or land lease. These potential risks will be mitigated through adequate capacity building and the matchmaking of beneficiaries with financial intermediaries. Another risk arises from limited coordination between women producer groups, value chain actors, and government decision makers that reduces the value chain and market linkage development, and creates barriers to ensure free flow of goods upstream and downstream of the value chain. This risk will be mitigated through the creation of adequate organizational structures that foster sectorial network creation and facilitated regular value chain stakeholder meetings at different governmental levels.
258. While a selection of the most significant Social and Environmental risks are presented in section G.2, the detailed risk assessment undertaken for the project covers all livelihood options including hydro-geonics, mud crab aquaculture, homestead agriculture, sesame, plant nursery and the crab feed value chain. A comprehensive Social and Environmental risk assessment can be found in Annex VI (a) Environmental and Social Impact Assessment (ESIA); Annex VI (b) Environmental and Social Management Framework and Annex VI (c) Indigenous Peoples' Planning Framework. In addition, the screening and assessment of these livelihoods is also detailed in Annex IIb, the Resilient Livelihoods Assessment Report. Other implementation and operational risks for livelihoods are detailed in G.2 below.
259. For the water provision interventions, the biggest risks are related to the Operation and Maintenance and maintenance of the systems. If RWH systems are not properly maintained, there are potential public health risks stemming from microbial contamination. Poor operation and maintenance of water provision systems, both for RWH and pond based filtration treatment systems may also result in technologies being abandoned or rendered useless over time in the target communities. These risks will be mitigated through the use of a code of conduct for the RWH system, as well as through community managed O&M committees. There is mild risk associated with installation of the tanks, which can be mitigated through the application of a construction management plan, including the management of waste and a soil erosion and sedimentation plan. Other implementation and operational risks are detailed in G.2 below.
260. The principle environmental risks arise from the adverse environmental impacts of aquaculture interventions, particularly related to crab hatcheries, crab farming and fish feed processing, as well as some risk in regards to the agricultural interventions if project practices in regards to prohibition of pesticide and fertilizer use are not implemented. There is a possibility that promotion of crab farming will negatively affect biodiversity by increasing pressure on wild crab stocks, however this has been directly addressed through the creating of crab hatcheries to provide crab stock for the farms, as well as parallel regulatory support to manage the collection of wild fry and to shift communities involved in crab farming and fattening to shift to hatchery produced stock. There is also a risk that the fish required to produce fish feed, as well as the feed used for crab will put pressure on wild fish stocks. This will be managed by promoting the use of sustainably sourced feed, including the use of fish processing waste and research into high-quality plant based feeds. Aquaculture interventions will also have impacts on soil acidification, the potential exacerbation of water quality impacts and the potential for disease. Many of the aquaculture impacts are also derived by lack of institutional capacity to manage the cumulative impacts of many clustered small-scale aquaculture interventions. These impacts will be mitigated by careful siting of aquaculture interventions and the use of international best practice in small scale aquaculture management, including planned water releases, water treatment through bioremediation, careful application of feed and consistent soil and water monitoring.
261. There are some environmental risks associated with the promotion of agricultural livelihoods. As the agricultural interventions take place in proximity to waterways, the use of pesticides and fertilizer can have an impact on water quality and public health. These possible impacts will be mitigated through prohibition of pesticide and fertilizer use in homestead gardens, plantations and aquageonics systems. Furthermore, training in integrated pest control and organic agricultural methods, and regular monitoring of water quality will take place.

262. Social risks arise from the socio-cultural context of the target districts where communal tensions between the majority Muslim populations and the minority Hindu populations have occurred. Furthermore, there is a risk of conflicts arising from beneficiary selection. Finally, previous aquaculture interventions in the target districts, and more generally in the coastal areas of Bangladesh have been subject to elite capture. Finally although the project is ultimately a gender focused intervention, there is a risk that existing social norms around gender empowerment and the perceptions of decent work for women, as well as restrictions on women's movement outside the homestead, and the related restriction on decent work will result in limited outcomes for beneficiary women, where income from livelihood generation activities ultimate remain in the control of men, despite focusing livelihoods assets and training towards women beneficiaries. There are also some risks that as gender norms are challenged, and existing power dynamics challenged, that women will become more vulnerable to violence and abuse already present in the targeted communities. The mitigation measures, which address each of these environmental and social risks, are described in detail in Section G.2.

## G.2. Risk Factors and Mitigation Measures

*Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.*

### Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
Risk 1: Vulnerability of both water provision solutions (RWH tanks and pond based systems) as well as livelihood options (aqua geaponics, hydroponics, plantations, crab farms) to storm surges, extreme winds and cyclones. Cyclones can cause RWH tanks to be moved or dislodged from base causing damage to nearby houses, storm surges can impact the quality of water used for pond based systems and the assets associated with the livelihood options can be damaged by extreme winds, floods and cyclones	Social and environmental	Medium (5.1-20% of project value)	Medium

#### Mitigation Measure(s)

The RWH tanks will be secured to cement platforms to minimize the risk of dislodging from the base. The community and institutional-scale RWH tanks will be made of reinforced concrete. Institutional and community level systems have been prioritized over household level systems where practical to minimize the possibility of damage to beneficiary houses. The pond based filtration units will be installed in a well-protected superstructure, resilient to disaster shocks. To improve climate-resiliency and prevent saltwater intrusion during intense cyclonic events, selected fresh water ponds (not in the vicinity of and exposed to shrimp farming), will be supported by raised embankments. All roof materials will be checked for structural integrity and guttering secured to ensure that catchment systems are resistant to extreme weather. Although the aquaculture interventions will be susceptible to cyclone damage, beneficiaries can use the early warning systems in the case of an impending extreme weather event, to minimize damage to assets and harvest all stock to minimize losses. These measures keep the risk at Medium.

### Selected Risk Factor 2

Description	Risk category	Level of impact	Probability of risk occurring
Risk 2: Exacerbation of soil and water salinity in pond culture of mud crabs. Since brackish water is used for pond culture, salt contents is exported to neighbouring fields through seepage, pond water discharge and pond sediments	Social and environmental	Medium (5.1-20% of project value)	Medium

#### Mitigation Measure(s)

The siting of crab farms will be strictly regulated by the project team, and in close consultation with government authorities to obtain the necessary licences and permits. Farms will only be allowed at the small and medium scales

at low densities, spatially dispersed to minimize cumulative impacts and will make use of existing shrimp ponds, in tidal zones already inundated by brackish water, with a strict prohibition of new ponds on existing agricultural land or expansion of farms. Perimeter ditches will be installed and clay pond lining used to control seepage into surrounding soil and groundwater, if deemed necessary after soil testing. Soil and water salinity will be carefully monitored. These measures keep the risk at Medium.

#### **Selected Risk Factor 3**

Description	Risk category	Level of impact	Probability of risk occurring
Risk 3: Expansion of crab farming will exacerbate already depleted wild stocks of crab fry and create an incentive for communities to enter mangrove areas and the Sundarbans Protected Forest for collection of wild fry with impacts on biodiversity. Currently crab farming in Bangladesh depends on collection of crab fry from mangrove areas, which has led to the depletions of wild stocks. Crab farming feed demand can also put a pressure on wild stocks due to the need for fishmeal, which currently comes from by-catch.	Social and environmental	Medium (5.1-20% of project value)	Medium

#### **Mitigation Measure(s)**

Crab hatcheries will be built as part of the livelihood component of the project in order to produce crab lets for use in crab farming by target beneficiaries. The project will also support environmental awareness training in communities and a code of practice to ensure that wild fry is not used, and will support enabling policy and regulations at the local government and national levels to promote the switch from reliance on wild stock to hatchery produced stock. The stock produced by the hatcheries will meet the demand created by the creation of crab farms under the project. These measures keep the risk at Medium.

#### **Selected Risk Factor 4**

Description	Risk category	Level of impact	Probability of risk occurring
Risk 4: Inadequate biosafety protocols in crab hatcheries. Water and airborne pathogens, poor hygiene of staff and equipment, and any organisms that are not adequately quarantined before entering the hatchery can negatively affect crab hatchery stock. A high level of biosecurity is required for high larval survival and production of cablets for the nursery phase of crab culture.	Social and environmental	Medium (5.1-20% of project value)	Medium

#### **Mitigation Measure(s)**

Hatchery facilities will be designed according to international best practice and will ensure that functional areas are separated to minimize spreading of contaminants between areas. Sterilization areas will be kept separate from operations areas, and staff will be trained to maintain proper hygiene and sterilization. The operation schedule of the hatchery will include regular shut down periods for cleaning and disinfection. Inlet and outlet water and wastewater will be thoroughly treated. Training will be given to all crab hatchery staff on best practice in biosecurity and knowledge dissemination, technical exchange and capacity building will be emphasized. These measures keep the risk at Medium.

#### **Selected Risk Factor 5**

Description	Risk category	Level of impact	Probability of risk occurring
Risk 5: Improper water management and effluent management of Mud crab farming. The proposed livelihood support for mud crab farming will be done at a small scale at the community level in extensive and	Social and environmental	Medium (5.1-20% of project value)	Medium

semi-intensive systems. Regardless, discharge wastewater from ponds into surrounding waterways, pollutes receiving systems and causes detrimental impacts, such as eutrophication, toxicity, and spread of disease. Untreated wastewater laden with uneaten feed and fish faeces contributes to nutrient pollution in the receiving estuaries.			
Mitigation Measure(s)			
Crab will be cultured according to international best practice to produce limited effluent and rely on a limited amount of external feed high quality feed which will be produced as part of the project. Farming will be carried out at low stocking densities. Best aquaculture practice will be applied, including minimal use of chemical inputs, antibiotics, drugs, and growth hormones, and supply chain linkages such as harvesting, processing, storage, and transportation will include environmental considerations and will be subject to an ESIA. All farms will be geographically dispersed to avoid accumulative impacts on water quality and polyculture systems with aquatic weeds with appropriate salinity tolerance will be researched to develop sustainable nutrient recycling systems (bioremediation) and scaled-up based on success. Water quality will be monitored on a regular basis and all aquaculture interventions sites will be subject to an Initial Environmental Examination and located an appropriate distance from environmentally sensitive mangrove areas. These measures keep the risk at Medium.			
<b>Selected Risk Factor 6</b>			
Description	Risk category	Level of impact	Probability of risk occurring
Risk 6: Crab disease risk. Crab culture, both in the hatcheries, and in the ponds is susceptible to disease, the incidence of which increases with higher stocking densities and poor water quality.	Social and environmental	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
International best practice will be used in mud crab aquaculture to minimize disease risk, including biosafety protocols used for the crab hatchery facilities. Training, low stocking densities (no more than 1.5/m <sup>2</sup> ) and water quality, feed consumption and disease incidence will be strictly monitored. These measures keep the risk at Medium.			
<b>Selected Risk Factor 7</b>			
Description	Risk category	Level of impact	Probability of risk occurring
Risk 7: Depletion of fish stocks due to demand as input for crab/fish feed processing for feed for crab farming and for the brackish water fish in the aqua-geoponics systems. Fish feed processing, as well the feed used in for crab requires inputs of small low-value fish, dried fish and shrimp heads which can put pressure on wild fish stocks if not sustainably sourced. Shrimp heads are also used locally for human consumption and feed demand may disrupt supply.	Social and environmental	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
The project will support the research and development of high quality crab/fish feed from plant-based sources that are locally available and do not rely on small fish and fish oils. In the initial phases, a formulation based on fulfilling the protein/fat requirement of the feed will be based on a low fish-processing by-product and shrimp head formulation, supplemented by vermiculture. This will be optimized over time for crab. A code of practice will also be developed for the GoB to move away from the use of small-fish and by-catch in aquaculture feeds. These measures keep the risk at Medium.			
<b>Selected Risk Factor 8</b>			

Description	Risk category	Level of impact	Probability of risk occurring
Risk 8: Lack of gender integration in aquaculture value chain. Women are playing an increasingly important role in the aquaculture value chain, however due to local norms and beliefs around appropriate work for women, restrictions on movement outside of the household (purdah) and the women's burden of unpaid work, women's participation have been largely limited to seeding and feeding of ponds and attempts to integrate women into other aspects of the aquaculture value chain has had mixed results.	Social and environmental	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
Lack of participation arises from multiple factors, which will be addressed by the project. Lack of knowledge and technical skills in aquaculture will be addressed through training designed for women beneficiaries, and training will be designed in a gender responsive manner, including use of flexible times, provision of household based trainings when required, and the use of female trainers. Male household members will also be integrated into separate trainings, coupled with norm and behaviours change programs at the community level. The project will ensure proper working conditions for female beneficiaries and will include training in negotiation skills, financial management and access to markets. The project will primarily use pond aquaculture rather than cage culture, which has shown better integration of women. The project will collect gender-disaggregated data on the effectiveness of interventions and apply lessons learned from the project and other interventions in the target districts to refine interventions. Continuous stakeholder consultations with women will ensure that beneficiary concerns and perspectives are incorporated over subsequent years of the project. These measures keep the risk at Medium.			
<b>Selected Risk Factor 9</b>			
Description	Risk category	Level of impact	Probability of risk occurring
Risk 9: Elite capture of aquaculture interventions and issues with land tenure. In the shrimp aquaculture value chain, it has been observed that due to the demand and profitability of farms, there was an effective privatization of resources which may have previously been under common property regimes for some or all of the year (by intermediaries, local elites and companies), and this led to profits and assets being controlled by powerful actors and local 'elites' rather than poor small-scale farmers.	Social and environmental	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
The projects will ensure that land tenure arrangements for beneficiaries are secured in the early stages of project implementation, including collective rights to community interventions for women. Project monitoring of possible elite capture will be supported through the project. Stakeholder engagement of communities will ensure knowledge of land tenure security and access to the grievance redress mechanism. These measures keep the risk at Medium.			
<b>Selected Risk Factor 10</b>			
Description	Risk category	Level of impact	Probability of risk occurring
Risk 10: Generation of waste materials from installation of rainwater systems and tanks. The project will involve the installation of very large rainwater tanks at 19 government building locations for institutional level rainwater harvesting, 228 tanks at community sites, and smaller tanks at the household level. There is potential for waste materials to be generated from extra pipe and guttering that exceeds the needs of the project.	Social and environmental	Low (<5% of project value)	Low

Mitigation Measure(s)			
Prior to installation, a full site evaluation will be undertaken to assess all sites, with consideration of proximity to water sources, suitability of existing roofing materials and proximity to environmentally sensitive areas. Appropriate measures will be taken to ensure a specific amount of material is procured according to RWH system design, thus, reducing waste. These measures keep the risk at Low.			
Selected Risk Factor 11			
Description	Risk category	Level of impact	Probability of risk occurring
Risk 11: Sediment movement during installation of rainwater harvesting tanks. During the installation of the rainwater tanks, it will be necessary to undertake earth works to provide a level platform to construct the tanks. The earth works will move sediment that, if not properly contained, may be removed either as air pollution or through overland flow during a rain event.	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
The installation of the rainwater tanks will be undertaken by experienced companies who will at the same time, train local staff in the construction of the tanks. To ensure that the sediment is not mobilised through current movement that will result in an impact, it will be necessary to prepare an erosion control sediment plan and install silt curtains to restrict sediment movement from the site. Further, any earthworks should be undertaken during the dry season and compacted sufficiently to reduce sediment movement. The plan should contain aspects including but not limited to the installation of sediment curtains to reduce sediment movement and the quick placement of footing material. These impacts will be spatially and temporally restricted. These measures keep the risk at Low.			
Selected Risk Factor 12			
Description	Risk category	Level of impact	Probability of risk occurring
Risk 12: Contamination of existing surface water. During the installation of the rainwater tanks, it will be necessary to undertake earth works to provide a level platform to construct the tanks. There is the potential for the release of chemicals, nutrients, heavy metals and other material that may be within the existing sediment and for these to enter waterways and groundwater systems during the works. Furthermore, semi-intensive aquaculture systems also risk degrading surface and ground water quality (see Risk 3) if not properly managed.	Social and environmental	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
As with the above, to ensure contaminants etc. do not enter waterways and groundwater systems, a water quality monitoring plan and management framework along with an erosion control sediment plan will be developed to ensure sediments are not released. This will involve testing sediment prior to movement and planning so that the works are not undertaken during rain events. Where rainfall is anticipated, appropriate material should be placed under the sediment prior to excavation to ensure there is no seepage into groundwater systems. The water quality monitoring for the sources will be designed to identify potential impacts so that management measures can be proactively rather than reactively enacted upon. These measures keep the risk at Medium.			
Selected Risk Factor 13			
Description	Risk category	Level of impact	Probability of risk occurring
Risk 13: Discrimination against vulnerable groups (Adivasi's and Hindu religious minorities) and beneficiary selection challenges. Extremely poor ethnic	Social and environmental	Medium (5.1-20% of project value)	Medium

and religious minority groups, who are often discriminated against, inhabit the two target districts. There are extreme poor Hindu families living in the target areas (-30 per cent of population in both Satkhira and Khulna), as well as indigenous (adivasi) families belonging to the Munda ethnic group. These groups may suffer discrimination in access to water (community and institutional level) and as well as in selection for livelihood interventions, and there is risk of conflict if selected or overlooked for household systems in both cases.			
Mitigation Measure(s)			
<p>A strict and transparent beneficiary selection process will ensure that project benefits are distributed in an equitable manner among the most vulnerable in the target districts, and that the selection is not based on any religious or basis. The selection process will be clearly documented and explained in stakeholder consultations with beneficiary communities. The final beneficiary selection will proportionately reflect the minority population. Siting of RWH tanks will also account for the preference of ethnic minorities to have a separate water access point and the final selection for HH tanks should be proportionate to the population of religious minority households at the ward level. Project evaluations should take a human rights-based and conflict sensitive approach and ensure that project benefits are distributed equitably. In case of any conflict or discrimination, minorities groups, along with all other project beneficiaries, can file a complaint using the grievance redress mechanism.</p> <p>The GRM focal point will also be given sensitivity training in regard to social marginalization. These measures keep the risk at Medium.</p>			
<b>Selected Risk Factor 14</b>			
Description	Risk category	Level of impact	Probability of risk occurring
Risk 14: Public health and sustainability risks from improper maintenance and operation of Rainwater Harvesting System. Rainwater Harvesting tanks require relatively simple operation and maintenance. There is some risk that improper operation and maintenance will lead to microbial contamination or that water in tanks may become a breeding site for mosquitoes	Technical and operational	Low (<5% of project value)	Medium
Mitigation Measure(s)			
<p>An environmental code of practice has been developed for the operation and maintenance of the rainwater harvesting tanks, as well as a detailed O&amp;M plan with the participation of the user groups. A pre-filter will be used prior to the tank storage to ensure that rainwater is free from microbial contamination, in conjunction with a first flush system to ensure that debris and other contamination from the catchment surface does not enter the tank. RWH tanks will be subject to regular operation and maintenance driven by a community led water management committee and a caretaker funded by the committee. The water management committee will be formed by representatives of the cluster of households (with a priority for women) that will collect water from each tank. Finally, water will be subject to regular water quality monitoring as per the ESMF. These measures reduce the probability of the risk from medium to low.</p>			
<b>Selected Risk Factor 15</b>			
Description	Risk category	Level of impact	Probability of risk occurring
Risk 15: Extreme weather events and/or disasters may affect project progress due to national and local urgency to address immediate disaster emergencies	Technical and operational	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			

Devastating cyclones hit the coastal areas of Bangladesh almost every year, usually accompanied by high speed winds, which infrequently reach 250 km/hour or more and 3-10 m high waves, causing extensive damage to life, property and livestock. Much of the target area is threatened with cyclonic storm surge. In order to mitigate these risks, the construction of the water supply technologies will be undertaken outside of the cyclone season. The duration of the project has been set to minimize the impact of delays which may be caused by circumstances such as storm surge. The risk of salt water inundation into the ponds from storm surges will be addressed through raising the pond embankment based on local knowledge of the historical height of flooding as well as survey data. The dissemination of EWs will also support the preparedness and response activities to mitigate implementation delays. These measures reduce the probability of the risk from medium to low.

#### **Selected Risk Factor 16**

Description	Risk category	Level of impact	Probability of risk occurring
Risk 16: Lack of Community Ownership and Buy-In to the water supply solutions	Other	Low (<5% of project value)	Medium

#### **Mitigation Measure(s)**

The social acceptability of the water supply solutions was considered during option selection. The final siting (for community-scale RWH tanks and pond treatment systems) and selection of beneficiaries and grouping (for access and distribution) will be undertaken during the first year of implementation to enable ownership and community buy-in. The formulation of Water User Groups (WUGs) and Water Management Committees (WMCs) will enable sustained community buy-in and management of the proposed water solutions. Site surveys were undertaken at institution buildings targeted for the installation of large and very large rainwater tanks (supplying 75 to 100 households). The site surveys included preliminary consultation with stakeholders to gain their permission for the future installation of RWH systems and tanks. These measures reduce the probability of the risk from medium to low.

#### **Selected Risk Factor 17**

Description	Risk category	Level of impact	Probability of risk occurring
Risk 17: Insufficient water stored in the rainwater tanks	Technical and operational	Low (<5% of project value)	Medium

#### **Mitigation Measure(s)**

The rainwater tanks have been sized to provide sufficient storage for the historical worst case of 180 days without rain based on the thirty years of climate records for both Satkhira and Khulna. Most years, the dry period without rain is much shorter than 180 days. Climate change predictions are for the peak monsoon months (June, July and August) to become warmer and wetter and the dry winter months (December, January, February) to become warmer and drier. Specifically a 5% decrease in rainfall is forecast for the dry winter months by 2050. The long-term average rainfall for the six driest months (to correspond with the 180 day design period) is 197mm in Satkhira District and 142mm in Khulna District. The design drought of 180 days with zero rainfall is more conservative than the climate change prediction for a 5% decrease in rainfall during the dry months. The caretaker of each community-scale and institution-scale rainwater tank will be responsible for monitoring the distribution of the 2 litres of drinking water per person per day to the target households. The caretaker will be supported by the WUGs and WMCs. These measures reduce the probability of the risk from medium to low.

#### **Selected Risk Factor 18**

Description	Risk category	Level of impact	Probability of risk occurring
Risk 18: Pond based filtration treatment technology fails due to poor water quality	Technical and operational	Low (<5% of project value)	Medium

#### **Mitigation Measure(s)**

The ponds that are currently used by villagers, but do not have any functional PSF installed at it, have been considered as potential locations for the pond based systems with filtration treatment. The suspended solids and salinity in these ponds are expected to be low as the water is currently being drunk untreated. Water quality testing will be carried at the proposed pond sites to select the most appropriate filtration technology . If a proposed pond location is found to be unsuitable during site selection, alternative water sources will be confirmed (for example additional community-scale or institution-scale RWH systems). Ongoing water quality monitoring will be carried out.

Installation with warranty would be procured to ensure robust technical support for long-term viability of filtration treatment solutions. These measures reduce the probability of the risk from medium to low.

#### **Selected Risk Factor 19**

Description	Risk category	Level of impact	Probability of risk occurring
Risk 19: Household level RWH systems fail either during installation or due to lack of maintenance/repairs	Technical and operational	Medium (5.1-20% of project value)	Medium

#### **Mitigation Measure(s)**

The implementation success of the household level RWH systems will be ensured through community mobilization, WUG formation for clusters of households with household level RWH, technical support from the caretaker and ongoing institutional support from DPHE. The project will initiate and facilitate, through capacity building and peer-to-peer learning activities, continued monitoring of the availability and quality of the systems. A nominal household fee will be collected to cover the materials for regular minor maintenance as well as a contribution towards the caretaker's salary. In addition to this nominal fee, households with household level RWH will also be encouraged to pay an amount of US\$19 per year as a set-aside to cover the household contribution to the major repairs/replacements for the short life assets of household roof catchment and gutters etc. These measures reduce the probability of the risk from medium to low.

#### **Selected Risk Factor 20**

Description	Risk category	Level of impact	Probability of risk occurring
Risk 20: Increase in community conflict and Gender Based Violence (GBV) due to challenging community gender norms and targeting women as primary beneficiaries of project interventions.	Social and environmental	Medium (5.1-20% of project value)	Medium

#### **Mitigation Measure(s)**

In designing the project interventions, a balance was considered between providing opportunities that would be considered suitable for, and preferred by, women with an expansion of opportunities in value chains in which women are already participating, such as aquaculture, for which additional skills and conditions are required to have access to fair and equitable economic opportunities. The norms and beliefs of community members in regards to "appropriate work for women" as well as exposure to GBV will be addressed through ongoing consultations and community sensitization activities, including women beneficiaries, as well as family members and the broader community. Finally, a robust, gender-sensitive grievance mechanism will be put in place, which will allow beneficiary women to report any incidences of social conflict arising from their involvement in project activities. The GRM will include women focal points, available to record and manage grievances that women beneficiaries may hesitate to report to male focal points

#### **Selected Risk Factor 21**

Description	Risk category	Level of impact	Probability of risk occurring
-------------	---------------	-----------------	-------------------------------

<p>Risk 21: There is a possibility of increased application of pesticides and fertilizers in the target areas due to the expansion of plant cultivation activities. Given that hydroponic systems will be used, there is the potential for eutrophication and public health impacts (from pesticides).</p>	<p>Social and environmental</p>	<p>Medium (5.1-20% of project value)</p>	<p>Medium</p>
<p>Mitigation Measure(s)</p>			
<p>The project will train beneficiaries in organic plant cultivation methods. Plant cultivation will be maximized using techniques such as mixed cropping, high quality seeds, raised beds, and organic fertilizer. Pesticide use will be prohibited, and avoided by offering training in Integrated Pest Control methods, such as hand collection, Neem extract application and bagging. Organic fertilizer use will be regulated and Water quality will be monitored in hydroponic and aquageoponics systems</p>			

## H.1. Logic Framework.

### H.1.1. Paradigm Shift Objectives and Impacts at the Fund level<sup>74</sup>

Paradigm shift objectives						
Increased climate-resilient sustainable development	The <b>paradigm shift</b> for the project is to move away from focus on short-term responses and technology-led interventions towards community-centric solutions that build ownership and capacities for sustainable, long-term adaptive responses to safeguard water security and livelihoods. Awareness, enhanced livelihood asset base, skills building, value-chain and market linkages will promote a transformational switch from current, non-adaptive livelihoods to climate-resilient livelihoods that can, in turn, reduce the vulnerabilities of the extreme poor against future climate change risks. Climate-resilient water technologies provide the communities with a means to shift away from their dependence on ground-water to surface water systems that can address seasonal variability and cope with slow- and sudden-onset changes. Institutional capacities, knowledge, and learning builds capacities across a variety of stakeholders for evidence-based implementation of adaptive solutions and creates an enabling environment to support communities, particularly, women as 'change-agents' for climate action.					
Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Fund-level impacts						
A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	O Total Number of direct and indirect beneficiaries; Number of beneficiaries relative to total population; disaggregated by gender	Project reports: annual reports; mid-term and final evaluations;	57,737 <sup>75</sup>	136,110 <sup>78</sup>	245,516 direct <sup>80</sup> ;  473,713 <sup>81</sup> indirect;  719,229 Total (50.2% female) (around 16.25% of the total population the two districts <sup>82</sup> )	Community-buy in and adoption of livelihoods.  Completed infrastructure and sustained maintenance for water supply systems  Uptake of training and capacity building by community and women on water management and climate-resilient livelihoods.
A2.0 Increased resilience of health and well- being, and food and water security	O Number of males and females benefiting from the adoption of diversified, climate- resilient livelihood options (including fisheries, agriculture, etc.);  Number of males and females with year - round access to reliable and safe water supply despite	Gender-sensitive field surveys, regional database, project monitoring (livelihood and water access	0 <sup>76</sup>			Uptake by government institutions of capacity for climate-risk informed management of livelihood and

<sup>74</sup> Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that [some indicators are under refinement](http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf)): [http://www.gcfund.org/fileadmin/00\\_customer/documents/Operations/5.3\\_Initial\\_PMF.pdf](http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf)

<sup>75</sup> Aggregate based on the baseline value for the water interventions and EWs (conservatively chose the higher if the two numbers)

<sup>76</sup> Currently none of the targeted beneficiaries in the selected wards are practicing resilient livelihoods.

<sup>78</sup> The aggregate of mid-term beneficiaries was used (the superset of the number of beneficiaries under livelihoods, water, and EWs – to avoid overlap).

<sup>80</sup> Direct beneficiaries consider the aggregated coverage of people targeted through the livelihood interventions, water interventions, and early warning systems (25,425\*4.4=83,904+ 600 value chain actors: 30,025 beneficiaries for livelihoods; 136,110 for water, and 245,516 for EWs). To aggregate the three constituent beneficiaries of direct water provision and livelihood interventions, a conservative approach was chosen. In the wards from Zone 2 for water provision, where 50 per cent of the ward is targeted for water supply, the aggregate direct beneficiary number is taken as the highest of the water and the livelihoods targets. Based on this, the total direct beneficiary number for just the water and livelihood interventions is 178,075 people. When considering the 100 per cent coverage of the ward population through the EWs interventions the aggregate total direct beneficiaries of Output 1 and 2 are 245,516 people, of which 50.2 per cent are women. The target is cumulative of the baseline.

<sup>81</sup> Indirect beneficiaries include (i) water users- including the existing baseline population with functioning water supply as the quality and quantity of their water supply could be improved (depending on water source, for example saline intrusion into groundwater could decrease when the extraction rate decreases) – 57,737 (see FN 16) ; and (iii) EWs beneficiaries – which include 80 per cent of the remaining population of the non-targeted wards of the targeted 39 unions (which is 719,229 people) as the project builds capacities of the Union level DMCs to support last-mile dissemination of EWs to the remaining wards. Aggregate, this is 80 per cent (see FN 83) of the total population of 899,036 of the targeted 39 unions minus the direct beneficiaries (719,229-245,516=473,713).

<sup>82</sup> The total direct and indirect beneficiaries is 719,229, which is 16.25 per cent of the population of the two targeted districts, which is (based on the 2011 BBS census data and a 4.4 people per household average): 4,427,662 people

	climate stresses	shocks and	and quality surveys)	737 <sup>77</sup> people with year-round access to safe drinking water	19,069 <sup>79</sup> women (of which 50.2% are female) 136,110(of whom 68,327 are women)	25,425 <sup>83</sup> women 136,110 <sup>84</sup> (of whom 68,327 are women)	drinking water solutions.
--	------------------	------------	----------------------	--	---	--	---------------------------

<sup>77</sup> The baseline for the existing safe drinking water supply is based on the people supplied by non-saline drinking water sources (e.g. deep tube wells rather than shallow tube wells) that provide year-round access of at least 2 LCPD drinking water to recipients. The baseline does not include water sources that are being used but are saline. Current baseline is 13,122 HHs (13,122 \* 4.4 = 57,737) in the target wards out of a total of 56,298 households as measured through the PRA process. This is equivalent to 23 per cent of the households in the target wards.

<sup>79</sup> The mid-term beneficiary figure of 19,069 is based on a conservative estimate of 75 per cent of the total target beneficiaries of 25,425 (see footnote 9 for more details on the computation of the total direct beneficiaries for livelihoods). Despite, the total target number of women will have received assets, tools, and inputs to start an alternative, resilient livelihood by mid-term, only 75 per cent will be considered due to the continued training the women receive throughout the entire project cycle and the perceived time it will take the women to develop capacities to sustainably and independent continue their livelihoods and access finance.

<sup>73</sup> The number of beneficiaries are the same for the mid-term and target and included. The project is expected to establish all infrastructure and provide access to year-round safe water by mid-term.

<sup>83</sup> The target population for the livelihood interventions were identified based on current livelihood practices in the selected wards. The distribution of women and households currently engaged in non-adaptive livelihoods, e.g. fisheries, agriculture, agriculture day labourers (which ranged between 15-70 per cent of the entire ward population), were targeted as being direct beneficiaries. This led to an identified need to form 1017 women livelihood groups of 25 women to provide 25,425 women (1017\*25=25,425) with alternative, adaptive livelihoods.

<sup>78</sup> (see FN 73).

### H.1.2. Outcomes, Outputs, Activities, and Inputs at Project/ Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Project/programme outcomes	Outcomes that contribute to Fund-level impacts					
A7.0 Strengthened adaptive capacity and reduced exposure to climate risks	0 Use by vulnerable households, communities, businesses and public-sector services of Fund-supported tools, instruments, strategies and activities to respond to climate change and variability	Gender sensitive project reports, field verification, and surveys (including questioned based surveys/interviews/q ualitative scorecard assessment)	57,737 <sup>85</sup>	136,110 <sup>86</sup>	245,516 direct <sup>87</sup> (50.2% of whom are female).	Community-buy in and adoption of livelihoods.  Completed infrastructure and sustained maintenance for water supply systems  Uptake of training and capacity building by community and women on resilient livelihoods and water management.  Uptake by government institutions of capacity for climate-risk informed planning and management of livelihood and drinking water solutions.
Project/programme outputs	Outputs that contribute to outcomes					

<sup>85</sup> Aggregate based on the baseline value for the water interventions and EWS (conservatively chose the higher if the two numbers)

<sup>81</sup> The number of beneficiaries at mid-are the same for the mid-term and target. The project is expected to establish all infrastructure and provide access to year-round safe water by mid-term. The estimation of 136,110 was made as follows: The first step for calculating the number of target direct beneficiaries for water supply interventions was to subtract the baseline from the number of households in the ward to determine the water supply gap. The second step was to multiply the number of households without existing functioning drinking water supply in each ward by the zone factor of either 50 per cent or 100 per cent to obtain the number of target direct beneficiaries for water supply interventions in each ward. The zone factor is 100 per cent for Zone 1 (Paikghacha and Assassuni upazila) as there is no overlap with other planned donor-funded interventions and 100 per cent of the households in the identified vulnerable wards are targeted as beneficiaries for potable water provision. The zone factor is 50 per cent for Zone 2 (Dacope, Shyamnagar, and Koyraupazila) as 50 per cent of the water supply gap in these upazila will be covered by other projects. The female ratio was estimated at 50.2 per cent based on the PRA process and census data.

<sup>87</sup> See FN 74

1. Climate-resilient livelihoods, focusing on women, for enhanced adaptive capacities of coastal agricultural communities	<i>Number of women in targeted wards with improved assets and income from climate resilient livelihoods</i>	Baseline and Endline surveys.	0 <sup>88</sup>	19,069 <sup>90</sup>	25,425 <sup>92</sup> women	Uptake of training and capacity building by women/ women groups on resilient livelihoods
	<i>Number of males and females with access to timely, gender-responsive early warning information</i>	Monitoring and social auditing reports	49,103 <sup>89</sup>	122,758 people <sup>91</sup> (50.2% female)	245,516 <sup>93</sup> (50.2% of whom are female).	No major disaster occurs in the project locations that may damage or destroy livelihood assets and yields.
	<i>Social audit protocols established and operational across 39 Unions for participatory monitoring of resilient livelihoods</i>	Impact evaluation	No social auditing protocols available for climate resilient livelihoods	Social auditing protocols developed and operational across 15 unions	Social auditing protocols developed and operational across 39 unions	There is capacity of value chain actors to supply WLGs with supplies and to market produced goods, and to establish sectorial coordination through PPIs.

<sup>88</sup> Currently none of the targeted beneficiaries are practicing resilient livelihoods.

<sup>89</sup> The existing EWS in the unions through male-based organizational structures (CPP program) currently effectively reaches 20 per cent (49,103 people) of the total population of 245,516 in the targeted wards ( $245,516 \times 0.2 = 49,103$  people). While cyclone warnings currently reach around 80 per cent of the population, the ability to fully understand the significance of the warning was found to be 20 per cent (Roy et. al, 2015).

<sup>90</sup> The mid-term beneficiary figure of 19,069 is based on a conservative estimate of 75 per cent of the total target beneficiaries of 25,425 (see footnote 9 for the calculation of target beneficiaries). Despite, the total target number of women will have received assets, tools, and inputs to start an alternative, resilient livelihood by mid-term, only 75 per cent will be considered due to the continued training the women receive throughout the entire project cycle and the perceived time it will take the women to develop capacities to sustainably and independent continue their livelihoods and access finance.

<sup>91</sup> The formation of one women and girls volunteer group with 15 people per ward (with three subgroups of 5 people each) will gradually build up its capacity throughout the project lifetime. Thus, a conservative 50 per cent coverage of the total ward population of 245,516 is considered by mid-term ( $245,516 \times 0.5 = 122,758$ ).

<sup>92</sup> The target population for the livelihood interventions were identified based on current livelihood practices in the selected wards. The distribution of women and households currently engaged in non-adaptive livelihoods, e.g. fisheries, agriculture, agriculture day labourers (which ranged between 15-70 per cent of the entire ward population), were targeted as being direct beneficiaries. This led to an identified need to form 1017 women livelihood groups of 25 women to provide 25,425 women ( $1017 \times 25 = 25,425$ ) with alternative, resilient livelihoods.

<sup>93</sup> The total beneficiary numbers of the last-mile EWs through women and girl volunteer groups will reach the entire ward population of the 101 selected wards of 245,516 people through mock exercises and information provision. Target is cumulative of the baseline.

2. Gender-responsive access to year-round, safe and reliable climate-resilient drinking water solutions	<i>Number of males and females with year-round access to reliable and safe drinking water</i>	DPHE registration database for the water supply systems.	57,737 <sup>94</sup> people with year-round access to safe drinking water	136,110 <sup>95</sup> (of whom 68,327 are women)	136,110 <sup>96</sup> (of whom 68,327 are women)	Completed infrastructure and sustained maintenance for water supply systems.
	<i>Total Number of project-established climate-resilient drinking water systems operational</i>	Project monitoring reports - Mid Term Review; Project Evaluation Report	0	7000	13596 <sup>97</sup>	No major disaster occurs in the project locations that may delay the installation of the rainwater harvesting tanks and pond treatment systems.
		Baseline and Endline surveys				Sufficient rainfall can be collected in the rainwater tanks to help achieve water security.
		Field Verification				Raising the embankment of the ponds prevents the ponds from becoming saline.
		Water quality monitoring results (aligned with activity 2.3)				Community cohesion and O&M capacities and commitments.
						DPHE and LGI are adequately mobilised to back up O&M

<sup>94</sup> In general, 100% people have access to some form of sources of drinking water. An estimated 61% people have access to some quality water sources (but not year round), and only 23% of the people have access to year round quality drinking water. (Source, BBS 2011, DPHE 2016 and PRA survey 2017). The coverage that qualifies as year-round, safe drinking water in each of the targeted Unions is treated as 'baseline' in the project logframe. The baseline for the existing safe drinking water supply is based on the people supplied by non-saline drinking water sources (e.g. deep tube wells rather than shallow tube wells) that provide year-round access of at least 2 LCPD drinking water to recipients. The baseline does not include water sources that are being used but are saline. Current baseline is 13,122 HHs ( $13,122 \times 4.4 = 57,737$ ) in the target wards out of a total of 56,298 households as measured through the PRA process. This is equivalent to 23 per cent of the households in the target wards.

<sup>95</sup> The first step for calculating the number of target direct beneficiaries for water supply interventions was to subtract the baseline coverage of year-round non-saline drinking water from the number of households in the ward to determine the water supply gap. The second step was to multiply the number of households without existing functioning non-saline drinking water supply in each ward by the zone factor of either 50 per cent or 100 per cent to obtain the number of target direct beneficiaries for water supply interventions in each ward. The zone factor is 100 per cent for Zone 1 (Paikghacha and Assassuni upazila) as there is no overlap with other planned donor-funded interventions and 100 per cent of the households in the identified vulnerable wards are targeted as beneficiaries for potable water provision. The zone factor is 50 per cent for Zone 2 (Dacope, Shyamnagar, and Koyra upazila) as 50 per cent of the water supply gap in these upazila will be covered by the development projects being undertaken by World Health and Oh Horizon. The female ratio was estimated at 50.2 per cent based on the PRA process and census data.

<sup>96</sup> The first step for calculating the number of target direct beneficiaries for water supply interventions was to subtract the baseline coverage of year-round non-saline drinking water from the number of households in the ward to determine the water supply gap. The second step was to multiply the number of households without existing functioning non-saline drinking water supply in each ward by the zone factor of either 50 per cent or 100 per cent to obtain the number of target direct beneficiaries for water supply interventions in each ward. The zone factor is 100 per cent for Zone 1 (Paikghacha and Assassuni upazila) as there is no overlap with other planned donor-funded interventions and 100 per cent of the households in the identified vulnerable wards are targeted as beneficiaries for potable water provision. The zone factor is 50 per cent for Zone 2 (Dacope, Shyamnagar, and Koyraupazila) as 50 per cent of the water supply gap in these upazila will be covered by the development projects being undertaken by World Health and Oh Horizon. The female ratio was estimated at 50.2 per cent based on the PRA process and census data. The target is incremental of the baseline.

<sup>97</sup> Estimated 13,308 household RWH systems; 228 community-scale RWH systems; 19 institutional-scale RWH systems; and 41 pond embankments.

3. Strengthened institutional capacities, knowledge and learning for climate-risk informed management of livelihoods and drinking water security	Number of government staff across MoWCA and DPHE who effectively apply skills in climate-risk informed planning and management for livelihoods and water (disaggregated by gender).	Qualitative score card applied to assess capacities of MoWCA and DPHE to undertake gender-response, climate-resilient management of livelihoods and drinking water resp.	0 <sup>98</sup>	250 <sup>99</sup> (of whom 30 % are women)	525 <sup>100</sup>	Skill building trainings do not result in accelerated turn-over of staff.  The host departments allow their staff to be away for skill building for sustained period of time
	Evidence of policy/programs in other sectors integrating gender and climate change  Number of girls and boys with increased awareness through 'adaptive learning' training through school and community based communications	Government websites verified for availability of tools/scenarios  Other sectoral policies/programs assessed for integration of gender and climate change (e.g. NAPs, Delta Plan, 8th 5 year plan, Forestry, Agriculture, etc.)  Impact evaluation of the 'adaptive learning' intervention  Baseline and Endline surveys – project monitoring reports	No integration of gender and climate change through MoWCA into other sectoral policies/programs  0	MoWCA's capacity enhanced through development of 'gender and climate change action plan' to support integration into other sectoral policies/programs  1500	Integration of gender and CC into at least 2 sectors through MoWCA  3000 <sup>101</sup>	MoWCA/DWA successfully uptake training and knowledge.  Willingness by other relevant Ministries to integrate gender and CC into design and implementation of programmes.
Activities	Description		Inputs		Description	
1.1 Enterprise- and community-based implementation of climate-resilient livelihoods for women  <u>Gender-Action Plan related indicator(s):</u> <sup>102</sup>	This activity will support the implementation of these climate-resilient livelihoods through organized groups of women, Women Livelihood Groups (WLGs), facilitating peer-to-peer learning for adoption, knowledge transfer, skills development, financial management, and capacity building for long-term viability of the resilient livelihoods.  At each of the Union Parishads, these WLGs would be supported by 'Women Standing Committees', which are established structures that operate at the Union level		1.1.1 Participatory mapping for the portfolio of climate-resilient livelihoods through <u>5 workshops across the Upazilas</u>  1.1.2 Development of livelihood profiles based on the community livelihood risk and adaptation assessment and selection of		Community-specific, participatory mapping will be undertaken. Based on the vulnerability and risk assessments, livelihood profiles would be developed. Beneficiaries will be selected in view of this assessment/profiles.  Women will be organized into about 1017 Women Livelihood Groups (WLGs) who will receive assets, skills development, and training to implement one or two selected	

<sup>98</sup> None of the institutional staff would be trained on the project introduced/supported climate risk modeling, planning tools, or mainstreaming of these strategies into their planning, monitoring, and implementation at the beginning of the project.

<sup>99</sup> By the mid-term of the project about half the staff trainings would be completed and staff would have been trained on the development of the scenarios/modeling/planning tool kits/gender action modules, etc. (see Implementation Timetable)

<sup>100</sup> By the end of the project 405 number of MoWCA/DWA and 120 number of DPHE staff would have undergone both initial and refresher trainings and engaged in the planning, monitoring, and implementation of the livelihoods and water solutions.

<sup>101</sup> Based on targeting 150 students each in 10 highschools across the unions (grades 8,9,10) and 150 non-school going boys and girls among the targeted HHs across 10 unions. Mid-term target aims for reaching half the targeted youth.

<sup>102</sup> For further details, please see Gender Analysis and Action Plan, Annex XIIIc

<p><i>Number of women and women-headed households in targeted wards with improved assets and income from climate resilient livelihoods</i></p>	<p>and comprise of local extension support (LGI) staff. The WSC will support them in addressing institutional barriers and enhancing vertical coordination linkages with Upazilas and districts.</p> <p>GCF resources will support initial investments into inputs and assets (and GoB co-financing inputs for additional production cycle for crab farming, crab nurseries, and homestead gardening); however, a phased approach will be supported to build the financial capacity of the WLGs to procure their own inputs through the subsequent production cycles.</p> <p>GCF and GoB resources will be blended to support technical training and community sensitization campaigns for skills transfer; promotion of best practices and norms; awareness raising; and O&amp;M, financial planning, and marketing.</p>	<p>beneficiaries (Utilize ActionAid resilience index)</p> <p>1.1.3. Formation and reactivation of 1017 Women Livelihood Groups (WLGs) based on the livelihood profiles (coordinating with Water User Groups – WUGs – under Output 2)</p> <p>1.1.4. Procurement of inputs, assets and tools for community-based management (through WLGs) of climate-resilient livelihoods</p> <p>1.1.5 ToT approach and community sensitization/awareness through <u>8 workshops (across 6 years) in 39 unions</u> for WLGs (involving WSCs/LGIs/MoWCA staff in 39 Unions) on skills development on climate resilient technologies, best practices and norms, sustainable management practices, and O&amp;M of resilient livelihoods (in coordination with BFRI for aquaculture interventions)</p> <p>1.1.6 ToT approach through <u>8 workshops (across 6 years) in 39 unions</u> for WLGs (involving WSCs/LGIs) to support business skills development resulting in marketing and financing plans for resilient livelihoods</p>	<p>resilient livelihood/s. Monthly group meetings would be facilitated to support continued learning and implementation.</p> <p>WLGs would be provided with upfront investments in inputs, assets, and tools to initiate new, climate-resilient livelihoods. Additional inputs would be provided for 1 year for homestead gardening, for 1 additional growing cycle for crab farms, and for 2 additional growing cycles for crab nurseries and then phased out as HH investment (and linkages with input service providers) is expected to phase in.</p> <p>ToT approach would be undertaken to build the capacity at various levels:</p> <ul style="list-style-type: none"> <li>- WLGs (at Ward level) would be trained in coordination with Women Standing Committees (WSCs) and the extension staff of LGIs at the Union Parishad level to support technical skills transfer as well as O&amp;M capacities (<u>bi-annual</u>)</li> </ul> <p><u>MoWCA</u> staff at the national level would also be <u>annually</u> engaged in the ToT to build institutional capacities to support community-based climate-resilient livelihoods</p> <p>WLGs will also be sensitized in best practices and awareness raised on fair working conditions, land tenure arrangements and negotiation for the women; and sustainable management of inputs and production.</p> <p>Specific training would also be provided (part of training for all 1017 WLGs) for business skills uptake and development of marketing and financing plans in light of value-chains and market access (Activity 1.2)</p>
<p>1.2. Strengthened climate-resilient value-chains and market linkages for alternative, resilient livelihoods</p> <p><u>Gender-Action Plan related indicator(s):</u></p> <p><i>Number of women with improved access to markets</i></p>	<p>GoB co-financing (with incremental support from GCF resources on incorporating climate risks) will primarily be invested in climate-resilient value-chain and market development activities for those resilient livelihoods that can leverage economies of scale, promote linkages across value-chains from production through market access, and enhance private sector engagement through establishment of public-private platforms. These linkages will enable knowledge sharing for improved technologies, practices, and management for resilient production and scale of the resilient livelihoods. Combined with the capacity building across value-chain actors (Activity 1.3) on climate risk reduction strategies, these linkages engender adaptive</p>	<p>1.2.1. Participatory, climate-risk informed, value-chain development planning among WLGs, linking with value-chain actors</p> <p>1.2.2. Climate-risk informed, value addition investments for resilient livelihoods (upgrading of 2 existing crab hatcheries)</p> <p>1.2.3. ToT based technical training, incorporating climate change risks, for operation and management of value-addition</p>	<p>Building on preliminary Ward-specific value-chain analysis and recommendations undertaken during project design (Annex IIb), WLG specific, participatory value-chain development planning will be undertaken during initial phase of implementation.</p> <p>Project resources (GoB co-finance) will be invested in upgrading two existing crab hatcheries to enable the resilient, crab value chain development.</p> <p>Technical operators, including women, would be trained (<u>initial</u>,</p>

<p><i>Number of women with improved access to finance</i></p>	<p>capacities across communities and support the exit strategy for the project.</p> <p>In particular, GoB resources will be leveraged to fully finance the upgrading of two existing crab hatcheries (one Government owned and one private sector owned) to ensure the up-scaling of the crab-farming and crab-nursery related resilient livelihoods introduced by the project. The project will also support the GoB in developing codes of practice to reduce adverse environmental stresses of the value-chains advanced.</p> <p>Finally, this activity will also enable access to finance linkages between the WLGs and value-chain actors and the financial intermediaries. For the switch to climate-resilient livelihoods to be sustained, GoB co-financing will be targeted to build on the collateral and financial capacities supported through investments in resilient livelihoods and connect the beneficiaries with financial intermediaries such as MFIs. Specifically, this Activity will support business and financial planning for beneficiaries, awareness, and training for financial intermediaries on climate risks and resilient livelihoods, and networking through workshops and forums to connect lenders and borrowers</p>	<p>technologies and facilities (<u>1 training for 2 technicians per each hatchery</u>)</p> <p>1.2.4 Development of a Codes of Practice for sustainable production and management of small aquaculture as climate change risks evolve</p> <p>1.2.5. Establishment and facilitation (<u>through quarterly workshops</u>) of the PPIs at Upazila level to enable replication and scale of climate-resilient livelihoods (<u>39 networking events</u> at union level to form PPIs)</p> <p>1.2.6 Training (<u>1 initial and mid-project refresher</u>) of Upazila and District level staff (MoWCA and DWA staff, Department of Agriculture, Department of Fisheries, LGIs) on supporting PPIs</p> <p>1.2.7 Capacity building workshops and networking events (<u>annually in all 39 unions</u>) for WLGs, value-chain actors, and FIs to promote access to finance linkages for sustained resilient livelihoods and value-chain investments</p>	<p><u>and annual refresher</u>) in the operation and maintenance of the facilities. O&amp;M backstopping would be provided for the investments of the WLGs.</p> <p>Codes of Practice for (i) environmental management of small aquaculture, (ii) development of sustainable aquaculture feeds without fishmeal from by-catch, and (iii) Switching from wild fry collection to hatchery stock in crab farming.</p> <p>PPIs will be established (and facilitated to <u>meet quarterly</u>) at the Upazila level with the platform comprising of represented members of the WLG from each union, value-chain actors and stakeholders from the ward, union, and Upazila levels, financial intermediaries, government representatives including DAE, Fisheries, etc. The platform will be hosted by MoWCA to facilitate public sector support to the PPIs whereas the decision making and governance of the platforms is retained by the private sector actors and WLGs.</p> <p>Producers would be linked with FIs and capacities built for both actors to understand climate risks and the financing products relevant for group-based climate-resilient livelihoods. Training and networking events will be supported <u>annually</u> to link WLGs, Value-chain actors, and FIs to promote access to finance. This is also enabled by business skills development of the WLGs/Value-chain actors undertaken in Activity 1.1.</p>
---	--	--	---

<p>1.3. Community-based monitoring and last-mile dissemination of EWs for climate-risk informed, adaptive management of resilient livelihoods</p> <p><u>Gender-Action Plan related indicator(s):</u></p> <p><i>Number of women participating in training on implementation of climate-risk reduction strategies and on results monitoring of livelihoods</i></p>	<p>This Activity focuses on building capacities for women, value-chain actors, and institutional support staff (WSCs/LGIs/MoWCA) in adaptive planning and management of the new livelihoods in light of evolving climate risks including slow- and sudden-onset climate change events.</p> <p>GCF resources will also be invested in capacitating and equipping women and girls to support last-mile dissemination of early warning and preparedness information to facilitate timely and effective response to extreme events. Union-level Disaster Management Committees (DMCs) will also be trained to support dissemination to other Wards of the targeted Unions.</p> <p>This Activity will also support the development of social audit protocols and training of the targeted beneficiaries as well as institutional staff (LGIs/MoWCA) in social auditing approaches to ensure that women are empowered to monitor their livelihoods, assess the effectiveness of the results, and adapt the implementation of the livelihoods to manage evolving climate change risks.</p> <p>This Activity closely links with Output 3 in which the institutional capacities and knowledge are promoted to create an enabling environment for climate-risk informed livelihood planning. Therefore, the capacity building under this Activity will foster upward linkages among communities, NGOs, and Government institutions to support evidence-based, community-driven adaptation planning for resilient livelihoods.</p>	<p>1.3.1. Awareness and capacity building through 101 workshops (<u>initial, and 5 annual at all wards</u>) for women groups and value-chain actors on climate risk reduction strategies</p> <p>1.3.2. Formation of women and girl volunteer groups in <u>101 targeted wards (15 per ward)</u> (including beneficiaries in WLGs) and (ToT) training (<u>twice a year workshop</u>) on dissemination and delivery of actionable early warnings (in coordination with CPP)</p> <p>1.3.3 ToT based training, learning exchange, and advocacy (<u>39 workshops, twice during project</u>) for DMC staff, Union level CPP volunteer groups, BRCS, and MoDMOR staff to enable replication of the volunteer mechanisms across other wards and Unions</p> <p>1.3.4 Development of climate-risk informed social audit protocol and toolkits for participatory monitoring and evaluation of climate-resilient livelihoods</p> <p>1.3.5 ToT based training (<u>8 batch trainings</u>) for WLGs and institutional staff (LGIs/DWA) on results monitoring of livelihoods in light of evolving climate risks</p>	<p>Workshops and training will be provided to enhance the awareness and capacities among WLGs and value-chain actors as well as local WSC and LGI staff in climate risks reduction strategies to safeguards lives, livelihoods and assets.</p> <p>Targeting beneficiary HHs, women and girl volunteer groups will be formed in coordination with the 'Cyclone Preparedness Program' (CPP). Through ToT-based training, distribution of basic equipment, preparedness/response activities, women and girls will be capacitated to support last-mile dissemination of early warning and preparedness information to facilitate timely and effective response to extreme events.</p> <p>The project will also build the capacity of Union-level Disaster Management Committees (DMCs) to facilitate the development of volunteers in other wards with similar skills to enable replication and scale. MoWCA will also support advocacy with CPP, Bangladesh Red Crescent Society, and Ministry of Disaster management and Relief (MoDMR) and coordinate with the NRP to scale up these women and girls volunteer groups and mechanisms for last mile dissemination of EWs to the remaining Unions across the two districts.</p> <p>Social audit protocols and toolkits will be developed and training of the targeted beneficiaries as well as institutional staff (LGIs/MoWCA) will be undertaken in social auditing approaches to ensure that women are empowered to monitor their livelihoods, assess the effectiveness of the results, and adapt the implementation of the livelihoods to manage evolving conditions including that of climate change.</p>
<p>2.1 Participatory, site-specific mapping, beneficiary selection, and mobilization of community-based management structures for climate-resilient drinking water solutions</p> <p><u>Gender-Action Plan related indicator(s):</u></p>	<p>This Activity will build on the site-specific assessments and PRA process undertaken during project design which involved participatory community consultations at the ward and union levels. Combined with analysis of secondary sources and assessment of existing and planned coverage information (triangulated with LGIs and DPHE), the PRA yielded a mapping of functional and potential drinking water supply solutions at household, community, and institutional levels.</p> <p>This Activity will be undertaken in the initial phase of implementation and includes</p>	<p>2.1.1 Consultations, in light of the selection criteria, to identify beneficiary HHs, raise awareness, and plan for distribution of access to proposed drinking water solution systems in light of climate change risks</p> <p>2.1.2. Participatory mapping, vetting, and siting of drinking water supply systems including identification of sites</p>	<p>Building on the design process for targeting of communities (based on salinity exposure and vulnerability including extreme poverty), consultations would be undertaken in each of the communities for participatory, siting and identification of the beneficiary HHs (taking into account the planned water supply improvements by others in Zone 2).</p> <p>In consultation with the households/communities, water access and distribution will be</p>

<p><i>Number of women participating in mapping and planning of installation and management of RWH tanks</i></p>	<p>awareness raising and social mobilization to support further community/HHs level consultative planning, implementation and management of water solutions.</p> <p>The formulation of Water User Groups (WUGs) and Water Management Committees (WMCs) will enable sustained planning and management of the proposed water solutions. The WUGs group will be comprised of women members from each of the targeted household and will be clustered based on their access to the identified drinking water solution sites.</p> <p>The WMCs will be formed at the ward level and will comprise Local government representatives (Ward Councilor and representative from the Watsan standing committee), Representative from DPHE, representatives from associated WUGs, owners/representatives (at least 2) from the institutional/community buildings/facilities and technician/caretaker representatives for the cluster of water solutions.</p>	<p>(sources and demand-supply) at ward-level</p> <p>2.1.3 Formulation/reactivation/facilitation of WUGs and WMCs (synergizing with WLGs in Output 1)</p> <p>2.1.4 Detailed assessment including water quality testing at applicable sites to support customized design of the water supply systems</p>	<p>planned combined with vetting of water sources and locations. Siting will be undertaken for any of the non-institutional-scale tanks (these have already been sited and location-specific parameters have been determined) (Annex IIc)</p> <p>In each of the targeted wards in 39 Unions, one WMC will be formed whose main responsibility will be to look after the water supply technologies provided to ensure proper management of the systems.</p> <p>Detailed assessments and necessary engineering parameter calculations will be undertaken to support customized, design under Activity 2.2.</p>
<p>2.2 Implementation of climate-resilient drinking water solutions (at HH, community, and institutional scales)</p>	<p>Considering technical, environmental and social sustainability of potential water technologies, the following water supply solutions will be supported by the project: Household based rainwater harvesting systems (RWH), Community based (small and medium-scale) RWH systems, Institutional (large-scale) RWH, and community based system for treatment of water from fresh water ponds, with supporting embankments for storm surge protection.</p> <p>This Activity will invest in design and construction of the portfolio of climate-resilient drinking water technologies in each of the 39 Unions of the targeted districts of Khulna and Sathkira. Each of these supply options and their designs take into account projected climate change risks including irregular rainfall patterns and intensified storm surges.</p>	<p>2.2.1. Customization and detailed design for each of the sites and water supply systems</p> <p>2.2.2. Site preparation and construction of <u>13,308 household RWH systems</u> including storage tanks, roof catchments, and conveyance elements</p> <p>2.2.3 Site preparation and construction of <u>228 community-scale RWH systems</u> including storage tanks, roof catchment preparation or new roof catchments, and conveyance elements</p> <p>2.2.4 Site preparation and construction of <u>19 institutional-scale RWH systems</u> including storage tanks, roof catchment preparation or new roof catchments, and conveyance elements</p> <p>2.2.5 Site preparation and construction to raise <u>41 pond embankments</u> and installation of filtration systems</p> <p>2.2.6. Water quality testing/verification of fresh water sources after installation and prior to commissioning</p>	<p>Customized technology and site-specific design will be developed through contractual services.</p> <p>Each of the water supply systems will be constructed at the HH, community, and institutional scales, as mapped and planned with the communities (Activity 2.1).</p> <p>The RWH systems, comprising the catchment, conveyance, storage, and the delivery, will be constructed to support year-round (with tanks sized for the worst case of a maximum of 180 days' dry period) access to safe drinking water.</p> <p>Pond water is an alternative and popular option of potable water supply through use of a pond sand filter (PSF) which is a simple low-cost technology. Filtration treatment systems will be installed at selected pond sites to provide filtration and ensure quality of the drinking water to GoB drinking water standards and WHO guidelines for drinking water. To improve climate-resiliency and prevent saltwater intrusion during intense cyclonic events, selected fresh water ponds (not in the vicinity of and exposed to shrimp farming), will be supported by raised embankments.</p> <p>All water supply systems will be tested and verified prior to commissioning for use.</p>

<p>2.3 Community-based, climate-risk informed Operation &amp; Maintenance (O&amp;M) and management of the resilient drinking water solutions</p> <p><u>Gender-Action Plan related indicator(s):</u></p> <p><i>Time saved by women in collecting and carrying water, due to implementation of drinking water solutions</i></p>	<p>This Activity will support capacity building for all the stakeholders in participatory, community-based water access, distribution, and delivery planning and implementation to ensure gender-targeted, inclusive, and equitable access to safe, year-round drinking water, in light of a changing climate.</p> <p>GCF resources will be used to set up a community and tier-based O&amp;M system comprising of the WUGs, WMCs, and LGI/DPHE staff. After initial GCF support, O&amp;M (as outlined in the O&amp;M plan, Annex XIIIb) will be co-financed by GoB with contributions from the WUGs.</p> <p>Tier 1: The WUGs will be responsible for daily and/or monthly monitoring of the water supply systems, in particular, the HH and community-scale RWH systems.</p> <p>Tier 2: The WMCs (at the ward level) will staff a technician/caretaker for each community or institution-scale water supply point. The caretaker will be responsible for an associated cluster of WUGs including WUGs for nearby household RWH systems and will support minor repairs including yearly maintenance of RWH systems including roof catchment cleaning, tank cleaning and minor repairs of taps, joints, gutters and pipes.</p> <p>Tier 3: GoB co-financing will be leveraged to backstop and cover the O&amp;M costs related to major repairs, part replacements, and potentially full system rehabilitation in case of unanticipated cyclonic shocks. For the pond-based systems, installation with warranty would be procured to ensure robust technical support for long-term viability of these solutions.</p> <p>Post-project O&amp;M would continue to be supported through community and DPHE financing and the commitment letter (Annex IVb) indicates the O&amp;M costs to be covered by DPHE beyond the project lifetime.</p>	<p>2.3.1. Facilitation of WUG and WMC meetings (<u>Initial and alternative quarters from year 2 onwards</u>) for yearly, adaptive water distribution and management planning in the face of a changing climate</p> <p>2.3.2 Awareness raising and capacity building (<u>batch-training, 1 initial and 5 annual</u>) for HHs, WUGs, WMCs (involving LGIs) on climate change and disaster risk management for water solutions</p> <p>2.3.3 Development of fee-based, three-tier O&amp;M plan including identification of O&amp;M needs, financing sources, and technical support</p> <p>2.3.4 ToT based technical training, incorporating climate risks, on operations, maintenance and use for HHs, water user groups &amp; WMCs, technicians/caretakers, LGIs, and DPHE staff (<u>1 initial and 5 annual, batch-training at different levels</u>)</p> <p>2.3.5 Implementation of community-based and three-tier system for water availability and quality monitoring and operations &amp; maintenance (O&amp;M) (including provision of water quality test reagents, caretaker costs, and O&amp;M support)</p>	<p>WUGs will be facilitated to meet, discuss, and plan for water supply for their households, including continuous monitoring of water availability and quality as well as peer-to-peer learning on safe health practices.</p> <p>Awareness raising and training workshops on understanding, assessing and responding to climate risks including extreme events to safeguard drinking water security.</p> <p>O&amp;M plans will be developed for WUGs/WMCs in coordination with LGI/DPHE staff. The provision of and access to water will be anchored in a fee-based model (based on existing practices and DPHE's mandate) that will engender ownership and commitment to securing drinking water for the targeted households. The fee will be standardized according to the water supply technology with one fee per HH for HH RWH, one fee per HH for Community/Institution-scale RWH and one fee per HH for treated pond water (the fee could be different from one ward to another but not from one RWH site to another RWH site within the same ward). The fee supports basic operation needs including simple cleaning and repairs and will be used as an O&amp;M fund to collectively contribute to the staffing of a technician/caretaker maintained as part of each WMC.</p> <p>Technical training for WUGs and support staff across ward/union/national levels including on water quality monitoring, system condition assessment, end-point quality control.</p> <p>O&amp;M will be implemented according to three-tier model. Implementation of monitoring and O&amp;M (co-financed by WUGs, GCF and DPHE)</p>
<p>3.1 Strengthen MoWCA's technical and coordination capacities for design and implementation of gender-responsive, climate-resilient coastal livelihoods</p>	<p>This Activity will promote mainstreaming of climate change concerns into institutional planning and coordination within MoWCA to foster cross-sectoral and comprehensive approaches to resilient coastal livelihoods. GCF resources and GoB co-financing will be invested in building institutional and technical capacities of MoWCA/DWA staff to assess climate change risks and scenarios and undertake adaptive planning and decision-making. MoWCA's cross-sectoral</p>	<p>3.1.1. Development of and training for MoWCA and DWA (<u>ToT approach – 50 staff; 2 batch, 25 persons in each batch; 4 days training</u>) on climate risks and livelihood scenarios for coastal livelihoods</p> <p>3.1.2 Development of and training (<u>ToT approach – 125 staff; 5 batch, 25</u></p>	<p>Support will be provided to develop climate change and adaptation scenarios, including socio-economic development considerations, to input into policy and decision-making for gender-responsive, coastal livelihoods. ToT approach will allow for capacity building of MoWCA and DWA in both the development of the scenarios and their application.</p>

	<p>coordination capacity will be improved to support integration of gender and climate change concerns into other socio-economic activities.</p>	<p><u>persons in each batch: 3 days training</u>) for MoWCA, DWA, and LGI staff on tool kit for gender-responsive, climate-resilient livelihoods design and implementation for the Southwest coast</p> <p>3.1.3 Development of 'Gender Sensitive Climate Change Action' Training Module and ToT (<u>200 staff</u>) for gender focal persons across key ministries</p> <p>3.1.4 Training for MoWCA and DWA staff (<u>30 staff</u>) to coordinate and integrate gender and climate change across policy and programs for other sectors in partnership with DoE.</p>	<p>The toolkit will include modules on climate risks and impact scenarios related to various livelihoods, climate-risk informed livelihood planning, cost-benefit models, programme design and management, and M&amp;E approaches to assess adaptive capacities and impacts of livelihood programs. A ToT approach would build MoWCA, DWA, and LGIs capacities to develop and implement these scenarios and tool-kit.</p> <p>A 'Gender Sensitive Climate Change Action' training module will be developed and disseminated including training of existing gender focal persons in each ministry.</p> <p>Training of MoWCA and DWA staff to advocate for gender sensitive adaptation and mitigation in policy forums like PEC, ECNEC, NDA Advisory Committee and to integrate gender and climate change across other sectors.</p>
3.2 Strengthen DPHE capacities for climate-risk informed management of drinking water solutions across the Southwest coast	<p>This Activity (blending GCF and GoB resources) will invest in technical capacities for DPHE and LGIs to integrate climate change risks and projected impacts on the freshwater resources and water supply infrastructure of the coastal communities into planning and implementation support. DPHE will be capacitated to undertake climate-risk modelling and assessment of drinking water needs in light of climate change. The current master plan for the drinking water sector would be updated/revised to incorporate climate risks to support planning of drinking water supply investments for vulnerable districts across the Southwest coast. A regional database would be established, co-financed, by GoB to map water supply sources and infrastructure to support effective coordination across various investments. Finally, technical capacity of DPHE staff will be strengthened through training and field based work to support the implementation of climate-resilient surface water solutions (PSF, MAR, river based solutions, RO, etc.) for year-round, safe drinking water for coastal populations in light of projected slow- and sudden-onset climatic events.</p>	<p>3.2.1. Development of and training (ToT) (<u>1 batch training</u>) for 20 DPHE staff on climate risks and scenario modelling for drinking water needs across the southwest coast.</p> <p>3.2.2. Establishment of a regional database for mapping of water supply sources and existing/planned water supply infrastructure</p> <p>3.2.3 Technical capacities for R&amp;D wing of DPHE (training and field-based studies) for innovation and design of climate-resilient water solutions across the coast, in coordination with technical institutes</p>	<p>Development of climate risks and scenario modelling (including ICT, software) based drinking water needs in the southwest coast including ToT-based technical training for DPHE staff on development and use of the scenarios is decision-making.</p> <p>A regional database would be established (ICT/software, data collection/entry, sharing), co-financed, by GoB to map water supply sources and infrastructure to support effective coordination across various investments.</p> <p>Build technical capacity of DPHE staff through training and field based work to support implementation of climate-resilient solutions (PSF, MAR, river based solutions, RO, etc.) for year-round, safe drinking water for coastal populations in light of projected slow- and sudden-onset climatic events.</p>

<p>3.3. Establish knowledge management, evidence-based learning and M&amp;E mechanisms to promote long-term, adaptive capacities of coastal communities</p> <p><u>Gender-Action Plan related indicator(s):</u></p> <p><i>Evidence of policy/programs in other sectors integrating gender and climate change</i></p> <p><i>Number of girls and boys with increased awareness through 'adaptive learning' training through school and community based communications</i></p>	<p>This Activity will contribute to the long-term sustainability of the project and create pathways for continued learning and evidence-based replication and scale of project impact. GCF resources will be used to codify knowledge products, such as climate risk and scenario analyses, decision-making and planning tools and products, and best practices and lessons learned and integrate them into training modules for academic and government institutes, and a web-portal for wider dissemination. The Activity will also support the development and promotion of Codes of Practice for environmental sustainability and resilience of the livelihoods.</p> <p>A targeted 'Adaptive Learning' activity will be undertaken to focus on young girls and boys in targeted coastal areas to build their long-term adaptive capacities. Learning will be related to various aspects of climate change such as causes of climate change, potential future changes, and adaptation technologies. The learning will also focus on their rights and resources and provide access to information and knowledge on social, economic, and health risks and benefits in a changing climate.</p> <p>GCF resources will also be used to undertake impact evaluation to enable evidence-based policy, planning, and implementation of climate-resilient programs for secure water and livelihoods.</p> <p>This Activity will also support the development of a replication roadmap, building on the analytical groundwork, knowledge, and learning established under this project, to support the GoB to replicate and scale project impact to other districts of the Southwest Coast.</p>	<p>3.3.1. Codification of knowledge, good practices, tools, and approaches such as climate risk and scenario analyses, tools for climate-resilient livelihood and drinking water solutions, and best practices and lessons</p> <p>3.3.2 Integration of knowledge and tools into training and informational modules of government and technical institutes</p> <p>3.3.3 Establishment of a web-portal, co-hosted by MoWCA, for dissemination of climate and gender related knowledge, tools, and adaptation practices</p> <p>3.3.4 Design and implementation of 'Adaptive Learning' for young boys and girls (3000 – in the project targeted HHs) through behavioural change communications</p> <p>3.3.5 Implementation of monitoring and evaluation framework including: (i) baseline climate risk and vulnerability assessments (Incorporate ActionAid resilience index) and (iii) impact evaluation to quantify project impacts.</p> <p>3.3.6 Development of a Replication Roadmap for replication and scale or climate-resilient livelihood and drinking water solutions, coordinating with donors, ministries, and multi-laterals</p>	<p>Codification of knowledge, good practices, tools, and approaches of climate change adaptive drinking water management and adaptive livelihoods.</p> <p>Support mainstream adaptive livelihood planning into curriculum of technical and research institutes such as BARD, RDA, NILG, etc. Support mainstreaming of planning tools for climate-resilient water solutions into BUET, RDA, Soil and Salinity Institutes, etc.</p> <p>Development of web portal for web-based knowledge management for wider stakeholder use, co-hosted by MoWCA and a CC think tank/partner</p> <p>Design and Implement awareness raising and BCC campaigns targeting girls and boys across the project HHS (under Output 1 and 2)</p> <p>An impact evaluation (quasi-experimental) will be designed and executed to quantify project impacts (subject to constraints imposed by the extent to which beneficiary selection can be feasibly modified).</p> <p>The roadmap, developed in coordination with relevant ministries, donor community, private sector, and multi-laterals, will identify priority districts and financing mechanisms (such as enhance micro-credit for livelihoods, private sector engagement for water provision) to support replication and scale of the project activities and impacts.</p>
--	---	---	--

## H.2. Arrangements for Monitoring, Reporting and Evaluation

263. Project-level monitoring and evaluation will be undertaken in compliance with the [UNDP POPP](#) and the [UNDP Evaluation Policy](#). The primary responsibility for day-to-day project monitoring and implementation rests with the Project Manager. The Project Manager will develop annual work plans to ensure the efficient implementation of the project. The Project Manager will inform the Project Board and the UNDP Country Office of any delays or difficulties during implementation, including the implementation of the M&E plan, so that the appropriate support and corrective measures can be adopted. The Project Manager will also ensure that all project staff maintain a high level of transparency, responsibility and accountability in monitoring and reporting project results.
264. The UNDP Country Office will support the Project Manager as needed, including through annual supervision missions. The UNDP Country Office is responsible for complying with UNDP project-level M&E requirements as outlined in the [UNDP POPP](#). Additional M&E and implementation quality assurance and troubleshooting support will be provided by the UNDP Regional Technical Advisor as needed. The project target groups and stakeholders including the NDA Focal Point will be involved as much as possible in project-level M&E.
265. A project inception workshop will be held after the UNDP project document has been signed by all relevant parties to: a) re-orient project stakeholders to the project strategy and discuss any changes in the overall context that influence project implementation; b) discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms; c) review the results framework and discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E plan; d) review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; e) plan and schedule Project Board meetings and finalize the first year annual work plan. The Project Manager will prepare the inception report no later than one month after the inception workshop. The final inception report will be cleared by the UNDP Country Office and the UNDP Regional Technical Adviser, and will be approved by the Project Board.
266. A project implementation report will be prepared for each year of project implementation. The Project Manager, the UNDP Country Office, and the UNDP Regional Technical Advisor will provide objective input to the annual PIR. The Project Manager will ensure that the indicators included in the project results framework are monitored annually well in advance of the PIR submission deadline and will objectively report progress in the Development Objective tab of the PIR. The annual PIR will be shared with the Project Board and other stakeholders. The UNDP Country Office will coordinate the input of the NDA Focal Point and other stakeholders to the PIR. The quality rating of the previous year's PIR will be used to inform the preparation of the next PIR. The final project PIR, along with the terminal evaluation report and corresponding management response, will serve as the final project report package.
267. An independent mid-term review process will be undertaken and the findings and responses outlined in the management response will be incorporated as recommendations for enhanced implementation during the final half of the project's duration. The terms of reference, the review process and the final MTR report will follow the standard templates and guidance available on the [UNDP Evaluation Resource Center](#). The final MTR report will be cleared by the UNDP Country Office and the UNDP Regional Technical Adviser, and will be approved by the Project Board. The final MTR report will be available in English.
268. An independent terminal evaluation (TE) will take place no later than three months prior to operational closure of the project. The terms of reference, the review process and the final TE report will follow the standard templates and guidance available on the [UNDP Evaluation Resource Center](#). The final TE report will be cleared by the UNDP Country Office and the UNDP Regional Technical Adviser, and will be approved by the Project Board. The TE report will be available in English. The UNDP Country Office will include the planned project terminal evaluation in the UNDP Country Office evaluation plan, and will upload the final terminal evaluation report in English and the management response to the public UNDP Evaluation Resource Centre (ERC) (<https://erc.undp.org/>)

269. The UNDP Country Office will retain all M&E records for this project for up to seven years after project financial closure in order to support ex-post evaluations. A detailed M&E budget, monitoring plan and evaluation plan will be included in the UNDP project document. Monitoring, reporting and evaluation arrangements will comply with the relevant GCF policies and Accreditation Master Agreement signed between GCF and UNDP.

Methodologies for monitoring and reporting of the key outcomes of the project/programme

270. Monitoring and reporting for the project outcomes are outlined as the means of verification in Table H.1.2 above, where progress on each indicator from the baseline to the mid-point and end-point targets for those indicators will be tracked. For Output 1, detailed HH surveys will be undertaken to monitor the capacity of women groups and communities in adopting and implementing the diversified, resilient livelihoods. The project monitoring will be aligned with the social auditing and monitoring protocols supported under Activity 1.3 to ensure participatory assessment of the adaptive capacities. Number of user groups and PPIs established, the engagement of value-chain actors, and number of EWs volunteer groups functioning would be assessed through field verification by NGOs and project staff. For Output 2, field verification would be undertaken along with the examination of the registration data in the DPHE database (created under Activity 3.2) to monitor the installation of the drinking water supply systems. Survey instruments will also be applied to assess the quality and accessibility of the drinking water across the technologies and households. The questionnaires would be designed to elicit information, among other aspects, on access, ease of use, quality of water, functioning of the community structures, quality of support from the institutional staff, and issues around O&M of the supply systems. Output 3 would be monitored through the administration of a qualitative score card to assess the awareness, learning, and capacities of various stakeholders across understanding of climate risks, climate-risk informed planning, and knowledge of resilient livelihoods and drinking water solutions. Tool-kits and climate-risk informed plans, would be verified through their availability at the institutional websites. Knowledge products generated would be verified including through their availability on the web-portal and integration into government and technical institute platforms. The engagement of youth under the 'Adaptive Learning' activity would be monitored through field verification of number of outreach campaigns, number of girls and boys (school-going and/or present in the targeted HHs) engaged, and schools engaged.
271. Beyond tracking and monitoring of progress, an Impact Evaluation would be undertaken (as outlined in Activity 3.3) to assess the adaptive capacities of the project beneficiaries across livelihoods, water, and the targeted youth learning. Baseline and end-line surveys would help gather baseline data as well as evaluate progress across variables such as incomes, health, access to resources, gender roles, and adaptive capacities.

## I. Supporting Documents for Funding Proposal

- ☐ NDA No-objection Letter (Annex I)
- ☒ Feasibility Study (Annex II (a))
- ☐ Livelihoods Assessment Report (Annex II (b))
- ☒ Drinking Water Assessment Report (Annex II (c))
- ☒ Union Reports (Annex II (d))
- ☐ Integrated Financial Model that provides sensitivity analysis of critical elements (xls format, if applicable) (Annex III)
- ☐ Confirmation letter or letter of commitment for co-financing commitment (Annex IV (a))
- ☐ Post-project O&M Commitment Letter (Annex IV (b))
- ☐ Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) (Annex V)
- ☐ Environmental and Social Impact Assessment (ESIA) (Annex VI (a))
- ☒ Environmental and Social Management Framework (Annex VI (b))
- ☒ Indigenous Peoples' Planning Framework (Annex VI (c))
- ☒ Environmental and Social Report(s) Disclosure (Annex VI (d))
- ☐ Appraisal Report or Due Diligence Report with recommendations (If applicable) (Annex VII)
- ☐ Evaluation Report of the baseline project (If applicable) (Annex VIII)
- ☐ Map indicating the location of the project/programme (Annex IX)
- ☐ Timetable of project/programme implementation (Annex X)

### ADDITIONAL INFORMATION

- ☐ Project/programme confirmation (Annex XI)
- ☐ Economic Analysis (summary) (Annex XII (a))
- ☐ Economic Analysis (excel) (Annex XII (b))
- ☒ Procurement Plan (Annex XIII (a))
- ☒ O&M Plan (Annex XIII (b))
- ☒ Stakeholder Consultation (Annex XIII (c))
- ☐ Stakeholder Engagement Plan (Annex XIII (d))
- ☒ Gender Assessment and Action Plan (Annex XIII (e))
- ☐ Evidence of Internal Approval (Annex XIII (f))
- ☒ Detailed budget sheet (Annex XIII (g))
- ☐ Beneficiary Methodology and Calculations (Annex XIII (h))
- ☐ Responses to GCF Comments on Funding Proposal (Annex XIV)
- ☐ UNDP Endorsement Letter (Annex XV)
- ☐ UNDP Responses to iTAP comments

*\* Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*