



ADAPTATION FUND

## ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Fully Developed Innovation Large Project

<b>Country/Region:</b>	Bangladesh		
<b>Project Title:</b>	Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh		
<b>Thematic Focal Area:</b>	Water Management		
<b>Implementing Entity:</b>	Palli Karma-Sahayak Foundation (PKSF)		
<b>AF Project ID:</b>			
<b>IE Project ID:</b>	[To be filled by IE]	<b>Requested Financing from Adaptation Fund (US Dollars):</b>	5,000,000
<b>Reviewer and contact person:</b>	Alyssa Gomes	<b>Co-reviewer(s):</b>	Eleanor Saunders
<b>IE Contact Person:</b>			

<b>Technical Summary:</b>	<p>The project “Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh” aims to aims to secure water security for the coastal families by establishing reverse osmosis water treatment plants. This will be done through the two components below:</p> <p><u>Component 1:</u> Development of drinking water supply facilities (USD 4,000,000).</p> <p><u>Component 2:</u> Institutional support at the local level for project implementation, infrastructure operation and sustainability and knowledge management (USD 525,000)</p> <p><u>Requested financing overview:</u>  Project/Programme Execution Cost: USD 400,000  Total Project/Programme Cost: USD 4,925,000  Implementing Fee: USD 75,000  Financing Requested: USD 5,000,000</p> <p>The initial technical review finds that the proposal is not sufficiently developed to be submitted as a fully developed proposal. From an innovation perspective, in its current formulation, the proposal presents itself as a technology transfer project that does little in the way to describe innovation in either the technology or its roll out. The proposal has potential to be defined as a roll out and scaling project by addressing the clarifications raised and after making recommended improvements.</p>
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	The initial technical review raises many issues such strengthening the innovation rationale and justification, further clarification of how the proposed interventions address climate vulnerabilities in the target areas, clarifications on the target beneficiaries including their composition, cost-effectiveness, sustainability, Environmental and Social Policy (ESP) and Gender Policy (GP) compliance and a number of other issues as is discussed in the number of Clarification Requests (CRs) and Corrective Action Request (CAR) raised in the review.
Date:	26 January 2022

Review Criteria	Questions	Comments	PKSF's Response
	1. Is/are the beneficiary country/countries a developing country/countries Party/Parties to the Kyoto Protocol?	<b>Yes.</b>	
Country Eligibility	2. Is the participating country / are all participating countries developing countries particularly vulnerable to the adverse effects of climate change?	<b>Yes.</b> (Pages 2 -6).  The geographical location and low elevation of the coastal zone of Bangladesh make it susceptible to disasters. The coastal areas in Bangladesh are more vulnerable to climate change. Sea-level rise is amplifying risks such as flooding, storm surges, inundation, saline water intrusion, and coastal erosion. Hence, the vulnerability of the coastal people is characterized by i) poor human settlement in low-lying areas, ii) climate-sensitive livelihood, and iii) scarcity of safe drinking water.	
letProject Eligibility	1. Has the designated government authority for the Adaptation Fund / Have the governments' designated authorities for the Adaptation Fund endorsed the project?	<b>Yes,</b> Letter of Endorsed dated January 2022.	
	2. Does the project/programme support	<b>Not clear.</b>	The proposal has been reviewed and updated.

	<p>concrete adaptation actions to assist the country or countries in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience? In case of regional project/programme, is there added value using the regional approach, compared to implementing similar activities in each country individually?</p>	<p>In general, the theory of change of the project needs to be strengthened to make it coherent in terms of suitability of activities in responding to current and projected trends. Activities are not detailed to a sufficient level for a fully developed proposal.</p> <p><b>CAR1:</b> Please utilize the correct template for Innovation Large Grants. Please be sure to insert relevant information under each section in the template in the format of the template. The word document is available at the bottom of the page under “Attachments”. <a href="https://www.adaptation-fund.org/apply-funding/innovation-grants/large-grants-for-innovation/">https://www.adaptation-fund.org/apply-funding/innovation-grants/large-grants-for-innovation/</a></p> <p>The project aims to supply continuous and safe drinking water to vulnerable coastal communities by establishing reverse osmosis water treatment plants. The chosen shift to RO water treatment plants is based on the rationale that available options (the use of tube wells, pond sand filters (PSFs), low saline pond water, rainwater harvesting) have proven to be unsustainable and/ or are impacted seasonal variations making continuous potable water supply not possible. Furthermore, in its current formulation, the project is addressing only one aspect i.e., supply of safe drinking water without addressing the vulnerability of developed infrastructure to coastal flooding.</p> <p><b>CR1:</b> Kindly justify the suitability of activities in responding to the threats posed by the likely climate scenarios outlined in detail in the background and context section and, clarify how the project will</p>	<p>The updated template is used.</p> <p>Information is provided to Section II (D) and II (E).</p>
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		<p>ensure the resilience of the RO plants themselves over a sustained period of time?</p> <p><b>CR2:</b> Please provide specific details of the (i) target communities and (ii) location specific details of climate change vulnerabilities in the target areas and (iii) justify the chosen intervention in this context.</p> <p><b>CR3:</b> Please provide details on the learnings coming out of the 2 completed projects that tested RO water treatment systems ('Community Climate Change Project' and 'Learning and Innovation Fund to Test New Ideas') that will inform the current project.</p>	<p>Information is provided in Section II.</p> <p>Information is provided in Section II (M).</p>
	<p>3. Does the project/programme help spread innovative adaptation practices, tools and technologies that have demonstrated success in one country to another country, countries or regions; and/or</p> <p>Does the project/programme pilot at larger scale innovative adaptation practices, tools or technologies generated that have demonstrated viability at a small scale?</p>	<p><b>Not clear.</b></p> <p>The project is a technology transfer project that does not sufficiently describe innovation in either the technology or its roll out. However, the project proposal has potential to situate itself as a roll out and scaling project with improvements to its innovation rationale and project design.</p> <p>The proposal appears to sit in the final stages of the innovation pathway, under the innovation end point of 'Embed and normalize locally'. While it is an important action in transferring innovation into general use, however the proposal is in the crossover stage where innovation is no longer innovation.</p> <p>The technology proposed (reverse osmosis) is well established, it is shown to operate in the regions specified in the project and is already rolled out and</p>	<p>Detailed information are provided in Section II (B).</p> <p>Detailed information are provided in Section II (B).</p> <p>Detailed information are provided in Section II (B), II (D) and II (E).</p>

		<p>functional in 50 sites (i.e., the CCCP project). The proposal aims to further roll out the technology to 250 sites to continue the improvement of lives in the vulnerable areas of the Bangladesh delta. Local integration of the technology has already been proven as a model (Page 9).</p> <p><b>CR4:</b> Please clarify the innovation rationale of the project. To show that innovation is present in the proposal, please clarify if the project aim to scale the solution to other areas. Therefore, innovation could be seen in the roll out to local communities.</p> <p><b>CR5:</b> Please clarify if the project will tailor the innovation to the new context and communities. Please clarify details of tailoring activities in the proposal.</p> <p>There is no specific information of the target communities in the proposal making it unclear to assess if the communities in the roll out phase are different to those already operationalised. If they are not different, then this is a technology transfer, not an innovation roll out.</p> <p><b>CR6:</b> Please clarify if the coastal communities for the roll out are different in terms of their structure, culture, water usage, water management?</p> <p>A learning process still needs to occur with each new installation and local set up.</p> <p><b>CR7:</b> Please clarify if there is anything to be learnt from the roll out that will influence the roll out process and thus requires innovation prior to a full roll out?</p>	<p>Detailed information are provided in Section II (B).</p> <p>Detailed information are provided in Section II (B).</p> <p>Detailed information are provided in Section II (C).</p> <p>Detailed information are provided in Section II (B).</p>
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		<p><b>CR10:</b> Please clarify how locally communities, local authorities, product designers, will be engaged in the design phase of the project.</p>	<p>Information is given in Section II (A) in Activity 2.1.1 and Section II (J).</p>
		<p><b>CR11:</b> Please clarify how does it change the format from the existing 50 models in operation?</p>	<p>Detailed information are provided in Section II (B).</p>
		<p>The proposal has identified several important characteristics of profitable plants such as (i) duration of operation; (ii) level of water production; (iii) price subsidy; and (iv) source of electricity. (page 12).</p>	
		<p><b>CR12:</b> Please clarify if users will have to pay for water, and if they do not - how will the price subsidy be implemented to ensure the operational costs of the RO plant are covered.</p>	<p>Detailed information are provided in Section II (E).</p>
		<p><b>CR13:</b> Please clarify how can subsidies or more equitable access systems be put in place locally and across communities?</p>	<p>Detailed information are provided in Section II (L).</p>
<p><b>CR14:</b> If volunteers are used (as mentioned on page 12) how will this be coordinated and managed?</p>	<p>Information is given in Section II (A) in Activity 2.1.1.</p>		
<p>The proposal on page 12 (section M) states, "Several important issues are crucial to the sustainability of the RO plants. The price of water is crucial for the profitability of the plants."</p>			
<p><b>CR15:</b> Please provide addition information on how can this sustainability point be blended with innovative financing to overcome the issues of water rates?</p>	<p>Detailed information are provided in Section II (D) and II (E).</p>		

		<p>The secretariat has created two guiding documents to support Implementing Entities in their application process:</p> <ol style="list-style-type: none"> <li>1) <a href="https://www.adaptation-fund.org/wp-content/uploads/2021/04/AFB.PPRC_.27.28-Operationalization-of-the-large-grants-for-innovation.pdf">https://www.adaptation-fund.org/wp-content/uploads/2021/04/AFB.PPRC_.27.28-Operationalization-of-the-large-grants-for-innovation.pdf</a> describes the process for the creation of Large Innovation Projects and in Annex IV (pages 28 to 43) provides a set of instructions on what type of questions proponents should think when writing their proposals</li> <li>2) <a href="https://www.adaptation-fund.org/wp-content/uploads/2021/04/AFB.36.8-Further-Clarification-of-the-Vision-and-Definition-of-Innovation.pdf">https://www.adaptation-fund.org/wp-content/uploads/2021/04/AFB.36.8-Further-Clarification-of-the-Vision-and-Definition-of-Innovation.pdf</a> states the Fund's approach to innovation, and in Annex I (pages 13 to 19) presents guidance on how to approach innovation in adaptation within proposals</li> </ol> <p>Please use the following guidance for all other sections in the proposal template that are not innovation grant specific</p> <ol style="list-style-type: none"> <li>3) <a href="https://www.adaptation-fund.org/document/opg-annex-5/">https://www.adaptation-fund.org/document/opg-annex-5/</a></li> </ol>	
	<p>4. Does the project/programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations, while avoiding or mitigating negative impacts, in</p>	<p><b>Not clear.</b></p> <p><b>CAR2:</b> Please include sufficient details on all 4 points below to enable an assessment of proposed benefits:</p> <ol style="list-style-type: none"> <li>1. Include information on the expected beneficiaries of the project/programme, with reference to the equitable distribution of</li> </ol>	<p>Detailed information are provided in Section II (D).</p>

	<p>compliance with the Environmental and Social Policy of the Fund?</p>	<p>benefits to vulnerable communities, households, and individuals.</p> <ol style="list-style-type: none"> <li>2. In target areas where marginalized and vulnerable groups and indigenous communities have been identified, particular benefits provided by the project/programme to those groups should be outlined.</li> <li>3. Please outline benefits in all three areas (economic, social, and environmental) and that the estimated benefits are quantified, whenever possible.</li> <li>4. Clarify that there are no concerns of negative development or maladaptation, and the project does not increase the vulnerability of beneficiaries or non-beneficiaries, nor reduce their capacity to adapt to climate change.</li> </ol>	
	<p>5. Does the project engage, empower and/or benefit the most vulnerable communities and social groups?</p>	<p><b>Not clear.</b></p> <p>Although the proposal clearly states that vulnerable communities will be engaged/participated in the project activities; the project is less well developed in terms of strategies to encourage and involve all social groups into the implementation of the project.</p> <p><b>CAR3:</b> Please provide some additional information on (i) the socio-demographic overview, including community governance structures of the vulnerable communities and social groups , (ii) the strategies to encourage and involve all the social groups into the implementation of the project.</p>	<p>Detailed information are provided in Section II (A).</p>

		Please see also see CAR above. An assessment is not possible as specific details of target beneficiary communities are not known.	
	6. Does the project advance gender equality and the empowerment of women and girls?	<p><b>Not clear.</b></p> <p>The project document states that proximity of a water source is associated with women’s dignity and security. In addition, it is expected the project will create 225 jobs during the implementation phase and after completion through micro-businesses especially in water distribution activities. The latter is a qualitative overview of the anticipated benefits.</p> <p><b>CAR4:</b> Please provide some disaggregated data of all the social groups (men, women, youth, etc.) who are expected to benefit of the project benefits.</p> <p>The project document states that access to water will generate revenue activities to women.</p> <p><b>CAR5:</b> Please demonstrate compliance with the Gender Policy by submitting a complete gender analysis, and/or assessment to determine the different needs, capabilities, roles, and knowledge resources of women (and girls) and men (and boys).</p>	<p>Please see the Gender Action Plan in Annex-6.</p> <p>Please see the Gender Action Plan in Annex-6.</p>
	7. Is the project/programme cost-effective? In the case of regional project/ programmes, does the regional approach support cost effectiveness? Does the project engage, empower and/or benefit the most	<p><b>Not clear.</b></p> <p><b>CAR6:</b> Please justify cost-effectiveness of the project by providing sufficient details on all 4 points listed below:</p> <ol style="list-style-type: none"> <li>1. Provide a logical explanation of the selected scope and approach.</li> <li>2. Demonstrate cost effectiveness from a sustainability point of view.</li> </ol>	<p>Please see Section II (E).</p>

	vulnerable communities and social groups?	<p>3. Include a clear description of alternative options to the proposed measures, to allow for a good assessment of the project/programme cost effectiveness</p> <p>4. Include a comparison to other possible interventions that could have taken place to help adapt and build resilience in the same sector, geographic region, and/or community; with quantitative estimates where feasible and useful.</p>	
	8. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments?	<p><b>Not clear</b></p> <p><b>CAR7:</b> Please identify plans and strategies and explain how the project is aligned with the plans and strategies. This includes adaptation-related plans, strategies and targets (particularly the NAP, NDC and SDGs) as well as the most important relevant sectoral plans and strategies in the country. The compliance of the project/programme with the relevant plans and strategies should be explained in detail.</p>	Please see Section II (F).
	9. Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund?	<p><b>Not clear.</b></p> <p><b>CAR8:</b> Please ensure that all relevant national technical standards are identified, and compliance requirements for those in a logical manner. These include building codes, water quality regulations, land use or tenure regulations, as required by national legislation, and any other sector-specific regulations.</p> <p>If one specific activity of the project/programme requires compliance with technical standards, the steps taken to comply with it and the nature of the</p>	Please see Section II (G) and Annex-5.

		authorization/clearance granted for the project to be implemented should be explained.	
	10. Is there duplication of project/programme with other funding sources?	<p><b>Not clear.</b></p> <p><b>CAR9:</b> Please identify all relevant potentially overlapping projects / programmes, and lack of overlap / complementarity stated in a logical manner. Kindly check list of other projects that may exist in the country and that may be relevant (E.g., GCF funded Extended Community Climate Change Project- Flood and the 2 listed projects - CCCP and SIFT).</p> <p>Linkages and synergies with all relevant potentially overlapping projects / programmes should be clearly outlined, including areas of overlap and complementarity, drawing lessons from the earlier initiatives during the project design, learning from their problems/mistakes, and establishing a framework for coordination during implementation.</p>	Please see Section II (H) and Annex-7.
	11. Does the project/programme have a learning and knowledge management component to capture and feedback lessons?	<p><b>Not clear.</b></p> <p>KM and learning should not be only related to knowledge products and capacity building activities. The project needs to better mainstream knowledge management and learning capture throughout the proposal of have a dedicated component focusing on KM.</p> <p><b>CAR10:</b> Please clarify learning and feedback loops in the description of the project. Please ensure that it is an embedded mechanism that goes beyond simply disseminating results or collecting learnings. The proposal needs to be stronger in indicating that feedback will be used to improve the innovation process.</p>	Please see Section II (I).

	<p>12. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations in compliance with the Environmental and Social Policy and Gender Policy of the Fund?</p>	<p><b>Not clear</b></p> <p>The project document states that vulnerable families (i.e. including male and female members) have been involved in the consultative process and that discussions with stakeholders will continue throughout the project preparation. Lists of the institutions and number of people consulted at the local level and disaggregated by gender are provided but the outcomes of the consultations.</p> <p><b>CAR11:</b> Please attach the consultation report(s) which presents the outcomes of the discussions held with the stakeholders and ensure that outcomes have been properly incorporated in the project design.</p> <p><b>CR16:</b> Please clarify how vulnerable families were identified and meaningfully involved in the consultations.</p>	<p>Please see the Annex-7.</p>
	<p>13. Is the requested financing justified on the basis of full cost of adaptation reasoning?</p>	<p><b>Not clear.</b></p> <p>For the Adaptation Fund, full cost of adaptation reasoning means that “the project demonstrates that the project/programme activities are relevant in addressing its adaptation objectives and that, taken solely, without additional funding from other donors, they will help achieve these objectives”.</p> <p><b>CR17:</b> Please clarify if the project has co-financing. The Adaptation Fund project should be able to deliver its outcomes and outputs regardless of the success of the other project(s).</p> <p><b>CR18:</b> Please clarify that activities are not “business-as-usual” development and are justified in</p>	<p>Please see Section II (L)</p>

		the context of achieving the adaptation goals of the project.	
	14. Is the project / program aligned with AF's results framework?	<p><b>Not clear</b></p> <p><b>CAR12:</b> The results framework demonstrates alignment with Outcomes 4 and 3. While these are relevant, alignment with outcome 8 (Innovation) is mandatory. Please just describe alignment in the description of project outcomes in Section II and revise the alignment table in Section III.F.</p>	Please see the revised Section II (E).
	15. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	<p><b>Not clear.</b></p> <p><b>CAR13:</b> Please justify sustainability from the point of view of the 3 points below:</p> <ol style="list-style-type: none"> <li>1. The adaptation benefits achieved with the help of the project/programme can be sustained after its end and enable replication and scaling up with other funds after its end.</li> <li>2. The proposal explains the arrangements through which this would be achieved, considering sustainability and maintenance of any infrastructure or installations to be developed, policies and governance arrangements to be developed and implemented, knowledge to be generated, management and other capacity to be improved, etc.</li> <li>3. All key areas of sustainability are addressed, including but not limited to economic, social, environmental, institutional, and financial.</li> </ol>	Please see Section II (D).
16. Does the project /programme provide an overview of environmental and social impacts / risks identified, in compliance with the Environmental and Social	<p><b>Not clear.</b></p> <p>The project is considered as Category 'B'. The risk identification presented, however, is not adequate.</p> <p>All principles except one are listed as no further assessment required for compliance. This is not</p>	Please see Annex-5.	

	<p>Policy and Gender Policy of the Fund?</p>	<p>justified in the context of this project as there are several inherent risk or potential risks present for which the project must put in place adequate safeguard and monitoring measures.</p> <p><b>CAR14:</b> Please ensure that checklist is completed, indicating which environmental and social impacts and risks have been identified and a justification of the risk findings is provided to achieve full compliance with the Environmental and Social Policy.</p> <p>It is suggested to refer to the following guidance case studies to complete this section comprehensively. <b>Environmental, Social and Gender Policy case studies:</b>  <a href="https://www.adaptation-fund.org/document/environmental-social-and-gender-policy-case-studies/">https://www.adaptation-fund.org/document/environmental-social-and-gender-policy-case-studies/</a></p> <p><b>CAR15:</b> Please include sufficient supported documentations (annexes) including a gender assessment and action plan report.</p>	<p>Please see Annex-5.</p> <p>Please see Annex-6.</p>
<p>Resource Availability</p>	<p>1. Is the requested project funding within the parameters for large grants set by the Board?</p>	<p><b>Yes.</b></p>	
	<p>2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project budget before the fee? Are the Project/Programme Execution Costs at or below 9.5 per cent of the total</p>	<p><b>Yes.</b></p>	

	<p>project/programme budget (including the fee)?</p> <p>For regional projects/programmes, are the administrative costs (Implementing Entity Management Fee and Project/ Programme Execution Costs) at or below 20 per cent of the total project/programme budget?</p>		
Eligibility of IE	<p>1. Is the project submitted through an Implementing Entity accredited by the Board?</p>	<b>Yes.</b>	
Implementation Arrangements	<p>1. Are there measures in place for the management of for environmental and social risks, in line with the Environmental and Social Policy of the Fund? Proponents are encouraged to refer to the Guidance document for Implementing Entities on compliance with the Adaptation Fund Environmental and Social Policy, for details.</p>	<p><b>No.</b></p> <p><b>CAR16:</b> Please submit an ESMP that include a clear description of the roles and responsibilities of the implementing entity as well as any executing entity or organizations/stakeholders that are involved in the project. If necessary, provide a full organization chart showing how they report to each other. The implementation arrangements should incorporate gender-responsive elements as appropriate.</p> <p>Please note that for the fully developed proposal, an ESMP must be submitted that</p> <ul style="list-style-type: none"> <li>• Provides a detailed description of the process that will be applied during project implementation to ensure that all USPs comply with the AF ESP.</li> <li>• Contains clearly allocated roles and responsibilities for its implementation,</li> </ul>	Please see Annex-5.

		<ul style="list-style-type: none"> <li>• Includes opportunities for consultation and adaptive management, clear arrangements for the IE to supervise executing entities for implementation of the ESMP, a clear description of the grievance mechanism in place, mentioning all parts of the grievance process, including where grievances can be addressed and clear monitoring and evaluation arrangements for ESP compliance.</li> <li>• Includes a budget provision for implementation of the ESMP should also be provided in the detailed budget section of the proposal.</li> </ul> <p><b>CAR17:</b> Please include arrangements for Grievance Mechanism.</p> <p>Please refer to the following guidance:  <a href="https://www.adaptation-fund.org/document/guidance-document-implementing-entities-compliance-adaptation-fund-environmental-social-policy/">https://www.adaptation-fund.org/document/guidance-document-implementing-entities-compliance-adaptation-fund-environmental-social-policy/</a>  <a href="https://www.adaptation-fund.org/document/opg-annex4-gender-policy/">https://www.adaptation-fund.org/document/opg-annex4-gender-policy/</a> and <a href="https://www.adaptation-fund.org/document/guidance-document-implementing-entities-compliance-adaptation-fund-gender-policy-2/">https://www.adaptation-fund.org/document/guidance-document-implementing-entities-compliance-adaptation-fund-gender-policy-2/</a></p>	Please see Annex-5.
	2. Are there measures for financial and project/programme risk management?	<p><b>No.</b></p> <p><b>CAR18:</b> Please identify all major risks, consider their significance, and include a plan of monitoring and mitigating them, including a table with detailed information on the different categories of risks (i.e., financial, environmental, social, institutional...), their level and how they will be managed.</p>	Please see Annex-5.

	<p>3. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&amp;E plans and sex-disaggregated data, targets and indicators, in compliance with the Gender Policy of the Fund?</p>	<p><b>No.</b>  <b>CAR19:</b> Please include a budgeted M&amp;E plan, that is in compliance with the AF M&amp;E guidelines and compliance with the Gender Policy. M&amp;E should include provisions for mid-term and terminal evaluations; the M&amp;E Plan should address management of the environmental and social risks identified and the project document should mention key M&amp;E milestones.</p>	<p>Please see Section III (D) and Annex-2.</p>
	<p>4. Is a budget on the Implementing Entity Management Fee use included?</p>	<p><b>No.</b>  <b>CAR20:</b> Please include a breakdown of the Implementing Entity Management Fee that covers: Corporate activities fees related to engagement with donor (Policy support, Portfolio management, Reporting, Outreach, and knowledge sharing) and Project cycle management fees (Project preparation and management oversight including financial management and quality insurance, Implementation reports supervision, and Project completion and evaluation oversight).</p>	<p>Please see Annex-2.</p>
	<p>5. Is an explanation and breakdown of the execution cost included?</p>	<p><b>No.</b>  <b>CAR21:</b> Please include a breakdown of the Execution costs that includes the main items supported by the Adaptation Fund for project management including - consultant services, travel, and office facilities, etc covering the direct costs for administration of the day-to day activities of projects. Specific costs include Staffing costs, and project related activity expenditures (Monitoring and evaluation costs; Costs related to drafting progress reports and financial reports; Consultation with project stakeholders (meetings, workshops); Communication, Travel).</p>	<p>Please see Annex-2.</p>

	<p>6. Does the M&amp;E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&amp;E function?</p>	<p><b>No.</b></p> <p><b>CAR22:</b> Please include a budgeted M&amp;E Plan with breakdown of IE fees for supervision of M&amp;E function.</p>	<p>Please see Annex-2.</p>
	<p>7. Is the timeframe for the proposed activities adequate?</p>	<p><b>Not clear.</b></p> <p>As there are many details that are pending clarification, an assessment of the proposed timeframe (3) is not possible at this time.</p>	
	<p>8. Is a summary breakdown of the budget for the proposed activities included?</p>	<p><b>Not clear.</b></p> <p>Table G is not sufficiently detailed. (Pages 19-20)</p> <p><b>CAR23:</b> Please include a detailed budget with budget notes indicating the break- down of costs at the activity level. Adequate resources should be allocated in the project/programme budget for gender-responsive implementation.</p> <p><b>CAR24:</b> Please check for consistency between detailed budget and the components and financing table.</p>	<p>Please see Annex-2.</p>
	<p>9. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?</p>	<p><b>Yes, but needs revision.</b> Please see CAR12 above.</p> <p><b>CAR25:</b> Please include a table on Core impact indicators.</p> <p>The project result framework must include at least the core impact indicator "Number of beneficiaries including estimations for direct and indirect beneficiaries. A second core indicator must be added if the project includes activities targeting the areas identified in AF results framework, namely (1)</p>	<p>Please see Section II (F).</p>

		<p>Early Warning System; (2) Assets Produced, developed; (3) Improved, or Strengthened; (4) Increased income, or avoided decrease in income or (5) Natural Assets Protected or Rehabilitated. Guidance: <a href="https://www.adaptation-fund.org/document/methodologies-for-reporting-adaptation-fund-core-impact-indicators-march-2014/">https://www.adaptation-fund.org/document/methodologies-for-reporting-adaptation-fund-core-impact-indicators-march-2014/</a></p>	
	<p>10. Is a disbursement schedule with time-bound milestones included?</p>	<p><b>Yes.</b> (Page 20).</p>	

# ADAPTATION FUND SINGLE COUNTRY INNOVATION PROJECT PROPOSAL

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## PART I: PROJECT INFORMATION

Title of the Project: Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh

Country/ Countries: Bangladesh

Thematic Focal Area<sup>1</sup>: Water Management

Type of Implementing Entity: National Implementing Entity

Implementing Entity: Palli Karma-Sahayak Foundation (PKSF)

Executing Entities: NGOs, who are PKSF's Partner Organizations

Amount of Financing Requested: 5 million (in U.S Dollar Equivalent)

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### 1. PROJECT BACKGROUND AND CONTEXT

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*Provide brief information on the problem the proposed project/programme is aiming to solve, including both the regional and the country perspective. Outline the economic social, development and environmental context in which the project would operate in those countries.*

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*Describe the problem the proposed project/programme is aiming to solve. Write this as a concise problem statement: The current situation, the desired future, and the gap between the two. Provide brief further information on the current situation including both the regional and the country perspective. Outline the economic social, development and environmental context in which the project would operate in those countries. Describe the climate change vulnerabilities impacting the country/region as well clearly explain the problem area that would be the focus of the innovation.*

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1.1 Ensuring safe drinking water for the people particularly those who are living in remote areas as an essential commodity for living and growth is a great challenge for all countries in the world. It is even more difficult for developing countries. Water is closely intertwined with, among others, poverty, health, education, and gender dimensions<sup>2</sup>. Bangladesh is largely treated as one of the water-rich countries of the world. The average yearly temperature and rainfall in Bangladesh are 29°C and 2000mm respectively with high fluctuations in different months within a year, and between years<sup>3</sup>. There are also geographical variations in receiving rainfall in a given period of time. In summer, large volumes of water from the Ganges, Brahmaputra and

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<sup>1</sup> Thematic areas are: Agriculture, Coastal Zone Management, Disaster risk reduction, Food security, Forests, Human health, Innovative climate finance, Marine and Fisheries, Nature-based solutions and ecosystem based adaptation, Protection and enhancement of cultural heritage, Social innovation, Rural development, Urban adaptation, Water management, Wildfire Management.

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<sup>2</sup> Nahian, M.A., Ahmed, A., Lázár, A.N., Hutton, C.W., Salehin, M., Streatfield, P.K., 2018. Drinking water salinity associated health crisis in coastal Bangladesh. Elem. Sci. Anth. 6 (1). <https://doi.org/10.1525/elementa.143>.

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<sup>3</sup> KARMALKAR, A., MCSWEENEY, C., NEW, M. & LIZCANO, G. 2008. UNDP: Climate Change Country Profile. Oxford: School of Geography and Environment, University of Oxford.

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Meghna (GBM) basins is often discharged through a vast network of 200 rivers and thousands of rivulets at a rate of up to 180,000 m<sup>3</sup>/sec<sup>4</sup>. However, the abundance of water in Bangladesh does not mean that people living in different parts of the country have equal access to drinking water. There are disparities in the water supply systems that include the aspects of water quality, accessibility, and affordability. Urban people are in the advantageous position to get access to piped water mainly managed by public institutions. In the rural areas in Bangladesh, many tubewells (hand pumps) mostly owned by individual households, are set up to provide drinking water with a wider coverage across the country. In relation to potable water, the coastal region of Bangladesh is one of the most water shortage regions in Bangladesh.

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1.2 Bangladesh is a lower-middle-income country with 164.6 million people in 2018 and a population density of 1,140 people per square kilometer, which is among the highest in the world<sup>5</sup>, except few city-states and small island-states. In 2016, 24.3% of the population lived below the poverty line a decrease from 49% in 2000<sup>6</sup>. 14 out of 19 coastal districts have higher poverty than the national average. Bangladesh has maintained a rate of GDP growth of around 9% per annum over the last decade, but economic and social inequality, malnutrition, and environmental degradation remain significant challenges. By value of production, the economy of Bangladesh is gradually shifting away from primary production. Agriculture constituted around 12.44% of GDP in FY 2020-21<sup>7</sup>.

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1.3 The characteristics of the physical environment of Bangladesh make this country vulnerable to climate change. More than 80% of its land is low-lying deltaic floodplains less than five meters above the mean sea level. The country often receives mainly pre-monsoon (March-May) and post-monsoon (August-November) tropical cyclones, originating mainly around the Bay of Bengal. A recent study stated that the geographical location and low elevation of the coastal zone of Bangladesh make it susceptible to disasters whereas climate change asserts a new depressing effect on the lives and livelihoods in the region<sup>8</sup>. Coastal flooding by saline water was found in the extreme south-west throughout the year and in north-west and south-eastern coast in dry season<sup>9</sup>. Polders (mainly these are earthen embankments that were first initiated in 1960 to protect people from coastal flooding) are particularly at risk of higher tidal surges. This is because once a polder embankment is breached, the enclosed land often stays waterlogged for long periods of time, making agriculture and other livelihood activities nearly impossible. Due to saline water intrusion, salinity in the soil and water sources increases. This salinity further goes down in the subsurface soil. Mainly due to lack of precipitation during dry season, sometimes sub-surface salinity

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<sup>4</sup> HOFER, T. & MESSERLI, B. 2006. *Floods in Bangladesh: History, Dynamics And Rethinking the Role of the Himalayas*, Tokyo, United Nations University.

<sup>5</sup> BBS, 2019 Bangladesh Statistics 2019, Bangladesh Bureau of Statistics, Dhaka

<sup>6</sup> Bangladesh Bureau of Statistics (BBS) 2019, *Report of the Household Income and Expenditure Survey 2016*, Dhaka,

<sup>7</sup> BBS, 2021 *Gross Domestic Product (GDP) of Bangladesh, 2015-16 to 2020-21*, Bangladesh Bureau of Statistics, Dhaka ([http://www.bbs.gov.bd/site/page/dc2bc6ce-7080-48b3-9a04-73cec782d0df/Gross-Domestic-Product-\(GDP\)](http://www.bbs.gov.bd/site/page/dc2bc6ce-7080-48b3-9a04-73cec782d0df/Gross-Domestic-Product-(GDP)))

<sup>8</sup> Climate Change Cell 2016, "Assessment of Sea Level Rise on Bangladesh Coast through Trend Analysis", Climate Change Cell, Department of Environment, Ministry of Environment and Forests, Bangladesh.

<sup>9</sup> Hug Brammer, (2013): Bangladesh's dynamic coastal regions and sea-level rise, *Climate Risk Management*, ELSEVIER, 2013.

moves upward. So agricultural and livelihood activities are hampered even after water recedes.

1.4 The coastal areas in Bangladesh are more vulnerable to climate change than any other area. Globally, the IPCC has identified coastal areas as being highly vulnerable to climate change because sea-level rise can amplify risks such as flooding, storm surges, inundation, saline water intrusion, and erosion, particularly in developing countries where coastal management is often lacking (Details can be seen in AR6). The total length of the Bangladeshi coastline is approximately 710 km. Most of the coastal areas are part of a big delta. This delta has three distinctive features: the west part is in a *moribund delta*, the central part is in an *active delta* and the east part is in *structurally dominated estuaries* with a relatively high gradient, where hills are not far from the coast<sup>10</sup>. The Bangladeshi coast is at the top of a funnel-shaped bay known as the 'Bay of Bengal'. It has a trench called 'the swatch of no ground' and a large number of islands and estuaries that are geomorphologically active, with huge sediments depositions, and tidal and wind action. The western and central parts of the coastal areas in Bangladesh have a very low elevation ranging from 1-2 meters from average sea level, which is prone to tidal flooding due to their low-lying geographical characteristics.

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1.5 There are 2.5 million hectares of arable land lying between 0.9 to 2.1 meters from Mean Sea Level (MSL). 53% of these lands i.e. 1.51 million hectares are salinity affected<sup>11</sup>. Due to salinity intrusion, the agricultural production system in the areas is changing day by day. Livelihood options particularly that of the poor community are gradually shrinking. Cyclone-induced tidal surges and intensive rainfall cause inundation of the homesteads of low-lying areas and damage to houses including water and sanitation of the vulnerable people. Hence, the vulnerability of the coastal people is characterized in three ways i.e. i) poor human settlement in low-lying areas, ii) climate-sensitive livelihood, and iii) scarcity of safe drinking water.

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1.6 Salinity is now a common environmental-risk phenomenon in freshwater ecosystems in the coastal region. The effects of climate change, such as sea-level rise and coastal flooding coupled with over-extractions of groundwater and reduced upstream flows are making the management of freshwater ecosystems complex in the coastal region. The unacceptable level of salinity, up to 28.2 ppt in some coastal rivers, is found in inland water which is 200 km far from the coast, particularly in the dry season<sup>12</sup>. Studies are also found that the water vulnerability of coastal people will become more acute in a changing climate from the combined effects of sea level rise (SLR), changes in upstream river discharge, and increased frequency of more intense cyclones. Figure 1 presents the spatial variation of the maximum river salinity level during 2011–2012 in the southwest zone<sup>13</sup>.

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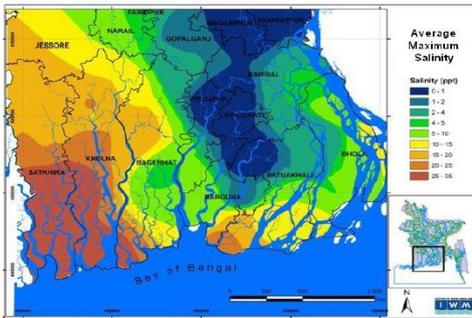
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<sup>10</sup> ISLAM, R., KAUSDSTAAL, R. & UDDIN, A. M. K. 2003. Delineation of the Coastal Zone. Dhaka: Water Resources Planning Organisation (WARPO), Ministry of Water Resources, Bangladesh.

<sup>11</sup> HOQUE, M. A., SCHEELBEEK, P. F. D., VINEIS, P., KHAN, A. E., AHMED, K. M. & BUTLER, A. P. 2016. Drinking water vulnerability to climate change and alternatives for adaptation in coastal South and South East Asia. *Climatic Change*, 136, 247-263.

<sup>12</sup> Brammer, H., 2014. Bangladesh's dynamic coastal regions and sea-level rise. *Clim. Risk Manag.* 1, 51–62. <https://doi.org/10.1016/j.crm.2013.10.001>.

<sup>13</sup> Dasgupta, S. Kamal, F.A. Khan, Z.H. Choudhury, S. Nishat A. 2015 River salinity and climate change: evidence from coastal Bangladesh. in: World Scientific Reference on Asia and the World Economy. World Scientific, 2015: 205-242.



**Figure 1: Map of Average Maximum River Salinity in the Southwest Region of Bangladesh**

IPCC sixth assessment report stated with high confidence that Asian coastal countries are likely to incessantly experience relative sea-level rise and it will result in the coastal flooding of many low-lying areas (IPCC, 2021)<sup>14</sup>. Bangladesh is considered as a hotspot for sea level rise impact, mentioned in a number of scientific studies (Nicholls et al., 2018)<sup>15</sup>. Increasing sea level rise is one of the most critical climate change issues for coastal areas of the country. Currently, because of the low topography in these coastal areas, about 50% typically becomes inundated during the annual monsoons. The study (SMRC, 2003)<sup>16</sup> found that the tidal level in Hiron Point, Char Changa and Cox's Bazar rose by 4.0 mm/year, 6.0 mm/year and 7.8 mm/year respectively, observing a tidal gauge record of 22 years from 1977-1998. The rate of the tidal trend is almost double in the eastern coast than that of the western coast. CEGIS and DOE (2011)<sup>17</sup> have analyzed 30 years of tidal gauge data for estimating observed sea level change in Bangladesh coastal zone without considering any land-sea interaction i.e. sedimentation, subsidence, erosion, accretion etc. It shows trends of water level in the Ganges tidal floodplain of 7-8 mm/year. On the other hand, the trend is 6-10 mm/year in the Meghna Estuarine flood plain and 11-21 mm/year in the Chittagong coastal plain areas. Scientific estimates showed that sea level in the 37 coastal stations of Bangladesh will rise between 0.53-0.97m by 2100 (Haque et al., 2019)<sup>18</sup>, while IPCC has mentioned in AR6 that under the intermediate GHG emissions scenario (SSP2-4.5) global sea level will elevate 0.44-0.76 m by 2100 (IPCC, 2021)<sup>19</sup>. Compared to the predicted global scenario of sea level rise, the coastal belt of Bangladesh will confront the dire impact of sea level rise. On the other hand, Hanebuth

<sup>14</sup> IPCC (2021) Sixth Assessment Report, Physical Science Basis

<sup>15</sup> Nicholls, R. J., Hutton, C. W., Lázár, A. N., Adger, W. N., Allan, A., Whitehead, P. G., ... & Payo, A. (2018). An integrated approach providing scientific and policy-relevant insights for South-West Bangladesh. *Ecosystem Services for Well-Being in Deltas: Integrated Assessment for Policy Analysis*; Nicholls, R.J., Hutton, C.W., Adger, W.N., Hanson, S.E., Rahman, M.M., Salehin, M., Eds, 49-69.

<sup>16</sup> SMRC (2003). The vulnerability assessment of the SAARC Coastal Region due to sea level rise: Bangladesh case study. Dhaka, SAARC Meteorological Research Center.

<sup>17</sup> CEGIS and DoE (2011). Final report on programmes containing measures to facilitate adaptation to climate change of the second national communication project of Bangladesh. Dhaka, Department of Environment.

<sup>18</sup> Haque, A., Rahman, M. H., Rahman, D., & Rahman, D. (2019). An evaluation of sea level rise vulnerability and resilience strategy to climate change in the coastline of Bangladesh. *International Journal of Environmental Sciences & Natural Resources*, 18(2), 56-70.

<sup>19</sup> IPCC (2021) Sixth Assessment Report

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et.al. (2013)<sup>20</sup> using radio-carbon dating of exposed 300 years old salt kilns from the east coast of Sundarban (35 km west from Kuakata) showed that land subsidence rate was 5.2+ 1.1 mm/year. This subsidence has also contributed to increased sea level change. It is predicted that for 45 cm rise of sea level may inundate 10-15% of the land by the year 2050 resulting over 35 million climate refugees from the coastal districts (MOEF, 2009).<sup>21</sup> Sea level rise may also influence the extent of the tides (currently the lower one-third of the country experiences tidal effects) and alter the salinity quality of both surface and groundwater (CCC, 2016)<sup>22</sup>.

The SRDI study showed that over 1 million hectares of cultivable land in the country are affected by salinity intrusion caused by slow- and rapid-onset events including sea level rise, cyclone and storm surges and consequential coastal flooding. The net cultivated area in Satkhira district decreased by about 7 per cent from 1996 to 2008 and production of the principal rice crop in Satkhira district decreased from about 0.3 million tons in 2008 to 0.2 million tons in 2010 (SRDI, 2010)<sup>23</sup>. During the last 35 years, salinity has increased by almost 26% in the country and is spreading over the non-coastal areas of Bangladesh (Reliefweb, 2019)<sup>24</sup>.

Dasgupta et al. (2014)<sup>25</sup> modelled cyclone storm surge impacts under a changing climate scenario in 2050. This model in a bid to determine potential future inundation zones by 2050 under the climate change scenario, was run for five cyclone tracks (covering the entire coastal area), incorporating a 27-cm rise in sea level, a 10 percent increase in wind speed, and landfall of cyclones during high tide. It predicted that by 2050 an additional 15 per cent of the coastal area of Bangladesh will be inundated with storm surges during cyclones. Figure 2 shows the additional area that will be impacted by inundation in 2050. Not only the areas of Khulna, Bagerhat and Satkhira Districts will be newly exposed, but tidal surges at 3 meters height will inundate 69 per cent more land area than they do at the present time.

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<sup>20</sup> Hanebuth, T.J.J., Kudrass, H.R., Linstadterm, J., Islam, B., Zander, A.M., (2013): Rapid coastal subsidence in the Central Ganges-Brahmaputra Estuary. University Press Ltd, Dhaka.

<sup>21</sup>MOEF (2009): National Adaptation Programme of Action (NAPA), 2009. The Ministry of Environment and Forests, Government of Bangladesh, Dhaka.

<sup>22</sup> CCC (2016): Assessment of Sea Level Rise on Bangladesh Coast through Trend Analysis", Climate Change Cell (CCC), Department of Environment, Ministry of Environment and Forests, Bangladesh.

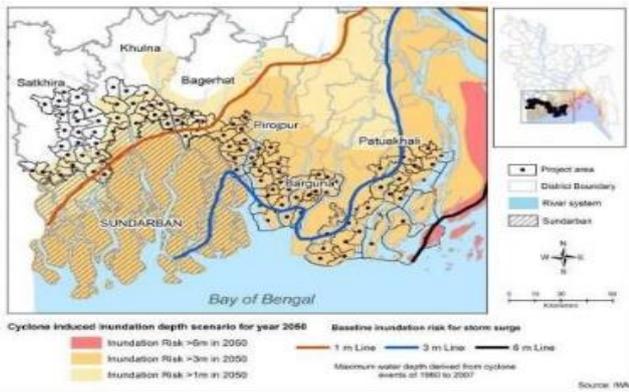
<sup>23</sup> Soil Resource Development Institute (SRDI) (2010): Saline Soils of Bangladesh, Soil Resource Development Institute (SRDI), Ministry of Agriculture, Dhaka.

<sup>24</sup> Reliefweb (2019) Climate Change-Induced Salinity Affecting Soil Across Coastal Bangladesh <https://reliefweb.int/report/bangladesh/climate-change-induced-salinity-affecting-soil-across-coastal-bangladesh>

<sup>25</sup> Dasgupta, Susmita & Huq, Mainul & Khan, Zahirul & Murshed, Ahmed & Mukherjee, Nandan & Khan, Malik & Pandey, Kiran. (2014). Cyclones in a changing climate: the case of Bangladesh. Climate and Development.

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**Figure 2: The projected inundation map of the coastal area in Bangladesh in 2050 due increased number of cyclones under climate change scenario**

1.7 The increased sea level, water salinity, soil salinity and cyclone intensity severely affect drinking water sources in the selected coastal districts. The coastal people have very limited sources of drinking water due to ground and surface water salinity as mentioned in paragraph 1.9. Most of the coastal people use pond water which is captured during monsoon for drinking water. This pond water often contaminate by storm surges and coastal flooding. Ground water is also not drinkable particularly in the coastal areas. With the evidence of present and future climate change as stated above, it is firmly stated that the climate change will intensify this situation for the coastal people. So, reliable safe drinking water supply in the coastal area should depend on water treatment technology.

1.8 Treating water is a public good, it is expected that the government will make necessary provisions to ensure water security to all its citizens. In Bangladesh, due to insufficient fiscal allocations, public institutions related to water management are not always able to adequately serve the people, particularly those who are living in remote coastal areas. There is some lack of coordination and participation in the decision-making process as well while a water supply system is installed in a community. The day-to-day management of the small-scale water supply system and its sustainability are not always considered carefully. Heavy subsidy at the initial stage, inadequate capital investment in the later stage, and inappropriate pricing policy for the purified water make a water plant unsustainable in the long run. There are also barriers associated with gendered and wealth inequalities for ensuring equal access to a water service point at the community level.

1.9 The coastal people of Bangladesh utilize a number of options to secure their drinking water. These include, among the available options, the use of tube wells, pond sand filters (PSFs), low saline pond water, rainwater harvesting during the rainy season, reverse osmosis, managed aquifer recharge, and small piped water supply. These options are influenced by seasonality and other technical factors. Ponds and other water bodies are often contaminated with saltwater. PSFs are often not functioning well due to their operational and maintenance challenges.<sup>26</sup> Rainwater

<sup>26</sup> Md. Atikul Islam, Md. Ali Akber, Prosun Kumar Ghosh; Water quality of small-scale desalination plants in southwest coastal Bangladesh. *Water Supply* 1 October 2018; 18 (5): 1606–1616.

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harvesting is not always a suitable option for ensuring year-round water security, particularly for the poor due to seasonal fluctuations in rainfall, inappropriate structures to capture rainwater, and insufficient storage capacity. These systems, therefore, are not able to supply drinking water to the poor throughout the year. The people living in coastal areas face portable water shortages all year round, but the situation deteriorated in the dry season, mainly from the month of November to May. It is observed that the groundwater and surface water salinity is very high in many coastal areas and this situation has increasing trends making other options for water supply more unsustainable<sup>27</sup>. Compared to a PSF plant and a rainwater harvesting plant, a RO plant can serve more families and for a long period of time (Details can be seen in Table 1).

**Table 1: Comparative Analysis among a RO, PSF and RWH Plants (DPHE 2016)**

Aspects	RO Plant	Pond Filter	Sand	Rain Water Harvesting
Installation Cost (Approx)	1000 USD	600 USD		400 USD
Plant Life Time	30 Years	10 Years		15-20 Years
Average Coverage	> 500 Families	10-15 Families		1 Family

1.10 The RO plant can supply safe drinking water for the people living in the coastal regions. A study on the quality of water sourced from a RO plant, which is located in Patharghata Upazila (sub-district) under Borguna district was conducted. The sample of water was tested in a public university lab. The results can be seen in Table 2.

**Table 2: The Test Results of RO Water Sample<sup>28</sup>**

Parameters	Unit	Water Processed from a RO Plant	Bangladesh Standard	WHO Guideline Values
Arsenic	mg/l	0.00	0.05	0.05
Chloride	mg/l	100	150 - 600	250
Fecal Coliform	N/100 ml	0	0	0
Odour	mg/l	Odourless	Odourless	-
pH	mg/l	7.00	6.5 - 8.5	6.5 -8.5
TDS	mg/l	20	1000	1000

1.11 A number of factors make the reverse osmosis system a possible alternative option of drinking water for the climate-vulnerable people living and maintaining their livelihoods in the coastal region. These factors include suitability to use it throughout the year, opportunity to set it anywhere in the coastal areas, it has long-term benefits to serve a large array of families, and scope to purify both ground and surface water.

doi: <https://doi.org/10.2166/ws.2017.222> and Shamsuzzoha, M., Rasheduzzaman, M., & Ghosh, R. C. (2018). Building resilience for drinking water shortages through reverse osmosis technology in coastal areas of Bangladesh. *Procedia Engineering*, 212, 559–566. <https://doi.org/10.1016/j.proeng.2018.01.072>.

<sup>27</sup> Shamsuzzoha, M., Rasheduzzaman, M., & Ghosh, R. C. (2018). Building resilience for drinking water shortages through reverse osmosis technology in coastal areas of Bangladesh. *Procedia Engineering*, 212, 559–566. <https://doi.org/10.1016/j.proeng.2018.01.072>.

<sup>28</sup> Shamsuzzoha, M., Rasheduzzaman, M., & Ghosh, R. C. (2018). Building resilience for drinking water shortages through reverse osmosis technology in coastal areas of Bangladesh. *Procedia Engineering*, 212, 559–566. <https://doi.org/10.1016/j.proeng.2018.01.072>

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1.12 Drinking water safety remains a major challenge with only 34.6% of households consuming water which meets both the Bangladesh standard for arsenic ( $\leq 50$  ppb) and E. coli ( $\leq 1$  cfu/100 ml)<sup>29</sup>. It is found from a study that in some coastal areas only 38% of families are water secured<sup>30</sup>. There is also huge demand for safe water from poor households.

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1.13 The current many global development goals as well as the Sustainable Development Goal 6 call for equitable access for all by the year 2030 to safe and affordable drinking water and environmentally responsible sanitation. To reach the new SDG water target, Bangladesh will need to measure access to “safely managed water,” which builds off of the MDG era’s improved water indicator by requiring that households have access to an improved water source that is also i) free from fecal and chemical contamination; ii) continuously available when needed, and iii) located on the household’s premises.

1.14 The Government of Bangladesh has committed to achieving universal access to safe drinking water, sanitation, and hygiene by 2021 by eliminating inequalities in services and ensuring sustainability, and the targets were not achieved as it was planned. However, the revised targets and interventions are outlined in the 8<sup>th</sup> Five Year Plan which started from FY 2020-21 and will end in FY 2024-25. The ‘Perspective Plan 2041’ of Bangladesh envisions a country where all citizens enjoy a quality of life assured with adequate nutrition. Bangladesh Climate Change Strategy and Action Plan (BCCSAP) recognizes the effects of climate change on water resources. In the last decades, the government WASH projects mainly focused on providing access to water and sanitation services through the Department of Public Health and Engineering (DPHE), WASAs, and Local Government Institutions. These public organizations work mainly in urban areas. However, around 80% of the water facilities in rural Bangladesh were constructed privately.

1.15 Many households in Bangladesh do not have sufficient cash in hand to install /upgrade safe water systems but can manage the cost of a system if the initial investment is made. To address this, a few Partner Organizations (POs), they are Non-Governmental Organizations (NGOs), of PKSF piloted a program since 2016. PKSF successfully implemented two projects: “Community Climate Change Project (CCCP)” under Bangladesh Climate Change Resilient Fund (BCCRF) and Learning and Innovation Fund to Test New Ideas (LIFT) financed by FCDO (former DFID). Under these projects, PKSF provided extensive support to promote reverse osmosis water treatment plants to make people more climate-resilient. –The POs helped the communities to set up water treatment plants in the coastal regions. As a result, at the end of 2021, these projects supported the establishment of 50 RO plants at the local level in 13 sub-districts of 5 districts by the 14 POs under the guidance of PKSF. Considering the huge demand-supply gap in drinking water in the coastal regions in Bangladesh, the suitability of establishing RO plants, and the experience of PKSF related to RO plants, PKSF is proposing a project on innovation under large grants project of adaptation fund.

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<sup>29</sup> Equity Monitoring for Results (MoRES): Application of MoRES to the Delivery of Water, Sanitation and Hygiene (WASH) Services in Bangladesh, 2014.

<sup>30</sup> Md. Atikul Islam, Md. Ali Akber, Prosun Kumar Ghosh; Water quality of small-scale desalination plants in southwest coastal Bangladesh. *Water Supply* 1 October 2018; 18 (5): 1606–1616. doi: <https://doi.org/10.2166/ws.2017.222> and Shamsuzzoha, M., Rasheduzzaman, M., & Ghosh, R. C. (2018). Building resilience for drinking water shortages through reverse osmosis technology in coastal areas of Bangladesh. *Procedia Engineering*, 212, 559–566. <https://doi.org/10.1016/j.proeng.2018.01.072>

**2. Project Objective**

List the main objectives of the project/programme.

The proposed project aims to ensure secure water security for the coastal families by establishing reverse osmosis water treatment plants.

The project will target 225,000 beneficiaries of the selected three coastal districts namely Khulna, Bagerhat and Satkhira. About 50% of the beneficiaries will be women and 30% of them will be youth.

The project has a plan to implement in three coastal districts of Bangladesh: Khulna, Satkhira and Bagerhat. As per the Household Income and Expenditure Survey (HIES), 2016 by the Bangladesh Bureau of Statistics (BBS, 2016), poverty Headcount Ratio (HCR) of Bagerhat district is 31%, followed by Khulna 30.8% and Satkhira 18.6%. The HCR of Bagerhat and Khulna districts are higher than the national average which is 27.2% while Satkhira showed below the national average. The rural average household size of the three districts is 3.75.

**Project Components and Financing**

Fill in the table presenting the relationships among project components, outcomes, outputs, and countries in which activities would be executed, and the corresponding budgets.

For the case of a programme, individual components are likely to refer to specific sub-sets of stakeholders, regions and/or sectors that can be addressed through a set of well-defined interventions / projects.

**Table 3. The relationships among project components, outcomes, outputs, and countries in which activities would be executed, and the corresponding budgets.**

Project Components	Expected Outcomes	Expected Outputs	Countries	Amount (US\$)
1. Development of drinking water supply facilities	<p><u>1. Enhanced ability of coastal communities to get access to safe drinking water</u></p> <p><u>(1.1) The prevalence of water-borne diseases is reduced in the project areas in coastal region of Bangladesh.</u></p>	<p><u>Locally appropriate Output 1.1. Reverse Osmosis (RO) plants are installed and safe drinking water are provided to the climate-vulnerable people.</u></p> <p><u>(1.1) Established 225 Reverse-Osmosis Water Treatment Plants</u></p>	Banglades h	4,000,000

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	(1.2) (2) The status of accessing safe drinking water of the coastal people will be enhanced.	in coastal region of Bangladesh <u>Output 1.2 Water testing kits are procured and supplied.</u>		
2. Institutional support at the local level for project implementation, infrastructure operation and sustainability and knowledge management	<u>2. Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.</u> (2.1) The proportion of the population sensitized and who have positively changed their behaviour towards safe drinking water has increased; (2.2) Jobs are created at the local level; (3) The capacity of implementing partners are strengthened.	<u>Output 2.1 Formation of Groups</u> <u>Output 2.2: Staff are recruited, trained and certified.</u> <u>Output 2.3: Training materials developed.</u> <u>Output 2.4: Training for beneficiaries conducted</u> (2.1) 225 Water Adaptation Groups are formed; (2.2) Water-Testing kits are provided; (2.3) Training materials are developed; (2.4) Staff are recruited at the local level; (2.5) The project participants of the coastal areas are sensitized on safe drinking water.	Bangladesh	525,000
3. Project Execution cost				400,000
4. Total Project Cost				4,925,000
5. Project Cycle Management Fee charged by the Implementing Entity (IE)				75,000
<b>Amount of Financing Requested</b>				5000000

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## Projected Calendar

*Indicate the dates of the following milestones for the proposed project/programme*

**Table 4. The milestones for the proposed project**

Milestones	Expected Dates
Start of the Project Implementation	July, 2022
Mid-term Review	Dec, 2023
Project Closing	June, 2025
Terminal Evaluation	March, 2025

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## PART II: PROJECT JUSTIFICATION

A. Describe the project/ programme components, particularly focusing on the concrete adaptation activities, how these activities would contribute to climate resilience. For regional projects describe also how they would build added value through the regional approach, compared to implementing similar activities in each country individually. For the case of a programme, show how the combination of individual projects would contribute to the overall increase in resilience.

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The geographical location and low elevation of the coastal zone of Bangladesh make it susceptible to disasters. The coastal areas in Bangladesh are more vulnerable to climate change. Sea-level rise is amplifying risks such as flooding, storm surges, inundation, saline water intrusion, and coastal erosion. Hence, the vulnerability of the coastal people is characterized by i) poor human settlement in low-lying areas, ii) climate-sensitive livelihood, and iii) scarcity of safe drinking water.

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The project targets to provide safe drinking water to 225,000 people in the three coastal districts i.e. Khulna, Bagerhat and Satkhira. Hence, the project will support about 60,000 households with safe drinking water through establishment of 225 RO plants. It is expected that 50% of the beneficiaries will be women and about 30% of the total beneficiaries will be youth. The project will focus mainly on the rural community because the community particularly the vulnerable poor people in the selected upazilas. 225 technical persons for carrying out maintenance of the plants will be selected from the poor households. The project will ensure that 50% of the technical persons will be women, particularly the youths (as defined in the national youth policy, 2017, aged 18-35 are the youths in Bangladesh).

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In target areas where marginalized and vulnerable groups have been identified, particular benefits provided by the project/programme to those groups should be outlined. There are a few special social groups. There are some extremely poor people found in the three districts. They mainly depend on natural resources and the ecosystem-services of the Sundarbans. They survive by collecting honey, catching fish and collecting crab and other forest materials. They also involve in shrimp farms and agricultural activities. The project will provide priority to them while selecting the sites for establishment of the RO plants.

The project aims to supply continuous and safe drinking water to vulnerable coastal communities by establishing reverse osmosis water treatment plants. The chosen shift to RO water treatment plants is based on the rationale that available options (the use of tube wells, pond sand filters (PSFs), low saline pond water, rainwater harvesting) have proven to be unsustainable and/ or are impacted seasonal variations making continuous potable water supply not possible.

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To ensure the drinking water needs of the population living in coastal areas, the proposed project will be structured around the following three main components: (1i) Development of drinking water supply facilities, development of drinking water supply facilities; (2ii) Institutional support at the local level for project implementation, infrastructure operation and sustainability and knowledge management, institutional support at the local level for project implementation, infrastructure operation, sustainability, knowledge management and future reference; and (3iii) project management.

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### **Outcome 1. Enhanced ability of coastal communities to get access to safe drinking water**

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#### **Output 1.1 Locally appropriate Reverse Osmosis (RO) plants are installed and safe drinking water are provided to the climate-vulnerable people.**

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The coastal region of Bangladesh is predominantly rural and prone to natural disasters. Their lives and livelihoods are being destroyed by many hazards. Historically, they are vulnerable people. Among others, the sources of water for these people are shrinking quickly due to climate change particularly sea level rise and salinity intrusion. Climate change and changes in land use exacerbate the situation and are negatively affecting surface and groundwater resources in coastal areas. Drinking water sources for the mass people living in the coastal rural areas are traditional, diverse, and these include shallow groundwater obtained through tube wells, small ponds with and without pond sand filters (PSF, a sand and gravel filter), harvested rainwater, and river water. Rainwater collection storage devices are of generally small volume (insufficient to last the entire year), and municipal reservoirs are essentially non-existent. The ponds are often contaminated with saline water by cyclonic storm surge and tidal surge. This lack of climate-resilient adequate water storage infrastructure intensifies water insecurity for the coastal people and complicates the situation of water-borne diseases, which is further compounded by climate change. Against this backdrop, the purification of brackish water can greatly aid climate change adaptation, primarily through diversification of water supply and resilience to water quality degradation. Diversification of water supply can provide alternative or supplementary sources of water when current water resources are inadequate in quantity or quality. Desalination technologies established on a raised plinth with storm resilient material also provide resilience to water quality degradation because they can usually produce very pure water, even from highly contaminated source waters. PKSF started to pilot PKSF-supported PO-installed RO plants in 2016.

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#### **Activity 1.1.1 Procurement of RO plants**

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The features of a RO plant will be designed considering the factors mentioned in Activity 1.1.1 with sufficient capacity to supply year-round household needs. These plants will also designed based on international best practices and locally appropriate specifications as well as the corrosion of certain construction materials under saline conditions. Under this activity, around 225 RO plants will be established by partner Non-Governmental Organizations (NGOs) with the active support from local people, adjusting with local contexts and cyclone and incorporating coastal flood-resilient features (Details on the processes and technologies used to treat water can be seen in Annex 1). The project partner NGO will procure RO plants based on the

specifications provided by the PMU. Necessary procurement policies and methods should be followed for ensuring transparency.

#### Activity 1.1.2 Construction of RO plant sites

A small scale construction needs to be done for establishing the RO plant. A detailed specification will be provided from PMU for this purpose. The corrosion of certain construction materials under saline conditions will be considered carefully (Details can be seen in Annex 1). Sites will be finalized in consultation with local communities and representatives of local councils. A number of factors will be considered to select a suitable site for establishing a RO plant. First, the supply-demand gap for drinking water at the household level will be assessed through surveys by the partner NGOs. Second, the availability of raw water will be explored. Third, the sources of power will be identified. Fourth, local enthusiasm will be understood. Fifth, the availability of land for setting up a RO plant will be considered. Sixth, the scope for the management of reject water will be evaluated. Seventh, the vulnerability of infrastructures and people to climate-induced hazards will be estimated. Eighth, the intention of local people to measuring the quality of water at various levels will be valued. For perform the activity 1.1.2, the necessary training will be provided to partner NGOs.

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#### Output 1.2 Water testing kits are procured and supplied.

Testing RO plant's water quality on a regular basis, being an important part of maintaining a safe reliable source of water, will ensure that the water source is being properly protected from potential contamination, and that appropriate treatment is selected and operating properly. It is necessary to understand regularly the quality of water on different parameters, such as pH, TDS, E-coli, chlorine, sodium, potassium, calcium, magnesium, arsenic, and iron to maintain national drinking water standards.

##### Activity 1.2.1 Procurement of testing kits

The testing kits will be procured by the Executing Entities and necessary guidelines will be provided by IE. If necessary, the bigger labs will be referred.

##### Activity 1.2.2 Distribution of testing kits

The testing kits will be provided to partner NGOs and even, water-user groups. Testing kit-users will be trained to operate and maintain those kits.

#### **Outcome 2. Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.**

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##### Output 2.1 Formation of Groups

These plants will be managed and owned by local community people with active guidance from PKSF and its local partner NGOs. Local council members and other local philanthropists are also be involved in this process. The locally-managed and locally-owned RO plants will have a broad base of memberships, and in which the

benefits will support a wide range of target groups, such as, among others, the extremely poor people, and people living with disabilities, the adolescents and youths, and female headed households. These are the people i) who will be active in the daily affairs of the RO plant, and (ii) who have the power to direct the management and policies of the RO plants.

#### Activity 2.1.1 Beneficiary selection and group formation

After finalizing a site for establishing a RO plant, a catchment area for the RO plant needs to be demarcated. Community members needs to be enrolled from this catchment area and formed a group. There will be a membership card for each household. These groups can be named as 'Water Organization' in Bengali 'Pani Sangathan'. To identify them clearly, the village name can be included in front of each 'Pani Sangathan'. These groups will be supported to establish water-user groups with active guidance from the local partner NGOs.

#### Activity 2.1.2 Project Participants' Mobilization and group meetings

Capacity building of the local people is an important factor. For this, participants will be trained on the maintenance of RO plants, water quality and challenges of drinking water related to climate change and other stressors.

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#### Output 2.2: Staff are recruited, trained and certified.

The competent staff both at the PMU and EE levels will be a critical input for the success of the project. For this, the appropriate Terms of Reference (ToR) for each staff will be developed. Among other issues, ToR will focus on experience and knowledge related to climate change and water issues of the incumbent.

##### Activity 2.2.1 Recruitment of PMU staff and Executing Entity staff

The staff will be recruited competitively with an open advertisement. PKSF will deploy the competent personnel to execute the project.

##### Activity 2.2.2 Training to the newly recruited staff on project management

Training will be provided all recruited staff both at the PMU and EE levels. A group of competent trainers will be invited to train the staff following standard training modules. Field visits will be included in each training batch. Industry experts will be invited to share their sheer experiences, particularly the best practices and challenges.

#### Output 2.3: Training materials developed.

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##### Activity 2.3.1 Prepare training material on climate change and water issues

Necessary training modules on group management, climate change, water and RO plant management will be developed. Local terminologies, analogies and metaphors will be used to contextualize theories and concepts. So that, locally contextualized theories and concepts could be practiced and understood. A training need assessment will be done before finalizing the training subjects.

#### Output 2.4: Training for beneficiaries conducted

The water-user groups will be trained on climate change and water issues, management of the distribution of purified water among the enlisted members and assist to maintain the accounts of a RO plant. The training will be provided by the partner NGO to the water-user groups with an expectation that these groups are capacitated to be self-sufficient before the end of the project period.

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#### Activity 2.4.1 Organise training for beneficiaries

Training will be provided to local water-users, even to caretakers of the RO plants, local council members and local technicians on a wide range issues with competent master trainers. Training of Trainers (ToT) will be conducted, if necessary, for rolling out the trainings quickly. The Gender Action Plan (GAP) will be used at all activities. The training contents will incorporate climate change and water issues, gender vulnerabilities and social inclusion.

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In addition to the above activities, knowledge management activities will be performed in the project by accumulating new knowledge about water desalination and water in climate-vulnerable areas, and by disseminating this knowledge to communities and decision-makers at the policy level. Three knowledge hubs will be established in the target area (one in each of three districts, i.e., Khulna, Satkhira and Bagerhat) to understand local challenges and best practices related to the management of RO plants, and to disseminate this knowledge across each target area. The location for the knowledge hub will be selected based on the factors described in Activity 1.1.2. Three partner NGOs will be responsible to operate these knowledge hubs. These hubs will gather local information and will also communicate national best practices to community members in the target areas through partner NGOs. Throughout the implementation of this project, the lessons learned from interventions and best practices will be collected by project staff. The hubs will support the establishment of visibility mechanisms, such as social media, adolescent clubs, community radio websites, brochures, workshops, seminars and public events. These best practices and lessons learned will be disseminated widely. Details can be seen in Annex-6.

#### Component 3. Project Management

PKSF will be the implementing agency for the project and will select Executing Entities (EEs) from its existing 187 active partner organizations following a set of criteria. The project will be managed by a Project Management Unit (PMU) at the PKSF, that will be staffed adequately. PKSF will also make use of its existing expertise, such as procurement, accounts and finance, general administration, human resources, audit and program implementation, environment, and climate change for related activities.

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B. Describe how the project /programme would promote new and innovative solutions to climate change adaptation, such as new approaches, technologies, and mechanisms.

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The reverse osmosis water purification model explains how a sustainable water supply plan can be developed by PKSF for implementation by the POs. A key concern of the proposed business model for PKSF-supported and PO-operated RO plants was to eventually transfer the operational control of the water supply system to the local people. It is evident that if properly trained, these technologies can be easily managed and operated by the local people. The poor people involved in the business will also get alternative employment opportunities. Based on the previous experiences, RO plants will be established considering the need of an individual community. This project will not be merely a technology transfer project. It needs to be adjusted with its operational modality, management structures based on the ground reality and the geographical characteristics of the working areas. The features of RO plants will be different from place to place and tailor-made. Equity and equal participation will be main principles. A few examples of different features of a RO plant are given below.

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Table 5. A few examples of different features of a RO plant

<u>Sl. No</u>	<u>Features of RO Plant and its Management</u>	<u>Description of the features</u>
<u>1</u>	<u>Community</u>	<u>The community will be different, such as poor, female headed households, fishers, small traders, PWDs, special social groups, youth, adolescents and elderly.</u>
<u>2</u>	<u>Water Demand</u>	<u>The supply-demand gap will be different.</u>
<u>3</u>	<u>Design and Capacity</u>	<u>The design and capacity of a RO plant will be different.</u>
<u>4</u>	<u>Membership and Organization</u>	<u>Membership and non-membership arrangements will be there. A water organization will be formed for each RO plant.</u>
<u>5</u>	<u>Pricing</u>	<u>There will be a flexible pricing structure based on the income-expenditure assessment of an individual plant.</u>
<u>6</u>	<u>Raw Water</u>	<u>The source of raw water will be different. However, the use of surface water, i.e., water from ponds and rivers will be preferred.</u>
<u>7</u>	<u>Energy</u>	<u>Energy from mains, solar and generator-operated sources will be utilized.</u>
<u>8</u>	<u>Materials</u>	<u>To avoid corrosion of the materials due to salinity, SS materials will be used where possible.</u>

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9.	<u>Operation of Plants</u>	<u>A water operator-cum-water manager will be responsible for day-to-day operation. An Engineer will supervise a group of operators.</u>
10.	<u>Management</u>	<u>A management committee will be formed for each RO plant. Members will be included from the water organization, the local council and the partner NGO.</u>
11.	<u>Distribution of Water</u>	<u>Water will be distributed from the point of water production. Besides, local manually-driven carts/vans/boats will be used for the distribution of water in the remote areas.</u>
12.	<u>Management of Reject Water</u>	<u>Reject will be discharged in the flowing water. Alternative uses of reject water will be explored.</u>
13.	<u>Capacity Building</u>	<u>An extensive training will be provided to all beneficiaries, operators, engineers and official of local council members and partner NGOs.</u>
14.	<u>Ownership</u>	<u>RO plants will be owned by the respective water organizations under active guidance from local councils and partner NGOs.</u>

C. Describe how the project/programme aims to roll out successful innovative adaptation practices, tools, and technologies and/or describe how the project aims to scale up viable innovative adaptation practices, tools, and technologies.

PKSF installed 50 RO plants in the coastal areas of Bangladesh as of December 2021. The majority of the plants have started their water production at the end of 2016 and in early 2017. These RO plants in purposively selected locations have a severe drinking water crisis, which has opened up new opportunities for overcoming the crisis. The POs of PKSF have 11,115 branch offices in Bangladesh serving more than 15 million families with various financial and non-financial services. Among those, more than 1,000 branches are located in the coastal areas. That means that there are 1,000 existing branches where PKSF can implement the project. Currently, only 50 branches are involved with the RO plants. It is to be noted that PKSF is working in those areas with other livelihood activities and has long-outstanding partnerships with local NGOs.

D. Describe how the project / programme would provide economic, social, and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme would avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.

Ensuring water security has many economic, social, and environmental benefits. First, it will save time, particularly for women and girls. That means that they have more time to engage themselves in economic activities and study. Second, it has a gender dimension too. Close proximity of a water source is associated with women's dignity and security. It is expected that the proposed project will help to meet the drinking

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water need of the coastal people estimated at 225,000 in 2025, around 50 percent of them are women. Third, the project will benefit the institutional structures involved in its implementation, namely POs and local government institutions. Fourth, the project will create 225 jobs during the implementation phase and after completion through micro-businesses especially in water distribution activities. (Annex-6 can be seen).

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The proposed RO plants will be installed on a raised plinth above surge height level so that it is not inundated by tidal surge or cyclonic storm surge. The sites for RO plants will be selected in such a place which is easily accessible to the local communities.

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The main expected project outputs are sustainable access to drinking water (the access rate will increase from 32% currently to 100% in 2025) in the project area and a positive change of attitude and behaviour among the project participants with respect to the use of safe drinking water. It is evident from a study that these water plants have not only meet the drinking water needs of the people but have also enabled the communities to remain secure from various waterborne diseases<sup>31</sup>. It is expected that through this project interventions, the average prevalence rate of diseases associated with water will drop significantly over the period.

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The economic, social, environmental, and technological benefits for establishing RO plants in severely saline-affected areas with particular reference to the most vulnerable communities are given below.

### **Social Benefits and Sustainability**

It is mentioned above that the women will save time as they will have drinking water sources at their locality. Thus, the women can engage more time in looking after their children's education. It will reduce potential sexual harassment due to reduced distance of water collection. As the project will involve 50% women in the project activities, it will empower them and help them play decision-making roles in their families.

The sustainability of a rural water technology depends on the willingness of users to provide the necessary time, money and labor to keep the system functioning. This willingness may be affected by socio-economic factors such as income level, ethnic homogeneity, or the willingness of villagers to work together. More commonly, however, the willingness will depend on their satisfaction with the technology, usually compared to the previous purification technology in the community. When communities perceive a significant improvement in water services, they are usually more willing to pay for O&M. Willingness-to-pay is also affected by community perceptions of ownership or sense of entitlement to free services from the government. Moreover, the technology has to also be well accepted by all involved stakeholders and beneficiaries as it directly or indirectly affects them. This component of sustainability also involves establishment of community based technical, financial, and management committees administering the water point and empowering them how to take care of the established infrastructure because when a new technology comes in, it takes a long time to learn it. When we evaluate the actual site situation in our project

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<sup>31</sup> Mujeri, Mustafa K; Islam, Md. Refatul; Hasan, Md. Mehadi; Nargis, Farhana; Akhter, Nahid and Muneer, Farah. 2017 Innovative Solutions to Sustaining Access to Safe Drinking Water for the Poor in the Saline-prone Coastal Belt: A Critical Review of LIFT Initiative of PKSF.

area, there are high demands for appropriate saline water purification technology. It is also observed that the past and currently on-going projects have faced various obstacles during the implementation. Absence of the source of financing to cover the operating and maintenance (O&M) cost; capacity and experience to conduct the O&M; and low public awareness on the water quality have been the main bottleneck. The community also reported that the reasons for not using public drinking water facilities were: the cost, bad taste, and long distance. Generally, the community in this area has big requests for the appropriate purification technology. Most of them already understand the health effect of high salinity water and they are ready to put all their effort and energy to care for any desalination option coming to their village. In addition to this all the purification technologies, such as Capacitive deionization (CDI), Solar still distillation (SSD), Reverse Osmosis (RO), and Reverse Electrodialysis (EDR) have been more or less attempted once in those coastal areas of Bangladesh and there will be high propensity the community will adapt them<sup>32</sup>. However, the reverse osmosis process has relatively higher likelihood as it is currently practiced everywhere, and everyone has seen or heard about it. Typical example of strengthening social sustainability was observed in the previous CCCP project. PKSF partner organization Nowabanki Gonomukhi Foundation with experience in providing clean water to coastal areas of Satkhira and Bagerhat. District leaders of these areas stated that water treatment plans for purifying water and serving pure drinking water to the habitants of the Satkhira district were established using reverse osmosis process. The technology was tested by BUET and certified by BSTI. NGF has been monitoring marketing and maintaining the project and machines for more than 4 years.

#### **Economic Benefits and Sustainability**

The project will supply safe drinking water to the vulnerable coastal people in the targeted areas. The beneficiaries will have two types of economic benefits. One is that they will reduce their health cost as the existing drinking water is not suitable for good health. So, they are often affected by different types of water borne diseases like dysentery, diarrhoea etc. Moreover, the women have to travel more than a kilometer to collect drinking water. By establishing the RO plants close to their residence, they will be able to save time and travel costs for collecting water. They will be able to engage more time in productive works particularly income generating activities. The project will document the quantity of the benefit during implementation of the project.

This term refers to the sustainability of the project in terms of economic aspects. This includes different segments (geography, management model) having a different level of cost recovery, Identification of fund sources and responsibility for major repairs, capital maintenance, and asset replacement, running and operation costs with special attention to the social pricing for the most vulnerable groups as well to ensure affordability. The total cost of a desalination facility is broken down into capital expenditure (CAPEX) and operational expenditure (OPEX). Both CAPEX and OPEX are highly dependent on the location of the treatment facility and vary considerably for small-scale systems. OPEX is primarily dependent on energy costs and maintenance which can be reduced by using low cost electric supply and involving local community for maintenance. Since RO is a more mature technology, it has lower CAPEX, and it

<sup>32</sup> CTCN, 2019, Bangladesh CTCN TA Project Potential Application for Purification of Saline Water at household level

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dominates the current desalination market<sup>33</sup>. However, due to poor economic conditions of the coastal people of Bangladesh few people are willing to pay for safe drinking water. The situation seems that the willingness to pay is low and a technology with low running and operational cost has to be better suggested. In the economical aspect, RO seems to have lower CAPEX and easily available technology. Moreover, if operated with renewable energy sources and for highly saline water, RO will be the first choice compared to other desalination technologies available in the market.

### **Environmental Benefits and Sustainability**

The project will use surface water for purification through the RO plants. Hence, the dependency on ground water will be reduced. This will enhance ground water storage in the project area. This sustainability pillar mainly ensures that the rate of waste generation from the desalination technology to be selected should not exceed the assimilative capacity of the environment (sustainable waste disposal). RO has relatively large waste volumes and associated environmental impact but investing in higher-quality membranes and/or multi pass systems can help reduce water waste and make RO more environmentally friendly and water-efficient. In the project the surface water from the nearest canal will be used and the wastewater will be released to the source which will make it dilute and less harmful for the source (deatails can be seen in Annex-5).

### **Technical Benefits and Sustainability**

Technical issues related to the design and construction of rural desalination plants are the most obvious determinants of purification technology sustainability. With this sustainability pillar, one can ensure that the selected purification technology is technically sound, scientifically proven, commercially available and can easily be installed and operated in the project area without any failure. This includes proper site selection which addresses duplication of efforts with other implementing bodies, avoiding flooding areas during site selection that complicate construction works; and addressing water to all parts of the community. The site we decide to establish the desalination plant definitely affects the type of purification method to decide. In this project area, during stakeholder's consultation, it has been stated that unlike household water purifiers, the public water facilities should be installed in public places such as schools and made available to many local residents. The other important technical issues to consider in the technology selection is the ability to remove all impurities. The problem of water quality in the coastal zone is not limited to its salinity but also has to be capable of removing iron, arsenic, and other impurities. The technology selection has to also make sure that the demand of the target community has been met. As to the commercialization, EDR and CDI technologies are in the early stages of commercialization, which is reflected in their wide ranges of capital cost. However, in general CDI and EDR are likely to be twice as expensive as conventional RO units. While SSD has minimal to no operating costs, it has a very high capital cost per liter due to its very low daily output rate, making the technology less attractive for

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[https://www.cmimarseille.org/sites/default/files/newsite/library/files/en/1.6.%20C.%20Cosin\\_%20Desalination%20technologies%20and%20economics\\_%20capex,%20opex%20and%20technological%20game%20changers%20to%20come%20-ilovepdf-compressed.pdf](https://www.cmimarseille.org/sites/default/files/newsite/library/files/en/1.6.%20C.%20Cosin_%20Desalination%20technologies%20and%20economics_%20capex,%20opex%20and%20technological%20game%20changers%20to%20come%20-ilovepdf-compressed.pdf)

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low-income rural communities. The main issue for CDI and EDR is that they are not mass-produced and have not been optimized in the way that RO has. A technology review of CDI in 2013 found that in terms of capital cost an 'RO system capable of treating similar capacity CDI systems with ten time less cost. SSD has very low water production volumes, with most units producing only 2– 35L/day, which is only enough to supply water to 1–5 individuals. It is possible to install numerous SSD facilities, but this requires excessive land area and capital investment<sup>34</sup>.

As and where possible, the project will quantify the benefits of these aspects at the implementation phase of the project.

It is to be noted that the project is aligned with several outcomes of the Adaptation Fund's (AF's) results framework. Primarily it is aligned with Fund's outcome 8: Support the development and diffusion of innovative adaptation practices, tools and technologies. It also qualifies output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated because the project will scale up the RO plants. The RO plant is proven viable in terms of water supply, cost-effectiveness and sustainability under the LIFT programme and CCCP project.

E. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme and explain how the regional approach would support cost-effectiveness.

Water purified by PSFs, water from rainwater harvesting systems, and water from low saline ponds are the main sources of water for the coastal people other than reverse osmosis. Among all these sources, water from the RO plants is safe and cost-effective. A brief description -Details- can be seen in Section 1.8, 1.9, 1.10 and 1.11.

Considering the income level of the coastal inhabitants, the water services should be made more affordable where possible, particularly for the poor people. PSF is the cheapest improved water source (6400 L/USD) followed by RWH (362 L/USD) for a 15-year economic life in coastal Bangladesh<sup>35</sup>. On the other hand, the Reverse Osmosis Desalination Plan (RO) system for this project will provide prime quality water with reasonable price (454 L/USD) [Each RO plant will produce water 10,000 L/day and will operate round the year. The project will establish 225 RO plants within three years with a project cost \$5million]. However, RO technology requires a high initial cost for installation (almost 90% of total cost). Since more than three-fourths of the families earn less than USD 1,000 annually, paying for one's water source is very difficult. Therefore, there is no other option but to increase public investment to ensure the provision of cost-free water. In this context, Adaptation Fund should play a pivotal role to improve drinking water security in this region.

Improved water sources with on premise access must be available for all. Roof-top Rain water harvesting system (RWH) at the household level is the preferred drinking

<sup>34</sup> S. Porada, R. Zhao, A. van der Wal, V. Presser, P.M. Biesheuvel, Review on the science and technology of water desalination by capacitive deionization, Progress in Materials Science, Volume 58, Issue 8, 2013, Pages 1388-1442, ISSN 0079-6425, (<https://doi.org/10.1016/j.pmatsci.2013.03.005>)

<sup>35</sup> Islam, M.A.; Sakakibara, H.; Karim, M.R.; Sekine, M. Potable water scarcity: Options and issues in the coastal areas of Bangladesh. J. Water Health 2013, 11, 532–542.

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water source in southwest coastal Bangladesh<sup>36</sup>. However, a need-based allocation approach using a combination of available technologies instead of promoting a single source to ensure water service is the best option. Further, households in the project area are situated in clusters generally sharing a common yard and pond; installing a Reverse Osmosis Desalination Plan (RO) will be an option for improved source for supplying water. On the other hand, Rainwater Harvesting System (RWH) could solve the problems of discrete households. Therefore, to eliminate the use of unimproved and surface water sources new infrastructure (RO) should be built where needed. In this way, access to safe drinking water within the community might be ensured.

Inappropriate Operation & Maintenance (O&M) of water sources is the most prominent cause behind the lower quality of service<sup>37</sup>. The well-functioning water services largely depend on community support (CCCP Experience). This arrangement for O&M is successful in other parts of the country to supply groundwater via tube wells, which require minimal O&M. However, the same arrangement is not very effective in areas where alternative options such as PSFs are used, which require continuous technical support to keep the system functional. In this regard, a lesson can be learned from the two PKSF successfully implemented projects namely (1) Community Climate Change Project (CCCP)<sup>38</sup> under Bangladesh Climate Change Resilient Fund (BCCRF) and (2) Learning and Innovation Fund to Test New Ideas (LIFT) financed by FCDO (former DFID). It applied a participatory approach to create formal water management committees so that communities can work together to manage the dynamic water resources of coastal Bangladesh. Thus far, these projects have been successful and the committees remain active (CCCP Experience). Here, similar initiatives will be undertaken to formally engage the community in participatory drinking water management. Therefore, current policy and practice will not be generalized. Situation specific strategies need to be devised to solve particular problems and special attention will be given for these hydro-geologically critical hard-to-reach areas.

A short analysis of alternative options that are available in the coastal areas of Bangladesh are given below to understand the reality at the local level.

#### Open Pond Water (OPW)

An open pond in the community provides water for drinking purposes and for other domestic uses without any treatment. Traditionally rural water supply to a great extent was based on open ponds before during the early stage of installation of tube wells in Bangladesh. During the dry season, a huge number of ponds dry up. The biological quality of this pond is extremely poor due to unhygienic practices and absence of any sanitary protection. Many of these ponds are contaminated for fish culture. In order to maintain good quality water, the open ponds shall not receive any surface discharges or polluting substances and should only be replenished by rainwater and ground water infiltration. In the coastal areas, most of the ponds are full of salt water.

#### Pond Sand Filter (PSF)

<sup>36</sup> Abedin, M.A.; Collins, A.E.; Habiba, U.; Shaw, R. Climate Change, Water Scarcity, and Health Adaptation in Southwestern Coastal Bangladesh. *Int. J. Disaster Risk Sci.* **2019**, *10*, 28–42.

<sup>37</sup> Islam, M.A.; Sakakibara, H.; Karim, M.R.; Sekine, M. Potable water scarcity: Options and issues in the coastal areas of Bangladesh. *J. Water Health* **2013**, *11*, 532–542.

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A prospective option for treatment of surface water is the construction of Slow Sand Filter (SSF) which is commonly known as Pond Sand Filter (PSF). It is developed to treat low-saline pond water for drinking water supply in the coastal area. It consists of a filter bed and a storage chamber (made by ferro-cement), installation of tube well and placing of filter. The quality of water from it is comparatively better because it can remove bacteria (*E. coli* and other pathogens). Usually every two months, the sand in the bed needs to be cleaned and replaced. It has a risk of microbiological contamination where maintenance is poor. Basic challenges of a PSF is that that particular pond cannot be used for fishing, bathing and washing purposes. Too much turbidity with dirty particles on the surface could reduce the flow rate. Installation, periodic maintenance and regular cleaning of a PSF are time-consuming and costly, but maintenance and cleaning of the PSF are important for the effectiveness of PSF. It is often difficult to find an appropriate pond in which a PSF can be installed. Moreover, many ponds dry up in the dry season in the coastal areas. In addition, ponds are also contaminated with salt water due to frequent incidence of cyclones and coastal flooding

#### Rainwater Harvesting System (RWHS)

Rainwater as a safe source of drinking water is used in many developing countries around the world, particularly in coastal areas, island communities and other areas where many aquifers are full of salt water. It consists of three components: a catchment area, a reservoir, and a plumbing system for transferring water from the catchment area to the reservoir. In many areas, the uneven distribution of rainfall over the year requires a larger storage tank. Rainwater can be collected from any type of roof but concrete, tiles, polythene and metal roofs give clean water. Periodical cleaning of tank and catchments, monitoring water quality, particularly during lean periods are needed. It gives reliable water quality but relatively less taste of water due to lack of minerals in rainwater. It has a risk of microbiological contamination where maintenance is poor. Bird feces and intrusion of insects can also cause contamination in the water. Doctors suggest taking vitamin tablets or extra vegetables and food to the people who drink water from RWHS for a long time to fill up the lack of mineral of rainwater<sup>38</sup>. Project area's people have smaller thatched roofs or no roof at all to be used as catchments for rainwater collection. Cleanliness of the roof and storage tank is critical for maintaining the good quality of rainwater. The first runoff from the roof should be discarded to prevent entry of impurities from the roof. If the storage tank is clean, the bacteria or parasites carried with the flowing rainwater will tend to die off. The storage tank requires cleaning and disinfectants when the tank is empty or at least once in a year.

#### Artificial Rainwater Harvesting System (ARWHS)

ARWHS is a newly invented device for preserving rainwater where a cone-shaped iron sheet is used to collect the rainwater. The collected rain water passed through a plastic pipe and stored in an underground storage tank. Beneficiaries use the water round the year by a tubewell. Underground construction is an obstacle to clean the

<sup>38</sup> Khan, A., Mojumder S. K., Kovats S, Vineis P., Saline Contamination of Drinking Water in Bangladesh. *Lancet*, 371:385. doi:10.1016/S0140-6736(08)60197-X (2008).

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storage tank. As a result water quality becomes low and finally it is unusable for drinking purpose. And users often cannot get the actual trust to drink it.

#### Artificial Aquifer Tubewell (AAT)

AAT is a comparatively new device for pond water treatment. The AAT system is a bit faster than a PSF system. One pipe adjusted with the pond lower part that is why water of the pond can pass through it with gravitational forces no need to pump regularly then the water passed through sand and gravels bed filtering procedure like as PSF, later than all the water stored in a large reserve tank which made by RCC structure completely. Another tubewell is linked up with the reserve tank by which people can pump out the fresh water by using the tube well. Painless and quick services can be provided by this technology smoothly. People generally think that the water comes from ground so that their faith is higher about this technology's service rather than other technologies. For relatively fresh drinking water public pressure is huge in dry periods and around 300 people take the water in a day from an ATT. Therefore, the technology loses its performance. Still it is new concept here in Bangladesh.

#### Hand Tube Well (HTW)

A shallow hand tubewell used in study area is a type of water well in which a long 100–200 mm wide stainless steel tube or pipe is bored into an underground aquifer. The required depth of the well depends on the depth of the water table. A small reservoir of water is made at the outlet of the tube well. This reservoir is used for different usage of water by the local population like bathing, cocking, washing and other daily chores<sup>39</sup>. Every two houses have a STW for their uses. The introduction of tube wells has led to major arsenic poisoning in Bangladesh for high concentrations of arsenic occur naturally in shallow depth around the south western coastal areas<sup>40</sup>. Usually two categories of shallow tubewell, i.e., 25-30m depth and 40-50m depth, are available in the project area.

#### Deep tubewell (DTW)

Sinking of deep tube wells in arsenic affected areas can provide safe drinking water. However where a confining layer exists and there is proper sanitary completion, deep tube wells have lower potential health risks than other options. Some deep tube wells installed in acute arsenic problems areas have been found to produce water with increasing arsenic content. Post construction analysis shows that arsenic

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<sup>39</sup> Safiuddin, M., Karim, M. M. 2001, "Groundwater Arsenic Contamination in Bangladesh: Causes, Effects and Remediation." *Proceedings of the 1st IEB International Conference and 7th Annual Paper Meet on Civil Engineering*. Chittagong, Bangladesh: Institution of Engineers Bangladesh, pp. 220-230 (2001).

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<sup>40</sup> Khan, A., Mojumder S. K., Kovats S. Vineis P., Saline Contamination of Drinking Water in Bangladesh. *Lancet*. 371:385; doi:10.1016/S0140-6736(08)60197-X (2008).

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contaminated water could rapidly percolate through shrouded materials to produce elevated levels of arsenic in deep tube well water. Experimentation by sealing the borehole at the level of impermeable layer is yet to be conducted to draw conclusions. Due to the cost of installation, deep tube wells are usually shared by many households. That means people have to walk long distances to collect safe water. Since there is no clear understanding so far of the processes by which arsenic is released into water, there is still discussion as to whether deep groundwater will remain arsenic safe after medium-term or long-term exploitation<sup>41</sup>. The presence of a relatively impermeable layer separating a deep uncontaminated aquifer from a shallow contaminated aquifer is a prerequisite for installation of a deep tube-well for arsenic free safe water.

### **Comparison to other possible interventions**

Drinking water scarcity is a silent disaster, especially during the dry season (November - May) in the coastal areas of Bangladesh. Different types of drinking water options, including Open Pond Water (OPW), Hand Tubewell (HTW), Deep Tubewell (DTW), Artificial Aquifer Tubewell (AAT), Rain Water Harvesting (RWH), Artificial Rain Water Harvesting (ARWH), Piped Water Supply (PWS) and Reverse Osmosis Water Treatment Plant (RO-WTP), are already being practiced here for a solution of the problem. According to installation cost, low capital cost (< Tk. 50,000) drinking water technologies are OPW, RWH, ARWH, HTW and PSF; medium capital cost (Tk. 50,000 – 100,000) technologies are OPW, AAT and DTW; and high capital cost (>Tk. 100,000) technologies are RO-WTP and PWS. The water quality parameters and social aspects revealed that, high capital cost drinking water technologies, i.e. WTP, is suitable as well as the first priority of the local users. RO-WTP, a high capital cost technology, is the best choice and OPW, low capital cost technology, is the worst choice of the users. RWH is popular for easy to use, individual ownership and good taste of water. However, microbial contamination and year round unavailability are the major constraints. PWS is another preferred choice, however, poor maintenance, misuse of water and microbial contamination are basic problems for its long-term use. DTW is functioning well in a specific layer (200m-350m). AAT is a good choice in social issues for easy pumping facilities rather than PSF, however, water quality is unsatisfactory due to water clogging problems inside its filter. Water quality of PSF remains fine initially, however, it deteriorates quickly due to poor maintenance and PSF becomes a less acceptable technology among the consumers. Communal OPW drinking water sources are not suitable for consumption due to pathogenic contamination, however, people use it traditionally. HTW is suitable for household activities, however, unsuitable for drinking purposes. Competitively low capital cost technologies can draw short term solutions. However, without continuous operational and maintenance fee collection, these low cost technologies are unable to provide safe drinking water for a long period. Assured, accessible and sustainable safe water market already exists through a system of payment by the users. The RO-WTP with a piped water system can meet both the demand of the local communities and financial

<sup>41</sup> Hossain, Z., Quaiyum, M., Jakariya, M., "Using Materials for Mass Communication: Experiences of an Arsenic Mitigation Project in Bangladesh," *Bangladesh Journal of Mass Communication and Publishing*, Vol. 2, pp. 203-210 (2003).

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viability in the newly formed water market<sup>42</sup> but these facilities demand capital investment and a long-term business plan.

The cost-effectiveness of the project can be viewed from different perspectives and supported by, for example,

- Taking a proactive approach to increase the capacity of the vulnerable people for withstanding against climate-induced hazards,
- Improving the local capacity to ensure water security,
- Saving time, particularly women and girls,
- Strengthening women's dignity and security,
- Reducing the incidence of water-borne diseases
- Creating jobs at the local level,
- Transforming climate-smart new technologies in the remote areas, and
- Increasing adaptive capacity of the local people.

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The costs and benefits of the proposed interventions are analyzed. This quantitative analysis shows that, taken together, the proposed interventions will have a positive internal rate of return (IRR). In calculating IRR, we have considered three possible scenarios. In scenario A, our expected productions and sales are 8000 liters, 5000 liters in scenario B which is considered as the worst case and 6000 liters in scenario C which is considered as moderate case.

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**Initial Investment**      **BDT**  
    **1,600,000**  
**Life span of the** **15 years**  
**project**

Expected Yearly Income (BDT)					
Scenarios	Production (liters)	Selling Price	Revenue	Monthly Revenue	Yearly Revenue
Best Case	8000	0.5	4000	120000	1440000
Moderate Case	6000	0.5	3000	90000	1080000
Worst Case	5000	0.5	2500	75000	900000

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\*The expected income above has been estimated based on market survey and current industry practice.

Expected Yearly Expenditure (BDT)		
Items	Monthly Cost	Yearly Cost
Electricity Cost	10000	120000
Maintenance	10000	120000
Salary	15000	210000
Variable Cost for running motors	10000	120000

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<sup>42</sup> Jubayer,A. 2005. Evaluation of Drinking Water Technologies Used in South-Western Coastal Bangladesh: A Case Study, IWFM, BUET.

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Other Cost	-	30000
Depreciation	5000	60000
Total Cost Per Year	-	660000

\*Cost has been forecasted considering future rise in price and averaged out.

Expected Yearly Cash Flow through the years (BDT)	
Best Case	780000
Worst Case	240000
Moderate Case	420000

**Table 6. IRR Calculations:**

Best Case		Worst Case		Moderate Case	
IRR	48.62%	IRR	12.40%	IRR	25.37%

After calculating IRR, we observe that in the worst case scenario the IRR is 12.40% which is above our hurdle rate or cost of capital i.e. 9%. We have considered conservative approach while calculating IRR. So the project is cost-effective.

F. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist. If applicable, please refer to relevant regional plans and strategies where they exist.

The proposed AF-financed project is aligned with several of Bangladesh's strategies, plans, programmes and reports related to climate change, as described in the table below.

Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009 is the key strategy document of the government of Bangladesh combating climate change. The strategy document includes six thematic areas such as 1) Food Security, social protection, and health; 2) Comprehensive disaster management, 3) Infrastructure, 4) Research and knowledge management, 5) Mitigation and low carbon development, and 6) Capacity building and institutional development. The proposed project is aligned with thematic areas 1, 3, 4, and 6. Bangladesh has also prepared the National Adaptation Programs of Action (NAPA) in 2005 and revised in 2009 to identify and implement immediate and urgent adaptation needs of the country. The current national planning instrument, named as the 8<sup>th</sup> Five Year Plan which started from FY 2020-21 and will end in FY 2024-25, and the national strategy document, named as the 'Vision 2021', recognize the importance of water security in Bangladesh with the advent of climate change.

Table 7. The proposed AF-financed project is aligned with several of Bangladesh's strategies, plans, programmes and reports.

Priorities in the National Policies	Alignment with National Policies, Strategies and Guidelines
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<u>Sustainable Development Goals (SDGs)</u>	<u>The proposed project is aligned with and will contribute towards achieving the SDG 6 – Clean water and sanitation. The project will promote improved water facilities for the coastal people by providing clean drinking water through reverse osmosis water treatment systems for the most vulnerable beneficiaries in the project sites.</u>
<u>The 8<sup>th</sup> Five Year Plan and Vision 2021</u>	<u>The 8<sup>th</sup> Five Year Plan which started from FY 2020-21 and will end in FY 2024-25, and the national strategy document, named as the 'Vision 2021', recognize the importance of water security in Bangladesh with the advent of climate change.</u>
<u>Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009</u>	<u>Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009 is the key strategy document of the government of Bangladesh combating climate change. The strategy document includes six thematic areas such as 1) Food Security, social protection, and health; 2) Comprehensive disaster management, 3) Infrastructure, 4) Research and knowledge management, 5) Mitigation and low carbon development, and 6) Capacity building and institutional development. The proposed project is aligned with thematic areas 1, 3, 4, and 6.</u>
<u>National Adaptation Programs of Action (NAPA) in 2005 and revised in 2009</u>	<u>The project is closely aligned with and will address several National Adaptation Programme of Action adaptation strategies, namely Strategy 2 - providing drinking water to communities to combat the effects of climate change.</u>

G. Describe how the project / programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

PKSF always follows the country's technical standards in establishing any plants and undertaking any projects. An elaborate technical specification is attached with the document **(Details can be seen in Annex-1)**. Semi-permanent structures will be built following the building codes where applicable. The plinth of the structure will be raised above the surge-height level, so that it will not be inundated during cyclones and storm surges. Besides, the testing on various parameters of water quality will be performed regularly (Details can be seen in Annex-1). In addition, a detailed ESMP is prepared to manage environmental and social impacts of the project in Annex-5.

H. Describe if there is duplication of project / programme with other funding sources, if any.

There is little chance of duplication of the project with other funding sources as a few initiatives are taken to ensure water security for the vulnerable coastal people. However, PKSF did extensive consultation with different stakeholders to avoid duplication. A stakeholder engagement plan can be seen in Annex-7.

I. Describe the learning and knowledge management component to capture and disseminate lessons learned.

PKSF puts its utmost importance on the value of knowledge management practices as these are increasingly being valued as strategic assets and management techniques that can be used for better project integration, improved decision-making, reduced risks, and ensured cost-effectiveness. PKSF, therefore, employs a number of tools to capture, document, and share the learnings from the implemented projects. PKSF gathers and shares learnings and new knowledge by storing and sharing information virtually, printing documents in the form of newsletters and books,

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organizing workshops/seminars for the stakeholders, and archiving its project artifacts (e.g. project appraisal documents, implementation guidelines, communication plan, visibility documents, risk and issues log, evaluation reports) for the future reference. The post-project review is a way to capture information for the knowledge repository.

Knowledge management activities will be performed in the project by accumulating new knowledge about water desalination and water in climate-vulnerable areas, and by disseminating this knowledge to communities and decision-makers at the policy level. Three knowledge hubs will be established in the target area (one in each of three districts, i.e., Khulna, Satkhira and Bagerhat) to understand local challenges and best practices related to the management of RO plants, and to disseminate this knowledge across each target area. These hubs will gather local information and will also communicate national best practices to community members in the target areas through partner NGOs. Throughout the implementation of this project, the lessons learned from interventions and best practices will be collected by project staff. The hubs will support the establishment of visibility mechanisms, such as social media, adolescent clubs, community radio websites, brochures, workshops, seminars and public events. These best practices and lessons learned will be disseminated widely.

J. Describe the consultative process, including the list of stakeholders consulted, undertaken during project/programme preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

PKSF has consulted with relevant stakeholders [for example, Department Public Health and Engineering (DPHE), Department of Environment, Bangladesh Standards and Testing Institution (BSTI), Ministry of Power, Energy, and Mineral Resources, Partners of PKSf, and Water Aid] during the project preparation period. PKSf will continue discussing with stakeholders, particularly while the project will select the technologies and interventions areas for the proposed project. As a part of project preparation, PKSf also invited these stakeholders in workshops and seminars to share learning and experience to maximize the benefits of the project. Extensive field visits were conducted in the coastal areas for understanding the needs and preferences of the coastal people. In the field, PKSf engages both women and men, representatives from local governments, and local public officials who are involved in water supply activities. A few examples are given in Table 83.

**Table 83. Participants who attended the different stakeholders' consultation meeting**

Sl No.	Name of Organizations/Places	Date	Nature of consultation	Female	Male	Total
1	PKSF, Dhaka	Nov 7, 2021	Workshop with implementing POs	12	28	40
2	Chila Union Mongla, Bagerhat	Nov 14-16, 2021	15 meetings with climate-vulnerable families	250	50	300
3	Chadpai Union Mongla, Bagerhat	Nov 16, 2021	2 meetings with climate-vulnerable families	40	5	45
4	Digraj Bazar Mongla, Bagerhat	Nov 16, 2021	2 meetings with climate-vulnerable families	40	10	50
5	Banishanta Union Dacope, Khulna	Nov 17, 2021	5 meetings with climate-vulnerable families	80	20	100
6	Rampal Union Rampal, Bagherhat	Nov 17, 2021	2 meetings with climate-vulnerable families	20	6	26

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7	BSTI, Dhaka	Nov 16, 2021	Meeting with BSTI Officials	4	8	12
8	Secretary, Power Division, Dhaka	Nov 24, 2021	Virtual meeting with Secretary, Power Division	2	2	4
9	Suterkhali Union Dacope, Khulna	Dec 27, 2021	3 meetings with climate-vulnerable families	90	30	120
10	Gabura, Union Shaymnaagar, Satkhira	Dec 28-29, 2021	10 meetings with climate-vulnerable families	150	75	225
11	PKSF, Dhaka	Feb 8, 2022	Workshop with water experts and implementing POs	20	25	45

(PKSF) has been working as a national accredited entity to the Adaptation Fund to support the government in addressing climate change issues in addition to its core business (rural employment generation, enterprise development, capacity building, and other social development activities). To ensure sustainability of its activities, PKSF has adopted Environment and Social Management Framework (ESMF). One of the requirements of the ESMF is to analyze relevant stakeholders who will be directly or indirectly involved during implementation of the project. Hence, a Stakeholder Engagement Plan (SEP) is required to engage various stakeholders systematically in the project implementation and monitoring process. This will ensure accountability as well as increase efficiency of the project interventions. This SEP is prepared as part of the project on "Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh". Details can be seen in Annex-5.

K. Describe how the project/programme draws on multiple perspectives on innovation from e.g., communities that are vulnerable to climate change, research organizations, or other partners in the innovation space, in the context in which the project/programme would take place.

Although the POs of PKSF run RO-based desalination plants are being operated with success so far. However, there are some areas of better performance that were mentioned by the different stakeholders, which need further attention for ensuring efficiency and sustainability of RO plants. The design of a RO unit should be based on the quality of raw water. The presence of the pre-treatment unit will increase the productivity and efficiency of a plant. There should have been self-explained 'Operation and Maintenance (O&M)' of RO plants. Water collection and distribution systems should be based on the geographical characteristics of the catchment areas of a plant. Groundwater extraction should be avoided. The revenue-cost accounts need to be well maintained and the system should be streamlined to provide actual production costs with a logbook of the production data and revenue earnings to assess financial sustainability. Wastewater disposal, cleanliness around plant areas, and regular water quality testing facilities should be of high standards.

L. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Drinking water is such an essential commodity, which should be provided by the State. As the shortage of fiscal allocation, it is not possible at this stage to cover large areas by the public organizations. In addition, it is even not possible for the local people to set up a RO plant by their own investment as it requires a handsome amount of capital

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investment at the initial stage. To foster equity in remote areas for the people who are excluded from public services in many ways, it is worthwhile to finance as the full cost of adaptation. It is argued that the promotion of locally-owned technologies (the technologies that are managed by local people), of adaptation to water insecurity by leveraging finance can create better affordability and collective action<sup>43</sup>. However, users will pay for using water from those plants and POs will provide management and coordination support voluntarily for the operation of those plants at the local level.

Climate change is an additional threat for the socio-economic development of Bangladesh. The country is in the process of switching from an LDC to a lower middle income country by 2025, which requires huge investment in regular development intervention. Hence, the country is not in a position to invest additional resources for shocks like climate change for which the country is not responsible. So, AF funding is important to address the additional threat from climate change to enhance resilience of the climate vulnerable people.

The coastal area of Bangladesh is vulnerable to many natural disasters including climate change variability and extreme events. Primarily, the land and water are affected by increased salinity and sea level rise leading to decrease crop production which is the main livelihood of the coastal people. In addition, cyclones & storm surges, coastal flooding, erosion etc. also damage to crop agriculture, aquaculture and other livelihoods of the poor community. These impacts challenge the government in supplying safe drinking water to the vulnerable coastal people. If, sea level rises, the brackish water sources would be demolish.

Most of the coastal people are poor and vulnerable to climate change as stated in section I. These people mainly depend on the natural resources. They have to struggle to manage their daily necessities. They have very limited capacity to collect safe drinking water due to their poverty as climate change induced salinity contaminates nearby source of drinking water.

The AF's mission is to build climate resilient communities and nations, it would not be achieve without addressing the need of safe drinking water. AF aims to mobilize funding at scale to invest in climate-resilient development in Least Developed Countries (LDCs) and other vulnerable areas in the world. Bangladesh is a least developed country (LDC) and severely affected by climate change. The proposed project aims to build resilient of the coastal community who are particularly vulnerable to climate change. This will be done through supporting supply of safe drinking water and capacity building on climate change and water technology for adaptation in the drinking water sector. Because, salinity intrusion and coastal flooding due to sea level rise, cyclone & storm surge etc. are major problems in coastal zone of Bangladesh.

AF involvement in this project is very important and critical in two ways: (i) climate change threat and long term projections to be mentioned that coastal vulnerability will likely to increase in southern areas of Bangladesh. Coastal floods, salinity intrusion, sea swells, storms and cyclone will likely increase in occurrence and intensity. It will require additional investment to reduce the impacts of and vulnerabilities to these climate variability and extreme events. Therefore more additional involvement and investment in enhancing knowledge and awareness on climate risk to inform and

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<sup>43</sup> Elliot, M., Armstrong, A., Lobuglio, J. and Bartram, J. (2011). Technologies for Climate Change Adaptation—The Water Sector. T. De Lopez (Ed.). Roskilde: UNEP Risoe Centre.

improve the present government programmes and policy in promoting climate-resilient livelihoods and safe housing is necessary; and (ii) Extreme climatic related threats also require additional finance to increase the scale of climate risk reduction investments to protect the coastal livelihoods and settlements (people and their main assets – the homes) as well as improve the methods and application of a good practice, AF involvement will considerably enhance the ongoing government programmes, employing best practices and scaling-up achievement of successful pilots and good international practice. As a result the proposed investment will be transformational.

Reflecting the limited resources available to the country as well as the need to trigger systemic change, it is proposed that a significant proportion of the total cost will be covered by the AF in the form of grant finance. This is essential because Bangladesh is a least developed country with very limited financial capacity to adapt to climate change, and having to invest most of its constrained resources to address competing needs. Thus, the project heavily rely on the AF grants to overcome structural barriers to change, are considered appropriate to the achievement of project objectives.

M. Describe how the sustainability of the project / programme outcomes has been taken into account when designing the project / programme.

Several important issues are crucial to the sustainability of the RO plants. The price of water is crucial for the profitability of the plants. On the cost side, having a cheap source of electricity is crucial. PKSF is working with the Power Division of Bangladesh on the price of electricity using for this purpose. Finally, the total production of water also influences the profitability of the plants. The average cost can be reduced if the scale of production is increased. From the analysis, one can identify several important characteristics of profitable plants. These are, among others, (i) duration of operation; (ii) level of water production; (iii) price subsidy; and (iv) source of electricity. In addition, monthly profitability such as location (acting as a proxy for the level of salinity in different plant areas affecting the operational cost of the plants), seasonality (influencing the demand for plant water), experience (affecting ability to fine-tune appropriate technology/mechanism for water production), water distribution efficiency, the scale of production (appears to be the most important determinant of profitability), price subsidy, after-sales maintenance services, storage facilities to meet emergency situations and technical know-how of the operator are considered important determinants. These issues are actively considered in the establishing of RO plants and its management mechanisms.

N. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

An overview of the environmental and social impacts and risks identified as being relevant to the project is given below. It is to be noted that the project is considered as Category 'B' while the screening process is done.

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Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks further assessment and management required for compliance
Compliance with the Law	√	
Access and Equity	√	
Marginalized and Vulnerable Groups	√	
Human Rights	√	
Gender Equity and Women's Empowerment	√	
Core Labour Rights	√	
Indigenous Peoples	√	
Involuntary Resettlement	√	
Protection of Natural Habitats	√	
Conservation of Biological Diversity	√	
Climate Change	√	
Pollution Prevention and Resource Efficiency		√
Public Health	√	
Physical and Cultural Heritage	√	
Lands and Soil Conservation	√	

Details can be seen in Annex-5.

### PART III: PROJECT IMPLEMENTATION

A. Describe the arrangements for project / programme management at the regional and national level, including coordination arrangements within countries and among them. Describe how the potential to partner with national institutions, and when possible, national implementing entities (NIEs), has been considered, and included in the management arrangements.

PKSF will be the implementing agency for the project. All components will be channeled through PKSF. PKSF will select implementing POs from its existing 187 active partner organizations following a set of criteria. The project will be managed by a Project Management Unit (PMU) that will be staffed adequately. PKSF will also make use of its existing expertise, such as procurement, accounts and finance, general administration, human resources, audit and program implementation, environment, and climate change for related activities. Besides, there will be a Project Implementation Committee (PIC) chaired by the Chief Executive Officer (CEO) of PKSF. Representatives from different organizations, such as the Ministry of Environment, Forest and Climate Change, the Ministry of Local Government, the Department of Public Health and Engineering, Economic Relations Division, Financial Institutions Division, Local Councils and Water Aid will be consulted regularly for better coordination and co-learning. This project will finance peer-to-peer learning programs between community groups, and strengthen community networks at the local level.

B. Describe the measures for financial and project / programme risk management.

There might be an issue related to political stability during election time in Bangladesh to be held December 2023. It is expected that recent political developments and the

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inclusive dialogue that took place in December 2021 and the initiatives taken by the Election Commission will promote an atmosphere of peace and stability. Another source of risk that is anticipated is institutional weakness. The project has a plan to strengthen the institutional capacity of various actors involved in implementing the project. Low project ownership by project participants might hinder the sustainability of the project. Involvement of local people and council members to ensure ownership of the facilities and equipment provided. Advocacy will be done to introduce a budget allocation from the local councils or local public organizations for maintenance of RO plants. An endowment fund might be created with the contribution of different stakeholders. An operational and management committee will look after the plants. Necessary communication including behavioural change communication will be done through community mobilization. Training will be provided on the management of plants and the quality of water for their sensitization on health and hygiene. The risk register will be maintained.

C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

The most common environmental impacts for a RO plant are the disposal of the concentrated wastewater that might affect local ecosystems, the impact of concentrate salt water intakes on aquatic life; and greenhouse gas emissions. The project will undertake a number of initiatives to minimize those risks that including pre-treatment and post-treatment processes.

Based on the E&S impacts described in Annex-5, the project has prepared an ESMP matrix. The ESMP matrix is presented below:

Table 9. The ESMP Matrix

ES impacts	Mitigation measures	Budget	Responsibility	
			Implementation	Supervision
Increasing the water salinity	Use of high quality membrane that will reduce the salinity level of the waste water  Prepare a small water tank where waste water and source water will be mixed to reduce salinity before discharge	Budget is built in construction of the RO plants	EE	Project Management Unit (PMU)
Loss of productive land	The plants will be installed in residential areas or community institutions	Not require	EE	PMU
Increasing soil salinity	Crab farming and hatchery operation will be conducted in already salinity affected lands	Not require	EE	PMU
Loss of grasses and herbs at homestead area	Grasses will be re-planted	Budget line item	EE	PMU
Health risks to the workers	Provided first aid box, hand gloves and gumboot to the workers	Local contractors	Local contractors	EE and PMU

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		<u>procured by</u> <u>EE</u>		
<u>Dust and air pollution</u>	<u>Use compressed natural gas-driven vehicle instead of petrol or diesel during transportation of materials for crab hatcheries</u>  <u>Water spray</u>	<u>Not require</u>	<u>Contractor</u>	<u>IE</u>

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**D. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.**

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This proposed project will support independent M&E and learning activities. This will include continuous and ongoing M&E of project implementation and results. The Annual Project Performance Reports (PPRs) will be prepared and a separate section in the PPRs will be designated to mention the status of environmental and social management plans including the measures to avoid, minimize or mitigate environmental and social risks. The monitoring system will make strong use of participatory techniques including Results-Based Monitoring (RBM). This project would also finance the independent supervision of any Environment and Social Management Plans, if and when applicable, to ensure compliance with Adaptation Fund guidelines. PKSF will monitor and evaluate the progress of the project and prepare project reports on the basis of the indicators acceptable to the Adaptation Fund. The Mid-Term Review (MTR) and the Final Evaluation will be conducted by the independent consultants/firm to capture progress and also the performance of the project respectively following the AF M & E Guidelines and its Gender Policy.

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**E. Include a results framework for the project / programme proposal, including milestones, targets, and indicators.**

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A results framework for the proposed project, including milestones, targets and indicators are given below.

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**Table 10. The Results Framework for the Project**

<u>Expected Results</u>	<u>Indicators</u>	<u>Baseline Data or Condition</u>	<u>Targets</u>	<u>Milestone</u>
<u>Impact: Reduced the prevalence of water-borne diseases.</u>	<u>• Number of people with water-borne diseases in the project areas in coastal region of Bangladesh.</u>	<u>• A significant number of people are suffering from water-borne diseases.</u>	<u>• A reduction of water-borne diseases by at least 50% from the baseline level of the family members in the project areas.</u>	<u>2025</u>

<b>Outcome 1:</b> Enhanced the status of accessing safe drinking water of the coastal people.	<ul style="list-style-type: none"> <li>• Number of people access to improved sources of drinking water in the project areas in coastal region of Bangladesh.</li> <li>• The level of satisfaction of the people who access to improved sources of drinking water in the project areas.</li> </ul>	<ul style="list-style-type: none"> <li>• A few RO plants are established in the project areas.</li> <li>• People are not satisfied with the water services that they have now.</li> </ul>	<ul style="list-style-type: none"> <li>• 225 RO plants will be established in the project areas.</li> <li>• An increase by at least 50% from the baseline level of population in the area of intervention that indicates a high degree of satisfaction with the water services.</li> </ul>	2024
<b>Outcome 2:</b> Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.	The proportion of the population sensitized and who have positively changed their behaviour towards safe drinking water.	In the project areas, the awareness campaign for safe drinking water is inadequate.	The necessary awareness campaigns in the project areas for all participants will be organized.	2024
<b>Outputs under outcome 1:</b> Enhanced the status of accessing safe drinking water of the coastal people.				
Output 1.1: RO Plants are procured and established.	The number of RO plants are procured and established.	• A few number of RO plants are in the working area.	• 225 RO Plants are procured and established.	2023
Output 1.2 Water testing kits are procured and supplied.	The number of water testing kits are supplied.	None of this type water testing kits are provided.	225 water testing kits are provided.	2023
<b>Outputs under Outcome 2: Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.</b>				
Output 2.1: Groups are formed.	Number of groups are formed to disseminate water vulnerability to climate change.	None of the groups of this kind in the project area:	225 Water Adaptation Groups are formed.	2023
Output 2.2: Staff are recruited, trained and certified.	The number of jobs are created at the local level and trained and certified.	The implementing partners do not have any staff related to water management.	225 staff are recruited at the local level, trained and certified.	2023
Output 2.3: Training materials developed.	The number of training materials are developed.	The implementing partners do not have training materials related to water management.	Three types of training materials (conceptual guidelines on water security in climate vulnerable areas, posters and leaflets) are developed.	2023

<u>Output 2.4: Training for beneficiaries conducted</u>	<u>The number of people from different stakeholders trained and certified.</u>	<u>A few people have proper understanding on water quality management in the coastal areas.</u>	<u>At least 500 people will be trained and certified.</u>	<u>2023</u>
<b>Activities</b>	<b>Inputs</b>			
<u>Activities under output 1.1: RO Plants are procured and established.</u>				
<u>Activity 1.1.1 Procurement of RO plants</u>	<u>Human resources, finance, logistics, transport</u>			
<u>Activity 1.1.2 Construction of RO plant sites</u>	<u>Labour, construction materials, human resources (Engineering), transport</u>			
<u>Activities under output 1.2: Water testing kits are procured and supplied.</u>				
<u>Activity 1.2.1 Procurement of testing kits</u>	<u>Human resources, finance, transport</u>			
<u>Activity 1.2.2 Distribution of testing kits</u>	<u>Human resources, transport</u>			
<u>Activities under output 2.1: Groups are formed.</u>				
<u>Activity 2.1.1 Beneficiary selection and group formation</u>	<u>Human resources and logistics</u>			
<u>Activity 2.1.2 Project Participants' Mobilization and group meetings</u>	<u>Human resources, finance and logistics</u>			
<u>Activities under output 2.2: Staff are recruited, trained and certified.</u>				
<u>Activity 2.2.1 Recruitment of PMU staffs and Executing Entity staffs</u>	<u>Human resources and finance</u>			
<u>Activity 2.2.2 Training to the newly recruited staffs on project management</u>	<u>Human resources/trainers, finance, logistics, transport</u>			
<u>Activities under output 2.3: Training materials are developed.</u>				
<u>Activity 2.3.1 Prepare training material on climate change and water issues</u>	<u>Human resource, logistics, printing</u>			
<u>Activities under output 2.4: Training for beneficiaries conducted</u>				
<u>Activity 2.4.1 Organise training for beneficiaries</u>	<u>Trainers, logistics, finance, transport</u>			

Expected Results	Indicators	Baseline Data or Condition	Targets	Milestone
<b>Impact:</b> Reduced the prevalence of water-borne diseases.	<ul style="list-style-type: none"> <li>Number of people with water-borne diseases in the project areas in coastal region of Bangladesh.</li> </ul>	<ul style="list-style-type: none"> <li>A significant number of people are suffering from water-borne diseases.</li> </ul>	<ul style="list-style-type: none"> <li>A reduction of water-borne diseases by at least 50% from the baseline level of the family members in the project areas.</li> </ul>	2025
<b>Outcome 1:</b> Enhanced the status of accessing safe drinking water of the coastal people.	<ul style="list-style-type: none"> <li>Number of people access to improved sources of drinking water in the project areas in coastal region of Bangladesh.</li> <li>The level of satisfaction of the people who access to improved sources of drinking water in the project areas.</li> </ul>	<ul style="list-style-type: none"> <li>A few RO plants are established in the project areas.</li> <li>People are not satisfied with the water services that they have now.</li> </ul>	<ul style="list-style-type: none"> <li>225 RO plants will be established in the project areas.</li> <li>An increase by at least 50% from the baseline level of population in the area of intervention that indicates a high degree of satisfaction with the water services.</li> </ul>	2024
<b>Outcome 2:</b> Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.	The proportion of the population sensitized and who have positively changed their behaviour towards safe drinking water.	In the project areas, the awareness campaign for safe drinking water is inadequate.	The necessary awareness campaigns in the project areas for all participants will be organized.	2024
<b>Outputs under outcome 1:</b> Enhanced the status of accessing safe drinking water of the coastal people.				
<b>Output 1.1:</b> RO Plants are procured and established.	The number of RO plants are procured and established.	<ul style="list-style-type: none"> <li>A few number of RO plants are in the working area.</li> </ul>	<ul style="list-style-type: none"> <li>225 RO Plants are procured and established.</li> </ul>	2023
<b>Output 1.2:</b> Water testing kits are procured and supplied.	The number of water testing kits are supplied.	None of this type water testing kits are provided.	225 water testing kits are provided.	2023
<b>Outputs under Outcome 2:</b> Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.				

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Output 2.1: Groups are formed.	Number of groups are formed to disseminate water vulnerability to climate change.	None of the groups of this kind in the project area;	225 Water Adaptation Groups are formed.	2023
Output 2.2: Staff are recruited, trained and certified.	The number of jobs are created at the local level and trained and certified.	The implementing partners do not have any staff related to water management.	225 staff are recruited at the local level, trained and certified.	2023
Output 2.3: Training materials developed.	The number of training materials are developed.	The implementing partners do not have training materials related to water management.	Three types of training materials (conceptual guidelines on water security in climate vulnerable areas, posters and leaflets) are developed.	2023
Output 2.4: Training for beneficiaries conducted	The number of people from different stakeholders trained and certified.	A few people have proper understanding on water quality management in the coastal areas.	At least 500 people will be trained and certified.	2023
<b>Activities</b>	<b>Inputs</b>			
<b>Activities under output 1.1: RO Plants are procured and established.</b>				
Activity 1.1.1 Procurement of RO plants	Human resources, finance, logistics, transport			
Activity 1.1.2 Construction of RO plant sites	Labour, construction materials, human resources (Engineering); transport			
<b>Activities under output 1.2: Water testing kits are procured and supplied.</b>				
Activity 1.2.1 Procurement of testing kits	Human resources, finance, transport			
Activity 1.2.2 Distribution of testing kits	Human resources, transport			
<b>Activities under output 2.1: Groups are formed.</b>				
Activity 2.1.1 Beneficiary selection and group formation	Human resources and logistics			
Activity 2.1.2 Project Participants' Mobilization and group meetings	Human resources, finance and logistics			

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<del>Activities under output 2.2: Staff are recruited, trained and certified.</del>				
<del>Activity 2.2.1 Recruitment of PMU staffs and Executing Entity staffs</del>	<del>Human resources and finance</del>			
<del>Activity 2.2.2 Training to the newly recruited staffs on project management</del>	<del>Human resources/trainers, finance, logistics, transport</del>			
<del>Activities under output 2.3: Training materials are developed.</del>				
<del>Activity 2.3.1 Prepare training material on climate change and water issues</del>	<del>Human resource, logistics, printing</del>			
<del>Activities under output 2.4: Training for beneficiaries conducted</del>				
<del>Activity 2.4.1 Organise training for beneficiaries</del>	<del>Trainers, logistics, finance, transport</del>			

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F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

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The alignment of the project the Results Framework of the Adaptation Fund is given below.

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Table 11. The Alignment of the project the Results Framework of the Adaptation Fund

Project Objective(s)	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Enhanced ability of coastal communities to get access to safe drinking water, which are polluting further by the negative impacts of climate change	Number of innovative technology scaled up for ensuring safe drinking water for the coastal communities in Bangladesh	Outcome 8: Support the development and diffusion of innovative adaptation practices, tools and technologies	8. Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level	4,525,000
	Number of families increased access to improved sources of drinking water.  Number of people with reduced risk to unsafe water and the prevalence of water-borne diseases	Fund outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets	4.1 Responsiveness of development sector services to evolving needs from changing and variable climate	
		Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1 Targeted population groups participating in adaptation risk reduction awareness activities	

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Project Outcome(s)	Project Outcome Indicator(s)	Fund Outcome	Fund Outcome Indicator	
<u>Outcome 1: Enhanced the status of accessing safe drinking water of the coastal people.</u>	<ul style="list-style-type: none"> <li>Number of people access to improved sources of drinking water in the project areas in coastal region of Bangladesh.</li> <li>The level of satisfaction of the people who access to improved sources of drinking water in the project areas.</li> </ul>	<u>Fund outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets</u>	<u>4.1 Responsiveness of development sector services to evolving needs from changing and variable climate</u>	
<u>Outcome 2: Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.</u>	<u>The proportion of the population sensitized and who have positively changed their behaviour towards safe drinking water.</u>	<u>Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level</u>	<u>3.1 Targeted population groups participating in adaptation risk reduction awareness activities</u>	
<u>Output 1.1 RO plant for safe drinking water procured and established</u>	<u>225 RO plants established</u>	<u>Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.</u>	<u>8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated</u>	
			<u>8.2. No. of key findings on effective, efficient adaptation practices, products and technologies generated</u>	
		<u>Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts.</u>	<u>4.1.2 No. of physical assets strengthened physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)</u>	

		including variability		
<u>Output 1.2: Water testing kits are procured and supplied.</u>	<u>The number of water testing kits are supplied.</u>	<u>Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability</u>	<u>4.1.2 No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)</u>	
<u>Output 2.1: Water-user groups are formed.</u>	<u>Number of groups are formed to disseminate water vulnerability to climate change.</u>	<u>Output 3.1 Targeted population groups participating in adaptation and risk reduction awareness activities</u> <u>Output 3.2 Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning</u>	<u>3.2.1 Number of technical committees/associations formed to ensure transfer knowledge</u>  <u>3.2.1 Number of technical committees/associations formed to ensure transfer knowledge</u>  <u>3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders</u>	
<u>Output 2.2: Staff are recruited, trained and certified.</u>	<u>The number of jobs are created at the local level and trained and certified.</u>	<u>Output 3.2 Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning</u>	<u>3.2.1 Number of technical committees/associations formed to ensure transfer knowledge</u>	
<u>Output 2.3: Training materials developed.</u>	<u>The number of training materials are developed.</u>	<u>Output 3.2 Strengthened capacity of national and</u>	<u>3.2.1 Number of technical committees/associations</u>	

		subnational stakeholders and entities to capture and disseminate knowledge and learning	formed to ensure transfer knowledge	
Output 2.4: Training for beneficiaries conducted	The number of people from different stakeholders trained and certified.	Output 3.1 Targeted population groups participating in adaptation and risk reduction awareness activities	3.2.1 Number of technical committees/associations formed to ensure transfer knowledge	

Project Objective(s)	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Enhanced ability of coastal communities to get access to safe drinking water, which are polluting further by the negative impacts of climate change	Number of families increased access to improved sources of drinking water.  Number of people with reduced risk to unsafe water and the prevalence of water-borne diseases	Fund outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets	4.1 Responsiveness of development sector services to evolving needs from changing and variable climate	4,525,000
		Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	Output 3.1 Targeted population groups participating in adaptation risk reduction awareness activities	
Project Outcome(s)	Project Outcome Indicator(s)	Fund Outcome	Fund Outcome Indicator	
Outcome 1: Enhanced the	Number of people access	Fund outcome 4: Increased	4.1 Responsiveness of development sector	

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status of accessing safe drinking water of the coastal people.	to improved sources of drinking water in the project areas in coastal region of Bangladesh. • The level of satisfaction of the people who access to improved sources of drinking water in the project areas.	adaptive capacity within relevant development sector services and infrastructure assets	services to evolving needs from changing and variable climate	
<b>Outcome 2:</b> Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.	The proportion of the population sensitized and who have positively changed their behaviour towards safe drinking water.	<b>Outcome 3:</b> Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	<b>Output 3.1</b> Targeted population groups participating in adaptation risk reduction awareness activities	
<b>Output 1.1:</b> RO Plants are procured and established.	The number of RO plants are procured and established.	<b>Output 4:</b> Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	<b>4.1.2</b> No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	
<b>Output 1.2:</b> Water testing kits are procured and supplied.	The number of water testing kits are supplied.	<b>Output 4:</b> Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	<b>4.1.2</b> No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	
<b>Output 2.1:</b> Groups are formed.	Number of groups are formed to disseminate	<b>Output 3.1</b> Targeted population	<b>3.2.1</b> Number of technical committees/associations	

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	water vulnerability to climate change.	groups participating in adaptation and risk reduction awareness activities  Output 3.2 Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	formed to ensure transfer knowledge  3.2.1 Number of technical committees/associations formed to ensure transfer knowledge  3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	
Output 2.2: Staff are recruited, trained and certified.	The number of jobs are created at the local level and trained and certified.	Output 3.2 Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.1 Number of technical committees/associations formed to ensure transfer knowledge	
Output 2.3: Training materials developed.	The number of training materials are developed.	Output 3.2 Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.1 Number of technical committees/associations formed to ensure transfer knowledge	
Output 2.4: Training for beneficiaries conducted	The number of people from different stakeholders trained and certified.	Output 3.4 Targeted population groups participating in adaptation and risk reduction awareness activities	3.2.1 Number of technical committees/associations formed to ensure transfer knowledge	

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**Table 12.** Core Impact Indicator (a)

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<b>Adaptation Fund Core Impact Indicator 1: Number of Beneficiaries</b>				
<b>Date of Report</b>	On the signing of the agreement between AF and PKSF, At the end of the first year and at the end of the final year			
<b>Project Title</b>	Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh			
<b>Country</b>	Bangladesh			
<b>Implementing Agency</b>	Palli Karma-Sahayak Foundation (PKSF)			
<b>Project Duration</b>	3 years			
	<u>Baseline (absolute number)</u>	<u>Target at project approval (absolute number)</u>	<u>Adjusted target first year of implementation (absolute number)</u>	<u>Actual at completion (absolute number)</u>
<b>Direct beneficiaries supported by the project</b>	0	225,000	202,500	180,000
Female direct beneficiaries	0	112,500	101,250	90,000
Youth direct beneficiaries	0	67,500	60,750	54,000
<b>Indirect beneficiaries supported by the project (not targeted, medium intensity)*</b>	0	125,000	112,500	100,000
Female indirect beneficiaries	0	62,500	56,250	50,625
Youth indirect beneficiaries	0	37,500	33,750	30,375

\*225 persons will receive training on RO plant management. In addition, community people, local NOGs and local government representatives will receive training on climate change and water management, RO plant management and maintenance.

**Table 12.** Core Impact Indicator (b)

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<b>Adaptation Fund Core Impact Indicator 2: Assets Produced, Developed, Improved, or Strengthened</b>	
<b>Date of Report</b>	On the signing of the agreement between AF and PKSF, At the end of the first year and at the end of the final year
<b>Project Title</b>	Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh
<b>Country</b>	Bangladesh
<b>Implementing Agency</b>	Palli Karma-Sahayak Foundation (PKSF)
<b>Project Duration</b>	3 years

	<u>Baseline (absolute number)</u>	<u>Target at project approval (absolute number)</u>	<u>Adjusted target first year of implementation (absolute number)</u>	<u>Actual at completion (absolute number)</u>
<b>Sector</b>	<b>Water Management</b>			
<u>Targeted Asset</u>				
1) <u>Health improved of % the targeted people</u>	<u>0</u>	<u>100%</u>	<u>90%</u>	<u>80%</u>
2) <u>Physical asset produced (RO plants)</u>	<u>0</u>	<u>225</u>	<u>225</u>	<u>225</u>
<b>Changes in Asset (Quantitative or qualitative depending on the asset)</b>				
<u>Increase in water supply in the targeted areas to withstand impacts of climate change (tons/m3)</u>	<u>0</u>	<u>1,350,000 m<sup>3</sup></u>	<u>1,200,000 m<sup>3</sup></u>	<u>1,000,000 m<sup>3</sup></u>

G. Include a detailed budget with budget notes, broken down by country as applicable, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

A detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs are given below. It is to be noted that the budgeted of proposed project are structured around the following three main components: (i) development of drinking water supply facilities; (ii) institutional support at the local level for project implementation, infrastructure operation, sustainability, and knowledge management future reference; and (iii) project management. **Details can be seen Annex-2.**

SI	Main Component	Budget US\$	Budget Notes
1.	Development of drinking water supply facilities	4,000,000	225 RO plants will be established at the cost US\$17,777 per plant. It includes machineries for a RO plant and a semi-permanent structures as a producing and distributing centre.
2.	Institutional support for capacity building at the local level	525,000	Capacity building support, the activities for monitoring and evaluation and knowledge management, and the development of BCC materials will provided and implemented under this component.
3.	Project Management	400,000	Staff salaries and office management expenses at the PMU level and the implementing partner level will be beared under this component.
4.	Project Cycle Management Fee charged by IE	75,000	This is related with project management fee.
	Total	5,000,000	

H. Include a disbursement schedule with time-bound milestones.

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A disbursement schedule with time-bound milestones is given below.

	Upon Agreement signature	One Year after Project Start	Year 2	Year 3	Total
Scheduled Date	July 2022	July 2023	July 2024	July 2025	
Project Funds	2,000,000	2,000,000	800,000	125,000	4,925,000
Implementing Entity Fee	---	25,000	25,000	25,000	75,000
<b>Total</b>	2,000,000	2,025,000	825,000	150,000	5,000,000

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## PART IV: ENDORSEMENT BY THE DESIGNATED GOVERNMENT AUTHORITY FOR ADAPTATION FUND AND CERTIFICATION BY THE IMPLEMENTING ENTITY

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### A. A. RECORD OF ENDORSEMENT BY THE DESIGNATED GOVERNMENT AUTHORITY<sup>44</sup>

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*Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project / programme. Add more lines as necessary. The endorsement letters should be attached as an annex to the project/programme proposal. Please attach the endorsement letters with this template; add as many participating governments if a regional project/programme:*

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The name, position, and government office of the designated government authority are provided with date of endorsement. Details can be seen in Annex-3.

### B. IMPLEMENTED ENTITY CERTIFICATION

*Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address.*

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<sup>6</sup> Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

The name and signature of the Implementing Entity Coordinator with the date of signature and also the project contact person's name, telephone number are provided. Details can be seen in Annex-4.

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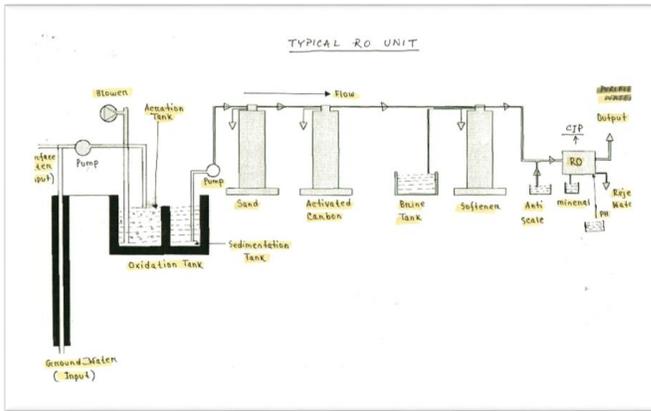
## Annex 1

### Specifications for Installation of a RO Plant and Water Testing indicators.

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#### 1. Specifications of materials for RO Plant (Capacity: 1000 LPH)



**RO Plant Flow Diagram**

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<b>Part-A: Supply and Installation 1HP (4000LPH) Centrifugal Pump</b>					
TI	Description of Work	Quantity	Unit	Rate	Amount
1	<p>Supply, Fitting, Fixing and commissioning of Single Phase High lift pump including necessary fittings and other pipes or parts for collecting water from River/Pond/Canal to a primary reservoir tank and lifting the water to a roof top storage tank of following specification:</p> <p>1. Type: Single phase Centrifugal pump                      2. Capacity:4000 LPH                      3. Suction head: 20ft                      4. Net Positive Suction Head (NPSH) : 1.20 m of Water                      4. Housing material: AISI 316                      5. Impeller materials: AISI 316                      6. Power: 220V, 50 Hz, 1.00 Hp (AC or DC)                      7. Brand: Wib /Ebara /Grundfos /CNP. /gazi / pedrollo or Equivalent                      8. Country of origin: EU / USA/China or equivalent.                      All complete as per instruction of Engineer-in charge. (including cost of all materials, labor and transportation, VAT and IT)</p>	1	no		
2	<p><b>Water Tank:</b> Supplying, fitting and fixing of 1000 litre capacity food grade HDPE water tank to preserve Feed water including all cost of materials, fittings labor etc. all complete as per direction of the Engineer-in- charge.</p>	1	Sets		
3	<p>Supplying, fitting and fixing of 1.5 inch dia 500ft uPVC pipe including all cost of materials, fittings labor etc. all complete as per direction of the Engineer-in- charge.</p>	500	ft		
<b>Sub Total =Part-A:</b>					
<b>Part-B: DESIGN BASIS</b>					

4	<p><b><u>Supply, installation and Commissioning of Community based Desalination Plant for treating brackish feed water</u></b>  From well complying the following water quality parameters at site in coastal areas through direct supervision and instruction of the Engineer in charge. The Components of the plant are of following specification:  <u>Feed Water Quality (Input of desalination Plant):</u>  TDS: 7000 mg/l  Chloride: 5000 mg/l  Iron: 5mg/l  <u>Feed water source: Surface water.</u>  <b><u>Treated Water Quality: (Output from desalination Plant)</u></b>  TDS: &lt;450 mg/l Chloride: 25 mg/l Iron :0.1 mg/l  <u>Arsenic: 0.01 ppm. Fresh water production: 1500-2000 LPH.</u>  <b><u>Power supply inputs: Single phase</u></b>  <b><u>Operation:</u></b> The plant will be operated semi automatically for startup and shut down both by Electricity &amp; Generator (Single phase)  <b><u>Warranty:</u></b> Warranty must be provided 03 (Three) years for servicing, operation and Maintenance (including spares). During the Warranty period no Payment shall be made for the service and spares.  <u>Fresh water shall be reserved in food grade plastic tank required for smooth operation of the treatment plant.</u></p>			
a)	<p><b><u>Pre-treatment Section:</u></b>  <b><u>Feed Pump</u></b>  <u>Supply, fitting, fixing and commissioning of Feed Pump of following specification:</u>  1. Type: Centrifugal  2. Capacity: 4000 LPH  3. Pump Head: 30-40 m  4. Housing material: SS304  5. Impeller materials: SS316  6. Power: 220V, 50 Hz, 1 HP  7. Brand: Wile/Ebara/Grundfos/CNP/ gazi or Equivalent  8. Country of origin: EU / USA/China or equivalent.  <u>All complete as per instruction of Engineer-in charge. (Including cost of all materials labor and Transportation, VAT and IT.</u></p>	1	no	
b)	<p><b><u>Multimedia Filter:</u></b>  <u>Supply, fitting, fixing and commissioning of MMF filter of following Specification:</u>  1. Capacity: 4000 LPH  2. Dimension: 400 mm X 1650 mm (16" X 65")  3. Operation: Continuous service with Manual Multiport backwash device  4. Sheet materials: FRP  5. Pipes and fittings: uPVC  6. Size of Inlet and Outlet pipes: 25mm (1.0 inch)  7. Media: Graded Sand/Birm/ Manganese  8. Pressure meter: 0-100 psi, 2.5 inch dial.</p>	1	no	

	<p>9. Operating Pressure: 100 - 150 psi, Testing Pressure: 200 - 300 psi, Cycle test: 100,000 cycles, Operating Temperature: 1 °C to 49 °C, Bursting Pressure: 750 -500</p> <p>10. Brand: MINTECH/HTCOM</p> <p>11. County of origin: EU/USA/China or equivalent.</p> <p>All complete as per instruction of Engineer-in Charge. (including cost of all materials, labor and transportation, VAT and IT)</p>				
c)	<p><b>Activated Carbon filter:</b> Supply, fitting, fixing and commissioning of ACF filter of following: Specification: 1. Capacity: 4000 LPH 2. Dimension: 400 mm X 1650 mm (16" X 65") 3. Operation: Continuous service with Manual Multiport backwash device 4. Sheet materials: FRP 5. Pipes and fittings: uPVC 6. Size of Inlet and Outlet pipes: 25mm (1.0 inch) 7. Media: Well graded gravel, Sand and Activated Carbon 8. Pressure meter: 0-100 psi, 2.5 inch dial. 9. Operating Pressure: 100 - 150 psi, Testing Pressure: 200 - 300 psi, Cycle test: 100,000 cycles, Operating Temperature: 1 °C to 49 °C, Bursting Pressure: 750 -500</p> <p>10. Brand: MINTECH/HTCOM</p> <p>11. County of origin: EU/USA/China or equivalent.</p> <p>All complete as per instruction of Engineer-in Charge. (including cost of all materials, labor and transportation, VAT and IT)</p>	<u>1</u>	<u>no</u>		
d)	<p><b>Water softener:</b> Supply, fitting, fixing and commissioning of WS filter of following: Specification: 1. Capacity: 4000 LPH 2. Dimension: 400 mm X 1650 mm (16" X 65") 3. Operation: Continuous service with Manual Multiport backwash device 4. Sheet materials: FRP 5. Pipes and fittings: uPVC 6. Size of Inlet and Outlet pipes: 25mm (1.0 inch) 7. Media: Graded Sand, Birm and Manganese 8. Pressure meter: 0-100 psi, 2.5 inch dial. 9. Operating Pressure: 100 - 150 psi, Testing Pressure: 200 - 300 psi, Cycle test: 100,000 cycles, Operating Temperature: 1 °C to 49 °C, Bursting Pressure: 750 -500</p> <p>10. Brand: MINTECH/HTCOM</p> <p>11. County of origin: EU/USA/China or equivalent.</p> <p>All complete as per instruction of Engineer-in Charge. (including cost of all materials, labor and transportation, VAT and IT)</p>	<u>1</u>	<u>no</u>		
e)	<p><b>Iron Removal Filter:</b> Supply, fitting, fixing and commissioning of MMF filter of following Specification: 1. Capacity: 4000 LPH</p>	<u>1</u>	<u>no</u>		

	<p>2. Dimension: 400 mm X 1650 mm (16" X 65")</p> <p>3. Operation: Continuous service with Manual Multiport backwash device</p> <p>4. Sheet materials: FRP (Fiber Reinforced Plastic)</p> <p>5. Pipes and fittings: uPVC</p> <p>6. Size of Inlet and Outlet pipes: 25mm (1.0 inch)</p> <p>7. Media: Graded Sand, Iron removal Stone and Manganese</p> <p>8. Pressure meter: 0-100 psi, 2.5 inch dial,</p> <p>9. Operating Pressure: 100 - 150 psi, Testing Pressure: 200 - 300 psi, Cycle test: 100,000 cycles, Operating Temperature: 1 °C to 49 °C, Bursting Pressure: 750 -500</p> <p>10. Brand: MINTECH/HTCOM</p> <p>11. County of origin: EU/USA/China or equivalent.</p> <p>All complete as per instruction of Engineer-in-Charge.</p>				
f)	<p><b>Antiscalant Dosing System</b></p> <p>Supply, fitting, fixing and commissioning of WS filter of following:</p> <p><b>Pump Specification:</b></p> <p>1. Capacity: 42 LPH</p> <p>2. Back pressure range : 85-100 psi</p> <p>3. Type: Mechanical actuated diaphragm type with adjustable stroke.</p> <p>4. Pipes and fittings: Plug &amp; Push System</p> <p>5. Power requirement of motor: 220 volt, 50 Hz, 16W</p> <p>6. Brand: Pulsafceder/seko</p> <p>Country of manufacturing: USA/Italy. or equivalent.</p> <p><b>Tank Specification:</b></p> <p>1. Capacity: 60 Ltr.</p> <p>2. MOC: HDPE/PVC</p> <p>3. Brand Gfiber/Pantair</p> <p>4. Country of manufacturing: USA or equivalent.</p>	1	no		
<b>Sub Total =Part-B:</b>					
<b>Part-C: Reverse Osmosis (RO) Unit</b>					
5a)	<p><b>Cartridge Filter: Housing with PP Filter :</b></p> <p>Supply, fitting, fixing and commissioning of Cartridge Filter of following specification:</p> <p>1. Capacity: 1000 LPH</p> <p>2. Accuracy 5 Micron</p> <p>3. Housing materials: SS 304</p> <p>4. Filter Materials: Poly Propylene (PP)</p> <p>5. No. of filter: 05</p> <p>6. Filter Size: Dia 2.5 inch &amp; Height 20 inch</p> <p>7. Country of Origin: EU/USA/China or equivalent.</p> <p>All complete as per instruction of Engineer-in Charge. (Including cost of all materials, labor and transportation, VAT and IT)</p>	1	no		
5b)	<p><b>High Pressure Pump:</b></p> <p>Supply, fitting, fixing and commissioning of High Pressure Pump of following specification:</p> <p>1. Type: Vertical Multistage Centrifugal</p> <p>2. Capacity : 1000 LPH</p> <p>3. Pump Head : 15 to 20 m</p> <p>4. Housing Material : SS304</p> <p>5. Impeller materials: SS304</p> <p>6. Power: 220V, 50 Hz, 3 HP</p> <p>7. Brand: KSB/Groundfos/CNP/Apex or Equivalent</p>	1	no		

	<u>8. County of origin: EU/USA/China or equivalent.</u> <u>All complete as per instruction of Engineer-in Charge. (Including cost of all materials, labor and transportation, VAT and IT)</u>				
<b>5c)</b>	<u>Supply, fitting, fixing and commissioning of RO Pressure Tube of following specification:</u> <u>1. Type End Entry Design</u> <u>2. Operating Pressure: 300psi</u> <u>3. Materials: FRP</u> <u>4. Size: Dia 100mm &amp; Length : 3048mm</u> <u>5. Brand: Code line/ROPV/MINTECH</u> <u>6. Country of origin: EU/ USA/China or equivalent.</u> <u>All complete as per instruction of Engineer-in Charge. (Including cost of all materials, labor and transportation, VAT and IT)</u>	<u>3</u>	<u>Pc</u>		
<b>5d)</b>	<u><b>RO membrane:</b></u> <u>Supply, fitting, fixing and commissioning of RO membrane of following specification:</u> <u>1. Type: TFC (0.12 Micron)</u> <u>2. Size: 100mm X 1016mm (4"X 40")</u> <u>3.Brand: Filmteh/ Toray/MINTECH/Hydranutics/Equivalent</u> <u><b>Specification:</b></u> <u>Performance:</u> <u>Permeate Flow: 9.1 LPH (380 LPH)</u> <u>Salt Rejection: Nominal 99.7%</u> <u>Minimum 99.5%</u> <u>Type:</u> <u>Configuration: Spiral Wound</u> <u>Membrane Polymer:Composite Polyamide</u> <u>Active Area:78 sq. ft</u> <u>Application Data:</u> <u>Maximum Applied Pressure: 600 psi</u> <u>Maximum Chlorine Concentration: &lt;0.1 PPM</u> <u>Maximum Operating Temperature:113 F (45 C)</u> <u>Feed water pH Range:3.0 – 10.0</u> <u>Maximum Feed Water Turbidity:1.0 NTU</u> <u>Maximum Feed Water SDI (15 mins):5.0</u> <u>Maximum Feed Flow: 1.6 GPM (363 LPH)</u> <u>Minimum Ratio of Concentrate to</u> <u>Permeate Flow for any Element:5:1</u> <u>Maximum Pressure Drop for each Element:10 psi</u> <u>Test Conditions:</u> <u>The stated performance is initial (data taken after 30 minutes of operation), based on the following conditions:</u> <u>2000 PPM NaCl solution</u> <u>150-225 psi (1.55 Mpa) Applied Pressure</u> <u>77 F (25 C) Operating Pressures</u> <u>15% Permeate Recovery</u> <u>6.5 – 7.0 pH Range</u> <u>4.Country of origin: EU/USA/Japan/China/Equivalent</u> <u>All complete as per instruction of Engineer-in Charge. (Including cost of all materials, labor and transportation, VAT and IT)</u>	<u>9</u>	<u>Pc</u>		
<b>5e)</b>	<u><b>Pipe fittings with others accessories:</b></u> <u>Pipe and fittings</u>	<u>1</u>	<u>Lot</u>		

	<p>High pressure side: should be SS304 pipe with fittings. (1.5 Inch)</p> <p>Low pressure side: uPVC fittings. (1 inch)</p> <p>Supply, fitting, and fixing of "T", "L-bow" and others fittings and pipes made of (80 Schedule).</p> <p><b>Others accessories:</b>          Inlet solenoid valve 1pc, automatic flush valve 1pc, flow meter 2pcs, pressure meter 4pcs, pressure switch 1 pc, etc.          All complete as per instruction of Engineer-in Charge.          (Including cost of all materials, labor and transportation, VAT and IT)</p>				
<b>5f)</b>	<p><b>Electric Control Panel:</b>          Supply, fitting, fixing and commissioning of Electric Control Panel Box (MOC: SS304) including Circuit breaker, magnetic contact, thermal overload relay, timer, digital Conductivity monitor, indicator lamp, selector switch and any other related accessories.          All complete as per instruction of Engineer-in Charge. (Including cost of all materials, labor and transportation, VAT and IT)          Brand : Schneider/Tokaimi/ABB/Simen/LS          Origin: USA/EU/Japan/China or equivalent.</p>	<u>1</u>	<u>Set</u>		
<b>5g)</b>	<p><b>Skid for Desalination plant:</b>          MOC: SS 304 hollow box (Thickness- 1.5mm)          Box Size: 40mm x 40mm</p>	<u>1</u>	<u>No</u>		
<b>Sub Total =Part-C:</b>					
<b>Part-D:TREATED PURE WATER SECTION</b>					
6a)	<p><b>Drinking Water Tank:</b> Supply, fitting and fixing of food grade pvc Stainless Water Tank Capacity 500 liter to preserve pure drinking water including all cost of materials, fittings labor etc. all complete as direction of the Engineer-in-charge.</p>	<u>1</u>	<u>Set</u>		
6b)	<p>Supply, fitting, fixing and commissioning of Water Level Controller with electric cable</p>	<u>2</u>	<u>Set</u>		
6c)	<p>Supply, fitting, fixing and commissioning of drinking water collection pipeline with U PVC pipe, SS Tap and clamp etc.</p>	<u>1</u>	<u>Lot</u>		
6d)	<p>Drinking Water Quality Test water samples in a recognized public laboratory for Arsenic, Iron, TDS and Chloride including collection, transportation and submission of water sample as per direction of the Engineer-in-charge. (Including VAT &amp; IT)</p>	<u>1</u>	<u>L.S</u>		
<b>Sub Total =Part-D:</b>					
<b>Total (Part-A+ Part-B + Part-C + Part-D)</b>					
<b>Sav Tk.</b>					

**2. Specifications of Civil Works for RO Plant.**



**Part-A: Construction of room (Size: 20 ft x 12 ft x 10ft) for water treatment plant and a water reservoir (12ft x 8ft x 5ft) on the existing ground surface. Bill of quantity of all civil works will be final on the basis of practical measurement.**

TI	Description of Work	Quantity	Unit	Rate	Amount
1	Earth work in excavation all kinds of soil for foundation trenches, including layout, providing enter Lines, Local bench-mark pillars, leveling ramming mid preparing the base, fixing bamboo spikes and marking layout with chalk powder, providing necessary tools and plants protecting and maintaining the trench dry etc.	19.95	cum		
2	Stacking cleaning the excavated earth at a safe distance of out of the area enclosed by the layout etc. all complete and accepted by the engineer, subject to submit method statement of carrying out excavation work to the engineer for approval. However, engineer's approval shall not relieve the contractor of his responsibilities /obligations under the contract	1	L.S		
3	Sand filling in plinth with fine local sand having minimum FM 0.80 in 150 mm layers, including leveling, watering and consolidation of each layer up to finished level as per design supplied by the design office only etc. all complete and accepted by the Engineer.	13	cum		
d)	250/375/500 mm or more thick brick walls with 1st class bricks in cement mortar (1 :6) in superstructure, including racking out joints, filling the interstices with mortar cleaning and soaking the bricks at least 24 hours before use and necessary scaffolding curing at least for 7 days etc. all complete accepted by the Engineer in charge.	27.5	cum		
5	One layer of brick flat soling in foundation or in floor with first class or picked jhama bricks including preparation of bed and filling the interstices with local sand leveling etc. all complete accepted by the Engineer.	46	sqm		
6	Reinforced cement concrete work (1 :24) of specified compressive strength fc 19 MPa at 28 days on standard cylinder with cement conforming to BOS 232 and ASTM standards, best quality sand [(50% quantity of best local sand (F.M. 1.2) and 50% quantity of Sylhet sand or coarse sand of equivalent (P.M.2.5) and 20 mm down well graded picked jhama brick chips including breading chips and screening, making placing in position, making shutter water-tight properly, placing reinforcement in position; mixing with mixer machine, casting in forms, compacting by vibrator machine and curing at least for 28 days, removing,				

	centering, all complete including cost of water, electrify, testing & other charges as per direction of the Engineer- in charge. (Rate excluding the cost of reinforcement, and its fabrication).				
	i) Lintel (250 mm x 125 mm)	0.7	cum		
	ii) Sunshade (2 nos. each 75 mm thick, 750 mm width and 1500 mm length)	0.2	cum		
	iii) Roof slab (125 mm thickness) and beam	6.3	cum		
7	Supplying and Fabrication of M.S. deformed bar (60 Grade) made from biller (Not Made from Scrapped) of Different dia in R.C.C works including removing rust, straightening, bending, cranking, placing at all height and binding with double G.I wire of 22 gauge.	705	Kg		
8	Minimum 12 mm thick cement sand (F.M. 1:2) plaster (1:4) with fresh cement to all brick works i.e. wall both inner-and outer surface and entry stair, veranda railing, roof sunshade, lintel, drop wall, finish the corner and edges including washing of sand cleaning the surface, scaffolding and curing at least for 7 days, cost of water, electricity and other charges etc. all complete in all respect as per direction and accepted by the engineer.	132	sqm		
9	Minimum 6 mm thick cement sand (F.M. 1:2) plaster (1:4) with (including NCF) fresh cement to outer surface of PL, to GL with Finishing the corner and edges including washing of sand cleaning the surface, scaffolding and curing at least for 7 days, cost of water, electricity and other charges etc. all complete in all respect as per direction and accepted by the engineer.	10	sqm		
10	White Washing by three coats, lime mixture prepared at least 12 hours before use, slacking stone lime, supply of gums blue, stirring thoroughly, removing the floating materials from the mixer, surface cleaning to free from all foreign materials before application of each coat, applying one vertical and one horizontal wash for each coat and successive coat is to be applied after drying up of previous coat including hair brass, providing necessary scaffolding and cleaning plinth, floors, doors, windows, portions and ventilators by washing, rubbing, oiling if necessary after white wash including cost of water, electricity and other charges etc. all complete and excepted by the Engineer.	40	sqm		
11	Supplying, fitting and fixing of high quality uPVC door frame and shutter of any design including necessary all fittings (Screw, Standard quality Handle, Hinge, Hasp bolt, Tower bolt). All complete and accepted by the Engineer-in - charge	2	No.		
12	i) Supplying, fitting, fixing window grills of any design made with F.I. bar including fabrication, welding, cost of electricity charge, carriage, cutting grooves, mending good the damages, tools and plants etc. all complete and accepted by the Engineer- in charge.	6.27	sqm		
	ii) Supplying, fitting and fixing of Aluminium sliding window as per the U.S. Architectural Aluminium Manufacturer's Association (AAMA) standard specification having 1.2 mm thick outer bottom (size 75.50 mm, 32mm), 1.2 mm thick outer top (size 75.50 mm, 16.80 mm), 1.2 mm thick shutter top (size 33 mm, 26.80, 22 mm), 1.2 mm thick shutter bottom (size 60mm, 24.40 mm), 1.2 mm thick outer side (size 75.50 mm, 19.90 mm), 1.2 mm thick sliding fixed side (size 31 mm, 26 mm), 1.2 mm thick shutter lock (size 49.20 mm 26.20 mm) and 1.2 mm thick inter lock (size 34.40 mm, 32.10 mm) sections all aluminium members (total weight kg/sqm) will be anodized to aluminium bronze/silver colour with a coat not less than 15 micron in thickness and density	6.27	sqm		

	<u>of 4 mg per square cm etc. including all accessories like sliding door key lock, sliding door wheel, sliding door mohiar, sliding door neoprene, bolts and nuts including sealants, keeping provision for fitting 5 mm thick glass including labour charge for fitting of accessories, making grooves and mending good damages, carriage, and electricity complete in all respect as per drawing and accepted by the Engineer.</u>				
<u>13</u>	<u>Painting window frames and grills, security jute, two coats with synthetic enamel paints of best quality and approved color over a coat of priming, including cleaning, finishing and polishing with necessary tools, scaffolding etc. all complete as per instruction of the E-in C.</u>	<u>6.27</u>	<u>sqm</u>		
<u>14</u>	<u>Supplying, fitting and fixing MORTICE door lock approved and accepted by the Engineer.</u>	<u>2</u>	<u>no.</u>		
<u>15</u>	<u>Mass concrete at floor in ratio 1:2:4 with cement. Mixture of sand (FM 1.2) and 19 mm downgraded Brick chips including shuttering. Carrying, with supply of all materials etc. all complete as per drawing, specification and direction of the Engineer- in charge.</u>	<u>3.7</u>	<u>cum</u>		
<u>16</u>	<u>75 mm thick mass concrete (1:1.5:3) at apron with cement, mixture of coarse (VM 2,5) and medium sand (I'M 1.5), 19 rum downgraded brick chips, including shattering, curing, including supply of materials etc. all complete as per drawing, specification and direction of the engineer in Charge</u>	<u>13</u>	<u>sqm</u>		
<u>17</u>	<u>Tiles for floor and wall: Supplying, fittings, fixing of glazed homogeneous tiles (more than 250 mm X 330 mm and less than 250 mm X 400 mm irrespective of color and/or design, with cement sand mortar (1:4) base and raking out the joints with white cement including cutting and laying the tiles in proper way and finishing with care etc. All complete and accepted by engineer in charge.</u>	<u>97</u>	<u>sqm</u>		
<u>18</u>	<u>Providing polythene sheet (0.18mm thick) in ground floor underneath the cement concrete, etc. all complete as per pacifications and direction of the E-I-C.</u>	<u>34</u>	<u>sqm</u>		
<u>19</u>	<u>75mm or 3" thick damp proof course (1:1.5:3) with brick chips and 50% sylhet sand (F.M. 2.2) and 50% local sand (F.M. 1.2) etc. All complete and accepted by engineer in charge.</u>	<u>5.2</u>	<u>m2</u>		
<u>20</u>	<u>25mm thick artificial patent stone (1:2:4) with brick chips and 50% sylhet sand (F.M. 2.2) and 50% local sand (F.M. 1.2) and 12mm down well graded brick chips including laying the concrete with neat cement and curing etc. All complete and accepted by engineer in charge.</u>	<u>35</u>	<u>m2</u>		
<u>21</u>	<u>Wall Painting (weather coat) with picture drawing including base coats painting and all complete as per direction of the engineer in charge.</u>	<u>4</u>	<u>m2</u>		
<u>22</u>	<u>Wall painting (weather coat) with picture massage including base coats painting and all complete as per direction of the engineer in charge.</u>	<u>4</u>	<u>m2</u>		
<u>23</u>	<u>3 Coat of weather coat of approved quality and color (smart blue (RO) of Berger or Berger code No-5T1101 open sky) applying on exterior surface as per direction of the E-in-C.</u>	<u>44</u>	<u>m2</u>		
<b>Sub Total of Part-A</b>					

<b>Part-B : Electrification</b>					
	<b>Internal Electrical Works :</b>				
24	Surface channel wiring for the following point looping at the switch board with earth terminal, including circuit drilling with 1 C-2 x 1.5 sq. nun PVC insulated and sheathed standard cable (BYM) and 1.5 sq. mm Green! White colored PVC insulated ECC wire (BY A) through minimum 1 mm thick PVC channel complete with 18 SWG OP sheet switch board with 3mm thick ebonite sheet cover, circular box, 5 amps piano switch, ceiling rose, fixing materials, accessories etc., and mending the damaged goods, cable manufactured by BRB/Sunshine Cables Limited; All complete and accepted by the Engineer-in -charge (Including cost of all materials, labor and transportation, VAT and IT)				
	i) Light Point with 2-Energy Saving Light	5	No.		
	ii) Fan Point with switch;	1	No.		
	iii) 2 pin 5 Amps socket point: Gang type	1	No.		
	iv) Ceiling Fan including fitting and Fixing with good quality. (Size: 56"; No. of Blade: 03)	1	No.		
25	Electric connection from Local REB/PDB (Including cost of all materials, labor and transportation, VAT and IT)	1	No.		
<b>Sub Total of Part-B</b>					
<b>Total (Part-A+ Part-B)</b>					
<b>Sav Tk.</b>					

### 3. WATER QUALITY ASSESSMENT INDICATORS

<u>SL</u>	<u>Components</u>	<u>WHO standard</u>	<u>BD Standard</u>
1	<u>PH Meter (Hanna)</u>	<u>6.5-8.5</u>	<u>6.5-8.5</u>
2	<u>TDS</u>	<u>1000</u>	<u>=</u>
3	<u>E-Coli (<math>\mu</math> s/cum)</u>	<u>1500</u>	<u>=</u>
4	<u>Cl<sup>-</sup> (mg/l)</u>	<u>250</u>	<u>150-600</u>
5	<u>Na<sup>+</sup> (mg/l)</u>	<u>200</u>	<u>200</u>
6	<u>Ca<sup>2+</sup> (mg/l)</u>	<u>100</u>	<u>75</u>
7	<u>Mg<sup>2+</sup> (mg/l)</u>	<u>60</u>	<u>30-35</u>
8	<u>HCO<sub>3</sub><sup>-</sup> (mg/l)</u>	<u>200</u>	<u>=</u>
9	<u>NO<sub>3</sub><sup>-</sup> (mg/l)</u>	<u>50</u>	<u>=</u>
10	<u>SO<sub>4</sub><sup>2-</sup> (mg/l)</u>	<u>250</u>	<u>400</u>
11	<u>F<sup>-</sup> (mg/l)</u>	<u>1.5</u>	
12	<u>As (mg/l)</u>	<u>0.01</u>	<u>0.05</u>

**Annex 2 A: Detail Budget for Access to safe drinking water for the climate vulnerable people in coastal areas of**

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Outcome	Output	Activity	Funding Source	Budget Categories	Detailed Budget				Annual Budget (USD)				Note
					Unit	# of Unit	Unit Cost (USD)	Total Cost (USD)	Year 1	Year 2	Year 3	Total Budget (USD)	
<b>Outcome 1: Enhanced the status of accessing safe drinking water of the coastal people.</b>	1.1 RO Plants are procured and established.	Activity 1.1.1 Procurement of RO plants	AF	RO Plant	Number	225	11750	2,643,750	1,175,000	1,468,750	-	2,643,750	A1
		<b>Sub-total:</b>	-	-	-	-	-	2,643,750	1,175,000	1,468,750	-	2,643,750	-
		Activity 1.1.2 Construction of RO plant sites	AF	Construction	Number	225	6350	1,428,750	635,000	793,750	-	1,428,750	A2
	<b>Sub-total:</b>	-	-	-	-	-	1,428,750	635,000	793,750	-	1,428,750	-	
	1.2 Water testing kits are procured and supplied.	Activity 1.2.1 Procurement of testing kits	AF	Testing kits	Number	750	310	232,500	108,500	124,000	-	232,500	A3
		<b>Sub-total:</b>	-	-	-	-	-	232,500	108,500	124,000	-	232,500	-
		Activity 1.2.2 Distribution of testing kits	AF	Training	Batch	25	1000	25,000	12,000	13,000	-	25,000	A4
			AF	Travel	Number	1000	15	15,000	7,200	7,800	-	15,000	A5
			AF	Office supplies	Number	1000	1	1,000	480	520	-	1,000	A6
	<b>Sub-total:</b>	-	-	-	-	-	41,000	19,680	21,320	-	41,000	-	
<b>Total Outcome:1</b>	-	-	-	-	-	-	4,346,000	1,938,180	2,407,820	-	4,346,000	-	
<b>Outcome 2: Strengthened the ability of coastal communities and institutions in the project areas to</b>	2.1: Groups are formed.	Activity 2.1.1 Beneficiary selection and group formation	AF	Training	Batch	2	2000	4,000	4,000	-	-	4,000	B1
			AF	Travel	Month	6	700	4,200	4,200	-	-	4,200	B2
			AF	Office supplies	Number	10000	0.5	5,000	5,000	-	-	5,000	B3
		<b>Sub-total:</b>	-	-	-	-	-	13,200	13,200	-	-	13,200	-
	Activity 2.1.2 Project Participants' Mobilization and group meetings	AF	Travel cost	Event	12	900	10,800	3,600	3,600	3,600	10,800	B4	
		AF	Training	Event	12	1500	18,000	6,000	6,000	6,000	18,000	B5	
	<b>Sub-total:</b>	-	-	-	-	-	-	28,800	9,600	9,600	9,600	28,800	-

<u>take informed decisions about pure drinking water.</u>	2.2: Staff are recruited, trained and certified	2.2.1 Recruitment of PMU staffs and Executing Entity staffs	AF	Advertisement and others	Event	1	5000	5,000	5,000	-	-	5,000	B6
		<b>Sub-total:</b>	-	-	-	-	-	5,000	5,000	-	-	5,000	-
		2.2.2 Training to the newly recruited staffs on project management	AF	Travel cost	Event	3	1500	4,500	4,500	-	-	4,500	B7
			AF	Training	Event	3	2300	6,900	6,900	-	-	6,900	B8
		<b>Sub-total:</b>	-	-	-	-	-	11,400	11,400	-	-	11,400	-
	2.3: Training materials developed.	2.3.1 Prepare training material on climate change and water issues	AF	Travel cost	Number	6	1200	7,200	2,400	2,400	2,400	7,200	B9
			AF	Office supplies	Number	6	2500	15,000	5,000	5,000	5,000	15,000	B10
		<b>Sub-total:</b>	-	-	-	-	-	22,200	7,400	7,400	7,400	22,200	-
	2.4: Training for beneficiaries conducted	2.4.1 Organise training for beneficiaries	AF	Travel cost	Number	25	250	6,250	2,000	2,000	2,250	6,250	B11
			AF	Office supplies	Number	25	1200	30,000	9,600	9,600	10,800	30,000	B12
		<b>Sub-total:</b>	-	-	-	-	-	36,250	11,600	11,600	13,050	36,250	-
	<b>Total Outcome:2</b>	-	-	-	-	-	-	116,850	58,200	28,600	30,050	116,850	-
	-												
	<u>PMC cost</u>	<u>Project Management Cost</u>	Project Coordinator 1	AF	Consultant-local	Month	36	3000	108,000	36,000	36,000	36,000	108,000
Deputy Project Coordinator (Accounts & Finance) - 2			AF	Consultant-local	Month	36	2500	90,000	30,000	30,000	30,000	90,000	C1
Technical Officer (Engineering) - 9			AF	Consultant-local	Month	36	3285	118,260	39,420	39,420	39,420	118,260	C1
Local travel for implementing the Project from PMU			AF	Travel & Communication	Number	366	185	67,800	13,338	27,231	27,231	67,800	C2
Procurement management (Materials purchase, staff recruitment cost, advertisement)			AF	Office supplies	Number	4	3900	15,600	15,600	-	-	15,600	C3

	<b>Sub Total:</b>	-	-	-	-	-	399,660	134,358	132,651	132,651	399,660	-
	Office equipment's for project management	AF	Equipment's	Number	16	1236	19,770	19,770		-	19,770	C4
	External Audit Fee	AF	Audit Fee	Number	3	3500	10,500	3,500	3,500	3,500	10,500	C5
	Office supplies for PMU management	AF	Office supplies	Month	36	895	32,220	10,740	10,740	10,740	32,220	C6
	<b>Sub Total:</b>	-	-	-	-	-	62,490	34,010	14,240	14,240	62,490	-
-												
-	<b>AE Fee</b>	AF	AE FEE	Number	3	25000	75,000	25,000	25,000	25,000	75,000	D1
-	<b>Grand Total:</b>	-	-	-	-	-	5,000,000	2,189,748	2,608,311	201,941	5,000,000	-

**Annex 2B**  
**Budget Notes**

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A1	Procurement of RO plants to implement Activity 1.1.1	Number of RO Plants				Unit cost (USD)	Total cost(USD)	Remarks
		Year-1	Year-2	Year-3	Total			
	Procurement of RO plants (RO plants costs charged to activity 1.1.1)	100	125	0	225	\$ 11,750	\$ 2,643,750	-

A2	Construction of RO plant sites to implement Activity 1.1.2	Number of Construction of RO plant sites				Unit cost (USD)	Total cost(USD)	Remarks
		Year-1	Year-2	Year-3	Total			
	Construction of RO plant sites (Construction of RO plant costs charged to activity 1.1.2)	100	125	0	225	\$ 6,350	\$ 1,428,750	-

A3	Procurement of Procurement of testing kits to implement Activity 1.2.1	Number of RO Plants				Unit cost (USD)	Total cost(USD)	Remarks
		Year-1	Year-2	Year-3	Total			
	Procurement of testing kits (Testing kits costs charged to activity 1.1.1)	350	400	0	750	\$ 310	\$ 232,500	-

A4 [Training to Beneficiaries on using the testing kits to implement Activity 1.2.2](#)

	Number of Participants	Days	Unit cost (USD)	Total	Remarks
25 batch training to IEs staff for day long	1,000	1	\$25.0	\$25,000	40 Participants per batch

A5 [Local level travel cost for Beneficiaries to attend the training to implement Activity 1.2.2](#)

	Number of Participants	Unit cost (USD)	Total
Local level travel for Beneficiaries to attend the training	1,000	\$15	\$15,000
<b>Sub total (USD)</b>	-	-	<b>\$15,000</b>

A6 [Printing and other related materials for the training to implement Activity 1.2.2](#)

	Number of Participants	Unit cost (USD)	Total	Remarks
Office supplies for training (Including printing of format, pen, pencil)	1,000	\$1.00	\$1,000	-

B1 [Training to Implementing Entities \(IEs\) staff on project management including selection of Beneficiaries, group formation, vulnerability assessment and adaptation action plan](#)

	Number of Participants	Days	Unit cost (USD)	Total	Remarks
2 batch training to IEs staffs for day long	40	2	\$50.0	\$4,000	20 Participants per batch

B2 Local level travel cost for IEs staff during Beneficiaries selection and group formation to implementation project activities and in field supervision

	Quantity (months)	Number of IEs	Unit cost (USD)	Total
Local level travel for IE's staff-local (IEs staff will frequently visit field during selection of Beneficiaries and group formation)	6	9	\$78	\$4,200
<b>Sub total (USD)</b>	-	-	-	<b>\$4,200</b>

B3 Printing and other related materials for Beneficiaries selection, group formation of beneficiaries

	Number of Participants	Unit cost (USD)	Total	Remarks
Office supplies for Beneficiaries selection (Including printing of format, pen, pencil)	10,000	\$0.50	\$5,000	-

B4 Travel cost for Project Participants' to implement Activity 2.1.2

	Number of participants	Number of days	Unit cost (USD)	Total	Remarks
Travel cost for Project Participants'	240	1	\$45	\$10,800	1 event participate 20 participants

B5 Training cost for Project Participants' to implement Activity 2.1.2

	Number of participants	Number of days	Unit cost (USD)	Total	Remarks
Training cost for Project Participants'	240	1	\$ 75	\$18,000	1 event participate 20 participants

Recruitment of PMU staffs and Executing Entity staffs on the establishment of project management structure in the recipient country

**B6**

	Number of news papers	Unit cost (USD)	Total
Advertisement	4	\$1,250	\$5,000

Travel Cost for EE's staff to attend Training to implement Activity 2.2.2

**B7**

	Number of participants	Days	Unit cost (USD)	Total	Remarks
Consultant-local for providing training to IE's staff	50	9	\$10	\$4,500	15 Participants per batch

EEs staff received training on Climate Change and project management to implement Activity 2.2.2

**B8**

	Number of Participants	Days	Unit cost (USD)	Total	Remarks
Training to IE's staff on CCA and Project Management	30	5	\$40	\$6,000	15 Participants per batch
Training to IE's staff on Project documents, procurement management, project monitoring	10	3	\$30	\$900	

Total:	40	-	-	\$6,900	-
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Local level travel cost for local consultant to prepare training material on climate change and water issues

B9

	Number of visit	Number of manuals and guidelines	Unit cost (USD)	Total
Local consultant travel to project sites to prepare training manuals and guidelines on Climate Change issues and project management	6	6	\$200	\$7,200
<b>Sub total (USD)</b>	-	-	-	<b>\$7,200</b>

Prepare training material on climate change and water issues

B10

	Number of manuals and guidelines	Unit cost (USD)	Total
Printing and design cost of training material on climate change and water issues	6	\$2,500	\$15,000
<b>Sub total (USD)</b>	-	-	<b>\$15,000</b>

Travel cost for Organise training for beneficiaries

B11

	Unit cost (USD)	Number of Workshop	Total	Remarks
Travel Cost	\$250	25	\$6,250	-

**B12** Office Supplies for Organize different workshop and seminar for project learning and sharing

	Unit cost (USD)	Number of workshop	Number of participants/event	Days	Total
Participants participate of different workshop for project management, learning-sharing	\$20	25	60	1	\$30,000

**C1** Local Consultant support to project implementation from Project Management Unit (PMU)

	Unit cost (USD)	Number of months	Total	Remarks	Year-1	Year-2	Year-3	Total
Project Coordinator to look after the overall project from PMU side	\$ 3,000	36	108,000	-	\$ 36,000	\$ 36,000	\$ 36,000	\$ 108,000
Deputy Project Coordinator (Accounts & Finance) - 2	\$ 1,250	72	90,000	-	\$ 30,000	\$ 30,000	\$ 30,000	\$ 90,000
Technical Officer (Engineering) - 9	\$ 365	324	118,260	-	\$ 39,420	\$ 39,420	\$ 39,420	\$ 118,260

**C2** Local travel for implementing the Project from PMU

	Unit cost (USD)	Number / months	Total	Remarks	Year-1	Year-2	Year-3	Total
Local travel for implementing the Project from PMU	\$ 200	330	\$ 66,000	-	\$ 12,000	\$ 27,000	\$ 27,000	\$ 66,000
Mobile and Internet Bill	\$ 50	36	\$ 1,800	-	\$ 600	\$ 600	\$ 600	\$ 1,800
Total:	-	-	\$ 67,800	-	\$ 12,600	\$ 27,600	\$ 27,600	\$ 67,800

**C3** Procurement management

	Unit cost (USD)	Number of event	Total	Remarks
Office supplies (Meeting and advertisement cost)	\$ 3,000	4	\$12,000	-
Procurement management	\$ 300	12	\$ 3,600	-

C4 Equipment's for PMU

	<u>Unit cost (USD)</u>	<u>Number</u>	<u>Total</u>	<u>Remarks</u>
<u>Computer (Desktop)</u>	<u>\$ 1,000</u>	<u>7</u>	<u>\$ 7,000</u>	-
<u>Laptop</u>	<u>\$ 1,250</u>	<u>2</u>	<u>\$ 2,500</u>	-
<u>Printer</u>	<u>\$ 1,500</u>	<u>2</u>	<u>\$ 3,000</u>	-
<u>Scanner</u>	<u>\$ 1,270</u>	<u>1</u>	<u>\$ 1,270</u>	-
<u>Camera</u>	<u>\$ 1,000</u>	<u>3</u>	<u>\$ 3,000</u>	-
<u>Photocopier Machine</u>	<u>\$ 3,000</u>	<u>1</u>	<u>\$ 3,000</u>	-

C5 External Audit Fee

	<u>Unit cost (USD)</u>	<u>Number</u>	<u>Total</u>	<u>Remarks</u>
<u>External Audit Fee</u>	<u>\$ 3,500</u>	<u>3</u>	<u>\$ 10,500</u>	-
<b><u>Total</u></b>	-	-	<b><u>\$ 10,500</u></b>	-

C6 Office supplies for PMU management

	<u>Unit cost (USD)</u>	<u>Number of Month</u>	<u>Total</u>	<u>Remarks</u>
<u>Office space for PMU</u>	<u>\$ 325</u>	<u>36</u>	<u>\$11,700</u>	-
<u>Utility bill</u>	<u>\$ 80</u>	<u>36</u>	<u>\$2,880</u>	-
<u>Stationaries</u>	<u>\$ 400</u>	<u>36</u>	<u>\$14,400</u>	-
<u>Meetings</u>	<u>\$ 90</u>	<u>36</u>	<u>\$ 3,240</u>	-
<b><u>Total:</u></b>	-	-	<b><u>\$ 32,220</u></b>	-

D 1 AE Fee

	Unit cost (USD)	Number	Total	Remarks
AE Fee	\$ 25,000	3	\$ 75,000	-
<b>Total</b>	-	-	<b>\$ 75,000</b>	-

### Annex 3: Letter of Endorsement

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## Ministry of Environment, Forest and Climate Change

### Letter of Endorsement

January, 2022

To  
The Adaptation Fund Board  
C/o Adaptation Fund Board Secretariat  
Email: Secretariat@Adaptation-Fund.org  
Fax: 202 522 3240/5

**Subject: Endorsement for "Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh" project proposal.**

In my capacity as designated authority for the Adaptation Fund in Bangladesh, I confirm that the above "access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh" project proposal is in accordance with the government's water sector priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the coastal areas of Bangladesh. Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by Palli Karma-Sahayak Foundation (PKSF) and executed by different local NGOs of Bangladesh.

Sincerely,

  
(Md. Mostafa Kamal)  
Secretary  
Ministry of Environment, Forest and Climate Change

## Annex 4: Implemented Entity Certification

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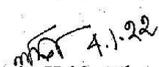


**PALLI KARMA-SAHAYAK FOUNDATION (PKSF)**

[www.pksf-bd.org](http://www.pksf-bd.org)

### Implementing Entity Certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans [(Bangladesh Climate Change Strategy and Action Plan (BCCSAP), National Determination Contribution (NDC), Delta Plan 2100 and 8<sup>th</sup> Five Year Plan)] and subject to the approval by the Adaptation Fund Board, commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project.

  
Dr. Nomita Halder ndc  
Managing Director and  
Implementing Entity Coordinator

Date: 04 January 2022 Tel. and email: +8801844481300, [md@pksf-bd.org](mailto:md@pksf-bd.org)

Project Contact Person: Dr. Fazle Rabbi Sadeque Ahmed  
Deputy Managing Director  
Palli Karma-Sahayak Foundation (PKSF)

Tel. and Email: +8801552310099, [frsa1962@yahoo.co.uk](mailto:frsa1962@yahoo.co.uk)

**Annex 5: Environmental and Social  
Management Plan (ESMP)**

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FEBRUARY, 2022

# ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

ACCESS TO SAFE DRINKING WATER FOR CLIMATE VULNERABLE PEOPLE IN  
COASTAL AREAS OF BANGLADESH



PALLI KARMA SAHAYAK FOUNDATION (PKSF)

iii

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### List of Abbreviation

<u>AF</u>	<u>Adaptation Fund</u>
<u>BCCSAP</u>	<u>Bangladesh Climate Change Strategy and Action Plan</u>
<u>BDT</u>	<u>Bangladeshi Taka</u>
<u>BECA</u>	<u>Bangladesh Environment Conservation Act</u>
<u>BIDS</u>	<u>Bangladesh Institute of Development Studies</u>
<u>BUET</u>	<u>Bangladesh University of Engineering and Technology</u>
<u>CGR</u>	<u>Central Grievance Redress</u>
<u>DG</u>	<u>Director General</u>
<u>DoE</u>	<u>Department of Environment</u>
<u>ECA</u>	<u>Environmental Conservation Act, 1995</u>
<u>ECC</u>	<u>Environmental Clearance Certificate</u>
<u>ECR</u>	<u>Environment Conservation Rules</u>
<u>EE</u>	<u>Executing Entity</u>
<u>EIA</u>	<u>Environmental Impact Assessment</u>
<u>ESMF</u>	<u>Environment and Social Management Framework</u>
<u>ESMP</u>	<u>Environmental and Social Management Plan</u>
<u>ESP</u>	<u>Environmental and Social Policy</u>
<u>ESS</u>	<u>Environmental and Social Safeguard</u>
<u>GIS</u>	<u>Geographical Information System</u>
<u>GoB</u>	<u>Government of Bangladesh</u>
<u>GR</u>	<u>Grievance Register</u>
<u>GRM</u>	<u>Grievance Redress Mechanism</u>
<u>ICZMP</u>	<u>Integrated Coastal Zone Management Plan</u>
<u>IE</u>	<u>Implementing Entity</u>
<u>IEE</u>	<u>Initial Environmental Examination</u>
<u>LG</u>	<u>Local Government</u>
<u>LGR</u>	<u>Local Grievance Redress</u>
<u>MD</u>	<u>Managing Director</u>
<u>NSDWSSP</u>	<u>National Safe Drinking Water Supply and Sanitation Policy</u>
<u>PKSF</u>	<u>Palli Karma-Sahayak Foundation</u>
<u>PMU</u>	<u>Project Management Unit</u>
<u>PPE</u>	<u>Personal Protective Equipment</u>
<u>RO</u>	<u>Reverse Osmosis</u>
<u>SLR</u>	<u>Sea Level Rise</u>
<u>SOD</u>	<u>Standing Orders on Disaster</u>
<u>UP</u>	<u>Union Parishad</u>
<u>WHO</u>	<u>World Health Organisation</u>

## 1.0 Introduction

Bangladesh is recognized as one of the most vulnerable countries to climate change in the world. This is mainly due to physical and socio-economic characteristics of the country. Existing poverty situation compounded by COVID-19 pandemic creates new challenges for maintaining existing growth of the country in one hand and on the other hand, climate change puts extra pressure by affecting lives and livelihoods of the rural vulnerable communities. The government of Bangladesh has set its own targets for achieving the SDGs and accordingly prepared strategies and action plans including 8th five year plan, Delta Plan 2100, Mujib Climate Prosperity Plan, and Perspective Plan 2041. These plans have incorporated climate change as one of the major challenges towards achieving the SDGs. The Palli Karma-Sahayak Foundation (PKSF) has been working as a national level accredited entity to the Adaptation Fund (AF) to support the government in addressing climate change issues in addition to its core business (rural employment generation, enterprise development, capacity building, and other social development activities). For ensuring sustainability of its activities, PKSF has adopted Environment and Social Management Framework (ESMF). The ESMF of PKSF mostly comply with the Environmental and Social Policy (ESP) of the Adaptation Fund (AF). PKSF is also committed to comply with AF's environmental and social compliance during implementation of project financed by the Fund. This Environmental and Social Management Plan (ESMP) is prepared as part of the project on "Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh" to comply with the ESP of the AF.

## 1.2 Purpose of ESMP

The purpose of this Environmental and Social Management Plan (ESMP) is to ensure that neither the project activities (both in terms of needs and quality) nor the environment is compromised through the project intervention. The ESMP will facilitate compliance with the PKSF's Environmental and Social Safeguard (ESS) policies and with policies, acts and rules of the Government of Bangladesh as well as AF's ESP. The ESMP will contribute the goal of environmental sustainability by:

- Enhancing environmental and social outcomes of the proposed activities;
- Preventing and/or mitigating any negative environmental and social impact that may emerge at the community level; and
- Ensuring the long-term sustainability of benefits of the proposed interventions by securing the natural resource base on which they are dependent.

More specifically the objectives of the ESMP are:

- To identify environmental and social impacts of the proposed interventions
- To prepare environmental and social management plan, and
- To prepare monitoring and evaluation plan for environmental and social management activities

## 1.3 Methodology

The methodology followed in preparing the ESMP consists of the following steps:

- Review relevant literature for conceptualizing ESS in the context of the funding proposal;
- Review policy and regulatory requirements;
- Initial scoping and screening to determine the key environmental and social parameters and aspects that are likely to be impacted by the Project activities;
- Collection and analysis of baseline environmental and social data, with the help of secondary literature review, and field data collection;
- Consultations with the stakeholders including beneficiary/ affected communities and developing the consultation process;

- Review the potential and likely impacts of the project activities and carrying out the screening of the project;
- Outline the detailed procedures to be followed to comply with the AF and Government of Bangladesh (GoB) rules and regulations including preparation of various ES documents, monitoring mechanism, stakeholder engagement, disclosure requirement, grievance redress and institutional arrangement.

#### 1.4 Description of the project

The project will fund salinity affected coastal communities in Bangladesh to get access to safe drinking water and institutional capacity building. The PKSf is the Implementing Entity (IE) of the project while the selected Partner Organisations (POs) of PKSf will be Executing Entity (EE). EEs will be selected through a rigorous process and based on pre-defined criteria as stated in the funding proposal.

- The proposed project aims to secure water security for the coastal families by establishing reverse osmosis water treatment plants. This will be achieved through the implementation of the following two components:
- Development of drinking water supply facilities
- Institutional support at the local level for project implementation, infrastructure operation and sustainability and knowledge management

Targeted beneficiaries: The project will target 225,000 beneficiaries of the selected three coastal districts namely Khulna, Bagerhat and Satkhira. About 50% of the beneficiaries will be women and 30% of them will be youth.

#### **Major activities**

Major activities of the project are community mobilization and group formation, training to the beneficiaries on climate change and adaptation in water sector, training to selected male and female on Reverse Osmosis (RO) technology and its maintenance, procurement and establishment of RO plants and monitoring, evaluation and documentation of lessons learned.

#### 2.0 Relevant Government Policies, Acts, Rules & Strategies

##### 2.1 General Description of Environmental Policies and Legislation in Bangladesh

A wide range of laws and regulations related to environmental issues are in place in Bangladesh. Many of these are cross-sectoral and partially related to environmental issues. The most important of these are the Bangladesh Environment Conservation Act, 1995 (BECA, 1995), and the Environment Conservation Rules (ECR, 1997). The Bangladesh Environment Conservation Act (BECA) 1995 is primarily an instrument for establishing the Department of Environment (DoE), and for controlling industrial and project related pollution. The Act also defines in general terms that if any particular activity is causing damage to the ecosystem, the responsible party will have to apply corrective measures. Until the appearance of ECR, 1997, enforcement of the Act was not possible, as many of the clauses refer to specifications detailed in the Rules. BECA and ECR were further amended to address the growing environmental challenges. The ECR has enlisted various industries and enterprises by its own environmental categories. But RO is not included in the list.

In addition to the Bangladesh Environment Conservation Act and Rules, there are a number of other policies, plans and strategies, which deal with the water sector, agricultural development, coastal area, protected area disaster management and climate change. These

are the National Water policy, 1999; the Forest Act 1927 (last modified 30th April 2000); National Forest policy, 1994; the National Conservation Strategy 1992; National Environmental Management Action Plan (NEMAP), 1995; Coastal Zone policy, 2005; Coastal Development Strategy, 2006; National Agricultural policy, 1999; National Fisheries policy, 1996; National Livestock Development Policy, 2007; Standing Orders on Disaster, 1999 (revised in 2010); Bangladesh Climate Change Strategy and Action Plan, 2009; National Plan for Disaster Management, 2010-2015. Some of these policies and legislations are described in this chapter for reference.

## 2.2 Bangladesh Environment Conservation Act, 1995

The national environmental legislation known as Environmental Conservation Act, 1995 (ECA'95) is currently the main legislative document relating to environmental protection in Bangladesh, which replaced the earlier environment pollution control ordinance of 1992 and has been promulgated in Environmental Conservation Rules, 1997 (ECR'97). This Act is amended in 2000, 2002 and 2010. The main objectives of ECA'95 are: i) conservation of the natural environment and improvement of environmental standards; and ii) control and mitigation of environmental pollution.

The main strategies of the act can be summarized as:

- Declaration of ecologically critical areas, and restriction on the operation and process, which can be continued or cannot be initiated in the ecologically critical areas
- Regulation with respect to vehicles emitting smoke harmful to the environment
- Environmental clearances
- Remedial measures for injuries to ecosystems
- Regulation of projects and other development activities
- Promulgation of standards for quality of air, water, noise and soil for different areas for various purposes
- Promulgation of standard limit for discharging and emitting waste
- Formulation and declaration of environmental guidelines

Department of Environment (DoE) implements the Act. DoE is under the Ministry of Environment and Forest and is headed by a Director General (DG). The DG has complete control over the DoE. The power of DG, as given in the Act, may be outlined as follows:

- The DG has the power to shut down any activities considered harmful to human life or the environment. The operator has the right to appeal and procedures exist for this purpose. However, if the incident is considered an emergency, there is no opportunity for appeal.
- The DG has the power to declare an area affected by pollution as an ecologically critical area. DoE governs the type of work or activities that can take place in such an area.
- Before beginning new development project, the project proponent must obtain Environmental Clearance from DoE. The procedures to obtain such clearance are in place.
- Failure to comply with any part of ECA'95 may result in punishment by a maximum of 10 years imprisonment or a maximum fine of BDT. 1000,000 or both.

## 2.3 Environment Conservation Rules (ECR), 1997

The Environment Conservation Rules provide a first set of rules under the Environment Conservation Act, 1995. This rule is further amended in 2002 and 2003. These provide, amongst others items, standards and guidelines for:

- Categorization of industries and development projects
- Procedure for obtaining environmental clearance
- Environmental quality standards in relation to water pollution, air pollution and noise, as well as permitted discharge/emission levels of water and air pollutants and noise by projects

The Rules incorporate "inclusion lists" of projects requiring varying degrees of environmental investigation. The Government is also empowered to specify which activities are permissible and which restricted in the ecologically critical area. Under this mandate, MoEF has declared Cox's Bazar-Tekhnaf Sea Shore, Saint Martin Island, Sonadia Island, Hakaluki Haor, Yanguar Haor, Marzat Baor and Gulshan-Baridhara Lake as ecologically critical areas and accordingly has prohibited certain activities in those areas. Government also declared four rivers surrounding Dhaka city respectively Buriganga, Balu, Turag and Dhaleshwari as ecologically critical area.

**Green Category** projects are considered relatively pollution-free and hence do not require initial environmental examination (IEE) and Environmental Impact Assessment (EIA). An Environment Clearance Certificate (ECC) from the Department of Environment (DoE) is adequate.

**Amber Category** projects fall into two categories. Amber-A projects are required to submit general information, a feasibility report, a process flow diagram and schematic diagrams of waste treatment facilities along with their application for obtaining DoE environmental clearance. Amber B projects are required to submit an IEE report, along with their application and the information and papers specified for Orange B projects.

**Red Category** projects are those which may cause 'significant adverse' environmental impacts and are, therefore, required to submit an Environmental Impact Assessment (EIA) report. It should be noted that they might obtain an initial site clearance based on an IEE report, and subsequently submit an EIA report for obtaining environmental clearance along with other necessary papers, such as feasibility study reports and no objections from local authorities.

As per ECR, 97 all existing industries and projects in Orange-B and Red category require an Environmental Management Plan (EMP) to be prepared and submitted along with other necessary papers while applying for environmental clearance.

#### 2.4 Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009

The Government of Bangladesh prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008 and revised in 2009. This is a comprehensive strategy to address climate change challenges in Bangladesh. It is built around the following six themes:

- **Food security, social protection and health** to ensure that the poorest and most vulnerable in society, including women and children, are protected from climate change. All Programmes focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.
- **Comprehensive disaster management** to further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.
- **Infrastructure** to ensure that existing assets (e.g., coastal and river embankments) are well maintained and fit for purpose and that urgently needed infrastructures

(cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.

- Research and knowledge management to predict that the likely scale and timing of climate change impacts on different sectors of economy and socioeconomic groups; to underpin future investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on climate change.
- Mitigation and low carbon development to evolve low carbon development options and implement these as the country's economy grows over the coming decades.
- Capacity building and institutional strengthening to enhance the capacity government ministries, civil society and private sector to meet the challenge of climate change.

44 specific programmes are proposed in the BCCSAP under the six themes.

## 2.5 National Water Policy 1999

The National Water Policy was promulgated in 1999 with the intention of guiding both public and private actions to ensure optimal development and management of water in order to benefit both individuals and the society at large. The policy aims to ensure progress towards fulfilling national goals of economic development, poverty alleviation, food security, public health and safety, a decent standard of living for the people and protection of the natural environment. According to the policy, all agencies and departments entrusted with water resource management responsibilities (regulation, planning, construction, operation and maintenance) will have to enhance environmental amenities and ensure that environmental resources are protected and restored while executing their activities. Environmental needs and objectives will be treated equally with the resources management needs. The policy has several clauses related to the protection and conservation of the natural environment to ensure sustainable development. The strategy of the policy to conserve environment and resource can be summarized as:

- Promoting modern eco-friendly technology and infrastructure for a safe and sustainable future;
- Biodiversity conservation and sustainable land & water management;
- Restricting the conversion of agricultural land for non agricultural purposes.

## 2.6 National Safe Drinking Water Supply and Sanitation Policy 1998

The National Safe Drinking Water Supply and Sanitation Policy (NSDWSSP, 1998) was adopted in 1998, and sets out the basic framework for the improvement of public health quality and to ensure an improved environment, together with a set of broad sectoral action guidelines. The policy offered the following various objectives to achieve the goal:

- To manage water supply and sanitation related basic needs for all
- To bring about a positive change of peoples' attitude towards water and sanitation
- To reduce the outbreak of water-borne diseases
- To increase the efficiency of the Local Government (LG) and associated communities for handling the problems related to water supply and sanitation
- To improve sustainable water supply and sanitation system
- To promote proper conservation, management and use of surface water and to control water pollution in light of the scarcity of groundwater
- To take necessary steps to capture and use rain water

## 2.7 Standing Orders on Disaster, 2010

The 'Standing Orders on Disaster, 2010' is a substantial improvement over the previous edition (English 1999). New features introduced in this edition include, among others, the following: i) an outline of disaster management regulative framework, ii) an introduction of core groups for emergency response at various levels, iii) multi-agency disaster incident management system, iv) risk reduction roles and responsibilities for all committees and agencies, v) new outlines for local level plans, vi) revised storm warning signals, vii) a report on cyclone shelter design. Conceptually, this edition follows a comprehensive approach emphasizing risk reduction as well as emergency responses relating to all hazards and all sectors.

The Standing Order is designed to enhance capacity at all tiers of government administrative and social structures for coping with and recovering from disasters. The document contains guidelines for construction, management, maintenance and use of cyclone shelters. According to the guideline, Geographical Information System (GIS) technology will be applied at the planning stage to select the location of cyclone shelter considering habitation, communication facilities, distance from the nearest cyclone-center etc. The advice of the concerned District Committee is to be obtained before final decision. The cyclone shelters should have effective communication facilities so that in times of distress there are no unnecessary delays. For this reason, the road communication from the cyclone shelters should link to cities, main roads and neighboring village areas. Provision of emergency water, food, sanitation and shelter space for livestock during such periods should also be considered for future construction of shelters.

The Standing Orders on Disaster (SOD) specifically focuses on community vulnerability and capacity development of the community to adapt disaster (cyclone, tidal surge, tsunami, earthquake, tornado, flood, water logging, salinity, high tide, cold wave) resistant features like disaster resistant agriculture and other livelihood options. The SOD also delineates the activity of different administration at pre, during and post disaster period.

## 2.8 Coastal Zone Policy, 2005

Coastal zone policy provides general guidance so that the coastal people can pursue their livelihoods under secured conditions in a sustainable manner without impairing the integrity of the natural environment. The policy framework underscores sustainable management of natural resources like inland fisheries & shrimp, marine fisheries, mangrove and other forests, land, livestock, salt, minerals, sources of renewable energy like tide, wind and solar energy. It also emphasizes on conservation and enhancement of critical ecosystem-necessary measures will be taken to conserve and develop aquatic and terrestrial including all the ecosystems of importance identified by the *Bangladesh National Conservation Strategy* (Mangrove, coral reef, tidal wetland, sea grass bed, barrier island, estuary, closed water body, etc).

## 2.9 Coastal Development Strategy, 2006

Coastal Development Strategy has been approved by the Inter-Ministerial Steering Committee on Integrated Coastal Zone Management Plan (ICZMP) on February 13, 2006. The strategy is based on the Coastal Zone policy and takes into account the emerging trends: increasing urbanization, changing pattern of land use, declining land and water resources, unemployment and visible climate change impacts. The strategy has 9 strategic priorities and the following 3 are relevant priorities with proposed type of interventions:

**Safety from man-made and natural hazards** - i) Strengthening and rehabilitation of sea dykes; and ii) reduction of severe vulnerability in the coastal zone through multi-purpose cyclone shelters-including coping mechanism.

**Sustainable management of natural resources** - i) environmentally and socially responsive shrimp farming; ii) introduction of renewable energy in coastal areas; and iii) development of marine fisheries and livelihood.

**Environmental conservation** – i) Marine and coastal environmental development; ii) strengthening of Coast Guard for improvement of coastal safety and security in coordination with other law enforcing agencies.

#### 2.10 Implication of Government Policies, Acts and Rules on the project Activities

The regulatory requirement for environmental management is described in the Bangladesh Environmental Conservation Act'95 and Environmental Conservation Rules'97. The ECR'97 (with amendments later on) is mainly intended for different industries and large scale projects. ECR'97 defined different sectors (industries and projects) as 'Green', 'Amber-A', 'Amber-B' and 'Red' categories, without considering the extent and types of interventions. For example, construction/reconstruction/expansion of flood control embankment, polders, dikes etc. are classified as the 'Red' category project. However, it does not explicitly mention about the environmental category for community level small scale rehabilitation of those structures. Considering the EE implemented community level small scale projects, the project requires a flexible approach on environmental categorization and clearance. However, as per ECR, the implementing IEs will screen all the proposals and further carry out screening (if required) and take appropriate mitigation measures. It should be mentioned that proposals with significant environmental impact would not be funded through the project.

## 4 Assessment of Environmental and Social (ES) Impacts of the Project

### 4.1 Introduction

Adverse environmental and social impacts of any intervention can be direct and indirect based on physical environment and scale of interventions. Although direct impacts often receive more attentions, indirect effects can be equally significant, gradually inducing changes to the environment, population and use of land. Most of the project impacts would be localized due to the small-scale community based activities. There are some issues of concern that cut across the range of proposed interventions. Field studies and lessons from similar projects show that issues such as community involvement, community ownership and selection of appropriate sites are some of the key concerns that influence project success and sustainability. This chapter provides briefly the potential direct and indirect environmental and social impacts of the project interventions. These impacts are very generic and may vary from one location to another.

### 4.2 Environmental and social screening and categorization

The 'environmental and social screening' is a mandatory requirement for the design of a project. The purpose of the environmental screening is to get relevant concerns addressed early on before further decision and/or design of a project and to ensure that actions to mitigate environmental impacts or enhance environmental opportunities are budgeted for. It is the first step to understand the possible environmental impacts and also to identify the environmental categorization of the project. The participation and consultation with local communities are important in identifying the potential impacts of the project interventions. The PKSF has carried out screening of the project in consultation with experts as well as communities. The screening results are presented below:

<u>ES principles</u>	<u>Relevancy</u>		<u>Requirements</u>	<u>Level of relevancy</u>
	<u>Yes</u>	<u>No</u>		
<u>Principle-1: Compliance with the Law</u>		√	<u>A description of the legal and regulatory framework that may require prior permission (such as planning permission, environmental permits, construction permits, permits for water extraction, emissions, and use or production or storage of harmful substances)</u>	<u>RO plant is not included in the ECR, 1997</u>
<u>Principle 2: Access and Equity</u>	√		<u>Description of benefits of the project and the process by which the project ensures fair and impartial access to benefits, statement of non-discrimination etc.</u>	<u>Highly relevant. The project ensures equal and fair access to the benefits for all classes of people in the community</u>
<u>Principle 3: Marginalized and Vulnerable Groups.</u>	√		<u>Requirements: Description of the characteristics of marginalized or vulnerable groups, identify adverse impacts that each marginalized and vulnerable group are likely to experience from the project, description of how the impacts are not disproportionate compared to non-marginalized and non-vulnerable groups, description monitoring</u>	<u>Highly relevant. The project described on the vulnerable and marginalized groups in the relevant section of the proposal.</u>

			<a href="#">that may be needed during project implementation</a>	
<a href="#">Principle 4: Human Rights</a>	√		<a href="#">Requirement: IE may provide an overview of the relevant human rights issues that are identified in the Special Procedures and describe how the project/programme will address any such relevant human rights issues, human rights issues should be an explicit part of consultations with stakeholders during the identification and/or formulation of the project and findings should then be included in the project</a>	<a href="#">Relevant. The project will ensure equal access to the safe drinking water to be produced by the RO plants. The project will confirm that location of RO plants and water price is comfortable to the vulnerable groups including women and girls and the poor.</a>
<a href="#">Principle 5: Gender Equality and Women's Empowerment</a>	√		<a href="#">Requirement: An analysis of the legal and regulatory context with respect to gender equality and women's empowerment, analysis of the cultural, traditional, religious, or any other grounds that might result in differential allocation of benefits between men and women, or of the disproportionate adverse impacts from the project may be appropriate, and equal participation.</a>	<a href="#">Relevant. Please refer to the Gender Action Plan of the project proposal.</a>
<a href="#">Principle 6: Core Labour Rights.</a>	√		<a href="#">Requirement: As the Government of Bangladesh (GoB) has ratified the ILO convention, the project will require to meet the core labour standards are stated in the 1998 ILO Declaration of Fundamental Principles and Rights at Work. The Declaration covers four fundamental principles and rights, which are further developed in eight fundamental rights conventions:</a> <ul style="list-style-type: none"> <li>• <a href="#">Freedom of association and the effective recognition of the right to collective bargaining (conventions ILO 87 and ILO 98);</a></li> <li>• <a href="#">Elimination of all forms of forced or compulsory labour (conventions ILO 29 and ILO 105);</a></li> <li>• <a href="#">Elimination of worst forms of child labour (conventions ILO 138 and ILO 182);</a> 16</li> <li>• <a href="#">Elimination of discrimination in respect of employment and occupation (conventions ILO 100 and ILO 111)</a></li> </ul>	<a href="#">Relevant. This project will ensure the labour rights at all stages of the project.</a>
<a href="#">Principle 7: Indigenous Peoples.</a>	√		<a href="#">Requirements</a> <ul style="list-style-type: none"> <li>• <a href="#">Describe how the project/programme will be consistent with UNDRIP, and particularly with regard to Free, Prior, Informed Consent (FPIC) during project, implementation and expected outcomes</a></li> </ul>	<a href="#">Not relevant. There is no indigenous people in the project area.</a>

			<p><a href="#">related to the impacts affecting the communities of indigenous peoples.</a></p> <ul style="list-style-type: none"> <li>• <a href="#">Describe the involvement of indigenous peoples in the design and the implementation of the project, and provide detailed outcomes of the consultation process of the indigenous peoples.</a></li> <li>• <a href="#">Provide documented evidence of the mutually accepted process between the project and the affected communities and evidence of agreement between the parties as the outcome of the negotiations. FPIC does not necessarily require unanimity and may be achieved even when individuals or groups within the community explicitly disagree.</a></li> <li>• <a href="#">Provide a summary of any reports, specific cases, or complaints that have been made with respect to the rights of indigenous peoples by the Special Rapporteur and that are relevant to the project. This summary should include information on subsequent actions, and how the project will specifically ensure consistency with the UNDRIP on the issues that were raised.</a></li> </ul>	
<a href="#">Principle 8: Involuntary Resettlement.</a>		√	<p><a href="#">Requirement: Provide justification for the need for involuntary resettlement, describe in detail the extent of involuntary resettlement, describe in detail the involuntary resettlement process that the project will apply, justify the conclusion that the involuntary resettlement is feasible, describe the adequacy of the project organisational structure to successfully implement the involuntary resettlement, and build awareness of involuntary resettlement and the applicable Principles and procedures of the project.</a></p>	<a href="#">Not relevant. The project will not require any involuntary resettlement.</a>
<a href="#">Principle 9: Protection of Natural Habitats</a>		√	<p><a href="#">Requirement: The AE will identify: 1) the presence in or near the project area of natural habitats, and 2) the potential of the project to impact directly, indirectly, or cumulatively upon natural habitats</a></p>	<a href="#">Not relevant. The project area does not have ecologically critical area declared by the government.</a>
<a href="#">Principle 10: Conservation of Biological Diversity</a>		√	<p><a href="#">Requirement: The IE will identify: 1) the presence in or near the project area of important biological diversity; 2) potential of a significant or unjustified reduction or loss of biological diversity, and 3) potential to introduce known invasive species.</a></p>	<a href="#">Not relevant. The project area is traditional Bangladeshi villages that are crisscrossed by tidal rivers and canals.</a>
<a href="#">Principle 11: Climate Change</a>	√		<p><a href="#">Requirements: Compliance with the principle may be demonstrated by a risk-based assessment of resulting increases in</a></p>	<a href="#">Slightly relevant. The RO plants will run</a>

			<a href="#">the emissions of greenhouse gasses or in other drivers of climate change.</a>	<a href="#">with the National Grid electricity.</a>
<a href="#">Principle 12: Pollution Prevention and Resource Efficiency</a>	√		<a href="#">Requirements: IEs may illustrate the minimization of resource use by showing how this concept has been applied in the project/programme design and how this will be effective during implementation; and a waste and pollution prevention and management plan</a>	<a href="#">Relevant. Waste management plan is included in this ESMP.</a>
<a href="#">Principle 13: Public Health</a>		√	<a href="#">Requirement: The project may demonstrate that it will not cause potentially significant negative impacts on public health</a>	<a href="#">Not relevant. The project does not have such activity that may negatively affect public health, rather it will improve health condition by supplying safe drinking water</a>
<a href="#">Principle 14: Physical and Cultural Heritage</a>		√	<a href="#">Requirement: Describe the cultural heritage, the location and the results of a risk assessment analysing the potential for impacting the cultural heritage; and the measures to be taken to ensure that cultural heritage is not impacted, a</a>	<a href="#">Not relevant. The project area does not have such cultural heritage.</a>
<a href="#">Principle 15: Lands and Soil Conservation.</a>	√		<a href="#">Requirements: The IE will identify: 1) the presence of fragile soils (e.g. soils on the margin of a desert area, coastal soils, soils located on steep slopes, rocky areas with very thin soil) within the project area or 2) project activities that could result in the loss of otherwise non-fragile soil.</a>	<a href="#">Relevant. As the project will be implemented in the coast zone, it will use coastal soil. This ESMP has identified impact of the project activities on the coastal soil.</a>

[The above screening of the proposed project found that the project will have some impacts that will require some mitigation measures. For example, the project will construct RO plants that will require construction of small house with raised ground. In addition, the RO plants will produce waste water which will require additional measures to manage it. Besides, construction labour will require Personal Protective Equipment \(PPE\) including masks, hand-gloves, helmet etc. For reducing dust, the construction activities will require water-spray etc. In this consideration, the project is categorized B.](#)

#### [4.3 Physical environment of the project area](#)

##### [4.3.1 Land form](#)

[The zone is characterised by a vast network of tidal rivers and channels, enormous discharge of water with huge amount of sediments, many islands, shallow northern Bay of Bengal, strong tidal influence and wind actions, tropical cyclones and storm surges.](#)

[The coastal zone is a low-lying very flat delta. About 80% of it is floodplains, which have very low mean elevation above the sea level. The average elevation of the southwest coastal zone \(where the project area is located\) ranges from 1-2 m and in the southeast coastal zone 4-5](#)

m (Figure 1). The flat topography, active delta and dynamic morphology play a significant part in its vulnerability to sea level change.

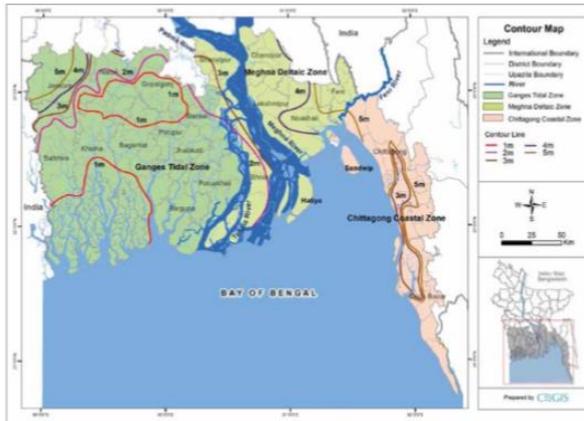


Figure 1: Physiography of Bangladesh coast

Throughout the centuries, the coast of

Bangladesh has undergone massive changes due to the dynamic processes of erosion and accretion along the coastline and river estuaries. Based on the hydro-morphological characteristics, the coastal zone has been delineated into three regions: (i) the Ganges Tidal Plain or the Western Coastal Region, (ii) the Meghna Deltaic Plain or the Central Coastal Region and (iii) the Chittagong Coastal Plain or the Eastern Coastal Region (Pramanik, 1983 cited in Islam, 2001; BUET and BIDS, 1993). The coastal districts covered by these three regions are shown in Figure 2.

*The Western Coastal Zone or Ganges Tidal Plain (includes the project area)*

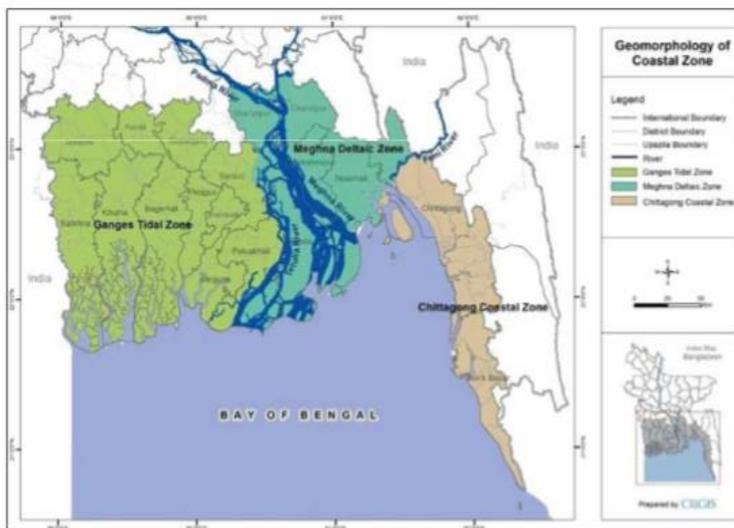
The Western Coastal Zone or the Ganges Tidal Plain extends from the Bangladesh-India border in the west to the Tetulia River in the east. It is mainly covered by the Sundarbans mangrove forest, greater Khulna and part of Patuakhali district. The Sundarbans is the feeding and breeding ground for fish, shrimps and other aquatic species. The zone is relatively stable because of the mangrove forest which acts as a natural barrier against cyclones, storm surges and soil erosion. Swamps, tidal flood plain and natural levees are found with numerous tidal creeks. The topography is low with an elevation between 0.9 to 2.1 m above mean sea level (Iftekhar and Islam, 2004). This zone is a semi active delta mostly composed of silty loams or alluvium washed down from the Himalayas (Islam, 2001).

*The Central Coastal Zone or Meghna Deltaic Plain*

The Central Coastal Zone or Meghna Deltaic Plain starts from the Feni river estuary to the eastern corner of the Sundarbans, covering Noakhali, Barisal, Bhola and Patuakhali (part) districts. High amount of silt is deposited through huge volume of discharge from the Ganges-Brahmaputra-Meghna river system. This is why the sediment load is mainly composed of silt (70%) and 10% sand (Coleman, 1969; cited in Allison et al., 2003). This zone is a very active delta with high rates of both erosion and accretion. Many islands including the country's only island district Bhola are located here. Islands have formed as well as have disappeared through the processes of accretion and erosion (Rahman et al. 1993; Pramanik, 1988 as cited in SDNP, 2004).

### [The Eastern Coastal Zone or Chittagong Coastal Plain](#)

[The Eastern Coastal Zone or Chittagong Coastal Plain extends from Teknaf upazila \(the southern tip of mainland\) to Mirsarai upazila along the estuary of the Feni River \(Pramanik, 1983 as cited in Islam, 2001; BUET and BIDS, 1993\). It is the most stable part of the Bangladesh coast and storm surge is less effective here \(BUET and BIDS, 1993\). The Naf River separates Bangladesh from Myanmar. The soil is mostly composed of submerged sands and mudflats \(Islam, 2001\). This submerged sand forms the 145 km long sandy beach from Cox's Bazar towards Teknaf. The beaches of Patenga and Cox's Bazar are situated in this zone.](#)



4.3.2 Biodiver [Figure 2: Geomorphology of Bangladesh coastal zone](#)

[The biodiversity of the project area is dominated by the Sundarban, the largest mangrove forest in the world. It is full of enormous variety of flora and fauna including aquatic resources, wild and domestic animals and bird species. The species represent estuarine, salinity and brackish water ecosystem. The coastal ecosystem supports diversity of fish as well as shrimp, oysters, crabs, and other invertebrates. The productivity of the ecosystem remains high because of existence of mangrove forest.](#)

[Mangroves are available in the form of natural forests Sundarban and planted \(in Barisal, Noakhali, Chittagong and Cox's Bazaar Coastal Areas\) forests together covering about 50% of the forest area of Bangladesh. The coastal mangrove forests constitute about 60% of the commercial productive forests including plantations, it covers 580 km<sup>2</sup>. It extends along the coast in isolated groups with the exception of the Sundarban, which accounts for 74% of the reserve forest of the country. The Sundarban and mangrove forest in other parts of coastal area including offshore islands support a wide range of mammals, birds, amphibian, reptiles and crustacean.](#)

### [4.3.3 Water quality](#)

Water quality of the project area is pre-dominantly saline prone. The level of salinity varies by seasons and by locations. Continuous salinity ingress towards land is already evident. Dasgupta et al. (2014<sup>45</sup>) found that salinity increased from 2ppt to 20 ppt. at Mongla (south-western coastal regions) in the Passur River from 1962 to 2008. The 5 ppt. isohaline line moves from the lower tip of Sundarbans (mangrove forest in Bangladesh) to the point of the lower Meghna river at Chandpur by the year 2100 under an assumed Sea Level Rise (SLR) of 88 cm due to global warming by 2<sup>o</sup>C by century. The salinity front will move about 60 km to the north in about 100 years. It is seen that sea level rise of 27 cm causes 6% increase of brackish water area compared to base condition. About an additional area of 327,700 ha would become a high saline water zone (>5 ppt) during the dry season due to 60 cm sea-level rise. In the monsoon, about 6% of the sweet water area (276,700 ha) will be lost.

#### 4.3.4 Air quality

Air quality in the project districts is unhealthy compare to World Health Organisation (WHO) provided air quality guideline value. Concentration of Particular Matter (PM2.5) is 64.2 micro-grams/m<sup>3</sup>. This value is 12 times greater than WHO guideline.

#### 4.4 Typical environmental impacts

##### 4.4.1 Loss of Top Soil of Agricultural Land

Construction of single-stored small houses for RO plants will involve one or more of several diverse activities: demolition, site-clearing, excavation, soil grading, leveling, and compacting. The most of these activities are related to the earthen works. This will require use of soil materials. The practice of soil collection from the top soil layer of agricultural land deprives the land from fertile ingredients, which reduce the agricultural production. Such impact can be avoided by collection of soil from barren land or stockpile topsoil and replace it later on. Soil can also be collected from existing borrow pits/ponds nearby, which will help increased fish production from those areas.

##### 4.4.2 Change in Land Use and Loss of Agricultural Land

Construction of small infrastructure may change the topography of the project area. Agricultural land may gradually be converted to non-agricultural uses. While it is not possible to avoid the agricultural lands, the mitigation measure is to collect soil from tidal rivers and canals or excavating fresh water reservoir in barren land. Among others grass turving or vetiver grass plantation could be effective means in minimizing erosion of the slope of the plinths.

##### 4.4.3 Drainage Congestion/Water Logging

The construction of small infrastructure may interfere with cross drainage and can cause flooding or drainage congestion in adjacent areas during period of high rainfall. The project proposed does not have any infrastructure activities that may cause drainage congestion or water logging.

##### 4.4.4 Impacts on biodiversity

None of the project activities will require cutting trees or forests. As the plinth of the house of the plants will be raised, some grasses and herbs may be damaged.

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<sup>45</sup> Dasgupta S., Kamal F. A., Khan Z. H., Choudhury S., Nishat A. (2014). River Salinity and Climate Change: Evidence from Coastal Bangladesh. Policy Research Working Paper No. 6817. Development Research Group, World Bank. March

#### 4.4.5 Dust and Noise Pollution

Dust pollution occurs due to handling of soils during construction and mainly from lack of watering of earth surface. Such pollution is also a function of weather condition - in dry season nuisance is more; during rainy season, dust nuisance subsides. Dust is of more consequences during pre-construction/construction stages. Noise pollution is normally due to some construction related works.

#### 4.4.6 Water Pollution

Improper disposal of solid and liquid wastes from the RO plants may also pollute the nearby water bodies.

#### 4.4.7 Soil salinity

The project will promote RO plants for safe drinking water, which will discharge saline water. This saline water may increase soil salinity.

### 4.5 Social impacts

#### 4.5.1 Labour and working condition

The project has light construction activities. Hence there is very limited risk to injury of the workers. There is available local labours for executing the project intervention. Labour will require for making construction of houses for the plants. These labours are locally available. So, the project will not influx external labour. There is also very limited chance of engaging child labour and forced labour.

#### 4.5.2 Community health and safety

The project will not require massive transportation and traffic because materials are locally available. So, fossil fuel burnt will be limited. Dust may be generated during raising plinth of the RO plant house that may affect community health but it is low risk.

#### 4.5.3 Impacts on indigenous people and cultural heritage

It was found during community consultations that there was no indigenous people in the project area. No archeological heritage was found in the project area. Though the project area is closed to Sundarban, but it is far away from the reserved area of the Sundarban.

#### 4.5.4 Occupational Health and Safety

Since the project activities does not include any large construction and risky activities, it is expected that no major occupational health & safety issues. However, attention should be provided on communicable diseases among workers and illness due to water pollution. First Aid facilities recommended addressing any minor accidents during project works.

## 5. Environmental and Social Management Plan

### 5.1 Environmental and Social Management Plan (ESMP)

Based on the E&S impacts carried out in chapter 4, the project has prepared an ESMP matrix.

The ESMP matrix is presented below:

<u>ES impacts</u>	<u>Mitigation measures</u>	<u>Budget</u>	<u>Responsibility</u>	
			<u>Implementation</u>	<u>Supervision</u>
<u>Increasing the water salinity</u>	<u>Use of high quality membrane that will reduce the salinity level of the waste water</u>  <u>Prepare a small water tank where waste water and source water will be mixed to reduce salinity before discharge</u>	<u>Budget is built in construction of the RO plants</u>	<u>EE</u>	<u>Project Management Unit (PMU)</u>
<u>Loss of productive land</u>	<u>The plants will be installed in residential areas or community institutions</u>	<u>Not require</u>	<u>EE</u>	<u>PMU</u>
<u>Increasing soil salinity</u>	<u>Crab farming and hatchery operation will be conducted in already salinity affected lands</u>	<u>Not require</u>	<u>EE</u>	<u>PMU</u>
<u>Loss of grasses and herbs at homestead area</u>	<u>Grasses will be re-planted</u>	<u>Budget line item</u>	<u>EE</u>	<u>PMU</u>
<u>Health risks to the workers</u>	<u>Provided first aid box, hand gloves and gumboot to the workers</u>	<u>Local contractors procured by EE</u>	<u>Local contractors</u>	<u>EE and PMU</u>
<u>Dust and air pollution</u>	<u>Use compressed natural gas-driven vehicle instead of petrol or diesel during transportation of materials for crab hatcheries</u>  <u>Water spray</u>	<u>Not require</u>	<u>Contractor</u>	<u>IE</u>

### 5.2 Environmental and Social Monitoring Plan (ESMP)

The environmental monitoring is another part of the ESMP. Environmental monitoring involves:  
 (i) planning a survey and realistic sampling programme for systematic collection of

data/information relevant to environmental and social management management; (ii) conduct of the survey; (iii) analysis of samples and data/information collected, and interpretation of data and information; and (iv) preparation of reports to ensure environmental and social compliance. ES staffs of PMU will carry out the monitoring activities whether the above mitigation measures are implementing properly at the field level. This monitoring will also ensure whether any new or additional negative or positive impacts are found during implementation of the project. Based on this, the ESS staffs will suggest measures to address those new impacts. The following table provides the template for the ES monitoring Plan. The plan consists of two type of monitoring: 1) monitoring for effectiveness of mitigation measures; and 2) general environmental and social effects monitoring. The information contained in the template needs to be completed by the EEs.

**Templates for Environmental Monitoring Plan**

<b>A) MITIGATION MONITORING</b>							
<u>Mitigation, &amp; Environmental Indicator</u>	<u>Location</u>	<u>Procedures / methods</u>	<u>Frequency / Duration</u>	<u>Baseline / ES Performance Standards</u>	<u>Responsibilities</u>		<u>Estimated Cost</u>
					<u>Implementation</u>	<u>Analysis/ Reporting</u>	
<b><i>Activities at the beginning of the sub project</i></b>							
<u>Mitigation/ Indicator</u>							
<u>Mitigation/ Indicator</u>							
<b><i>Activities at Implementation Stage</i></b>							
<u>Mitigation/ Indicator</u>							
<u>Mitigation/ Indicator</u>							
<b><i>Operation &amp; Maintenance Phase Activities</i></b>							
<u>Mitigation/ Indicator</u>							
<u>Mitigation/ Indicator</u>							

<b>B) ENVIRONMENTAL AND SOCIAL IMPACT MONITORING</b>							
<u>ES Impact &amp; Indicator</u>	<u>Location</u>	<u>Procedures / methods</u>	<u>Frequency / Duration</u>	<u>Baseline / Environmental Standards</u>	<u>Responsibilities</u>		<u>Estimated Cost</u>
					<u>Implementatio n</u>	<u>Analysis/ Reporting</u>	
<b><u>Activities at the beginning of sub project</u></b>							
<u>Impact/ Indicator</u>							
<u>Impact/ Indicator</u>							
<b><u>Operation &amp; Maintenance Phase</u></b>							
<u>Impact/ Indicator</u>							
<u>Impact/ Indicator</u>							

**Frequency/ Duration:**

The number of times (annual/biannual) biophysical or social samples will be collected, and the total time period during which the sampling occurs.

**Baseline / Environmental Standards:**

The baseline-preconstruction - condition of the indicator variable(s) will be determined with initial baseline sampling. The baseline level of the indicator will be used to gauge the effects of mitigation measure or impact when compared to monitoring data collected during and after construction phase. Existing environmental standards or criteria for the indicator variable are also identified and subsequently compared to the indicator during all phases of the sub-project to assist with determination of whether the mitigation measure is effective, or whether an impact has been registered.

**Responsibility:****Implementation**

If EE lacks in-house expertise, it will outsource the implementation of the monitoring programme to an environmental specialist or firm.

**Analysis / Reporting**

The analysis and subsequent reporting of the results and recommendations of the environmental monitoring plan is a joint responsibility between the consultant of the plan, and the EE. The consultant is responsible to prepare a timely report which clearly indicates the performance of all mitigation measures, and whether other unpredicted impacts are occurring. EE then will prepare all necessary reports that need to be submitted to PKSF.

**Estimated Cost:**

It includes survey, laboratory works (if required) and reporting costs. The item-wise budget should be prepared for better cost estimation and accountability. If the works is outsourced, all the costs will be included in the consultant budget.

### 5.3 ES Monitoring at PKSF Level

In addition to the environmental monitoring plan prepared and implemented by the EE, PKSF will develop its own monitoring mechanism to ensure proper implementation of the environmental mitigation activities to avoid any negative environmental consequence from the sub-projects. The monitoring will be carried by 2 levels: i) internal monitoring and ii) external monitoring/evaluation.

#### 5.3.1 Internal Monitoring

PKSF will develop the capacity of the newly recruited ES staff at PMU to carry out the environmental monitoring as part of their regular monitoring of the sub-project implementation. The ES staff will undertake monitoring visits quarterly and seek the validation of the environmental monitoring already undertaken by the implementing EEs. Each ES staff will prepare his/her own monitoring report on quarterly basis and will share with Environment and Climate Change Unit (ECCU) of the PKSF. The ES staff will review the report and may have separate discussion with other PMU staffs on ES monitoring data, implementing EEs capacity and further action. The PO (Environment and Natural Resource Management) will also carryout field visit on certain percentage. S/He will monitor the ES safeguard issues in the selected sub-projects and publish annual report on environmental compliance of sub-projects based on agreed monitoring indicators.

### 5.4 Grievance Redress System

Grievance Redress Mechanism (GRM) will be established at central (PKSF) and project level to deal with any complaints/grievances about environmental issues. At the project level, the Union

Parishad (UP) Chairman or his/her nominated representative from the UP will be the Local Grievance Redress (LGR) focal Point. At the PKSf central level, the ES staffs or any other person/staff nominated by the Project Coordinator will be Central Grievance Redress (CGR) focal Point. The aggrieved persons or entities will submit the complaints/grievances in sealed envelopes to the selected partner's office duly entered in the Grievance Register (GR) and will collect a receipt with entry reference to the GR. Partners will not open the envelopes, but inform the LGR focal point about receipt of complaints and schedule hearings as per his/her advice. In open meetings, the selected/implementing partner will facilitate the LGR focal Point to hear and discuss the complaints and resolve them in view of the applicable guidelines of the ESMP. The aggrieved person, if female, will be assisted by a female UP member in hearing, and if from a tribal community, by a tribal representative. LGR focal Point with the help of EE will ensure sending a copy of the complaint by postal mail, fax or other means to the Project Coordinator at the PKSf headquarters.

The EEs will forward the unresolved cases with all proceedings to the CGR focal Point within 7 days of taking decision by the LGR focal Point. Unresolved cases forwarded by IEs will be registered in the office of the CGR focal Point and disposed within 15 days. If any decision made by CGR focal Point is unacceptable to the aggrieved persons, he/she will forward the complaints with all proceedings to the PKSf Managing Director (MD) through the Project Coordinator. The MD will review and resolve the cases which will be final for PKSf. The MD may seek advices from the PKSf Chairman for any critical issues as per his discretion. A decision agreed by the complainants at any level of hearing will be binding on the concerned IEs and PKSf. The GRM will, however, not pre-empt an aggrieved person's right to seek redress in the courts of law.

The aggrieved persons or entities will have the option to lodge the complaints directly to the CGR focal Point if they are against the EE, to the PKSf MD if they are against the PKSf project management or directly to the Management Committee at Adaptation Fund Secretariat if there is any issue related to PKSf itself. The institutional arrangement of Grievance Redress Mechanism is illustrated in the following figure:

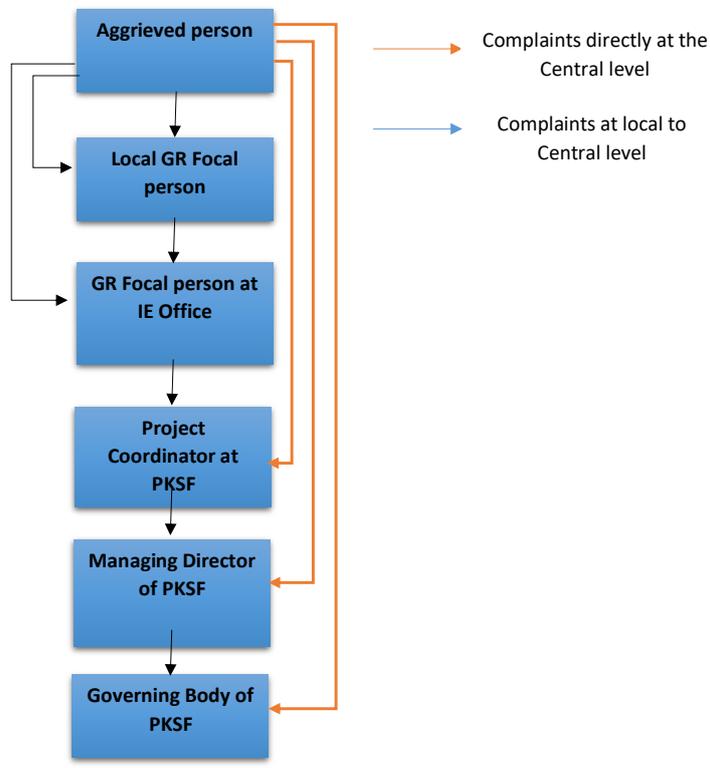


Figure: Institutional Arrangement of the GRM

PKSF and EEs will keep the records of all resolved and unresolved complaints and grievances and make them available for review -- as and when asked for by the development partners and others interested in climate change issues. The provision of GRM and the process will be well disclosed to the community and the likely affected persons before implementation of the project. The disclosure will be done by the PMU.

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**Annex 6: Gender Action Plan**

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GENDER ACTION PLAN

ACCESS TO SAFE DRINKING WATER FOR THE CLIMATE  
VULNERABLE PEOPLE IN COASTAL AREAS OF BANGLADESH

DR. A.K.M. NURUZZAMAN (GENERAL MANAGER)

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## **ABBREVIATIONS & ACRONYMS**

<u>AF</u>	<u>Adaptation Fund</u>
<u>BCCSAP</u>	<u>Bangladesh Climate Change Strategy and Action Plan</u>
<u>ccGAP</u>	<u>Climate Change and Gender Action Plan</u>
<u>CEDAW</u>	<u>Convention on the Elimination of all Forms of Discrimination Against Women</u>
<u>DRR</u>	<u>Disaster Risk Reduction</u>
<u>EE</u>	<u>Executing Entity</u>
<u>FY</u>	<u>Financial Year</u>
<u>GAP</u>	<u>Gender Action Plan</u>
<u>GoB</u>	<u>Government of Bangladesh</u>
<u>GO</u>	<u>Governmental Organisation</u>
<u>IEs</u>	<u>Implementing Entities</u>
<u>IPCC</u>	<u>Inter-governmental Panel on Climate Change</u>
<u>IDPs</u>	<u>Internally Displaced Persons (IDPs)</u>
<u>MCH</u>	<u>Maternal and Child Health MCH</u>
<u>MDGs</u>	<u>Millennium Development Goals</u>
<u>M&amp;E</u>	<u>Monitoring and Evaluation</u>
<u>NAPA</u>	<u>National Adaptation Program of Action</u>
<u>NGO</u>	<u>Non-governmental Organisation</u>
<u>PKSF</u>	<u>Palli Karma-Sahayak Foundation</u>
<u>PMU</u>	<u>Project Management Unit</u>
<u>RMG</u>	<u>Ready-Made Garments</u>
<u>RO</u>	<u>Reverse Osmosis</u>
<u>SME</u>	<u>Small and Medium Enterprises SME</u>
<u>SDG</u>	<u>Sustainable Development Goal</u>
<u>FYP</u>	<u>Five-Year Plan</u>
<u>TFR</u>	<u>Total Fertility Rate</u>
<u>UDMC</u>	<u>Union Disaster Management Committee</u>
<u>UNDP</u>	<u>United National Development Programme</u>
<u>UNFCCC</u>	<u>United National Framework Convention on Climate Change</u>

<u>UN</u>	<u>United Nations</u>
<u>UzDMC</u>	<u>Upazila Disaster Management Committee</u>
<u>VGD</u>	<u>Vulnerable Group Development</u>
<u>VGf</u>	<u>Vulnerable Group Feeding</u>
<u>WDP</u>	<u>Women's Development Policy</u>

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## **1. Introduction**

The Adaptation Fund Board approved the gender policy in 2016 in order to mainstream gender in all levels of activities as a cross-cutting issue. As per the policy, it is mandatory for the Implementing Entities (IEs) to comply gender policy in its institutional level as well as project level. As an IE of Adaptation Fund (AF), Palli Karma-Sahayak Foundation (PKSF) is designing a project that will be submitted under the large grant innovation financing mechanism. To comply with the gender policy requirements, PKSF needs to analyse gender vulnerabilities, differentiated roles and responsibilities of men and women and girls and boys, role in decision-making etc. This Gender Action Plan (GAP) is prepared to comply the AF gender policies at the design phase of the project. It analyses socio-cultural aspects of gender in Bangladesh, status of women and men in the society particularly in the context of human rights, climate change vulnerabilities of women in Bangladesh etc. Finally the gender action plan develops a gender logframe so that PKSF can monitor the gender activities throughout the project cycle and evaluation. This gender action plan is a part of the project document.

## **2. An overview of the proposed project**

Considering the vulnerability of water sector to climate change of the coastal people of Bangladesh, PKSF has decided to submit the project proposal to AF on "Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh." The proposal is developed for scaling up water purification technology i.e. Reverse Osmosis (RO) plant as a means of adaptation to salinity in the coastal area of the country. A brief description of the proposed project is presented below:

The proposed project aims to secure water security for the coastal families by establishing reverse osmosis water treatment plants. This will be achieved through the implementation of the following two components:

- Development of drinking water supply facilities
- Institutional support at the local level for project implementation, infrastructure operation and sustainability and knowledge management

Targeted beneficiaries: The project will target 225,000 beneficiaries of the selected three coastal districts namely Khulna, Bagerhat and Satkhira. About 50% of the beneficiaries will be women and 30% of them will be youth.

## **Major activities**

Major activities of the project are community mobilization and group formation, training to the beneficiaries on climate change and adaptation in water sector, training to selected male and female on RO technology and its maintenance, procurement and establishment of RO plants and monitoring, evaluation and documentation of lessons learned.

## **3. Gender Assessment**

Although nationally, Bangladesh has made significant progress in poverty, human development and gender equality indicators over the last few decades, poverty in some areas and inequality remain prevalent, and the social status of Bangladeshi women still needs to be improved, especially in rural areas. Central to the issue of gendered inequality is that Bangladeshi women suffer under a particularly high burden of low-paid work, responsible for a range of essential household functions such as collecting water, providing childcare, and producing half of the food at the household level, yet making up only a quarter of the industrial workforce.

### **3.1 Social Aspects**

The mobility of women in Bangladesh varies depending on social status, religious affiliation and whether they live in urban or rural areas. Socio-cultural norms not only shape perceptions of the value of women but also restrict a large proportion of women to unpaid domestic responsibilities, further reducing their productive value in the perspectives of Bangladeshi society. These restrictions are felt throughout the social sphere, with limits on women's access to education and healthcare. In 2011, only 54.5% of girls were enrolled in secondary school, while 42% of women aged 15-19 were unable to attend a health center alone. The recent local study indicates that only 12% of women travel outside of their village alone and that when they travel other family members such as children (52%) and other female members (18%) usually accompany them, which has important implications in terms of women's access to markets. Although these social dynamics are in flux, and there have been important shifts due to economic conditions and opportunities, traditional beliefs regarding the role of women in the household and public spheres remain deeply conservative.

Looking after children and old and cooking for all members of the family are seen as the central roles of a woman throughout Bangladesh, particularly in rural areas, and the nature of work a woman performs is principally conducted within the premises of the household. This type of labor remains socially invisible and has little exchange value or impact on woman's decision-making power, reinforcing women's undervalued role in Bangladeshi society. The tradition of dowry still prevails, violence against women and child marriage is decreasing in the area because people are becoming more aware. Promisingly, a recent study carried out in the target districts, indicated a changing awareness in regards to the challenges faced by women, with women reporting that if they are financially empowered, they can do anything (we need a reference here).

### **3.2 Role of women in decision-making**

Women are poorly represented in planning and decision-making processes in climate change policies, limiting their capacity to engage in political decisions that can impact their specific needs and vulnerabilities.<sup>46</sup> There has been increasing recognition in international policy frameworks on the importance of incorporating gender in climate risk reduction efforts. In 2009, the Convention on the Elimination of all Forms of Discrimination Against Women

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<sup>46</sup> CCC, 2009

[\(CEDAW\) stated, “all stakeholders should ensure that climate change and disaster risk reduction measures are gender-responsive, sensitive to indigenous knowledge systems and respect human rights. Women’s right to participate at all levels of decision-making must be guaranteed in climate change policies and programmes” and the Inter-governmental Panel on Climate Change \(IPCC\)’s report in 2014 highlights vulnerability due to climate change due to gender.<sup>47</sup> The United National Framework Convention on Climate Change \(UNFCCC\) adopted the Paris agreement in 2015 also formally recognized the intersection of climate change and gender equality, but women’s participation in planning and decision-making on climate protection is still low, even in industrialized countries, and is linked above all to the heavily technical nature and male dominance in key areas of work related to climate risk including energy, transport, and urban planning. This is certainly the case in Bangladesh, where women’s perspectives on resilience are sometimes absent from national conversations.](#)

[In regards to women’s role in the domestic sphere, most household activities are done by women, with the highest participation in activities such as house cleaning, child care, cooking, and meal preparation and lower but significant participation in household-level activities such as tree plantations, dairy farming, and poultry rearing.<sup>48</sup> Despite this central role in household activities, women’s decision-making power remains limited, with a recent study indicating that 31% of household decisions are made by women and that women’s participation rate in choice of crop to be grown, and the buying and selling of agricultural products is 19% and 34% respectively and even lower in decision regarding a property at 20%.](#)

[Regardless, women’s central role in household management places them in a pivotal position for adapting livelihood strategies to changing environments. Given that women’s roles in decision-making are higher in areas such as food preparation and distribution, resolving food deficits and household work, women are central in assuring household food security as livelihood strategies shift due to slow-onset impacts such as salinity and are assigned higher responsibility in disaster preparedness particularly in the storage of food and water, during rapid-onset disasters. Adding nuance, a context-specific view of women’s role in household decision-making in the vulnerable coastal districts targeted by the project is also available from the baseline assessment of socio-economic conditions carried out by United Nations \(UN\) Women, and is presented in Table 1 below. The results clearly indicate that that women’s decision-making power is greatly limited in all spheres, with higher participation in regards to food distribution and household work \(including the collection of water\).](#)

**Table 1: Role of women in decision-making**

<a href="#">SI No.</a>	<a href="#">Type of Decision</a>	<a href="#">Percent</a>
<a href="#">1</a>	<a href="#">Food related (Meal preparation, distribution etc.)</a>	<a href="#">86.78</a>
<a href="#">2</a>	<a href="#">Meeting food deficit</a>	<a href="#">33.58</a>

<sup>47</sup> UN Women, 2016

<sup>48</sup> Asaduzzaman, 2016

3	<a href="#">Selling assets (land, house, livestock, seeds)</a>	<a href="#">9.40</a>
4	<a href="#">Selling agricultural production (crops, seeds)</a>	<a href="#">6.88</a>
5	<a href="#">Buying household assets (livestock, ornament, trees.)</a>	<a href="#">11.10</a>
6	<a href="#">Buying agricultural production (crops, seeds etc.)</a>	<a href="#">7.35</a>
7	<a href="#">Receive credit from mohajon/relatives/bank/Non-governmental Organisation (NGO)/Governmental Organisaition (GO)</a>	<a href="#">14.50</a>
8	<a href="#">Agricualtural work (crop cultivation, land mortgage etc.)</a>	<a href="#">5.84</a>
9	<a href="#">Household work (Collection of Water, Collection of natural resource etc.)</a>	<a href="#">47.91</a>
10	<a href="#">Household decision making (Engage in new income generating activity, Conceiving a baby, Using savings, ownership of Vulnerable Group Development (VGD)/Vulnerable Group Feeding (VGF)</a>	<a href="#">11.59</a>
11	<a href="#">Female and children healthcare decision making</a>	<a href="#">16.32</a>
12	<a href="#">Decision making about communication (Female going outside the homestead, going for work, education for children)</a>	<a href="#">11.06</a>
13	<a href="#">Decision making on disaster preparedness/coping/adaptation (Going to a shelter, Engaging in alternative livelihood activity</a>	<a href="#">11.48</a>
14	<a href="#">Other</a>	<a href="#">14.29</a>

Source: [UN Women \(2014\)](#)

#### **4. Gender and Climate Change Vulnerability**

[It is widely documented that women experience the effects of climate change differently than men, both in terms of adjusting livelihood strategies, in their changing relationships to scarce resources and in regards to disasters. There are physical, cultural, and social factors, often linked with poverty, that blend in making women more vulnerable to climate change than men. For example, women in Bangladesh are more dependent than men on natural resources threatened by climate change for their livelihoods, with the responsibility to secure water, food and fuel for cooking and heating for their households. It has also been shown that women in Bangladesh face social, economic and political barriers that limit their coping capacity, confronting unequal access to resources and information and cultural restrictions, which limit their mobility.<sup>49</sup> Climate change effects on health also affect women and girls indirectly through the added burden of caring for sick relatives and, directly, through the additional work and physical effort of collecting water and other resources for their families at increasingly longer distances. Climate change impacts on food production and access also disproportionately affect the nutrition and health of poor women<sup>50</sup>. Finally, recent research has also shown that the strenuous economic conditions created by climate change are leading to an increase in child and forced marriages in Bangladesh, as dowries become cheaper.<sup>51</sup>Compelling](#)

<sup>49</sup>UN Women, 2009

<sup>50</sup> IPCC, 2001

<sup>51</sup> Alston, 2014

[evidence from this research has shown that child and forced marriages of girls to appear to be short-term solutions designed to ease both the food insecurity and future financial pressures on families exacerbated as a result of climate events. The research concludes that attention to climate challenges must take a much broader focus on social consequences in order to protect the human rights of women and girls in vulnerable communities.](#)

[The IPCC suggests that the differentiation of vulnerability to climate change among population groups can be clearly observed in the pattern of vulnerability to natural disasters. In general, women have less access to resources that are essential in disaster preparedness, mitigation and rehabilitation<sup>52</sup> and women and children are 14 times more likely to die than men during disasters.<sup>53</sup> In Bangladesh, as in global estimates, women are more affected and suffer more during and after disasters than men, exemplified by the impacts of cyclones on women in the coastal areas of Bangladesh. During Cyclone Sidr for example, many of the female casualties in coastal Bangladesh occurred because women, the majority of which are homebound, were busy tending the family livestock when the cyclone struck and could not leave without prior preparations, others died because of their traditional clothing \(saris\) got trapped in trees and other objects while running, and others perished trying to rescue or search for children who could not evacuate fast enough<sup>54,55</sup>. Furthermore, the cyclone was announced primarily among men, with many women lacking the necessary information to evacuate, remaining at home and facing serious risks.<sup>56</sup> Disaster preparedness requires decision-making and leadership, but in coastal Bangladesh, women are generally excluded from such roles.<sup>57</sup> Post-disaster stages also take a toll on women. Often, women find facilities for personal hygiene in shelters are inadequate, and with few alternatives, are exposed to urinary tract diseases, may be sexually abused while looking for firewood or reconstruction materials, face deteriorating nutrition status as they eat less in order to offer more food to other household members and they lose the natural resources and livelihood assets they depend upon<sup>58</sup>. Regarding early warning and disaster preparedness, women consulted mentioned having been included in village disaster management committees and have been provided training and necessary equipment, such as early warning flags. The GoB and Bangladesh Red Crescent Society are also rolling out a cyclone preparedness program using community volunteers. However, none of these initiatives has focused on women's particular needs and have not identified gender segregated preparedness plans and priorities.](#)

[Both during disasters and in the face of changing environmental conditions, women's role in communities is not formally recognized or accounted for in mitigation, adaptation and relief efforts and women's knowledge about ecosystems and their particular strategies, experiences and skills for coping with water shortages, are often ignored.<sup>59</sup> For example, Cyclone Sidr contaminated at least 6000 surface water ponds with saline water, used primarily by women for small vegetable farming and domestic water requirements.<sup>60</sup>Overall, women and girl's vulnerability to climate change generally depends on the interaction of three key functions: -](#)

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[52 UN Women, 2014](#)

[53 Araujo, 2007](#)

[54 Kabir, 2016](#)

[55 Alam, 2010](#)

[56 Kabir, 2016](#)

[57 Alam, 2010](#)

[58 MoEF, 2012](#)

[59 Dankelman, 2002](#)

[60 UN Women, BCAS \(2014\)](#)

exposure, sensitivity, and adaptive capacity. The exposure is largely determined by the climatic hazards and the extent the women and girls are exposed to cyclones, salinity and sea level rise. The following table provides a summary of the vulnerabilities of women and girls in the context of climate change in coastal areas in Bangladesh:

**Table 1: Women and Girls Vulnerability to Coastal Hazards: Coastal Flooding, Cyclone and Tidal Surge, Salinity Intrusion, Water logging**

<u>Critical elements at risk</u>	<u>Exposure (degree and frequency)</u>				<u>Sensitivity (Low to High)</u>				<u>Deficit in Adaptive Capacity</u>
	<u>Cyclone &amp; Tidal Surge</u>	<u>Coastal Flooding</u>	<u>Salinity</u>	<u>Water logging</u>	<u>Cyclone &amp; Tidal Surge</u>	<u>Coastal Flooding</u>	<u>Salinity</u>	<u>Water-logging</u>	
<u>Life</u>	<u>Very Likely</u>	<u>Very Likely</u>	<u>Certain</u>	<u>Very Likely</u>	<u>High</u>	<u>High</u>	<u>Low</u>	<u>Low</u>	<u>Less education to understand cyclone early warning; lack of warning system for tidal surge and coastal flooding; less access to early warnings; less places to evacuate during cyclone; tendency to undermine the risks from cyclones and tidal surges; lack of long term predictions of salinity and water-logging, inadequate facilities for women and girls in public cyclone shelters; lack of women volunteers; lack of gender sensitive rehabilitation; lack of water and sanitation in houses and public shelters during cyclone, tidal surge, coastal flooding, salinity and water-logging.</u>
<u>Employment</u>	<u>Very Likely</u>	<u>Very Likely</u>	<u>Certain</u>	<u>Very Likely</u>	<u>High</u>	<u>High</u>	<u>Low</u>	<u>Low</u>	<u>Lack of diversity of livelihoods; lack of off-farm livelihood skills; reduced options for on-farm livelihoods; cultural barriers in employment in industry sector; limited SMEs to absorb women labour; lack of women with diversified skills in urban sector jobs; poor capacity to enter into skilled service sectors; heavy domestic responsibility; lack of incentives in skilled job outside domestic territory; sole responsibility for child care.</u>
<u>Potable Water</u>	<u>Very Likely</u>	<u>Very Likely</u>	<u>Certain</u>	<u>Very Likely</u>	<u>High</u>	<u>High</u>	<u>Low</u>	<u>Low</u>	<u>Very limited number of safe and salinity free water-points in public and private spheres; lack of available water sources during droughts; lack of economic ability for poor women and women headed households to install salinity free water sources; forced to spends long hours to collect water from distant sources; insecurity due to</u>

									<a href="#">sexual harassment during long walks to collect water from distant sources.</a>
<a href="#">Food Production</a>	<a href="#">Very Likely</a>	<a href="#">Very Likely</a>	<a href="#">Certain</a>	<a href="#">Very Likely</a>	<a href="#">High</a>	<a href="#">High</a>	<a href="#">Low</a>	<a href="#">Low</a>	<a href="#">Lack of available varieties of food to produce in salinity and water logging context; lack of means to recover food loss from cyclones, tidal surges and coastal flooding; lack of fresh irrigation options; lack of grasses and other inputs for livestock rearing.</a>
<a href="#">Food Preparation</a>	<a href="#">Very Likely</a>	<a href="#">Very Likely</a>	<a href="#">Certain</a>	<a href="#">Very Likely</a>	<a href="#">High</a>	<a href="#">High</a>	<a href="#">Low</a>	<a href="#">Low</a>	<a href="#">Lack of fire-wood during coastal flooding, cyclone, tidal surges, salinity and water logging; unsafe and saline water for cooking; lack of hygiene during different hazards; lack of food during cyclone and tidal surge; lack of knowledge on food and nutrition standards; lack of storage facilities during hazard onsets; challenge of food preservation in extreme temperatures.</a>
<a href="#">Sanitation and Hygiene</a>	<a href="#">Very Likely</a>	<a href="#">Very Likely</a>	<a href="#">Certain</a>	<a href="#">Very Likely</a>	<a href="#">High</a>	<a href="#">High</a>	<a href="#">Low</a>	<a href="#">Low</a>	<a href="#">Lack of number of salinity, cyclone, flooding and waterlogged proof/resilient toilets; lack of hazard proof public toilets; poor public health condition; lack of personal hygiene knowledge.</a>
<a href="#">Core Shelter Maintenance</a>	<a href="#">Very Likely</a>	<a href="#">Very Likely</a>	<a href="#">Certain</a>	<a href="#">Very Likely</a>	<a href="#">High</a>	<a href="#">High</a>	<a href="#">Low</a>	<a href="#">Low</a>	<a href="#">Poor maintenance of household assets and housing materials safer from salinity, coastal flooding, water logging, and tidal surge; lack of saline free housing materials for durable and cyclone resistant housing; lack of retrofitting materials and capacities to protect house from hazards; lack of financial capacities to prepare hazard proof/resilient house materials.</a>
<a href="#">Child Care</a>	<a href="#">Very Likely</a>	<a href="#">Very Likely</a>	<a href="#">Certain</a>	<a href="#">Very Likely</a>	<a href="#">High</a>	<a href="#">High</a>	<a href="#">Low</a>	<a href="#">Low</a>	<a href="#">Lack of means and knowledge to protect children from death, injury, fever, drowning, de-hydration, malaria, pneumonia, and other water-borne diseases.</a>
<a href="#">Reproductive Health</a>	<a href="#">Very Likely</a>	<a href="#">Very Likely</a>	<a href="#">Certain</a>	<a href="#">Very Likely</a>	<a href="#">High</a>	<a href="#">High</a>	<a href="#">Low</a>	<a href="#">Low</a>	<a href="#">Lack of knowledge and means for safe births during cyclone, tidal surge, water logging and coastal inundation; lack of trained birth attendants in disasters; lack of easy access to MCH clinic and hospitals in disasters.</a>

<a href="#">Girl's Education</a>	<a href="#">Very Likely</a>	<a href="#">Very Likely</a>	<a href="#">Certain</a>	<a href="#">Very Likely</a>	<a href="#">High</a>	<a href="#">High</a>	<a href="#">Low</a>	<a href="#">Low</a>	<a href="#">Challenge to continue education of girls during cyclone, coastal flooding, tidal surge and water-logging; increased role of adolescent girls in domestic spheres during disasters; increasing tendency to early marriage amongst disaster affected households; discontinuation of girl's education; lack of social safety net for girl's continued education.</a>
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Source: United National Development Programme (UNDP) Bangladesh, 2015

## **5. Gender and the Women's Development Policy (WDP)**

In the context of the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and the Beijing Platform of Action, Bangladesh has developed several policies and sectoral strategies to ensure gender equality, including the Women's Development Policy (WDP), 2011 and the National Action Plan to implement the WDP. The objective of this policy is to take special measures to enhance the overall safety and security of women and children, including helping them deal with disasters, ensuring rehabilitation services of those affected with special consideration for disabled women, and ensuring food distribution and assistance to eliminate bottlenecks created due to extreme climate events and disasters. The proposed project will consider the following policies, strategies, and action plans regarding gender aspects.

### **5.1 Bangladesh Climate Change Strategy and Action Plan (BCCSAP)**

The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) identifies women, particularly in poor households, as an important target group for monitoring and planning to protect livelihoods and achieve objectives for equitable and sustainable growth.

### **5.2 Climate Change and Gender Action Plan (ccGAP)**

The underlying principle of the ccGAP is the transformative nature of gender-focused interventions and the action plan has the potential to enhance the effectiveness and efficiency of climate change and socio-economic development responses. The development of the ccGAP followed a participatory process that included in-country meetings, stakeholder consultations involving representatives from several ministries/ government departments, civil society, academia, research institutions, local NGOs, and international organizations, as well as a desk review of several key reports, publications, websites, surveys, and in-person interviews.

The ccGAP integrates gender considerations into four of the six main pillars as identified in the BCCSAP: (i) Food security, social protection and health; (ii) Comprehensive disaster management; (iii) Infrastructure and (iv) Mitigation and low carbon development. The remaining two pillars of the BCCSAP, those of research and knowledge management and capacity building and institutional strengthening, were mainstreamed within the above four pillars as crosscutting topics.

Under the food security, social protection and health pillars, emphasis has been given to integrating gender and climate change concerns into policies and national documents concerning the agricultural sector, creating an environment to lease land/water bodies to women, ensure crop insurance and/or other safety nets for poor female farmers, accessing to financial instruments and involving women applying alternative technologies e.g. bio-fertilizer and climate-resilient cropping practices.

Under the Comprehensive Disaster Management pillar, some actions worth highlighting are the development of a gender-responsive disaster management policy, increased participation of women in central and local disaster management councils (Union Disaster Management Committee (UDMC)/Upazila Disaster Management Committee (UzDMC)), allocating financial resources to address gender and Disaster Risk Reduction (DRR) issues, participation of women in community risk assessments, vulnerability and capacity assessment activities, as well as activities to help women and men provide first aid and primary health care as first responders in an emergency.

### **5.3 The National Plan for Disaster Management**

This plan recognizes the particular vulnerabilities of women, though in implementation these do not necessarily trickle down into disaster-specific or local plans. The policy calls for incorporating the needs of female Internally Displaced Persons (IDPs) in that, it encourages the building of separate facilities where possible, and for the inclusion of women in the management committees of cyclone shelters. In practice, security and privacy concerns continue to deter women from shelters, and that continues to be evidence of increased domestic and external violence against women taking place during and after the onset of disasters.

### **5.4 National Adaptation Program of Action (NAPA), 2005**

The Government of Bangladesh also launched its National Adaptation Program of Action (NAPA) in 2005. The document is the product of a collective effort of stakeholders and highlighted the main adverse effects of climate change. It also identified the country's adaptation needs. At the time of submission, the NAPA provided a response to the urgent and immediate needs of adaptation and identified priority programs in Bangladesh. Of the 43 countries that have developed NAPAs up to November 2009, Bangladesh is among a group of eight countries that incorporated gender in a more comprehensive manner throughout the document. In total, eight references to gender are made. Poverty reduction and security of livelihoods with a gender perspective have been ranked as the most important set of criteria for prioritization of adaptation needs and activities and it is acknowledged that various groups in society will experience the impacts thereof in various degrees depending largely on the

economic condition they find themselves (poor or non-poor), their location (coastal or non-coastal, rural or urban) and their gender.

### **5.5 Eighth Five-Year Plan (2021 – 2025)**

Bangladesh has been preparing its medium-term development plans known as the Five-Year Plan (FYP) since 1973. This 8th Five Year Plan (FYP) from July 2020 to June 2025 of Bangladesh represents the first phase of the country's Perspective Plan 2041, which aims to bring Bangladesh closer to the goals of attaining Upper Middle-Income Country status, attaining major Sustainable Development Goal (SDG) targets, and eliminating extreme poverty by Financial Year (FY) 2031. A sustainable development pathway that is resilient to disaster and climate change; entails sustainable use of natural resources; and successfully manages the inevitable urbanization transition is one of six core themes of the 8th FYP. The Plan also includes strategies to incorporate “gender mainstreaming into policies” and to “integrate gender issues in planning and budgetary processes” by placing a strong emphasis on the importance of managing climate change through incorporation thereof.

### **6. Position of Women in Bangladesh**

The Constitution of Bangladesh (Articles 27, 28, 29, and 31) guarantees equality and non-discrimination on account of sex, religion, ethnicity, place of birth in order to provide scope for affirmative action in favor of the “backward section of citizens”. Article 24 promised to ensure religious freedom within a pluralist, National framework and Article 28 (sections 1,2 and 3) ensure equality in all spheres of life between women and men. Although the constitution guarantees equality between women and men in the public domain but the further scope for improvements remains in the private sphere. These have been upheld in differing degrees since independence some 4 decades ago, changes have occurred in some contexts, including in the situation of women. Efforts towards women’s development in Bangladesh are based on a wide array of international commitments including the Millennium Development Goals (MDGs), the CEDAW (1979), and the Beijing Platform of Action (1995), amongst others. Following the declaration of the UN Decade of Women (1976-85), the Government of Bangladesh, national and international non-government organizations, and others have undertaken several programs towards the advancement of women in the country. Simultaneously, the women’s movement has also played an important role in raising mass awareness of women’s issues and enhancing women’s participation in every sphere of life in order to achieve equality. As a result, over the last 40 years, women in Bangladesh, as was the case with women in other developing countries, have gradually become more visible in the labor force, development programs, and local institutions such as local government bodies.

Gender parity in primary and secondary education has been achieved and the Government of Bangladesh also established institutions for girls and women at the secondary and tertiary levels. However, concerns are raised over the high drop-out rate among girls, especially in rural areas, the gender gap at technical/vocational and the tertiary education levels, and the high number of girls who suffer sexual abuse and harassment both at school as well as on their way there. Barriers experienced by women and girls to quality education, for example,

the lack of physical infrastructure, the lack of facilities for girls in schools, the negative impact of early marriages, and the lack of access to education by rural women and girls are also of concern. The Bangladesh Labour Act (2006) promotes equality of opportunity in employment and provides for equal pay amongst men and women. However, it does not extend to workers in the informal sector where the largest population of Bangladesh's women is being employed. The persistence of discrimination against women in the labor market, in particular, occupational segregation, a wide gender wage gap, and the exploitation of girls are also prevalent.

With regards to Millennium Development Goal 3 (Promote Gender Equality and Empower Women), it is noteworthy to mention that the Total Fertility Rate (TFR) has fallen from 7 live births in the mid-70s to 2.3 births per woman in 2011 as the contraceptive prevalence rate increased from about 8% in the early 1970s to 40 % in early 1990s to 60% by 2011. The reduction in birth rate is also attributed to the education of girls and more women joining the workforce. Another positive development is that women's life expectancy has increased to 68.9 years in 2009 from 46.7 years in 1960. Overall mortality amongst women of reproductive age has consistently declined over the last 10 years. Maternal mortality has decreased from 322 per 100,000 live births in 2001 to 194 in 2010. More needs to be done, however, to meet the MDG target of 143 deaths per 100,000 live births by 2015. At primary and secondary level enrolment in educational institutions, girls now account for larger proportions at 1.02% and 1.14% respectively. Girls are also doing better, or no worse, in public examinations at these levels compared to their male counterparts. However, at the tertiary level, the proportion of girls is only 39%, which is largely due to social reasons such as the marrying off of girls at that age. Overall, girls lag behind in science education. The World Development Report 2012: Gender Equality and Development mentions that in Bangladesh, a woman earns only 12 cents for every dollar that a man earns, one of the lowest wages earned by women compared to other countries of the world. A major breakthrough has been achieved in the area of education and employment for girls due to affirmative action by the government and employment opportunities in the Ready-Made Garments (RMG) industries that employ mostly women. Although the wage rates at the entry level within this sector is much lower than in other sectors requiring similar (or less) skill. Other issues such as unsafe working conditions and high levels of harassment also undermine the contribution to women's empowerment and gender equality.

## **7. Gender Considerations for the Proposed Project**

The proposed project has taken a gender-responsive and transformative approach to climate change vulnerability, considering gendered differences in access to natural resources, and institutional support and capacity building, and this has fundamentally shaped all of the activities and outputs of the project. The proposed recognizes women's essential contributions as leaders and agents of change in the face of a changing climate and resource constraints.

The women will be educated on climate change issues and water management in their localities. The children will learn about climate change from their mothers. This will have long-term impacts on society. The new generation will grow in a climate-resilient environment. It is already mentioned that 50% of the beneficiaries will be women because they are lagging behind in decision-making and access to resources as stated above. The activities are

designed in a way that the women will be most benefited economically and socially. Besides, necessary female staff will be ensured at the field level so that women members can easily express their opinions and actively take part in the project activities.

The project not only considers the benefits of women, but also the inter-sectional vulnerability to changing conditions, of those beneficiaries facing additional marginalization due to poverty, and social exclusion. The project design recognizes to build adaptive capacity in regards to changing climatic conditions, by supporting climate-resilient water supply technology, in which women are already playing a growing role.

The project will accommodate GoB's policies and strategies on women's resilience and their critical role in preparedness and recovery from disasters and the necessity of shifting livelihoods towards adaptive options, efforts remain limited compared to the actual and acute needs of women. The Gender Assessment expands on the information provided throughout the proposal, by providing additional information on the national and local gender context, particularly in regards to women's access to resources, their role in decision-making, and the gendered aspects of local water management, and provides the basis for, and lessons on which, the Gender Action Plan (GAP) (which is reflective of the overall project design) has been built. The activities of the proposed project have been selected considering that women can easily implement to enhance their capacity and increase their resilience to climate change.

## **8. Gender considerations by activities**

### **Activity 1.1.1 Procurement of RO plants**

The executing entity to be selected to implement the project at community level will carry out the procurement activities. The procurement process will include different committees as per procurement guideline to be provided by PKSf. The project will ensure that the committees will include women members as per project plan. It is expected that 50% of the committee members will be women.

### **Activity 1.1.2: Construction of RO plant sites**

The project will engage women in different stages of the construction of the RO plants. The project will consult with both male and female members of the beneficiary groups while selecting the sites. The project will encourage women members in monitoring the construction activities. The project will ensure that about 50% of technical persons for operation and maintenance of the plants will be women.

### **Activity 1.2.1 Procurement of testing kits**

Like the procurement of RO plants, this activity will engage both male and female members in the procurement committees.

#### **Activity 1.2.2 Distribution of testing kits**

The testing kits will be distributed among the technical persons to be trained under the project form operation and maintenance of the plants. These persons will be selected from the poor households. The PMU at PKSf will encourage the Executing Entity (EE) to select about 50% female youth for developing the technical capacities of female youth. Hence, the kits will be distributed among them.

#### **Activity 2.1.1 Beneficiary selection and group formation**

The project targets 225,000 people to provide safe drinking water. It is expected that 50% of them will be women. In addition, the project will form 225 beneficiary groups for 225 RO plants. The objectives of forming these groups are to ensure participation of local communities in the project activities, deliver support services and transfer knowledge on climate change and water management in the coastal areas of the country. Each group will contain +/-20 members. The project will ensure that 50% of the group members will be women.

#### **Activity 2.1.2 Project Participants' Mobilization and group meetings**

The executing entity will facilitate the groups in organizing monthly meetings to discuss about climate change and water issues, operation and maintenance of the plants. It is expected that 50% attendees of these meetings will be women.

#### **Activity 2.2.1 Recruitment of PMU staffs and Executing Entity staffs**

PKSF always encourage women to respond to job circular whenever any recruitment is started. The project will also encourage women to apply for the PMU posts by mentioning "Women are encouraged to apply" in the job circular. PKSf will also encourage the executing entity to adopt the similar approach for this project.

#### **Activity 2.2.2 Training to the newly recruited staffs on project management**

The PMU will engage both male and female trainers for facilitating the training. Male-female composition of the trainees will depend on the composition of the newly recruited staffs. It is expected that around 30% staffs at PMU and executing entity level will be women.

#### **Activity 2.3.1 Prepare training material on climate change and water issues**

Women's role in household level water management is crucial. Hence, the PMU will ensure that the contents of the training materials are gender responsive. Gender disaggregated effects of water stress due to climate change will be incorporated in the training materials. The training materials will also include but not limited to gender specific role and responsibilities in water management, household level decision-making, etc.

#### **Activity 2.4.1 Organise training for beneficiaries**

As mentioned earlier, the selected group members will receive the training on climate change and water management. The project will ensure that about 50% of the trainee will be women.

#### **9. Women's views on the above activities**

Women in the saline vulnerable areas perceive that they are the most benefited groups among the saline and cyclone affected communities due to having safe drinking water closed to their home. They think that they can save their time for collecting water. They can do productive activities at home with the time they save. They also think that they can give more time to their children's education. In addition, the women think that they would play role in decision making of their families having enhanced knowledge and understanding on the climate change issues.

#### **10. Proposed Gender Action Plan**

The purpose of a Gender Action Plan is to operationalize the constraints and opportunities for women and men that were identified during the gender analysis, towards fully integrating them into the project design, providing the framework for a gender-responsive and socially inclusive project. In addition, specific indicators are also proposed to measure and track progress on these actions at the activity level, which can be incorporated into the detailed Monitoring and Evaluation (M&E) plan which will be developed at the start of implementation, and provides concrete recommendations on how to ensure that the degree of gender-responsiveness and transformation (including collection of sex and age disaggregated data) continues to be measured throughout implementation. Furthermore, it is recommended that the project take into consideration gender and social inclusion measures outlined above and these measures are tailored specifically for a Bangladeshi context. In order to do this, the following approaches are strongly recommended:

	<u>Activity</u>	<u>Target and Indicators</u>	<u>Time period</u>	<u>Responsible institutions</u>
	<u>Activity 1.1.1 Procurement of RC plants</u>	Baseline=0 Target= 50%  <u>Indicator: 50% members of the procurement committee will be women</u>	<u>First year, Second year and Third year</u>	<u>PMU and Executing Entity (EE)</u>
	<u>Activity 1.1.2 Construction of RC plant sites</u>	Baseline=0 Target= 50%  <u>Indicator: 50% of the beneficiaries will be women.</u>	<u>First year, Second year and Third year</u>	<u>PMU and Executing Entity (EE), community people and contractors</u>
	<u>Activity 1.2.1 Procurement of testing kits</u>	Baseline=0 Target= 50%  <u>Indicator: 50% members of the procurement committee will be women</u>	<u>First year, Second year and Third year</u>	<u>PMU and Executing Entity (EE)</u>
	<u>Activity 1.2.2 Distribution of testing kits</u>	Baseline=0 Target= 50%  <u>Indicator: 50% of the trained technical person will be women who will received testing kits</u>	<u>First year and second year</u>	<u>PMU and Executing Entity (EE)</u>
	<u>Activity 2.1.1 Beneficiary selection and group formation</u>	Baseline=0 Target=50 %  <u>Indicator: 50% of the selected beneficiaries will be women</u>	<u>First year</u>	<u>PMU and Executing Entity (EE), community people</u>
	<u>Activity 2.1.2 Project Participants' Mobilization and group meetings</u>	Baseline=0 Target=50 %  <u>Indicator: 50% of the meeting attendees will be women</u>	<u>Throughout the project cycle</u>	<u>PMU and Executing Entity (EE), community people</u>

<a href="#">Activity 2.2.1 Recruitment of PMU staffs and Executing Entity staffs</a>	<u>Baseline=0</u> <u>Target= 30%</u> <u>Indicator : About 30% of the staffs will be women</u>	<u>First year</u>	<u>PMU and Executing Entity (EE)</u>
<a href="#">Activity 2.2.2 Training to the newly recruited staffs on project management</a>	<u>Baseline=0</u> <u>Target=30 %</u> <u>Indicator: 30% of the trainees will be women</u>	<u>First year</u>	<u>PMU and Executing Entity (EE)</u>
<a href="#">Activity 2.3.1 Prepare training material on climate change and water issues</a>	-	-	<u>PMU and Executing Entity (EE)</u>
<a href="#">Activity 2.4.1 Organise training for beneficiaries</a>	<u>Baseline=0</u> <u>Target= 50%</u> <u>Indicators: 50% of the beneficiary trainees will be women</u>	<u>First year and Second year</u>	<u>PMU and Executing Entity (EE), community people.</u>

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Annex 7: Stakeholder Engagement Plan (SEP)  
GENDER ACTION PLAN Access to  
safe drinking water for the climate  
vulnerable people in coastal areas of  
Bangladesh

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Dr. A.K.M. Nuruzzaman (General Manager)  
JANUARY, 2022



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## 2.0 Introduction

Bangladesh is recognized as one of the most vulnerable countries to climate change in the world. This is mainly due to the physical and socio-economic characteristics of the country. Existing poverty situation compounded by COVID-19 pandemic creates new challenges for maintaining existing growth of the country and on the other hand, climate change puts extra pressure by affecting lives and livelihoods of the rural vulnerable communities. The government of Bangladesh has set its own targets for achieving the SDGs and accordingly prepared strategies and action plans including 8th five year plan, Delta Plan 2100, Mujib Climate Prosperity Plan, and Perspective Plan 2041. These plans have incorporated climate change as one of the major challenges towards achieving the SDGs. The Palli Karma-Sahayak Foundation (PKSF) has been working as a national accredited entity to the Adaptation Fund to support the government in addressing climate change issues in addition to its core business (rural employment generation, enterprise development, capacity building, and other social development activities). To ensure sustainability of its activities, PKSF has adopted Environment and Social Management Framework (ESMF). One of the requirements of the ESMF is to analyze relevant stakeholders who will be directly or indirectly involved during implementation of the project. Hence, a Stakeholder Engagement Plan (SEP) is required to engage various stakeholders systematically in the project implementation and monitoring process. This will ensure accountability as well as increase efficiency of the project interventions. This SEP is prepared as part of the project on "Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh".

## 3.0 Brief description of the project

Considering the vulnerability to climate change of the coastal people of Bangladesh, PKSF has decided to submit the project proposal to Adaptation Fund on "Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh". A brief description of the proposed project is presented below.

The primary goal of the project is to develop climate adaptive coastal communities in Bangladesh through adopting resilient water technologies. The proposed project aims to ensure water security for the coastal families by establishing reverse osmosis water treatment plants. The project will achieve the following outcomes to meet the primary goal. It will enhance ability of coastal communities to get access to safe drinking water and strengthen the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.

### Major activities

#### Outcome 1. Enhanced ability of coastal communities to get access to safe drinking water

Output 1.1 Locally appropriate Reverse Osmosis (RO) plants are installed and safe drinking water are provided to the climate-vulnerable people.

The coastal region of Bangladesh is predominantly rural and prone to natural disasters. Their lives and livelihoods are being destroyed by many hazards. Historically, they are vulnerable people. Among others, the sources of water for these people are shrinking quickly due to climate change particularly sea level rise and salinity intrusion. Climate change and changes in land use exacerbate the situation and are negatively affecting surface and groundwater resources in coastal areas. Drinking water sources for the mass people living in the coastal rural areas are traditional, diverse, and these include shallow groundwater obtained through

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tube wells, small ponds with and without pond sand filters (PSF, a sand and gravel filter), harvested rainwater, and river water. Rainwater collection storage devices are of generally small volume (insufficient to last the entire year), and municipal reservoirs are essentially non-existent. The ponds are often contaminated with saline water by cyclonic storm surge and tidal surge. This lack of climate-resilient adequate water storage infrastructure intensifies water insecurity for the coastal people and complicates the situation of water-borne diseases, which is further compounded by climate change. Against this backdrop, the purification of brackish water can greatly aid climate change adaptation, primarily through diversification of water supply and resilience to water quality degradation. Diversification of water supply can provide alternative or supplementary sources of water when current water resources are inadequate in quantity or quality. Desalination technologies established on a raised plinth with storm resilient material also provide resilience to water quality degradation because they can usually produce very pure water, even from highly contaminated source waters. PKSf started to pilot PKSf-supported PO-installed RO plants in 2016.

#### Activity 1.1.1 Procurement of RO plants

The features of a RO plant will be designed considering the factors mentioned in Activity 1.1.1 with sufficient capacity to supply year-round household needs. These plants will also be designed based on international best practices and locally appropriate specifications as well as the corrosion of certain construction materials under saline conditions. Under this activity, around 225 RO plants will be established by partner Non-Governmental Organizations (NGOs) with the active support from local people, adjusting with local contexts and cyclone and incorporating coastal flood-resilient features (Details on the processes and technologies used to treat water can be seen in Annex 1). The project partner NGO will procure RO plants based on the specifications provided by the PMU. Necessary procurement policies and methods should be followed for ensuring transparency.

#### Activity 1.1.2 Construction of RO plant sites

A small scale construction needs to be done for establishing the RO plant. A detailed specification will be provided from PMU for this purpose. The corrosion of certain construction materials under saline conditions will be considered carefully (Details can be seen in Annex 1). Sites will be finalized in consultation with local communities and representatives of local councils. A number of factors will be considered to select a suitable site for establishing a RO plant. First, the supply-demand gap for drinking water at the household level will be assessed through surveys by the partner NGOs. Second, the availability of raw water will be explored. Third, the sources of power will be identified. Fourth, local enthusiasm will be understood. Fifth, the availability of land for setting up a RO plant will be considered. Sixth, the scope for the management of reject water will be evaluated. Seventh, the vulnerability of infrastructures and people to climate-induced hazards will be estimated. Eighth, the intention of local people to measuring the quality of water at various levels will be valued. For performing the activity 1.1.1, the necessary training will be provided to partner NGOs.

Output 1.2 Water testing kits are procured and supplied.

Testing RO plant's water quality on a regular basis, being an important part of maintaining a safe reliable source of water, will ensure that the water source is being properly protected from potential contamination, and that appropriate treatment is selected and operating properly. It is necessary to understand regularly the quality of water on different parameters, such as pH, TDS, E-coli, chlorine, sodium, potassium, calcium, magnesium, arsenic, and iron.

#### Activity 1.2.1 Procurement of testing kits

A minilab will be established in the working areas to test the quality of water. If necessary, the bigger labs will be utilized.

#### Activity 1.2.2 Distribution of testing kits

The testing kits will be provided to partner NGOs and even, water-user groups. Testing kit-users will be trained to operate and maintain those kits.

### **Outcome 2. Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.**

#### Output 2.1 Formation of Groups

These plants will be managed and owned by local community people with active guidance from PKSf and its local partner NGOs. Local council members and other local philanthropists are also be involved in this process. The locally-managed and locally-owned RO plants will have a broad base of memberships, and in which the benefits will support a wide range of target groups, such as, among others, the extremely poor people, and people living with disabilities, the adolescents and youths, and female headed households. These are the people i) who will be active in the daily affairs of the RO plant, and (ii) who have the power to direct the management and policies of the RO plants.

#### Activity 2.1.1 Beneficiary selection and group formation

After finalizing a site for establishing a RO plant, a catchment area for the RO plant needs to be demarcated. Community members needs to be enrolled from this catchment area and formed a group. There will be a membership card for each household. These groups can be named as 'Water Organization' in Bengali '*Pani Sangathan*'. To identify them clearly, the village name can be included in front of each '*Pani Sangathan*'. These groups will be supported to establish water-user groups with active guidance from the local partner NGOs.

#### Activity 2.1.2 Project Participants' Mobilization and group meetings

Capacity building of the local people is an important factor. For this, participants will be trained on the maintenance of RO plants, water quality and challenges of drinking water related to climate change and other stressors.

#### Output 2.2: Staff are recruited, trained and certified.

The competent staff both at the PMU and EE levels will be a critical input for the success of the project. For this, the appropriate Terms of Reference (ToR) for each staff will be developed.

#### Activity 2.2.1 Recruitment of PMU staff and Executing Entity staff

The staff will be recruited competitively with an open advertisement. PKSf will deploy the competent personnel to execute the project.

#### Activity 2.2.2 Training to the newly recruited staff on project management

Training will be provided all recruited staff both at the PMU and EE levels. A group of competent trainers will be invited to train the staff following standard training modules. Field visits will be included in each training batch. Industry experts will be invited to share their sheer experiences, particularly the best practices and challenges.

#### Output 2.3: Training materials developed.

#### Activity 2.3.1 Prepare training material on climate change and water issues

Necessary training modules on group management, climate change, water and RO plant management will be developed. Local terminologies, analogies and metaphors will be used to contextualize theories and concepts. So that, locally contextualized theories and concepts could be practiced and understood. A training need assessment will be done before finalizing the training subjects.

#### Output 2.4: Training for beneficiaries conducted

The water-user groups will be trained to manage the distribution of purified water among the enlisted members and assist to maintain the accounts of a RO plant. The training will be provided by the partner NGO to the water-user groups with an expectation that these groups are capacitated to be self-sufficient before the end of the project period.

##### Activity 2.4.1 Organise training for beneficiaries

Training will be provided to local water-users, even to caretakers of the RO plants, local council members and local technicians on a wide range issues with competent master trainers. Training of Trainers (ToT) will be conducted, if necessary, for rolling out the trainings quickly.

In addition to the above activities, knowledge management activities will be performed in the project by accumulating new knowledge about water desalination and water in climate-vulnerable areas, and by disseminating this knowledge to communities and decision-makers at the policy level. Three knowledge hubs will be established in the target area (one in each of three districts, i.e., Khulna, Satkhira and Bagerhat) to understand local challenges and best practices related to the management of RO plants, and to disseminate this knowledge across each target area. The location for the knowledge hub will be selected based on the factors described in Activity 1.1.2. Three partner NGOs will be responsible to operate these knowledge hubs. These hubs will gather local information and will also communicate national best practices to community members in the target areas through partner NGOs. Throughout the implementation of this project, the lessons learned from interventions and best practices will be collected by project staff. The hubs will support the establishment of visibility mechanisms, such as social media, adolescent clubs, community radio websites, brochures, workshops, seminars and public events. These best practices and lessons learned will be disseminated widely.

#### 4.0 Stakeholder analysis

##### 3.1 Summary of the Stakeholder Consultations

PKSF has carried out consultation meetings at different levels of stakeholders including community people, and government and non-government representatives. Consultations at the community level suggest that mostly poor communities are struggled with to secure safe drinking water in the coastal areas. This unacceptable situation often threatens their lives and livelihoods. Moreover, the situations get worse in the dry seasons. However, these people are looking for secured water options to increase their resilience against climate change. PKSF also organized a number of consultation meetings at the national level and also at the local level. A summary of recommendation s are given in Annex-1.

The participants in these meetings argued that water should be the most important element for making their livelihoods resilient to climate change in coastal areas of the country. They suggested installing desalination plants and supply bottle water to the community, water pricing, use of surface water for drinking purposes, rain water harvesting etc. Besides, the project was presented to the NDA in Bangladesh for receiving 'No Objection Letter.'

In addition to these consultations, this project has used the experience of the earlier Community Climate Change Project (CCCP). During the implementation of the project, many consultation meetings were held at the community level (October, 2012 to December, 2016). The purpose of these meetings was to monitor project progress, implementation quality and quantity, effectiveness and other project level indicators. These meetings and project evaluations also suggested that reverse osmosis treatment plant an effective alternative option for drcuring drinking water in the coastal areas.

### 3.2 Stakeholder Engagement Plan

Stakeholder engagement during the project implementation will begin at the inception workshop to be held at the initial stage of the project. PKSF will organize a project launching ceremony at national level where NDA representatives, representatives of relevant government ministries and departments including but not limited to Ministry of Environment, Forests and Climate Change (MOEFCCC), Department of Fisheries, Water Resource Planning Organization (WARPO), Water Development Board, Department of Public Health and Engineering (DPHE), Bangladesh Fisheries Research Institute (BFRI), Department of Environment, Bangladesh Climate Change Trust, Universities, NGOs and civil societies will be invited to attend the ceremony. However, the three outcomes of the project will have the following stakeholders.

#### **Outcome 1. Enhanced ability of coastal communities to get access to safe drinking water**

This outcome will engage multiple stakeholders ranging from the national level down to the community level. The PMU at PKSF will lead the activities of the outcome. PKSF, as NIE, will provide guidance on carrying out the baseline study and indicators. It will hire national level consultants who are experts in the climate change adaptation sector. It will engage Economic Relations Division (ERD) as the NDA to Adaptation Fund for Bangladesh as respondents of layers of interviews and for sharing the research results. It will also engage the Department of Environment, Bangladesh Water Development Board and Department Public Health Engineering and other relevant climate change actors including non-government organizations, NIE, EEs, LGIs, beneficiaries and civil society members. Finally, activities under this outcome will engage communities in drought-vulnerable areas to capture their views and status in terms of addressing climate change.

#### **Outcome 2. Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.**

This outcome will involve the selected beneficiaries, local offices of the Department of Agricultural Extension (DAE), implementing entities, CCAG members, community people other than beneficiaries, consultants, and local government representatives.

Stakeholder engagement will be performed using best practices and principles so that the project demonstrates:

- **Commitment** when the need to understand, engage, and identify the community is recognized and acted upon early in the process;
- **Integrity** through mutual respect and trust;
- **Respect** for rights, cultural beliefs, values, and interests of stakeholders and

affected communities are recognised:

- Transparency when community concerns are responded to in a timely, open, and effective manner;
- Inclusiveness when broad participation is encouraged and supported by appropriate participation opportunities; and
- Trust through open and meaningful dialogue that respects and upholds a community's beliefs, values, and opinions.

**Table 1: Stakeholder engagement strategies**

<u>Type of stakeholders</u>	<u>Engagement Purpose</u>	<u>Proposed Strategy for stakeholder engagement of stakeholders</u>
<u>Government organisations</u>	<u>Share project information with relevant stakeholders, enhance transparency and accountability.</u>	<p><u>1. Project website, online monitoring system, workshops, seminars. Another preferred medium is email.</u></p> <p><u>2. For official communications – Official Letters. These written communications can be sent via email and hard copy via courier or post office.</u></p> <p><u>3. Regular project updates are to be provided on a monthly and/or quarterly basis through meetings (face-to-face and/or Skype/zoom) at the project level. One assigned focal person and their alternate should be assigned by each organization to the project to ensure continuity.</u></p> <p><u>4. At the national level, project updates should be shared through seminars and websites.</u></p> <p><u>5. Annual presentations to stakeholders should also be conducted by the EE and Implementing Partners.</u></p>
<u>IEs and communities</u>	<u>Increase knowledge and understanding of climate change, transfer technologies for increasing resilience</u>	<u>1. Classroom training, group formation and group meetings, implementation of technologies, etc.</u>
<u>NGOs, IEs and beneficiary communities</u>	<u>Successful implementation of the project and wider dissemination of its results</u>	<p><u>1. Sharing of best practices among IEs, water-user groups need to be conducted, peer-to-peer learning will contribute to capacity building and scaling up of the project.</u></p> <p><u>2. Continued updating of evaluation data, maintenance of project-supported infrastructure, holding regular meetings, and capacity building and training activities will hold the interest and support of local communities, IEs even beyond project life.</u></p> <p><u>3. Conducting regular meetings and work planning with community stakeholders will increase transparency and ownership.</u></p> <p><u>4. Developing common communication materials and branding for unified messaging</u></p>

<u>Type of stakeholders</u>	<u>Engagement Purpose</u>	<u>Proposed Strategy for stakeholder engagement of stakeholders</u>
		<p>that will sustain the interest of end-users and stakeholders at the <i>upazila</i> and community levels.</p> <p>5. Closer coordination among PKSF and IEs in undertaking field work and site visits at the project sites is needed.</p> <p>6. Active participation and engagement at all project activities in the project sites will ensure continued support.</p>
All levels of stakeholders		<p>1. PKSF will follow its information disclosure policy, which is consistent with Adaptation Fund.</p> <p>2. Website of PKSF and Implementation Partners should also provide access to data/information and recent news and developments of the project.</p> <p>3. For sharing technical and sensitive information, a closed social media group and email loop can be formed.</p> <p>4. Regular project management meetings should be held where substantive and implementation issues and concerns will be discussed.</p> <p>5. Meetings with the IEs and water-user groups on a regular basis should also be established.</p>

These strategies will be implemented through the stakeholder engagement plan during the implementation of the project. The SEP is summarised in Table 2.

**Table 2: Proposed Stakeholder Engagement Plan**

<u>Activity</u>	<u>Timing</u>	<u>Objectives of Engagement</u>	<u>Target stakeholders</u>
Activity 1.1.1 <u>Procurement of RO plants</u>	Yr.1, 2, 3, 4 & 5	<u>To promote climate-resilient water supply in the coastal communities in Bangladesh.</u>	<u>Ministry of Water Resources, Department of Public Health Engineering (DPHE), IE, Beneficiaries and local contractors.</u>
Activity 1.1.2 <u>Construction of RO plant sites</u>	Yr.1, 2, 3, 4 & 5	<u>To construct climate-resilient structures for the RO plants.</u>	<u>Local Housing and Public Works Offices, NIE and Beneficiaries and local workers.</u>
Activity 1.2.1 <u>Procurement of testing kits</u> Activity 1.2.2 <u>Distribution of testing kits</u>	Yr.1, 2, 3, 4 & 5	<u>To promote safe water supply.</u>	<u>Department of Public Health and Engineering, National Implementing Entity (NIE), and the local people.</u>

<u>Activity</u>	<u>Timing</u>	<u>Objectives of Engagement</u>	<u>Target stakeholders</u>
<u>Activity 2.1.1 Beneficiary selection and group formation</u>	<u>Yr.1, 2, 3, 4 &amp; 5</u>	<u>To organise local people for the RO plant management</u>	<u>PKSF, NIE, and growers i.e. project beneficiaries.</u>
<u>Activity 2.1.2 Project Participants' Mobilization and group meetings</u>	<u>Y1, Y2</u>	<u>To transfer knowledge and technology for adaptation to climate change in coastal areas of Bangladesh.</u>	<u>Beneficiaries, IEs, and PKSF.</u>
<u>Activity 2.2.1 Recruitment of PMU staff and Executing Entity staff</u> <u>Activity 2.2.2 Training to the newly recruited staff on project management</u>	<u>Yr. 1, 2, 3, 4</u>	<u>To increase capacity of beneficiaries and NIE on climate change and adaptation technologies.</u>	<u>Relevant Staff and NIE, and PKSF.</u>
<u>Activity 2.3.1 Prepare training material on climate change and water issues</u>	<u>Y1, Y2, Y3, Y4 &amp; Y5</u>	<u>To develop and share knowledge base; and document and share lessons learned.</u>	<u>Beneficiaries, relevant local government officers, Adaptation Fund, other global communities, civil society representatives, NGOs, NIEs, and PKSF.</u>
<u>Activity 2.4.1 Organise training for beneficiaries</u>	<u>Y1, Y2, Y3, Y4 &amp; Y5</u>	<u>To develop and share knowledge base.</u>	<u>Beneficiaries, relevant local government officers, Adaptation Fund, other global communities, civil society representatives, NGOs, NIEs, and PKSF</u>

## Annex 1

### Summary Recommendations of Stakeholders' Consultation Meetings

1. The quality of raw water needs to be tested and pre-treatment facilities need to be in place.
2. There should have an assessment on the comparative advantage of RO plants
3. The specifications for a RO plant and probable budget should be communicable and detailed.
4. The equipment should procure from a good company and there should have quality assurance of machineries from the manufacturers.
5. There should have a detailed operational procedures/treatment process of RO plants in place.
6. The selection criteria for site selection should be well-defined and followed.
7. A suitable land (flood free) will be required to establish a plant and to do the necessary civil works.
8. The source of water (merits and demerits of surface and groundwater, pre-treatment of raw water, etc.) will be critical.
9. The capacity of RO plants considering 8 hours operation time in a day (outreach for about 250 households) should be explored carefully.
10. The management of reject water will be an important environmental issue.
11. There should have after-sale service from manufacturers.
12. An appropriate training/capacity development for plant operators and plant mechanics should be provided.
13. Regular and periodic maintenance of RO plants will be crucial for its longevity.
14. Water testing requirements/facilities will be needed to ensure safe drinking water and check the quality of the treated water.
15. In the remote areas, water distribution mechanism should be in place.
16. Other possible challenges and issues related to long-term sustainability were also discussed.

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