Funding Proposal Template

Application Template for Fully-Developed Proposal and Project Concept Proposal[1]

PROGRAMME ON INNOVATION: LARGE GRANTS PROJECTS

REQUEST FOR PROJECT FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project must be fully prepared when the request is submitted.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN N7-700
Washington, D.C., 20433
U.S.A
Fax: +1 (202) 522-3240/5
Email: afbsec@adaptation-fund.org

[1] Single Country and Regional Concept proposals should complete Part I and Part II of the Project Proposal Template.

ADAPTATION FUND

SINGLE COUNTRY/ REGIONAL INNOVATION PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme:	Access to Safe Drinking Water for the Climate Vulnerable People in Coastal Areas of Bangladesh through Solar-generated Reverse Osmosis Water Treatment Facilities
Country/ Countries:	Bangladesh
Thematic Focal Area[2]:	Water Management
Type of Implementing Entity:	National Implementing Entity (NIE)
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 Dollars Equivalent)

Project / Programme Background and Context:

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.

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.

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.

[2] 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.

It is even more difficult for developing countries. Water is closely intertwined with, among others, poverty, health, education, and gender dimensions[3]. Bangladesh is largely treated as one of the world's water-rich countries. The average yearly temperature and rainfall in Bangladesh are 29^0C and 2000 mm respectively with high fluctuations in different months within a year, and between years[4]. 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 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^3/sec[5]. 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 of getting 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 scarce regions in Bangladesh. The Bangladeshi south-west coast is constantly under risk from cyclones, tidal surges, riverbank erosion, saline water intrusion, and other climate risks. The community is notably impacted by salinity intrusion in a number of ways, including agriculture production degradation, precarious livelihoods, and a lack of potable water. According to studies, many residents of coastal regions over consume salt, even during heavy rains when the salt concentration in the water is substantially lower. This may pose serious health risks in the long run. In addition, women, who are typically in charge of home duties, must walk a distance of up to 3 kilometres every day in the burning sun or pouring rain in order to obtain drinking water from a distance. This puts a stress on their health and also exposes them to other social concerns.

1.2 Bangladesh is a lower-middle-income country with 165.1 million people in 2022 and a population density of 1,119 people per square kilometer, which is among the highest in the world[6], except for a 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[7]. 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[8].

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[9]. Coastal flooding by saline water was found in

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[3] 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.
[4] KARMALKAR, A., MCSWEENEY, C., NEW, M. & LIZCANO, G. 2008. UNDP: Climate Change Country Profile. Oxford: School of Geography and Environment, University of Oxford.
[5] HOFER, T. & MESSERLI, B. 2006. *Floods in Bangladesh: History, Dynamics And Rethinking the Role of the Himalayas,* Tokyo, United Nations University.

[6] BBS, 2022 Bangladesh Population and Housing Census 2022, Dhaka: Bangladesh Bureau of Statistics (BBS).
[7] Bangladesh Bureau of Statistics (BBS) 2019, *Report of the Household Income and Expenditure Survey 2016,* Dhaka,
[8] 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).
[9] 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.

the extreme south-west throughout the year and in the north-west and south-eastern coasts in the dry season[10]. People who live mainly on polders (mainly these are earthen embankments that were first initiated in 1960 to protect people from coastal flooding) or near to them 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 the dry season, sometimes sub-surface salinity moves upward. So agricultural and livelihood activities are hampered even after the water recedes.

1.4 The coastal areas of 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[11]. 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 sediment 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 below average sea level, which is prone to tidal flooding due to their low-lying geographical characteristics.

1.5 There are 2.5 million hectares of arable land in coastal areas of Bangladesh lying between 0.9 and 2.1 meters above mean sea level (MSL). Salinity affects 53% of these lands, or 1.51 million hectares[12]. The agricultural production system in the areas is evolving daily as a result of saline intrusion. Livelihood possibilities are increasingly dwindling, especially for the disadvantaged people. Tidal surges brought on by cyclones and heavy rains flood low-lying areas' homesteads and harm houses, including water and sanitary systems. In summary, coastal residents are mainly vulnerable due to poor human settlement conditions in low-lying areas, climate-sensitive livelihoods, and a lack of clean drinking water.

1.6 Freshwater ecosystems in the coastal region are now frequently affected by salinity, an environmental risk phenomenon. The management of freshwater ecosystems is becoming increasingly challenging in the coastal region due to the effects of climate change, including sea level rise and coastal flooding, excessive groundwater extraction, and decreased upstream flows. 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[13]. Additionally, studies have shown that the combined effects of sea level rise (SLR), changes in upstream river discharge, and an increase in the frequency of more violent storms will make coastal populations more vulnerable in a changing climate. Figure 1 presents the spatial variation of the maximum river salinity level during 2011–2012 in the southwest zone[14].

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[10] Hug Brammer, (2013): Bangladesh's dynamic coastal regions and sea-level rise, Climate Risk Management, ELSEVIER, 2013.

[11] 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.

[12] 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.

[13] 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.

[14] 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.

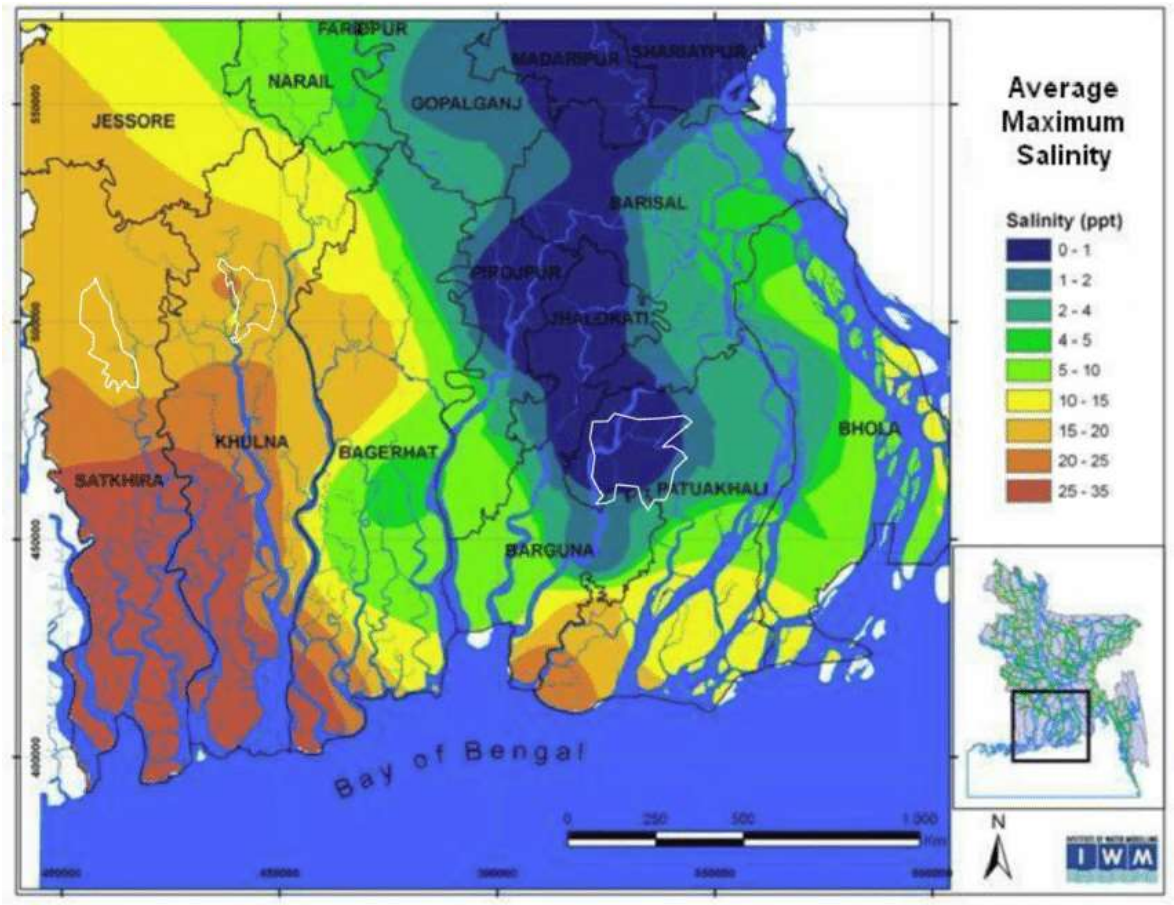

Figure 1: Map of Average Maximum River Salinity in the Southwest Region of Bangladesh

1.7 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)[15]. Bangladesh is considered a hotspot for sea level rise impact, mentioned in a number of scientific studies (Nicholls et al., 2018)[16]. 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% of them become inundated during the annual monsoons. The study (SMRC, 2003)[17] 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 compared to that of the western coast. CEGIS and DoE (2011)[18] have analyzed 30 years of tidal gauge data for estimating observed sea level change in Bangladesh's coastal zone without considering any land-sea interaction i.e., sedimentation, subsidence,

[15] IPCC (2021) Sixth Assessment Report, Physical Science Basis
[16] 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, RJ, Hutton, CW, Adger, WN, Hanson, SE, Rahman, MM, Salehin, M., Eds, 49-69.
[17] SMRC (2003). The vulnerability assessment of the SAARC Coastal Region due to sea level rise: Bangladesh case study. Dhaka, SAARC Meteorological Research Center.
[18] 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.

erosion, accretion etc. It shows trends in 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. According to scientific estimates, sea level in Bangladesh's 37 coastal stations will rise by 0.53-0.97m by 2100 (Haque et al., 2019)[19], while the IPCC stated in AR6 that under the intermediate GHG emissions scenario (SSP2-4.5), global sea level will rise by 0.44-0.76m by 2100 (IPCC, 2021)[20]. 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 et.al. (2013)[21] 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).[22] 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)[23].

1.8 According to the SRDI study, over 1 million hectares of cultivable land in the country are affected by salinity intrusion caused by slow and rapid-onset events such as sea level rise, cyclone and storm surges, and subsequent coastal flooding. From 1996 to 2008, the net cultivated area in Satkhira district decreased by about 7%, and production of the main rice crop in Satkhira district decreased from about 0.3 million tons in 2008 to 0.2 million tons in 2010 (SRDI, 2010)[24]. 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)[25].

1.9 Dasgupata et al. (2014)[26] modelled cyclone storm surge impacts under a changing climate scenario in 2050. This model was run for five cyclone tracks (covering the entire coastal area) in order to determine potential future inundation zones by 2050 under the climate change scenario, incorporating a 27-cm rise in sea level, a 10% increase in wind speed, and cyclone landfall during high tide.It is predicted that by 2050, an additional 15 per cent of the coastal area of Bangladesh will be inundated by storm surges during cyclones. Figure 2 shows the additional area that will be impacted by inundation in 2050. Not only will the districts of Khulna, Bagerhat, and Satkhira be newly exposed, but tidal surges at 3 meters in height will inundate 69 percent more land area than they do now.

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[19] 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.

[20] IPCC (2021) Sixth Assessment Report

[21] 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.

[5]MOEF (2009): National Adaptation Programme of Action (NAPA), 2009. The Ministry of Environment and Forests, Government of Bagnladesh, Dhaka.

[23] 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.

[24] Soil Resource Development Institute (SRDI) (2010): Saline Soils of Bangladesh, Soil Resource Development Institute (SRDI), Ministry of Agriculture, Dhaka.

[25] 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

[26] 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.

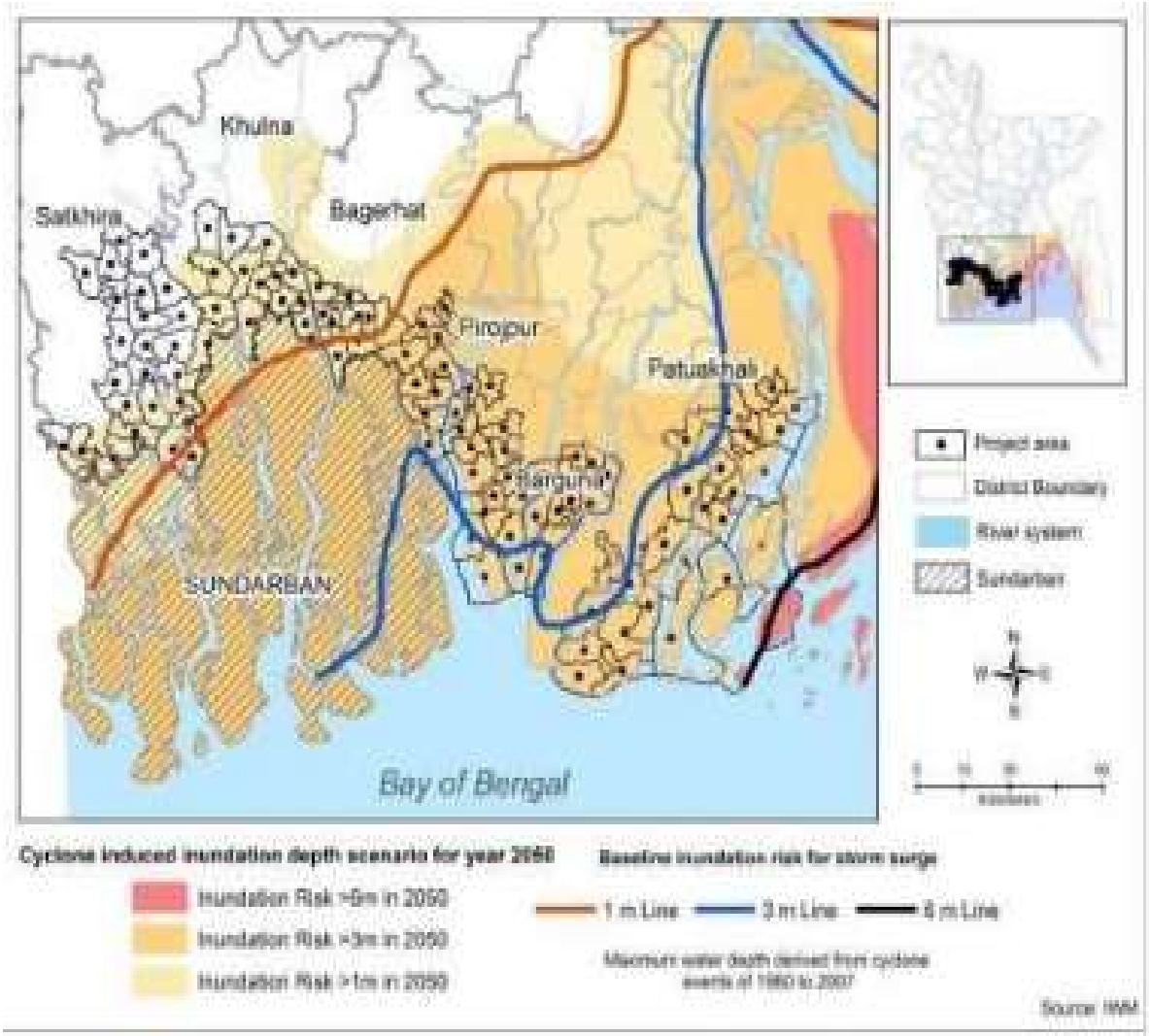

Figure 2: The projected inundation map of the coastal area in Bangladesh in 2050 due to increased number of cyclones under climate change scenario

1.10 The drinking water supplies in the selected coastal districts are adversely impacted by the rising sea level, increasing water salinity, increased soil salinity, and intensified cyclones. Due to the salinity of the ground and surface water, as described above, the drinking water supplies for those living along the coast are highly limited.

1.11. For drinking water, the majority of coastal residents use pond water that is collected during the monsoon. Given the above-mentioned evidence of past, present, and future climate change, it is clear that these conditions will only get worse for coastal residents. So, reliable safe drinking water supply in the coastal areas should depend on water treatment technology.

1.12 Since treating water is a public good, it is expected that the government will make the necessary provisions to ensure water security for all its citizens. 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 being 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 subsidies at the start, insufficient capital investment later on, and an unsuitable pricing policy for purified water make a

water plant unsustainable in the long run. There are also barriers associated with gender and wealth inequalities to ensuring equal access to a water service point at the community level.

1.13 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[27]. Due to seasonal fluctuations in rainfall, inappropriate structures to capture rainwater, and insufficient storage capacity, rainwater harvesting is not always a suitable option for ensuring year-round water security, particularly for the poor. These systems, therefore, are not able to supply drinking water to the poor throughout the year. People living in coastal areas face portable water shortages all year round, but the situation deteriorates 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[28]. 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 Sand Filter (PSF)	Rain Water Harvesting
Installation Cost (Approx)	10000 USD	600 USD	400 USD
Plant Life Time	30 Years	10 Years	15-20 Years
Average Coverage	> 500 Families	10-15 Families	1 Family
Seasonality	Minimum	Substantial	Substantial

1.14 People who live in coastal areas, in some areas, can get clean drinking water from the RO facility. A study was done on the water quality coming from a RO plant in the Patharghata Upazila (sub-district), which is part of the Borguna District. A public university lab evaluated the water sample. Table 2 displays the outcomes.

Table 2: The Test Results of RO Water Sample[29]

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

1.15 A number of factors make the reverse osmosis system a possible alternative option for drinking water for the climate-vulnerable people living and maintaining their livelihoods in the

[27] 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 Sngineering, 212, 559–566. https://doi.org/10.1016/j.proeng.2018.01.072 .

[28] 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.

[29] 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.

coastal region. These factors include suitability to use it throughout the year; the opportunity to set it anywhere in the coastal areas; that it has long-term benefits to serve a large array of families; and the scope to purify both ground and surface water.

1.16 Drinking water safety remains a major challenge with only 34.6% of households consuming water which meets both the Bangladesh standard for arsenic (<=50 ppb) and E. coli (<=1 cfu/100 ml)[30]. It is found from a study that in some coastal areas only 38% of families are water secured[31]. There is also huge demand for safe water from poor households.

1.17 Many current global development goals, including the Sustainable Development Goal 6, call for equitable access to safe and affordable drinking water and environmentally responsible sanitation for all by 2030. 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.

1.18 The Government of Bangladesh made a commitment 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. It didn't achieve. However, the revised targets and interventions are outlined in the 8th 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 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.

1.19 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. The initial investment includes, but is not limited to, the purchase of a membrane, the construction of a house, labor costs, an electricity connection, pre-treatment water tanks, and a shallow engine for pumping water from a source . 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 of Bangladesh and the suitability of establishing RO plants incorporating some new innovative features based on the experience and learning of PKSF related to RO plants, PKSF is proposing a project on provisioning safe drinking water through RO facilities under innovation: the large grant project of the adaptation fund. It is to

[30] Equity Monitoring for Results (MoRES): Application of MoRES to the Delivery of Water, Sanitation and Hygiene (WASH) Services in Bangladesh, 2014

[31] 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.

be noted that this initiative won't just be about transferring technologies (e.g., solar and other renewable energy). It needs to be modified and also innovative in terms of its style of management, operation and organizational structures that take into account regional conditions, characteristics of beneficiaries and physical characteristics of the working places (see Table 5).

Project / Programme Objectives:

List the main objectives of the project/programme.

1.20 The proposed project aims to ensure water security for coastal families by establishing reverse osmosis water treatment plants. The project will target 180,000 beneficiaries in the selected three coastal districts, namely Khulna, Bagerhat, and Satkhira. About 50% of the beneficiaries will be women, and 30% of them will be young. The project has a plan to be implemented 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 at 30.8% and Satkhira at 18.6%. The HCR of Bagerhat and Khulna districts is higher than the national average, which is 27.2%, while Satkhira is below the national average. The average rural household size of the three districts is 3.75. However, the key performance indicator of this locally-driven intervention will be the drinking water access rate among disadvantaged groups of people in the saline-prone areas of Bangladesh. The target will be to increase the drinking water access rate from 30.3% to 95% in the project catchment area within a time period of three years.

The project involves community-led or locally-led uptake of the RO systems in each location. Additional details are provided based on the locations and their needs (current solutions and future solutions). The project will, however, employ a participatory approach to create formal water management committees so that communities can work together to manage water resources and maintain of RO plants. Based on past experience with the LIFT and CCCP, the approach has proven to be successful, and committees remain active. In addition, based on the previous learnings, the project aims to tailor RO systems to local contexts and cyclones and incorporate coastal flood-resilient features. RO plants will be installed on a raised plinth above the surge height level to avoid inundation by tidal surges or cyclonic storm surges. Activity 1.1.1 highlights the need for corrosion minimization, matching international best practices with local needs, active support from local people, adjusting to local contexts and cyclones, and incorporating coastal flood-resilient features. It further mentions that situation-specific strategies will be devised to solve particular problems, and special attention will be given to these hydro-geologically critical, hard-to-reach areas. The RO plants will be established by partner NGOs that have a long presence in the working area with other livelihood support, with the extended active support of local people and also involving local council members. The proposal provides direct justification that it is not a simple technology transfer project but, in fact, an innovation rollout. The establishment of Reverse Osmosis (RO) plants in communities facing water scarcity and environmental challenges represents a significant technical innovation. RO system offers adaptable designs that can be customized to suit the unique requirements of each location. This flexibility extends to the membranes used in the filtration process, which can be adjusted based on water quality assessments. Additionally, the size, capacity, and specifications of the RO plants can be tailored to meet the specific needs and constraints of different communities, making them highly versatile and adaptable solutions.

RO technology allows for dynamic changes in design, membrane specifications, and capacity, ensuring optimal performance in diverse environmental conditions. The ability to modify these aspects of the RO plants enables continuous improvement and optimization, leading to enhanced efficiency and effectiveness in water treatment processes. This adaptability not only addresses current challenges but also positions RO plants as resilient solutions capable of evolving to meet future needs and emerging threats, such as cyclones and tidal surges. Furthermore, the incorporation of corrosion minimization techniques and coastal flood-resilient features demonstrates a commitment to innovation in design and engineering, ensuring the longevity and sustainability of RO plants in coastal regions prone to environmental hazards. Overall, the RO plant represents a technical innovation that combines flexibility, adaptability, and advanced engineering to provide communities with reliable access to clean and safe drinking water.

The introduction of Reverse Osmosis (RO) plants in communities grappling with water scarcity signifies not only a technical advancement but also a profound social innovation. Beyond its technical functionalities, the implementation of RO plants includes a collaborative effort that engages local residents in decision-making processes and encourages their active participation in project execution and maintenance. This inclusive approach develops a sense of ownership, pride, and community cohesion, enriching the social fabric of the area. Furthermore, by providing avenues for community involvement through labor contributions or land use, RO plants generate social capital and empower individuals to become stewards of their own water resources.

Additionally, the presence of RO plants can catalyze economic opportunities, attracting enterprises and fostering entrepreneurship within the community. Thus, RO plants represent a holistic solution that not only addresses water quality challenges but also drives positive social transformation and sustainable development

It gives some light detail about how the project will need to be adapted for each region based on the 18 various factors outlined in Table 5. The learnings coming out of the two completed projects that tested RO water treatment systems, i.e., the CCCP and the LIFT, that are addressed in Table 5, will inform the current project.

Project / Programme 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.

Project/Programme Components	Expected Outcomes	Expected Outputs	Countries	Amount (US$)
1. 1. Development of drinking water supply facilities	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. Output 1.2 Water testing kits are procured and supplied.	Bangladesh	4,167,240
2. Institutional support at the local level for project implementation, infrastructure operation and sustainability and knowledge management	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 Output 2.2: Training materials developed. Output 2.3: Training for beneficiaries conducted Output 2.4: Learnings are captured and disseminated	Bangladesh	375,205
3. Project/Programme Execution cost				68,400
4. Total Project/Programme Cost				4,610,845
5. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)				389155
Amount of Financing Requested				5,000,000

Projected Calendar:

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

Milestones	Expected Dates
Start of Project/Programme Implementation	December 2024
Mid-term Review (if planned)	June 2026
Project/Programme Closing	September 2027
Terminal Evaluation	December 2027

PART II: PROJECT/PROGRAMME 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*.

2.1 The geographical location and low elevation of the coastal zone of Bangladesh make it susceptible to disasters, as mentioned above. The coastal areas of Bangladesh are therefore more vulnerable to climate change. Sea-level rise is amplifying risks such as flooding, storm surges, inundation, saline water intrusion, and coastal erosion. As a result, coastal people are vulnerable due to i) poor human settlement in low-lying areas, ii) climate-sensitive livelihoods, and iii) a scarcity of safe drinking water.

2.2 The project targets to provide safe drinking water to 180,000 people in the three coastal districts, i.e., Khulna, Bagerhat, and Satkhira. Hence, the project will provide about 45,000 households with safe drinking water through the establishment of 180 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. 180 technical workers for plant maintenance will be chosen from low-income families. The project will attempt to ensure that 50% of the technical people will be women, particularly the youths (as defined in the national youth policy, 2017, aged 18-35 are the youths in Bangladesh).

2.3 In target areas where marginalized and vulnerable groups have been identified, particular benefits provided by the project or program 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 crabs and other forest materials. They are also involved in shrimp farms and agricultural activities. The project will give priority to them while selecting the sites for the establishment of the RO plants.

2.4 Reverse osmosis water treatment facilities will be built as part of the project to provide vulnerable coastal communities with continuous, clean drinking water. The rationale behind the decision to switch to RO water treatment plants is that the alternatives (using tube wells, pond sand filters (PSFs), low saline pond water, and rainwater harvesting) have proven to be unsustainable and/or are affected by seasonal variations, making it impossible to have a continuous supply of potable water. Additionally discussed in Section 1.9 is the justification for using RO plants.

2.5 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: (1) Development of drinking water supply facilities; (2) Institutional support at the local level for project implementation, infrastructure operation and sustainability and knowledge management; and (3) project execution.

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 have been 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. Traditional and diverse drinking water sources for the masses living in coastal rural areas 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 devices are generally of 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 surges and tidal surges. The lack of climate-resilient adequate water storage infrastructure exacerbates coastal people's water insecurity and complicates the situation of water-borne diseases, which is exacerbated 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 Procure RO plants

The features of a RO plant will be designed considering the new innovative features mentioned in Table 5 and the specifications mentioned in Annex 1, with sufficient capacity to supply year-round household needs of around 1000 people from each plant. 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 180 RO plants will be established by partner non-governmental organizations (NGOs) with the active support of local people, adjusting to local contexts and cyclones and incorporating coastal flood-resilient features (details on the processes and technologies used to treat water can be seen in Annex 1). The Executing Entities (EEs) will procure RO plants based on the specifications provided by the PMU. Necessary procurement policies and methods should be followed to ensure transparency.

Activity 1.1.2 Construct RO plant sites

A small scale of construction needs to be done to establish the RO plant. A detailed specification will be provided by PMU for this purpose. The corrosion of certain construction materials under saline conditions will be considered carefully (details can be seen in Annex 1). One of the more preferable energy options for this RO plant will be the energy that derived from renewable sources, notably solar energy. A target of the proposed project is to obtain 20% of its energy from renewable sources. However, due to the situation, energy from generators, solar panels, and the mains will also be utilized. 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 EEs. Second, the availability of raw water will be explored. Third, the sources of power will be identified. Fourth, local enthusiasm to manage and operate the plants will be understood. Fifth, the availability of land, preferable donated by the community, for setting up a RO plant will be considered. Land-user right for setting up a RO plant will be organized where applicable. Sixth, the scope for the management of rejected water will be

evaluated. Seventh, the vulnerability of infrastructure and people to climate-induced hazards will be estimated. Eighth, the intention of local people and EEs to monitor the quality of water at various levels will be valued. For performing activity 1.1.2, the necessary training will be provided to the representatives of EEs and local 'Water-User Groups'. It is to be noted that the project will not use an energy storage device. The maintenance of the solar panels is related to cleaning of the surface of the panels, converters, and connection wire. Hence, long-term maintenance costs will be minimal.

Output 1.2 Water testing kits are procured and supplied.

Regular water quality testing at the RO plant, which is a crucial component of maintaining a trustworthy and safe source of water, will guarantee that the water source is being appropriately protected from potential contamination and that the right treatment is chosen and working as intended. To maintain national drinking water standards 9 details can be seen Section 3 of Annex 1), it is essential to regularly understand the quality of water on various criteria, including pH, TDS, E. coli, chlorine, sodium, potassium, calcium, magnesium, arsenic, and iron. If necessary, water testing will be done in public laboratories with funding from the local community.

Activity 1.2.1 Procure testing kits

The testing kits will be procured by the EEs and necessary procurement guidelines will be provided by IE. Besides, detail specifications and operational procedures for testing kits will be provided to EEs from IEs.

Activity 1.2.2 Distribute testing kits

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

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 Groups are formed

These plants will be managed and owned by local community people with active guidance from PKSF and its EEs. Local council members and other local philanthropists will also be involved in this process. The locally-managed and locally-owned RO plants will have a broad base of memberships in which the benefits will support a wide range of target groups, such as, among others, the extremely poor, people living with disabilities, 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 capacity to direct the management and policies of the RO plants.

Activity 2.1.1 Select beneficiaries and form groups

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-User Group' in Bengali *'Pani Sangathan'*. To identify them clearly, the village or location 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 EEs.

A water-user group will be established to carry out this activity after the location of the RO plant has been decided upon after thorough consultation with the local population and taking into account the factors described in Activity 1.1.2. A membership base of 250 families, which can potentially accommodate 1,000 people, is the goal. Each family will obtain a membership card on which will be recorded information about the water they received from the plant. Each member will pay a yearly subscription fee based on their financial situation and after a thorough discussion with all members during the meeting. Water usage fees may also be established and billed to members on a weekly basis. Members will have a guarantee that they will get a certain amount of water through this arrangement. The committee may sell a portion of the water to others after

satisfying the demands of all members in order to recoup some of the expense. The reference to selling water to "others" after meeting the demands of all members pertains to individuals or entities outside of the water-user groups who may require access to purified water from the RO plants. These "others" could include neighboring communities, or individuals who may benefit from purchasing purified water from the RO plants. However, priority is given to meeting the water needs of the project beneficiaries before considering selling to external parties. This aspect of the project's revenue generation strategy ensures that surplus water, if any, can be utilized to generate additional income to support the sustainability of the RO plants and the community water supply system as a whole. However, it will depend on the capacity of a RO plant.

For a period of two years, this water-user group will elect a five-person management committee from among its members. They are also able to include a local EE member. There should be at least two female members. This water-user group will also hire a local individual to work as an operator-cum-technician and serve as the management committee's member secretary. This person will be in charge of running and maintaining the plant. This management committee will be responsible for operating a separate bank account, managing a water distribution logbook, keeping a maintenance register, and maintaining an accounting register. In case of an emergency response, this committee will also be in charge of maintaining close communication with the supplier of the RO plant. This committee must present a report on the financial and maintenance status of the plant to the annual general meeting each year. In addition, there will be a three-member advisory group made up of representatives from the local council, and the office of public health engineering in the area, and the management committee's chair. A designated local EE person will periodically check the plant, at least once in a week.

To ensure the project's sustainability, a dedicated committee will oversee monitoring and managing its financial status. As this is a local community and the beneficiaries know each other very well, they can support each other personally in case of shortfalls (if any).

Activity 2.1.2 Mobilize Project Participants and organize 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 issues and the challenges of drinking water related to climate change and other stressors.

Output 2.2: Training materials developed.

Activity 2.2.1 Prepare training material on climate change and water issues

Necessary training modules will be developed on group management, climate change, water and RO plant management. Theories and concepts will be contextualized using local terms, analogies, and metaphors so that theories and notions with a local context can be used and comprehended. Before choosing the training topics in detail, a training needs analysis will be conducted.

Output 2.3: Training for beneficiaries are conducted

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

Activity 2.3.1 Organize 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 of issues with competent master trainers. Training of Trainers (ToT) will be conducted, if necessary, to roll out the training quickly. The

Gender Action Plan (GAP) will be used for all activities. The training content will incorporate climate change and water issues, gender, vulnerabilities, and social inclusion.

Output 2.4: Learnings are captured and disseminated

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. Currently, there is limited knowledge and understanding of the effectiveness of adaptation interventions globally, including in Bangladesh. Through organized monitoring and evaluation operations, knowledge information will be acquired.

Activity 2.4.1 Conduct periodical and final evaluation of the project activities

This project will promote a periodical evaluation system of the project interventions to understand their effectiveness in terms of adaptation to climate change. Hence, the project will record all the data from the beginning and will conduct a final evaluation. This will help generate adaptation knowledge as well as learning for future projects and programs.

Activity 2.4.2 Establish three knowledge hubs

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 for operating 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.

Component 3. Project Execution Arrangement

PKSF does not directly implement projects. Instead, it facilitates project implementation through its existing network of partner organizations.
PKSF will establish a Project Management Unit (PMU) to oversee and supervise the project. This PMU will be responsible for monitoring and ensuring the effective implementation of the project by the selected EEs. PKSF will select EEs from its existing pool of 187 active partner organizations/NGOs. These EEs will be chosen based on specific criteria such as their presence in project sites, credibility in fund management, track record of project implementation, transparency, accountability, and technical skills. Additionally, these organizations must be registered with the Microcredit Regulatory Authority and have established relationships with local communities and government agencies.
While PKSF will not directly implement the project, it will play a crucial role in ensuring the successful execution of the project through effective monitoring and supervision via the PMU. This approach allows for leveraging the expertise and resources of both PKSF and its selected EEs to achieve the project objectives efficiently.

various financial services, implement development projects and capacity building programs.

Criteria for Selecting EEs:

- EEs must have a presence of at least 03 years in the proposed project areas to ensure effective implementation at the grassroots level.

- EEs should demonstrate a track record of transparent and accountable fund management to ensure the proper utilization of project resources.
- EEs should have experience in successfully implementing development projects, particularly in the areas of water management and climate change adaptation.
- EEs must possess the technical expertise necessary for implementing the various components of the project, including RO plant management, community mobilization, and capacity building.

Selection Process:

- PKSF will seek EOI from the POs and then, conduct an initial screening of its existing pool of interested partner NGOs based on the specified criteria by a high level selection-committee formed by the PKSF's management.
- Eligible NGOs will be invited to submit applications detailing their experience, capacity, and proposed approach to project implementation.
- A high level selection committee of PKSF will evaluate the applications against the selection criteria and shortlist a maximum of 10 EEs deemed most suitable for the project.
- Shortlisted EEs will undergo a due diligence process to verify their credentials, including financial stability, organizational capacity, and past performance.
- Based on the results of the due diligence process, the final selection of EEs will be made, ensuring a diverse representation of organizations with complementary strengths.
- The entire selection process might take approximately 3-4 moths.

Competent staff both at the PMU and EE levels will be a critical input for the success of the project. The staff will be recruited competitively through an open advertisement. PKSF may deploy competent personnel to execute the project. Training will be provided to 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 experiences, particularly the best practices and challenges. Details budget related to project execution costs can be seen in Annex-2.

PKSF will also involve the local council members, who are the elected members of the union parishad (the lowest administrative unit of the government). They have their own development mandates established by the local government act. These members are also members of the union disaster management committee and the union WASH committee. The proposed water user groups (described in paragraph 2.50) will be an integral part of the implementation arrangement. Among other duties (as described in the said paragraph 2.50), they will coordinate them about the project activities and seek advice from them for effective implementation of the project. Local officials (sub-district level) of the Department of Public Health Engineering (DPHE) will also be consulted for ensuring water quality, sources, etc. However, the project will not involve volunteers other than the water management groups. The group members will volunteer the project's activities.

Project Cycle Management Fee

PKSF, as a NIE of the Adaptation Fund, will monitor the activities of the proposed project. A number of high-level field visits will be organized for high-level officials and policymakers. To

recruit efficient staff for implementing the project, the appropriate Terms of Reference (ToR) for each staff member will be developed, focusing on the experience and knowledge related to climate change and water issues of the incumbent by NIE. Besides, PKSF will review the quarterly and annual reports prepared by PMU staff.

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

2.6 The reverse osmosis water purification model demonstrates how PKSF may create a sustainable water supply strategy for the POs to implement. The eventual handover of operational management of the water supply system to the local population was one of the main goals of the planned business model for PKSF-supported, PO-operated and community-managed RO facilities. It is clear that these technologies may be simply controlled and used by the locals provided they are properly trained. The underprivileged individuals working in these plants would also have access to alternative employment options. On the basis of past experience, RO plants will be built with each community's needs in mind. This initiative won't only be about transferring technologies. It needs to be adjusted in terms of its operating mode, management structures that take local conditions and geographic features of the working locations into account. The characteristics of RO plants will vary by location and be tailor-made. The fundamental guiding principles and concepts will be equity and equitable participation. Below are a few illustrations of the various attributes of a RO plant based on the previous leanings, which indicate the scope for further innovations.

2.6.1 Lessons from previous CCCP and Lift project

PKSF has been working to promote RO plants as a means of supplying safe drinking water for more than a decade. Altogether, PKSF has been able to establish 83 RO plants in several coastal districts. We have carried out field visits and consultations with communities to capture the lessons of these plants. The key challenges are related to maintenance, lack of technical personnel, lack of ownership, lack of community participation, lack of knowledge on the technical aspects of the RO plants etc. The consultation team found that the RO plant-based drinking water demand of the community people decreased during the monsoon as they got rainwater. During this time, some of the RO plants, remain closed. As a result, the machines get affected and become dysfunctional. As there is a lack of technical personnel and ownership, these plants cannot be repaired. In addition, the earlier RO plants did not have pre-treatment facilities and the membrane was not selected considering the water quality, particularly the amount of dissolved materials and sediments. Besides, the structure of the RO plants did not consider climate change-induced disasters. Hence, some of the plants were affected by cyclones and coastal floods. Furthermore, the existing RO plant did not incorporate a waste water management system. There were no consultation meetings for the establishment of the RO plants. As a result, ownership was not developed, and thus maintenance and management were affected. These are some key lessons that we learned from existing practices.

This project has incorporated all these challenges. It will target new areas and communities that are not familiar with the RO plants. The targeted communities are different in terms of administrative area though social structure and geographical characteristics are more or less similar. Different administrative areas, mean that these people receive local government services differently, including services related to the supply of drinking water. The project has involved the Department of Public Health Engineering (DPHE), specialists from Bangladeshi universities, private entrepreneurs, local government representatives, and community members. PKSF has carried out both formal and informal consultations with these stakeholders. This project will bring both process innovation and technical innovation. For example, this project will form water management committees involving women for the management and maintenance of the RO plants. An integrated monitoring system will be developed involving women representatives, local

government representatives, civil society organizations, an operation and maintenance plan, etc. On the other hand, the project will consider raw water quality for procuring membranes, incorporate pre-treatment of water, waste water treatment facilities, solar energy, etc.

Our proposal indeed acknowledges the successful approach employed in the LIFT and CCCP projects, particularly the establishment of formal water management committees and community-led uptake of Reverse Osmosis (RO) systems. These successes have provided a strong foundation for our project. However, we also recognize the challenges faced, such as maintenance issues, lack of technical personnel, ownership, and community participation.

To address these challenges, our project takes a multi-faceted approach:

Tailored Solutions: We have learned from past experiences and are tailoring our interventions to address local contexts and needs. This includes incorporating cyclone and coastal flood-resilient features into the design of RO plants.

Community Engagement and Ownership: We are actively involving communities in the establishment and management of RO plants. By forming formal water management committees that include women representatives, we aim to foster ownership and ensure sustained community participation.

Capacity Building: Recognizing the lack of technical personnel and knowledge, our project includes capacity building components aimed at empowering local communities to effectively operate and maintain RO plants.

Innovation Integration: We are integrating technical innovations such as pre-treatment of water, waste water management systems, and renewable energy sources like solar power into our project design to address identified gaps.

Theory of change: If safe drinking water is made available for water-stressed coastal people of Bangladesh through reverse osmosis plants and communities are empowered through mobilization and training support, then their adaptive capacity, wellbeing, and resilience will be enhanced, which will facilitate the implementation of water policy, the national adaptation plan, and the 8th five-year plan of Bangladesh, eventually contributing to the relevant SDGs' achievements because coastal communities, including women and other vulnerable groups, will be i) less vulnerable to salt water, ii) less water-related health hazards, and iii) increase in productive time.

Assumptions underlying this theory of change include the expectation that people will buy purified drinking water, which will effectively mitigate water-related health hazards and reduce vulnerability to saltwater intrusion. Furthermore, it assumes that community mobilization and training will result in increased awareness and capacity to manage water resources sustainably. However, potential barriers to success may include logistical challenges in establishing and maintaining RO plants, limited community participation, and the need for ongoing support and resources to ensure the sustainability of interventions. Additionally, the effectiveness of the RO plants in addressing water quality issues and the extent to which communities adopt and utilize the technology will influence the achievement of desired outcomes. Despite these challenges, the theory of change posits that by addressing these barriers and leveraging community empowerment, the initiative can contribute to improved wellbeing and resilience among coastal communities in Bangladesh, aligning with broader development goals and SDG targets.

The table below describes existing practices and innovations for the proposed project.

Table 5. A few examples of innovation potentials for a RO plant

Sl. No	Features of RO Plant and its Management	Existing Practices	Description of innovation potentials
1.	Community	Selected communities are involved.	The proposed community will be different in terms of administrative areas at the upazila (sub-district) and union levels. This community fully depends on traditional water management systems, which have many disadvantages, particularly in the context of present and future climate change. For example, the hand-pump tube wells in this community have become dysfunctional due to increased salinity in the groundwater. Moreover, rainwater harvesting in ponds or reserve tanks could not supply water for all seasons due to limited storage capacity and contamination with increasing salinity. The plants will be established in marginalized and remote areas, such as poor, female-headed households, fishers, small traders, PWDs, special social groups, youth, adolescents, and the elderly. Their preferences and choices will be acknowledged. A community-based approach will be taken.
2	Technology	Similar membrane and equipment were used.	The existing RO plants mainly depend on groundwater, but it has not been considered that groundwater and surface water require different types of membranes. This project will strongly consider the technological variations for ground and surface water to ensure the durability and sustainability of the RO plants.
3	Developing technical skill within the community for maintenance and management of RO plants	No technical staff was developed for maintenance of RO plants.	The existing RO plants do not have a technical person for maintenance. If any plant becomes dysfunctional due to damage to parts of the machine, the community has to wait for a technical person who mainly lives in city areas. They get the technical person after a few days or even a week. This project will provide training to people within the community on the repair and maintenance of the RO plants so that the damaged plants can be instantly repaired.
4	Management Committee	There is no management committee for the existing RO plants.	A management committee consisting of members from the respective water organizations involving women will be formed for each RO plant. Members will include representatives from the water organization, the local council, and the partner EEs. There will be a management committee that will be responsible for operating the plant.
5	Water-user groups, Organization, membership and Ownership	No membership and no water-user group.	A fee-based membership system will be introduced to form a water-user group. A water organization will be formed locally for each RO plant. Non-membership arrangements, in case of surplus water, will also be there. RO plants will be owned by the respective water-user groups under active guidance from local councils, public organizations, and EEs.
3			
6	Management of Waste Water	No waste water treatment system was adopted.	Waste water will be treated through dichlorination before discharge to the natural water systems.

Sl. No	Features of RO Plant and its Management	Existing Practices	Description of innovation potentials
7	Consideration of sea level rise, coastal floods, cyclone and storm surges	The existing RO plant did not consider the climate change related extremes.	This project has analyzed the climate change impacts and vulnerabilities of the proposed areas. Considering these impacts, the project will raise the plinth of the RO plant and build storm-resilient houses for it so the plants can provide fresh water for drinking even during cyclones and floods.
8	Energy	Energy from the mains was mostly used.	One of the more preferable options is energy derived from renewable sources, notably solar energy. The target of the proposed project is to obtain 20% of its energy from renewable sources. However, due to the situation, energy from generators, solar panels, and the mains or power grid will also be utilized.
9	Land Ownership	The land was purchased to set up a plant by the local NGO.	Land user rights will be provided by the local community voluntarily. It will promote a sense of belongingness and ownership.
10	Involvement of Stakeholders	It was the minimum.	All stakeholders will be involved in the operation of RO plants, including NGOs, local councils and public health organizations.
11	Water Demand	Water demand was not assessed properly.	The supply-demand gap will be assessed before setting up a plant.
12	Design and Capacity	A unique design was supplied.	The design and capacity of an RO plant will be demand-driven based on the quality of raw water and the demand for water at the plant site.
13	Monitoring and Accounting	It was absent.	A systematic monitoring and accounting mechanism will be designed, including a real-time monitoring tool. There will be a separate accounting system for the plant activity to understand its financial transactions.
14	Pricing and sustainability	It was an ad-hoc arrangement and poorly addressed.	There will be a flexible pricing structure based on the income-expenditure assessment of an individual plant. There will be a proper balance between the philanthropic and commercial approaches to this intervention. The equity justification will be key to this. The pricing will be considered based on the 'willingness to pay' and 'ability to pay' approaches. Intensive consultations, including household surveys, will be conducted to determine the income and expenditures of individuals in the selected communities.
15	Raw Water	Mostly, ground water was used.	The source of raw water will be different. However, the use of surface water, i.e., water from ponds, tidal canals, and rivers, will be preferred. The community will take initiatives to expand the capacity of water bodies to harvest rainwater and then use it in the plant to treat it.
16	Materials	The issues related to corrosion were not considered.	To avoid corrosion of the materials due to salinity, steel with corrosion-free paint, SS materials and pre-fabricated structures will be used where possible.

Sl. No	Features of RO Plant and its Management	Existing Practices	Description of innovation potentials
17	Operation of Plants	Locals rarely supervise the operators.	The local management committee will recruit a local operator-cum-technician, who will be responsible for day-to-day operations under the active supervision of the above-mentioned committee. She will receive proper training on the operation and management of the plant. An engineer will supervise a group of operators.
18	Distribution of Water	The distribution mechanisms were not efficient.	Water will be distributed from the point of water production. Besides, local manually-driven carts, vans, and boats will be used for the distribution of water in the remote areas based on the needs of the community.
19			
20	Capacity Building on O & M	Limited capacity building arrangements were there.	An extensive training program will be provided to all beneficiaries, including operators, engineers, and officials of local council members and partner EEs on the management and maintenance of the RO plants.
21	Maintenance and water quality monitoring	The proper maintenance facilities were not present	A hub will be created for water quality monitoring. Cluster-based approaches will be undertaken for technical troubleshooting. Therefore, maintenance costs are expected to be reduced significantly. There will be a post-service warranty from the suppliers.
22	Gender Equality, Disability and Social Inclusion (GEDSI)	The GEDSI approach was not there.	A proper GEDSI approach will be implemented from the conceptualization to completion stages of the project, and from installation to distribution of water and management of plants.

Operation and Maintenance

The project will apply technical means for purifying saline water using reverse osmosis techniques. This technique will include highly technical equipment and machinery, including membranes. Hence, a RO plant will require day-to-day maintenance for smooth operation and efficient production of drinking water.

The proposed water management committees will nominate or elect at least three members as volunteers for the O&M activities. The DPHE and specialists from BUET will provide training involving such volunteers. PMU will organize such training sessions, one in every district. PKSF technical team will supervise and provide technical support during the course of the training for O&M.

However, identification the actors representing each water management committee and scheduling their activities will not be adequate to get the O&M actions done. These micro-level efforts will require the mobilization of the necessary funds. Since the RO plants are a fairly new initiative in the selected communities, the costs of O&M must be taken into consideration. For a RO plant, each maintenance routine involving the cleaning of filtration material requires about BDT 2,500 to BDT 3,000.

The stakeholder consultations provided insights into raising funds through the participation of service recipients. It is found that even the poorest have the willingness to pay up to BDT 100 per month, which is roughly about 1.4 percent of the monthly average household expenditure of a household of 4 to 5 persons belonging to the poor strata of society in the coastal area. When asked, these poorest people indicated that they would be happy to pay any amount between BDT

50 and 70, which indicates that their ability to pay is within the ballpark of 0.7 to 1.0 percent of their monthly average expenditure.

Since it is assumed that at least 250 households (1000 beneficiaries) will be sharing the benefits of water availability for drinking from each RO plant. If these households are levied BDT 70 per month (i.e., 1% of the average monthly expenditure of a household belonging to the poorest class, falling within their ability to pay), the amount generated will be more than sufficient to cover the occasional costs for O&M activities as outlined above.

It is proposed that each water management committee will be given the responsibility to raise the amount from their participating households. The fund thus generated will be kept by opening a bank account, which will be operated by selected members. The NGO, as the Partner Organization, will help and guide them, if needed for the maintenance of the fund. The sub-committee on O&M, as proposed earlier, will identify dates for O&M activities and request NGO supervising personnel to help withdraw funds from the bank account and mobilize. The overall supervision will be provided by the technical team, which is led by DPHE and the respective partner organizations.

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.*

2.7 PKSF has installed 50 RO plants in the coastal areas of Bangladesh as of December 2021. The majority of the plants started their water production at the end of 2016 and early 2017. These RO plants, in specifically selected locations, have a severe drinking water crisis, which has opened up new opportunities for overcoming the crisis. The POs of PKSF have 13,115 branch offices in Bangladesh, serving more than 19.3 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-standing 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.*

2.8 It will save time, particularly for women and girls. That means that they have more time to engage themselves in economic activities including education. Second, it has a gender dimension too. Close proximity to a water source is associated with women's dignity and security. It is expected that the proposed project will help to meet the drinking water needs of the coastal people, estimated at 180,000 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 200 jobs during the implementation phase and after completion through micro-businesses, especially in water distribution activities (Annex-6 can be seen).

2.9 The proposed RO plants will be installed on a raised plinth above the surge height level so that they are not inundated by tidal surges or cyclonic storm surges. The sites for RO plants will be selected in a location that is easily accessible to the local communities. 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 met the drinking water needs of the people but have

also enabled the communities to remain secure from various waterborne diseases[32]. It is expected that through this project interventions, the average prevalence rate of diseases associated with water will drop significantly over the period.

2.10 Based on the previous learning, it observed that 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.

2.11 For the sake of financial and social sustainability, these RO plants will incorporate various community-based mechanisms, such as the formation of community-based technical, financial, and management committees to administer the water point and empower them on how to care for the existing infrastructure, because learning a new technology takes time. When we evaluate the actual site situation in our project area, there is a high demand for appropriate saline water purification technology. It is also observed that the past and currently on-going projects have faced various obstacles during their implementation. Absence of a source of financing to cover the operating and maintenance (O&M) costs; capacity and experience to conduct the O&M; and low public awareness of the water quality have been the main bottlenecks.

It is to be noted that a fee-based membership will be introduced to form a water-user group known as a water organization. A water organization will be formed locally for each RO plant. Initially, it is assumed that users will pay BDT 0.5 per liter of purified water to meet the operational and maintenance costs of the RO plants. It is assumed based on the consultation with potential users and previous experiences. It is to be noted that each plant's service area's beneficiaries should come together to form a water group. For the proper and long-term management of the desalinated fresh water supply plant, a five-member plant management committee needs to be formed among the water organization's members (at least two women members in the committee and one representative from PKSF's local partner of PKSF). The desalinated drinking water supply plant management committee will be constituted for two years based on the opinions of the beneficiary groups. The committee will only be responsible for the operation and maintenance of desalinated freshwater supply plants. This committee will be under the authority of the water organization and be accountable to it. Members of the committee may be changed from time to time for any reason. However, it should be decided by the water organization. The operation, maintenance, daily production, and sale of drinkable water will be managed by one salaried full-time employee appointed by the committee. He will be known as an operator-cum-technician. The salary of the said officer shall be paid from the proceeds of the sale of water. Besides, one sponsor and three advisors will be responsible for providing assistance to the desalinated fresh water supply plant management committee. A local branch officer or designated officer of the concerned partner organization of PKSF will act as sponsor, and b) an advisory committee consists of three members, i.e., the concerned local council chairman, the president of the water organization, and a representative from the local public health office. The involvement of various stakeholders, particularly those related to local water management, will enhance the capacity to secure additional funding help to share knowledge and avoid duplications.

The community also reported that the reasons for not using public drinking water facilities were the cost, bad taste, and distance. Generally, the community in this area has many requests for

[32] 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.

the appropriate purification technology. Most of them already understand the health effects of high salinity water and they are ready to put all their effort and energy into caring 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 a high propensity that the community will adapt to them[33]. However, the reverse osmosis process has a relatively higher likelihood as it is currently practiced everywhere, and everyone has seen or heard about it. The economic, social, environmental, and technological benefits of establishing RO plants in severely saline-affected areas, with particular reference to the most vulnerable communities are given below.

Social Benefits and Sustainability

2.12 It is mentioned above that the women will save time as they will have drinking water sources in their locality. Thus, women can spend more time looking after their children's education. It will reduce potential sexual harassment due to the reduced distance of water collection. Because the project will involve 50% women in its activities, it will empower them and allow them to participate in family decision-making. Typical examples of strengthening social sustainability, such as ownership at the local level and women's participation in management and operation of the plants, and better health outcomes, were observed in the previous CCCP project. PKSF partner organization, Nowabenki Gonomukhi Foundation (NGF), has experience in providing clean water to the coastal areas of Satkhira and Khulna. District leaders of these areas stated that water treatment plans for purifying water and serving pure drinking water to the inhabitants of the Satkhira district were established using the reverse osmosis process. NGF has been monitoring, marketing, and maintaining the project and machines for more than 4 years.

Economic Benefits and Sustainability

2.13 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 care costs as the existing drinking water is not suitable for good health. So, they are often affected by different types of waterborne diseases, such as dysentery and diarrhea. Moreover, the women have to travel more than a kilometer to collect drinking water. By establishing the RO plants close to their residences, they will be able to save time and travel costs for collecting water. They will be able to spend more time on productive work, particularly income-generating activities. The project will document the quantity of the benefit during implementation of the project.

2.14 The economic sustainability of the RO plants will depend on many aspects. These include, among others, various 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 split into capital expenditures (CAPEX) and operating expenses (OPEX). For small-scale systems, the location of the treatment facility has a substantial impact on both CAPEX and OPEX, which vary greatly. OPEX is primarily influenced by energy costs and maintenance, which can be reduced by switching to a cheap electricity source and involving the local community in maintenance. RO now rules the desalination business since it is a more established technology with lower CAPEX[34]. However, few people in Bangladesh's coastal regions are willing to pay for clean drinking water due to their dire economic circumstances. The circumstance appears to be one where there is little willingness to pay, thus it would be best to recommend a technology with

[33] CTCN, 2019, Bangladesh CTCN TA Project Potential Application for Purification of Saline Water at household level.

[34] 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

low operating and maintenance costs. In the economical aspect, RO plants seem to have lower CAPEX and easily available technology. In addition, when compared to other desalination technologies on the market, RO will be the first choice when used with renewable energy sources and for highly salinized water. On the basis of the prior experiences, cost recovery measures will be devised, and the community will decide on their cost recovery plan. For cost recovery, such as ongoing operational costs and maintenance costs, appropriate mechanisms will be put in place by creating management committees and providing the local community with the necessary training.

Environmental Benefits and Sustainability

2.15 The RO plants will purify surface water. So, there will be less reliance on groundwater. This will improve the project area's ability to store groundwater. This sustainability pillar essentially makes sure that the rate of waste generation from the chosen desalination technique shouldn't be higher than the environment's assimilative capacity (sustainable waste disposal). RO produces a lot of waste and has an associated negative impact on the environment, but by investing in better membranes and/or multi-pass systems, RO can use less water and be more water-efficient and environmentally friendly. The project will use nearby canal surface water and discharge wastewater into the source, which will dilute it and make it less dangerous for the source (details can be seen in Annex-5). Wherever practical, solar energy will be employed. The locally-suited options available shall be adopted in place of the rejected water management.

Technical Benefits and Sustainability

2.16 The most evident factors affecting the sustainability of purification technology are technical ones connected to the design and construction of rural desalination facilities. With the help of this sustainability pillar, it is possible to make sure that the purification technology is technically sound, scientifically validated, commercially viable, and conveniently installable and faultlessly operable in the project area. This involves choosing the right site to avoid duplicating efforts with other implementing bodies, avoiding places that flood during site selection and make building more difficult, and providing water to the entire community. The location at which we choose to build the desalination plant will undoubtedly influence the choice of purifying technique. Contrary to home water purifiers, it has been suggested that public water facilities in this project should be built in public spaces, such as schools and community spaces, where possible, and made accessible to many local inhabitants. The capacity to eliminate all contaminants is another crucial technological factor to take into account when choosing a technology. Iron, arsenic, and other contaminants must be able to be removed from the water in order to solve the problem of water quality in the coastal zone, which is not just limited to salinity.

2.17 The target community's needs must be satisfied as part of the technology selection process. End-point Detection and Response (EDR) and Capacitor Discharge Ignition (CDI) technologies are still in the early stages of commercialization, which is shown in the vast range of capital costs they have. However, CDI and EDR are generally expected to cost twice as much as traditional RO units. Although Surface Sewage Disposal (SSD) has very cheap to nil operating expenses, due to its extremely low daily output rate, the technology is less appealing for low-income rural areas. The fundamental problem with CDI and EDR is that they are not mass-produced and have not undergone the same level of optimization as RO. An RO system can handle CDI systems with a same capacity for ten times less money, according to a 2013 technological study of CDI. The majority of SSD's units only produce 2 to 35 liters of water per day, which is only adequate to

serve water to 1 to 5 people. It is conceivable to set up a lot of SSD facilities, but this demands a lot of land and capital investment[35].

2.18 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 the Fund's outcome 8: Support the development and diffusion of innovative adaptation practices, tools, and technologies. It also qualifies for 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 was adjusted with lessons that were learnt under the LIFT programme and the CCCP project has proven viable in terms of water supply, cost-effectiveness, and sustainability.

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.*

2.19 Other than reverse osmosis, water purified by PSFs, water from rainwater harvesting systems, and water from low saline ponds are the main sources of water for the coastal population. Among all these sources, water from the RO plants is safe and cost-effective. A brief description can be seen in various sections of Part I.

2.20 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[36]. 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 180 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.

2.21 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 water source in southwest coastal Bangladesh [37]. 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.

[35] 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).

[36] 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.

[37] 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.

2.22 Inappropriate Operation & Maintenance (O&M) of water sources is the most prominent cause behind the lower quality of service[38]. 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)" 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) in many places with some challenges. A few of them are outlined in Table 5. Here, similar initiatives will be undertaken taking people's preference and convenience to formally engage the community in participatory drinking water management, particularly in production and distribution. 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 introduction with a content 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)

2.23 Untreated water for drinking and other domestic applications is provided by an open pond in the neighborhood. Before the early stages of the installation of tube wells in Bangladesh, the traditional rural water supply in Bangladesh was based to a large extent on open ponds. Many ponds evaporate during the dry season. This pond's biological quality is quite bad because of unclean behaviors and a lack of sanitary protection. For fish culture, many of these ponds are contaminated. In order to maintain good quality water, the open ponds should 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)

2.24 Building a Slow Sand Filter (SSF), also known as a Pond Sand Filter, is a potential solution for treating surface water (PSF). It was developed to purify low-saline pond water for the coastal area's drinking water supply. It comprises of installing a tube well, positioning the filter, and building a filter bed and storage chamber out of ferro-cement. The quality of water from it is comparatively better because it can remove bacteria (*E. coli* and other pathogens). The sand in the bed should typically be washed out and refilled every two months. Where maintenance is lacking, there is a risk of microbial contamination. A PSF's primary drawback is that a particular pond cannot be utilized for fishing, bathing, or washing. The flow rate may be slowed down by excessive turbidity with unclean particles on the surface. A PSF requires installation, frequent maintenance, and routine cleaning, all of which take time and money, but maintenance and cleaning are crucial to the PSF's performance. It can be challenging to locate a suitable pond in which to put a PSF. Ponds are also contaminated with saline water as a result of the frequent coastal floods and cyclone activity.

Rainwater Harvesting System (RWHS)

2.25 In many developing nations across the world, rainwater is used as a safe supply of drinking water, particularly in coastal locations, island communities, and other places where many aquifers

[38] 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.

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. The uneven distribution of rainfall throughout the year necessitates a larger storage tank in many locations. Any form of roof can be used to collect rainwater, however concrete, tiles, polythene, and metal roofs produce clean water. It is necessary to regularly clean tanks and catchments and to check the quality of the water, especially during lean times. Because rainwater lacks minerals, it provides reliable water quality but has a rather bad taste. Where maintenance is lacking, there is a risk of microbial contamination. Insect invasion and bird droppings can contaminate the water as well. To make up for the absence of minerals in rainfall, doctors advise patients who regularly drink water from RWHS to take vitamin supplements or eat more vegetables and meals.[39] People living in the project area have thatched roofs that are either smaller or do not have any roofs at all. Maintaining the high quality of the rainwater depends on keeping the roof and storage tank clean. To avoid contamination from the roof, the first runoff from the roof should be discarded. The bacteria or parasites brought by the flowing rainwater will typically die off if the storage tank is clean. When the tank is empty or at least once a year, the storage tank needs to be cleaned and disinfected.

Artificial Rainwater Harvesting System (ARWHS)

2.26 A recently developed rainwater storage system, or ARWHS, collects rainwater using an iron sheet shaped like a cone. A plastic pipe carried the collected rainwater to an underground storage tank for storage. Through a tubewell, the beneficiaries use the water all year long. Underground construction is an obstacle to clean the storage tank. As a result, water quality becomes low and necessary trust to drink it.

Artificial Aquifer Tubewell (AAT)

2.27 AAT is a very recent pond water treatment technology. AAT systems are a little bit quicker than PSF systems. One pipe was adjusted to fit the lower portion of the pond so that water could flow through it naturally without the need for constant pumping. After passing through a PSF-style sand and gravel bed filter, all of the water was then kept in a sizable reserve tank made entirely of RCC structure. The reserve tank is connected to another tubewell so that individuals can use the tube well to pump out fresh water. With the help of this technology, services can be delivered quickly. People generally believe that water comes from the ground, thus they have more faith in this technology's benefits than in those of other technologies. During dry spells, there is intense public pressure for reasonably fresh drinking water, and about 300 people use an ATT daily. As a result, the technology performs worse.

Hand Tube Well (HTW)

2.28 A long, 100-200 mm diameter stainless steel tube or pipe is bored into an underground aquifer to construct the shallow hand tubewells that are operated in the study area. The water table's depth determines the required well depth. A small reservoir of water is made at the outlet of the tube well. The local community uses this reservoir for a variety of water-related functions, including bathing, cleaning, washing, and other daily tasks[40]. A HTW is available for usage in every other residence. Due to the high amounts of arsenic that naturally present in shallow depths around the south-western coastal areas, the introduction of tube wells has resulted in significant arsenic poisoning in Bangladesh[41]. Typically, the project area has two types of shallow tubewells: those that are 25 to 30 meters deep and those that are 40 to 50 meters deep.

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[39] 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).

[40] 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).

[41] 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).

Deep Tubewell (DTW)

2.29 Arsenic-affected areas may be able to access safe drinking water by sinking deep tube wells. However, deep tube wells pose fewer possible health problems than other options when a confining layer is present and a sanitary completion is used. It has been discovered that some deep tube wells placed in locations with severe arsenic problems produce water with an increasing amount of arsenic. According to post-construction studies, arsenic-contaminated water may quickly infiltrate through covered materials and result in high arsenic levels in deep tube well water. To get conclusions, more research must be done by sealing the borehole at the impermeable layer's level. Deep tube wells are typically shared by several houses because to the high installation costs. 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[42]. Installing a deep tube-well for arsenic-free water requires the presence of a somewhat impermeable barrier separating a shallow polluted aquifer from a deep uncontaminated aquifer.

Comparison to other possible interventions

2.30 Lack of drinking water is a quiet catastrophe, particularly in Bangladesh's coastal regions during the dry season (November to May). Various methods of obtaining drinking water, such as Open Pond Water (OPW), Hand Tubewells (HTW), Deep Tubewells (DTW), Artificial Aquifer Tubewells (AAT), Rain Water Harvesting (RWH), Artificial Rain Water Harvesting (ARWH), Piped Water Supply (PWS), and Reverse Osmosis Water Treatment Plants (RO-WTP), are already being used in this area to tackle the problems. According to installation costs, drinking water technologies with low capital costs (less than USD 500) include OPW, RWH, ARWH, HTW, and PSF; those with medium capital costs (USD 500–1000) include OPW, AAT, and DTW; and those with high capital costs (more than USD 1000) include RO-WTP and PWS. The social factors and water quality metrics showed that WTP, a high capital cost drinking water technology, is ideal and the local users' top priority. The users' best option is RO-WTP, a high capital cost technology, and their worst option is OPW, a cheap capital cost technology. Easy use, private ownership, and superior water quality make RWH popular. The main limitations, however, are microbial contamination and year-round unavailability. PWS is another option that is popular, but its long-term use is hampered by issues with inadequate maintenance, water waste, and microbial contamination. In a certain layer, DTW is effective (200m-350m). AAT is a better option than PSF in terms of social difficulties because it has simple pumping facilities, but the water quality is poor because of issues with water clogging in its filter. Initial PSF water quality is good, but due to inadequate maintenance, it quickly degrades, making PSF a less popular technology with consumers. Despite the fact that communal OPW drinking water sources are contaminated with pathogens, people nevertheless utilize them. 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 viability in the newly formed water market[43] but these facilities demand capital investment and a long-term business plan. Technologies with competitively low capital costs can generate immediate solutions. However, even inexpensive technologies cannot deliver clean drinking water for a very long time without ongoing operating and maintenance fee collection. A

[42] 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).

[43] Jubayer.A, 2005, Evaluation of Drinking Water Technologies Used in South-Western Coastal Bangladesh: A Case Study, IWFM, BUET.

market for assured, reachable, and sustainable safe water already exists thanks to a user-pays payment system. The RO-WTP with a piped water system can satisfy local communities' needs while also being financially viable in the recently established water market, but these facilities call for substantial upfront investment and a long-term business strategy.

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

- Taking proactive measures to improve the vulnerable population's ability to tolerate climate-related hazards,
- Increasing local ability to guarantee water security;
- Saving time, especially for women and girls,
- Strengthening women's dignity and security,
- Generating employment locally,
- Improving the ability of the local population to adapt, and
- Transforming climate-smart new technology in the isolated locations.

2.32 Our recent analysis reaffirms the critical need for support in initiating a transformative project targeting communities' reliance on salty water. Through thorough examination of both with-project and without-project scenarios, we've uncovered a pivotal finding: with grant, the project yields a 7% Internal Rate of Return (IRR), while without it, the IRR becomes negative, particularly if reliant on loans. This revelation underscores the urgent necessity of initial support to catalyze a broader process that goes beyond mere technological implementation. The initial support is crucial to kick start a significant initiative to change the behavior of the communities to transition from consuming salty water to safe, fresh water. Many individuals are unaware of the health risks associated with drinking salty water. Acquiring this grant is essential to initiate a transformative process as it is the key to creating a ripple effect that will enable us to bring about this vital behavioral change.

2.33 The selling price of 0.5 BDT per liter was determined based on extensive stakeholder consultations and considerations of affordability for the target population. The pricing decision aims to find a middle ground between keeping the project financially stable and making sure the water is affordable for the people using it, especially those in low-income coastal areas facing climate challenges. However, the main goal of the project is to change how people think about drinking water. Once they get used to clean water, they're less likely to go back to salty water sources and will learn to manage their water better on their own.

With project scenario

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

Expenditures	**Amount (BDT)**
Human Resource cost	180000
Electricity Cost	180000
Motor running cost	240000
Other cost (Servicing)	120000
Maintenance	120000
Depreciation	60000
Total expenditure per year	**900000**

Revenue	Amount (BDT)
Per Day sales (Liter)	10200
Per Month sales (Liter)	306000
Incremental production per year	15%
Per Liter Revenue (BDT)	0.5
Subscription fee per year	12000

IRR	7%

Without project scenario

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

Expenditures	Amount (BDT)
Installment amount	266420
Human Resource cost	180000
Electricity Cost	180000
Motor running cost	240000
Other cost (Servicing)	120000
Maintenance	120000
Depreciation	60000
Total expenditure per year	**1166420**

Revenue	Amount (BDT)
Per Day sales (Liter)	10200
Per Month sales (Liter)	306000
Incremental production per year	15%
Per Liter Revenue (BDT)	0.5
Subscription fee per year	12000

IRR	-4%

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.*

2.34 The proposed AF-financed project is aligned with several of Bangladesh's strategies, plans, programs 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 8th 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
Sustainable Development Goals (SDGs)	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.
The 8th Five Year Plan and Vision 2021	The 8th 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.
Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009	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.
National Adaptation Programs of Action (NAPA) in 2005 and revised in 2009, and National Adaptation Plan (NAP), 2022	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. NAP is also recognized increased salinity as one of risks for water resources due to climate change.

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.*

2.35 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). It was prepared following the Bangladesh National Building Code (BNBC) in consultation with the Housing and Building Research Institute (HBRI), Bangladesh University of Engineering and Technology (BUET), and Department of Public Health Engineering (DPHE). A small scale (around 40 square meter) semi-permanent structures will be built following the building codes. 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.*

2.36 Since several steps are being taken to secure water security for the vulnerable coastal residents, there is minimal likelihood that the project will be duplicated with funds from other sources. To prevent duplication, PKSF held in-depth consultations with numerous stakeholders. In Annex 7, a stakeholder engagement plan is presented. With those involved in water-related initiatives in the proposed working areas (see Table 8), a number of meetings and conversations were held. Duplications of any kind should be avoided, it was generally acknowledged. Those projects are implementing in a small areas. It should be mentioned that the supply of safe drinking water is extremely low and insufficient compared to the demand.

Table 8: A list of water-related projects in proposed working areas

S.L.	Name of Project	Development Partner	Geographical Areas	Interventions	Synergies between LOGIC and the proposed project
1	Local Government Initiative on Climate Change (LOGIC) Project	UNDP, SIDA, EU, UNCDF	7 districts, viz. Kurigram, Sunamganj, Khulna, Bagerhat, Barguna, Patuakhali and Bhola,	i) Building capacity, awareness and empowerment of the vulnerable people to generate plans; ii) Development of capacity of the LGIs to integrate climate change into their local development plans; iii) Building capacity and engagement of local actors and government extension workers at local level to work as drivers for accountability of climate action; iv) Provide grant to local government (PBCRG) as additional resource to climate-proof their investment on community-based adaptation work;	3 districts have overlapped with these two projects. These are Khulna, Bagerhat and Satkhira. However, the activities and implementation approach are different. The LOGIC project did not specify the adaptation activities for the beneficiaries to make it need-based and participatory. This project carries out the vulnerability and needs assessment during the implementation of the project. The proposed project has carried out consultations at the design phase of the project and identified one urgent need, i.e., supplying drinking water through the establishment of RO plants. The LOGIC project will provide support to improve livelihoods of vulnerable people but this project will increase access to drinking water. Here, the proposed project complements to the

				v) Provide direct support to the vulnerable households to meet their adaptation needs; and vi) Promote a local climate financing mechanism through evidence-based advocacy for delivering climate finance at scale.	LOGIC project. In addition, the LOGIC project finances the local government institutions and also increase their capacity, which will complement the proposed project, which will enhance capacity of EEs who are non-government organisations. Thus, both projects have synergies and complementarity. This project will be carried out vulnerability assessment that will be used for selecting the sites of the project along with PKSF's consultation meetings.
2	Enhancing adaptive capacities of coastal communities, especially women, to cope with climate change induced salinity.	GCF	Satkhira and Khulna districts	Climate resilient livelihoods and rainwater harvesting for drinking purposes	Satkhira and Khulna districts are common for the GCF-funded and proposed projects. However, activities are not similar because GCF- funded activities included safe drinking water. The means of supplying drinking water are different. The GCF-funded project implements community-based rainwater harvesting techniques, whereas the proposed project will establish RO plants for supplying safe drinking water. These two projects are complementary. The proposed project has already involved the stakeholders of the GCF-funded project during consultations to avoid duplication of beneficiaries between these two projects. The project will continue this

					coordination throughout the project period.
3	Enhancing Safe Drinking Water Security and Climate Resilience through Rainwater Harvesting	Government of Denmark	Mongla, Bagerhat	1) Climate Action Groups; 2) Climate adaptive safe drinking water interventions; 3) Awareness raising on adaptation to climate change; 4) Evidence based advocacy	This project and the proposed project have synergies for supplying safe drinking water. This Danish-funded project tested multiple options of supplying drinking water, including a pond-sand-filter, a rainwater harvesting system and a water treatment plant. The proposed project proposes RO plants for supplying drinking water. The Danish-funded project is being implemented in a small area (only 6 unions of Mongla sub-district), whereas the proposed project will be implemented in three districts. However, the proposed project will coordinate with the Danish-funded project to avoid the duplication. In addition, this project will seek the experience and learning of the Danish-funded project to implement this project.

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

2.37 PKSF places 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 learning from the implemented projects. PKSF gathers and shares learning and new knowledge by storing and sharing information virtually, printing documents in the form of newsletters and books, organizing workshops and 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 future reference. The post-project review is a way to capture information for the knowledge repository.

2.38 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. The knowledge hubs in Khulna, Satkhira, and Bagerhat districts are essential for direct engagement with local communities to test the water quality in the local level and to understand their specific challenges and disseminate best practices. It is important to have these in the local areas as at this stage, the testing facilities are far away from the proposed working area. Costs for these hubs are included in the budget, covering setup, operations, and staff. To ensure long-term sustainability, we will work with our EEs to operate the hubs, integrating them into cost structures. While calculating the cost of a RO plant, we have considered the cost of testing facilities in the line item of maintenance cost.

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.*

2.39 PKSF has consulted with relevant stakeholders [for example, Department of Public Health 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 to consult with stakeholders, especially as the project selects technologies and intervention areas for the proposed project to improve on existing ideas. As a part of the project preparation, PKSF also invited these stakeholders to workshops and seminars to share learning and experience to maximize the benefits of the project. Extensive field visits were conducted in the coastal areas to understand 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 9.

Table 9. 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
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 Shaymnagar, 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

2.40 PKSF has been working as a national accredited entity as well as implementing entity for 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 an 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 the 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 the 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 - 7.

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.*

2.41 PKSF did an extensive consultation with research, academic, and public health engineering organizations. It is reflected in the outline proposed for the RO plants (for more information, see Annex 1). 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 to ensure efficiency and sustainability of RO plants. The design of an 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*.

2.42 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 not even possible for the local people to set up a RO plant on their own investment as it requires a handsome amount of capital 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 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[44]. 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.

[44] 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.

2.43 Climate change is an additional threat to 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 a huge investment in regular development intervention. Hence, the country is not in a position to invest additional resources in shocks like climate change for which the country is not responsible. So, AF funding is important to address the additional threat from climate change and enhance the resilience of the most vulnerable people.

2.44 Bangladesh's coastline region is susceptible to a wide range of natural disasters, including the unpredictable effects of climate change and extreme occurrences. The main source of food for coastal residents is agriculture, which is negatively impacted by increased salt and sea level rise on the land and water. Furthermore, agricultural cultivation, aquaculture, and other livelihoods are affected by cyclones and storm surges, coastal flooding, and erosion. These effects make it difficult for the government to supply vulnerable coastal populations with clean water to drink. The brackish water sources would be ruined if sea levels rose.

2.45 As mentioned in Part 1, the majority of coastal inhabitants are underprivileged and vulnerable to climate change. These individuals rely heavily on the environment. To manage their everyday needs, they must strive. Due to their poverty and the contamination of surrounding drinking water sources brought on by climate change-induced salinity, they have very little capacity to access safe drinking water.

2.46 The purpose of the AF is to create communities and countries that are climate resilient; however, this goal cannot be met without addressing the need for safe drinking water. In order to invest in climate-resilient development in Least Developed Countries (LDCs) and other vulnerable regions of the world, AF seeks to gather funds on a large scale. Climate change has had a significant impact on Bangladesh, one of the least developed nations (LDC). The planned initiative intends to make the coastal community, which is especially vulnerable to climate change, more resilient. This will be accomplished by promoting the provision of clean drinking water and increasing capacity in the drinking water sector for adaptation to climate change using improved water technologies.

2.47 Due to the threat posed by climate change and long-term estimates that coastal vulnerability will likely rise in Bangladesh's southern regions, AF's involvement in this project is crucial and extremely vital. The frequency and intensity of coastal floods, saline intrusion, sea swells, storms, and cyclones are projected to rise. In order to strengthen present government programs and policies promoting climate-resilient water supply systems and lessen the effects and vulnerabilities to climate variability and extreme events, more engagement and funding in expanding understanding and awareness of climate risk is necessary. The projected investment will be transformative in terms of increasing water security at the household level.

2.48 It is proposed that a sizeable amount of the total cost will be financed by the AF in the form of grant money, reflecting the country's limited resources as well as the necessity to bring about systemic change. Being one of the least developed nations, Bangladesh has very little financial capacity to adapt to climate change and must utilize the majority of its limited resources to meet competing needs. As a result, the project heavily relies on the AF funding to get beyond structural obstacles to change that are deemed necessary for achieving the initiative's goals.

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

2.49 The sustainability of the RO plants depends on a number of crucial factors. For the plants to be profitable, the cost of water is essential. Having a cheap supply of electricity is essential from a financial standpoint. The pricing of the electricity utilized for this purpose is a topic on which PKSF is collaborating with Bangladesh's Power Division. Solar solutions are also being actively considered. The profitability of the plants is also influenced by the overall amount of water produced. If production is scaled up, the average cost can be decreased. Several significant features of successful plants can be determined from the analysis. These include, among others: (i) operating time; (ii) water output level; (iii) price subsidies; and (iv) electricity source. Additionally, location (which influences the operational costs of the plants and acts as a proxy for the level of salinity in various plant areas), seasonality (which influences the demand for plant water), experience (which affects the ability to fine-tune the appropriate technology or 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. Other financial analysis and comparative advantages of RO plants can be seen in Section Part II (D) and Part II (E). To address the issue of sustainability and affordability, we have devised a pricing strategy that involves selling water at the subsidized rate of 0.50 BDT per liter. This subsidized pricing model aims to ensure equitable access to safe drinking water for the vulnerable coastal communities we serve. The implementation of this subsidy will be carried out transparently, with clear guidelines established for its application at the point of sale.

Additionally, robust monitoring mechanisms will be put in place to track the effectiveness of the subsidy in promoting access to safe drinking water among target beneficiaries. Furthermore, we plan to conduct community awareness campaigns to inform local residents about the availability of subsidized water and to encourage its utilization.

2.50 First step is to select an appropriate site. Following the location of the RO plant has been chosen after extensive consultation with the local population and taking into account the factors outlined in Activity 1.1.2, a water-user group will be constituted to carry out this activity. The objective is to have a membership base of 250 families, which has the capacity to serve 1,000 individuals. Each family will receive a membership card, on which details about the water they received from the plant will be recorded. Depending on their financial status and following a comprehensive discussion with all members during the meeting, each member will pay an annual subscription fee. Additionally, water usage charges might be established and billed to members every week. Through this arrangement, members will receive a guarantee that they will receive a specific amount of water. After meeting the demands of all members, the committee may sell a portion of the water to others in order to repay some of the cost. This water-user group will choose a five-person management committee from among its members for a period of two years. They could also be able to include a local EE member and local council. In this committee, at least two of the members should be women.

2.51 Additionally, a local person will be employed by this water user group to operate as an operator/technician and act as the management committee's member secretary. This person will be in charge of running and maintaining the plant. This management committee will be responsible for operating a separate bank account, managing a water distribution logbook, keeping a maintenance register, and maintaining an accounting register. In case of an emergency response, this committee will also be in charge of maintaining close communication with the supplier of the RO plant. This committee must present a report on the financial and maintenance status of the plant to the annual general meeting each year. In addition, there will be a three-member advisory group made up of representatives from the local council, and the office of public

health engineering in the area, and the management committee's chair. A designated local EE person will periodically check the plant, at least once in a week. Besides, the committee will have a close relationship with the local council and the public health engineering office. That will increase their scope to secure some additional funding, and help to share knowledge, and avoid duplication.

Civil works: As the structure is a permanent RCC structure, no maintenance will be required for civil works within 15 years. If any maintenance work on a small scale is required, the community will do it at their own cost.

For RO plant machinery and solar panels: there are two types of maintenance and replacement

1) Regular: filter, cartridge, anti-scaling dosing chemical, and cleaning of machinery based on quality of the source water.
2) Requirement-based maintenance and replacement: membrane (depending on the salinity concentration of feed water), feed pump, solar panel and its accessories.

All this maintenance and replacement will also be done through community contributions.

The maintenance and replacement of RO plant machinery and solar panels will be facilitated through a committee composed of community representatives, operator cum technician and project staffs. This committee will engage the community, establish transparent contribution mechanisms, manage finances, assess maintenance needs, oversee implementation, and monitor effectiveness. This structure ensures community ownership and sustainability in maintaining essential infrastructure.

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

2.52 The project will be implemented in the southwest coastal zone of the country. This area is crisscrossed by Ganges tidal rivers and creeks. It is low elevated area and most of it is within 1 meter above the mean sea level. Sea level rise, water and soil salinity, cyclone & storm surges and coastal flooding are the most common climate change induced disasters in the project area. It is located closed to the Sundarbans. Brackish water ecosystem is observed in the project area which is influenced the biodiversity of the Sunderbans. A number of economic activities like shrimp farming, crab fattening, agriculture production etc. are operated in this region. However, the proposed project will enhance access to safe drinking water of the coastal community through establishment of RO plants. PKSF as IE carried out the screening process of the project using the 15 principles of AF that are required to comply with the Environmental and Social Plan (ESP) of the fund. The screening result is presented below.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Principle 1: Compliance with the Law		√
Principle 2: Access and Equity	√	
Principle 3: Marginalized and Vulnerable Groups	√	
Principle 4: Human Rights		√
Principle 5: Gender Equity and Women's Empowerment	√	
Principle 6: Core Labour Rights		√
Principle 7: Indigenous Peoples	√	
Principle 8: Involuntary Resettlement	√	
Principle 9: Protection of Natural Habitats	√	
Principle 10: Conservation of Biological Diversity	√	
Principle 11: Climate Change	√	
Principle 12: Pollution Prevention and Resource Efficiency		√
Principle 13: Public Health	√	
Principle 14: Physical and Cultural Heritage	√	
Principle 15: Lands and Soil Conservation		√

2.53 The screening result shows that five principles are related to the project activities. These are Principle 1, 4, 6, 12 and 15. A brief description of the associated risks are presented below:

Principle 1: *Compliance with the Law*

2.54 The country has adopted the Environmental Conservation Rules (ECR), 1997 (amended in 2023) and Environmental Conservation Act (ECA), 2010. There is no mentioned of RO plants in the ECR. However, It mentioned about water treatment plant. As per schedule 1 of the ECR, water treatment plant is category Orange-B which is equivalent to Category B of the AF ES policy. The requirement for clearance of orange B activity for compliance of the ECR is given below:

i) report on the feasibility of the industrial unit or project (applicable only for proposed industrial unit or project);
ii) report on the Initial Environmental Examination of the industrial unit or project, and also the process flow diagram, Layout Plan (showing location of Effluent Treatment Plant), design of the Effluent Treatment Plant (ETP) of the unit or project (these are applicable only for a proposed industrial unit or project);
iii) report on the Environmental Management Plan (EMP) for the industrial unit or project, and also the Process Flow Diagram, Layout Plan (showing location of Effluent Treatment

Plant), design of the Effluent Treatment Plant and information about the effectiveness of the ETP of the unit or project, (these are applicable only for an existing industrial unit or project);

iv) no objection certificate from the local authority;
v) emergency plan relating adverse environmental impact and plan for mitigation of the effect of pollution;
vi) outline of the relocation, rehabilitation plan (where applicable); and
vii) other necessary information (where applicable).

2.55 The regulatory authority for ensuring the compliance of the rules is the Department of Environment (DoE) under the Ministry of Environment, Forests and Climate Change. The project has already received no objection from the Ministry of Environment, Forests and Climate Change (MoEFCC). It is also to be noted that Bangladesh Standard Testing Institute (BSTI) is the responsible authority to ensure the quality of the purified water. PKSF has conducted meetings and consultations with BSTI and local administration. They tested purified water produced from the existing plants and approved the quality. This project is not related to international laws.

Principle 4: Human rights

2.56 Human rights in the country is protected by the Constitutions of Bangladesh. It is enshrined as fundamental rights in Part III of the Constitution. The government has established the Human Rights Commission to protect the rights of its citizen. The Human Rights Commission Act was enacted in 2009. The act defines human rights as “Right to life, Right to liberty, Right to equality and Right to dignity of a person guaranteed by the constitution of the People’s Republic of Bangladesh and such other human rights that are declared under different international human rights instruments ratified by the People’s Republic of Bangladesh and are enforceable by the existing laws of Bangladesh.” Bangladesh is a signatory of all UNHR related conventions and treaties. A list of some treaties and conventions are presented in the table below as an example.

Sl. No	Name of treaty	Ratification date
1	Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment	05 Oct 1998 (a)
2	International Covenant on Civil and Political Rights (CCPR)	06 Sep 2000 (a)
3	Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)	06 Nov 1984 (a)
4	International Convention on the Elimination of All Forms of Racial Discrimination (CERD)	11 Jun 1979 (a)
5	International Covenant on Economic, Social and Cultural Rights (CESCR)	05 Oct 1998 (a)
6	International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (CMW)	24 Aug 2011
7	Convention on the Rights of the Child (CRC)	03 Aug 1990
8	Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict (CRC-OP-AC)	06 Sep 2000

Sl. No	Name of treaty	Ratification date
9	Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography (CRC-OP-SC)	06 Sep 2000
10	Convention on the Rights of Persons with Disabilities (CRPD)	30 Nov 2007

2.57 Any violation of these treaties by any person, groups, or organizations will be considered as criminal offends and applies to national laws and acts. It is to be noted that some of the treaties like Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), International Covenant on Economic, Social and Cultural Rights (CESCR), Convention on the Rights of the Child (CRC) and Convention on the Rights of Persons with Disabilities (CRPD) are closely linked with the project activities. These are also supported by the definition of Human Rights in the National Human Rights Commission acts, 2009 as stated above.

2.58 The risks of violation of human rights due to the project intervention is very minimum or low. Because, the project will adopt a community-based approach. PKSF has already conducted a number of consultation meetings at the local level. These meetings will be continuing throughout the implementation period of the project.

Principle 6: Core Labor Rights

2.59 The ILO has 36 conventions and 1 protocol related to labor rights. Out of 36 conventions, Out of 36 Conventions and 1 Protocol ratified by Bangladesh, 30 are in force, 1 Convention has been denounced; 4 instruments abrogated; 2 have been ratified in the past 12 months. Bangladesh has particularly ratified the ILO core labor standards that are stated in the 1998 ILO declaration of Fundamental Principles and Rights at work. These rights cover a) freedom of association and the effective recognition of the right to collective bargaining (conventions ILO 87 and ILO 98); b) Elimination of all forms of forced or compulsory labor (conventions ILO 29 and ILO 105); c) Elimination of worst forms of child labor (conventions ILO 138 and ILO 182) and d) Elimination of discrimination in respect of employment and occupation (conventions ILO 100 and ILO 111). All these conventions are in force in the country.

2.60 The Bangladesh Labor Act, 2006, consolidates and amends the laws relating to employment of labor, relations between workers and employers, payment of wages and compensation for injuries to workers, and other matters related to labor. The law prohibited child labor, adolescent labor, wage of women at certain period etc. It ensures rights of women labor during maternity leave. In a nutshell, all types of rights of labor including wage, freedom of association, working hours, working environment, retirement, conviction etc. are preserved by the law.

2.61 The proposed project will involve various levels of staffs and wage labors which include PMU staffs at IE level, staffs at EE level, technical staffs at local level and construction labor. There is very limited risks of violation of the labor rights. But the construction labor may be affected by low rate of wage, discrimination of wage between male and female labors and working hours. Because the labor will be engaged by the local contractors. Besides, there is risks of using child labor. However, IE will ensure that the labor rights are duly incorporated in the procurement documents of the contractors. In addition, IE will sensitize the community through the EE on the negative impacts of child labor to minimize it.

Principle 12: Pollution Prevention and Resource Efficiency

2.62 The project intervention will require very minimum fuel during implementation of the RO plants. It will involve some fuel for transportation of bricks, cement, equipment of the RO plants and vehicle used for monitoring purposes. It will also require very minimum water and soil (for raising plinths of RO plants) during construction of RO plants. So, by nature the project is resource-efficient. But energy (electricity or solar generated) will require to operate the RO plants on a regular basis. The project proposed to use 20% renewable energy for operating the plants. In addition, the project will ensure regular maintenance of the plants' equipment to keep it energy efficient.

Principle 15: Lands and Soil Conservation

2.63 As the project will be implemented in brackish ecosystem, the salinity prevails in the soil at different levels. But there are seasonal variations. The project area is highly saline prone and salinity ranges from about 5 ppt. to more than 15 ppt. depending on seasons and locations. The salinity rises during dry season (November to May) and lessen in the monsoon.

2.64 The RO plants will mostly purify saline water. So, there is risk of increasing salinity by the waste water of the plants. Besides, 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.

Based on the above assessment, the project should be fall under ES category B.

Environmental and social management plan

2.65 The above assessment suggest that the project will have limited negative environmental and social impacts. These impacts can be mitigated by preparation of Environmental and Social Management Plan (ESMP). An ESMP is prepared and presented in Section C of Part III.

Grievance mechanism

2.66 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.

2.67 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.

2.68 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 GCF Secretariat if there is any issue related to PKSF itself. The institutional arrangement of Grievance Redress Mechanism is illustrated in the following figure.

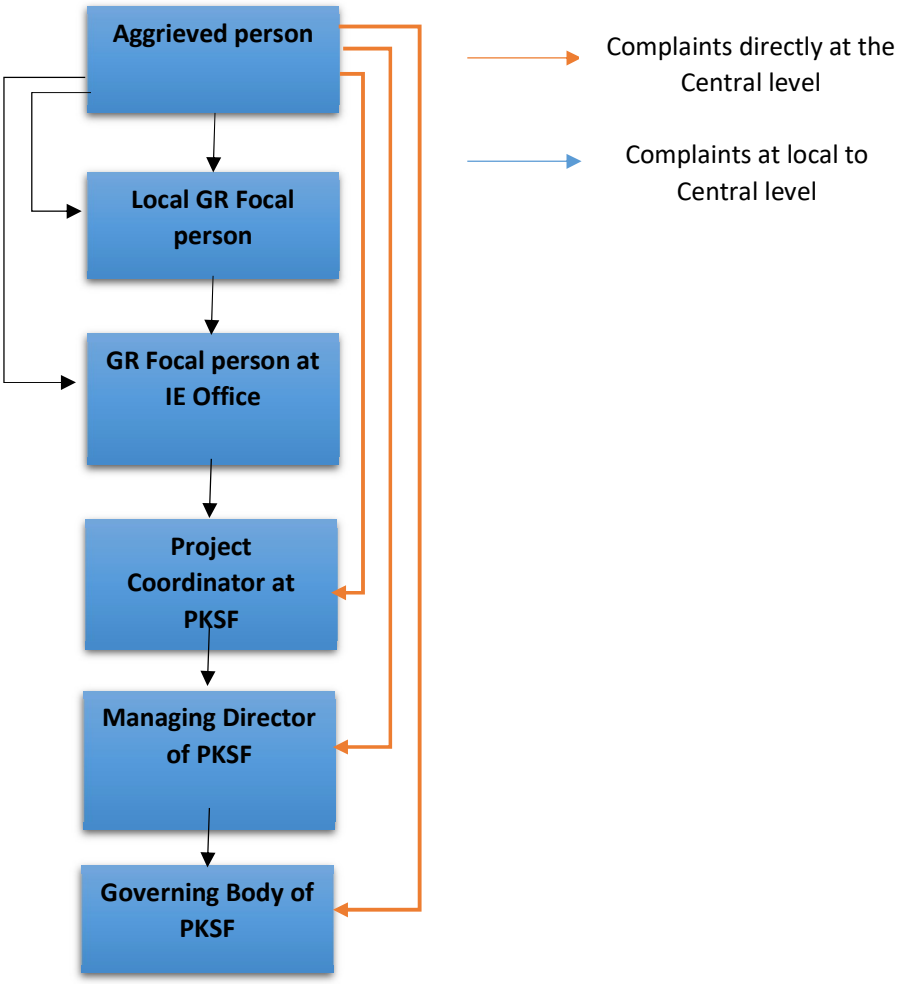


Figure: Institutional Arrangement of the GRM

2.69 PKSF as IE and selected 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.

Monitoring, Reporting and Evaluation

Implementation of Environmental and Social Management Plan (ESMP) will be monitored on a quarterly basis. An environmental expert will be recruited at the PMU level. The expert will develop guideline for implementing the ESMP and provide training to the respected staffs at EE level, the person will regularly visit and prepare monitoring report. The EE's project staffs will be responsible to ensure the compliances and report to the PMU at IE through the CEO of the EE. The PKSF as IE will report to AF on the outcome of the ESMP on a quarterly basis.

PART III: IMPLEMENTATION ARRANGEMENTS

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.

2.71 PKSF will be the implementing entity for the project. All components will be channeled through PKSF. PKSF will select implementing entities from its existing 187 active partner organizations/NGOs 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.

2.72 There might be an issue related to political stability during election time in Bangladesh to be held in December 2023. It is expected that recent political developments, the 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 the maintenance of RO plants. An endowment fund might be created with the contributions of different stakeholders. An operational and management committee will look after the plants. Necessary communication, including behavioral 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.

2.73 The most common environmental impacts of an RO plant are the disposal of concentrated wastewater, which may have an impact on local ecosystems, the impact of concentrated salt water intakes on aquatic life, and greenhouse gas emissions. The project will undertake a number of initiatives to minimize those risks, 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 10. The ESMP Matrix

Principle	Identified risks	Mitigation measures	Monitoring measures	Timeline	Budget	Responsibility	
						Implementation	Supervision
Principle 1: Compliance with the Law	Less capacity of EE to address the compliances of Environmental Conservation Rules (ECR) of Bangladesh related to Category B project.	PKSF will provide guideline and on-the-job training to the IE staffs on the compliances, monitoring and reporting.	Review quarterly monitoring report Quarterly field visits by the PMU staffs	Quarterly	N/A	PMU of IE	IE
Principle 2: Access and Equity	No risks idemnified	-	Analysis of monthly and quarterly report, Physical field visit by PMU staffs	Monthly and quarterly	-	PMU of IE	IE
Principle 3: Marginalized and	No risks identified	-	Analysis of baseline survey report	Monthly and quarterly	N/A	PMU of IE	IE

Principle	Identified risks	Mitigation measures	Monitoring measures	Timeline	Budget	Responsibility	
						Implementation	Supervision
Vulnerable Groups			Analysis of monthly and quarterly report, Physical field visit by PMU staffs				
	Loss of productive land	The plants will be installed in residential areas or community institutions .			Not require	EE	PMU
Principle 4: Human Rights	Violation of human rights for the project would be very minimum. For example, sometimes some poor people may feel that RO plant operator is not treating them as the influential person (dignity issue)	The project will provide training to the plant operator about the 15 principles of AF so that s/he is able to comply all the principles	Consultation meetings with the local peoples throughout the project period Individual interview with RO plant beneficiaries Regular guidance to the RO plant operator	Monthly and quarterly	Not require	EE	IE
Principle 5: Gender Equity and Women's Empowerment	Wage discrimination between male and female labor	The EE will ensure that equal wage is provided to male and female workers by the contractor	Individual interview with female labour Analysis of payment sheet of the contractor	Monthly and quarterly	N/A	EE	IE

Principle	Identified risks	Mitigation measures	Monitoring measures	Timeline	Budget	Responsibility	
						Implementation	Supervision
		s. A condition in the procurement document will be incorporated to ensure the equal wage.					
Principle 6: Core Labour Rights	Health risks to the workers	Provided first aid box, hand gloves and gumboot to the workers.	Individual interview with male and female labour Group discussion with labours Interview with contractors and EE staffs Group discussion with beneficiaries	Quarterly	Local contractors procured by EE	Local contractors	EE and PMU
	Child labour may be used	Advocacy with the guardian of the children not to send for earning. Prohibit child labor in the agreement between the EE and contractors	Individual interview with male and female labour Group discussion with labours Interview with contractors and EE staffs Group discussion with	Quarterly	Not require	Local contractors	EE and PMU

Principle	Identified risks	Mitigation measures	Monitoring measures	Timeline	Budget	Responsibility	
						Implementation	Supervision
			beneficiaries				
Principle 7: Indigenous Peoples	No risks identified	-	Meetings with local communities Meeting with EE staffs Physical site visits Analyse progress reports submitted by the EE	Quarterly	Not require	EE	IE
Principle 8: Involuntary Resettlement	No risk identified	-	-	-	-	--	-
Principle 9: Protection of Natural Habitats	No risk identified	-	Meetings with local communities Meeting with EE staffs Physical site visits Analyse progress reports submitted by the EE	Quarterly	Not require	EE	IE
Principle 10: Conservation of Biological Diversity	No risk identified	-	Meetings with local communities Meeting with EE staffs	Quarterly	Not require	EE	IE

Principle	Identified risks	Mitigation measures	Monitoring measures	Timeline	Budget	Responsibility	
						Implementation	Supervision
			Physical site visits Analyse progress reports submitted by the EE				
Principle 11: Climate Change	Coastal flooding, salinity, cyclone and storm surge	Design climate resilient RO plant system Raise the plinth of the RO plants above surge level Cyclone resilient house construction for the RO plants	Physical visits Collect pictures and videos of the established RO plant Analyse progress reports	Monthly and quarterly	Budget is in built in the activity budget	IE, EE and Contractor	IE and EE
Principle 12: Pollution Prevention and Resource Efficiency	Energy (electricity or solar generated) will require to operate the RO plants on a regular basis.	The project will promote solar energy to reduce use of electricity It will ensure regular maintenance of the plants' equipment to keep it energy efficient.	Physical visits Collect pictures and videos of the established RO plant Analyse progress reports	Quarterly	Budget is built in the activity budget	IE, EE and Contractor	IE and EE
Principle 13: Public Health	Dust and air pollution	Use compressed natural gas-driven vehicle	Meetings with local communities	Quarterly	Not require	Contractor	EE and IE

Principle	Identified risks	Mitigation measures	Monitoring measures	Timeline	Budget	Responsibility	
						Implementation	Supervision
		instead of petrol or diesel during transportation of materials related to the RO plants. Water will be sprayed.	Meeting with labour Meeting with EE staffs Physical site visits				
Principle 14: Physical and Cultural Heritage	No risk identified	-	Regular field visit by the PMU of IE	Quarterly	Not require	PMU of IE	IE
Principle 15: Lands and Soil Conservation	Increasing soil salinity	The design of the RO plants will include the salinity treatment system.	Physical monitoring of the plants Analyse photos and videos of the plants Analyse progress report	Quarterly	Budget is built in construction of the RO plants	EE	Project Management Unit (PMU)
	Loss of productive agricultural soil	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	Physical visits of RO plants during implementation	Quarterly	Budget is built in construction of the RO plants	EE	Project Management Unit (PMU)

Principle	Identified risks	Mitigation measures	Monitoring measures	Timeline	Budget	Responsibility	
						Implementation	Supervision
		pits/ponds nearby, which will help increased fish production from those areas.					

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

2.74 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's M & E Guidelines and its Gender Policy.

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

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

Table 11. The Results Framework for the Project

Expected Results	Indicators	Baseline Data or Condition	Targets	Milestone
Impact: Reduced the prevalence of water-borne diseases.	• Number of people with water-borne diseases in the project areas in coastal region of Bangladesh.	• A significant number of people are suffering from water-borne diseases.	• A reduction of water-borne diseases by at least 50% from the baseline level of the family members in the project areas.	2026

Expected Results	Indicators	Baseline Data or Condition	Targets	Milestone
Outcome 1: Enhanced the status of accessing safe drinking water of the coastal people.	• Number of people access 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.	• A few RO plants are established in the project areas. • People are not satisfied with the water services that they have now.	• 180 RO plants will be established in the project areas. • 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.	2025
Outcome 2: 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.	2025
Outputs under outcome 1: 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.	• 180 RO Plants are procured and established.	2025
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.	180 water testing kits are provided.	2025
Outputs under 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: 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;	180 Water-user Groups are formed.	2025
Output 2.2: 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.	2025

Expected Results	Indicators	Baseline Data or Condition	Targets	Milestone
Output 2.3: 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 400 people will be trained and certified.	2025
Output 2.4: Learnings are captured and disseminated	A variety documents were prepared and disseminated.	A wide range of people will have understanding on salt water treatment facilities though reverse osmosis technique.	Two studies will be conducted and two types of documents/reports will be published (two reports and six newsletters). Besides, other materials such as posters and leaflets will be produced.	2026
Activities	**Inputs**			
Activities under Output 1.1: RO Plants are procured and established.				
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			
Activities under output 1.2: Water testing kits are procured and supplied.				
Activity 1.2.1 Procurement of testing kits	Human resources, finance, transport			
Activity 1.2.2 Distribution of testing kits	Human resources, transport			
Activities under output 2.1: Beneficiaries are selected and groups are formed.				
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			
Activities under output 2.2: Training materials are developed.				
Activity 2.2.1 Prepare training material on climate change and water issues.	Human resource, logistics, printing			

Expected Results	Indicators	Baseline Data or Condition	Targets	Milestone
Activities under output 2.3: Training for beneficiaries conducted				
Activity 2.3.1 Organize training for beneficiaries	Trainers, logistics, finance, transport			
Activities under output 2.4: Learnings are captured and disseminated				
Activity 2.4.1 Conduct periodical and final evaluation of the project activities.	Human resource Consultants, Trainers, logistics, finance			
Activity 2.4.2 Establish three knowledge hubs	Human resource, logistics, finance, printing			

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

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

Table 12. The Alignment of the project the Results Framework of the Adaptation Fund

Project Objective(s)[45]	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 technologies 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	2083620

[45] The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

	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	2083620
		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	443605
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Outcome**	**Fund Outcome Indicator**	
Outcome 1: Enhanced the status of accessing safe drinking water of the coastal people.	• Number of people access 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.	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 2: Strengthened	The proportion of the	Outcome 3: Strengthened	3.1 Targeted population groups participating in	

the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.	population sensitized and who have positively changed their behaviour towards safe drinking water.	awareness and ownership of adaptation and climate risk reduction processes at local level	adaptation risk reduction awareness activities	
Output 1.1 RO plant for safe drinking water procured and established	180 RO plants established	Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	
			8.2. No. of key findings on effective, efficient adaptation practices, products and technologies generated	
		Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	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)	
Output 1.2 Water testing kits are procured and supplied.	The number of water testing kits are supplied.	Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	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)	
Output 2.1: **Water-user**	Number of groups are formed to	Output 3.1 Targeted	3.2.1 Number of technical	

groups are formed.	disseminate water vulnerability to climate change.	population 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	committees/associations 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: 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 2.3: 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	
Output 2.4: Learnings are captured and disseminated	A variety documents were prepared and disseminated.	Output 3.2 Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate	3.2.1 Number of technical committees/associations formed to ensure transfer knowledge	

		knowledge and learning		

Table 13. Core Impact Indicator (a)

Adaptation Fund Core Impact Indicator 1: Number of Beneficiaries				
Date of Report	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			
Project Title	Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh			
Country	Bangladesh			
Implementing Agency	Palli Karma-Sahayak Foundation (PKSF)			
Project Duration	3 years			
	Baseline (absolute number)	Target at project approval (absolute number)	Adjusted target first year of implementation (absolute number)	Actual at completion (absolute number)
Direct beneficiaries supported by the project	0	180,000	162,000	144,000
Female direct beneficiaries	0	90,000	81,000	72,000
Youth direct beneficiaries	0	54,000	48,600	43,200
Indirect beneficiaries supported by the project (not targeted, medium intensity) *	0	125,000	112,500	100,000
Female indirect beneficiaries	0	62,500	56,250	50,625
Youth indirect beneficiaries	0	37,500	33750	30375

*180 persons will receive training on RO plant management. In addition, community people, PO/NGOs and local government representatives will receive training on climate change and water management, RO plant management and maintenance.

Table 14. Core Impact Indicator (b)

Adaptation Fund Core Impact Indicator 4: Assets Produced, Developed, Improved, or Strengthened				
Date of Report	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			
Project Title	Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh			
Country	Bangladesh			
Implementing Agency	Palli Karma-Sahayak Foundation (PKSF)			
Project Duration	3 years			
	Baseline (absolute number)	Target at project approval (absolute number)	Adjusted target first year of implementation (absolute number)	Actual at completion (absolute number)
Sector	Water Management			
Targeted Asset 1) Health improved of % the targeted people 2) Physical asset produced (RO plants)	0 0	100% 180	90% 180	80% 180

Changes in Asset (Quantitative or qualitative depending on the asset)				
Increase in water supply in the targeted areas to withstand impacts of climate change (tons/m3)	0	1,350,000 m^3	1,200,000 m^3	1,000,000 m^3

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.

Budget summary for Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh

A: Detail Budget for Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh													
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)**	
Outcome 1: Enhanced the status of accessing safe drinking water of the coastal people.	1.1 RO Plants are procured and established.	Activity 1.1.1 Procure RO plants	AF	RO Plant	Number	180	11750	**2,115,000**	998,750	1,116,250	-	**2,115,000**	A1
		Sub-total:						**2,115,000**	**998,750**	**1,116,250**	**-**	**2,115,000**	
		Activity 1.1.2 Construct RO plant and select sites	AF	Construction	Number	180	10020	**1,803,600**	851,700	951,900	-	**1,803,600**	A2
		Sub-total:						**1,803,600**	**851,700**	**951,900**	**-**	**1,803,600**	
	1.2 Water testing kits are procured and supplied.	Activity 1.2.1 Procure testing kits	AF	Testing kits	Number	180	310	**55,800**	26,350	29,450	-	**55,800**	A3

		Sub-total:						**55,800**	**26,350**	**29,450**	**-**	**55,800**	
		Activity 1.2.2 Distribute testing kits	AF	Training	Batch	10	1000	**10,000**	4,000	6,000		**10,000**	A4
				Travel	Number	1000	14.6	**14,600**	7,008	7,592		**14,600**	A5
				Office supplies	Number	1000	1	**1,000**	480	520	-	**1,000**	A6
		Sub-total:						**25,600**	**11,488**	**14,112**	**-**	**25,600**	
	Total Outcome:1							**4,000,000**	**1,888,288**	**2,111,712**	**-**	**4,000,000**	
Outcome 2: Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.	2.1: Groups are formed.	Activity 2.1.1 Select beneficiary and form groups	AF	Training	Batch	10	2000	**20,000**	20,000	-	-	**20,000**	B1
			AF	Travel	Month	6	700	**4,200**	4,200	-	-	**4,200**	B2
			AF	Office supplies	Number	10000	4.299	**42,990**	12,897	21,495	8,598	**42,990**	B3
		Sub-total:						**67,190**	**37,097**	**21,495**	**8,598**	**67,190**	
		Activity 2.1.2 Mobilize Project Participants and organize groups	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
		Sub-total:						**28,800**	**9,600**	**9,600**	**9,600**	**28,800**	
	2.2: Training materials developed.	2.2.1 Prepare training material on climate change	AF	Travel cost	Number	6	1164	**6,984**	2,328	2,328	2,328	**6,984**	B6
			AF	Office supplies	Number	6	2500	**15,000**	5,000	5,000	5,000	**15,000**	B7

		and water issues											
		Sub-total:						**21,984**	**7,328**	**7,328**	**7,328**	**21,984**	
	2.3: Training for beneficiaries conducted	2.3.1 Organise training for beneficiaries	AF	Travel cost	Number	25	250	**6,250**	2,000	2,000	2,250	**6,250**	B8
			AF	Office supplies	Number	25	1800	**45,000**	**14,400**	**14,400**	**16,200**	**45,000**	B9
		Sub-total:						**51,250**	**16,400**	**16,400**	**18,450**	**51,250**	
	2.4: Learning Capture and Dissemination	2.4.1 Conduct peridiocal and final evaluation	AF	Evaluation Cost	Event	3	62000	**186,000**	62,000	62,000	62,000	**186,000**	B10
		2.4.2 Establish three knowledge hub	AF	Knowledge Management Cost	Event	10	15000	**150,000**	25,000	75,000	50,000	**150,000**	B11
			AF	Equipment's for project management and Training	Number	16	1236	**19,776**	19,776	-	-	**19,776**	B12
		Sub-total						**355,776**	**106,776**	**137,000**	**112,000**	**355,776**	
	Total Outcome:2							**525,000**	**177,201**	**191,823**	**155,976**	**525,000**	
	Total Activity Cost							**4,525,000**	**2,065,489**	**2,303,535**	**155,976**	**4,525,000**	
PMC cost	**Project Management Cost**	Project Coordinator 1	AF	Consultant-local	Month	36	3000	**108,000**	36,000	36,000	36,000	**108,000**	C1
		Deputy Project	AF	Consultant-local	Month	36	2500	**90,000**	30,000	30,000	30,000	**90,000**	C1

		Coordinator (Accounts & Finance) - 2											
		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 and others	Number	4	3985	**15,940**	10,000	5,940		**15,940**	C3
		Sub Total:						**400,000**	**128,758**	**138,591**	**132,651**	**400,000**	
	Total Management cost							**400,000**	**128,758**	**138,591**	**132,651**	**400,000**	
AE Fee			AF	AE FEE	Number	3	25000	**75,000**	25,000	25,000	25,000	**75,000**	D1
Grand Total:								**5,000,000**	**2,219,247**	**2,467,126**	**313,627**	**5,000,000**	

2.77 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 in Annex 2. It is to be noted that the budged 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.

Sl	Main Component	Budget US$	Budget Notes
1.	Development of drinking water supply facilities	4,000,000	180 RO plants will be established at the cost USD22,222 per plant. It includes machineries for a RO plant and a semi-permanent structures as a producing and distributing centre. The cost also includes purchase of lands. There will be some financial innovations to make it more sustainable.
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 Behavioral Change and Communication (BCC) materials will be provided and implemented under this component.
3.	Project Execution Cost	400,000	Staff salaries and office management expenses at the PMU level and the executing entity level will be bore under this component.
4.	Implementing Entity fee	75,000	This is related with project management fee.
	Total	5,000,000	

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

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 2024	December 2024	July 2025	July 2026	
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
Total	2,000,000	2,025,000	825,000	150,000	5,000,000

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government[46] *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:*

(Enter Name, Position, Ministry)	Date*: (Month, day, year)*
(Enter Name, Position, Ministry)	Date*: (Month, day, year)*
(Enter Name, Position, Ministry)	Date*: (Month, day, year)*

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

6. 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.

B. Implementing 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*

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 (……list here…..) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme 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/programme.	
Name & Signature Implementing Entity Coordinator	
Date: *(Month, Day, Year)*	Tel. and email:
Project Contact Person:	
Tel. And Email:	

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.

ANNEX-1

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

SECTION-1 of Annex 1: SPECIFICATION OF MATERIALS FOR RO PLANT (Capacity: 1000 LPH)

Part-A: Supply and Installation 2HP (4000LPH) Centrifugal Pump

TI	Description of Item	Quantity	Unit
1	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: 1. Type: Single phase Centrifugal pump 2.Capacity:3000 LPH 3. Head: 35-40 m 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, 2.00 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)	1	no
			Sub Total =Part-A:
Part-B: DESIGN BASIS			
2	**Supply, installation and Commissioning of Community based Desalination Plant for treating brackish feed water** 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: Feed Water Quality (Input of desalination Plant): Turbidity: 100 NTU		

TI	Description of Item	Quantity	Unit
	TDS: 7000 mg/l Chloride: 5000 mg/l Iron: 5mg/l Feed water source: **Surface water.** **Treated Water Qty: 1000 LPH** **Treated Water Quality: (Output from desalination Plant)** **TDS:**<250 mg/l Chloride: 50 mg/l Iron :0.1 mg/l **Arsenic**: 0.01 ppm. Fresh water production: 1500-2000 LPH. **Power supply inputs:** Single phase **Operation:** The plant will be operated semi automatically for startup and shut down both by Electricity & Generator (Single phase) **Warranty**: 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. Fresh water shall be reserved in food grade plastic tank required for smooth operation of the treatment plant.		
2(a)	**Pre-treatment Section:** **Feed Pump** Supply, fitting, fixing and commissioning of Feed Pump of following specification: 1. Type: Centrifugal 2.Capacity: 3000 LPH 3. Pump Head: 30-40 m 4, Housing material: SS304 5. Impeller materials; SS316 6. Power: 220V, 50 Hz, 2 HP 7. Brand: Wilo/Ebara/Grundfos/CNP/ 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.	1	no
2(b)	**Backwash Pump** Supply, fitting, fixing and commissioning of Feed Pump of following specification: 1. Type: Centrifugal	1	no

TI	Description of Item	Quantity	Unit
	2.Capacity: 6000 LPH 3. Pump Head: 35-40 m 4. Housing material: SS304 5. Impeller & Shaft: SS316 6. Power: 220V, 50 Hz, 1.1/1.5KW 7. Brand: Wilo /Calpeda /Grundfos /CNP/Pedrollo 8. Country of origin: EU / USA/China or equivalent. All complete as per instruction of Engineer-in charge. (Including cost of all materials labor andTransportation, VAT and IT.		
2(c)	**Multimedia Filter**: Supply, fitting, fixing and commissioning of MMF filter of following Specification: 1. Capacity: 3000 LPH 2. Dimension: 500 mm X 1725 mm (20" X 69") 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. 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 10. Brand: MINTECH/HTCOM /Hi-Pure/ Equivalent 11. County 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)	1	no
2(d)	**Iron Removal Filter:** Supply, fitting, fixing and commissioning of MMF filter of following Specification: 1. Capacity: 3000 LPH 2. Dimension: 500 mm X 1725 mm (20" X 69") 3. Operation: Continuous service with Manual Multiport backwash device	1	no

TI	Description of Item	Quantity	Unit
	4. Sheet materials: FRP (Fiber Reinforced Plastic) 5. Pipes and fittings: uPVC 6. Size of Inlet and Outlet pipes: 25mm (1.0 inch) 7. Media: Graded Sand, Iron removal Stone 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 10. Brand: MINTECH/HTCOM/Hi-pure/equivalent. 11. County of origin: EU/USA/China or equivalent. All complete as per instruction of Engineer-in-Charge.		
2(e)	**Activated Carbon filter**: Supply, fitting, fixing and commissioning of ACF filter of following: Specification: 1. Capacity: 4000 LPH 2. Dimension: 500 mm X 1725 mm (20" X 659) 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 10. Brand: MINTECH/HTCOM Hi-Pure/ Equivalent 11. County 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)	1	no
2(f)	**NaOCl Dosing System** Supply, fitting, fixing and commissioning of Chemical Dosing System as follows: Pump Specification:	1	

TI	Description of Item	Quantity	Unit
	1. Capacity: 4-6 LPH 2. Back pressure range : 85-100 psi 3. Type: Mechanical actuated diaphragm type with adjustable Stroke. 4. Pipes and fittings: Plug & Push System 5. Power requirement of motor: 220 volt. 50 Hz, 16W 6. Brand: Seko/Prominent/Equivalent Country of manufacturing: USA/Italy. or equivalent. **Tank Specification**: 1. Capacity: 60 Ltr. 2. MOC: HDPE/PVC 3. Gazi/Madina 4. Country of MFR: Bangladesh		
2(g)	**SMBS Dosing System** Supply, fitting, fixing and commissioning of Chemical Dosing System as follows: Pump Specification: 1. Capacity: 4-6 LPH 2. Back pressure range : 85-100 psi 3. Type: Mechanical actuated diaphragm type with adjustable stroke. 4. Pipes and fittings: Plug & Push System 5. Power requirement of motor: 220 volt. 50 Hz, 16W 6. Brand: Seko/Prominent/Equivalent Country of manufacturing: USA/Italy. or equivalent. **Tank Specification**: 1. Capacity: 60 Ltr. 2. MOC: HDPE/PVC 3. Gazi/Madina 4. Country of manufacturing: Bangladesh or equivalent.	1	
2(h)	**Anti-Scaling Dosing System** Supply, fitting, fixing and commissioning of WS filter of following: Pump Specification: 1. Capacity: 42 LPH 2. Back pressure range : 85-100 psi 3. Type: Mechanical actuated diaphragm type with adjustable stroke. 4. Pipes and fittings: Plug & Push System	1	no

TI	Description of Item	Quantity	Unit
	5. Power requirement of motor: 220 volt. 50 Hz, 16W 6. Brand: Seko/Prominent/Equivalent Country of manufacturing: USA/Italy. or equivalent. Tank Specification: 1. Capacity: 60 Ltr. 2. MOC: HDPE/PVC 3. Gazi/Madina 4. Country of manufacturing: Bangladesh or equivalent.		
		Sub Total =Part-B:	
Part-C: Reverse Osmosis (RO) Unit			
3(a)	**Cartridge Filter: Housing with PP Filter :** Supply, fitting, fixing and commissioning of Cartridge Filter of following specification: 1. Capacity: 3000 LPH 2. Accuracy 1 Micron 3. Housing materials: SS 304 4. Filter Materials: Poly Propylene (PP) 5. No. of filter; 05 6. Filter Size: Dia 2.5 inch & Height 20 inch 7. Country of Origin: China/India or equivalent or equivalent. All complete as per instruction of Engineer-in Charge. (Including cost of all materials, labor and transportation, VAT and IT)	1	no
3(b)	**High Pressure Pump:** Supply, fitting, fixing and commissioning of High Pressure Pump of following specification: 1. Type: Vertical Multistage Centrifugal 2. Capacity : 3000 LPH 3. Pump Head : 198 m 4. Housing Material : SS316 5. Impeller materials: SS316	1	no

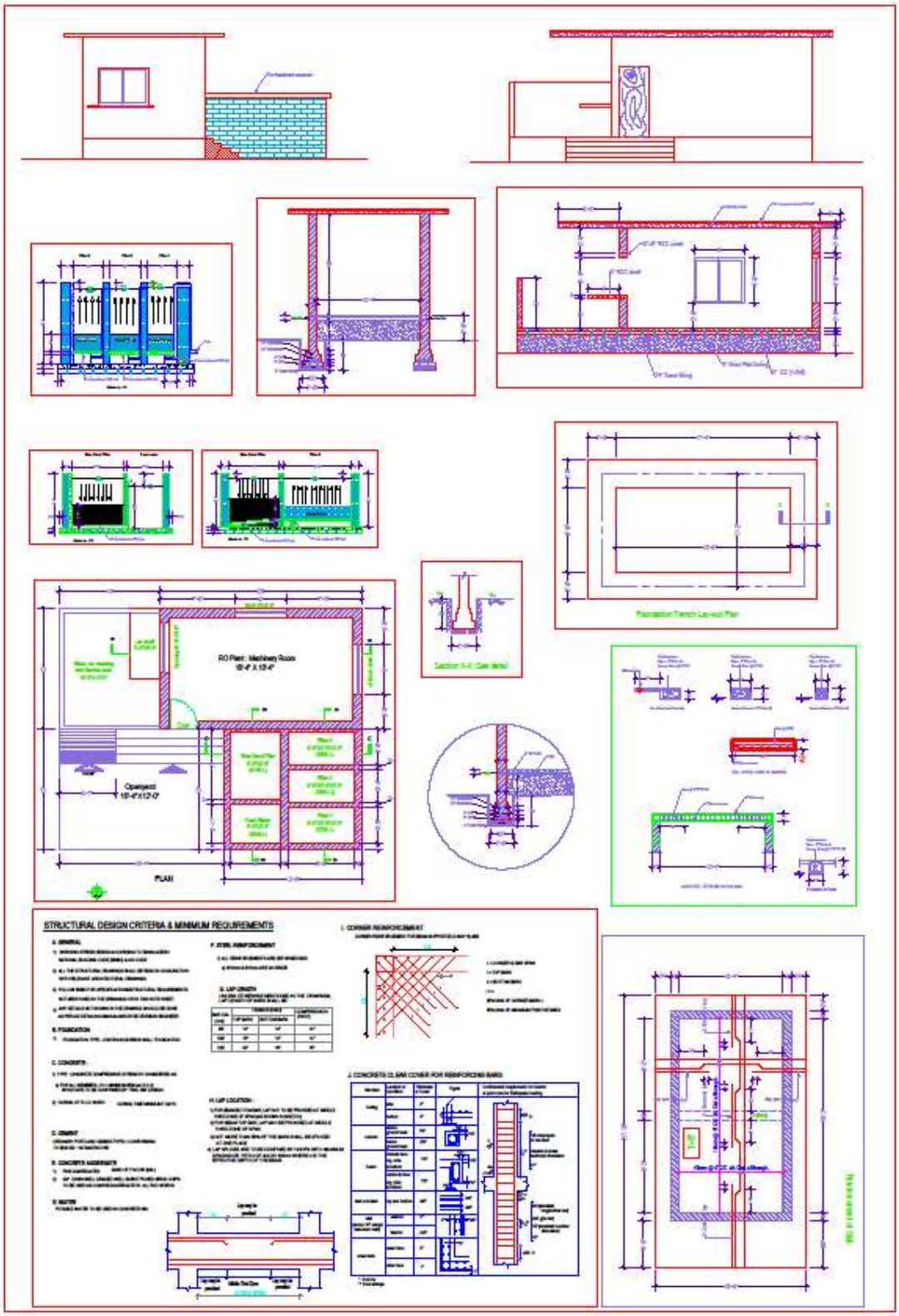
TI	Description of Item	Quantity	Unit
	6. Body Material: SS304 7. Power: 400V AC, 50 Hz. 4KW 8. Brand: Wilo/Calpeda/Grundfos /CNPor Equivalent/Dynamic 9. County of origin: EU/USA/China or equivalent. All complete as per instruction of Engineer-in Charge. (Including cost of all materials, labor and transportation, VAT and IT)		
3(c)	Supply, fitting, fixing and commissioning of RO Pressure Tube of following specification: 1. Type: End Entry Design 2. Operating Pressure: 300psi 3. Materials: FRP 4. Size: Dia 100mm & Length : 3048mm 5. Brand: Code line/ROPV/MINTECH/Hi-pure 6. 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)	3	Pc
3(d)	**RO membrane:** Supply, fitting, fixing and commissioning of RO membrane of following specification: l. Type: 4040 Low Fouling Spiral Wound 2. Feed Spacer Thickness: 34 mil 3 Size: 100mm X 1016mm (4"X 40") 4. Brand: Filmteh/ Toray/ Equivalent. **Specification:** Performance: Permeate Flow: 7.8-9.5 m3/day Salt Rejection: Nominal 99.7% Minimum 99.5% Type: Configuration: Low Fouling Spiral Wound Membrane Polymer:Composite Polyamide	4	Pc

TI	Description of Item	Quantity	Unit
	Active Area:70-80 sq. ft Application Data: Maximum Applied Pressure: 600 psi Maximum Chlorine Concentration: <0.1 PPM Maximum Operating Temperature:113 F (45 C) Feed water pH Range:3.0 – 10.0 Maximum Feed Water Turbidity:1.0 NTU Maximum Feed Water SDI (15 mins):5.0 Maximum Feed Flow: 1.6 GPM (363 LPH) Minimum Ratio of Concentrate to Permeate Flow for any Element:5:1 Maximum Pressure Drop for each Element:10 psi 15% Permeate Recovery 6.5 – 7.0 pH Range 4.Country of origin: EU/USA/Japan/China/Equivalent All complete as per instruction of Engineer-in Charge. (Including cost of all materials, labor and transportation, VAT and IT)		
3(e)	**Pipe fittings with others accessories:** **Pipe and fittings** High pressure side: should be SS304 pipe with fittings, (1.5 Inch) Low pressure side: uPVC fittings, (1 inch) Supply, fitting, and fixing of "T", "L-bow" and others fittings and pipes made of (80 Schedu1e). **Others accessories:** Inlet solenoid valve 1pc, automatic flush valve 4pc, 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)	1	Lot
3(f)	**Electric Control Panel:**	1	Set

TI	Description of Item	Quantity	Unit
	Supply, fitting, fixing and commissioning of Electric Control Panel Box (MOC: SS304) including Circuit breaker, magnetic contact, thermal overload really, 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.		
3(g)	**Skid for Desalination plant:** MOC: SS 304 hollow box (Thickness- 1.5mm) Box Size: 40mm x 40mm	1	No
			Sub Total =Part-C:
Part-D:TREATED PURE WATER SECTION			
4(a)	**NaOCl Dosing System** Supply, fitting, fixing and commissioning of Chemical Dosing System as follows: Pump Specification: 1. Capacity: 4-6 LPH 2. Back pressure range : 85-100 psi 3. Type: Mechanical actuated diaphragm type with adjustable stroke. 4. Pipes and fittings: Plug & Push System 5. Power requirement of motor: 220 volt. 50 Hz, 16W 6. Brand: Seko/Prominent/Equivalent Country of manufacturing: USA/Italy. or equivalent. **Tank Specification:** 1. Capacity: 60 Ltr. 2. MOC: HDPE/PVC 3. Gazi / Madina 4. Country of manufacturing: Bangladesh or equivalent.	1	Set
4(b)	**Drinking Water Tank:** Supply, fitting and fixing of food grade pvc Stainless Water Tank Capacity 1000 liter to preserve pure drinking water including all cost of materials, fittings labor etc. all complete as direction of the Engineer-in-charge.	2	Set
4(c)	Supply, fitting, fixing and commissioning of Water Level Controller with electric cable	2	Set
4(d)	Supply, fitting, fixing and commissioning of drinking water collection pipeline with U PVC pipe, SS Tap and clamp etc.	1	Lot
4(e)	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 & IT)	2	No.
	Multi-Functional Water Quality Tester: Supplying, fitting and Fixing of a Water Quality Tester to test TDS, EC, pH, Salinity and Temperature.	1	No.

TI	Description of Item	Quantity	Unit
4(f)	**Jar washing unit:** Supplying, fitting and Fixing of a power driven complete set of Water Jar cleaner including all necessary fittings as per following specification- i) All Material :SS 304 ii) water drum: uPVC, Capacity-60Litre iii) Motor: Single phase Centrifugal pump, 220V, 50 Hz, 0.50 HP (AC or DC), Head-20ft. iv) Brand: Wib /Ebara /Grundfos /CNP, /Gazi / Pedrollo or Equivalent. v) 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)	1	LS
4(g)	**Discharge measuring meter:** Supplying, Fitting, Fixing Water flow meter including necessary all SS fittings as per following specification- a) Diameter of flow pipe: Output meter ¾ inch and Input meter-1½ inch. b) Maximum capacity: 1 liter/Sec. c) Material: SS 304 d) Display: LCD display programmed to show the readings in LPS.	2	each
5	Supply, Fitting, Fixing of a complete set of Sprinkler system for aeration of raw water including all necessary SS (Stainless Steel) fittings. As per direction of the Engineer-in-charge. (Including VAT & IT)	1	set
6	Supply, Fitting, Fixing of a complete set of Pressure Gauge including all necessary SS (Stainless Steel) fittings. All complete as per direction of the Engineer-in-charge. (Including VAT & IT)	4	each
7	**Miscellaneous**		LS
			Sub Total =Part-D:
			Total (Part-A+ Part-B + Part-C + Part-D)

SECTION -2 of Annex 1: SPECIFICATION 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
1	Earth work in excavation all kinds or 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
4	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
	iiii) Roof slab (125 mm thickness) and beam	6.3	cum
	iV) RCC perforated slab (62.50mm thick) at pre-treatment reservoir	0.85	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, 1inishin 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 ate. alt compete in all respect as per direction and accepted by the engineer.	132	sqm

TI	Description of Work	Quantity	Unit
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 electricitycharge, 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 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.	6.27	sqm
13	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. a1l complete as per instruction of the E-in C.	6.27	sqm
14	Supplying, fitting and fixing MORTICE door lock approved and accepted by the Engineer.	2	no.
15	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.	3.7	cum
16	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	13	sqm
17	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	97	sqm

TI	Description of Work		Quantity	Unit
	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.			
18	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.		34	sqm
19	75mm or 3inch 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.		5.2	`
20	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.		35	sqm
21	Wall Painting (weather coat) with picture drawing including base coats painting and all complete as per direction of the engineer in charge.		4	sqm
22	Wall painting (weather coat) with picture massage including base coats painting and all complete as per direction of the engineer in charge.		4	sqm
23	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.		44	sqm
24	Supplying and placing of stone chips (Size-15mm and 10mm), and 5mm pea gravel when and where ever necessary as per direction of E-I-C	15mm	1.50	m^3
		10mm	1.50	m^3
		5mm	4.50	m^3
1	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 bythe 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.
2	Electric connection from Local REB/PDB (Including cost of all materials, labor and transportation, VAT and IT)		1	No.
Grand Total of Section-1 and Section-2				

3. SECTION 3 OF ANNEX 1:

WATER QUALITY ASSESSMENT INDICATORS

SL	Components	WHO standard	BD Standard
1	P^H Meter (Hanna)	6.5-8.5	6.5-8.5
2	TDS	1000	-
3	E-Coli (µ s/cum)	1500	-
4	Cl^- (mg/l)	250	150-600
5	Na^+ (mg/l)	200	200
6	Ca^{2+} (mg/l)	100	75
7	Mg^{2+} (mg/l)	60	30-35
8	HCO^-_3 (mg/l)	200	-
9	NO^-_3 (mg/l)	50	-
10	SO^{2-}_4 (mg/l)	250	400
11	F^- (mg/l)	1.5	
12	A_s (mg/l)	0.01	0.05

ANNEX-2

Detail Budget for Access to safe drinking water for the climate vulnerable people in coastal areas of Bangladesh

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)	
Outcome 1: Enhanced the status of accessing safe drinking water of the coastal people.	1.1 RO Plants are procured and established.	Activity 1.1.1 Procure RO plants	AF	RO Plant	Number	180	12500	**2,250,000**	1,062,500	1,187,500	-	**2,250,000**	A1
		Sub-total:						**2,250,000**	**1,062,500**	**1,187,500**	**-**	**2,250,000**	
		Activity 1.1.2 Construct RO plant and select sites	AF	Construction	Number	180	10148	**1,826,640**	862,580	964,060	-	**1,826,640**	A2
		Sub-total:						**1,826,640**	**862,580**	**964,060**	**-**	**1,826,640**	
	1.2 Water testing kits are procured and supplied.	Activity 1.2.1 Procure testing kits	AF	Testing kits	Number	180	350	**63,000**	29,750	33,250	-	**63,000**	A3
		Sub-total:						**63,000**	**29,750**	**33,250**	**-**	**63,000**	
		Activity 1.2.2	AF	Training	Batch	10	1200	**12,000**	4,000	8,000		**12,000**	A4

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)	
		Distribute testing kits		Travel	Number	1000	14.6	**14,600**	7,008	7,592		**14,600**	A5
				Office supplies	Number	1000	1	**1,000**	480	520	-	**1,000**	A6
		Sub-total:						**27,600**	**11,488**	**16,112**	**-**	**27,600**	
	Total Outcome:1							**4,167,240**	**1,966,318**	**2,200,922**	**-**	**4,167,240**	
Outcome 2: Strengthened the ability of coastal communities and institutions in the project areas to take informed decisions about pure drinking water.	2.1: Groups are formed.	Activity 2.1.1 Select beneficiary and form groups	AF	Training	Batch	10	2000	**20,000**	20,000	-	-	**20,000**	B1
			AF	Travel	Month	6	800	**4,800**	4,800	-	-	**4,800**	B2
			AF	Office supplies	Number	10000	4.299	**42,990**	12,897	21,495	8,598	**42,990**	B3
		Sub-total:						**67,790**	**37,697**	**21,495**	**8,598**	**67,790**	
		Activity 2.1.2 Mobilize Project Participants and organize groups	AF	Travel cost	Event	12	1000	**12,000**	4,000	4,000	4,000	**12,000**	B4
			AF	Training	Event	12	2000	**24,000**	8,000	8,000	8,000	**24,000**	B5
		Sub-total:						**36,000**	**12,000**	**12,000**	**12,000**	**36,000**	
	2.2: Training materials developed.	2.2.1 Prepare training material on climate change and water issues	AF	Travel cost	Number	6	1300	**7,800**	2,600	2,600	2,600	**7,800**	B6
			AF	Office supplies	Number	6	2500	**15,000**	5,000	5,000	5,000	**15,000**	B7
		Sub-total:						**22,800**	**7,600**	**7,600**	**7,600**	**22,800**	

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)	
	2.3: Training for beneficiaries conducted	2.3.1 Organise training for beneficiaries	AF	Travel cost	Number	25	348	**8,700**	2,784	2,784	3,132	**8,700**	B8
			AF	Office supplies	Number	25	1800	**45,000**	**14,400**	**14,400**	**16,200**	**45,000**	B9
		Sub-total:						**53,700**	**17,184**	**17,184**	**19,332**	**53,700**	
	2.4: Learning Capture and Dissemination	2.4.1 Conduct peridiocal and final evaluation	AF	Knowledge Management Cost	Event	10	17000	**170,000**	51,000	68,000	51,000	**170,000**	B10
		2.4.2 Established three knowledge hub	AF	Equipment's for project management and Training	Number	16	1557.15	**24,914**	24,914	-	-	**24,914**	B11
													B12
		Sub-total						**194,914**	**75,914**	**68,000**	**51,000**	**194,914**	
	Total Outcome:2							**375,204**	**150,395**	**126,279**	**98,530**	**375,204**	
	Total Activity Cost							**4,542,444**	**2,116,713**	**2,327,201**	**98,530**	**4,542,444**	
		Technical Officer (Engineering) - 6	AF	Consultant-local	Month	36	1900	**68,400**	22,800	22,800	22,800	**68,400**	C1
		Sub Total:						**68,400**	**22,800**	**22,800**	**22,800**	**68,400**	
	Total Management cost							**68,400**	**22,800**	**22,800**	**22,800**	**68,400**	
IE Fee			AF	IE FEE	Number	3	129718	**389,155**	129,718	129,718	129,718	**389,155**	D1

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)	
Grand Total:								**5,000,000**	**2,269,232**	**2,479,719**	**251,048**	**5,000,000**	

Budget Notes							
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)	85	95	0	**180**	$ 12,500	**$ 2,250,000**	
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)	85	95	0	**180**	$ 10,148	**$ 1,826,640**	
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)	85	95	0	**180**	$ 350	**$ 63,000**	
Training to Beneficiaries on using the testing kits to to implement Activity 1.2.2							

	Number of Batch	**Days**	**Unit cost (USD)**	**Total**	**Remarks**		
10 batch training to staff for day long	10	1	$1,200.0	**$12,000**	50 Participants per batch		
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	$14.6	**$14,600**				
Sub total (USD)			**$14,600**				
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**				
Training to staff on project management including selection of Beneficiaries, group formation, vulnerability assessment and adaptation action plan							
	Number of Batch	**Days**	**Unit cost (USD)**	**Total**	**Remarks**		
2 batch training to staffs for day long	10	1	$2,000.0	**$20,000**	20 Participants per batch		
Local level travel cost for staff during Beneficiaries selection and group formation to implementation project activities and in field supervision							
	Quantity (months)	**Number of IEs**	**Unit cost (USD)**	**Total**			

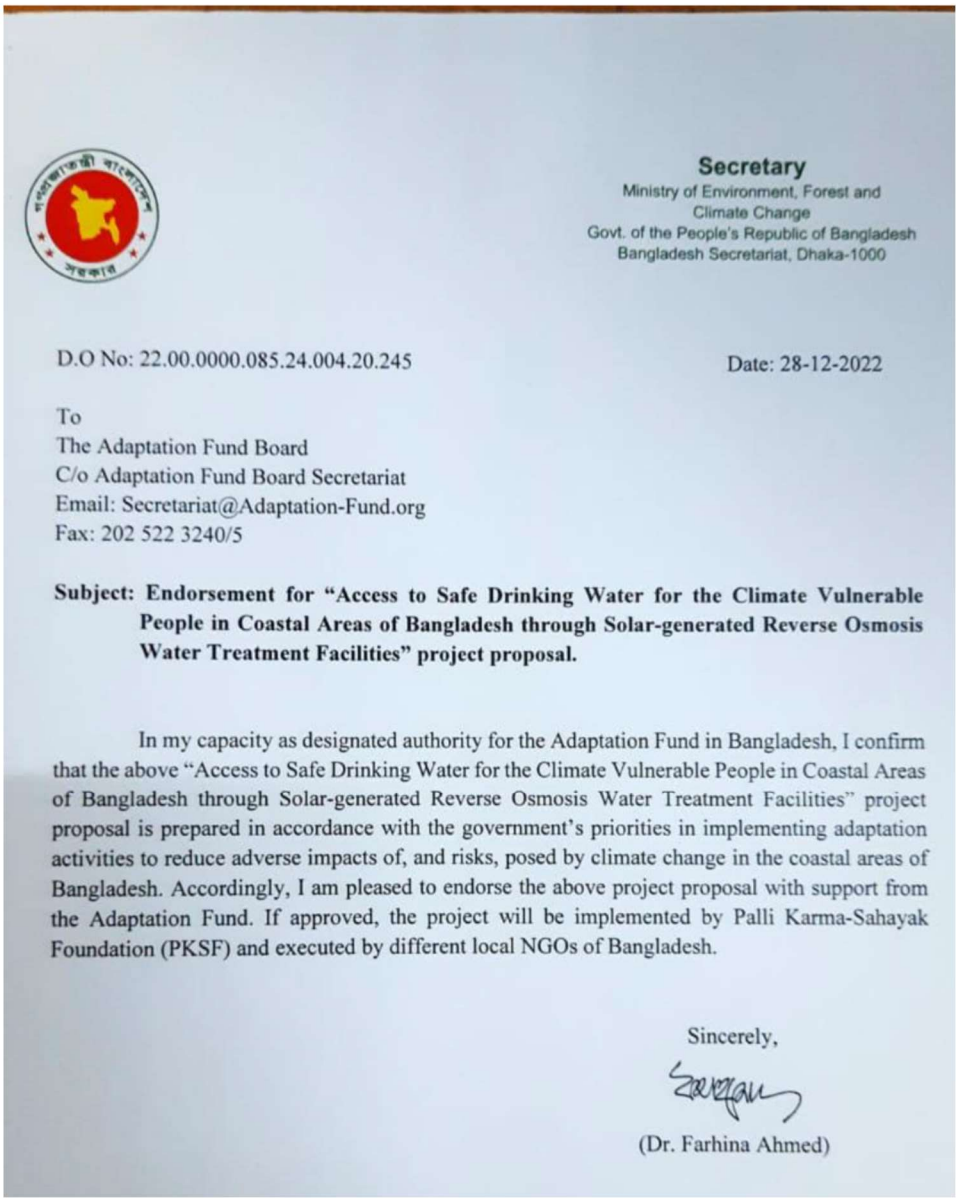
Local level travel for staff-local (staff will frequently visit field during selection of Beneficiaries and group formation)	6	9	$89	**$4,800**			
Sub total (USD)				**$4,800**			
Printing and other related materials for Beneficiaries selection, group formation of beneficiaries							
	Number of Participants	**Unit cost (USD)**	**Total**	**Remarks**			
Office supplies for Beneficiaries selection (Including printing of format, pen, pencil)	10,000	4.299	**$42,990**				
Travel cost for Project Participants' to implement Activity 2.1.2							
	Number of participants	**Number of days**	**Unit cost (USD)**	**Total**	**Remarks**		
Travel cost for Project Participants'	240	1	**$ 50**	**$12,000**			
Training cost for Project Participants' to implement Activity 2.1.2							
	Number of participants	**Number of days**	**Unit cost (USD)**	**Total**	**Remarks**		
Training cost for Project Participants'	240	1	**$ 100**	**$24,000**			
Local level travel cost for local consultant to prepare training material on climate change and water issues							
	Number of visit	**Number of manuals and**	**Unit cost (USD)**	**Total**			

		guidelines					
Local consultant travel to project sites to prepare training manuals and guidelines on Climate Change issues and project management	6	6	$217	**$7,800**			
Sub total (USD)				**$7,800**			
Prepare training material on climate change and water issues							
	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**				
Sub total (USD)			**$15,000**				
Travel cost for Organise training for beneficiaries							
	Unit cost (USD)	**Number of Workshop**	**Total**	**Remarks**			
Travel Csot	$348	25	**$8,700**				
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	$30	25	60	1	**$45,000**		
Established three knowledge hub							
	Unit cost (USD)	**Number of products**	**Number of participants/ event**	**Days**	**Total**		

Knowledge Management Cost for producing different knowledge products	$17,000	10	-	-	**$170,000**		
Equipment's for project management and Training							
	Unit cost (USD)	**Number**	**Total**	**Remarks**			
Computer (Desktop)	$ 1,350	7	$ 9,450				
Laptop	$ 1,350	2	$ 2,700				
Printer	$ 1,700	2	$ 3,400				
Scanner	$ 1,364	1	$ 1,364				
Camera	$ 1,500	3	$ 4,500				
Photocopier Machine	$ 3,500	1	$ 3,500				
		16	**$ 24,914**				
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**
Technical Officer (Engineering) - 6	$ 317	216	68,400		$ 22,800.02	$ 22,800.02	$ 22,800.02
IE Fee							
	Unit cost (USD)	**Number**	**Total**	**Remarks**			
For staff/consultant/firm recruitment	$ 75,000	3	$ 225,000				
Project Monitoring, evaluation and Supervision	$ 22,000	3	$ 66,000				
Travel, communication & others	$ 25,000	3	$ 75,000				
Review different project evaluation reports	$ 3,000	3	$ 9,000				

Office supplies and others	$ 4,718	3	$ 14,155				
Total	**$ 129,718**		**$ 389,155**				

ANNEX - 3



Secretary
Ministry of Environment, Forest and Climate Change
Govt. of the People's Republic of Bangladesh
Bangladesh Secretariat, Dhaka-1000

D.O No: 22.00.0000.085.24.004.20.245

Date: 28-12-2022

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 through Solar-generated Reverse Osmosis Water Treatment Facilities" 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 through Solar-generated Reverse Osmosis Water Treatment Facilities" project proposal is prepared in accordance with the government's 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,

(Dr. Farhina Ahmed)

ANNEX-4

PALLI KARMA-SAHAYAK FOUNDATION (PKSF)
www.pksf.org.bd

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 [e.g., Bangladesh Climate Change Strategy and Action Plan (BCCSAP), National Adaptation Plan (NAP), National Determination Contribution (NDC), Delta Plan 2100, and the 8th Five-Year Plan]. Subject to the approval of the Adaptation Fund Board, I commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund, with the understanding that the Implementing Entity (IE) will be fully responsible (both legally and financially) for the implementation of this project.

4.1.23

Dr. Nomita Halder, ndc
Managing Director and
Implementing Entity Coordinator
Date: 04 January 2023 Tel and Email: +8801844481300, md@pksf-bd.org

Project Contact Person
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ANNEX-5: ENVIRONMENTAL AND SOCIAL MONITORING FORMAT

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

B) ENVIRONMENTAL AND SOCIAL IMPACT MONITORING							
ES Impact & Indicator	Location	Procedures / methods	Frequency / Duration	Baseline / Environmental Standards	Responsibilities		Estimated Cost
					Implementation	Analysis/ Reporting	
Activities at the beginning of sub project							
Impact/ Indicator							
Impact/ Indicator							
Operation & Maintenance Phase							
Impact/ Indicator							
Impact/ Indicator							

ANNEX-6

Gender Action Plan

Annex 6.1: 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, as an NIE, it is mandatory for the PKSF to comply gender policy in its institutional level as well as project level. As an NIE 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 Bnalgadesh 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.

There are significant climate threats for Bangladesh. Particularly in the coastal areas, flooding, cyclones, and salinity brought on by rising temperatures can leave areas without enough water for drinking and sanitation. Given their traditional responsibilities, particularly at the household level, women are more vulnerable to climate change than males. Additionally, it makes the already restricted access to water for the underprivileged sector worse. In order to increase its effectiveness in fostering inclusive growth through climate-resilient and sustainable infrastructure, the proposed project included a gender-targeted and socially inclusive program. Features of a project's design known as Gender Equality, Disability and Social Inclusion (GEDSI) ensure that benefits reach socially underprivileged populations.

Poor rural residents, women, and children will all be included in this project. They will consent to their active involvement in the planning and execution of the project. In three coastal districts' public meetings, there were women present. Participants had the chance to advocate for and present their suggested ideas during these sessions. The GEDSI mandate will lead to the formation of community development committees and groups, which will include women in leadership roles who can offer their opinions. Involving the rural poor and women in the initiative was considered to be advantageous by Bangladesh's Strategic Program for Climate Resilience, which builds on the priority measures established by the National Adaptation Plan (NAP). They will have the chance to develop and put into action the best ideas for their local communities. They were able to develop effective methods to protect the water supply through the Gender Equality and Social Inclusion features incorporated into the climate resilience plan. They will also be able to enhance the gender balance by boosting the participation of women in climate action.

The project's integration of GEDSI elements was effective and benefited women in several ways. The distribution and storage of water provided by the project will make it available to the target communities, cutting the time it takes women to fetch water by 75%. Women will participate more actively in public meetings that addressed the project approach and scheme selection if GEDSI processes are integrated. The GEDSI mechanism seems to work well when incorporated into development programs, though. The following are some takeaways from the stakeholders' engagement: a) women's roles in the home and other concerns specific to women will be identified and addressed by including them in discussions and climate action; b) programs that are gender-specific will promote engagement by women. At least 50% of participants in all coordinated meetings and groups will be female, with at least one woman holding a leadership position; c) health, sanitation, and nutrition will all benefit from an improved water supply, as would other facets of communal life; d) planning procedures that involve participation will enhance social peace; and e) finally, a GEDSI-centered agenda that targets women and other marginalized groups enables, mobilizes, and creates awareness of social issues while providing participatory support for issues that the community faces. In the context of climate response in Bangladesh, it will empower communities and give them the knowledge and know-how to collaborate more efficiently to address their common climate risks.

Annex 6.2: 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 180,000 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.

Annex 6.3: 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.

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).

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.[47] 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 (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.[48] The United Nations 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.[49] 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).

47 CCC, 2009

48 UN Women, 2016

49 Asaduzzaman, 2016

Table 1 for Annex 6: Role of women in decision-making

Sl No.	Type of Decision	Percent
1	Food related (Meal preparation, distribution etc.)	86.78
2	Meeting food deficit	33.58
3	Selling assets (land, house, livestock, seeds)	9.40
4	Selling agricultural production (crops, seeds)	6.88
5	Buying household assets (livestock, ornament, trees.)	11.10
6	Buying agricultural production (crops, seeds etc.)	7.35
7	Receive credit from mohajon/relatives/bank/Non-governmental Organisation (NGO)/Governmental Organisaiton (GO)	14.50
8	Agricultural work (crop cultivation, land mortgage etc.)	5.84
9	Household work (Collection of Water, Collection of natural resource etc.)	47.91
10	Household decision making (Engage in new income generating activity, Conceiving a baby, Using savings, ownership of Vulnerable Group Development (VGD)/Vulnerable Group Feeding (VGF)	11.59
11	Female and children healthcare decision making	16.32
12	Decision making about communication (Female going outside the homestead, going for work, education for children)	11.06
13	Decision making on disaster preparedness/coping/adaptation (Going to a shelter, Engaging in alternative livelihood activity	11.48
14	Other	14.29

Source: UN Women (2014)

Annex 6.4: 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.[50] 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[51]. 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

50 UN Women, 2009

51 IPCC, 2001

dowries become cheaper.[52]Compelling 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 [53] and women and children are 14 times more likely to die than men during disasters.[54] 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[55,56.] Furthermore, the cyclone was announced primarily among men, with many women lacking the necessary information to evacuate, remaining at home and facing serious risks.[57] Disaster preparedness requires decision-making and leadership, but in coastal Bangladesh, women are generally excluded from such roles.[58] 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 [59] . 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.[60] For example, Cyclone Sidr contaminated at least 6000 surface water ponds with saline water, used primarily by women for small vegetable

52 Alston, 2014

53 UN Women, 2014

54 Araujo, 2007

55 Kabir, 2016

56 Alam, 2010

57Kabir, 2016

58 Alam, 2010

59 MoEF, 2012

60 Dankelman, 2002

farming and domestic water requirements.[61]Overall, women and girl's vulnerability to climate change generally depends on the interaction of three key functions: - 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:

Annex 6.5: 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.

a) Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009

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.

b) Climate Change and Gender Action Plan (ccGAP), 2013

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

61 UN Women, BCAS (2014)

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.

c) 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.

d) National Adaptation Program of Action (NAPA), 2005 and National Adaptation Plan (NAP) 2022

The Government of Bangladesh also launched its National Adaptation Program of Action (NAPA) in 2005 and NAP in 2022. 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 and NAP provided a response to the urgent and immediate needs of adaptation and identified priority programs in Bangladesh. 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.

e) 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.

f) Technical Needs Assessment (TNA) and Technical Action Plan (TAP), 2012

Bangladesh TNA recognizes that desalination technology for drinking water in coastal areas of Bangladesh is a crucial for addressing salinity contamination in the drinking water. It states that desalinization program for drinking water in coastal areas will reduce water-borne diseases and will reduce salt intake and help reducing high blood pressure of the inhabitants.

Annex 6.6: 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.

Annex 6.7: 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.

Annex 6.8: 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 180,000 people to provide safe drinking water. It is expected that 50% of them will be women. In addition, the project will form 180 beneficiary groups for 180 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 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 2.3.1 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.

Activity 2.4.1 Conduct periodical and final evaluation of the project activities

This project will promote a periodical evaluation system of the project interventions to understand their effectiveness in terms of adaptation to climate change. Hence, the project will record all the data from the beginning and will conduct a final evaluation. Data will be collected and segregated by sex. This will help to capture adaptation knowledge from different perspectives.

Activity 2.4.2 Establish three knowledge hubs

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 for operating 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.

Annex 6.9: 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 issus.

Annex 6.10: 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:

Activity	Target and Indicators	Time period	Responsible institutions
Activity 1.1.1 Procurement of RO plants	Baseline=0 Target= 50% Indicator: 50% members of the procurement committee will be women	First year, Second year and Third year	PMU and Executing Entity (EE)
Activity 1.1.2 Construction of RO plant sites	Baseline=0 Target= 50% Indicator: 50% of the beneficiaries will be women.	First year, Second year and Third year	PMU and Executing Entity (EE), community people and contractors
Activity 1.2.1 Procurement of testing kits	Baseline=0 Target= 50% Indicator: 50% members of the procurement committee will be women	First year, Second year and Third year	PMU and Executing Entity (EE)
Activity 1.2.2 Distribution of testing kits	Baseline=0 Target= 50% Indicator: 50% of the trained technical person will be women who will received testing kits	First year and second year	PMU and Executing Entity (EE)
Activity 2.1.1 Beneficiary selection and group formation	Baseline=0 Target=50 % Indicator: 50% of the selected beneficiaries will be women	First year	PMU and Executing Entity (EE), community people
Activity 2.1.2 Project Participants' Mobilization and group meetings	Baseline=0 Target=50 % Indicator: 50% of the meeting attendees will be women	Throughout the project cycle	PMU and Executing Entity (EE), community people
Activity 2.2.1 Prepare training material on climate change and water issues	Baseline=0 Target= Issues related to GEDSI will included	First year	PMU and Executing Entity (EE)
Activity 2.3.1 Organise training for beneficiaries	Baseline=0 Target=30 % Indicator: 30% of the trainees will be women	First year	PMU and Executing Entity (EE)
Activity 2.4.1 Conduct periodical and final evaluation	Baseline=0 Target= 50% Indicators: 50% of the respondents will be women	First, Second and Third year	PMU and Executing Entity (EE), community people.
Activity 2.4.1 Knowledge Hub	Baseline=0 Target= 30% Indicators: 30% of the leadership role of this hub will be women	First year and Second year	PMU and Executing Entity (EE), community people.

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ANNEX-7

Stakeholder Engagement Plan (SEP)

Annex 7.1: 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". Three areas of concerns, such as stakeholder analysis, summary of the stakeholder consultations and stakeholder engagement plan are documented.

Annex 7.2: 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 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 RO plants in 2016.

Activity 1.1.1 Procure 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 180 RO plants will be established by the selected executing entity 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 selected executing entities 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 Construct 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 1.1.1, the necessary training will be provided to executing entities.

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 Procure 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 Distribute testing kits

The testing kits will be provided to executing entities 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 executing entities. 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 selected executing entity.

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: Training materials developed.
Activity 2.2.1 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 2.3: 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 selected executing entity 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 2.3.1 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 of issues with competent master trainers. Training of Trainers (ToT) will be conducted, if necessary, for rolling out the trainings quickly.

Output 2.4: Learnings are captured and disseminated

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. Currently, there is limited knowledge and understanding of the effectiveness of adaptation interventions globally, including in Bangladesh. Through organized monitoring and evaluation operations, knowledge information will be acquired.

Activity 2.4.1 Conduct periodical and final evaluation of the project activities

This project will promote a periodical evaluation system of the project interventions to understand their effectiveness in terms of adaptation to climate change. Hence, the project will record all the data from the beginning and will conduct a final evaluation. This will help generate adaptation knowledge as well as learning for future projects and programs.

Activity 2.4.2 Establish three knowledge hubs

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 IEs will be responsible for operating these knowledge hubs. These hubs will gather local information and will also communicate national best practices to community members in the target areas through the IEs. 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.

Annex 7.3: Stakeholder Analysis: 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 (see Table Annex 7.1). 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 recommendations is given below.

Table Annex 7.1: 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
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 Shaymnagar, 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

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.

The participants in these meetings, in summary, 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

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 securing drinking water in the coastal areas.

Annex 7.4: Stakeholder Analysis: 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 (MOEFCC), Department of Fisheries, Water Resource Planning Organization (WARPO), Water Development Board, Department of Public Health 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 the Ministry of Environment, Forests and Climate Change (MoEFCC) as the Designated Authority (DA) 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 NGOs/POs, 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 safe drinking water.

This outcome will involve the selected beneficiaries, local offices of the Department of Public Health Engineering, implementing entities, organized members, and community people other than beneficiaries, consultants, and local government representatives. Stakeholder engagement are and 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 Annex 7.2: Stakeholder engagement strategies

Type of stakeholders	Engagement Purpose	Proposed Strategy for stakeholder engagement of stakeholders
Government organisations	Share project information with relevant stakeholders, enhance transparency and accountability.	1. Project website, online monitoring system, workshops, seminars. Another preferred medium is email. 2. For official communications – Official Letters. These written communications can be sent via email and hard copy via courier or post office. 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. 4. At the national level, project updates should be shared through seminars and websites. 5. Annual presentations to stakeholders should also be conducted by the EE and Implementing Partners.
IEs and communities	Increase knowledge and understanding of climate change, transfer technologies for increasing resilience	1. Classroom training, group formation and group meetings, implementation of technologies, etc.
POs/NGOs, IEs and beneficiary communities	Successful implementation of the project and wider dissemination of its results	1. Sharing of best practices among EEs, water-user groups need to be conducted. peer-to-peer learning will contribute to capacity building and scaling up of the project. 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. 3. Conducting regular meetings and work planning with community stakeholders will increase transparency and ownership. 4. Developing common communication materials and branding for unified messaging that will sustain the interest of end-users and

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

These strategies will be implemented through the stakeholder engagement plan during the implementation of the project. The SEP is summarised in Table Annex 7.2.

Table Annex 7.3: Proposed Stakeholder Engagement Plan

Activity	Timing	Objectives of Engagement	Target stakeholders
Activity 1.1.1 Procurement of RO plants	Yr.1, 2, 3, 4 & 5	To promote climate- resilient water supply in the coastal communities in Bangladesh.	Ministry of Water Resources, Department of Public Health Engineering (DPHE), EE, Beneficiaries and local contractors.
Activity 1.1.2 Construction of RO plant sites	Yr.1, 2, 3, 4 & 5	To construct climate-resilient structures for the RO plants.	Local Housing and Public Works Offices, IE, EEs and Beneficiaries and local workers.

Activity	Timing	Objectives of Engagement	Target stakeholders
Activity 1.2.1 Procurement of testing kits Activity 1.2.2 Distribution of testing kits	Yr.1, 2, 3, 4 & 5	To promote safe water supply.	Department of Public Health and Engineering, IE, EEs and the local people.
Activity 2.1.1 Beneficiary selection and group formation	Yr.1, 2, 3, 4 & 5	To organise local people for the RO plant management	PKSF, EEs, and growers i.e. project beneficiaries.
Activity 2.1.2 Project Participants' Mobilization and group meetings	Y1, Y2	To transfer knowledge and technology for adaptation to climate change in coastal areas of Bangladesh.	Beneficiaries, EEs, and PKSF.
Activity 2.2.1 Recruitment of PMU staff and Executing Entity staff Activity 2.2.2 Training to the newly recruited staff on project management	Yr. 1, 2, 3, 4	To increase capacity of beneficiaries and NIE on climate change and adaptation technologies.	Relevant Staff and EE, and PKSF.
Activity 2.3.1 Prepare training material on climate change and water issues	Y1, Y2, Y3, Y4 & Y5	To develop and share knowledge base; and document and share lessons learned.	Beneficiaries, relevant local government officers, Adaptation Fund, other global communities, civil society representatives, POs/NGOs, EEs, and PKSF.
Activity 2.4.1 Organise training for beneficiaries	Y1, Y2, Y3, Y4 & Y5	To develop and share knowledge base.	Beneficiaries, relevant local government officers, Adaptation Fund, other global communities, civil society representatives, NGOs, EEs, and PKSF

ANNEX-8

List of Abbreviations

AAT	Artificial Aquifer Tubewell
AF	Adaptation Fund
ARWH	Artificial Rain Water Harvesting
BCC	Behavioral Change Communication
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BDT	Bangladeshi Taka
BFRI	Bangladesh Fisheries Research Institute
BHBRI	Bangladesh Housing and Building Research Institute
BNBC	Bangladesh National Building Code
BSTI	Bangladesh Standards and Testing Institution
BUET	Bangladesh University of Engineering and Technology
BUET	Bangladesh University of Engineering and Technology
CAPEX	Capital Expenditures
CCCP	Community Climate Change Project
CDI	Capacitive Deionization
CEO	Chief Executive Officer
DoE	Department of Environment
DoF	Department of Fisheries
DPHE	Department of Public Health Engineering
DTW	Deep Tubewell
ECA	Ecologically Critical Area
EDR	Reverse Electrodialysis
EE	Executing Entities
ESMF	Environment Social Management Framework
EU	European Union
GCF	Green Climate Fund
GEDSI	Gender Equality, Disability and Social Inclusion
HTW	Hand Tube Well
IE	Implementing Entity
IRR	Internal Rate of Return
MoEF&CC	Ministry of Environment, Forest and Climate Change
NAP	National Adaptation Plan
NAPA	National Adaptation Programs of Action
NGO	Non-Governmental Organizations
O&M	Operation and Maintenance
OPEX	Operating Expenses
OPW	Open Pond Water
PKSF	Palli Karma Sahayak Foundation
PMU	Project Management Unit
PSF	Pond Sand Filter
PWD	Public Works Department
PWS	Piped Water Supply
RO	Reverse Osmosis
RWH	Rainwater Harvesting
SDGs	Sustainable Development Goals

SIDA	Swedish International Development Cooperation Agency
SSD	Solar Still Distillation
TAP	Technical Action Plan
TNA	Technical Need Assessment
ToR	Terms of Reference
ToT	Training of Trainers
UNCDF	UN Capital Development Fund
UNDP	United Nations Development Program
USD	US Dollar
WARPO	Water Resource Planning Organization
WASH	Water, Sanitation and Hygiene