PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC375

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Coastal Embankment Improvement Project - Phase 1 (CEIP-1) (P128276)</th>
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I. Introduction and Context

Country Context

Bangladesh is a hydraulic civilization situated at the confluence of three great trans-Himalayan rivers—the Ganges, the Brahmaputra (or Jamuna), and the Meghna (GBM). The GBM river system marks both the physiography of the nation, as well as the culture and livelihood of the people. While over 90 percent of the GBM catchment lies outside of Bangladesh, approximately 200 rivers and tributaries of the GBM drains through the country via a constantly changing network of estuaries, tidal inlets, and tidal creeks, before emptying out into the Bay of Bengal. Thus, the coastal zone of Bangladesh, the lowest landmass of the country, is continually influenced by these Himalayan drainage ecosystems that join to form one of the largest, youngest, and most active deltas in the world.

The coastal zone spans over 580 km of coastline and is prone to multiple threats. Sixty-two percent of the coastal land has an elevation of up to three meters and eighty-three percent up to five meters above mean sea level. The zone constitutes 32 percent of the land area and hosts nearly 28 percent of the population. Coastal districts are characterized by a high pace of population growth. The coastal population is projected to grow to 61 million by 2050. The trend continues to push millions of people to live in the low lying coastal areas which are highly vulnerable to natural hazards.

Poverty indicators in the coastal area show a higher percentage of population living below the absolute poverty line compared to the rest of the country (i.e., 52 percent versus 49 percent). This is often attributed to the high vulnerability of the low lying coastal area to multiple threats such as cyclones, storm surges and floods, as well as earthquakes, and tsunamis. The achievement of food self-sufficiency remains a key development goal for the country. Poor people spend a large majority of their income on food (i.e., poor in Bangladesh almost 65-70% of income spent on food), while many farmers derive much of their income from producing food. The inter-connectivity nature between livelihood of the poor and food production suggests that increased farmers vulnerability will have large negative consequences on the welfare of both farmers and poorer consumers.

The year 2007 was indicative of the vulnerability of coastal population and the development challenges faced by the government. Severe flooding from July to September along the Ganges and Brahmaputra rivers affected over 13 million people and caused extensive damage to agricultural production and physical assets. This catastrophic flooding event was shadowed by cyclone Sidr which made landfall across the southern coast on the November 15th, further causing over 3,400 deaths. The cyclone destroyed over a million ton of rice and incurred over US$ 1.6 billion in damages and losses. The concurrent increase in international prices of oil and food place further strains on both government budgets and household livelihoods. In addition, scarcity of drinking water, land erosion, the high groundwater arsenic content, water logging, water and soil salinity and various forms of pollution have compounded the downward trend in social and economic developments in coastal zones.

Sectoral and Institutional Context

Sectoral Context

The government has always sought to buffer the socioeconomic activities and assets of the coastal population from natural hazards and risks. Their commitment to develop a safe and inhabitant coastal zone can be dated back to the 1960s. Compelled by the call for intensive rice cultivation during the green revolution, the government constructed a series of embankments and polders in order to provide tidal flood protection for coastal zone population, and thereby enable intensification of crop production and agricultural
growth. The Bank became involved in coastal area protection through the Coastal Area Rehabilitation Project (Cr 339-BD) following the devastating cyclone of November 1970. The government requested further Bank assistance that resulted in the Coastal Embankment Rehabilitation Project in 1995. Coastal embankment projects put in place regulators and other structures to control water intake and drainage of the poldered area with the primary principle of improving agriculture productivity. Overall the Government invested about US$10 billion towards the development of structural (i.e. cyclone shelters, cyclone-resistant housing) and non-structural (i.e. early warning and awareness raising systems) disaster mitigation and preparedness systems.

Continuous investment since 1960’s has resulted in the establishment of 2,130 cyclone shelters, 139 polders, 2,900 water control structures for drainage, and an improved early warning systems. All of which, have mitigated the exposure to natural catastrophes and significantly saved lives and property during extreme events. In addition, rural households have adapted their farming systems to floods occurrence by switching from low-yielding deepwater rice to high-yielding rice crops. As a result, the scale of the agricultural production in Bangladesh has seen an increase as much as 200 to 300 percent in certain areas. The construction of polders along the entire coastal belt provided protection to the people and their agricultural land. Today, 1.2 million hectares of land is under agriculture within the coastal embankment system. This represents almost 15% percent of Bangladesh total arable land. Overall, polderization has altered the landscape of the Bangladesh coastal zone in ways that contributed to enhanced livelihood and food security for growing populations (see the map of the polder areas attached).

Notwithstanding the security and enhanced resilience brought by polders, the vulnerability of the coastal population is on the rise due climate change. Climate variability and change will accentuate the intrinsic risks facing coastal Bangladesh. These risks span: (i) cyclones and storm surges (ii) river bank erosion and vulnerability of islands and chars, (iii) sea level rise, (iv) saline intrusion (v) coastal erosion. Climate change has been attributed to induce sea level rise and increased the intensity and frequency of cyclones in the Bay of Bengal. It is also reported that under climate change there will be increased propensity for extreme monsoon outbreaks. So, lack of investment to retrofitting and upgrading the polders scheme will weaken their capacity to mitigate the risk associated with natural hazards and their ability to improve livelihood and save lives and assets. A recent study on the cost of adapting to extreme weather events in a changing climate indicated that if a 10 year return period cyclone hit the coastal area today, about 8 million people will be affected by inundation depths greater than 3 meters. With population growth that number is projected to increase to 13.5 million by 2050. However under a climate change scenario an additional 9 million coastal inhabitant will be exposed to inundation depths greater than 3 meters. The study identifies which polders will likely be overtopped by intensified storm surges under the climate change scenarios. It further estimates the cost of enhancing the height of coastal embankment at $2.4 billion under the baseline scenario and at $3.3 billion under the climate change scenarios.

Primarily, the coastal embankment system brought immense benefits to the people living along low lying areas. The system was designed originally to protect against the highest tides, without much attention to storm surges. Recent cyclones brought substantial damage to the embankments and further threatened the integrity of the coastal polders. In addition to breaching of the embankment due to cyclones, siltation of peripheral rivers surrounding the embankment caused the coastal polders to suffer from water logging, which lead to large scale environmental, social and economical degradation. Poor maintenance and inadequate management of the polders have also contributed to internal drainage congestion and heavy external siltation. As a result, in some areas soil fertility and good agriculture production are declining because of water logging and salinity increase inside polders.

All the above reasons have led the Government to re-focus its strategy on the coastal area from one that only protects against high tides to one that provide protection against frequent storm surges. The Government has recognized the need for a systematic approach to upgrade the coastal embankment system to protect against an appropriate return period and be based on sound local risk and vulnerability assessment. Moreover, the embankment program needs to be accompanied with afforestation program particularly on the sea side, as forestation has been shown to significantly reduce storm surge damages. Restoration of the embankment system is a much needed catalyst to provide resilience to vulnerable communities and to revitalize the coastal zone’s ailing socio-economic engine

Institutional Context

The Government has created a highly supportive policy environment for mainstreaming coastal development, water resources management, disaster risk management and climate change adaptation agenda in its major development strategies.

Coastal Zone Development. The administration in Bangladesh, like in many other countries, is highly departmentalized with agencies under different Ministries of the Government having their own focused mandate. However, development problems do not occur departmentally; they appear in a complex web of interrelationships needing concerted efforts by more than one agency. This complexity is very apparent in the management of the coastal zone area. As such, since 1999 the Government has developed the concept of an Integrated Coastal Zone Management (ICZM) as a response to this sort of administrative fragmentation. The concept is to create a common vision for the development of the coastal area and to translate this vision into actions and operations. As part of the effort under ICZM, the Government has promulgated the Land Use Policy (2001), Tsunami Vulnerability Map (2005) the Coastal Zone Policy (2005) and the Coastal Development Strategy (2006). The Coastal Zone Policy was the first sectoral policy to explicitly include climate change impacts and actions.

Water Resources Management. The Ministry of Water Resources (MWR) is the apex body of the government responsible for development and management of the whole water resources of the country. It formulates policies, plans, strategies, guidelines, instructions, acts, and rules relating to the development and management of water resources. It prepares and implements
development projects relating to flood control drainage and irrigation, river bank erosion and control, delta development and land reclamation. It is also responsible for constructing barrages, regulators, sluices, canals, embankments and sea-dykes along the banks of the rivers and coasts. Bangladesh Water Development Board (BWDB) is the implementing arm of the MWR in the executions of flood, drainage and irrigation plans and development projects and it has been in operation since 1959. BWDB is also responsible for collecting and dissemination of hydrologic and hydraulic data and the management of Flood Forecasting and Warning Center. Water Resources Planning Organization (WARPO) is the strategic and macro planning arm of MWR. It prepared the National Water Policy (1999), a Coastal Zone Policy (2005), and National Water Management Plan (2004).

Disaster Risk Management. After the 1991 cyclones that claimed nearly 140,000 lives, Bangladesh’s ability to manage disaster risks, in particular floods and cyclones, has substantially improved. This has been the result of a gradual shift from a response-based approach to a strategy that incorporates elements of greater emergency preparedness and risk mitigation. Bangladesh’s Second Poverty Reduction Strategy Paper provides for strengthening disaster management and risk reduction, mainstreaming disaster management into national policies and enhancing community capacity for disaster preparedness and risk reduction. The National Plan for Disaster Management (NPDM) (2010-2015) is centered on the following strategic pillars: (i) risk identification and assessment; (ii) strengthening and enhancing emergency preparedness; (iii) institutional capacity building; (iv) risk mitigation investments; and (v) introducing catastrophe risk financing in the longer term. The underlying principles of the NPDM are that both loss of life and the economic impact of disasters can be reduced through advance planning and investment. Further the plan should be both affordable and delivery-efficient. The proposed upgrading of the embankment system is recognized as a key investment to building resilience of coastal population. The Ministry of Food and Disaster Management is the apex institution responsible for coordinating national disaster management interventions across all agencies.

Climate Change Policies. Government of Bangladesh also launched the National Adaptation Program of Action (NAPA) in 2005. The NAPA highlights the main adverse effects of climate change and variability on various economic sectors and identifies a list of adaptation needs. In 2009, Bangladesh was one of the first countries to prepare a Bangladesh Climate Change Strategy and Action Plan (BCCSAP), which seeks to guide activities and programs related to climate change in Bangladesh. The BCCSAP is a 10 year program to build the capacity and resilience of the country to meet the challenge of climate change. The rehabilitation and upgrading of coastal embankment is a prime objective of the strategy. Bangladesh is also one of 9 countries selected to participate in the Pilot Program for Climate Resilience (PPCR) established under the multi donor Climate Investment Fund (CIF). As part its Strategy Program for Climate Resilience (SPCR) Bangladesh submitted a request for a $25 million grant to increase the resilience of coastal infrastructure through the proposed CEIP project. This request was approved by the PPCR steering committee in November 2010. The Ministry of Environment and Forests is the focal ministry for all work on climate change, including international negotiations.

Relationship to CAS
The proposed operation is fully aligned with the Country Assistance Strategy (CAS) for FY11-14. The overarching objective of the CAS is to help Bangladesh achieve its ambitious target of reaching middle-income status and reducing poverty from 32 percent to 15 percent of the population by 2021. The proposed operation directly supports the implementation of the second pillar of the CAS, which is to Reduce Environmental Degradation and Vulnerability to Climate Change and Natural Disasters. By enhancing the performance of coastal embankments, the project will protect people’s assets, enhance their livelihood and reduce their vulnerability to severe cyclones and storm surges.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)
The overall project development objective is to increase the resilience of coastal population to natural disasters and climate change. More specifically, the project aims at (a) reducing the loss of life, assets, crops and livestock during natural disasters; (b) reducing the time of recovery after natural disaster such as cyclone; and (c) improving agricultural production by reducing saline water intrusion which is expected to worsen due climate change. This objective will be achieved by rehabilitating and improving the polder system in the coastal area.

Key Results (From PCN)
The following key results are expected from the project:
(i) Reduction in loss of life, assets, crops and livestock during a natural disaster (such as cyclonic storm surge);
(ii) Reducing the recovery time after a disaster; and
(iii) Improving agricultural production inside the polder area, employment and incomes.

III. Preliminary Description

Concept Description
A multi-phased approach. The long term objective is to increase the resilience of the entire coastal population to tidal flooding and natural disasters by upgrading the whole embankment system. With an existing network of embankment of nearly 6,000 km long with 139 polders, the magnitude of such a project is enormous. Hence a multi-phased approach will be adopted over a period of 15 to 20 years. The proposed CEIP-I1 is the first phase of this long term program. Studies for the preparation of the CEIP-I project are currently funded by the IDA credit for the Emergency Cyclone Recovery and Restoration Project 2007 (Cr 45070).
Strategic assessment of polders. As indicated previously, the embankment system was originally designed to keep out the highest tides without any consideration of possible storm surges. Recent cyclone storm damages and the anticipation of worse future situation due to climate change have lead the Government to shift its strategy towards providing protection against future storm surges, instead of only tidal protection. BWDB with the help of the major modeling institutes in Bangladesh is engaged in a strategic assessment of the overall polder system. This involves updating the environmental baseline and using extensive modeling to determine present and future storm surge levels affecting embankment stability taking into consideration the impact of climate change.

Polder selection. As part of the strategic polder assessment, a multi criteria analysis was developed to guide the gradual selection of polders. The analysis relies on the following key criteria: physical condition of the embankment and the drainage system, economic activities in the polders (agriculture or fishery), population and socio economic conditions, environmental condition and economic efficiency considerations (for example the geographical proximity of polders can facilitate efficient execution of works). Based on this assessment a first priority group of 17 polders was selected. Among the seventeen, 5 will be considered for the first year investment.

Level of protection. As clearly define in the strategy, the level of protection should be beyond the highest tides and protect against frequent storm surges. In the course of this strategic assessment, protection against a 25 year return period maximum surge height with additional buffer for climate change is likely to be adopted. A higher return period for the technical design of embankment structures would be prohibitively expensive. However the intention is to make the design robust enough so that even if the embankment is overtopped, it should not be breached.

The project will comprise the following components:

**Component A – Rehabilitation and Improvement of Polders (US$285 million)**

Component A1: Rehabilitation and Improvement of Polders (US$275 million). The component will finance activities that aim to increase polders resilience to tidal flooding and storm surges. Investments include: (i) improvements of critical portions of the polders embankment; (ii) restoration of embankments and channel improvement in critical stretches; (iii) increasing embankment height in some stretches for improved resilience; (iv) upgrading drainage systems within polders and, (v) improving operation and maintenance (O&M) programs. The reconstruction and rehabilitation works will be designed with improved standards so that protection not only against tidal flooding but also frequent storm surges. Depending on the length of embankment in each polder, it is expected that about 17-20 polders will be rehabilitated under this component.

The stakeholders and beneficiaries consultations and their participation would be central to carrying out the improvement works to the polder system. The beneficiaries through their formal and informal water management associations (WMAs) would be involved in all stages of project implementation from identification of works, prioritization, design, and construction. These consultation would be carried out by the consultants and NGOs with support from the BWDB etc..

Component A2: Afforestation (US$10 million). Afforestation is critical to the security of embankment. The planting of selected species of trees on the slopes of the embankment would commence after the completion of earthworks in restored and new embankments. The component will attempt to engage community participation in the effort of afforestation activities and maintenance with emphasis on sustainability of these operations. The component will finance effort to build capacity of local government institutions, Water Management Association, and community organizations in secondary maintenance schemes for improved O&M, embankment afforestation, protection of embankment toe against erosion.

**Component B–Implementation of Social Action and Environmental Management Plans (US$3 5 million).**

Component B1: Social Action Plan (US$5 million). This component will support consultation with and strengthening of polders stakeholders and beneficiaries as well as formal and informal water management organization (like water management groups, water management associations and embankment management groups). It will also support the implementation of social action plan identified during the consultative, design and implementation phases.

Component B2: Resettlement Action Plans (US$26 million). Polder scheme rehabilitation is a complex project that involves a variety of issues ranging from land acquisition, physical and economic displacement and other unanticipated impacts. Generally there are squatters on the embankments as they are safe structures. A Social Management and Resettlement Policy Framework (SMRPF) is currently under preparation and will be disclosed in accordance with Bank guidelines. This component will finance the implementation of Social Management Plans, Resettlement Action Plans (RAP), embankment monitoring and public consultation plans. The component will also finance resettlement and rehabilitation of persons adversely affected by the project. It will also support the development of a system to computerize land acquisition data with GPS reference and independent institute to undertake surveys and verify field data in order to guard against improper targeting of beneficiaries and/or false delivery of benefits in case of SAP/RAP.

Component B3: Environmental Management Plan (US$4 million). An overall environmental assessment of the polder system and an Environmental Management Framework (EMF) for the project are already under preparation. This component will finance polder specific Environmental Impact Assessment (EIA) and Environment Management Plan (EMP). It will finance the implementation of
an environmental monitoring plan and environmental mitigation and enhancement measures. Some of the items under EMP will be integrated with the civil works and will be included in the budget sub component A1. The component will also support the establishment of an environmental management system in BWDB to enable it to target, achieve and demonstrate continuous improvement in environmental performance of the polder system. Some activities, development of protected area, and community environment management plan may be funded under this component.

Component C- Supervision and Monitoring and Evaluation of Project Impact (US$20 million)

Component C1: Supervision of Construction (US$16 million). This component will cover consulting services for surveys, designs, and construction supervision of rehabilitation and improvement of coastal embankments. This will include facilitating consultations with local communities in identifying needs and suitable design of the embankment as well as with other stakeholder such as local government, upazilla and union level government. The component will finance surveys required prior to construction work.

Component C2: Monitoring and Evaluation and supervision of EMP, SAP/RAP (US$4 million). This component will also cover consulting services for continuously monitoring project activities and providing feedback to the government and the implementing agency on the project’s performance. It would also provide independent monitoring and supervision of the EMP, SAP and RAP.

Component D – Project Management, Technical Assistance, Training and Strategic Studies (US$25 million)

This component will support BWDB in implementing the project through the establishment of a fully functioning Project Management Unit (PMU). It will provide resources for needed strategic studies (including the continuous updating of the strategic polder assessment as well as all necessary preparatory studies for following phases CEIP), institutional capacity building, technical assistance and training.

Component E – Contingent Emergency Response (US$0 million).

A provisional zero amount component to be included under this project that will allow for rapid reallocation of loan proceeds during an emergency, under streamlined procurement and disbursement procedures. In the event of an emergency during the implementation of the project, the contingent component would be implemented following the rapid response procedures under OP/ BP8.00 in combination with the IDA Immediate Response Mechanism (IRM) guidelines dated November 3, 2011. In addition to reallocation of funds from other project components, the contingent component may also serve as a conduit for additional funds to be channeled to the project in the event of an emergency. A specified amount could also be earmarked for liquidity support through reimbursement of a pre-identified positive list of good purchased by the state. The resources would be executed through the existing PIU greatly accelerating immediate response and recovery needs.

IV. Safeguard Policies that might apply

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VI. Contact point

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