Report Number: ICRR0024220

1. Project Data

Project ID P128276	**Project Name** BD: Coastal Embankment Improvement Proj
Country Bangladesh	**Practice Area(Lead)** Urban, Resilience and Land

L/C/TF Number(s)	Closing Date (Original)	Total Project Cost (USD)
IDA-52800,TF-14713	31-Dec-2020	330,755,370.02
Bank Approval Date	**Closing Date (Actual)**	
26-Jun-2013	31-Dec-2023	

	IBRD/IDA (USD)	Grants (USD)
Original Commitment	375,000,000.00	25,000,000.00
Revised Commitment	375,739,892.98	24,999,892.29
Actual	336,839,899.00	24,999,892.29

Prepared by	Reviewed by	ICR Review Coordinator	Group
Cynthia Nunez-Ollero	Avjeet Singh	Avjeet Singh	IEGSD (Unit 4)

2. Project Objectives and Components

a. Objectives

According to the Financing and Grant Agreements, (FA, p. 5) and the Project Appraisal Document, (PAD, paragraph 22), the Project Development Objectives (PDOs) of this Bangladesh Coastal Embankment Improvement Project were to: (i) increase the area protected in selected polders from tidal flooding and frequent storm surges, expected to worsen due to climate change; (ii) improve agricultural production by reducing saline water intrusion in selected polders; and (iii) improve government capacity to respond promptly and effectively to an eligible crisis or emergency.

This review will parse the objectives into the following three sub-objectives:

i. To **increase** the area protected in selected polders from tidal flooding and frequent storm surges
ii. To **improve** agricultural production by reducing saline water intrusion in selected polders
iii. To **improve** government capacity to respond to an eligible crisis or emergency

b. Were the project objectives/key associated outcome targets revised during implementation?
Yes

Did the Board approve the revised objectives/key associated outcome targets?
No

c. Will a split evaluation be undertaken?
Yes

d. Components

1. **Rehabilitation and Improvement of Polders**: (US$291.0 million at appraisal, restructuring reduced this to US$274.1 million, US$215.6 million actual). This component was to finance civil works to (i) rehabilitate critical portions of polder embankments, including slope protection, (ii) increase embankment heights, (iii) repair and upgrade drainage and flushing systems within polders, and (iv) improve operation and maintenance (O&M) of the polders. 17 polders in three works packages across the following seven districts were to be rehabilitated and improved: Khulna, Bagerhat, Pirojpur, Patuakhali, Barguna, Jhalkathi, and Satkhira. In addition, this component was to finance afforestation activities to protect embankments from tidal flooding and storm surges.
2. **Implementation of Social and Environmental Management Frameworks and Plans**: (US$56.0 million at appraisal; restructuring reduced this to US$51.0 million, US$49.3 million actual). This component was to finance the implementation of three plans – (i) the social action plans (SAPs); (ii) the Social Management and Resettlement Policy Framework (SMRPF) and Resettlement Action Plans (RAPs); and (iii) the Environmental Management Framework and Environmental Management Plan (EMP). This component was also to finance the establishment of water management organizations (WMOs) in the target polders. WMOs are participatory water management organizations or schemes in a polder. These include Water Management Group (WMG) and Water Management Association (WMA). Each hydraulic boundary in a polder/scheme is a Water Management Unit (WMU). Each WMU may form a WMG. Representatives from each WMG form an apex body called a WMA. The WMGs and the WMA in a polder/scheme are known as WMOs. WMOs were to determine needs and uses for water resources and support the operation and maintenance (O&M) of hydraulic infrastructure. This component was to finance land acquisition, resettlement and rehabilitation of persons adversely affected by the project. In addition, this component was to finance (i) the environmental impact assessments (EIAs) for all remaining polders, (ii) the implementation of environmental mitigation measures, and (iii) the establishment of an environmental monitoring system within the Bangladesh Water Development Board (BWDB) to track the environmental performance of the polder system.
3. **Construction Supervision, Project Monitoring and Evaluation (M&E), and Coastal Zone Monitoring**: (US$32.0 million at appraisal; restructuring reduced this to US$30.8 million, US$36.6 million, actual) This component was to finance surveys and designs of the target polders;

construction supervision of the coastal embankment rehabilitation and improvement work; and the project M&E. In addition, this component was to finance a morphological assessment of the Bangladesh Delta, extend the current monitoring systems in coastal Bangladesh to generate data to assess the effects of multiple drivers to guide future design, rehabilitation, and improvement requirements of the coastal zone environment.

4. **Project Management, Technical Assistance, Training and Strategic Studies**: (US$21.0 million at appraisal, restructuring reduced this to US$19.5 million, US$10.4 million actual). This component was to finance project management, audits, technical assistance, strategic studies, and training support to the BWDB. This component was to finance the updating of the strategic polder assessment, and preparatory studies for subsequent phases of the project.
5. **Contingent Emergency Response Component (CERC)**: (US$0 million at appraisal, US$0 million actual). This component was to finance the government's emergency response to a disaster.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost: The original total project cost was US$ US$400 million. The total project cost was reduced to US$375.74 million after cancelling US$24.26 million in IDA credit (or SDR18.2 million; see Dates below). The credit disbursed US$311.84 million in IDA funds and US$25.0 million in grants for a total disbursement of US$336.84 million.

Financing: The International Development Association provided a credit equivalent to US$375 million. The Pilot Program for Climate Resilience under the Strategic Climate Fund (PPCR-SCF) provided an additional grant of US$25 million.

Borrower Contribution: None.

Dates: The World Bank Board approved the project on June 26, 2013. The credit and the grant became effective on November 24, 2013. The World Bank team conducted the Mid Term Review (MTR) on January 13, 2017. The credit and the grant were originally scheduled to close on December 31, 2020. The project period was extended twice for a total of 36 months to close on December 31, 2023. The following restructurings occurred:

- On January 14, 2020 to reduce the scope due to financing constraints, and extend the loan closing date by 18 months, from December 31, 2020 to June 30, 2022 to complete delayed activities. The PDO was not revised. The following changes were made to targets of two PDO-outcome level indicators, three intermediate results indicators and three new intermediate results indicators were added to measure outputs that were part of the scope but not reflected in the original results framework.
    - **Reduced** the targets for the following PDO outcome indicators:
        - Gross area protected from 100,800 to 66,012 hectares (ha)
        - Direct project beneficiaries from 760,000 to 724,202 persons.
    - **Reduced** the targets for the following output targets
        - Number of polders from 17 to 10 polders
        - Length of embankment to be upgraded from 623 to 408 kilometers (km)
        - Length of drainage channels to be upgraded from 794 to 305 km
        - the replacement and repair of hydraulic structures
        - redefined flushing inlets (IRI 2 and 4) with reduced targets

- The following intermediate results indicators were added:
  - **Dropped** one output indicator – upgrading regulators
  - **Increased** the targets for the following output indicators
    - Area to be afforested from 300 to 600 ha
    - Number of water management associations to be formed from 4 to 10
    - Number of grievance redress committees to be formed from 17 to 36

- On March 06, 2022 to extend the loan closing date for an additional 18 months, from June 30, 2022 to December 31, 2023 to complete ongoing critical works because of the impact of COVID-19; supply chain disruptions; delayed compensation; slow land acquisition; and severe weather. Two cyclones affected the project polders.
- On December 12, 2023 to cancel US$24.26 million, reduce the project cost from US$400 million to US$375.74 million. Cost savings from work contracts and foreign exchange gains reduced the allocations of the components.

Split Rating: A split rating of the outcome will be undertaken. The project scope was **reduced** during the first restructuring leading to the reduced targets for two outcome level indicators and adjustments of the targets for the intermediate results indicators. Cost overruns led to these adjustments because of (i) a 300 percent increase in land acquisition costs following the implementation of a new Acquisition and Requisition of Immovable Property Act 2017; (ii) a 2.0 percent increase in value added tax; 2.5 percent increase in income tax for works, and a 10 percent increase in income tax for consultancy services; (iii) price escalation; (iv) foreign exchange gains resulting in a decrease from US$375.00 million to US$342.15 million as of November 7, 2019); and (v) emergency protection works during implementation.

3. Relevance of Objectives

Rationale

Context: Bangladesh is a low-lying delta where three great trans-Himalayan rivers — the Ganges, the Brahmaputra or Jamuna, and the Meghna (GBM) meet. Only about 10 percent of the GBM catchment lies in Bangladesh, but about 200 rivers and tributaries of the GBM drain through the country through a constantly changing network of estuaries, tidal inlets, and tidal creeks, before emptying out into the Bay of Bengal. Floods, cyclonic storms, and erosion frequent this topography. The Bangladeshi coastal zone is home to nearly 42 million in 2010 and is estimated to grow to 61 million by 2050. Poverty indicators in the coastal area show a higher percentage of the population live below the absolute poverty line compared to the rest of the country. Coastal communities are often also the poorest, who rely heavily on subsidence agriculture. Polders protect coastal communities from flooding, tidal inundations and salinity intrusion. The polder embankments also provide emergency shelter to victims of riverbank erosion and flood inundations. After the 2007 Cyclone Sidr, government agencies, development partners, and the World Bank conducted consultations to prepare a long-term disaster risk reduction program. The government invested about US$10 billion in key climate adaptation investments such as structural and non-structural disaster mitigation and preparedness systems to upgrade the embankment system. The government constructed over 2,130 multipurpose cyclone shelters, 139 polders, and 2,900 water control structures. The Dutch term “polder” refers to areas enclosed on all sides by dikes, or embankments, separated from the main river system. Inlets and outlets control the water inside the polder and protect against tidal floods, salinity intrusion, and sedimentation (PAD, footnote 12). The existing coastal embankments protect against the impact of climate

variability. To maintain their effectiveness, these required retrofitting and upgrading. The siltation of peripheral rivers, poor maintenance, and inadequate management threaten the integrity and the effectiveness of these embankments against damages.

National Plans: The government adopted a policy environment to mainstream water resource management, disaster risk management, and climate change adaptation agendas in its major coastal and development strategies. The project was relevant to achieving the goals of Bangladesh's Eighth Five Year Plan FY2020–25 by strengthening community capacity, building resilient infrastructure, and providing technical assistance in O&M. The PDO was also relevant to the objectives of the Bangladesh Delta Plan, which highlights reducing vulnerability to storm surges and building resilience to climate change and other delta challenges. The PDO and this project supported the August 2021 update of the Bangladesh Nationally Determined Contribution (NDC), where this project was noted as one of the key adaptation actions in mitigating significant impacts of cyclones and enhanced emergency response in the coastal region. The PDO was also relevant to the mitigation actions of the updated NDC noting that afforestation activities promoted collaborative forest management and social forestry.

World Bank Country Partnership Framework: The PDO was relevant to the World Bank Groups' Country Partnership Framework (CPF) for Bangladesh FY2023–27 (Report No. 181003-BD). The PDO was relevant to the CPF's Objective 7 High-Level Outcome C: Enhanced climate and environmental resilience. This objective focused on improved effectiveness of delta management to accelerate climate resilience through activities such as the implementation of the Bangladesh Delta Plan, building climate-resilient infrastructure, improved disaster risk management, and community-led adaptation and risk management. One of the CPF's progress indicators was the number of people benefiting from enhanced resilience to riverbank erosion or inundation damage that this project supported. The PDO was also relevant to High-Level Outcome B: Improved socioeconomic inclusion, through enhancing economic opportunities for vulnerable groups, by improving resilience in agriculture.

World Bank Experience in the Sector and in the Country: The multi donor Climate Investment Fund (CIF) in the World Bank established a *Pilot Program for Climate Resilience* (PPCR) in 2011 and selected Bangladesh as one of nine pilot countries to implement a national strategy for climate resilience. Following Cyclone Sidr in 2007, the World Bank financed the Emergency 2007 Cyclone Recovery and Restoration Project (P111272) and the Multipurpose Disaster Shelter Project (P146464) to construct and rehabilitate disaster shelters and coastal embankments. The World Bank has also financed the ongoing Resilient Infrastructure for Adaptation and Vulnerability Reduction Project (P173312) to reduce vulnerability to river and flash floods and improve disaster preparedness and response. The ongoing *Climate-Smart Agricultural Water Management Project* (CSAWMP, P161534) is expected to promote resilient agriculture. The World Bank also has a track record of financing disaster risk management globally. The World Bank experience in the sector and in Bangladesh point to a strong justification for Bank financing of this project.

Summary of Relevance of Objectives Assessment. The PDO statement was clear and specific. The level of ambition relative to the Bank's experience in the country and the expected outcomes was appropriate. The scope was limited to a target number of polders to showcase how to reduce the impact of cyclone-induced storm surges on embankments, hydraulic structures, drainage channels, and cropping intensity. The scope was downscaled during implementation because of design and implementation constraints. Numerous cyclones hit the coastal areas of Bangladesh during the project period - Roanu (2016), Mora (2017), Fani and Bulbul (in 2019), Amphan (2020), Yaas and Jawad (in 2021), Sitrang (2022), and Mocha, Hamoon, and Midhili (in 2023). At completion, the PDO remained relevant to

the Bank's CPF and the Government disaster risk management priorities. Overall, the relevance of the PDO is rated as High.

Rating
High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1
Objective
To increase the area protected in selected polders from tidal flooding and frequent storm surges.

Rationale
Theory of Change (TOC): No TOC was prepared at appraisal. It was prepared at the ICR using the causal links established by the inputs, outputs, and expected outcomes in the results framework at appraisal (PAD, Annex 1). Climate change was expected to worsen tidal flooding and cause frequent storm surges. Rehabilitating and improving targeted polders would increase community resilience. Multicriteria analysis guided the prioritization of selected polders. These included the condition of the embankment and the drainage system, economic activities in the polders (agriculture, fishery), population and socioeconomic conditions, environmental and economic considerations such
as proximity of polders to facilitate the efficient execution of works). Afforestation was to protect from erosion, stabilize the embankments by countering floods, tidal surges, wave attacks, and strong winds. Afforestation was to support the livelihoods of local communities. Selected mangrove and salt tolerant species were to be planted as a protective greenbelt on the tidal inundation zone to the foreshore of the embankment. A range of commercial wood, fuel wood, fruit, other tree, palm and grass species were to be planted
along foreshore slopes of embankments using participatory social forestry practices. These were to support the livelihoods needs of landless, marginalized and poor villagers, including women.

Inputs: were to be the financing and technical assistance of the activities in the target polders such as the rehabilitation and improvement of the polders and the afforestation of the target area.

Outputs: were to be the area protected, the upgraded embankments with improved slopes and protective works; the repaired and replaced drainage and flushing systems; the upgraded drainage channels; and the area that has been afforested.

Outcomes: were to be the increase in area protected from tidal flooding and frequent storm.

Overall, the causal link between inputs, outputs and outcomes were established. The TOC identified **three critical assumptions** that if realized, were to enhance the likelihood that the outcomes would be achieved: (i) a multicriteria analysis was to guide the assessment that would prioritize the targeted polders; (ii) the government would allocate adequate O&M budget for these polders; and (iii) BWDB would maintain O&M capacity after the project closed. The World Bank Task Team clarified that these last two critical assumptions

referred to the government providing BWDB with O&M budgets allocated for the polders completed under this project. Adequate O&M budget for BWDB would then allow BWDB to maintain its O&M capacity.

OUTPUTS:

- 10 polders were improved (the original target was 17 polders).
- 405.67 km of embankments were upgraded to resilient standards. The original target was 623 km.
- afforested 700 ha as a nature-based solution for climate resilience (original target was 300 ha).
- Completed 29 km of slope protective works (original target was 28 km), and 9.85 km of bank protective works (original target was 9.37 km).

OUTCOMES: The following outcomes were **not achieved**:

- The area protected from tidal flooding and frequent storm surges reached 65,657 ha (the original target of 100,800 ha).
- 720,573 persons were the direct project beneficiaries of the increased resilience to climate change, the original target was 760,000. The original and unrevised target that 50 percent of direct project beneficiaries were female, was achieved.

Overall, the efficacy of the project to achieve this objective against the original targets is rated **Modest**. While the outputs achieved some level of protecting selected coastal polders against the risk of flooding, storm surges, coastal erosion, and salinity intrusion, the original targets for both outcome indicators and some outputs were not achieved.

Rating
Modest

OBJECTIVE 1 REVISION 1

Revised Objective
Objective 1 was not revised. The targets for outcome indicators were reduced.

Revised Rationale
Revised Theory of Change: No change.

Revised Inputs: Resources and correspondingly, the scope of the project were reduced.

Revised Outputs: The January 2020 restructuring reduced the scope to target 10 instead of 17 polders and targets of the output indicators were proportionately reduced. The end target for afforested area was increased from 300 (ha) to 600 (ha) due to actual requirements.

Revised Outcomes: The outcome indicators were not changed but its targets were reduced.

Revised Critical Assumptions. No change. Overall, the TOC retained the reasonable causal link between inputs, revised target outputs, and reduced targets of the original outcome indicators.

Revised OUTPUTS: The following outputs with revised targets were **achieved** or **almost achieved**:

- Improved 10 polders **(**the revised target was 10 polders).
- The project upgraded 405.67 km of embankments to resilient standards. The revised target of 408 km was proportionate to the reduced target of polders from 17 to 10.
- afforested 700 ha as a nature-based solution for climate resilience (revised target was 600 ha)

Revised OUTCOMES: The following revised outcome targets were **achieved** or **almost achieved**:

- Increased the area protected from tidal flooding and frequent storm surges to 65,657 ha (revised target was 66,012 ha).
- 720,573 persons were the direct project beneficiaries of the increased resilience to climate change. (The revised target was 724,202)

Overall, the efficacy of the project to achieve the objective against revised targets is rated **Substantial**. The outputs protected the targeted polders against the risk of flooding, storm surges, coastal erosion, and salinity intrusion.

Revised Rating
Substantial

OBJECTIVE 2
Objective
To improve agricultural production by reducing saline water intrusion in selected polders.

Rationale
Theory of Change: A TOC was prepared at completion. The inputs, outputs and expected outcomes were reasonably linked. Reducing saline water intrusion in selected polders was to increase cropping intensity and improve agricultural production. Forming the water management organizations was to strengthen the operations and maintenance (O&M) of the investments to reduce the saline water intrusion. The cropping intensity would increase because of the improved O&M. Cropping intensity refers to the number of crops a farmer grows on the same field in a given agricultural year. This is calculated by taking the total gross cropped area (single, double, and triple crops) divided by the total arable land area in a cropping season for the 10 selected polders. The ICR did not mention other factors that affected cropping intensity other than saline intrusion. However, the World Bank Task Team clarified that environmental factors such as land elevation, inundation patterns, and climate change also affected cropping intensity with impacts generally secondary to the dominant constraint from salinity intrusion. The critical assumption noted above in Objective 1 – the government would allocate adequate O&M budget – was to support BWDB to improve its capacity to maintain the completed polders. The World Bank Task Team clarified that the WMAs were community-based organizations designed to participate in water management of the polders. This project created a structured

benefit-sharing scheme for WMAs to carry out minor maintenance from the sales proceeds of the social afforestation activities after the customary rotation period.

Inputs: were to be training and technical assistance to support target beneficiaries to form water management bodies and the financing of physical structures that would reduce saline water intrusion in selected polders.

Outputs: were to be the organized water management associations, newly constructed and rehabilitated drainage, regulators, and flushing structures.

Outcomes: was to be the rate of increase in cropping intensity.

Critical Assumptions: The same assumptions from the TOC of the first objective also applied here.

Overall, a causal link was established between the outputs and some of the expected outcomes.

OUTPUTS: The following target outputs were **exceeded** or **achieved**:

- 10 water management associations (WMAs) were organized (original target was 4), are overseeing the overall polder operations and maintenance (O&M) including the minimal upkeep during cyclones to ensure overall sustainability (such as closing the gates to avoid tidal flooding).
- BWDB delivered 1,200 person-days of training (original target was 160 days). The target indicator was revised at restructuring (see below).
- Client days of training provided to women was not reported because this was dropped at restructuring. The target was 60 women.
- Completed two studies to meet the PPCR indicator target on improving coastal monitoring by using climate information in decision making (original target was 2 studies).
    - Modelling of the long-term physical processes and other relevant phenomena (subsidence, climate change, river morphology etc.) (scale: macro, meso, and micro)
    - An investment plan describing a phased polder improvement roadmap for Bangladesh Coast.

The following target outputs were **unmet**:

- Upgraded 305.85 km of drainage channels (original target 794 km)

OUTCOMES:

- The cropping intensity at the project sites increased from a baseline of 140 percent to 192 percent, **exceeding** the original end target of 180 percent.
- The project enabled a two-crop cycle annually. This outcome reflected an improvement in agricultural practices, enhanced both agricultural efficiency, and community resilience**.** The annual 2-crop cycle resulted in tangible benefits for the community, such as optimized land use, increased food production, higher incomes for farmers, improved food security, and greater crop diversification. These outcomes were **not valued**.
- From 2015-2016 to 2022-2023, watermelon cultivation in the project polders under the first works package increased from 3 to 9 percent of the total cropped area. Non-project polders saw an increase from 1 to 5 percent.: The World Bank Task team further clarified that the resulting increase in

watermelon production for the project-assisted polders was significant. In 2022-2023, project polders reported a watermelon yield of 12.36 tons per hectare, which is nearly double the yield of 6.86 tons per hectare in non-project polders. This substantial difference in yield highlights the effectiveness of the interventions and support provided under the project in enhancing the productivity of watermelon cultivation in the project polders.

Overall, the efficacy of the project to achieve this objective is rated Substantial. Cropping intensity was achieved; and was attributed to reduced salinity intrusion. The World Bank Task Team clarified that other factors also affected cropping intensity, but the impacts from these socio-economic factors were generally secondary to those of salinity intrusion.

Rating
Substantial

OBJECTIVE 2 REVISION 1
Revised Objective
Objective 2 was not revised. Targets for the output indicators were revised.

Revised Rationale
Revised Theory of Change: No changes.

Revised Inputs: Financing resources were reduced.

Revised Outputs: The January 2020 restructuring reduced the number of polders from 17 to 10 polders. Targets of output indicators were proportionately reduced. Three new output indicators and targets replaced two indicators in the original results framework to distinguish the outputs of specific interventions. Hence – “drainage structures **replaced**” and “drainage structures **repaired**” replaced “drainage structures replaced/upgraded” – and “flushing inlets **replaced**” and “flushing inlets **repaired**” replaced the indicator “flushing inlets upgraded.” Two new indicators were added because the original results framework inadvertently omitted these – "riverbank protection” and “slope protection." One output indicator – regulators – was dropped because it was part of the drainage structure.

Revised Outcomes: No change.

Revised Critical Assumptions. No change.

Revised OUTPUTS: The following new output indicator targets were **achieved** or **exceeded**:

- Upgraded 305.85 km of drainage channels. The January 2020 project restructuring, decreased the drainage channel target to 305 kilometers (from 795 km) proportionate to the reduction of the project scope from 17 to 10 polders.
- 10 water management associations (WMAs) were organized (revised target 10). The January 2020 restructuring revised the indicator from “Water Management **Organization** (WMO)” to “Water Management **Association** (WMA).” End target was increased from 4 to 10 because each polder is

required to have one WMA per the institutional requirement. Initial project design targeted 4 WMA to be piloted in a few polders. Restructuring acknowledged the need to form WMA for each polder.

- New indicators – Replaced and upgraded drainage structures –
  - 89 drainage structures replaced, target 88
  - 8 drainage structures repaired, target 8
- New indicators – replaced and repaired flushing inlets
  - replaced 85 flushing inlets – target 80
  - 46 flushing inlets repaired – target 44
- Constructed 9.85 km of riverbank protection works – target 9.37 km. BWDB reported an additional 7.91 km of precautionary protection works for a total of 17.75 km. However, only 9.85 km met the uniform design standards.
- new indicator - 29.1 km in Slope Protection was part of the original project scope, but not reflected in the original results framework. Target was 28 km.
- BWDB delivered 1,200 person-days of training (revised target was 1,200 person-days).

Revised OUTCOMES: No changes.

Overall, the efficacy of the project to achieve the objective using revised targets is rated **Substantial**.

Revised Rating
Substantial

OBJECTIVE 3
Objective
To improve the government's capacity to respond promptly and effectively to an eligible crisis or emergency.

Rationale
Theory of Change: This objective was to be triggered when the government declared an emergency. No resources were allocated to this objective. Once triggered, the government would have the ability to reallocate uncommitted resources to finance previously agreed eligible activities to respond to a disaster or emergency. The ICR acknowledged that a belated World Bank guidance was to include "if applicable" in formulating the PDO. The government did not declare an emergency. There were no outputs or expected outcomes to be reported.

Rating
Not Rated/Not Applicable

OBJECTIVE 3 REVISION 1
Revised Objective
To improve the government's capacity to respond promptly and effectively to an eligible crisis or emergency.

Revised Rationale
Same as above. The CERC was not triggered, so the objective is Not rated.

Revised Rating
Not Rated/Not Applicable

OVERALL EFFICACY
Rationale
The overall efficacy of the project to achieve the objectives against the original targets is rated Substantial with moderate shortcomings. Some increase in the area covered by the improved polders increased cropping intensity, due to the reduced saline intrusion. The efficacy of the project to achieve Objective 1 is rated Modest, that of Objective 2 is rated Substantial and of Objective 3 is not rated.

Overall Efficacy Rating
Substantial

OVERALL EFFICACY REVISION 1
Overall Efficacy Revision 1 Rationale
The revised overall efficacy of the project to achieve the objectives against the revised targets is rated Substantial. Sufficient impact was reported on meeting the target area covered by the improved polders and the increase in cropping intensity and agriculture production because of reduced saline intrusion. The revised outcome targets were achieved or almost achieved. The efficacy of the project to achieve Objective 1 against revised targets is rated Substantial, that of Objective 2 is rated Substantial. Objective 3 was not rated. The revised overall efficacy is rated Substantial.

Overall Efficacy Revision 1 Rating
Substantial

5. Efficiency
Economic Efficiency. At appraisal, an economic cost benefit analysis was conducted for the investments in rehabilitating and improving the polders and investments in implementing the social and environmental management framework and plans. The total cost was US$264.80 million or 85 percent of the total project cost.

Appraisal used a 10 percent discount rate. The NPV at appraisal was estimated at US$398.6 million and the estimated EIRR was at 22 percent.

At closing the analysis of the economic efficiency of the physical investments used a 12 percent discount rate while investments related to the implementation of the social and environmental management framework and corresponding plans used a 6 percent discount rate**.** The resulting Net Present Value (NPV) ranged from US$372.80 to US$1,177.50 million. The economic internal rate of return (EIRR) was estimated at 25.7 percent. The benefit cost ratio (BCR) ranged from 2.9 to 5.1. The scope and methodology used at appraisal differed for what was used at closing and cannot be compared given the difference in coverage.

Administrative and Operational Efficiency: Cost overruns downscaled the project scope. Five factors caused cost overruns. First, land acquisition costs increased by 300 percent because the government implemented the 2017 Acquisition and Requisition of Immovable Property Act. Second, the value added tax rate increased by 2.0 percent, the income tax rate for works increased by 2.5 percent, and the income tax rate for consultancy services increased by10 percent during the project period. Third, prices increased since the project was approved. Fourth, the SDR lost against the US$ as of November 7, 2019, reducing the original project cost equivalent from US$375 to US$342.15 million. Fifth, periodic cyclones caused severe inland riverbank erosion adversely affecting the property and livelihood of local farmers and fishermen. Additional resources were needed to undertake urgent rehabilitation protection works at these severely eroded sites to protect these embankments from further erosion. Scope was reduced to complete only 10 of the planned 17 polders because of increased costs for land acquisition, and changes in the prevailing value added tax and income tax. Procurement and contract management issues delayed the contracting for polder rehabilitation. The COVID-19 pandemic also contributed to the delays. The frequent cyclones – 6 during the project period – interrupted implementation in vulnerable areas – up to 47 months for the first works package, and up to 35 months for the second works package. Numerous hartals (strikes) and blockades that took place during the project period also contributed to implementation delays. Delayed works extended the implementation period twice and closed 36 months later than originally planned. All these affected the disaster risk vulnerability of the population. For example, the target beneficiary farmers in some areas had no access to irrigation facilities for an entire year because of delayed installation of gates to repair sluices or the construction of structures.

The project demonstrated substantial operational efficiency by completing the rehabilitation of 10 polders mostly within cost estimates, except for the contract prices adjusted to accommodate the impact of tax legislation (ICR, paragraph 45). Project management costs were 50 percent lower than appraisal estimates even as resources were added for detailed design construction supervision and project management support (a 41.42 percent increase) and monitoring and evaluation (M&E) consultants (a 48.13 percent increase) to supervise the works and associated M&E activities under Component C. The World Bank Task Team clarified that the lower actual cost for project management compared to the original estimate was due to BWDB's strategic decision to embed capacity building and training components within existing consultancy service contracts (Components C1, C2, and C3). BWDB achieved significant cost savings by having the hired experts provide technical assistance and training to BWDB officials in the course of their regular duties, rather than treating these as separate line items. The integrated approach resulted in less cost while still achieving the intended outcomes for institutional capacity building and training.

Overall, project efficiency is rated **Modest**. Substantial operational and administrative inefficiencies resulted in a 36-month extension of the project period. The project economic efficiency at closing was substantial, but could not be compared with the method used at appraisal.

Efficiency Rating

Modest

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal		0	0 ☐ Not Applicable
ICR Estimate		0	0 ☐ Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

The overall outcome is rated **Moderately Satisfactory**.

	Before Restructuring	After Restructuring
Relevance of Objective	High	
Efficacy of the project to achieve		
Obj 1 Increased area protected from tidal flooding and frequent storm surges	Modest	Substantial
Obj 2 Improved agricultural production by reducing saline water intrusion	Substantial	Substantial
Obj 3 CERC	Not rated	Not rated
Overall Efficacy	Substantial with moderate shortcoming	Substantial
Efficiency	Modest	
Overall Outcome	Moderately Satisfactory	Moderately Satisfactory
Numerical value of Overall Outcome	4	4
Disbursements (in US$ millions)	US$203.77	US$330.6
Disbursement Rate (in percent)	203.77/330.6 = 61.6	330.6-203.77/330.6 =38.4
Numerical Value of Outcome	4*.616 = 2.46	4*.384 =1.54
Overall Outcome	4 or Moderately Satisfactory	

a. **Outcome Rating**
Moderately Satisfactory

7. Risk to Development Outcome

The following pose risks to the development outcome:

- **Technical risk:** This is a substantial risk. The completed protective works, hydraulic structures, and drainage channels incorporated climate-resilience technical designs. These require frequent update based on climate induced threats. For example, severe riverbank erosion could easily threaten the integrity of the completed embankments and hydraulic structures. Storm and tidal surges could cause a breach, increase the area exposed to flooding and saline intrusion, degrade agricultural land, and negatively impact the lives and livelihoods of residents. The government would need to adopt urgent engineering solutions and management strategies to prevent erosion and maintain the technical resilience of the polders.
- **Financial risk**. This is a substantial risk. The 141 Water Management Groups (WMGs) and 10 Water Management Associations (WMAs) implemented O&M of the polders to mitigate this threat. However, the Project Management Unit (PMU) confirmed that the O&M of the infrastructure built and rehabilitated under the project had no adequate budget assigned. No follow-on coastal resilience operation is planned.
- **Government ownership or commitment.** This is a moderate risk at closing. The government has adopted plans and invested in infrastructure that address the environmental risks faced by the coastal zone area. The government maintains their commitment to these plans by adopting measures in Bangladesh's 8th five-year plan and Delta Plan 2100. The government marked CEIP-I as a key initiative for ongoing disaster risk management efforts emphasizing continued investment in reducing and mitigating the effects of the underlying risks of coastal polders as well as sustainable development of climate change resilient coastal polders. However, recent events in Bangladesh and the resulting change in government heightens this risk.
- **Exposure to natural hazard risks.** This is a substantial risk. The country's geographic location and topography exacerbate this risk. The mitigating solutions adopted by the project points to a long-term disaster preparedness by constructing new disaster-resilient embankments with build-back-better elements. Increased cropping intensity improved agricultural production. A bottom-up approach in coastal monitoring is expected to lead to the long-term capacity of the BWDB and address resilience against this exposure to natural disasters.

8. Assessment of Bank Performance

a. Quality-at-Entry

The World Bank team designed this project to contribute to Objective 7 High-Level Outcome C: Enhanced climate and environmental resilience of the World Bank Group's current Country Partnership Framework for Bangladesh. The World Bank team used the Emergency Cyclone Recovery and Restoration Project (P111272) to plan and design this project as part of the government's policy environment to mainstream water resource management, disaster risk management, and climate change adaptation agendas reflected in its major coastal and development strategies. The PDO statement expressed three different objectives with a wide scope to respond to a complex and rapidly changing climate induced environment. The World Bank team designed the project to pilot innovative solutions,

targeting several polders; and phased, to test run the approach of improving agricultural production by reducing tidal flooding, storm surges, and reducing saline intrusion. The ICR acknowledged that the Bank issued recent guidance to include “if applicable” in the formulation of the CERC related PDO (ICR, paragraph 38). The World Bank team did not adequately provide for mitigating measures to address the implementing agency’s lack of capacity to implement large value works contracts on time (see delays below). In addition, the project design in the PAD did not match the government’s Development Project Proforma (DPP), the basis of its budget process. This led to a mismatch of end targets for the project interventions and corresponding cost allocations.

Overall, the Bank team performance at entry is rated **Moderately Satisfactory**.

Quality-at-Entry Rating
Moderately Satisfactory

b. Quality of supervision
The World Bank team conducted 20 in-person, virtual, and hybrid supervision missions over the 10-year implementation period, including technical field missions, various reviews, and high-level discussions with the BWDB and the Ministry of Water Resources. Operational staff were mostly in the country. The Bank team provided training for hands-on procurement, FM, and social and environmental safeguards. Key procurement and technical documents were ready at effectiveness. Yet, the implementation arrangements took two years to establish. The project team acknowledged this delay was not anticipated at appraisal. The ICR acknowledged a shortcoming in supervision by the World Bank team by not facilitating the timely request by the government to officially request restructuring (ICR, paragraph 82). The World Bank team did not implement the corrective measures identified during the January 2017Mid Term Review (MTR) to address implementation challenges until three years later when the results framework was revised (see Section 9 M&E below). The timing of the three restructurings appeared to be ill-timed. The first restructuring reduced the scope, and the results framework was approved three years after the MTR. The second restructuring took four months to review. The last reallocated costs among the components and cancelled IDA funds 17 days before the project closed (ICR, paragraph 62). The Bank team conducted fortnightly progress review meetings with the PMU and monthly technical field missions to effectively resolve problems caused by a lack of construction materials and changes in the construction design. In some cases, the Bank team helped BWDB establish a time-bound action plan to address case-specific land acquisition payment bottlenecks and arranged to monitor BWDB after the project closed to monitor the remaining land acquisition payments (ICR, paragraph 83).

Factors that the government and the implementing agency could control included the delays in land acquisition. The typical land acquisition process took 12 to 15 months from initial surveys to compensation delivery but was further delayed by unclear land ownership records and inconsistent Land Acquisition and Resettlement Action Plans. The shifts in the embankment alignment caused by river erosion also affected approved plans. The slow government approval process for large-value service contracts, the implementing agency’s contract management challenges, and a change in the procurement process caused implementation delays (ICR, paragraph 58). Limited contractor capacity, design modifications, and the need for supplementary works also affected supervision performance (see Section 10 Other Issues below).

The unanticipated extensive erosion that caused morphological changes of the rivers; numerous hartals (strikes) and blockades during the project period; Cyclone Yaas in May 2021, unprecedented rainfall, and flooding that affected not only the project polders but also contractors' sites and marketplaces; and the COVID-19 pandemic that caused nationwide lockdowns, health risks to staff, and supply chain disruptions were outside the control of the project.

Overall, Bank performance at supervision is rated Moderately Satisfactory because of the minor shortcoming in using timely restructuring to effectively address implementation challenges.

Overall Bank performance is rated **Moderately Satisfactory,** with minor shortcomings in both quality of performance at entry and at supervision.

Quality of Supervision Rating
Moderately Satisfactory

Overall Bank Performance Rating
Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design
The Theory of Change prepared during the completion of the ICR used the causal links between the outputs and expected outcomes of the results framework. The TOC linked the outputs to the expected outcomes. The initial intermediate results indicators used showed their contribution to achieving the expected outcome, although some indicators were missed and added during implementation (see below). The indicators were specific, measurable, timebound and relevant. The intermediate results indicators did not differentiate between "upgrading" or "replacing." The intended impact on gender gaps by the project interventions noted in the results framework were not measured (ICR, paragraph 66). All identified indicators had targets. Baseline data was to be collected at implementation (see below).

b. M&E Implementation
The Bangladesh Water Development Board implemented the M&E system through a third-party M&E consultancy firm using a web-based MIS. Consultants conducted overall monitoring and supervision of the project components including compliance with environmental safeguards. However, the M&E consultants were only hired two years into the project. The World Bank Task Team clarified that this delay did not affect the implementation of the M&E system as designed because physical works were also delayed; the baseline survey was conducted before the works began; and the BWDB PMU stepped in the interim. Indicators in the results framework were reported in the Implementation Status and Results Reports. The January 2020 restructuring addressed M&E design weaknesses. Indicators were clarified, targets adjusted to correspond to the reduced scope. Output indicators for project activities previously missed were added to capture its contributions to achieving the PDOs. Baseline data for the three works packages were collected in 2016. Delays in implementing the second works package updated the

baseline data in 2018 using the 2017 agricultural data. Comparative data was collected from non-CEIP polders. Surveys were conducted on two groups: the general population (entire polder) and project-affected households.

c. M&E Utilization

M&E data informed decisions made by project management and the World Bank team in formulating corrective measures to address implementation challenges. The public and other stakeholders had access to the M&E data through the project website. The project team identified and conducted corrective measures to address delays and noncompliance using real-time information from the M&E system in place.

Overall M&E quality is rated Substantial.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

Environmental Safeguards: The project was categorized a safeguards category “A” requiring a full assessment because environmental impacts were expected to be triggered by the following activities: upgrading embankments (height increased and base widening), limited realignment, embankment slope and river bank protection work by concrete block and vegetation, disposal of drainage substrate obtained from drainage channels re-excavation and construction/repair and operation of hydraulic structures. The sensitivity, extent and duration of the impact of activities would affect agricultural land, fish habitat, flora and fauna, physical and cultural structure and livelihood of the people. The project triggered the following environmental safeguards policies: Environmental Assessment (OP/BP) 4.01), Natural Habitats (OP/BP 4.04), Forests (OP/BP 4.36), and Physical Cultural Resources (OP/BP 4.11). According to the ICR, the environmental safeguards performance of the project was satisfactory (ICR, paragraph 74). The project implemented a framework approach with site specific safeguards assessments for the selected polders, together with community consultation. The BWDB developed an environmental management framework and polder-specific Environmental Impact Assessments (EIAs) for the original 17 polders. Polder-specific Environmental Management Plans (EMPs) were prepared following consultations with communities and stakeholders. The BWDB also disclosed the EIAs and environmental management framework on the project website and conducted a national-level consultation to finalize the documents. The Department of Environment issued environmental clearance certificates for the first two works packages renewed annually. EMP implementation costs for mitigating measures were included in the Bill of Quantity items. Contractors for the first and second works packages prepared contractor environmental and social management plans (C-ESMP). The World Bank reviewed and cleared these as well as the updated ones based on site requirements. The contractors of both the first and second works packages conducted monthly environmental training programs. the project prepared monthly, quarterly semi-annual, and annual environmental monitoring progress and environmental audit reports. The project conducted environmental enhancement activities, including constructing fish conservation sanctuaries, studying fish catch

assessment, conducting net pen culture, raising awareness on aquatic biodiversity conservation, and promoting social afforestation in the polder areas. The World Bank Team clarified that the BWDB prepared an environmental action plan for the operation of the polders.

Social Safeguards: The project triggered OP/BP 4.12 on Involuntary Resettlement. The ICR reported that the project complied with the requirements of the social safeguards, including involuntary resettlement, grievance redress, and labor influx monitoring (ICR, paragraph 75). The project complied with land acquisition and compensation requirements although by April 2024, land acquisition payment was at 92.4 percent. The balance was attributed to the incomplete embankment works, small value of compensation (even as little as BDT 345/US$4.00), and lack of ownership (e.g., unavailable mauza (cadaster) maps, khatians (landholding records for the payment of land tax), transfer/succession documents, possession records, disputed claims with objections and parcels of land under sub-judicial cases). The BWDB developed a system at closing to monitor household-level compensation payment status and implemented a time-bound action plan to address case-specific land acquisition payment bottlenecks. According to the World Bank Task team as of June 2024, land acquisition payment progress reached 94 percent. The Key Focal Point for the project, the executive engineers of the concerned BWDB O&M divisions, and the Deputy Commissioner offices of concerned districts were to complete payments to the remaining affected landowners and report to the Bank monthly. Resettlement assistance for involuntarily displaced non-titled persons were completed prior to the commencement of works for the respective sections. BWDB prepared a Social Management Resettlement Policy Framework (SMRPF), which included a resettlement policy framework, a social inclusion/gender framework, and Resettlement Action Plans (RAPs) for the first works package. BWDB prepared the RAPs for the remaining works packages, updated the RAPS for the first works package, following the SMRPF. After reaching agreement with the World Bank, the documents were disclosed locally and implemented. BWDB established 36 grievance redress committees in each Union Parishad in the 10 polders with representatives from the BWDB, the Union Parishad, local educational institutions, project-affected persons, women's groups, and the RAP team. Leaflets with the grievance redress mechanism were distributed to project-affected persons and communities in the polder areas with contact details of the GRM focal points at the local level, the office of the Project Director, and the Bank's grievance redress service. The GRCs received and resolved 269 complaints by December 31, 2023. The project also prepared monthly reports on labor influx risks, requirements, and implications for the works packages with a checklist for tracking labor influx-related issues. According to the World Bank Task Team, the interim government changed several times the district administration of all the districts including Deputy Commissioners responsible for land acquisition (LA) payment. The team acknowledged no further update since June 2024.

b. Fiduciary Compliance

Financial management: The project complied with the World Bank's financial management guidelines and procedures (ICR, paragraph 78). The Project Management Unit (PMU) had prior experience with Bank-financed projects and had internal controls and accounting systems in place. The Comptroller & Auditor General of Bangladesh, through its Foreign Aided Project Directorate (FAPAD) conducted an annual external audit of the project. The PMU submitted audit reports in a timely manner. The PMU had adequate staff– (i) an FM specialist; (ii) a dedicated Deputy Director for Accounts; and (iii) two dedicated accountants. An independent private auditor conducted performance audits. Some shortcomings were reported. The FAPAD Director General is resolving findings related to land acquisition that is beyond the project's control. For the FY2023 external audit report, auditors raised eight findings – seven serious and

one non-serious financial irregularities. The FY2013 to FY2016 internal and external audit reports were completed after some delays, but subsequent reports were conducted regularly and on time. The PMU showed limited capacity to forecast expenditures based on actual scope. These shortcomings affected financial management efficiency and forfeited US$12.69 million in concessional IDA funding as a result. The forfeited amount consisted of US$6.24 million from an undocumented designated account and an undisbursed balance of US$6.45 million. Funds cancelled in December 2023 could have but did not include this US$12.69 million.

Procurement: The project fully complied with the World Bank's procurement guidelines and procedures (ICR, paragraph 77). The PMU had previous procurement experience with World Bank guidelines and procedures. The World Bank team conducted a procurement capacity assessment at appraisal and proposed risk mitigation measures that were implemented. The PMU established a Procurement Panel with two international and one national consultant; conducted training on World Bank procurement procedures, international competitive bidding procurement, and fraud and corruption issues. The PMU updated and published procurement plans on time and commenced procurement only after plan approval.

c. Unintended impacts (Positive or Negative)

---

d. Other

---

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Moderately Satisfactory	
Bank Performance	Moderately Satisfactory	Moderately Satisfactory	
Quality of M&E	Substantial	Substantial	
Quality of ICR	---	Substantial	

12. Lessons

The operation offered eight lessons. Three are presented below with minor adaptation of language:

- **Obtaining a better understanding of climate change impacts on coastal polders may lead to developing models to address risks from climate variability.** In this project, comprehensive monitoring, and morphological assessment of the coast, including long-term monitoring, research, and analysis of the coastal zone were initiated. However, a gap remains in understanding the complex interplay among the natural phenomena, human intervention, and climate change forces that the coast experiences. To bridge this knowledge

gap, the next phase of coastal investment could include empirical evidence on key coastal processes, such as geomorphology, land subsidence, tectonic effects, erosion, sea level rise, tidal dynamics, river morphology, shoreline changes, and salinity intrusion. The next phase could also focus on the maintenance and further development and application of the tools developed under this project to inform the design of new investments in the coastal zone. For example, Bangladesh could develop a more detailed storm surge forecasting system for the coastal zone and the polders using the hydraulic models developed by this project.

- **Nature-based solutions may enhance resilience, effectiveness, and community ownership of infrastructure interventions in polders.** In this project, nature-based engineering designs were integrated into the rehabilitation of polders. Such designs were meant to strengthen embankments. Afforestation programs on the slopes of embankments and foreshore areas formed part of the design to protect against the impacts of climate change. This approach enhanced physical infrastructure and made use of the benefits of ecological systems for a sustainable, long-term resilience against environmental threats. Squatters who benefited from the afforestation program were boosted by the public's support for the program and did return to the embankment slopes because cutting trees to construct houses illegally on the slope of the embankment were discouraged.
- **Investing in embankment protective works may be an effective means to address riverbank erosion in a timely manner.** In this project, the more expensive proposition from financing embankment protective measures to fortify riverbanks against erosion may prove to be more cost effective. The approach would not require land acquisition. Implementation would not be delayed by having to acquire new land if the alternative, retiring an embankment, were used instead. Communities would be more resilient sooner because the lack of having to acquire new land would be sidestepped. Potential severe impacts on livelihoods and assets would be avoided because a new embankment would be operational sooner.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR provided a detailed overview of the project. The report followed the guidelines. The report was focused on results. The evidence was aligned to achieving the PDOs. The narrative supported the TOC that was created for this report. The TOC helped the reader understand how the ratings were reached based on available evidence. It is candid, acknowledging the shortcomings in the initial indicators and inability of the restructurings to fully address implementation challenges. The ICR's lessons were useful and based on the project findings. The ICR quality is rated **Substantial**.

a. Quality of ICR Rating

Substantial