Asian Development Bank. 6 ADB Avenue, Mandaluyong City, 1550 Metro Manila, Philippines
Tel +63 2 632 4444; Fax +63 2 636 2163; evaluation@adb.org; www.adb.org/evaluation

Independent Evaluation ADB

Evaluation Approach Paper
Project Performance Evaluation Report for Jamuna-Meghna River Erosion Mitigation Project in Bangladesh (Loan 1941)
September 2019

Team Leader: Shimako Takahashi, Evaluation Specialist
Contact: evaluation@adb.org

A. Introduction

1. The proposed project performance evaluation report (PPER) will evaluate the Jamuna-Meghna River Erosion Mitigation Project in Bangladesh.[1] The project was supported by an Asian Development Bank (ADB) loan financed through the Asian Development Fund. It was approved on 25 November 2002 and financially closed on 5 October 2011. The project completion report (PCR) circulated in July 2013 and rated it *successful*.[2] This rating was confirmed by a project validation report (PVR) approved in December 2014.[3] This provides sufficient gestation period for the project's outputs and outcome to be re-assessed and the impact to become apparent.

2. The project established innovative riverbank protection technologies, by applying unconventional cost-effective sand-filled geotextile bags and systematic dumping of the geo-bags with stringent quality control and monitoring of underwater works. This evaluation aims to confirm whether the flooding mitigation under the project continues to be effective and the population remains to be benefitted.[4] The findings and lessons of this evaluation will be used as input to IED's planning Bangladesh Country Assistance Program Evaluation of ADB programmed for delivery in 2020 and a thematic evaluation study on ADB's support for Climate Change to be prepared in 2021.

3. This approach paper presents the project background, issues to be addressed, evaluation scope and approach, requisite data sources, and schedule requirements for this evaluation.

B. Background

4. **Country and Strategic Context**. During project preparation stage, the economy of Bangladesh expanded at an average annual rate of more than 5% over a 5-year period.[5] Agriculture was mainstay of the economy and remained as the primary source of income and employment.[6] Improvement in crop yields and product diversification were considered crucial for agricultural growth. Bangladesh is in an alluvial deltaic floodplain in the confluence of the three major rivers–the Ganges (Padma), Jamuna (Brahmaputra), and Meghna. Their catchment area

---

[1] ADB. 2002. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Bangladesh for the Jamuna-Meghna River Erosion Mitigation Project*. Manila.
[2] ADB. 2013. *Completion Report: Jamuna-Meghna River Erosion Mitigation Project in Bangladesh*. Manila (*Loan 1941)*.
[3] Independent Evaluation Department (IED). 2014. *Validation Report: Bangladesh: the Jamuna-Meghna River Erosion Mitigation Project*. Manila: ADB.
[4] Besides the government support for the O&M of the project, no development interventions have taken place since 2011 when the project was completed, based on the communications with BRM.
[5] International Monetary Fund. 2003. *Bangladesh: 2003 Article IV Consultation Report*. June 2003 and IMF Country Report No. 03/205. Washington, DC.
[6] Agriculture supported the majority of the population, accounting for 32% of gross domestic product (GDP), 13% of exports, and 60% of employment. (Appendix 2 of footnote 1)

of 1.74 million square kilometers (km^2) were to cause massive annual floods that could inundate up to two thirds of the country.[7] While riverbank erosion has been a perennial problem in the country, such water sector challenges generated by the river system would impact on the livelihood in the surrounding areas.[8] Before the project preparation, riverbank erosion had displaced thousands of people annually along the three major rivers where poverty was heavily concentrated. There was strong need for the water sector of the country to mitigate progressive riverbank erosion by reinforcing flood embankments.

5. At the appraisal phase, the Jamuna and Meghna rivers critically threatened two ADB-supported flood protection and irrigation schemes—the Pabna Irrigation and Rural Development Project (PIRDP) and the Meghna—Dhonagoda Irrigation Project (MDIP).[9] PIRDP was located along the right bank of the Jamuna river and MDIP left bank of the Meghna river. In the project scope, riverbank protection against erosion were undertaken about 7.0 kilometers (km) in PIRDP and 4.4 km in MDIP. Since the late 1990s, however, natural river erosion was accelerated along the two projects areas, reducing the distance between the bank and their flood embankments from 1 km to none in critical reaches. There were concerns, in the absence of intervention, that these rivers would erode the embankments, resulting in inundation that could affect the livelihoods of about 2 million people. Such erosion would significantly reverse the momentum of poverty reduction, due to the loss of agriculture and other benefits secured by the embankments (e.g., local institutions for participatory water management). About 1,700 hectares (ha) of highly productive agricultural lands and homesteads were to be eroded, which could potentially displace about 5,600 households or 28,000 people.

6. Conventional protection structures using hard materials to actively control the river channels required high investment and maintenance costs and thus, were considered not feasible. Retiring the embankments could be less costly.[10] Under a retirement embankment scenario, there was a concern that continued river erosion would accelerate environmental degradation in the project area. As a result, the population once displaced by erosion would be further pushed away to remaining marginal land. It could result in significant social disruption associated with substantial loss of land and dislocation of people. Given the social implications, the approach of embarkment retirement was difficult to be implemented. Sustainable measures that are economically feasible and socially viable were required (footnote 1).

7. **Government policy and strategies**. Before the project preparation phase, the government undertook water sector reforms. Water management associations (WMAs) were established to promote optimal use of irrigation facilities. Cost-recovery arrangements were introduced for sustainable operation and maintenance (O&M), rendering them the first large-scale irrigation schemes to institutionalize participatory water management in Bangladesh (footnote 1). In 1999, the National Water Policy (NWP) was approved, adopting the principles of integrated water resources management with emphasis on stakeholder participation, strategic planning, decentralization, and sustainable O&M through management transfer to water management

[7] ADB. 2002. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Bangladesh for the Jamuna-Meghna River Erosion Mitigation Project*. Manila. Appendix 2.

[8] Water sector challenges included (i) massive floods in the monsoon season, (ii) severe water scarcity in the dry season, (iii) riverbank erosion and siltation of watercourses, (iv) periodic natural disasters such as cyclones and tidal surges, and (v) widespread arsenic contamination of groundwater. (ADB. 2002. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Bangladesh for the Jamuna-Meghna River Erosion Mitigation Project*. Manila. Appendix 2).

[9] ADB. 2002. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Bangladesh for the Jamuna-Meghna River Erosion Mitigation Project*. Manila. Footnote 3.

[10] Embankments retirement is inward shifting of embarkment (Appendix 5 of footnote 1).

associations.[11] Institutional reforms took place in the Bangladesh Water Development Board, a key agency of implementing water resource projects exceeding 1,000 ha. In 2000, guidelines for participatory water management was prepared, stipulating the management transfer and local participation arrangements in water resources schemes.[12] The government also prepared the national water management plan (NWMP) which laid out national strategies and priority programs for the next 25 years.[13]

8. **ADB strategies.** Focus areas of ADB's country strategy and program update (2003–2005) Bangladesh during the project's approval included sustainable development of agriculture and natural resources.[14] ADB's Water Operational Plan 2011–2020 notes: (i) social equity, economic efficiency, and ecosystem services are a triple bottom line of integrated water resources management (IWRM) and a further evolution of water governance frameworks is needed; and (ii) development partners' support for the adaptive management (IWRM) in river basins must be intensified to mitigate floods and other water-related disasters including riverbank erosion, cyclones, and tidal surges, and drought.[15] It is on the same trajectory with the Sustainable Development Goals, specifically Goal 6 to ensure equitable access to water, increase water-use efficiency, and implement integrated water resources management.

B. Project Description

9. **Impact, outcomes, and outputs.** The project's envisaged goal was sustained economic growth and poverty reduction with livelihood security in the PIRDP and MDIP areas threatened by riverbank erosion, through cost-effective and sustainable erosion mitigation strategy and measures. The measures and institutions managed the project process was to be applied for replication nationwide. The impact indicators were: (i) poverty incidence and rural incomes were not affected by river erosion and showed steady improvement in project areas; and (ii) annual damage and income losses caused by riverbank erosion were reduced through replication of the measures applied and established under the project. The project's expected objective was sustained incomes in PIRDP and MDIP areas by establishing effective riverbank erosion management system (REMS), comprising comprehensive structural and nonstructural measures. Establishing sustainable REMS was to provide (i) reliable and cost-effective mitigation measures through adaptive riverbank protection works and (ii) nonstructural instruments to adapt to the dynamic morphological processes of the Jamuna and Meghna rivers (footnote 1). The project with REMS would save and reduce potential loss of agriculture and fish culture beneficiaries around the project area. The outcome performance indicators were (i) improved output performance in cropping intensity, cereal production, fishery production, permanent employment, engagement of poor households in economic activities, employment of labor-intensive construction works, and capture of people of majority of benefits; and (ii) conduct of effective REMS operations.

10. The project had three intended outputs: (i) riverbank protection works in PIRDP and MDIP areas; (ii) nonstructural river erosion mitigation measures, including data and information management, disaster preparedness, and targeted social development for erosion-displaced

[11] Government of the People's Republic of Bangladesh, Ministry of Water Resources. 1999. *National Water Policy of Bangladesh.* Dhaka.

[12] Government of the People's Republic of Bangladesh, Ministry of Water Resources. 2000. *Guidelines for Participatory Water Management.* Dhaka. (PCR).

[13] Government of the People's Republic of Bangladesh, Ministry of Water Resources. 2004. *National Water Management Plan of Bangladesh.* Dhaka. (PCR, Appendix 2 of RRP).

[14] ADB. 2002. *Country Strategy and Program Update: Bangladesh, 2003–2005*. Manila.; It also noted the government's move related to water sector including the GPWM, the Development Strategy for the Water Sector prepared in 2001, and a draft NWMP. These were envisaged to contribute to the long-term water management program up to 2025.

[15] ADB. 2011. *Water Operational Plan 2011–2020*. Manila.

poor; and (iii) institutional strengthening of REMS, including capacity development and project management both at the central and local levels.

11. The first component involved the construction and maintenance of about 7.0 km and 4.4 km of geotextile bag launching revetments in PIRDP and MDIP, respectively. Project approaches for erosion mitigation included: (i) protecting the riverbanks through placing revetments along the natural river alignments; and (ii) using sand-filled geotextile bags, a lower cost and labor-intensive alternative to conventional materials. About 82% of project cost was invested in the first component (footnote 2). The second concerned improved disaster preparedness and management plan (DPMP) and resettlement of affected persons, including improvement of living standard for households inhabited near the embankments and along the riverbank. The third pertained to capacity development and project management and establishment of operational riverbank erosion information management, including monitoring, forecasting, and warning of riverbank erosion. The institutional development was to focus full implementation of the key principles of the 1999 National Water Policy applied to the project institutions including the operation of joint management committees (footnote 1).

12. **Project cost and implementation arrangements.** The project cost at appraisal was estimated at $61.3 million ($56.8 million for Component 1, $2 million for Component 2, and $2.5 million for Component 3). ADB support was originally intended to cover 66.6% of project financing at $40.8 million but the actual cost at completion amounted to $60.3 million, with ADB financing at 67.5% ($40.7 million) and government at 31.2% of total project cost (footnote 2). Technical assistance resources amounted to $1 million, comprising $0.8 million from Japan Fund for Poverty Reduction.

13. The executing agency of the project was Bangladesh Water Development Board (BWDB) under Ministry of Water Resources. The executing agency established Project management office (PMO) in Dhaka. Under the supervision of PMO, subproject management offices (SMOs) were set up in PIRDP and MDIP to undertake day-to-day implementation for the project activities.[16] A project steering committee was formed comprising representatives of the concerned agencies.[17] Interagency coordination was carried out by the committee chaired by the secretary of the Ministry of Water Resources. Committee meetings were planned to be held semiannually for the first year and annually from the second year.

14. Following the 1999 NWP and its relevant BWDB Act 2000, the government was to establish a joint management committee (JMC) in each subproject. JMCs were intended as permanent institutions, comprising the national line agencies, local governments, and diverse stakeholders including WMAs that represent the beneficiaries and vulnerable social groups. Under the project component 3 (institutional strengthening of REMS), JMC was to be established to incorporate diverse stakeholder participation and transparent and accountable decision-making regarding water resources management activities, including riverbank erosion management, irrigation and drainage O&M, and agricultural and fisheries development in the project area. The project was to establish and operate sustainable O&M funding following the NWP which stipulates

[16] SMOs undertaking included: developing subproject institutions, preparing tender documents, evaluating bids, awarding contracts for equipment, civil works and other project activities including preparation and implementation of a resettlement plan, and monitoring of environmental and social impacts.

[17] The project steering committee included the Finance Division, Planning Commission, Ministry of Environment and Forests, Ministry of Agriculture, Ministry of Fisheries and Livestock, Local Government Division, Rural Development and Cooperatives Division, Ministry of Land, Economic Relations Division, Implementation Monitoring and Evaluation Division, and Ministry of Water Resources and their concerned line departments, along with the Bangladesh Inland Water Transport Authority.

O&M cost recovery of irrigation schemes through local resource mobilization and of flood control schemes (footnote 1). In addition, JMCs and SMOs were to form an emergency riverbank protection group (ERPG) to provide labor for emergency works during flood seasons.

15. **Changes during implementation.** JMC was envisaged to play key roles in forming a basis for water resources management from an integrated perspective as promoted under the NWP. This arrangement, however, was modified during implementation, and the project's intent to support greater collaboration among national line agencies, local governments, WMAs and beneficiaries—through the JMC—did not materialize (footnote 3). Instead, WMAs took the function of the JMCs. The reason and consequences for this change will be investigated.

16. **Safeguards.** The project is classified as category A for the environment and involuntary resettlement as per *Environmental Assessment Requirements of the Asian Development Bank*[18] and the guidelines of the Government of Bangladesh, including Guidelines for Environmental Impact Assessment (EIA) and Guidelines for Environmental Assessment of Flood Control, Drainage and Irrigation Projects.[19] The project is classified as category A for involuntary resettlement.[20] The project had a total of (i) 11.4 km of revetment works in the PIRDP and MDIP, and (ii) 1.2 km of secondary defense line (SDL) of embankments in the PIRDP. The land acquired for revetment was estimated at 35 ha in PIRDP and 22 ha in MDIP. The SDL anticipated 10 ha of land acquisition. A resettlement framework for the revetment works and a short resettlement plan for SDL were prepared, in accordance with ADB Policy on Involuntary Resettlement.[21] There were no indigenous peoples within the project locations.[22] SMOs was responsible for preparation and implementation of environmental management and resettlement plans.

C. Major Findings from Completion Reports and Related Evaluations

17. Below is a summary of major findings of the project's PCR and related evaluation, which are valuable references in the preparation of the PPER.

18. **Project completion report.** Overall rating of the project in the PCR was successful. PCR assessed the project to be relevant, effective, efficient, and likely sustainable. The PCR reported that the project was implemented as conceived with technical competence and diligence to achieve the desired target and goal. The project attempted to transfer the project management of BWDB to the JMC, with participation of WMAs, Department of Agriculture Extension (DAE), and Department of Fisheries (DOF) during project implementation. The transfer did not happen, however. PCR attributed it to lack of interdepartmental coordination. Lessons identified were: (i) institutional capacity should continue to be strengthened for adaptive and cost-effective design and implementation of riverbank erosion and management; (ii) disaster preparedness and risk management need to be in place appropriately against flood hazards induced by riverbank erosion; and (iii) community-based irrigation and water resources management should be improved though WMAs. The PCR recommended (i) O&M requirement of the canals, dikes, and intake structures should be identified on an annual basis and assessed before each irrigation season starts; (ii) the schedule of irrigation water supply should be declared 8 weeks ahead of irrigation seasons; (iii) adequate O&M funding should be secured for yearly maintenance and immediate repairment of each scheme as needed. Consultation and coordination with the WMAs,

[18] ADB.1998. *Environmental Assessment Requirements of the Asian Development Bank*. Manila.
[19] Summary Environmental Impact Assessment (SEIA) of the proposed Jamuna-Meghna River Erosion Mitigation Project, Bangladesh
[20] Project data sheet (https://www.adb.org/projects/34038-013/main#project-pds).
[21] ADB. 1995. *Involuntary Resettlement Policy*. Manila.
[22] Category for indigenous people was not provided for the project.

with participation from BWDB and DAE, will play a facilitating role in conflict resolution for cultivation of rice and cash crops.

19. **Validation of the completion report.** The validation of the project completion report (PVR) noted that the project had a positive development impact on poverty reduction from 43.8% to 35.2% and increased monthly per capita income of the poor by 72%. The validation assessed the project successful overall: it was relevant, effective, efficient, and likely sustainable. The project commitment to transfer the project management of BWDB to the JMC, was diminished during project implementation. The PVR noted that support for the JMC roles was a key initiative under the institution strengthening component at appraisal. It also pointed out the need for both the government and ADB to have a better understanding on the interlinkage and demarcation between riverbank and/or flood control and irrigation activities.[23] It considered the project effective in achieving the intended outcome to sustain incomes in the PIRDP and MDIP areas by providing improved flood protection and associated irrigation services. The project contributed to improved agriculture performance and increased land value in the flood-protected areas.

20. The PVR noted three areas of lessons: institutional capacity, disaster preparedness, and community-based scheme. Additional lessons of the PVR included: there is the need for a clear separation of analysis on the institutional setup and financing responsibilities between different functions, i.e., riverbank protection and irrigation management. The validation recommended an in-depth evaluation in providing further insights on (i) sustainability of project benefits including river erosion protection and disaster preparedness, (ii) the extent of beneficiary ownership involving the project structures and activities, and (iii) the project impact (footnote 3).

D. Evaluation Scope and Approach

21. The objective of the evaluation is to assess whether the project achieved its stated objective of sustained incomes in the two schemes (PIRDP and MDIP areas) through established cost-effective and sustainable riverbank erosion management systems (REMS). The PPER will assess various aspects of project formulation, design, implementation and sustainability. The project's performance will likewise be assessed, taking into account the progress in outcomes after project completion, and whether there were any unintended outcomes. Institution strengthening component including JMC and water management associations will be explored. The proposed PPER aims to identify lessons and recommendations for future ADB assistance in erosion mitigation projects in Bangladesh and a broader context of climate change.

21. The key issues that the PPER will address issues related to: (i) project design and innovation; (ii) achievement of intended outcome and outputs; (iii) sustainability of key outcomes and outputs; (iv) the functional development status of JMC, water management associations, and emergency riverbank protection group; and (v) institutional capacity and development impacts of disaster risk management. Major issues with regards to the sustainability and impact of the project include: (i) the extent and sustainability of project benefits after the project (e.g., resilience and durability of the facilities and protection works), (ii) the O&M status of preventive measures of flood control and irrigation service fees, (iii) institutional capacity of disaster risk management including village disaster preparedness committees, and (iv) the poverty impact of the project.

[23] According to PVR, "Although the two are related, the institutional and financing responsibilities for these two sets of activities are inherently different. This aspect was not fully recognized during institutional building design at appraisal—and to some extent, in writing the PCR".

22. **Methodology.** The PPER will evaluate the project in accordance with the Guidelines for the Evaluation of Public Sector Operations using the evaluation criteria of relevance, effectiveness, efficiency, and sustainability.[24] The main evaluation questions to be considered under each criterion are provided in Attachment 2. The PPER will make use of primary and secondary data and will encompass (i) a desk review of relevant project information; (ii) discussions with project staff from South Asia Department (SARD) and Bangladesh Resident Mission, development partners and other stakeholders; (iii) interviews with the targeted beneficiaries, and (iv) consultations with government and implementing agencies.

E. Data description and sources

23. **Desk review and data collection.** Secondary data sources include, among others, (i) ADB policies and strategies (e.g., Strategy 2030, Strategy 2020, Midterm review of Strategy 2020, Water Operational Plan (2011–2020), Environment Operational Directions (2013–2020, Guidelines for climate proofing investment in agriculture, rural development, and food security; (ii) ADB analytical reports; (iii) project documents (e.g., report and recommendation of the President, back-to-office reports, midterm review reports, PCRs, and other partners' reports); (iv) government PCR; and (v) IED evaluation studies (e.g., ADB's Support for the Agriculture, Natural Resources, and Rural Development Sector 2018, country program, thematic and corporate evaluations).

24. **Field observation and key informant interviews**. The analysis will be on data and evidence-based information. Data will be gathered during consultations with staff from SARD and during an independent evaluation mission to Bangladesh. Data relating to major flood events during and after the project includes (i) record of flooding and impacts of flood events, around the project areas, since project preparation in 2000; (ii) rainfall in the project catchment area, (iii) erosion status, of the rivers (with and without the intervention), (iv) observed water levels, flow, and/or geomorphological data (cross section profile) of the rivers, (v) records of monitoring of physical soundness of the riverbank protection as well as the embankments, and (vi) remedial measures after flood events based on the monitoring, if any. These data and baseline data are available at BWDB under Ministry of Water Resources and will be sought during the mission.[25]

25. Interviews will be conducted with staff from ADB operations including the BRM, key informants in government offices (BWDB, project management offices, SMOs), JMCs, the water management associations, local governments, and relevant stakeholders. Production data will be analyzed to grasp the trends of (i) cropping intensity, (ii) cereal production, (iii) fishery production, and (iv) income levels from 2002 to 2011 and those since 2012. Field observations and interviews in selected project sites will be conducted to discuss with villagers including farmers and government counterparts and to observe the condition of project outputs.[26]

[24] ADB. 2016. *Guidelines for the Evaluation of Public Sector Operations.* Manila.
[25] Based on communication with BRM.
[26] The evaluation mission will visit project sites as feasible. The sites to visit will be determined following pre-mission consultations with SARD.

F. Tentative Schedule and Resources

26. The evaluation will be carried out according to the following schedule, subject to approvals and the Government of Bangladesh's clearance of the mission:

Activity/Milestone	Target Date
Approval of Evaluation Approach Paper	IV September 2019
Independent Evaluation Mission in Bangladesh	III–IV November 2019
Analysis and Preparation of Draft PPER	I October–II November 2019
Draft PPER for Interdepartmental and Government Review	II January 2020
Draft for Editor's Review	IV January 2020
Submission to Director, IESP	III–IV February 2020
Approval of Director General, IED	II March 2020
Circulation	IV March 2020

PPER= project performance evaluation report.

27. The evaluation team is comprised of Shimako Takahashi (Evaluation Specialist, team leader), Franklin D. De Guzman (Senior Evaluation Officer), Irene I. Garganta (Evaluation Analyst), and external consultants. The specialist should have experience in flood control and water resource management projects including related institutional issues, in Bangladesh. The evaluation report will be commented by an IED evaluation specialist and peer reviewed by a water resource and flooding disaster risk management specialist. Overall guidance will be provided by the Director, Sector and Project Division, IED. The time commitment for the PPER will be about 3–4 months intermittently for each of the Team Leader, Analyst, and Evaluation Officer.

G. Dissemination of Findings

28. The PPER will be made available to the public after approval by the Director General, IED. The report will be uploaded on ADB's external and internal websites and will provide inputs to ADB's evaluation information system.

Attachments:
1. Project Design Matrix Framework
2. Evaluation Matrix: Key Evaluation Questions (by criteria)

Project Design Matrix Framework

Design	Performance Indicator	Monitoring Mechanism	Achievement
Sector/Area Goal			
Sustain (i) economic growth, and (ii) poverty reduction with livelihood security in areas threatened by riverbank erosion, through cost-effective and sustainable erosion mitigation strategic and measures (to be applied in PIRDP and MDIP and then reflected nationwide)	Poverty incidence and rural incomes Annual damage and income losses caused by riverbank erosion	National statistics BME reports Government riverbank Management programs and projects	Economic growth, social upliftment, and infrastructure development are being achieved continuously as a result of security and safeguards against the risk of hazards induced by riverbank erosion. Land improved through irrigation, drainage, and flood management for about 44,000 ha and 400,000 households in terms of reduced flood risk. Poverty incidence reduced from 43.8% to 35.2% and monthly per capita income of the poor increased from Tk703.98 to Tk1211.57 during 2005–2011. The riverbank erosion management programs of the government are being implemented with the knowledge and skills gained and the REMS developed in connection with this project.
Purpose and Objectives			
Sustain incomes in PIRDP and MDIP areas by establishing effective REMS comprising comprehensive structural and nonstructural measures	Output performance as follows: (a) Cropping intensity of 215% in PIRDP and 230% in MDIP by 2011 (b) Cereal production of 118,000 tons and 112,000 in PIRDP and MDIP by 2011 (c) Incremental fishery production of at least 500 tons more than that of 2001	BME reports National statistics Project progress and completion reports Consultant reports Project progress and completion reports Consultant reports	(i) During recent years, cropping intensity has been up to 270% in the PIRDP and up to 264% in the MDIP (Appendix 6) (ii) Cereal production of 87,000 tons achieved in the PIRDP and 71,000 tons in the MDIP. The PIRDP areas are gradually shifting toward more profitable

Design	Performance Indicator	Monitoring Mechanism	Achievement
	(d) Incremental permanent employment of 1.92 million days Output performance as follows: a) Cropping intensity of 215% in PIRDP and 230% in MDIP by 2011 b) Cereal production of 118,000 tons and 112,000 in PIRDP and MDIP by 2011 c) Incremental fishery production of at least 500 tons more than that of 2001 d) Incremental permanent employment of 1.92 million days **Conduct of effective REMS operations as follows:** (i) Regular meeting by JMCs (ii) Planning and implementation of maintenance works (iii) Achievement of annual beneficiary contribution targets (iv) Provision of sufficient budget by the government (v) Retention of qualified capacity and staff (vi) Preparation of sound annual reports approved by JMCs	BWDB annual reports JMC annual reports Evaluation reports by independent agents	and labor-oriented cash crop production. (iii) Incremental fish production in the PIRDP has been achieved by 470 tons[a] (iv) Incremental permanent employment has generated 0.132 million person-days so far[b] (v) About 4,055 poorest households were engaged in economic activities (vi) 3.87 million days of employment have been generated so far (vii) Works were done by the local poor inhabitants of PIRDP and MDIP areas **REMS** acquired through this project has been evaluated by experts from Bangladesh University of Engineering and Technology BUET and BWDB. The knowledge has been disseminated through seminars and discussions and BWDB approved it for replication in other river erosion areas of Bangladesh. (i) JMC does not function because of the multidisciplinary setup of the relevant government departments. (ii) Annual maintenance works are being planned and executed in accordance with requirements. Participation of WMA members appears good in the MDIP, but not encouraging in the PIRDP. O&M fund allocation by BWDB is marginally sufficient.

Design	Performance Indicator	Monitoring Mechanism	Achievement
			(iii) Beneficiary contribution through ISC collection achieved in the MDIP was 25%–30% of the target and that in the PIRDP was within 10% of the target. Modality in the process of collection and recycling of the generated fund needs modification. (iv) Counterpart funding was adequate. (v) Skeleton staff retained for monitoring. The main activities were taken up in BWDB's core programs. (vi) Annual reports prepared but JMCs were not functional
Outputs			
A. Riverbank Protection Works 7.0 km and 4.4 km of geotextile bag launching revetment in PIRDP and MDIP, constructed and maintained using gradual, phased, and process approaches	Riverbank stabilized with satisfactory performance and launching revetment Optimal design and implementation approach identified with support of an external panel	Project progress and completion reports Consultant's reports JMC river monitoring Reports ADB review missions	As a result of the project savings achieved through cost-effective design and an adaptive implementation approach, a total protection length of 28.44 km[b] (11.44 km in the MDIP and 17.00 km in the PIRDP) has been achieved without any compromise to the quality of works. BWDB developed and approved Guidelines for Riverbank Protection.
B. Nonstructural Erosion Impact Mitigation (i) improved DRM plan (ii) Affected persons resettled, and living standard improved for households	DRM plan approved DRM campaign undertaken in the project area 800 stakeholder representatives trained	(Same as above) (Same as above) BME of social development support	DRM plan approved in 2003 Campaign undertaken through cultural shows, billboards, etc. Two training sessions (one at each site) on DRM under Part A in 2003 by engaging local NGOs. The training

Design	Performance Indicator	Monitoring Mechanism	Achievement
living on the embankments and along the riverbank	About 5 ha acquired and compensation provided About 2,000 most vulnerable households provided with social development supports RSD IRCs operational with community participation		mainly aimed at awareness building for DRM. Some 45 village disaster preparedness committees were formed with people in the fringe areas. They were trained through emergency drills, mock exercises. The project acquired 63.32 ha of land (42.43 ha for the PIRDP and 20.89 ha for the MDIP) at an estimated cost of Tk140.40. The money was deposited to the deputy commissioner (DC) office for payment to landowners.
C. Institutional Strengthening (i) Capacity development and project management a) Permanent institutions in the project level established and strengthened, including: JMCs Project offices with strong monitoring and evaluation capacities Stakeholder institutions with diverse professions b) Central level project management, programming, and coordination strengthened c) Capacities of participating agencies, stakeholders, and their representatives strengthened through training (ii) Operational riverbank erosion information management including monitoring forecasting and warning	Effective operational procedures and arrangements defined and operated Functional JMCs operational with diverse stakeholder representation in decision making Project offices effectively functioning with transparency and accountability to JMCs Stakeholder institutions performing/playing stipulated responsibilities, including O&M REMS activity reports prepared with consultants for planning and programming, coordination, and implementation CDP for key staff positions and JMC representatives	Detailed operational procedures and arrangements Project progress and completion reports Consultant's reports JMC and project office annual reports Annual audit of Stakeholder institutions ADB review mission Project progress and completion reports Consultant's reports ADB review missions	For capacity building, 36 government personnel were trained abroad through short courses and participation in seminars and symposiums on REMS in different countries. A total of 9 person months of staff resources was utilized in this respect. Permanent project is operating through existing BWDB setup. Stakeholders' participation is strengthened by reforming the 756 WUGs and 18 WMAs into 80 WMAs, which have been given a legal framework through registration with the DOC. The target-oriented approach for shifting the day-today management of the project by the WMAs is in process. However, the sustainability of WMAs needs to be ensured through coordinated efforts of BWDB, DAE, DOF, DCO, and the local administration.

Design	Performance Indicator	Monitoring Mechanism	Achievement
	prepared and effectively implemented Concerned institution [BWDB offices for REMS PMU, JMCs and project offices, water resources planning organization (WARPO), etc.] operational through effective project management support Effective management procedures and arrangements established Information collected and processed by the executing agency Warning issued to Concerned stakeholders	BWDB annual Reports (Same as above) CDP CDP implementation report (by consultants) Database management procedures and arrangements Project progress and completion reports Consultants reports JMC annual reports ADB review mission	REMS activity reports were prepared. Local training was held for 5,849 stakeholders (2,122 female and 7,962 male) utilizing a total of 776 person months. The training covered topics relevant to WMA, environmental awareness, land use survey, laws and bylaws of cooperatives, ISC collection, fish culture, REMS, home gardening, project O&M, cultivation of improved rice, and rice seeds. River erosion information management system is in force in BDWB (involving concerned institutions), with continuous update of technology in its Hydrology and Flood Forecast wing. Effective management procedures and arrangements established within BWDB Information collected and processed by BWDB Warning issued regularly

ADB = Asian Development Bank, BME = benefit monitoring and evaluation, BWDB = Bangladesh Water Development Board, CADP = Command Area Development Project, CDP = capacity development plan, DAE = Department Extension, DOC = Department of Cooperatives, DOF = Department of Fisheries, DRM = disaster risk management, FCDI = flood control drainage and irrigation, ha = hectare of Agriculture, IRC = information and resource center, ISC = irrigation service charge, JMC = joint management committee, km = kilometer, MDIP = Meghna–Dhonagoda Irrigation Project, NGO = nongovernment organization, O&M = operation and maintenance, PIRDP = Pabna Irrigation and Rural Development Project, PMU = project management unit, REMS = riverbank erosion management system, RSD = resettlement and social development, WMA = water management association.

[a] As per data received from Department of Fisheries office in Shathiya, Pabna during an interview by PCR consultant.

[b] ADB. 2011. *Final Report of the Part B Consultant of the Project. Bangladesh (*L1941- BAN [SF]).

Source: ADB.s 2013. *Completion Report: Jamuna-Meghna River Erosion Mitigation Project in Bangladesh.* Manila.

Evaluation matrix: key evaluation questions (by criteria)

Criteria	Evaluation Questions	Data Sources
Relevance	**Policies and Strategies** 1. Was the project consistent with the development strategies, policies, and priorities of the government of the Bangladesh? 2. Was the project in line with ADB's country and sector strategies at the design, completion and evaluation stages? **Design and Formulation, Beneficiaries** 3. Was the rationale for the project design based on sound diagnostics of development problems, including analyses of impact on environment and socio-economic issues? Was there a sufficient assessment at appraisal of institutional capacity and readiness to undertake the project? 4. Were project risks identified during preparation and considered sufficiently in the design (e.g., slow release/lack of counterpart funds, safeguards, extended time and resources to meet requirements)? 5. Was the engineering design for flooding mitigation measures valid and appropriate in terms of design flood and O&M plan? 6. Was the DMF adequate to capture identified challenges? To what extent, was the linkage between inputs, intended outputs and outcomes coherent for a robust results chain? Were the key performance indicators and targets in the DMF measurable and realistic? 7. Does the executing agency have the appropriate governance structure, procedures, and risk management approaches? Did any institutional changes occur during the project lifetime? 8. What drove changes (e.g., diminishing role of JMC) during implementation? How did the change impact on the project outcomes? 9. What were ADB's value additions? Were there any innovations introduced by ADB? **Ownership** 10. To what extent were key stakeholders—executing and implementing agencies—involved in designing the project? 11. What is the level of ownership during implementation and after completion? What drives their ownership to continued support to the project, and/or what hinders?	• RRP • BTORs • Mid-term reviews, other project documents • PCR • PVR • Field observations and interviews during IEM • CPS 2002, CPS 2004, 2009 • Country Assistance Program Evaluation 2009
Effectiveness	**Achievement of Outcomes and Outputs** 12. To what extent have the intended outputs and outcomes been achieved? Changes and records around the project area will be sought including: (a) Record of flooding and impacts of flood events, (b) Rainfall data in the catchment area, (c) Riverbank erosion status (e.g., comparison of current and as-built-drawings), (d) Water level and flow, geomorphological data (cross section profile) of the rivers,	• RRP • BTORs • Mid-term reviews, other project documents

Criteria	Evaluation Questions	Data Sources
	(e) O&M records of physical soundness, (f) Trends in agriculture production. 13. What were the major achievements realized? What is the extent to which the outcomes achieved were attributable to the program's interventions? What factors contributed to the achievement? 14. Were there any unexpected outcomes and achievements made beyond the scope of the interventions? 15. Were there outcome and outputs that were not achieved or fell below expectations and why? 16. What was the extent to which factors beyond the government's control influenced the outcome of the project? 17. Are data on outputs and outcomes derived from credible and documented sources? 18. Was the TA well designed and complementary to the achievement of the project outcomes? 19. Did the project result to knowledge generation and transfer? 20. What lessons and recommendations for future sector interventions can be drawn from this going forward? **Institutional Arrangements for Project Management** 21. Were the executing agency and implementing agencies sufficiently staffed with the requisite balance of technical and management skills? Were their responsibilities clear? 22. What were the roles of stakeholders in project implementation—WMAs, JMC, and emergency riverbank protection group? 23. What institutional factors influence, positively or negatively, the effectiveness of the project? Did executing and implementing agencies work complementarily and effectively in terms of implementation and communication? 24. Were there any good practices that can be replicated or generate transformative effect? **Safeguards (overall)** 25. Did ADB and/or the executing agency conduct a proper and meaningful consultation before and during the implementation? Have these consultations—including information on participants including women, issues raised, and implementing agency and/or executing agency responses or corrective actions—been documented and reported to ADB? 26. Was ADB supportive in helping executing agency and implementing agency to develop their capacity to manage environmental and social risks? 27. Are there any contradictory statements between the Bangladesh's country safeguard system and ADB safeguards policies? Are there any lessons and suggestions for ADB safeguard implantation to improve from the project experience? **Environmental Safeguards** 28. How have environmental safeguard risks been mitigated during preparation stage? 29. How effective was mitigation of environmental safeguard risks conducted during implementation?	(monitoring reports) • PCR • PVR • Field observations and interviews during IEM

Criteria	Evaluation Questions	Data Sources
	Social Safeguards 30. Were compensation and entitlements appropriate and adequate (amount, timing, informed)? 31. Did living standards of affected households improve after the project, by what factors? For example, on one hand, improved agriculture productivity should have contributed to increased wages. On the other hand, the rise in land prices could have a negative impact on the landless in in paying rent or in their limited ability to acquire land, given the landless accounted for 62% of the total households in the project area (Appendix 13, RRP). 32. Was the operation of the grievance redress mechanism effective? Was a complaints log maintained and reported to ADB? Did they record the nature of the complaint and of the implementing agency and/or executing agency response/corrective action? **Gender** 33. What was the level of women's involvement in the project design, implementation, operating and monitoring, and training?	
Efficiency	**Project Efficiency** 34. How well were project resources used in achieving the outcomes? Were there cost overruns or underruns and what were the reasons, if any? 35. How does the recalculated EIRR at evaluation compare with the EIRR estimates at appraisal? 36. Were the economic and financial analyses done correctly with regard to their assumptions, data, and calculations? **Process Efficiency** 37. Were project preparation and appraisal processes for investment subprojects implemented in a timely manner? 38. Did the executing and implementing agencies function efficiently? 39. Did effective communications channels operate between central government, executing and implementing agencies?	• RRP • BTORs • Mid-term reviews, other project documents • PCR • IEM interviews
Sustainability	**Benefit Sustainability** 40. What is the likelihood that the project benefits will be sustained? What outcomes and outputs are likely more sustainable? 41. What is the likelihood that the strengthened capacity development of BWDB and implementing agencies will be maintained? (capacity for project management including financial management, audit, environmental management, and land acquisition and resettlement) 42. What is the functional and ownership status of the government and WMAs, JMC, and emergency riverbank protection group? 43. There was limited inroad made to foster greater beneficiary and WMA participation in maintaining project facilities. What was implication on the O&M of irrigation and project sustainability?	• RRP • BTORs • Mid-term reviews, and other project documents (monitoring reports) • PCR

Criteria	Evaluation Questions	Data Sources
	Operational Sustainability 44. What is the current condition of the physical outputs, assets, and services after the project? 45. What was operationalizing and sustainability of project performance management system during project implementation? 46. How has been BWDB engaged with river protection since project completion? 47. What implementation arrangements for M&E have been put in place after project completion? How well were the M&E systems institutionalized? Are they working effectively and sustainably? **Financial Sustainability** 48. How are post-project activities (monitoring, rehabilitation and management of protected riverbanks) being financed? 49. Have sufficient human, institutional, and financial capacity and resources been put into place to sustain achievements made? 50. What were project sustainability and ownership challenges after the project? What sustainability challenges are met in maintaining required resources and how can these be addressed?	• Field observations and interviews during IEM

ADB = Asian Development Bank, BTOR = back-to-office report, BWDB = Bangladesh Water Development Board, CPS = country partnership strategy, DMF = design and monitoring framework, EIRR = economic internal rate of return, IEM = independent evaluation mission, M&E = monitoring and evaluation, PCR = project completion report, PVR = project completion report validation report, RRP = report and recommendation of the President, TA = technical assistance, WMA = water management association.
Source: Asian Development Bank (Independent Evaluation Department).