

Document of
The World Bank

Report No: ICR00003136

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-43590 TF-94800)

ON A

CREDIT

IN THE AMOUNT OF SDR 67.5 MILLION
(US\$102.26 MILLION EQUIVALENT)

TO THE

PEOPLE'S REPUBLIC OF BANGLADESH

FOR A

WATER MANAGEMENT IMPROVEMENT PROJECT

February 13, 2017

Agriculture Global Practice
South Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective as of January 3, 2017)

Currency Unit = Bangladeshi Taka (BDT)

BDT 79.13 = US\$1

SDR 1 = US\$1.33

FISCAL YEAR

July 1- June 30

ABBREVIATIONS AND ACRONYMS

BWDB	Bangladesh Water Development Board
BDT	Bangladeshi Taka
BP	Bank Procedures
DPP	Development Project Proposal
ECNEC	Executive Committee of the National Economic Council
ERR	Economic Rate of Return
FAO	Food and Agriculture Organization
FCD	Flood Control and Drainage
FCDI	Flood Control and Drainage and Irrigation
FDR	Flood Damage Rehabilitation
HRD	Human Resources Development
ICR	Implementation Completion Report
ICRR	Implementation Completion and Results Report
IDA	International Development Association
IRR	Internal Rate of Return
LCS	Labor Contract Service
M&E	Monitoring and Evaluation
NA	Not Applicable
NGO	Non-Governmental Organizations
O&M	Operations and Maintenance
PCU	Project Coordination Unit
PDO	Project Development Objective
PSM	Participatory Scheme Management
SDR	Special Drawing Rights
WARPO	Water Resources Planning Organization
WMA	Water Management Association
WMG	Water Management Group
WMIP	Water Management Improvement Project
WMO	Water Management Organization

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BANGLADESH
WATER MANAGEMENT IMPROVEMENT PROJECT
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BANGLADESH
WATER MANAGEMENT IMPROVEMENT PROJECT
DATA SHEET

A. Basic Information				
Country:	Bangladesh	Project Name:	Water Management Improvement Project	
Project ID:	P040712	L/C/TF Number(s):	IDA-43590, TF-94800	
ICR Date:	02/13/2017	ICR Type:	Core ICR	
Lending Instrument:	SIL	Borrower:	GOVERNMENT OF BANGLADESH	
Original Total Commitment:	XDR 67.50M	Disbursed Amount:	XDR 59.58M	
Revised Amount:	XDR 62.13M			
Environmental Category: B				
Implementing Agencies: Bangladesh Water Development Board Water Resources Planning Organization				
Co-financiers and Other External Partners: Government of Netherlands				
B. Key Dates				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	08/03/1998	Effectiveness:	11/26/2007	11/26/2007
Appraisal:	02/10/2004	Restructuring(s):		07/15/2011 and 03/05/2015
Approval:	09/18/2007	Mid-term Review:	18/10/2010	05/02/2011
		Closing:	06/30/2015	06/30/2016
C. Ratings Summary				
C.1 Performance Rating by ICR				
Outcomes:		Moderately Satisfactory		
Risk to Development Outcome:		Substantial		
Bank Performance:		Moderately Satisfactory		
Borrower Performance:		Moderately Satisfactory		
C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)				
Bank	Ratings	Borrower	Ratings	
Quality at Entry:	Moderately satisfactory	Government:	Moderately satisfactory	
Quality of Supervision:	Moderately satisfactory	Implementing Agency/Agencies:	Moderately satisfactory	

Overall Bank Performance:	Moderately satisfactory	Overall Borrower Performance:	Moderately satisfactory
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C.3 Quality at Entry and Implementation Performance Indicators

Implementation Performance	Indicators	QAG Assessments (if any)	Rating
Potential Problem Project at any time (Yes/No):	Yes	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	Yes	Quality of supervision (QSA):	None
DO rating before Closing/Inactive status:	Satisfactory		

D. Sector and Theme Codes

	Original	Actual
Sector Code (as % of total Bank financing)		
Central government administration	9	9
Flood protection	64	64
Irrigation and drainage	27	27
Theme Code (as % of total Bank financing)		
Natural disaster management	25	25
Participation and civic engagement	25	25
Water resource management	50	50

E. Bank Staff

Positions	At ICR	At Approval
Vice President:	Annette Dixon	Praful C. Patel
Country Director:	Qimiao Fan	Xian Zhu
Practice Manager/Manager:	Martien Van Nieuwkoop	Constance A. Bernard
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F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)

The primary Project Development Objective (PDO) was to improve national water resources management by involving the local communities to play an expanded role in all stages of the participatory scheme cycle management. The secondary objective was to enhance institutional performance of the Country's principal water institutions, particularly the Bangladesh Water Development Board (BWDB) and Water Resources Planning Organization (WARPO).

Revised Project Development Objectives (as approved by original approving authority)

To improve water resources management by improving infrastructure and institutions through rehabilitating damaged water infrastructure, piloting the role of local communities, and enhancing the institutional performance of the Country's principal institutions, particularly BWDB and WARPO.

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	A reduction in the level of damage to property and assets that is to the satisfaction of the communities in 60% of completed project schemes			
Value (quantitative or qualitative)	BDT 79.9 billion in total damage, 2007 ¹ BDT 4.9 billion in damages to all embankments and water control structures, 2007 BDT 5,559.2 million in damages in 475 Bangladesh Water Development Board schemes, 2007 BDT 322.8 million in damages in 39 WMIP sample project schemes, 2007	Less than baseline in 60% of completed project schemes (60% of 200 schemes or 120 schemes)	60% of the reduced target of 67 schemes or 40 schemes	Less than baseline in 60% of completed project schemes
Date achieved	08/10/2007	6/30/2015	6/30/2016	6/30/2016
Comments (including % achievement)	The FAO conducted an independent impact evaluation of components 1 and 2. The evaluation covered 30 percent of the total schemes (20 schemes of the total 67). Four hundred twelve WMO members completed the survey. Nearly 30 percent (120) of respondents rated benefits from irrigation and flood control schemes to be medium (rating of 3), and 28 percent (116) reported them to be high (rating of 5). Data from 36 schemes (12 from component 1, 10 from component 2, 14 from flood damage rehabilitation component) were collected to			

¹ The World Bank estimated that total asset damage and output losses from the 2007 floods were approximately BDT 78 billion and affected more than 16,000 km², with nearly half of this estimate being asset damage. This included more than 1 million homes partly or fully damaged (at an estimated economic damage of BDT 5 billion) and more than BDT 5 billion in damaged flood control and drainage irrigation works.

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
	show the nature of structures completed to prevent damages. This resulted in protection of agricultural land and assets from floods and cyclones after completing 261 km of embankment rehabilitation, 121 km of canal rehabilitation, and 178,700 hectares of cropland and other assets (e.g., housing structures, livestock, and grain storage).			
Indicator 2:	About 60% reduction in crop area damaged by floods/cyclones in 60% of project schemes starting 2014-15.			
Value (quantitative or qualitative)	Total of 186,883 hectares fully damaged and 498,645 hectares partially damaged, 2007 ² 27,100 hectares damaged in 23 WMIP sample project schemes, 2007	60% less than baseline in crop area in 60% of completed project schemes	60% of the reduced target of 67 schemes or 40 schemes	60% less than baseline in crop area in 60% of all completed project schemes
Date achieved	8/10/2007	6/30/2015	6/30/2015	6/30/2016
Comments (including % achievement)	Data from 23 sample schemes selected at baseline, showed that 109 km of embankment was strengthened through 85 structures, 141 km of canal length was rehabilitated, and 100% of the 27,100 hectares of affected cropland was reclaimed for crop production after flood and cyclone damage. The beneficiary survey also revealed that, because of reduced damage to agricultural land, rice production increased from 0.5 to 6.4 tons per hectare.			
Indicator 3:	An increase in agricultural production that is to the satisfaction of the communities in 60% of project schemes.			
Value (quantitative or qualitative)	N.A.	Target to be achieved in 60% of the 102 schemes or 60 schemes		
Date achieved	08/10/2007	6/30/2015		
Comments (including % achievement)	Dropped after project restructuring 2011			

² The World Bank estimated that the damaged crops from the 2007 floods covered approximately 147,000 hectares (partial) and 164,000 hectares (full). This resulted in the loss of more than 1 million tons of rice. The assessed economic loss due to this agriculture disruption was estimated at BDT 44 billion.

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 4:	About 60% of completed project schemes have WMOs functioning in accordance with their roles and responsibilities agreed upon in the management plan.			
Value (quantitative or qualitative)	No WMOs existed in selected schemes.	WMOs in 60% of completed project target of 102 schemes or about 120 schemes	Target reduced from 120 to 40 schemes	WMOs in 100% of completed project schemes.
Date achieved	08/10/2007	6/30/2015	6/30/2015	6/30/2016
Comments (including % achievement)	Achieved in 100% of completed schemes; 785 WMOs were formed in the completed schemes. Although there were no gender-specific project indicators, the FAO evaluation report showed that the participation of women ranged from the required 30%, according to the national Guidelines for Participatory Water Management, to 70% for some of the Central zone Komornai water management groups.			

Notes: BDT, Bangladesh taka; WMIP, water management improvement project; FAO, Food and Agriculture Organization; WMO, water management organization.

(b) Intermediate Outcome Indicators

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Component 1: Successful completion of rehabilitation and improvements in 100% of targeted project schemes.			
Value (quantitative or qualitative)	N.A.	100% of targeted project schemes completed or 102 schemes	32 schemes	100% of targeted 32 project schemes completed
Date achieved	08/10/2007	6/30/2015	6/30/2015	6/30/2016
Comments (including % achievement)	Achieved 100% (60% completed 2012/13; 90% completed 2013/14; 98% completed 2014/15, 100% completed 2015/16). This information was obtained from impact assessment reports and third-party monitoring reports.			
Indicator 2:	Component: Scheme O&M satisfactorily completed as per management plan with WMO contribution in x% ³ of project schemes.			

³ This is how it is presented in the original Results Framework.

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Value (quantitative or qualitative)	N.A.	100% of targeted project schemes or 102 schemes		
Date achieved	08/10/2007	6/30/2015		
Comments (including % achievement)	Dropped during project restructuring in July 2011			
Indicator 3:	(i) Operational water user association created and/or strengthened (number) (core sector indicator). (ii) Detailed text as per original indicator: Signed agreement between BWDB and WMOs completed in 100% of project schemes.			
Value (quantitative or qualitative)	N.A.	60% of 102 schemes or 60 schemes	(i) 785 WMOs formed and received training (ii) 100% of project schemes completed or 32 schemes	785 WMOs formed and received training 100% of project schemes completed
Date achieved	08/10/2007	6/30/2015	6/30/2015	6/30/2016
Comments (including % achievement)	Fully achieved, with 785 WMOs formed and trained and 100% of schemes completed			
Indicator 4:	Component 2: Timely completion of need based O&M assessment and allocation of BWDB's O&M budget for 100% of completed project schemes			
Value (quantitative or qualitative)	N.A.	100% of the schemes or 98 schemes	Target reduced to 35 schemes	Completion of need-based O&M assessment and allocation for 2015/16 from BWDB O&M budget; 100% of project schemes completed
Date achieved	08/10/2007	6/30/2015	6/30/2015	6/30/2016
Comments (including % achievement)	In 2015/16, need-based O&M assessment completed and O&M budget allocations made for all schemes.			
Indicator 5:	Component 2: Scheme O&M satisfactorily completed as per management plan with WMO contribution in 100% of project schemes.			
Value (quantitative or qualitative)	Dropped	100% of the schemes or 98 schemes		

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Date achieved	08/10/2007	6/30/2015		
Comments (including % achievement)	Dropped during project restructuring in July 2011			
Indicator 6:	Component 2: Compliance of participatory monitoring system in 100% of completed project schemes. (New).			
Value (quantitative or qualitative)	N.A.	80% of WMOs in completed project schemes		100% of WMOs in completed project schemes
Date achieved	07/15/2011	6/30/2015		6/30/2016
Comments (including % achievement)	Achieved beyond target in 100% of completed schemes having adopted participatory monitoring system			
Indicator 7:	Component 3: BWDB institutional reform plan completed by June 2005 and approved by December 2006 (Revised)			
Value (quantitative or qualitative)	N.A.	BWDB institutional reform plan completed by 2008	Plan to be completed by 06/2011 and approved by 12/2011	BWDB institutional reform plan completed in June 2011 and approved in December 2011
Date achieved	08/10/2007	06/30/2008	12/31/2011	12/31/2011
Comments (including % achievement)	Achieved: Institutional reform plan completed and approved December 2011			
Indicator 8:	Component 3: Following BWDB's approved institutional reform plan, new staffing plan completed and approved by June 2006. (Revised).			
Value (quantitative or qualitative)	N.A.	New staffing plan completed and approved by 2008	Plan to be approved by 6/2012	New staffing plan completed and approved in June 2012
Date achieved	08/10/2007	06/30/2008	06/30/2012	06/30/2012
Comments (including % achievement)	New staffing plan completed and approved in June 2012 in line with 2011 BWDB institutional reform plan			
Indicator 9:	Component 3: BWDB's interim Human Resources Development (HRD) plan prepared by March 2005 and implementation commenced by September 2005			
Value (quantitative or qualitative)	N.A.	HRD Plan implemented		
Date achieved	08/10/2007	09/30/2005		
Comments (including % achievement)	Dropped during restructuring of project in June 2011 but replaced by Indicator 10 below.			
Indicator 10:	Component 3: Intermediate Result indicator Four: Following (1) and (2), HRD plan completed by December 2011.			

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Value (quantitative or qualitative)	N.A.	HRD plan completed by December 2011		HRD plan completed by December 2011
Date achieved	07/15/2011	12/31/2011		12/31/2011
Comments (including % achievement)	HRD plan completed.			
Indicator 11:	Component 3: 60% of WMOs satisfied with the services provided by BWB.			
Value (quantitative or qualitative)	N.A.	60%		
Date achieved	08/10/2007	6/30/2015		
Comments (including % achievement)	Dropped during restructuring of project in July 2011			
Indicator 12:	Component 3: 100% of BWDB project staff trained in the PSM approach			
Value (quantitative or qualitative)	N.A.	100%		
Date achieved	08/10/2007	6/30/2015		
Comments (including % achievement)	Dropped during restructuring mission in July 2011			
Indicator 13:	Component 3: 50% increase in computer-literate staff in BWDB			
Value (quantitative or qualitative)	N.A.	50%		
Date achieved	08/10/2007	6/30/2015		
Comments (including % achievement)	Dropped during restructuring mission in July 2011			
Indicator 14:	Component 3: WARPO's institutional reform plan completed by December 2005 and approved by June 2006.			
Value (quantitative or qualitative)	N. A.	WARPO institutional reform plan completed by June 2008	Plan to be completed by December 2011	Institutional reform plan completed in June 2011 and approved in December 2011
Date achieved	08/10/2007	6/30/2008	12/31/2011	12/31/2011
Comments (including % achievement)	Achieved: Institutional reform plan completed and approved in December 2011			
Indicator 15:	Component 3: Updated NWRD database with enhanced data layers completed and disseminated.			

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Value (quantitative or qualitative)	N.A.	100% complete		80% complete
Date achieved	08/10/2007	06/30/2015		6/30/2016
Comments (including % achievement)	National water resources database only 80% completed because of complex computing system and data layers; WARPO continuing this activity after project completion with its own resources.			
Indicator 16:	Component 3: 100% of professional staff trained in various subjects related to integrated water resources.			
Value (quantitative or qualitative)	N.A.	100% staff trained		
Date achieved	08/10/2007	12/31/2012		
Comments (including % achievement)	Dropped during restructuring of project in July 2011			
Indicator 17:	Component 4: Successful completion of rehabilitation and improvement in 100% of target. (New).			
Value (quantitative or qualitative)	0	Completion of 100% of targeted works in FDR schemes		100% of targeted works in FDR schemes completed
Date achieved	07/15/2011	06/30/2015		06/30/2016
Comments (including % achievement)	FDR works categorized as length of embankments (km), number of water control structures, and length of protection works (km); 100% of FDR schemes completed with satisfactory quality of works, resulting in rehabilitation of 716 km of embankments rehabilitated, 315 water control structures reconstructed, and 41 km of protective works repaired.			

Notes: WMO, water management organization; O&M, operations and maintenance; BWDB, Bangladesh Water Development Board; HRD, human resources development; FDR, flood damage rehabilitation; WARPO, Water Resources Planning Organization.

G. Ratings of Project Performance in ISRs

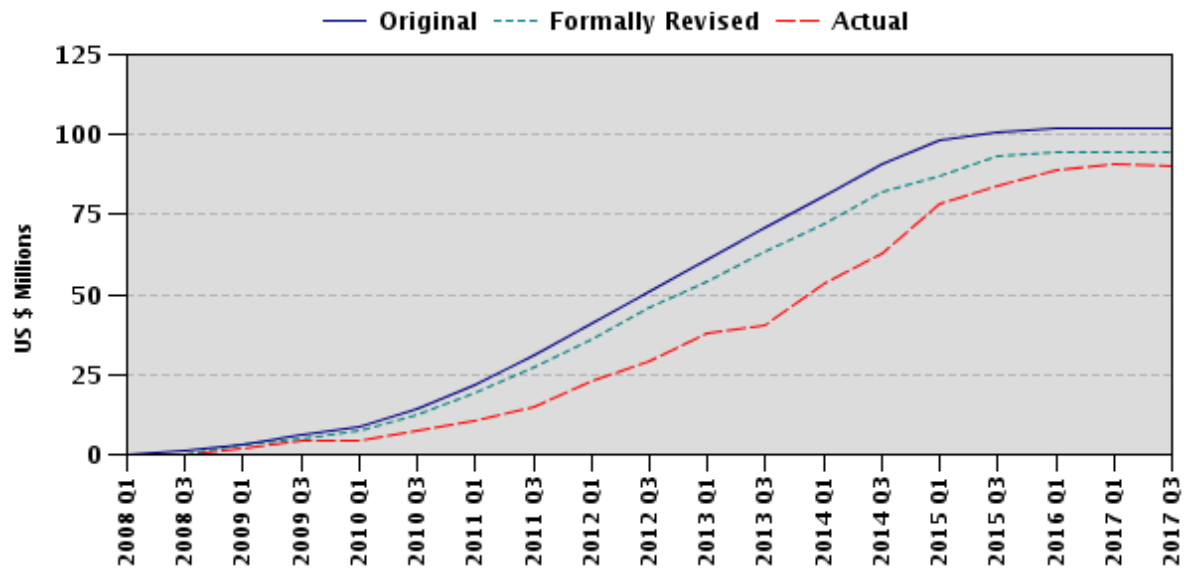
No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	04/12/2008	Satisfactory	Satisfactory	1.97
2	09/06/2008	Satisfactory	Moderately satisfactory	1.97
3	03/31/2009	Satisfactory	Moderately satisfactory	4.17
4	11/05/2009	Satisfactory	Moderately satisfactory	4.41
5	05/21/2010	Moderately satisfactory	Moderately unsatisfactory	8.87
6	12/05/2010	Moderately satisfactory	Moderately unsatisfactory	12.27
7	03/27/2011	Moderately satisfactory	Moderately unsatisfactory	15.01

No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
8	10/01/2011	Moderately satisfactory	Moderately unsatisfactory	23.16
9	11/28/2011	Moderately satisfactory	Moderately unsatisfactory	27.92
10	03/20/2012	Moderately satisfactory	Moderately satisfactory	29.10
11	12/13/2012	Moderately satisfactory	Moderately satisfactory	38.09
12	05/16/2013	Moderately satisfactory	Moderately satisfactory	45.54
13	12/13/2013	Moderately satisfactory	Moderately satisfactory	54.99
14	05/20/2014	Satisfactory	Moderately satisfactory	67.31
15	11/26/2014	Satisfactory	Satisfactory	80.17
16	06/16/2015	Satisfactory	Satisfactory	86.84
17	09/27/2015	Satisfactory	Satisfactory	88.63
18	05/21/2016	Satisfactory	Satisfactory	89.99

H. Restructuring (if any)

Restructuring Date(s)	Board Approved PDO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		DO	IP		
07/15/2011	Yes	MS	MU	22.39	To revise the project development objective (PDO) and reallocate funds across project components
03/05/2015	No	S	S	86.84	To extend the project closing date by one year and reallocate funds between budget categories

I. Disbursement Profile



1. Project Context, Development Objectives, and Design

1.1 Context at Appraisal

1. At appraisal, poverty was endemic, and Bangladesh was prone to natural disasters such as floods, erosion, cyclones, and tidal surges that result in human casualties and economic loss. Approximately half of the population of Bangladesh was living below the poverty line, and 90 percent of poor people were living in rural areas. Poor households were more vulnerable than wealthier ones. Floods and cyclones aggravated poverty by destroying food stocks and scarce resources of poor households. Each year, 20 percent to 30 percent of the country was inundated, flooding more than 6 million hectares to depths ranging from 30 cm to 2 m. This situation created opportunities and risks—opportunities for highly productive farming and fishing systems but considerable risks from deep flooding, erosion, and drainage problems. By contrast, the availability of surface water during the dry season was low.

2. In this context, the government of Bangladesh adopted a new approach to water management, shifting from flood control to water management, from purely structural solutions to combinations of structural and nonstructural measures to meet a broader range of water management needs, and from project development purely by technicians to stakeholder participation in all stages of the project development cycle. The government's strategy for economic growth, poverty reduction, and social development, outlined in its poverty reduction strategy paper, was to promote rational management, optimal use and access to water for production, health, and hygiene and ensure availability of clean water in sufficient quantities for multipurpose use and preservation of aquatic and water-dependent ecosystems. It was acknowledged in the poverty reduction strategy paper that the availability of land was declining and that acceleration of growth required high investment levels to promote diversification and finance infrastructure and greater productivity.

3. At appraisal, the government's new approach to water management took into account past experience. The main elements of this approach were to reform and strengthen key institutions, particularly the Bangladesh Water Development Board (BWDB) and Water Resources Planning Organization (WARPO); ensure local user community participation at all stages of the cycle of water management projects; encourage private sector participation in water management; minimize adverse effects of water sector interventions on fisheries and the environment; ensure environmentally sustainable use of existing facilities through rehabilitation and effective O&M, including transfer of flood control and drainage (FCD) and flood control and drainage and irrigation (FCDI) schemes to water management organizations (WMOs) and local governments; and selective introduction of cost-sharing policies to improve efficiency in water use.

4. The Bank conducted an assessment of the water sector in Bangladesh and contributed to the government's sector strategy by defining the long-term water management strategy within the Flood Action Plan, the National Water Policy, and the National Water Management Plan. With the Flood Action Plan and the National Water Management Plan, the Bank assisted the government in implementing a comprehensive, strategic water sector development plan and mobilized major donors in the water sector to support the government's strategy. The Bank's support was critical for reforming and strengthening key institutions, particularly BWDB and WARPO, and piloting the role of local communities.

5. At the request of the government of Bangladesh, the World Bank agreed to finance the Water Management Improvement Project (WMIP) to contribute to the poverty reduction strategy paper and implement the new approach to water management, especially to expand the role of

communities in water resources management, empowering them to manage the water resources infrastructure and providing a framework for participation of beneficiaries and stakeholders in rehabilitation and operation of the water management systems and to strengthen public institutions involved in the water sector, improving governance and transparency and enhancing their capacity to manage the large water infrastructure. The Bank's Water Resources Sector Strategy, which outlined different ways to assess the effect of water management on poverty, provided a framework for the WMIP. The project was designed to contribute to the Bank's Country Assistance Strategy (2006-09) pillars of improving the investment climate and empowering the poor. The project also was aligned with the Bank's Country Partnership Strategy (2011-15), which envisioned providing a framework for participation of beneficiaries and stakeholders in the rehabilitation and operation of the water management system in addition to reforming the government institutions. The government of the Netherlands decided to co-finance the WMIP to build the capacity of the WMOs.

1.2 Original Project Development Objectives (PDO) and Key Indicators (*as approved*)

6. The primary PDO was to improve national water resources management by involving local communities in all stages of the participatory scheme cycle management, from planning and design to operations and management. The secondary objective was to enhance institutional performance of the country's principal water institutions, particularly BWDB and WARPO.

7. The PDO outcome indicators were:

- a) A reduction in the level of damage to property and assets that is to the satisfaction of the communities in 60 % of project schemes;
- b) About 60 % reduction in crop area damaged by floods /cyclones in 60 % of project schemes from YR 5;
- c) An increase in agricultural production that is to the satisfaction of the communities in 60% of project schemes; and
- d) About 60% of project schemes have WMOs functioning in accordance with their roles and responsibilities agreed upon in the management plan.

1.3 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

8. The project had undergone a Level 1 restructuring in May 2011, including a reallocation of credit proceeds to support rehabilitation works to BWDB schemes damaged by cyclones Sidr in 2007 and Aila in 2009. Originally, there were 102 FCD and FCDI schemes under the WMIP for component 1 and 98 FCD and FCDI schemes for component 2. With the corrections and adaptations that resulted from restructuring, the numbers of schemes were reduced to 32 and 35, respectively, while flood damage rehabilitation (FDR) of 63 schemes in 27 districts and eight BWDB regions was added. The PDO was revised accordingly to include emergency FDR of 63 schemes in 27 districts and eight BWDB regions. Later, two FDR contracts were dropped because of a shortage of fund because the Netherlands withdrew their funding.

9. Accordingly, the revised PDO was to improve water resources management by improving infrastructure and institutions through rehabilitating damaged water infrastructure, piloting the role of local communities and enhancing the institutional performance of the country's principal water institutions, particularly BWDB and WARPO.

10. The revised PDO indicators were:

- (i) A reduction in the level of damage to property and assets that is to the satisfaction of the communities in 60% of completed project schemes;
- (ii) 60% reduction in crop area damaged by floods/cyclones in 60% of completed project schemes starting 2014-15; and
- (iii) 60% of completed project schemes have Water Management Organizations (WMOs) functioning in accordance with their roles and responsibilities agreed in management plan.

1.4 Main Beneficiaries

11. At appraisal, approximately half of Bangladesh's population lived below the poverty line, with most of the population living in rural areas. Frequent natural disasters, including floods, cyclones, land erosion, and tidal surges, led to massive human casualties and economic loss. The direct project beneficiaries included rural households, including farmers and agricultural wage laborers and households involved in fisheries and aquaculture. The flood and cyclone damage of the drainage and irrigation schemes also directly or indirectly affected the beneficiary population. At appraisal, it was estimated that approximately 2 million rural households would benefit from the expected 200 FCD and FCDI schemes. Farming accounted for 90 percent of the households that the project covered. The non-farming households, including daily wage laborers, landless poor households, and sharecroppers, indirectly benefitted from project interventions, especially through local community contracts during scheme construction activities.

12. The project also targeted the BWDB and WARPO to benefit from institutional support and capacity enhancements. This included setting up institutional mechanisms to promote participatory approaches to irrigation infrastructure selection, design, and monitoring. The most-important capacity improvement was in the role of BWDB zonal and district staff, who received focused training to implement the participatory scheme management (PSM) component and post-completion transfer of scheme to WMOs after 1 year of joint management.

1.5 Original Components (*as approved*)

13. The project had three components: system improvement and management transfer, Operations and Maintenance (O&M) performance improvement, and institutional improvement.

- (i) *Component 1: System Improvement and Management Transfer (US\$89.0 million of which US\$69.5 million IDA).* This component was designed to support rehabilitation and improvement of 81 medium (average area 2,500 hectares) and 21 large (average area 8,400 hectares) FCD and FCDI schemes of the BWDB covering approximately 378,900 hectares. Important design features of the component included the participatory process in scheme cycle management, which is based on the Guidelines for Participatory Water Management that the government has adopted; financing the development of database survey, geographic information systems, and mathematical modeling tools that would be used in screening and auditing FCD and FCDI batches of schemes by hydrological unit; and preparation of annual plan based selection of eligible batches of medium and large FCD and FCDI schemes located in a particular hydrological unit.
- (ii) *Component 2: O&M Performance Improvement (US\$35.5 million of which US\$ 28.30 million IDA).* This component was designed to support measures to improve O&M performance of approximately 98 medium and large BWDB schemes covering approximately 410,200 hectares that are "technically functional" and do not require major

rehabilitation and improvement. This component supported medium and large FCD or FCDI schemes that had functioning WMOs or similar community organizations. The component was also designed to improve the culture and practice of the O&M planning and execution cycle within the BWDB.

- (iii) *Component 3: Institutional Improvement (US\$12.2 million, of which US\$ 10.30 million IDA).* The component objective was to support the institutional improvement of BWDB and WARPO, the two major national institutions that manage the nation's water resources, and support activities related to program coordination, public relations, monitoring and evaluation (M&E), and strategic studied fiduciary reviews. Component 3 was structured into three subcomponents: (a) *BWDB Institutional Improvement (US\$6.0 million):* to support implementation of BWDB reforms, focusing primarily on implementation of decisions that the government has already made to restructure and strengthen BWDB as a water resources management agency rather than just a development agency; (b) *WARPO Institutional Improvement (US\$2.6 million):* (i) organizational improvement and institutional development and (ii) maintenance, updating, and dissemination of the National Water Resources Database; and (c) *Program Coordination and Monitoring (US\$3.6 million)* conducted by a program coordination unit (PCU) to support the establishment, operations, and facilitation of the PCU by providing office equipment and transport facilities.

1.6 Revised Components

14. *Level 1 restructuring in May 2011:* according to the level 1 restructuring, the project components were revised as follows.

15. The restructuring was done in response to the two major natural disasters - cyclones Sidr in 2007 and Aila in 2009. The scope of the project had to change to respond to the new reality of post-disaster rehabilitation, which led to the following changes in the components. The restructuring paper did not present breakdown of component cost by IDA and other sources of financing.

- (i) *Component 1: System Improvement and Management Transfer (US\$19 million).* The number of schemes under this component was reduced from 102 to 32 to allow for more-robust designs (e.g., build-back better concepts) in the civil works. The revised component also included provision of civil works for the construction of training centers to support the PSM process and WMO mobilization.
- (ii) *Component 2: O&M Performance Improvement (US\$9.87 million).* The number of schemes under this component was reduced from 98 to 35 using routine O&M to allow for greater focus on the participatory and community mobilization aspects of system management transfer and the involvement of communities in O&M management.
- (iii) *Component 3: Institutional Improvement (US\$9.27 million).* This component remained primarily unchanged and continued to focus on institutional strengthening of BWDB and WARPO, as well as overall coordination and monitoring.
- (iv) *Component 4: Flood Damage Rehabilitation (US\$62.96 million).* This was added as a new component to the project to focus on FDR with support for financing of repairs of embankments and hydraulic structures damaged in cyclones Sidr in November 2007 and Aila in May 2009.

1.7 Other significant changes

16. A number of other changes were instituted as part of the 2011 Level 1 restructuring, including clarification of incremental operating costs, modification of prior review thresholds, revision of financing percentages, and allowing for beneficiary contributions to be provided in kind. In addition, the Results Framework was streamlined to better align with the PDO by dropping one existing PDO indicator, revising one PDO indicator and reducing the number of intermediate indicators.

17. *Level 2 restructuring in 2015:* to extend the project closing date until June 30, 2016, and reallocate funds to allow successful completion of ongoing works and PSM and to cover overdrawn under some categories and adjust these against savings available in others after the partial cancellation of the government of Netherlands grant and a more-realistic cost estimate of the ongoing works contracts. The reallocation of funds did not present breakdown of component cost by IDA and other sources of financing.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

18. **Project preparation process.** The project preparation process was longer than expected, with concept review taking place in August 1998, appraisal in February 2004, and BWDB approval another 3.5 years later in September 2007. The lengthy project preparation process was primarily due to delays in completion of readiness actions agreed with the World Bank, including actions to change the structure of BWDB to implement the reforms and participatory management program. The Bank team determined that BWDB would not be able to implement the challenging reforms in the sector unless substantial changes were made in how BWDB functions. The Bank was ready to support BWDB's implementation of WMIP only after a determination that the BWDB had improved its capacity and established the political and institutional commitment of the government and BWDB management to embark on participatory water management reform agenda. Although the delay in completing organizational changes in BWDB significantly delayed project preparation, the Bank team maintained its position that, without the changes in BWDB's functioning, launching the reform program could risk the reputation of the Bank and the government.

19. **The analytical basis and lessons learned that underpinned the project design were sound.** It was recognized that much of the irrigation and drainage infrastructure in Bangladesh continued to suffer from lack of adequate resources for proper maintenance and timely repairs, creating a cycle of build-neglect-rebuild, where even when infrastructure were rehabilitated, lack of adequate O&M often led to dilapidation and risk of scheme failure due to its vulnerability to disasters. Involving communities in O&M responsibilities and transferring scheme management to local institutions was recognized as an important lesson from other countries in the region and elsewhere. The government and Bank undertook significant analytical work to inform the project design. The project conformed to the 1998 Bangladesh National Water Policy. At the start of project preparation in 2000, the government also prepared the Guidelines for Participatory Water Management, and later, in 2001, the government prepared a draft National Water Policy Plan. The guidelines and plan outlined the government's intention to shift water planning and management toward participatory approaches and identified the key policy and organizational changes needed to implement such program. These documents provided conceptual bases for WMIP design. The government also completed the final preparation study for WMIP in 2003. This study planned

assessment of more than 500 FCD and FCDI schemes but it was decided that only a portion of these could be done using a selection criteria for small and medium schemes, and only a few larger schemes. The long-term objective remained assisting the government in institutionalizing the participatory management processes and improving the sustainability and performance of schemes. The sector assessment and analytical work performed as part of project preparation closely aligned with the water sector development needs identified in the Bank's Country Assistance Strategy and also in the development programs of other partners, furthering the scope of reforms being introduced through WMIP.

20. **There was strong commitment from the government to the new approach to water management adopted under the project.** Since the late 1980s, the government of Bangladesh has acknowledged a need for a more-integrated, multisector approach to water management. This has shifted the focus from flood control to water management and from purely structural engineering solutions to multifaceted, multi-stakeholder measures that address the need for people-centric water management. The policy and institutional reforms proposed under this project were considered critical to the institutional reforms that would mainstream the best practices for water resources management in the country. The government adopted a new approach to planning, construction, and O&M through making participation central to its functions. The WMIP project was designed to support the government's new participatory approach to water management that was developed to avoid the vicious cycle of build-neglect-rebuild irrigation infrastructure. The government adopted this new approach in recognition that proper water resource management played a key role in agricultural growth, with a significant effect on reducing poverty. To implement the program effectively, it was also recognized that institutional reforms of water management agencies would be needed to support the government's new approach. The main elements of this approach were to reform and strengthen key institutions, particularly BWDB and WARPO; ensure participation of local user community at all stages of water management projects; encourage private sector participation in water management; minimize adverse effects of water sector interventions on fisheries and the environment; ensure environmentally sustainable use of existing facilities through rehabilitation and effective O&M, including the transfer of FCD and FCDI schemes to WMOs and local governments; and selective introduction of cost-sharing policies to improve efficiency in water use.

21. **The project was specifically designed to support institutional reforms, as also reflected in the PDO,** and to address the need for policy and institutional reforms to redefine the role of the government in the development and management of water resources. The project was designed as a framework-type project; the total number of schemes that the project was to finance was left open at appraisal, but it was estimated that there would be approximately 200 FCD and FCDI schemes. The scope of work included re-excavation of channels and rehabilitation, improvement, and restoration of embankments to mitigate drainage and flooding problems; fish passes; navigation locks and boat passes to improve navigation; repair, replacement, or addition of regulators or drainage structures; and foreshore mangrove plantation in coastal areas. The project was to be rated as satisfactory if coverage reached approximately 60% and highly satisfactory if coverage was approximately 70% of the estimated number of schemes at the end of the project. Furthermore, the project was to be rated as satisfactory if approximately 60% of the project schemes at the end of batch 1 (and cumulatively thereafter) were operational at an enhanced performance level with increased community participation and highly satisfactory if the number of project schemes increased to approximately 70%. The project design included a new concept of transferring management of schemes to the community by making local community an essential stakeholder in the proper functioning and maintenance of the irrigation and drainage infrastructure. It was recognized that, without creating an enabling environment with social and political considerations, the intended objective of institutional reforms might not take off fully. The

participatory scheme management therefore became the hallmark of project design, and the complexity of the reforms entailed significant changes at BWDB and WARPO, as well as strengthening the new local institution of WMOs. Involvement of a large number of stakeholders, including government, civil society, and development partners, posed a unique challenge to the archaic and highly hierarchical structure of the BWDB.

22. **Explicit efforts were undertaken to establish partnerships with other development partners.** To support the government's new approach, it was deemed critical that a coordinated dialogue be sustained between the Bank and other development partners to align the evolving institutional reforms for water management in Bangladesh. Given the nature of institutional reforms and introduction of participatory approaches, the Netherlands expressed interest in partnering as co-financier. The primary reasons for Dutch co-financing was their interest in institutional development and piloting the participatory approaches through establishing the WMOs. The Netherlands considered it critical to the success of sector reforms and sustainability of the program to focus efforts on proper formation and functioning of the WMOs.

23. **Risk assessment and mitigation.** The challenges of implementing institutional reforms in the water management sector were well recognized in the early stages of project preparation. The project appraisal document showed an overall risk rating of substantial and proposed several mitigation actions to address the risks. In addition, a detailed governance and accountability plan was prepared as part of the project preparation process to mitigate and guard against governance, corruption, and fraud risks and to improve transparency and accountability in implementation of project. The following specific measures were incorporated into the project design.

- Improved financial management procedures
- The overall design of the project itself, leading to transparency in water management
- Improved institutional arrangements for project implementation
- Measures in management of procurement, civil society oversight, and remedies
- Enhanced supervision and surveillance arrangements

2.2 Implementation

24. **Project implementation was off to a slow start because of natural disasters in 2007 and 2009.** The implementation arrangements used BWDB's existing structure and strengthened it by establishing a program steering committee, program coordination unit, and institutional coordination framework at four levels (national, program, zonal, scheme). The implementation organizational chart for implementing WMIP is attached in Annex 3. At the onset of the project implementation period, Bangladesh experienced a major natural disaster—Cyclone Sidr. Consequently, BWDB's attention was diverted by the need to provide for emergency and rehabilitation support, limiting the mobilization of various support consultancies under the project. This technical support was crucial for quality implementation given that the experience with participatory approaches in Bangladesh had been limited to a few donor-funded projects and that WMIP was the first significant program that supported the PSM approach in a systematic manner. In addition, with its priorities elsewhere, BWDB had difficulties fully operationalizing the supporting guidelines on PSM among its staff. Moreover, while still attending to the rehabilitation of damaged infrastructures caused by Cyclone Sidr, Cyclone Aila struck in 2009.

25. **The project was restructured to reflect the change in government priorities after cyclones Sidr and Aila.** In the aftermath of the 2007 and 2009 disasters, the government prioritized damage rehabilitation and strengthening of vulnerable infrastructure to avoid such extreme level of

damages in future. The disasters were severe and resulted in massive losses. The damage and losses from Cyclone Sidr alone were estimated to be US\$1.7 billion. The rehabilitation work had barely started when Cyclone Aila further damaged the coastal embankments, necessitating additional funding to improving livelihoods and rehabilitating infrastructure. This required adjusting the project design, which was done through a Level 1 restructuring of the project in 2011. The restructuring was performed 2 years after Cyclone Sidr in 2007 and 4 years after Cyclone Aila in 2009 for two main reasons: to reflect the shift in project focus toward emergency repairs to the BWDB schemes that the cyclones damaged, and the operating context given the lack of sector experience with the participatory aspects of the project. By reallocating resources from Components 1 and 2, a new Component 4 for FDR was created with an allocation of US\$32 million. Also, approximately US\$8.0 million was removed from the International Development Association (IDA) credit and steered to other projects to support emergency repairs to non-embankment infrastructure such as roads and schools. The PDO and results framework were adjusted accordingly to reflect this new orientation of the project. The restructuring also provided an opportunity to address a number of operational challenges that had emerged.

- (i) To address the lack of communication between BWDB and the monitoring teams, field-level monitoring was enhanced by increasing the strength of the M&E team, including a dedicated M&E point at field offices and holding regular project review meetings in district and at head offices.
- (ii) To address the lack of required information for the supervision of the works and the lack of capacity of the district offices to fully support the WMOs, random documentation checks were conducted during field visits and Bank's supervision missions.
- (iii) To ensure that monitoring teams fully understood their roles and authority, regular training programs were conducted.
- (iv) To ensure full understanding of the participatory management by BWDB staff, the participatory scheme management workflow was developed, and training was provided to district teams.
- (v) To address the lack of mechanism to provide O&M support to WMOs, the role of the Water Management Cell was enhanced.

26. **After the restructuring, project implementation improved significantly.** The new focus on FDR under Component 4 aligned the orientation of the project with government priorities, which had a positive effect on project implementation. Likewise, the reduced scope of Components 1 and 2 after the reallocation of credit proceeds to Component 4, allowed available institutional capacity to be concentrated in fewer schemes (67 instead of 200). Considering that the introduction of participatory water management was new with little previous operational experience, the reduced scope of Components 1 and 2 also had a positive effect on project implementation.

27. **Partnership with the Netherlands.** After the 2007 and 2009 natural disasters and with an urgent need to reframe the program to rehabilitate damaged infrastructure, the Government of the Netherlands recognized to withdraw the remainder of the Dutch contribution/ the Trust Fund (US\$17.35 million out of a total commitment of US\$20 million) because with the changes in scope of the project, the IDA credit was sufficient to finance further project implementation. At the time of the Netherlands' withdrawal of its co-financing, US\$2.65 (13.2%) was disbursed and the remaining US\$17.35 was cancelled.

28. **Considerable efforts were undertaken in managing procurement risks.** The project management capacity of BWDB was also a focus of restructuring and continuing implementation support from the Bank. In particular, the project faced procurement risks during implementation.

Given Bangladesh's poor track record on procurement performance and to address the high procurement risk identified at appraisal, a set of mitigation measures was developed, including establishing an international procurement panel to assist the borrower in bid evaluation, awarding of contracts, and overall contract management; mobilizing third-party supervision consultants to provide construction supervision and contract management on behalf of the borrower; and developing a set of countermeasures in consultation with the Integrity Vice Presidency. These mitigation measures also substantially improved implementation performance and greatly enhanced transparency and accountability in procurement and implementation of contracts.

29. **Factors affecting institutional changes.** The government fully recognized the complexity of institutional arrangements needed for effective water management. On the basis of lessons learned from past experiences, which was limited to a few donor-supported programs, the WMIP design acknowledged that successful approaches to decentralized reforms require commitments from nascent local community institutions and traditional government departments. Because many of these local institutions (e.g. WMOs) were relatively new and the BWDB had not fully operationalized the supporting guidelines on PSM among its own staff, a full-scale implementation program was not realistic at the time. Therefore, the PSM was designed as a pilot within WMIP for scale-up at later stage. In line with the challenges of introducing a gradual shift in institutional mechanisms, the government relied on its strategies for economic growth, poverty reduction, and social development to promote rational management structures for water resources management and creating the enabling environment for long-term change, but after cyclones Sidr and Aila, several factors further challenged the already-limited institutional capacity. Limited institutional capacity was needed to focus on emergency response and rehabilitation efforts rather than medium- to long-term institutional change processes; the multi-sectoral nature of the new approach coupled with the lack of a strong history of interinstitutional coordination among departments and agencies involved in the project affected implementation of the institutional changes; and empowerment of local water use associations required a fundamental change in the existing relationships between government officials and local stakeholders.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

30. **M&E Design.** The project had a well-developed results-based participatory monitoring, evaluation, and learning system with a strong focus on project processes, results, effects, and outcomes, in addition to input and output monitoring. The project appraisal document included several aspects of monitoring, including process monitoring of PSM, including rehabilitation and improvement of the schemes, with a clearly articulated role for WMOs; monitoring of the performance of BWDB schemes under Components 1 and 2, including the outcomes; monitoring of institutional improvement activities in BWDB and WARPO and their effect; monitoring of the status of procurement and financial management; and monitoring of the overall project performance and its effect, but the complexity of the indicators in the original project made it difficult to monitor for results. Therefore, at the 2011 restructuring, changes were made to the results framework, and several indicators were revised to align the project components with intended results to better measure results. The M&E design was intended to generate data to evaluate the project in three stages: baseline situation, midterm evaluations, and the end of project implementation.

31. **M&E Implementation.** During project implementation, the BWDB engaged consultancy services for M&E. Implementing agencies and the independent M&E unit reporting directly to the Project Steering Committee regularly collected data on the results indicators. Project-level activities were monitored and tracked through village-level monitoring of each scheme. The project had also developed a robust management information system to monitor results and

compliance regularly. The Bank implementation support missions regularly reviewed the data collected to report results and monitoring framework. The information was collected through field visits, site verification by M&E and Bank teams, government documents (including zonal water management reports), and interviewing community members and representatives of the WMOs. In addition to the management information system and regular M&E data collection, the PSM process was monitored by evaluating WMO performance and making random site visits to completed schemes after management transfer. However, detailed data for the economic and financial analysis were not readily available to determine the economic benefits of protection works that were constructed and rehabilitated before and after improvements; the cropping pattern in those areas (before and after); and the average yields, farm gate prices, and production costs for those main crops. These activities were under the purview of Department of Agricultural Extension and due to lack of capacity and coordination, monitoring these aspects of project outcomes remained somewhat cumbersome, resulting in delays in data availability.

32. **M&E Data Use.** The information collected with BWDB, WARPO, and the M&E consultants was consistently used to inform project performance during implementation. The Bank missions also reviewed the data and provided advice to the Borrower. Information on the performance of the PSM approach remained a key focus, and the BWDB prepared additional case studies and results stories to share with policy makers and the general public. The Food and Agriculture Organization (FAO) conducted an independent evaluation of the PSM components to gauge the results of participatory approaches and identify key lessons for future programs. The BWDB used the findings from the M&E reports and the FAO evaluation to formulate the Preliminary Development Project Proposal for the follow-on project to continue and deepen the PSM and associated institutional reforms for water management in Bangladesh.

2.4 Safeguard and Fiduciary Compliance

Safeguard Compliance

33. The following environmental and social safeguards policies were triggered:

- Environmental Assessment (OB/BP 4.01);
- Natural Habitats (OP/BP 4.04);
- Pest Management (OP 4.09);
- Involuntary Resettlement (OP/BP 4.12); and
- Projects on International Waterways (OP/BP/GP 7.50).

34. **Environmental Assessment.** Because the scope of the projects entailed rehabilitation and modernization of existing irrigation schemes, no significant risk of negative environmental effects was identified. The project was classified as category B, and the overall environmental safeguards compliance was rated satisfactory throughout project implementation period. An environmental management framework was adopted to ensure that all subprojects were adequately screened and assessed for environmental concerns and to prepare site-specific environmental management plans. In accordance with the environmental management framework, the Department of Environment (DoE) prepared and cleared the site-specific environmental screening and assessment and the environmental management plan, although in a few cases, the cost of environmental management plan preparation was not included in the bill of quantities at the time of preparing the bidding documents, which delayed submission of an environmental management plan. In these cases, the PCU field staff and consultants closely monitored and addressed adverse environmental effects. The printed copies of site-specific environmental management plans for each scheme were made available in the respective field and site offices. The PCU organized training programs on environmental management for field staff and contractors. The PCU prepared

a checklist on the environmental questions and distributed it to all field offices to monitor compliance with environment management standards.

35. **Natural Habitats.** The construction works were limited to areas with existing FCD and FCDI schemes. All schemes were screened before the start of civil works for possible effects on the natural habitat; no expected effects were reported on any of the schemes. During construction, the M&E consultants and the WMOs monitored implementation of scheme-specific environmental management plans.

36. **Pest Management.** There was no report of use of pesticides in any of the FCD or FCDI schemes. There was no need to prepare a pest management plan because the Department of Agricultural Extension did not conduct any agricultural or farming activities.

37. **Involuntary Resettlement.** The project implementation included no involuntary resettlement. All civil works were performed on BWDB sites without any encumbrances.

38. **Projects on International Waterways.** The project included rehabilitation of existing FCD and FCDI schemes and an exception of OP7.50 was sought because the project did not adversely change the quality or quantity of water in the upper riparian countries. Therefore, in accordance with Bank procedures, the Regional Vice President approved a waiver of notification to the riparian countries.

Fiduciary Compliance

39. **Financial Management.** The financial management performance rating of the project was satisfactory for much of the project implementation period. A financial management information system was in place, and reporting, internal controls, and audits were on track. Interim unaudited financial reports and annual external audits were prepared timely. The interim unaudited financial reports were used as the basis for disbursements. For the BWDB, the financial management arrangements were adequate throughout the project implementation period, but for WARPO, the limited skills of staff required additional technical support, which WARPO management addressed by hiring a consultant.

40. **Procurement.** Procurement of all works, goods, and technical services under the project followed the procurement guidelines “Procurement under IBRD [International Bank for Reconstruction and Development] Loans and IDA Credits of May 2004, Revised October 2006.” The procurement risk was rated high given the past performance of government agencies and experience with Bank operations. To mitigate procurement risks, several measures were agreed upon and applied during implementation: An international procurement panel was put in place to assist the borrower in bid evaluation, awarding of contracts, and overall contract management; third-party supervision consultants were mobilized to enhance construction supervision and contract management on behalf of the Borrower; and a set of countermeasures was developed in consultation with the Integrity Vice Presidency. Several challenges had been reported before project appraisal, but implementation of the mitigation measures significantly improved client performance, and as a result, only special drawing rights (SDR) 0.26 million of the total IDA financing of SDR 67.5 million was declared ineligible, because of one mis-procurement of a work contract in 2014. Regular procurement post reviews were conducted every year during the project period, with no other mis-procurements identified during reviews. Overall procurement performance was satisfactory.

2.5 Post-completion Operation/Next Phase

41. The government has requested the Bank to finance a follow-on project, the goal of which is to among other rehabilitate and to put under WMO management the remaining schemes that were originally identified and could not be covered due to needed flood damage rehabilitation following the restructuring in 2011, as well as to deepen the institutional reforms by strengthening existing WMOs and forming new WMOs across the country. The Bank has agreed to finance the follow-on operation based on the achievements and lessons learned from WMIP and recognizing the need to continue reforms to institutionalize these reforms within BWDB and the Ministry of Water Resources.

42. This Implementation Completion and Results Report (ICRR) will inform the design of the follow-on project, which will also be further enhanced to focus on agricultural water management in addition to improving irrigation infrastructure. New activities related to on-farm water use efficiency and climate-smart agriculture through improved irrigation and water management technologies will be introduced. This orientation of the design for the follow-on operation is consistent with the Bank Country Partnership Framework (2016-20) Objective 2.4 (Enhanced Rural Income Opportunities for the Poor) and 3.3 (Increased Adoption of Sustainable Agriculture Practices). Hence, the new project would support broader rural development and poverty reduction activities and develop a wider range of income-earning opportunities for participating communities. The follow-on operation will also focus on strengthening the WMOs and contribute to the government's efforts in economic development and poverty reduction. This will be done by expanding the pilot reforms program initiated under WMIP to deepen the PSM approach and institutionalize it within BWDB structure.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

Rating: Modest before restructuring and Substantial after restructuring

43. *Before restructuring*, the objectives were fully aligned with the objectives of the government poverty reduction strategy paper and government's new approach to water management. However, the objectives had been modified to maintain its relevance including: improvement of infrastructure and institutions specifically to provide this focus even though the activities were already included in the project component 3; the PSM at all stages for all project schemes had been modified to make this approach pilot in nature; the physical targets relating to the schemes under the two components had been reduced from an aggregate of 200 to 67. One key PDO indicator, and several other institutional improvement indicators had been dropped.

44. *After restructuring*, at the ICRR, the project objective remains highly relevant to the government's approach to water management—improving infrastructure and institutions through rehabilitating damaged water infrastructure, piloting the role of local communities, and enhancing the institutional performance of the BWDB and WARPO. The PDO remained highly relevant to the Bank's Country Partnership Strategy (2011-15), which envisions providing a framework for participation of beneficiaries and stakeholders in rehabilitation and operation of the water management system in addition to reforming government institutions. At the ICRR, the project is also strongly consistent with the Bank's Country Partnership Framework 2016-20 objectives under Focus Area 2 (Social Inclusion: 2.4: Enhanced Rural Income Opportunities for the Poor) and 3 (Climate and Environment Management: 3.3: *Increased Adoption of Sustainable Agriculture Practices*). Overall, by targeting the most-vulnerable, poorest communities, the project contributed

to the World Bank Group's strategic goals of ending extreme poverty and shared prosperity. Given the above, the relevance of objectives is rated high.

Relevance of Design: Substantial before restructuring and Substantial after restructuring

45. *Before restructuring*, the project was designed to implement the key elements of the government's new approach to water management, which remains valid today, and in that way the design of the project was and remains relevant. The government program focused on improving water resources management through physical rehabilitation of water schemes, mainstreaming the role of beneficiary communities in the scheme planning, implementation, operation and management, and reforming and strengthening the key institutions (BWDB and WARPO). These aspects were captured in original project Components 1, 2, and 3. However, the original process of O&M had been changed from a fully community-based approach to a pilot approach.

46. *After restructuring*, the relevance of the design was substantial. The restructuring was done in response to the two major natural disasters—Cyclones Sidr in 2007 and Aila in 2009. As a result, the scope of the project was changed to respond to the context of post-disaster rehabilitation by creating a fourth component on FDR after restructuring of the project in 2011. The conclusions of the independent effect evaluation of the PSM approach of FAO clearly indicated that the future direction of water management in the country must involve local communities and continue to strike a balance between supporting infrastructure and institutions.

47. The project helped improve the resilience of the beneficiary communities to climatic disasters, floods, and drought by upgrading FCD and FCDI schemes and promoting the PSM approach and community participation in O&M. Considering that the extent of agriculture production risks from climate change is probably perceived now as being higher than it was at project appraisal in 2007, this would be another indication of the continuing relevance of the project design.

48. Based on the WMIP implementation experience, the government is eager to continue and deepen the institutional reforms process across Bangladesh. The government has identified an ambitious program of more than 700 FCD and FCDI schemes covering more than 6 million hectares. The government has approached the Bank to continue supporting the PSM approach and institutional reforms program, thus showing serious commitment to continuing participatory, integrated water management.

Relevance of implementation: Modest before restructuring and Substantial after restructuring

49. *Before restructuring*, the relevance of the implementation was moderate. Implementation of the project was progressing only slowly before restructuring caused by a number of factors including: delays in mobilization of various support consultancies, lack of technical support and sector experience with PSM, and a shift in focus toward emergency repairs to damaged BWDB flood control and drainage infrastructure schemes after the floods of 2007. Prior to restructuring disbursements was US\$22.39 million.

50. *After restructuring*, the relevance of the implementation was substantial. Implementation of the project was relevant to its design and intended objectives. Water resources management was improved through rehabilitation of FCD and FCDI schemes; restructuring and strengthening of BWDB and WARPO; operationalization and mainstreaming of the PSM approach and O&M to BWDB; and establishment of legally registered WMOs, enabling involvement of local communities in scheme management. The project further enhanced water resources management

by supporting FDR under the additional FDR component. To achieve this, project implementation called for a multi-sectoral approach with strong community participation involving the Ministry of Water Resources Development, Ministry of Agriculture, Ministry of Fisheries and Livestock, and WMOs. The project has provided a strong foundation and collaboration among these institutions, which will be relevant moving forward.

3.2 Achievement of Project Development Objectives

Rating: Modest before Restructuring and Substantial after Restructuring

51. The original PDO outcome indicators were a reduction in the level of damage to property and assets to the satisfaction of the communities in 60 percent of project schemes, an approximately 60 percent reduction in crop area damaged by floods and cyclones in 60 percent of project schemes from YR 5, an increase in agricultural production to the satisfaction of the communities in 60 percent of project schemes, and approximately 60 percent of project schemes have WMOs functioning in accordance with the roles and responsibilities agreed upon in the management plan.

52.

53. Because of slow implementation, *achievement of PDO-level and intermediate outcome indicators is assessed as limited pre-restructuring and therefore considered modest* for the purpose of this ICRR. For instance: the PDO indicator 3 relating to production was dropped and could not be measured; the three PDO indicators 1, 2, and 4 relating to the achievement of 67 schemes compared to the original target (60% of 200 schemes) was 120 schemes (56 percent); the intermediate outcome indicator 1 relating to 102 schemes was achieved with 32 schemes (31 percent); intermediate outcome indicator 2 was dropped and could not be measured; the intermediate outcome indicator 3 relating to 60 percent of 102 schemes (60 schemes) was achieved with 32 schemes (53 percent); the intermediate outcome indicators 4 and 5 relating to all original 98 schemes (100 percent target) were achieved with 35 schemes (35 percent); the intermediate outcome indicator 5 was dropped and could not be measured; the intermediate outcome indicators 7, 8, 9, 10, and 14 relating to institutional development were all achieved although with delay of several years; the intermediate outcome indicators 11, 12, 13, and 16 were all dropped and could not be measured; and the intermediate outcome indicator 15 relating to the database was achieved at only 80 percent.

54. As already stated in the context section of this report, the Level 1 restructuring reduced the scope of the original components but did not change their orientation, while a flood rehabilitation component was added. The PDO was revised accordingly to reflect the new component for emergency FDR. The revised PDO consisted of three elements: (i) improving water management through rehabilitation of damaged water infrastructure, (ii) piloting the role of local communities, and (iii) enhancing the institutional performance of the country's principal water institutions (BWDB and WARPO). Each of these dimensions in the *post-restructuring period* is assessed below.

55. **Improved water management through rehabilitation of damaged infrastructure.** With respect to the first element of the PDO, the related key PDO-level and intermediate outcome indicators were a reduction in the level of damage to property and assets to the satisfaction of the communities in 60 percent of completed project schemes, 60 percent reduction in crop area damaged by floods and cyclones in 60 percent of completed project schemes starting in 2014/15, successful completion of rehabilitation and improvements in 100 percent of targeted project

schemes under Component 1, and successful completion of rehabilitation and improvement in 100 percent of target under Component 4.

56. The project improved water management structures in 67 schemes under Components 1 and 2 and 61 schemes implemented under the FDR component. The rehabilitation of irrigation, drainage, and riverbank protection infrastructure improved an area of 800,579 hectares, reaching a population of approximately 9.5 million. The project coverage was spread over 43 districts and 119 subdistricts. The WMOs in nearly all schemes reported a noticeable reduction in local flooding and damage to housing, roads, fishing ponds, and other private structures (e.g., village shops, schools, mosques). The targets and achievements with percentage of targets achieved are shown in Table 1.

Table 1. Targets and achievement of PDO results

Types of Works	Unit	Target	Achieved	% Achieved
Embankment	Km	422.8	422.8	100%
Water Control Structure	Number	90	90	100%
Protective Work	Km	42.3	42.3	100%

57. Similarly, the results showed that damage to crops from flooding was substantially reduced and that production increased. Complementing this data and presenting an even more positive picture is the information gathered from farmers on the effects of WMIP on agricultural production and other livelihood activities. Based on the beneficiary survey, the FAO assessment found that gains to production from improved drainage and flood control and irrigation have been very significant. Most of the schemes that the FAO team visited for the evaluation were of the FCD type, and in all the zones, the improved flood control and drainage, enabled additional production from 0.5-2.1 tons per hectare to an average of 6.4 tons per hectare for rice. The benefit was primarily to rice cultivation during the monsoon season, for which, before scheme rehabilitation, persistent waterlogging and damage had prevented production on almost half of the land. For example, in the Muradia Kalagachia polder in the south, the survey revealed that production increased from 0.5 tons to 2.1 tons per hectare before scheme rehabilitation to 2.5 tons to 3.2 tons per hectare after scheme completion. Survey findings from the north zone were similar, and production increases in the central zone, especially in the Boka Beel and Suktajuri schemes, were reported to be significant, with the combined FCD and FCDI rehabilitation leading to production of 6.4 tons per hectare, compared with original production of 3.2 tons per hectare. The improved flood control and drainage also allowed cultivation of other high-value rabi crops such as chilies, wheat, groundnuts, potatoes, and mung beans, as well as other vegetables and fruits, and reportedly led to greater production of fish, in areas which used to wash out from floods before rehabilitation. Livestock raising and fodder production have also been made possible.

58. The benefits of repaired irrigation systems have been equally positive. The excavation of channels and other repairs have increased irrigation coverage for boro winter-season rice and reduced the cost for farmers, who had depended on groundwater, which is expensive. Surface water is commonly preferred because it contributes to soil fertility. In the northwest zone schemes, where boro rice production has remained the same at 5 tons to 6 tons per hectare, the gain has been in increased water savings, but in the other zones, boro rice production has increased as well—in the South's Padri Shibpur scheme from 0.5-2.1 tons per hectare to an average of 4.9 tons per hectare.. As in the case of FCD repairs, increased irrigation and the availability of water in channels and ponds has made the production of other rabi crops possible. Sunflower, maize, and watermelon outputs in the southern schemes have doubled. Gains have also come from improved flood control

and irrigation, in the northwest, mango orchards made possible from decreased flooding are also irrigated during the dry season, to increase production by 50 %.

59. **Piloting the role of local communities.** With respect to the second element of the PDO, the related key PDO-level indicator was 60 percent of completed project schemes having WMOs functioning in accordance with their roles and responsibilities agreed upon in the management plan. Four intermediates indicators were also associated with this element of the PDO: operational water user association created or strengthened, detailed text according to original indicator (signed agreement between BWDB and WMOs completed in 100 percent of project schemes), timely completion of need-based O&M assessment and allocation of BWDB O&M budget for 100 percent of completed project schemes, and compliance with participatory monitoring system in 100 percent of completed project schemes.

60. This result was achieved above the stated target, and 100 percent of the schemes were found to have established WMOs with staff who had received training and technical support from BWDB to perform their duties of O&M of completed schemes. Despite the slow start of the project in late 2009 and its restructuring in 2011, the project achieved its targets of forming the WMOs and transferring the FCD and FCDI schemes to them using a well-designed process. Seven hundred eighty-five WMOs have been formed, and management of all the schemes under Components 1 and 2 have been transferred to the respective water management associations (WMAs). The project successfully implemented the PSM approach to O&M by involving local communities at all stages of project planning, implementation, and monitoring. At the time of this ICR, all 67 schemes (32 from Component 1 and 35 from Component 2) were transferred to the WMOs after a 1-year joint trial management period. WMO management of FCD and FCDI schemes provided significant agricultural benefits (increase in productivity and diversification and into high-value crops) and other livelihood activities, including employment and income generation.

Table 2. Targets and achievement of project development objective results

	Number of schemes	Water management organizations		Federated water management association		Labor contract services formed	Progress
		Targets	Achieved	Targets	Achieved		
Component 1	32	409	409	35	35	104	100%
Component 2	35	376	376	37	37	76	100%
Total	67	785	785	72	72	180	100%

61. **Enhanced institutional performance of principle water institutions.** With respect to the third element of PDO, the key performance indicators were: BWDB institutional reform plan completed by June 2011 and approved by December 2011; after BWDB approval of institutional reform plan, new staffing plan completed and approved by December 2012; after completion and approval of institutional reform and staffing plans, human resources development (HRD) plan completed by June 2012; WARPO institutional reform plan completed by December 2011; and updated national water resources database with enhanced data layers completed and disseminated.

62. The planned institutional reforms are overall in place at BWDB and WARPO. The institutional reform plan for BWDB was completed and approved in December 2011. A new staffing plan was completed and approved in June 2012, in line with the 2011 BWDB institutional reform plan. A HRD plan was completed in June 2012. The WARPO institutional reform plan was completed and approved in December 2011. The national water resources database was only 80%

completed because of the complex computing system and data layers. WARPO is continuing this activity after project completion using its own resources.

63. In addition, a new Water Management Cell in the Ministry of Water Resources was established with defined roles and the responsibility to facilitate the WMOs. The Chief of Water Management, a new position created within the Ministry, heads the cell. Additional staff have been provided to strengthen the cell and make it fully functional. The cell is responsible for legally registering the WMOs and providing them with regular training and other technical support. Through the support provided under the WMIP, an enabling social and political environment and a water policy and institutional framework to facilitate a new approach to water resource management is in place at the BWDB. This institutional mechanism needs to be further strengthened to scale up the implementation of participatory approaches in water management across Bangladesh. The government is eager to continue the reform program based on the performance of WMIP and has requested that the World Bank finance the second phase of WMIP—the Climate Smart Agricultural Water Management Project—as a program with additional activities focus on on-farm agricultural water management and deepening of institutional reforms.

3.3 Efficiency

Rating: Substantial before and after Restructuring

64. **Cost effectiveness of community-managed water infrastructure.** The introduction of cost sharing for effective O&M of water schemes was an important strategy to end the prevailing build-neglect-rebuild cycle of water infrastructure in Bangladesh. It was realized that BWDB could not manage and maintain every scheme because it lacked the manpower and resources. If WMOs could make small repairs immediately, costly larger repairs could be avoided or reduced.

65. **At appraisal, the economic rate of return (ERR) for a sample of schemes to be improved were well above the opportunity costs of capital (12%).** The estimated average ERR was 29.5% for FCD schemes to be covered under Component 1 and 48% for FCDI schemes to be covered under Component 2. Estimated benefits were based on quantification of a sample of four schemes only, including increased agricultural production arising from a reduction in crop damage, increased cropping intensity, and shifts in crop patterns and increased shrimp and salt production in a coastal polder scheme, but because of a lack of adequate historical data on loss of lives and damage to or loss of property, these benefits were not quantified at appraisal even though they were expected to be substantial in the coastal areas highly susceptible to cyclones and storm surges.

66. **The ERR of the overall project at closing is estimated at 22% and the net present value (with 12% discount rate) at BDT 5.65 billion (US\$72.4 million).** This analysis is based on a sample of 10 schemes that are considered representative of the schemes supported under the project (details in Annex 2). A sensitivity analysis of deviations from the base case assumptions used for the quantification of benefits shows that the ERR of the project is robust. With a 25% reduction in benefits, the ERR would fall to 16.3% which is still above the opportunity cost of capital, and the net present value would still reach BDT 2.21 billion (US\$28.3 million).

67. **The project also helped rationalize public sector functions.** By implementing the new approach to water management, the project helped redefine the role of the government in the development and management of water resources and decentralize the water sector with effective beneficiary participation. The PSM approach enabled transfer of FCD and FCDI schemes to the beneficiary local communities and their participation in the O&M of schemes. Hence, the project

contributed to rationalization of the functions of the key public institutions in the water sector (BWDB and WARPO) in the rehabilitation and the management of water infrastructures.

68. The rehabilitation of irrigation, drainage, and riverbank protection infrastructure improved an area of 800,579 hectares against 800,000 hectares as envisaged at appraisal.

3.4 Justification of Overall Outcome Rating

Rating: Moderately Satisfactory

69. Since the PDO and results framework were revised through a level 1 restructuring, the ICRR team conducted a split evaluation to determine the outcome ratings, taking into account the original and formally revised objectives and indicators, as well as disbursements prior and after restructuring. Project performance was moderate before restructuring but improved significantly after the level 1 restructuring of the PDO. Based on the ICRR guidelines, this makes the case for applying a split evaluation of the PDO, and the team applied the Independent Evaluation Group split methodology (disbursement-weighted split rating) for the final outcome rating, following the methodology presented in Appendix B of the ICRR Guidelines. Late restructuring in 2011 resulted in and above-the-line overall rating, and the split evaluation shows an overall weighted value of 4.28, corresponding to a final moderately satisfactory. The overall rating is still in the satisfactory range (moderately satisfactory-highly satisfactory). Table 3 presents a split evaluation of PDO indicators before and after restructuring.

Table 3. Split evaluation of PDO indicators before and after restructuring

		Pre- Restructuring	Post- Restructuring	Overall	Comments
1.	Relevance	Modest	Substantial		
2.	Efficacy	Modest	Substantial		
3.	Efficiency	Substantial	Substantial		
4.	Outcome	Unsatisfactory	Satisfactory		Significant improvement
5	Rating value	2	5		
6.	Disbursement (\$ million)	22.4	70.7	93.1	
7.	Weight (% disbursed before/after PDO change)	24.06%	75.94%	100%	
8.	Weighted value (5 x 7)	0.481	3.797	4.28	All PDO outcome indicators have been achieved at closing
9.	Final rating			Moderately Satisfactory	Restructuring in 2011 resulted in above-the-line overall rating

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Effects, Gender Aspects, and Social Development

70. *Poverty effects.* The project created three pathways to reduce poverty: greater productivity associated with more-secure access to water and increased crop intensity, greater resilience provided by upgraded irrigation and flood protection infrastructure that better protects poor rural households against climatic shocks, and enhanced employment opportunities for rural populations associated with the transfer of water management functions from public institutions to WMOs under the PSM approach. The WMOs also contributed to poverty reduction in their management of the labor contract services (LCSs) under them by employing individuals in the community on scheme rehabilitation earth works. The WMOs prioritized the poorest households in filling the available positions. For instance, with polder 55/2A and the Muradia Kalagachia schemes in the south, employment was provided for 120 families in each case for 20 to 25 and 45 to 50 days, respectively.

71. *Gender.* Although there were no gender-specific indicators in the results framework, women's participation in project activities was high. The independent evaluation that FAO conducted shows that the WMOs have adequately engaged women in their communities as members and in leadership. In the WMOs surveyed, the participation of women ranged from the required 30 percent, according to the national Guidelines for Participatory Water Management, to 70 percent for some of the central zone Komornai WMGs. The executive committees in all of the sample WMOs included three women, and the WMAs each had two to three female members, based on an open election process. The female members attended most of the meetings, took part in discussions, and had no major concerns. Moreover, many of the recipients of the income-generating activities that the WMOs promoted were women.

72. *Social Development and Inclusion.* The economic benefits of employment on earth works are a major reason for communities to engage in PSM, and the work played an important social role by providing income to the poorest families. The WMOs went beyond their role as defined by the project and worked for the local rural development more broadly. The WMOs provided employment not only to their paying members, but also, based on an apparent sense of social responsibility and wish to see the whole community benefit, employed individuals who could not afford to be organization members. Some of those individuals were unrelated to the FCD and FCDI schemes and included households that would not benefit directly from their rehabilitation. The WMOs assumed a broader role for community development, including by providing microcredit and advocating for leases to BWDB of other lands for livelihood activities.

73. *Nutrition-Sensitive Activities.* In addition to reducing access to safe water and sanitation facilities, floods affect household food security, health, and nutrition. Rehabilitation and management of FCD and FCDI schemes significantly increased productivity and diversification of fish, livestock, and crop production into high-value rabi crops such as chilies, wheat, groundnuts, potatoes mung beans, other vegetables, and mangoes, although related nutrition benefits were not monitored or quantified.

(b) Institutional Change and Strengthening

74. The project had substantial institutional development effects by implementing the government's new approach to irrigation water management.

75. *Enhancement of the institutional performance of the country's principal water institutions.* Thanks to the support of the project, BWDB and WARPO were restructured and strengthened. Achievements at BWDB included consolidation of the organizational reform initiatives (including reorientation and rationalization for right sizing BWDB and preparation of a plan for skills mix in BWDB to enhance its performance and development of career plan), human resources development, upgrading the procurement and financial management system, computerization of BWDB operations. For WARPO, the project supported implementation of its institutional reform plan (consisting of institutional strengthening and HRD, including for stakeholders in water management) and maintenance, updating, and dissemination of the National Water Resources Database. The project also established 30 hydro-meteorological stations for flood forecasting, one of which has metrological and eight of which include rainfall facility.

76. *Establishment of legal organizations enabling involvement of local communities in scheme management.* With the support of the project, the WMOs and WMAs have been functioning effectively and have taken over O&M of schemes. Most WMOs meet once a month, and WMAs once every two to three months, but they gather more frequently if there are particular O&M measures to take.

77. *Mainstreaming PSM approach to BWDB.* After experience with the project and other donor projects in PSM, there has been a significant shift in the views of BWDB on the importance of involving local communities in FCD and FCDI scheme management for Bangladesh. Previously, according to technical and managerial personnel, the participatory approach was given little emphasis in practice, and it was even felt that technical maintenance of schemes could not be left in the hands of untrained farmers.

(c) Other Unintended Outcomes and Effects (positive or negative)

78. *Community savings and income-generating activities.* In addition to raising membership funds for the purpose of scheme repair and maintenance, WMOs assisted community members in establishing savings as revolving funds to finance O&M of the transferred schemes. In times when no O&M is needed, the WMOs used their funds to provide microcredit to households, including the more-disadvantaged households. Through these programs and across the zones, beneficiaries were able to initiate a wide variety of income-generating activities. Beneficiaries used microcredit loans, savings schemes, and income from employment on earth works to raise poultry, small livestock, and vegetables and to start household industries. Many of the recipients of the income-generating activities that WMOs promoted were women.

79. *Support of local government officials to WMG formation and evolution contributed to community scheme ownership.* Representatives of the sub-districts, although not given a formal role in the project, attended meetings for the establishment of WMGs and helped persuade community members to form them. They frequently attended WMG meetings and as a result were informed of the status of PSM and the challenges faced and of the other, livelihood-oriented activities of WMGs.

4. Assessment of Risk to Development Outcome

Rating: Substantial

80. Assessment of risks to WMIP outcomes can be structured into the following categories: capacity of BWDB and WARPO, capacity of WMOs, and government commitment to PSM. The

overall risk to these outcomes is rated substantial. At the same time, with the Bank ready to finance the follow-on operation, there are opportunities to further consolidate project outcomes.

81. **Risk to capacity of BWDB and WARPO.** The planned institutional reforms are overall in place at BWDB and WARPO and likely to continue, although BWDB still does not have an adequate budget to finance larger repairs of schemes in case of disasters. The portion of the BWDB budget allocated and from which large-scale O&M is funded is far less than the needs of BWDB. No regulations governing the costs that the BWDB and the concerned WMO would pay in the event of a large-scale rehabilitation need have been established.

82. **Risk to capacity of WMOs.** The WMO response to the challenges of cooperative work for sustained water resources management is positive. The WMOs are able to finance minor maintenance work of schemes, but how the maintenance of larger schemes or the conduct of larger repairs will be financed has not been clearly addressed. Given their limited resources, it is difficult for WMOs to pay for larger repairs. Because of the delay and restructuring of WMIP, the available time and resources were insufficient to ensure the full financial sustainability of schemes. The challenge is how the benefits to institutions, organizations, and individual households from the project could be sustained immediately and in the long term. It will take more time than the project duration for WMOs to stabilize and to sustain their operations. Skills and knowledge transfer activities are necessary inputs to achieve this. The envisaged follow-on project can play a role in addressing these issues.

83. **Risk to government commitment to PSM.** The government continues to accept the PSM as the way to move forward for sustained water resources management, and the progression of steps is deemed appropriate. The government's commitment to sustain the participatory program piloted under WMIP and institutionalize the reforms through changes in organizational structure and administrative functions is evident with the formation of a new Water Management Cell in the Ministry of Water Resources that was established specifically to work with the WMOs. The follow-on operation is expected to strengthen the Water Management Cell through capacity building of government officials, incorporating lessons from WMIP, and participatory reforms in other countries in the region and elsewhere, although the government commitment is unclear when it comes to addressing the question of scheme rehabilitation financing and cost recovery at the national level. Without some form of broader strategy for resource mobilization and the logical expansion of PSM, efforts to advance it will not fully succeed.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Moderately Satisfactory

84. The project focus was implementation of the new approach to water management that Bangladesh has adopted and its related reforms. Therefore, the project supported the government's new approach to irrigation water management and incorporated lessons from experience into the project design. During project preparation, the Bank also assessed the water sector in Bangladesh and directly contributed to the government's sector strategy by defining the long-term water management strategy within the Flood Action Plan, the National Water Policy, and the National Water Management Plan. The findings of the sector assessment were also incorporated into the programs that other development partners supported, namely the Netherlands and the Asian

Development Bank. The Netherlands also decided to co-finance WMIP for capacity building of WMOs. The program management approach that the Bank team used encouraged institutional reforms in the BWDB and WARPO by providing knowledge and expertise from other countries and technical assistance timely at various intervals and during implementation support missions.

85. The Bank team determined that BWDB would need to make substantial changes in its organizational setup to implement the reforms. The length of the project preparation period was long because the Bank team needed to determine whether the BWDB had increased its capacity and established the political and institutional commitment of the government and BWDB management to embark on a participatory reform agenda. Project readiness was compromised at inception because of delays in completing institutional changes (e.g., establishment of a Water Management Cell at BWDB and the planning and design functions of the WARPO). As a result, the creation of WMOs and initiating the PSM approach took longer than scheduled in the project implementation plan. Also, no specific interventions for responding to natural disasters were anticipated at the project design stage, and when the 2007 and 2009 disasters struck, project restructuring became unavoidable not only to respond to rehabilitation needs, but also to enhance the project planning mechanisms in adding criteria that select and prioritize schemes that are more vulnerable to climate change impacts.

(b) Quality of Supervision

Rating: Moderately Satisfactory

86. The Bank team provided regular supervision and implementation support missions and numerous informal and desk reviews and field supervision visits. In addition to intensive supervision, the Bank team was proactive and proposed relevant measures and actions during project implementation. The Bank team performed an extensive assessment when the project was restructured in 2011, not only to improve the implementation performance, but also to incorporate just-in-time lessons learned from the initial years of implementation and reassess the achievability of PDO results. The Bank team also addressed project management problems at the institutional level and introduced targeted measures to improve client capacity for fiduciary compliance, including management of procurement risks. Following restructuring, the WMIP was among the few government programs that did not experience procurement delays and contract management problems. The Bank team was recognized for proactively reaching out to the Integrity Vice Presidency for advice on developing risk mitigation measures. As a direct result of the support that the Bank team provided during supervision, the project was removed from problem status, the implementation progress improved significantly over a short period, and the steps that the Bank team introduced at restructuring became examples of good practice for several other BWDB and government projects.

87. At the level 1 restructuring approved in 2011, the Bank team incorporated the FDR component as a direct response to post-disaster rehabilitation needs. This adjustment not only supported rehabilitation work on BWDB schemes that cyclones Sidr and Aila damaged, but also provided an opportunity to strengthen the selection criterion, implementation arrangements, clear division of roles and responsibilities of the BWDB field staff and local communities, and a well-designed system of scheme transference through a period of joint management and training of WMOs and BWDB staff. Although the restructuring in 2011 created an important opportunity to incorporate lessons from the ongoing implementation, it also meant that, because of the limited project period remaining and the need to divert resources to address post-disaster rehabilitation, the overall project scope had to be reduced. Originally, there were 102 FCD and FCDI schemes under Component 1 and 98 FCD and FCDI schemes under Component 2 (in total 200 schemes). With the

restructuring, the number of schemes was reduced to 32 and 35 (67 schemes), respectively, considering the slow progress of the work. FDR of 63 schemes located across 27 districts and eight BWDB regions was added. The budget was revised to US\$123.26 million. Implementation delays were partly because of the revision made to the implementation arrangements after the Netherlands Trust Fund was cancelled.

88. Due to this delay and restructuring of WMIP, the available time available and the resources were insufficient to ensure the full financial sustainability of the schemes. Although the Memorandum of Understanding with the Department of Agriculture Extension as well as the Department of Fisheries was not implemented, the Bank team did not revise the arrangement to ensure the provision of agricultural support and services to WMOs that was assigned to the said departments.

89. The government and Bank management also recognized the Bank team for its continuous effort to focus on results and client needs by taking timely measures to meet the government's capacity challenges and implementation of the project to ensure achievement of the PDO results. These measures included simplification and rationalization of the approach to the PSM process to allow for greater focus on the participatory and community mobilization aspects of system management transfer and involvement of communities in O&M management; identifying and addressing new demands, including FDR projects, construction of training centers to support the PSM process and WMO mobilization pilot, innovative hydrologic monitoring equipment, revision of the National Water Plan, and information technologies to modernize the business processing of the BWDB; simplification of implementation arrangements, in particular the role of the Department of Agricultural Extension and Department of Fisheries in project design; and extension of the project closing date from June 30, 2015, to June 30, 2016, to ensure completion of activities and smooth closing of the project.

(c) Justification of Rating for Overall Bank Performance

Rating: Moderately Satisfactory

90. The overall rating of Bank performance is based on ratings for quality at entry and during supervision, considering the overall moderately satisfactory outcome rating. Although the initial project design may have been ambitious, the Bank team remained vigilant in project monitoring and took measures to adjust implementation and project design to address emerging conditions (e.g., post-disaster rehabilitation). The measures that the Bank team took were justified and greatly supported the project in achieving its development objectives. In addition, successful implementation of the project and acknowledgment from other development partners increased the government's commitment to continue and expand the program beyond this project.

5.2 Borrower Performance

(a) Government Performance

Rating: Moderately Satisfactory

91. The government of Bangladesh expressed strong commitment to the project and consistently requested and obtained Bank financing of a follow-on project, although approval of the revised development project proposal (DPP) was delayed, even though it was recognized as a high priority in the midterm review. The government should have signed a grant agreement with the Netherlands at the beginning and opened a separate designated account for the Netherlands co-financing to avoid systematic delays in transfers of funds and cancellation of the grant.

92. The government remained highly committed throughout implementation of WMIP as demonstrated by policy reforms, and institutional changes enacted as part of project implementation. The government prepared a series of guidelines and plans for the water sector institutions in the past that promoted PSM, but the experience gained through implementing WMIP has led to a visible increase in the government's commitment not only to continue the reforms program, but also to scale up with more schemes across the country. At the same time, there is a need to enhance human and financial resources for PSM to promote it as part of a national approach to water management. The government provided counterpart funding largely (93.6%) according to agreement, as evidenced by the figures in Annex 1.

(b) Implementing Agency or Agencies Performance

Rating: Moderately Satisfactory

93. The WMIP was designed as a framework project, with objectives, components, and specific criteria to select schemes to be included in project Components 1 and 2. The implementation responsibility was placed with the main organizations of the water sector (BWDB and WARPO) as the existing water agencies under the direct supervision of the Ministry of Water Resources. The implementation arrangements were based on past experience, which had shown that excessive reliance on external consultants and technical assistance could limit the sustainability of the program and did not increase the capacity of the sector organizations to execute their mandated tasks. Therefore, in WMIP, technical assistance was focused on initiating project activities and focusing on capacity building to mainstream the participatory water management approach.

94. These arrangements led to better coordination in monitoring project implementation and implementation of safeguards, procurement, and financial management that adhered to Bank policies. The BWDB, as lead implementation agency, handled its project management and coordination role in a satisfactory fashion while ensuring that inter-ministerial collaboration with WARPO and the newly established Water Management Cell remained on track.

95. However, with respect to PSM, the issue of scheme rehabilitation financing and cost-recovery was not resolved by BWDB. The BWDB acknowledges the financial sustainability issue of PSM, and funds are yet to be raised for O&M and large-scale repairs. The BWDB budget allocation for large-scale O&M is far less than what is required. The FAO report noted that ethics of participatory management is yet to be fully adopted by all BWDB staff.

(c) Justification of Rating for Overall Borrower Performance

Rating: Moderately Satisfactory

96. Given that the performance of the government and the implementing agency improved after project design was adapted at restructuring and that all project targets were subsequently completed with satisfactory quality, the borrower's overall performance is rated as moderately satisfactory.

6. Lessons Learned

97. The project was first of its kind in Bangladesh, introducing systematic reforms in irrigation and water management with a view to breaking the dysfunctional cycle of build-neglect-rebuild infrastructure with little or no mechanism for sustained O&M arrangements. The project

generated important changes during its implementation and generated important lessons that should inform the future design of similar operations in Bangladesh and in other countries in similar situations.

General

98. ***Analytical work provides important input for needed policy changes before the program is instituted.*** Sector assessment conducted during project preparation was an important point of reference in informing the government's major sector planning instruments, including the Flood Action Plan, National Water Policy, and National Water Management Plan. These plans aligned the sector development needs identified not only in the Bank's Country Assistance Strategy, but also in the development programs of other partners, furthering the importance of reforms being introduced through WMIP.

99. ***Changes in organizational structure are an important indicator of strong political ownership and the government's commitment to implementing any reform program.*** Formation of the Water Management Cell in the Ministry of Water Resources, headed by the Chief of Water Management, not only raised the profile of the reforms, but also raised confidence in local communities that the government was serious about seeking and incorporating farmers' views consistently from planning to design and implementation of schemes. This interface between farmers and engineers of BWDB not only increased understanding of the joint management responsibilities, but also clearly laid out the division of responsibilities between BWDB and WMOs. In addition, the government committed to further strengthen the cell with additional staff and financial resources and to provide the cell with legal standing in terms of registration of WMOs. Although establishing the cell took time, it was a step toward institutionalization of participatory approaches to irrigation water management.

100. ***Institutional changes take time to establish.*** The pace of implementation of institutional reforms and performance of new WMOs, which was initially slow, demonstrated this. Had the conditions for establishing a well-resourced Water Management Cell been fulfilled before project implementation, the pace of project implementation probably would have been faster.

Project Design

101. ***Acknowledge complexity to incorporate phased approach to program design.*** The complexity of institutional reforms when combined with multiple actors could make it difficult to achieve the desired outcomes. The BWDB had the challenging task of changing its internal organizational functions to become more participatory and inclusive. This meant changing the way it functioned and allocated financial and human resources. The additional assigned roles for the Department of Agricultural Extension and Department of Fisheries to assist WMOs and communities in the preparation of land use plans and agriculture and fishery development plans and to provide critical agriculture support services were beyond the scope of BWDB. Now that the PSM pilot has created functioning WMOs, the scale-up phase should include introducing these activities into WMOs that WMIP has already formed. The follow-on operation would be the best place to incorporate this lesson.

102. ***Establishment of community organizations through a social engineering process is time consuming and may require iterations.*** The changes in project scope at the time of first restructuring were appropriately introduced to acknowledge that newly formed organizations would require additional handholding and institutional support to meet their objectives. The strengthening of the scheme management transfer, with an elaborate mechanism of joint

management transition over one year, was an important adjustment to the project design and provided much-needed clarity of roles and responsibilities for farmers and zone- and district-level BWDB staff.

103. ***Adopt “principled pragmatism,” which recognizes that reforms and investments must proceed in parallel.*** Past investments in irrigation system rehabilitation no doubt brought benefits of fewer incidences of canal and river embankment breaches and resolved siltation and erosion problems, but without institutional changes and adequate O&M, the system reverted to pre-rehabilitation conditions. The WMIP addressed this through a principled approach in which investments in system rehabilitation were seen as complementary to fundamental institutional change, with greater participation of farmers and accountability at its core. The emphasis on introducing accountability and transparency was also evident from the Bank team’s support during supervision by helping the client develop and implement procurement risk mitigation measures that significantly reduced the risk of corruption and mis-procurement.

Project Implementation

104. ***Any program that generates significant demand can be considered relevant.*** The PSM program created a significant interest and desire among farmers to approach the BWDB and request prioritization of irrigation infrastructure in their areas for inclusion in WMIP. The primary justification for the government’s request to prepare a follow-on operation is based on the increase in the number of demands being received from various districts across the country and several communities approaching the Water Management Cell to file their registration papers for forming WMOs. The institutional architecture that evolved under the WMIP has provided strong bases for farmers’ participation in the PSM and decentralized irrigation management responsibilities. A well-designed communication plan is needed to ensure that all stakeholders—especially farmers—are aware of the steps that the government is taking to continue the reforms.

105. ***Contract management and record keeping are important in ensuring transparency and managing procurement risks.*** During supervision, the Bank team helped the government develop and implement measures to achieve fiduciary compliance by managing procurement risks. As a result, unlike other programs in WMIP, only one scheme was declared misprocurement during procurement post review. Misprocurement in this case was declared because of lack of proper record keeping. Although the post review of procurement contracts revealed this, it also highlighted that focused risk mitigation measures could enhance the government’s capacity to improve contract management.

106. ***Decentralized financial management requires proper accounting systems at all administrative levels.*** The project was designed to follow decentralized accounting and financial management, but the nonexistent financial reporting mechanisms at the regional accounting centers did not provide component wise expenditure statements or reports. In most instances, a manual system was adopted that reduced the reliability of information and reconciliation of financial statements. Investing in centrally linked accounting software is an easy and cost-effective way to strengthen accounting and financial management capacities and should be introduced in the follow-on operation as a contribution to upgrading BWDB’s institutional systems.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

107. The government prepared a Borrower's Completion Report (November 2016) and provided direct input during preparation of the ICRR. A summary of the comments is incorporated into the final ICRR and a summary of the Borrower's Completion Report in Annex 8.

(b) Cofinanciers

108. N/A.

Annex 1. Project Costs and Financing

(a) Project cost by component (in USD million equivalent)

Components	Appraisal estimate (USD millions)	Estimate at restructuring July 1, 2011 (USD million)	Estimate at restructuring March 5, 2015 (USD million)	Actual /latest estimate (USD millions)	Percentage of appraisal	Percentage of revised at restructuring
Component 1: System improvement and management transfer	69.50	26.11	19.66	19.00	27.3	28.3
Component 2: O&M performance improvement	28.30	13.77	10.35	9.87	34.9	36.6
Component 3: Institutional improvement	10.30	23.70	10.10	9.27	90.0	98.1
Component 4: Flood damage rehabilitation (FDR-2007)	0.00	67.53	65.27	62.96	0.0	96.4
Total baseline cost	108.10	131.12	105.38	101.09	93.5	97.5
Physical contingencies	12.50	0.38	0.38	0.38	3.0	3.0
Price contingencies	16.10	0.00	0.21	0.00	0.00	0.00
Total project costs	136.70	131.50	105.98	101.47	74.2	77.5
Front-end fee PPF	0.00	0.00	0.00	0.00	0.00	0.00
Front-end fee IBRD	0.00	0.00	0.00	0.00	0.00	0.00
Total financing required	136.70	131.50	105.98	101.47	74.2	77.5

(b) Financing

Source of funds	Type of cofinancing	Appraisal estimate (USD millions)	Estimate at restructuring July 1, 2011 (USD million)	Estimate at restructuring March 5, 2015 (USD million)	Actual/latest estimate (USD millions)	Percentage of appraisal	Percentage of revised at restructuring
Borrower		10.04	9.03	9.40	7.68	76.5	93.63
Local communities		4.40	0.00	0.00	0.00	0.00	*0.00
International Development Association (IDA)		102.26	102.26	93.3	90.39	88.4	91.85

Netherlands: Min. of Foreign Affairs / Min. of Dev. Coop		20.00	20.00	2.65	2.65	13.3	13.25
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*At the level 1 restructuring in 2011, it was decided that the water management organizations would no longer be required to make financial contributions. In-kind contributions (e.g., labor, materials) would be sufficient to indicate community commitment to the participatory scheme management approach and operations and maintenance aspects of the project. This better reflects the current operating environment. In addition, the estimates for component 3 were revised to complete activities agreed under Dutch cofinancing, but the Netherlands later withdrew these funds, resulting in reduction of overall component costs.

Annex 2. Outputs by Component

The achievement of intermediate outcomes is summarized in table A2.1. All intermediate outcomes indicators have been fully achieved.

Table A.1: Review of achievement of intermediate results indicators according to component

Intermediate outcome indicators	Baseline, June 2006	End target	Achievement at end of project	Level of achievement	Comments
Component 1: System Improvement and Management Transfer					
Successful completion of rehabilitation and improvements in 100% of targeted project schemes	NA	100% of targeted project schemes completed	100% of targeted project schemes completed	Achieved	60% completed in 2012/13, 90% in 2013/14; 98% in 2014/15, 100% in 2015/16. This information was obtained from impact assessment and third-party monitoring reports.
(i) Operational water user association created and/or strengthened (number) (core sector indicator). (ii) Detailed text as per original indicator: Signed agreement between BWDB and WMOs completed in 100% of project schemes	NA	(i) 785 WMOs formed and received training (ii) 50% of project schemes completed	(i) 788 WMOs formed and received training (ii) 100% of project schemes completed	Exceeded	(i) 100% of schemes have WMOs (ii) 100% completed schemes
Component 2: O&M performance improvement (OMPI)					
Timely completion of need-based O&M assessment and allocation of BWDB's O&M budget for 100% of completed project schemes	NA	Completion of need-based O&M assessment and allocation for 2015/16 from	Completion of need-based O&M assessment and allocation for 2015/16 from BWDB O&M budget	Achieved	Completed 100%

		BWDB O&M budget for 100% of completed project schemes	for 100% of completed project schemes		
Compliance to participatory monitoring system in 100% of completed project schemes ⁶	% of WMOs in completed project schemes	80% of WMOs in completed project schemes	80% of WMOs in completed project schemes	Achieved	Compliance in 100%
Component 3: Institutional Improvement					
BWDB's institutional reform plan completed by June 2011 and approved by December 2011	NA	BWDB institutional reform plan completed by June 2011 and approved by December 2012	Institutional reform plan completed and approved in December 2011	Achieved	Completed
Following BWDB's approved institutional reform plan, new staffing plan completed and approved by December 2012	NA		New staffing plan completed and approved in June 2012	Achieved	Plan completed
Following (1) and (2), HRD plan completed by June 2012	NA	HRD plan completed	HRD plan completed	Achieved	Completed
WARPO's institutional reform plan completed by December 2011	NA		Institutional reform plan completed and approved in December 2011	Achieved	Plan completed
Updated NWRD database with enhanced data layers completed and disseminated	Status of database	100% completion	80% completion	Achieved 80%	Completed 80%

Component 4: Flood Damage Rehabilitation (FDR-2007)					
Successful completion of rehabilitation and improvement in 100% of target	NA	100% of targeted works	100% completed	Achieved	Completed 100%

Notes:

- 1 *Cyclone Sidr in Bangladesh: Damage, Loss and Needs Assessment for Disaster Recovery and Reconstruction, April 2008 [a report that the government prepared, assisted by the international development community with financial support from the European Commission].*
- 2 *Summary of Damages of BWDB Infrastructure Due to Flood 2007, Bangladesh Water Development Board (BWDB) [printed material].*
- 3 *National Plan for Disaster Management, 2010-2015, Disaster Management Bureau, Disaster Management and Relief Division, April 2010.*
- 4 *Various sources including Centre for Geographic and Environmental Services database, participatory rural appraisal reports and Environmental Impact Assessment reports.*
- 5 *Preliminary based on sample schemes with available participatory rural appraisal reports.*
- 6 *Refers to compliance with participatory monitoring of operations and maintenance (O&M) plan.*
- 7 *Refers to progress reporting of Package BWDB-S5 consultant activities to support implementation of institutional reforms, which include work on organization set-up, skills mix, and dissemination of information on reforms.*
- 8 *Progress reporting will include implementation of recommendations in the approved Final Report on Strengthening of Water Resources Planning Organization (WARPO) Organizational and Institutional Development and those in the organizational development plan that the WARPO Board has approved.*
- 9 *Flood damage rehabilitation (FDR) works are categorized as: length of embankments (km), water control structures (n), and length of protection works (km).*

WMO: water management organization; NA: not available; HRD: human resources development.

A more-detailed description of the achievement of intermediate outcomes is given below.

Component 1: System Improvement and Management Transfer

The revised target of forming 409 WMGs and 35 WMAs has been completed. One hundred four LCS groups were formed in 32 schemes, and the work is complete. Under this component, 178 km of embankment has been reconstructed or repaired, 263 km of canal has been re-excavated, and 135 hydraulic structures have been repaired or reconstructed. All physical projects were completed in accordance with their designs and specifications and are serving their purpose, particularly in terms of safety and opportunities to earn additional income, given the availability of water after rehabilitation.

Component 2: O&M Performance Improvement

The revised target of forming 376 WMGs and the original target of 37 WMAs were achieved; 67 LCS groups were formed. Under this component, 115 km of embankment was reconstructed or repaired, 100m of canal was re-excavated, and 126 hydraulic structures were repaired or reconstructed. WMGs started operation of their FCD and FCDI structures and minor maintenance work. In some cases, WMGs also used their own resources for larger repairs. The groups have effectively organized their members for the operation of sluice gates and regulators and, regarding maintenance, for the clearing of water hyacinth from channels and regulators, repairing rain cuts, removing trees from embankments where necessary, and other minor maintenance work.

Achievement under components 1 and 2

Participatory Scheme Management: At project closing, 785 WMGs and 72 WMAs had been formed in the 67 schemes financed under the project. Beneficiaries in 32 schemes under Component 1 and 35 schemes under Component 2 have been organized into WMOs. The WMOs were formed with the goal of sustaining participatory irrigation management in BWDB schemes. WMAs, the apex body of the WMGs at the scheme level, represent the WMOs. The assessments proved that PSM is the way to move for sustained water resources management, and the progression of steps has been deemed appropriate, but WMOs have yet to fully raise and provide funds for O&M, and in the case of larger repairs after disasters, BWDB will fund the larger part of the expense, although the portion of the BWDB budget allocated and from which large-scale O&M is funded is far less than the needs of. No regulations have been established governing the costs that the BWDB and the concerned WMO would each pay in the event a large-scale rehabilitation is needed.

Legal WMOs established: The WMOs and WMAs were functioning effectively by having regular meetings and more frequently in the case of O&M, maintaining meeting minutes, and sharing information. Community members had a strong understanding of the rationale behind PSM and took solid ownership of their schemes. WMG executive committees were selected democratically, through elections by members or by agreement among them on which members should be on the committees. Overall, the WMOs were relatively free of negative political interference or “elite capture.” Training and education of farmers regarding the project’s objectives, scheme co-management, the rationale behind these, and the capacity building of the WMOs to manage their responsibilities was the main factor behind the development of successful WMOs and community commitment to PSM. Partner nongovernmental organizations (NGOs), Centre for Geographic and Environmental Services, and BWDB used a variety of methods of outreach to community members and, over the course of numerous meetings, motivated them to take ownership of their schemes and organized them into WMGs. The training that WMGs received, in financial and organizational management and on technical matters related to O&M, led to more-capable WMOs, and the

communities and the BWDB regarded them as successful. Registration of WMOs and the official transfer of O&M to them played a strong role in having them take the lead. Establishment of the monitoring committees enabled WMOs to officially check and approve the quality of work of contractors and report to the BWDB if necessary with issues.

Quality of works: The quality of the earth works that the communities performed was better than that of the contractors. Local BWDB officials who recognized that WMOs required less monitoring because they are more accountable to their members to perform the work well corroborated this. On that basis, more earth projects might be awarded to the LCSs instead of the contractors. Monitoring committees, which are a part of each WMO, were instrumental in bringing the shortcomings to the attention of local BWDB officials and, in some instances, a solution as well, but the extent to which they could improve the work varied, depending largely on the responsiveness and support of the local BWDB office.

WMOs contributed to livelihoods improvement in their communities. The project brought income benefits from livelihood or employment activities that the WMOs promoted in their communities. Most of the WMOs used their funds to provide microcredit to households. Beneficiaries used microcredit loans, savings schemes, and income from employment on earth projects to raise poultry, small livestock, and vegetables and to start household industries. The economic benefits from employment on earth projects was an important reason for communities to engage in PSM, and the work played an important social role by providing income to the poorest families. For Polder 55/2A and the Muradia Kalagachia schemes in the south, employment was provided for 120 families in each case and for 20 to 25 and 45 to 50 days, respectively. Many WMOs have requested that the labor allocated for LCSs on schemes under the project be increased from the current 25 percent to 50 percent or higher, but the process for paying workers for LCS work was cumbersome according to a wide range of stakeholders, which delayed payments, which was difficult for poor households.

Agricultural benefits of scheme rehabilitation: Final evaluations of FCD and FCDI schemes and the PSM approach showed that damage to crops from flooding was substantially reduced. Positive effects have been recorded from beneficiary farmers in agricultural production and other livelihood activities, including increased productivity from drainage and flood control and irrigation at least up to one metric ton per hectare; diversification into higher-value rabi crops, such as chiles, wheat, groundnuts, potatoes, mung beans, other vegetables, and mangoes; production of fish in areas which had been washed out from floods in the past; and livestock keeping and fodder production.

Component 3: Institutional Improvement

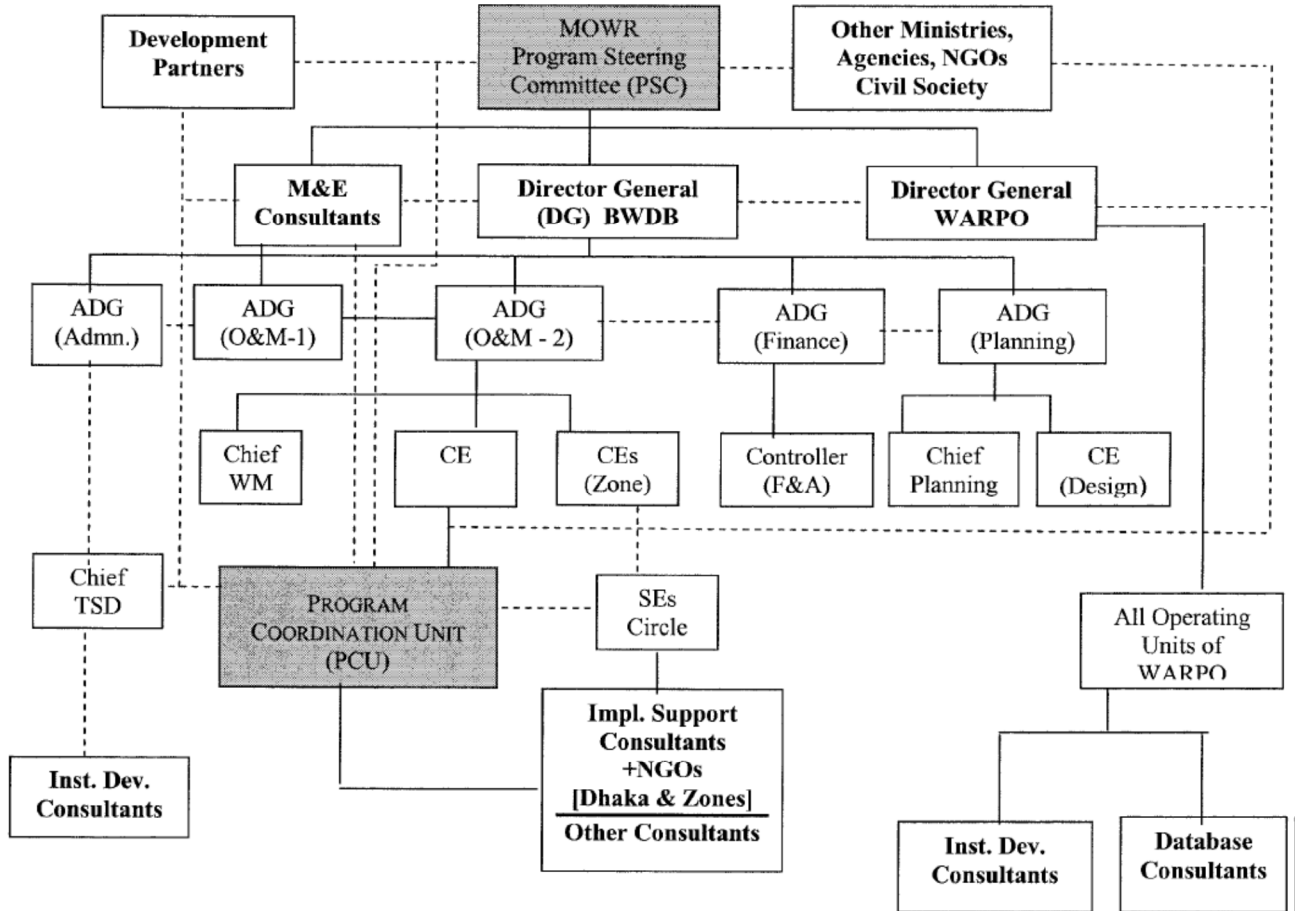
This component supported BWDB, WARPO, and PCU for improvement of the organizations. It also supported modernization and computerization of human resource management, the BWDB project monitoring and management system, strengthening of the BWDB geographic information system cell, and modernization of hydraulic monitoring. Training was arranged on computer skills for BWDB officials at all levels. The component also supported updating of the national water resources database for WARPO and of the National Water Management Plan. Twenty-one thousand fifty-eight staff members were trained in local training institutes and venues in Bangladesh, and 475 persons underwent training abroad in disciplines such as engineering, accounting, auditing, computer, procurement, and human resources.

Component 4: Flood Damage Rehabilitation

This was an added component following the restructuring under which the embankment and hydraulic structures that Cyclone Sidr damaged in November 2007 and Cyclone Aila in May 2011

were repaired. This work covered 25 districts all over Bangladesh in 61 schemes and was performed under 90 contracts. Major rehabilitations were in a hard point along the river Brahmaputra (Jamuna) at Sirajgonj, revetment work at Katubdia island sea dike, and river slope protection work and repair of a 20-vent sluice gate at the coastal belt (Bagerhat). The infrastructures under this component were 422,773 km of embankment, 42,119 km protective works, 69 Water Control Structures, and 21 repaired Water Control Structures. The interventions covered approximately 503,000 hectares .

Annex 3. Organizational Chart for Water Management Improvement Project



Legend: Normal: Permanent Units within BWDB/WARPO; Shaded: Temporary unit/committee; **Bold**: Consultants/community or support organizations; ADG: Additional Director General; CE: Chief Engineer; F&A: Finance and Accounting; SE: Superintendent Engineer; TSD: Training and Staff Development; WM: Water management

Annex 4. Economic and Financial Analysis

Background

The project originally had three main components: System improvement and management transfer rehabilitation of approximately 102 existing FCD and FCDI schemes and transfer their management to the local communities through WMOs; O&M performance improvement of approximately 98 existing FCD and FCDI schemes that did not require major rehabilitation and had functioning WMOs; and institutional improvement of BWDB and WARPO, the two national government institutions that manage national water resources and support the program coordination unit for implementation and for M&E.

The project was restructured in 2011 to reallocate funds across components; finance FDR works to BWDB schemes affected by cyclones Sidr and Aila; and reduce the project target of 200 schemes, which was considered too ambitious and given the slow implementation start. The target was reduced from 102 to 32 schemes for Component 1 and from 98 to 35 schemes for Component 2, for a total of 67 schemes, while under Component 4 a total of 61 schemes were added for flood damage rehabilitation and the budget was revised from US\$136.7 million to US\$123.26 million.

The economic and financial analysis was performed at appraisal and estimated the economic poverty, and fiscal effects. The likely primary benefits were:

- increases in agricultural production and incomes due to a reduction in crop damage and losses; better drainage and flood management; expansion of irrigation in FCDI schemes; changes in cropping patterns; and greater cropping intensity—benefits that would be realized from improvements and rehabilitation of FCD and FCDI facilities and improved O&M of these structures
- increases in production in capture fisheries due to the introduction of measures to mitigate adverse effects on fish migration patterns because the net effect on capture fisheries and better drainage and flood control could also reduce the size of water bodies
- increases in fish production in culture fisheries
- reductions in loss of life and property damage
- increases in employment opportunities due to reductions in crop damage and increases in agricultural production
- increases in safety and reductions in disruption of economic and social activities
- improvements in management of water resources by strengthening institutional capacity of key water sector institutions (BWDB, WARPO, WMOs)
- increases in empowerment and self-reliance of communities

The main costs related to rehabilitation of FCD and FCDI schemes included construction and engineering costs; scheme management, implementation, and O&M costs; and costs for land acquisition and compensation for property, which was expected to be minimal because no new schemes were foreseen under the project.

Economic Effect

At appraisal, the ERRs for a sample of schemes to be improved were well above the opportunity costs of capital (12%). The estimated average ERR was 29.5% (range 14.8–32.2%) for FCD schemes to be covered under Component 1 and 48% for all FCDI schemes to be covered under Component 2; and Component 3 (institutional improvement of key water sector institutions) was

expected to yield many positive externalities not quantified in the analysis. Benefits were based on quantification for a sample of four schemes, including only increases in agricultural production arising from reductions in crop damage, increases in cropping intensity, and shifts in cropping patterns and increases in shrimp and salt production in a coastal polder scheme. Because of lack of adequate historical data on loss of life and damage to or loss of property, these benefits were not quantified even though it was expected that they would be substantial in coastal areas, which are highly susceptible to cyclones and storm surges.

At closing, the project had successfully improved the water management structures of the 67 schemes targeted at project restructuring under Components 1 and 2 and 61 schemes implemented under the added fourth FDR component. The rehabilitation of irrigation, drainage, and riverbank protection infrastructure has improved an area of approximately 800,579 hectares, reaching a population of approximately 9.5 million. Project coverage was spread in 43 districts and 119 subdistricts.

The FAO conducted an independent evaluation to assess the results of the PSM project approach⁴. Based on field-level observations, the FAO report provided its assessment using a mix of qualitative and quantitative evidence, with greater reliance on the former given the nature of the issues being examined. The conclusions clearly indicate that the future direction of water management in the country must involve local communities. Community ownership was found to be strongest where the agricultural benefits made possible from scheme rehabilitation were significant.

The results for the indicators designed to measure the achievement of the project's outcomes show that the damage to crops from flooding was substantially reduced and that production increased. Complementing this data and presenting an even more positive picture is the information gathered from farmers on the effects of the WMIP on their agricultural production and other livelihood activities. The FAO assessment found that "gains to production from improved drainage and flood control and irrigation have been significant if not tremendous".

Most of the schemes that the FAO team visited for the evaluation were of the FCD type, and in all the zones, the improved flood control and drainage enabled at least an additional ton of production per hectare. The benefit was primarily to Aman rice cultivation, which waterlogging and damage had prevented on approximately half of the land, for example, in the Muradia Kalagachia polder in the south⁵. Across the zones visited, better flood control and drainage has also allowed the cultivation of other, higher-value rabi crops such as chiles, wheat, groundnuts, potatoes, mung beans, other vegetables, and mangos and has led to higher production of fish, which had been washed out from floods in the past. Livestock keeping and fodder production have also been made possible.

The benefits from repaired irrigation systems have been equally positive. The excavation of channels and other repairs has increased irrigation coverage for Boro winter-season rice and

⁴ A nonrandom sample of FCD and FCDI schemes was selected to assess the WMGs and their adoption of participatory management. Because of time and resource limitations, not all of the zones could be visited. The focus was therefore on schemes with higher poverty levels, the tendency to flood or be prone to drought, and the highest number of schemes under the project.

⁵ In the schemes surveyed in this zone, production was originally 0.5 to 2.1 tons/ha and has increased to 2.5 to 3.2 tons/ha. The increase was the same in the north. In the Boka Beel and Suktajuri schemes in the central zone, the combined FCD and FCDI benefits from rehabilitation and O&M have increased from 3.2 ton/ha to 6.4 ton/ha.

reduced the cost for farmers because they had previously been dependent on groundwater, which is expensive. Surface water is also preferred because it contributes to soil fertility. In the northwest zone schemes, where Boro rice production has remained the same at 5 to 6 tons/ha, the gain has been in increased water savings, but in the other zones, Boro rice production has increased as well—in the south's Padri Shibpur scheme to 4.9 tons/ha from almost nothing. As in the case of FCD repairs, increased irrigation and the availability of water in channels and ponds has made the production of other Rabi crops possible. Sunflower, maize, and watermelon crop outputs in the southern schemes have doubled. Gains have also come from better farmer management of flood control and irrigation; in the northwest, mango orchards made possible from decreased flooding are also irrigated during the dry season, which has increased production by 50%.

The ERRs at closing were estimated based on a sample of 10 schemes representative of the 128 schemes financed under the project: seven schemes representing the main regions covered under Components 1 and 2 and the other three schemes financed under Component 4. The subprojects in the selected sample are detailed below (table A4.1).

Table A4.1. List of selected schemes for the implementation completion report analysis

Hydro-Region	Scheme	Type	BWDB Region	Benefitted area (hectares)		Investment cost (BDT million)	
				Gross	Net	Estimated	Actual
Dhaka	Katakhali khal	FCD	Central Zone, Dhaka	2,665	2,225	29.21	14.16
Chittagong	Sonaichari	FCDI	Northeastern Zone, Comilla	5,603	4,321	67.16	47.7
Dhaka	Kalkini North	FCDI	Midwestern Zone, Faridpur	3,846	3,077	42.89	23.48
Shylhet	Sharif pur	FCD	Eastern Zone, Shylhet	1,822	1,170	39.18	37.93
Rangpur	Barabeela beel	FCDI	Northern Zone, Rangpur	1,020	817	14.12	4.89
Chittagong	Hangor khal	FCDI	Southeastern Zone, Chittagong	4,200	2,500	31.57	21.62
Rajshahi	Morichardar	FCD	Northwestern Zone, Rajshahi	9,205	6,715	103.42	63.61
Rajshahi	Rehabilitation of Sirajganj Hard Point	FDR	Northwestern Zone, Rajshahi	-	-	803.42	793.52
Chittagong	Rehabilitation of Polder 71 (Kutobdia)	FDR	Southeastern Zone, Chittagong	-	-	521.33	668.97
Dhaka	Rehabilitation of Dhaleswari left bank	FDR	Central Zone, Dhaka	-	-	75.13	75.16

FCD: flood control and drainage; FCDI: flood control, drainage, and irrigation; FDR: flood damage rehabilitation. Areas are gross scheme area.

Main assumptions for the ICR analysis: The assumptions for estimating the economic benefits for the FCD, FCDI, and FDR schemes are summarized below.

- A project life of 25 years was assumed for all schemes.
- All costs and benefits were valued at 2016 prices. Investment costs were expressed in 2016 values by adjusting actual expenditures using the Consumer Price Index provided by the Bangladesh Bureau of Statistics.
- Financial prices on project investments, nontraded goods, and services have been adjusted to express economic prices using a standard conversion factor of 0.902, in accordance with recent Bank projects in Bangladesh. Farm labor was corrected using a conversion factor of 0.75.

- For each FCD, FCDI, and FDR scheme in the sample, rehabilitation and improvement economic costs were the actual costs incurred adjusted using the Consumer Price Index and the standard conversion factor.
- O&M costs for individual schemes were assumed to follow a regime involving routine maintenance every year costing BDT 900/ha and BDT 300/ha for engineering and administration costs.
- Crop production models for each of the schemes were estimated using FARMOD software. Overall cropping patterns and inputs used were based on data obtained from the respective subdistrict officials in each of the project areas.
- In spite of the significant yield and production increases that the FAO team observed for the “without” rehabilitation scenario, in line with the appraisal assumptions, estimation of the production of all rice crops was decreased by 2% per year (as compared with the present scenario) in the third, fourth, and fifth years, assuming increases in crop damages because protection structures were not functioning to their design standards, whereas in the “with” rehabilitation scenarios, production was maintained constant at 2015/16 levels.
- Information on rice crops (yield and cropped area) was collected from the field offices. No changes were assumed for other crops (in yield or cropped area) due to project improvements.
- The implementation period for each FCD and FCDI scheme was two years, including all of the project’s interventions.
- The project field offices estimated benefits from FCD schemes based on the estimated value of a list of affected properties that the project structure improvements were protecting. These benefits were expressed as damages avoided annually by rehabilitation of the flood protection structures.

As mentioned above, even though the FAO assessment concluded that *the results for the indicators designed to measure achievement of the project’s outcomes show that the damage to crops from flooding was substantially reduced and that production increased; most of the schemes visited for the evaluation were of the FCD type, and in all the zones, the improved flood control and drainage enabled at least an additional ton of production per hectare; and the benefits from repaired irrigation systems have been equally positive*, for this ICR assessment, the quantification of benefits conservatively assumed that the rehabilitation of FCD and FCDI schemes resulted in avoiding only a 6% reduction in rice yields (approximately 200–300 kg/ha).

Scenarios “without” and “with” rehabilitation of structures were prepared for each of the seven sampled FCD and FCDI schemes. The ICR analysis was performed using FARMOD software. Detailed tables for each scheme are available in the project files, including output and input financial and economic prices used for the analysis, financial and economic crop budgets for the main crops in each scheme area, cropping patterns in the respective scheme’s benefitted areas, and financial and economic costs and benefits for each scheme. Results estimated for the seven FCD and FCDI schemes sampled and for the three FDR schemes sampled are presented in table A4.2. The weighted average ERR was estimated at 30.3% for the FCD and FCDI schemes and 24% for the FDR schemes.

Project efficiency is considered to be substantial. For expansion of results to the overall project at closing, the addition of costs and benefits that the seven FCD and FCDI schemes sampled incurred and generated, costs and benefits were increased by a factor of 5.76 and those for the three FDRs sampled by a factor of 2.71, to express the amounts invested in each type of scheme. All supporting project costs for communities’ mobilization and institutional strengthening of water agencies were added to the expanded costs and benefits to account for all project costs. *Under this minimalist*

scenario (table A4.2), the ERR of the overall project was estimated at 22%, and the net present value (with 12% discount rate) at BDT 5.65 billion (US\$72.4 million).

Table A4.2: Summary of Economic Analysis

Scheme			Investment	Operations and maintenance, per year	Benefits, per year	Economic rate of return	Net present value (12% discount rate)	Benefit-cost ratio
			(in million 2016 BDT)			(%)	(in mill 2016 BDT)	
1.	Barabeela Beel	FCDI	5.27	0.99	5.76	45.3	21.2	4.19
2.	Hangor Khal	FCDI	21.93	3.82	14.54	28.5	37.0	2.47
3.	Kalkini North	FCDI	25.30	3.75	17.57	32.8	53.5	2.18
4.	Katakhali Khal	FCD	15.27	2.60	17.74	55.0	74.3	3.52
5.	Moricher Dala	FCD	64.51	8.38	37.51	29.5	103.6	1.97
6.	Sharifpur	FCD	38.47	1.66	12.66	22.0	29.6	1.69
7.	Sonaichari	FCDI	48.38	5.10	24.13	25.1	59.7	1.81
Seven FCD and FCDI sample schemes			219.12	26.31	129.92	30.3	378.9	2.07
Other 60 FCD and FCDI			1,043.19	125.26	618.52	30.3	1,803.8	2.07
Total 67 project FCD and FCDI schemes			1,262.31	151.57	748.44	30.3	2,182.7	2.07
8.	Dolshari	FDR	92.29	2.30	31.00	25.2	94.8	2.41
9.	Kutubdia	FDR	702.95	17.57	238.66	22.3	458.8	2.93
10.	Serajganj Hard Point	FDR	933.12	23.33	328.80	24.8	901.2	2.68
Three FDR sampled schemes			1,728.36	43.20	598.46	24.00	1,455.0	2.36
Other 58 FDR schemes			2,786.80	69.66	964.95	24.00	2,346.1	2.36
Total 61 project FDR schemes			4,515.16	112.86	1,563.41	24.00	3,801.1	2.36
All other project costs			1,902.75	-	-	-	1,849.2	-
Overall water management improvement project (weighted average)			7,680.22	264.43	2,311.85	22.0	5,650.3	1.70

Notes: Weighted average was estimated based on the project investments that each type of sampled scheme represented.

FCD: flood control and drainage; FCDI: flood control and drainage and irrigation; FDR: flood damage rehabilitation.

A sensitivity analysis of deviations from the base case assumptions used for the quantification of benefits shows that the ERR of the project is robust. A 25% reduction in benefits that could result from the avoided damages in crops and assets shows that the ERR is still above the opportunity cost of capital because the ERR would be 16.3%, and the net present value would be 2.21 BDT billion (US\$28.3 million).

In addition to the quantified benefits, the FAO evaluation concluded that a series of income benefits that the project brought (not foreseen at appraisal) are being generated from livelihood and employment activities that the WMOs promoted and are being developed in their communities⁶.

⁶ The interest in diversified, improved income-generating activities was a theme the FAO assessment groups returned to repeatedly in the field assessment meetings. When asked whether training that the project provided for WMG management was sufficient, all of the interviewee groups stated that the training of most interest to them was for livelihood activities: high-value agriculture, fisheries, marketing, and other areas.

Some of these benefits were unrelated to the FCD and FCDI schemes and included households that were unable to benefit directly from the rehabilitation works. The WMOs went beyond their role as defined according to the project and became instrumental for local rural development more broadly. Although WMOs were to raise membership funds for the purpose of scheme maintenance and repair, they also have tended to regard the resources raised as more of a means to assist community members in establishing income-generating activities than to use only for scheme maintenance. In most of the areas that the FAO team visited, the WMOs are using their funds to provide microcredit to households, particularly the more-disadvantaged ones in the community. Beneficiaries have been able to initiate a wide variety of income-generating activities, and many of the recipients have been women. They have used microcredit loans, savings schemes, and income from employment on earth projects to raise poultry, small livestock, and vegetables and to start household industries, although this ICR could not quantify these benefits because the data were not collected.

The effect on poverty of the project is considered to be substantial. Floods affect all facets of life in rural Bangladesh through significant crop losses, damaged or destroyed homes and other durable assets, loss of employment and wages, and disrupted transportation networks. Coupled with reduced access to safe water and sanitation facilities, floods affect household food security, health, and nutrition. Completion of the rehabilitation projects in 128 schemes and the improved O&M under the participatory scheme management that the project introduced is having a considerable effect on reduction of rural poverty in the improved areas. It is estimated that 9.5 million people have benefited. Effects of floods are usually much larger on poorer households than on those that are not -poor because they have fewer assets, and losses are always higher as a proportion of preflood asset values than for wealthier households.

Other income benefits that the project brought to poorer households were those from new livelihood or employment activities that the WMOs promoted in their communities. The FAO assessment indicates that the WMOs have also been active agents for poverty reduction in their management of the LCSs under them by employing individuals in the community on scheme rehabilitation earth projects. According to all the WMOs surveyed, WMOs prioritized the poorest households in filling available positions. Although it may be expected, according to the logic of WMO creation, that WMOs would provide employment to their paying members, based on an apparent sense of social responsibility and wish to see the whole community benefit they are acting to assist individuals who could not afford to be organization members. The economic benefits from employment on earth projects have served as an important reason for communities to engage in PSM, and the work has played an important social role by providing income to the poorest families.

Annex 5. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team Members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Masood Ahmad	Lead Water Resources Specialist	ECSSD	
S.A.M. Rafiquzzaman	Co-TTL (Irrigation Engineer)	SASRD	
Mohinder S. Mudahar	Task Team Leader (Economic Adviser)	SASRD	
Ohn Myint	Irrigation Engineer (Consultant)	SASRD	
Mona Sur	Economist	SASRD	
T.K. Balakrishnan	Senior Financial Management Specialist	OPCFM	
T. K. Barua	Sociologist (Resettlement)	SASES	
Shankar Narayanan	Senior Social Development Specialist	SASES	
Yuka Makino	National Resource Management Specialist	SASES	
Zafrul Islam	Senior Procurement Specialist	SARPA	
Burhanuddin Ahmed	Senior Financial Management Specialist	SARFM	
Shakila Parvin Khan	Program Assistant	SASRD	
Tarak Chandra Sarker	Team Assistant	SASRD	
Nadia Islam	Program Assistant	SASAR	
Kishor Uprety	Legal	LEGMS	
Chau-Ching Shen	Loan	LOAG2	
Supervision/ICR			
Manievel Sene	Sr. Agriculture Specialist	GFADR	
Masood Ahmad	Lead Water Resources Specialist	SASDA	
Tahira Syed	Sr. Rural Development Specialist	GFADR	
Burhanuddin Ahmed	Sr. Financial Management Specialist	SARFM	
Muhammad Ali	Consultant	SARPS	
Shakil Ahmed Ferdausi	Senior Environmental Specialist	SASDI	
Tanvir Hossain	Senior Procurement Specialist	SARPS	
Mainul Husain Khan	Consultant	SASFP	
Fabio Pittaluga	Senior Social Development Spec	LCSSO	
S. A. M. Rafiquzzaman	Consultant	SASDA	
Tarak Chandra Sarker	Program Assistant	SASDO	
Anthony Nihal Fernando Warnakulasuriya Alagappag	Sr. Water Resources Mgmt. Spec.	AFTA2	
Winston Yu	Sr. Water Resources Spec.	ECSAR	
Ishtiak Siddique	Sr. Procurement Specialist	GGO06	
Arvind Prasad Mantha	Sr. Financial Management Specialist	GGO024	
Rafiqul Islam	Consultant	GSU18	
Pabithra Nathan	Consultant	GSU18	
Mohammad Sayeed	Consultant	GEE06	
Jinia Sultana	Program Assistant	SACBD	

(b) Staff Time and Cost

Stage of project cycle	Staff time and cost (Bank budget only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY96		6.96
FY97		46.22
FY98		35.09
FY99		65.13
FY00		106.41
FY01		56.73
FY02		24.71
FY03		169.36
FY04		280.02
FY05		65.08
FY06		50.54
FY07		89.43
FY08		22.20
Total:		1017.88
Supervision/ICR		
FY96		0.00
FY97		0.00
FY98		0.13
FY99		3.08
FY00		-1.86
FY01		0.00
FY02		0.00
FY03		0.00
FY04		0.00
FY05		0.00
FY06		0.00
FY07		0.00
FY08		31.77
Total:		33.12

Annex 6. Beneficiary Survey Results

FAO conducted the beneficiary survey. The evaluation used a mix of qualitative and quantitative evidence, with greater reliance on the former given the nature of the issues being examined. For assessment of the WMGs and their adoption of participatory management, a nonrandom sample of FCD and FCDI schemes was selected, with the focus on those with higher poverty levels, the tendency to be prone to floods and droughts, and the most schemes under the project.

Five of the seven zones that the project covered were selected in the north, northwest, center, south, and southeast. These five zones contain more schemes. In each zone, four schemes were selected—two each for Components 1 and 2 of the project. The schemes were selected to achieve an appropriate balance between FCD and FCDI schemes and small (<5,000 hectares), medium (5,000–10,000 hectares) and large (>10,000 hectares) schemes.

In-depth group meetings, using a structured set of questions, were held with the WMGs of each scheme. The groups consisted of approximately 20 individuals and included WMA members, executive committee representatives from all WMOs under the WMA, and WMO members, for a total of 412 WMO members.

Small groups of farmers who were not members of any WMOs also met so that their reasons for not participating, which could shed light on how to make PSM more attractive to small farmers and expand it to other areas could be understood, and with engineers and extension staff from local BWDB offices.

Based on field-level assessment, the evaluation found that, overall, the project built significant community commitment to PSM. The formation of WMOs for each scheme began through extensive formal and informal communication and educational efforts, begun by partner NGOs and the Centre for Environmental and Geographic Information Services and later followed up by BWDB, on the aims of the project and the rationale behind establishing WMGs. In field-level discussions, WMG members reported that they understood fundamentally what WMIP was seeking to achieve and what it entailed in terms of community responsibility. The project partners and BWDB primarily motivated the communities to form WMOs by trying to convince them that the project and schemes were theirs to own.

Annex 7. Stakeholder Workshop Report and Results

PCU and BWDB organized a workshop for stakeholder on completion of the project on October 17, 2016 in the BWDB conference room. The Assistant Director General (Eastern Region) of BWDB chaired the workshop, which the bank Task Team attended. The findings of the workshop are summarized as follows:

Shahid Ahmed Babul, President Sonaichari Khal WMA, Comilla

WMO President Mr. Shahid Ahmed Babul, stated that formation of the WMA and handing over management of the schemes to them has benefited them.

He informed the meeting that they received necessary training regarding O&M monitoring of the schemes. Accordingly, they have monitored the work of their scheme better than before. He also indicated that the quality of earthwork that LCS has implemented is better than that of the contractor. The spoil earth of the re-excavated canals and khals dumped at far distance.

They would like more involvement of LCSs in earthwork. WMA members removed water hyacinth of their schemes spontaneously. They have deposited BDT 18.00 lakh in their savings fund and distributed part of it as loan to their members for fish culture and poultry farming. This will contribute in raising their fund. They opined to get lease of unused BWDB's land and borrow pits.

Mr. Md. Abdur Razzaq, President Sutia WMA, Mymensingh

The WMA president informed the meeting that they had previously been unable to solve the problem related to the management of the schemes themselves.

They feel they are well organized after formation of the WMA and are now able to solve the field problem and also inform the BWDB if any problem arises that is beyond their capacity.

Because of insufficient manpower in the BWDB division office, BWDB could not perform emergency work in a timely manner during floods because most of projects were located far away. Under this circumstance, WMA may do the necessary works in case of emergency during any kind of natural disaster.

Mr. Md. Shariful Islam, President Sorial Embankment WMA, Gaibandha

The WMA president informed the meeting that they realize that they have role in O&M of the schemes. They were previously ignorant of such responsibility. This realization comes after transfer of the management of schemes to their WMA. The WMA representatives have been elected democratically. They have deposited BDT 4.00 lakh in their WMA, and they are now thinking of giving micro credit to WMA members, increasing their fund.

Annex 8. Summary of Borrower's ICRR and Comments on Draft ICRR

Executive Summary

Name of Project	: Water Management Improvement Project
Administrative Ministry/Division	: Ministry of Water Resources
Executive Agency	: Bangladesh Water Development Board and Water Resources Planning Organization

Background

The government has adopted a new approach to water management based on past experience. The main elements of this approach are to reform and strengthen key institutions, particularly BWDB and WARPO; ensure community participation at all stages of water management projects; minimize adverse effects of water sector interventions on fisheries; and use existing facilities in environmentally sustainable ways through rehabilitation and effective O&M, including transfer of management of FCD and FCDI schemes to WMOs to improve efficiency in water use and sustainability of schemes. The participatory water management approach has been implemented in some BWDB schemes, but widespread implementation of the approach has not been possible because of resource constraints. In addition, the reform process and capacity development of key water sector institutions could not be implemented as expected. Under the circumstances, the WMIP was expected to serve as an anchor for participatory water management in Bangladesh on a wider scale, focusing on institutional reforms that would mainstream best practices of water resources management in Bangladesh.

Objective of Project

The objective of the project is to improve water resources management by improving infrastructure and institutions through rehabilitating damaged water infrastructure, encouraging the role of local communities, and enhancing the institutional performance of the country's principle water institutions, particularly BWDB and WARPO. This is expected to result in less vulnerability and greater livelihood opportunities for beneficiaries and will also create a favorable environment for better water resources management by the core water institutions in partnership with the beneficiaries and change a centralized top-down approach to a more-decentralized, participatory water sector management approach for efficient and sustainable operations and management of existing FCD and FCDI schemes.

Location of Project

The project covers 128 completed FCD and FCDI schemes of BWDB in 119 subdistricts under 43 districts throughout the country; 67 of these schemes have been completed under Components 1 and 2 and 63 schemes under Component 4 (FDR 2007). The schemes were selected from eight BWDB zones with a command area ranging from 1,000 to 15,000 hectares. The total command area of 128 schemes is 801,000 hectares.. Of these command area, 125,000 hectares was for system improvement and management transfer,; 1,73,000 hectares related to O&M performance improvement, and 503,000 hectares were under FDR 2007.

Implementation Period

The Executive Committee of the National Economic Council (ECNEC) approved the original DPP of WMIP in August 2005 at a cost of BDT 97,585.75 lakh. The DPP had undergone its first revision in May 2007. Implementation of WMIP started after 2009. The second revision of the DPP took place in June 2012, and ECNEC approved the third revision in August 2015 at a cost of 81,595.11 lakh, of which the government accounted for 7046.70 lakh and reimbursable project aid 74,548.41

lakh. According to the last revision of the DPP, the credit closing date of the project was June 30, 2016, and the project closing date was December 31, 2016.

Financing of the Project

The government of Bangladesh, the World Bank, and the government of the Netherlands cofinanced the project. The ECNEC originally approved the project in August 2005 at a cost of BDT 97,585.75 lakh, which included a government fund of BDT 29,105.70 lakh and reimbursable project aid of BDT 68,480.05 lakh. The ECNEC approved the final amount on March 6, 2016, at a cost of BDT 8,1595.11 lakh, which included a government fund of BDT 7,046.70 lakh and reimbursable project aid of BDT 74,548.41, including the Dutch contribution of BDT 2,093 lakh.

Project Components

The project takes a new approach to water resource management, with stakeholder participation and implemented through the following four components.

Component 1: System Improvement and Management Transfer

The objective of this component is to rehabilitate schemes that require major rehabilitation and repair work. This component supports rehabilitation and improvement of 32 existing medium and large completed FCD and FCDI schemes of BWDB covering approximately 125,000 hectares. Under this component, work has been successfully completed for construction and reconstruction of 192,200 km of embankment, excavation of 264,503 km of khal, construction of 59 WCSs, and repair of 78 WCSs. LCS has executed some of the work. Management of all the schemes under these components has been transferred to the WMA.

Component 2: O&M performance Improvement

The objective of this component is to ensure maintenance and functioning of schemes that require minor rehabilitation or repair work and have functional WMOs. This component supports measures to improve O&M performance of 35 existing medium and large completed FCD and FCDI schemes of BWDB covering an area of approximately 173,000 hectares. Under this component, construction and reconstruction of 121,116 km of embankment, excavation of 100,645 km of khals, construction of 53 WCSs, and repair of 85 WCSs have been completed at a cost of BDT 4,088.36 lakh. Management of these schemes has been transferred to the WMA.

Component 3: Institutional Improvement

This component supported the institutional improvement of BWDB and WARPO, which are the two major national institutions that manage the nation's water resources. The component would also contribute to institutional improvement and human resources development. Under this component, 21,058 persons were trained in local institutes and venues in Bangladesh, and 475 underwent the foreign training in different disciplines such as engineering, accounting, auditing, computer, procurement, and human resources.

Component 4: Flood Damage Rehabilitation (FDR-2007)

The component was incorporated to rehabilitate and repair part of the BWDB infrastructure damaged by flooding in 2007. Approximately 503,000 hectares benefited from this component. Construction and reconstruction of 422,773 km of embankment and 42,119 km of protective works, construction of 69 WCSs, and repair of 21 WCSs has been successfully completed at a cost of 45,038.55 lakh. The objective of this component is to ensure the sustainability of schemes that are functioning well.

Social Mobilization

The main purpose of social mobilization is to ensure sustainable O&M of BWDB FCD and FCDI schemes by involving local stakeholders through WMOs in all water-related activities. The project was conceived with a view to handing over management of the schemes to WMOs after rehabilitation. Eight hundred five WMOs (735 WMGs, 72 WMAs) have been formed for each schemes under Components 1 and 2 through engaging NGOs and Centre for Geographic and Environmental Services. All the WMAs have been registered under Participatory Water Management Rule 2016. Management of the schemes under Components 1 and 2 has been transferred to the WMOs. To enhance the capacity of the WMOs, the project provided training on organizational, financial, and environmental management and O&M for WMO members at the field level. In addition, a joint trial of O&M has been executed with BWDB field offices to provide on-the-job training to WMOs.

Compliance with Environmental and Social Safeguard Policy

WMIP was designed to address the requirements of environmental and social safeguard policies of Bangladesh and the World Bank. Exact locations, size, and extent of subprojects under WMIP were not known during the appraisal stage, so a framework approach has been adopted, and an environmental management framework has been prepared for conducting an environmental assessment and environmental management plan, and a resettlement policy framework has been prepared for conducting a social assessment under WMIP.

Schemes under WMIP were selected following such criteria as would minimize the adverse effects of WMIP activities on people and the environment, but in a few cases in which environmental and social issues were triggered, the issues were addressed following the guidelines of the environmental management framework and resettlement policy framework for WMIP. WMIP has been implemented in full compliance with the environmental and social safeguard policies set forth in the respective frameworks.

Funds and Expenditures

According to the third revised DPP, the total allocation for the project was BDT 81,595.11 lakh (government fund BDT 7,046.70 lakh, project aid BDT 74,548.41 lakh). Up to June 2016, a total amount of BDT 76,784.61 lakh has been used (government BDT 5,688.87 lakh, project aid BDT 71,095.74 lakh).

Achievement of WMIP

The main objective of WMIP was to develop a sustainable water management system in Bangladesh by improving infrastructure by rehabilitating damaged water infrastructure, piloting the role of communities; and enhancing the institutional performance of the country's principle water institutions, particularly BWDB and WARPO.

WMIP has successfully improved 67 schemes under Components 1 and 2 and 61 schemes under Component 4 (FDR-2007); 715 km of embankment has been constructed or reconstructed, 365 km of khals have been excavated or reexcavated, 166 hydraulic structures have been constructed, 179 hydraulic structures have been repaired, 42 km of protective work has been completed, and five foot bridges have been constructed under WMIP. Eight hundred seven WMOs have been formed, and management of all the schemes under Components 1 and 2 have been transferred to the respective WMAs. WMIP has rehabilitated a number of training centers in BWDB and provided local training for 21,958 staff and beneficiaries and foreign training for 475 BWDB and WARPO officers.

Annex 9. List of Supporting Documents

1. Project Appraisal Document
2. Aide Memoires and ISRs after implementation of support missions
3. Management letters after implementation of support missions
4. Bangladesh Country Assistance Strategy FY2006-09
5. Bangladesh Country Partnership Strategy FY2011-14 (extended to FY2015)
6. Bangladesh Country Partnership Framework FY2016-20
7. Bangladesh Country Investment Plan, 2011
8. Financial Management Manual
9. Environmental and Social Management Framework
10. Government project completion report
11. Annual reports of M&E consultant
12. Impact Assessment Report of M&E Consultant
13. Impact Evaluation of Participatory Scheme Management Component
14. Economic and Financial Analysis of FAO Consultant

MAP



