Project Administration Manual

Project Number: 45207
June 2014

Bangladesh: Irrigation Management Improvement Project (IMIP)

CONTENTS

Project Administration Manual Purpose and Process

The Project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with Government and Asian Development Bank (ADB) policies and procedures. The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The BWDB as the executing agency is wholly responsible for the implementation of ADB financed projects, as agreed jointly between the borrower and ADB, and in accordance with Government and ADB's policies and procedures. ADB staff is responsible to support implementation including compliance by the BWDB of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At Loan Negotiations the borrower and ADB shall agree to the PAM and ensure consistency with the Loan agreement. Such agreement shall be reflected in the minutes of the Loan Negotiations. In the event of any discrepancy or contradiction between the PAM and the Loan Agreement, the provisions of the Loan Agreement shall prevail.

After ADB Board approval of the facility's report and recommendations of the President (RRP) changes in implementation arrangements are subject to agreement and approval pursuant to relevant Government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval they will be subsequently incorporated in the PAM or subsequent Project Administration Manuals, if applicable.

Abbreviations

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
AFS	–	audited financial statements
CQS	–	consultant qualification selection
DMF	–	design and monitoring framework
EARF	–	environmental assessment and review framework
EIA	–	environmental impact assessment
EMP	–	environmental management plan
ESMS	–	environmental and social management system
GACAP	–	governance and anticorruption action plan
GDP	–	gross domestic product
ICB	–	international competitive bidding
IEE	–	initial environmental examination
IPP	–	indigenous people plan
IPPF	–	indigenous people planning framework
LAR	–	land acquisition and resettlement
LIBOR	–	London interbank offered rate
NCB	–	national competitive bidding
NGOs	–	nongovernment organizations
PAI	–	project administration instructions
FAM	–	facility administration manual
PIU	–	project implementation unit
QBS	–	quality based selection
QCBS	–	quality- and cost based selection
RRP	–	report and recommendation of the President to the Board
SBD	–	standard bidding documents
SGIA	–	second generation imprest accounts
SOE	–	statement of expenditure
SPS	–	Safeguard Policy Statement
SPRSS	–	summary poverty reduction and social strategy
TOR	–	terms of reference

I. PROJECT DESCRIPTION

1. The primary sources of water in Bangladesh are local rainfall amounting to about 250 cubic kilometers (km^3) annually and the trans-boundary inflows amounting to about 1,000 km^3 annually, derived mainly from the Brahmaputra, Ganges, and Meghna Rivers. Bangladesh occupies only 8% of the total drainage area of these rivers but is located at their downstream end. The result is an abundant excess of surface water during the summer monsoon months and water shortfalls in the winter dry months. The impossibility of developing dams' facilities prevents flow regulation throughout the year. Despite being scarce, water is not well managed. There is minimal attention to water use efficiency and equitable allocation. Many farmers rely on groundwater to supplement the limited and irregular surface water supplies. However, in many parts, the use of groundwater is significantly constrained by arsenic contamination and aquifer limitations. Consequently, the minimum flows required to meet total dry season demands are less than what is available from surface and groundwater. This is aggravated by the increasing competition for water among sectors including agriculture, domestic and industrial water use, navigation, fisheries, and conservation of natural eco-habitats. Possible changes in temperature and rainfall patterns due to global warming may also modify crop water requirements and water availability, and adversely widen the current gap between supply and demand.

2. **Performance of irrigated agriculture and large irrigation schemes**. In Bangladesh, 31.5% of the population was living below poverty line in 2010. Although agriculture's share of gross domestic product has declined, it is the primary economic sector in rural areas and provides 63% of rural employment. Bangladesh has a net cultivable area of around 8 million hectares (ha). About 5.3 million ha were irrigated in 2011–2012. The total rice production in Bangladesh in 2010–2011 was 33.5 million metric tons with 56% of the total being produced during the dry season.[1] Productivity of irrigated agriculture remains chronically low; paddy yields during the past 10 years average at 3.6 tons per hectare (t/ha).[2] The low land productivity is attributable to unreliable irrigation supply, inadequate agriculture extension services and poor access to farm inputs, markets and agricultural credit services. Around 550,000 ha or 11% of the total irrigated area is under large irrigation schemes.[3] However, only 46% of this area is currently irrigated during the dry season.

3. A major weakness that continues to plague the productivity of large irrigation schemes is the lack of efficient and sustainable MOM. In 2012, the average level of MOM cost recovery from the beneficiaries for three large scale irrigation projects; Muhuri Irrigation Project (MIP), Ganges Kobadak Irrigation Project (GKIP) and the Teesta Barrage Project (TBP) was 24%. The highest recovery was for MIP with 63% while TBP was at 18% and GKIP at 0.26%. As a consequence, the infrastructure of these schemes is degraded and needs rehabilitation and modernization. Other reasons include inadequate Government financing[4]; lack of beneficiary empowerment and engagement in MOM; and limited capacity of public agency resulting in weak service delivery. Specific issues are the: (i) inadequacy of budget[5] to support system MOM; (ii) lack of distinction between annual, periodic or emergency maintenance of a system; and (iii) poor cost recovery from the water management groups.

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1 2011. BBS. Yearbook of Agricultural Statistics, Chapter 2

2 Bangladesh Bureau of Statistic, yearbooks of agricultural statistics, 2003-2012.

3 Large irrigation schemes have command areas of 2,000 ha or more.

4 Government of Bangladesh fund provided for maintenance only meet about 50% of requirements for the 3 schemes.

5 For 2009–2010, budget was $126,000 against a demand of $710,000 and irrigation service charge was $12,000 against target of $430,000.

4. During the past 20 years, substantial efforts were made to improve irrigation MOM through introduction of participatory irrigation management (PIM). In Bangladesh, PIM proved generally successful on small and medium schemes but it has yielded limited results on large schemes. The variable performance of PIM in improving irrigation MOM is internationally documented and private sector participation through public private partnership (PPP) is seen as an alternative approach.[6] It has demonstrated promising results in few developing countries such as Brazil, Morocco and Ethiopia but is still to be developed in Asia. In 2009, the Asian Development Bank (ADB) provided a technical assistance (TA) to the Bangladesh Water Development Board (BWDB) to examine alternative approaches of service delivery agreements and management arrangements including PPP for sustainable irrigation MOM in large irrigation schemes. The TA proposed a conceptual framework for engaging a third party operator to address the shortcomings in MOM of MIP. It established the basis for the social and economic feasibility of the approach and confirmed farmer's willingness to pay.

5. The National Water Policy, adopted by the government in 1999, sets out a comprehensive framework for the water sector in general, and for large surface water irrigation schemes including a strategic vision comprising private irrigation MOM through leasing, concession, or management contracts. The government has well established an advanced policy, legal, institutional, and planning frameworks for the water sector in Bangladesh. These provide a suitable environment for driving the necessary reforms in the sector. The Water Act that was promulgated in May 2013 further revised and consolidated existing laws that govern the ownership, utilization and financial management of water.

6. The Sixth Five Year Plan, 2011–2015 recognizes the need to raise agricultural productivity, foster crop diversification, and boost public spending on rural infrastructure.[7] The Plan also presents a strategic direction for medium and large scale surface water irrigation. At its highest level, the strategy focuses on modernization and improved management of existing irrigation systems and expansion of the irrigation areas. To reduce public costs in sustainably operating these schemes and to improve delivery service, the strategy encourages use of PPP wherever appropriate. As part of an overall investment program for the water sector, the government has approved an investment plan to rehabilitate and modernize all large surface water irrigation schemes at an estimated total cost of $745 million. The project will support the implementation of the program by modernizing the infrastructure and MOM of the MIP including transfer of the MOM to private sector. The project will also finance the preparation of the modernization strategy including feasibility studies and detail designs of the Ganges-Kobadak (GKIP) and Teesta (TBP) irrigation projects.

7. The MIP construction was completed in 1986. The design enabled dry season irrigation as well as supplemental wet season irrigation by constructing the Feni Closure Dam and Regulator to create a reservoir downstream of the confluence of the Feni, Muhuri and Kalidash-Pahalia rivers. The backwaters from the barrage enter the natural channels (khals) and canal network by gravity. From there it was to be lifted to irrigate the fields by about 800 low-lift diesel pumps. The project was to increase the dry season rice area from about 6,000ha to 20,000ha. Initially, farmers experienced major improvement in production and were able to cultivate much larger areas with rice; however siltation of the reservoir and khals due to lack of maintenance

[6] Participatory Irrigation Management (PIM) has been used as the primary method of achieving Irrigation Management Transfer (IMT) so the terms IMT and PIM are used interchangeably.

[7] Government of Bangladesh, Planning Commission, Ministry of Planning. 2011. *Sixth Five-Year Plan, 2011–2015.* Dhaka

and reduction of river runoff in the river has reduced the benefit over the years. The area irrigated in dry season shrunk to 11,300 ha. Increase in diesel cost combined with low efficiency of the pumps and decrease in rice price further contribute to discourage farmers from cultivating. Opportunities to substantially increase water use efficiency and reduce pumping cost through innovative design modernization and improved MOM were identified during the project preparatory technical assistance and will be supported by the project.

8. The project impact will be sustained high growth in irrigated agriculture. The outcome will be increased productivity and sustainability of MIP.

9. The project has 3 outputs comprising:

(i) **Performance-based irrigation management and agriculture support services established.** This output will include contracting private irrigation management operators under 5 years performance-based management contracts. This "Construction phase" irrigation management operators (C-IMO) will supervise modernization works, establish sustainable MOM and provide agricultural support services in MIP. Efficient management systems will be adopted to maximize water use efficiencies and develop sustainable and reliable irrigation service delivery. Viable and effective operations and maintenance (OM) cost recovery mechanisms will be setup to achieve 100 % cost recovery. The objective will be to bring MIP scheme to the level of profitability and sustainability required for enabling the recruitment of a long term (15 years) "Management phase" irrigation management operator (M-IMO) through a PPP modality. The project will also support the preparation of the long-term PPP transaction.

(ii) **Irrigation system infrastructure rehabilitated and modernized.** This output will include physical rehabilitation and modernization of irrigation infrastructure including (i) repair of about 460 km of canals and 23 km of coastal embankments with ancillary facilities; (ii) development of about 17,000 ha of modern and highly efficient piped water distribution system to improve timely water access and reduce water losses; (iii) provision of prepaid card meters to allow water allocations to be based on a volumetric basis and ensure full and transparent payment and accounting, (iv) full electrification of the pumping to reduce the operational costs and increase management flexibilities and; (v) pilot solar panels and pumps for about 60 ha.

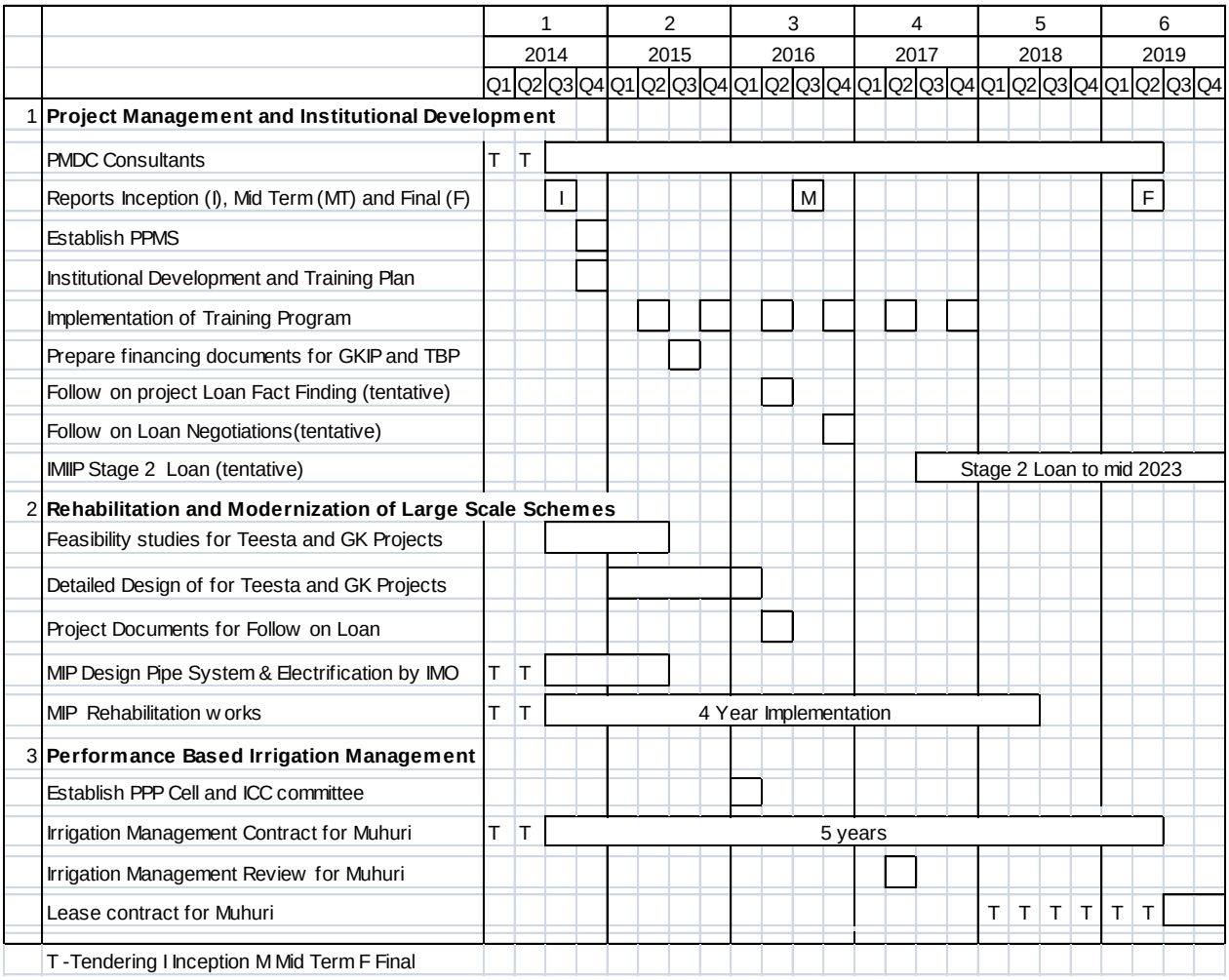
(iii) **The Project is efficiently managed with effective institutional development.** This output will include (a) establishment of competent project management and project implementation unit; (b) timely procurement and disbursement; (c) timely preparation of detail designs for Muhuri Irrigation Project remaining works, (d) timely appraisal of GK and Teesta modernization requirements and provision of required feasibility studies and detail designs and strategies to transfer MOM to private sector; and (e) institutional support and capacity and awareness building of BWDB and water management organizations to successfully administer and support PPP contracts.

II. IMPLEMENTATION PLAN

A. Project Readiness Activities

N.	Actions	Who	When
1	Approve Loan Fact Finding Aide Memoire	MOWR/BWDB	25 August 2013
Project Management - Finance			
1	Appointment of Project Director	BWDB	30 September 2013
2	PMU initial stage formed	MOWR/BWDB	31 March 2014
3	Include 1st year implementation budget including year 1-retroactive actions in greenleaf	MOWR/BWDB	15 April 2014
4	Submit DPP to Ministry of Water Resources	BWDB with support from PPTA.	23 January 2014
5	Request for EOIs for PMDC and C-IMO MIP	ADB	20 September 2013
6	DPP submitted to Planning commission	MOWR/BWDB	15 February 2014
7	DPP approved in PEC	PEC with BWDB support	07 May 2014
8	DPP approval	ECNEC With BWDB	07 June 2014
9	30% of works tenders to be floated	BWDB	21 June 2014
10	PMU fully established	MOWR/BWDB	31 July 2014
Environment Safeguards			
1	Prepare TOR for Government EIA study and submit ADB IEE to Directorate of the Environment.	BWDB	30 August 2013
2	Prepare and submit EIA based on requirements of DOE	BWDB with support of PPTA	20 February 2014
3	Obtain temporary non-objection certificates for DPP ECNEC clearance from DOE	BWDB with support from PPTA	15 February 2014
4	Obtain approval of EIA from DOE	BWDB with support of PPTA	15 March 2014

B. Overall Implementation Plan



III. PROJECT MANAGEMENT ARRANGEMENTS

A. Steering Committee

10. A Project Steering Committee will be established to provide overall coordination to the Project and to deal with issues requiring inter-ministerial coordination. The Steering Committee will be chaired by the Secretary, Ministry of Water Resources (MOWR). The Project Steering Committee will include representation of all concerned ministries and agencies including: Ministry of Water Resources Ministry of Agriculture, Ministry of Local Government Rural Development and Cooperatives, Ministry of Environment and Forests, Economic Relations Division (ERD), Finance Division, IMED, Planning Commission, BWDB, DAE, Ministry of Fisheries and Livestock and a representative of the ADB. The Project Management and Design Consultants as well as the Irrigation Management Operators will also participate in the Project Steering Committee as observers.

11. As well as dealing with issues that emerge during the implementation the Project Steering Committee will have two permanent agenda items: review safeguard compliance, and review project impacts in terms of metrics that include amongst others: poverty and gender.

These agenda items will require a monitoring unit to prepare submissions to the Project steering Committee. The steering committee will meet at least twice per year.

B. Executing Agency

12. The Executing Agency for the Project will be the Bangladesh Water Development Board. A Project Director will be appointed with at least the rank of superintending engineer. The Project Director will be responsible for the overall management of the project and will manage the Project Management Unit and authorise payments. He will report directly to BWDB additional Director General Planning.

13. The Project Director will be supported by the IMIP support services based on seven support units; accounts, administration, procurement, PPP, Planning and Design, Safeguards and Communications and Strategy Building. The core of the project management will be managed by the Dhaka central office however supported by frequent field visits to engage with the field staff as well as stakeholders. All procurement, payments as well as planning and design will be managed by the support units based in Dhaka.

14. A Project implementation unit (PIU) will be established in MIP. A PIU Director with the rank of Executing Engineer will be appointed. He will be in charge of supervising MIP modernization in the field including the activities currently managed by the GoB as well as the investments and OM activities of the project. The PIU Director will be based in the field but will make frequent visits to the PMU in Dhaka. The PIU would incorporate the staff of the superintending engineer's office in Muhuri. Thirty staff would be formally assigned to the PIU under the PIU director. For the Teesta Barrage and the GK irrigation projects, a small Design Support Unit (DSU) will be set up under the direction of an Executive Engineer Design to be based at each project site. Coordination and support will be provided by the Project Directors of the two projects on a part time basis.

15. The development of capacity in the management of PPP is a key requirement. A PPP unit will be established to support the IMIP Project Director, the unit will comprise of one person from Government with appropriate knowledge in tendering, contract management, negotiating, legal, and communication and preferably private public partnerships. The unit will work closely with the procurement unit and will be responsible for tender documents and will be active in the bidding process during the engagement of the Irrigation Management Operators (IMOs). The unit will also be a party to the PPP contract negotiations between the Project management phase IMO (M-IMO) and construction phase and management phase IMOs of GKIP and TBP and BWDB and will, in the longer term, be responsible for monitoring and managing the PPP contract. The PPP unit will participate and support the Implementation Coordination Committee in C-IMO and M-IMO performance evaluation and review and will maintain linkages to the PPP Office under the Prime Minister's Office. It is expected that PPP Office in the Prime Minister's office will be able to provide specialist PPP support as and when requested by BWDB. BWDB will consult with the PPP Office in the prime minister's office and prepare a MOU to identify and implement appropriate support actions. Support to establish and develop the PPP unit will be provided by the PMDC.

16. **Positions outside the PMU**: As the PPP lease contract will continue after the completion of the IMIP project it will be necessary to create a structural PPP cell outside the PMU funded from the establishment budget. This will be established by year 3, two years prior to the start of the Muhuri lease contract. Similarly a monitoring cell will be established to provide independent verification of the performance of various stakeholders as well as assessing

impacts associated with investment objectives. There is an existing monitoring division within BWDB under the Chief Monitoring who reports to BWDB's Director General. The IMIP monitoring cell will be situated under the Chief Monitoring. The monitoring cell will monitor the project progress against the outputs and targets set out in the Design and Monitoring Frameworks (DMF).

17. The staff for the PMU will be assigned on deputation or given additional charge from BWDB or other Government Departments. If staffs are not available from Government they will be recruited from the private sector for the period of the project. The proposed PMU staffing is shown in the table below. Initial recruitment of the PMU priority positions will be by 31 January 2014 with the PMU to be fully established by 31 July 2014.

Proposed PMU Staffing

	Position	Nr	Responsibilities/ Location	FT/PT	Recruitment	
					Date 2014	Source
A	**Central PMU Dhaka**					
1	IMIP Project Director Project Management Unit. (ACE/SE Gr-3/4)	1	Head of the PMU responsible for overall project implementation	FT	January	Deputation
2	Deputy Director Accounts and Finance (Gr-5)	1	Head of the Central Accounts unit	PT	July	Deputation.
3	Accountant (Gr10)	1	Central Accounts Unit	FT	July	Additional charge
4	Executive Engineer Planning and Design (EE Gr-5)	2	Central Planning and Design Unit. Planning and Design of GKIP, TBP and MIP	FT	January	Deputation
5	Economist (Gr-5/6)	1	Central Planning and Design Unit	FT	March	Deputation
6	MIS Expert (Ass Engineer Gr-9)	1	Central Planning and Design Unit	FT	March	Deputation
7	Deputy chief (extension) Grade 5	1	Extension support & communication and capacity building	FT	March	Deputation
8	Procurement Officer (SDE Gr-6)	1	Central Procurement Unit	FT	January	Deputation.
9	PPP Officer (Gr-6)	1	Central PPP Unit	FT	July	Deputation
10	Safeguards Officer (Gr-6)	1	Central Safeguards Unit	FT	March	Deputation
11	Assistant Director Administration (Gr-9)	1	PDs office/ Central administration unit	FT	March	Deputation
12	Data Entry Operator (Gr-16)	2	PDs office/Central administration unit	FT	July	Additional charge
13	Driver (Gr-16)	4	PDs office/Central administration unit	FT	March	Outsource
14	MLSS & cleaner (Gr-20)	5	PDs office/Central administration unit	FT	March	Outsource
	Sub Total PMU	**23**				
A. Project Implementation Unit (PIU) Feni						
1	Muhuri Project Implementation Unit Director/Project Executive Engineer/EE (Gr.-5)	1	Head of implementation of the Muhuri Irrigation Project. Reports to Director Project Management Unit (PMU) Liaises with central support units and field operations.	FT	March	Deputation

	Position	Nr	Responsibilities/ Location	FT/PT	Recruitment	
					Date 2014	Source
2	Sub Divisional Engineer (Gr-6)	3	Implementation to support works, MOM, design and safeguards.	FT	July	Deputation
3	Sub Assistant Engineer Section Officer (Gr 10)	6	BWDB Feni OM Division. Post to include; (i) design,(ii) works,(iii) OM, 9, (iv) extension; (v) capacity building and (vi) communication	FT	July	Deputation
4	Surveyor (Eng) (Gr-11)	2	Field engineering surveys	FT	July	Additional charge
5	Data Entry Operator (Gr-16)	2	Office support	FT	July	Additional charge
6	Assistant Accountant (Gr-11)	1	Assistant on finance and account related tasks	FT	July	Deputation
9	MLSS, Cleaner and Guards (Gr20)	7	Office of the PIU Feni	PT	July	outsourced
	Sub Total PIU	**22**				
3. Design Support Units (DSU) for TBIP and GKIP						
1	Feasibility Study/ Design Support Officer (EE Gr-5)	2	Head of the Planning and Design Unit at the Teesta and GK project sites	PT	July	Additional charge
2	Design Support Sub Divisional Engineers (SDE Gr 6)	10	Sub Divisional Engineers to support planning and design work in TBIP and GKIP	PT	July	Additional charge
3	Sub Assistant Engineers (SO Gr10)	20		PT	July	Additional charge
	Sub Total (SDUs)	**32**				
	Overall Total	**77**				

Notes; Deputation-BWDB Staff on Deputation from Existing Manpower of BWDB, or existing staff will be given the Additional Charge to support the IMIP.

C. Implementation Coordination Committee

18. To facilitate implementation of the MIP modernization, an Implementation Coordination Committee (ICC) will be established. The ICC will be under the leadership of the BWDB Zonal Chief Engineer. Members of the ICC will include representatives from the offices of the Deputy Commissioner, the Water Users Federation, Water User Associations, the Rural Electrification Board, Department of Agriculture Extension, and law enforcement. The IMO will also be a member of the ICC and will act as the member secretary. The ICC will deal with field implementation issues that arise related to conflicts, safeguards, security, and more generally concerns about the performance of the implementing parties and will meet four times per year at a location close to MIP. The PMU with the support of the PMDC will be responsible for the establishment of the ICC.

D. Water Management Organizations

19. The Water Management Organizations WMOs (WUG, WMA and WMF) will play a supporting and guiding role in close coordination with the ICC. The role of the WMOs will include; (i) to support feedback and monitoring of the operation and management of the projects through the ICC; (ii) liaising with farmers and the ICC;(iii) implementing independent monitoring function of the management activities including construction, operation and physical maintenance work; and (iv) supporting and dealing with the complaints and grievances in coordination with ICC; more serious complaints would be referred to the ICC who would meet every 3 months; additional special meetings can be organized as necessary.

E. Summary of the Project Management Arrangements

Project implementation organizations	Management Roles and Responsibilities
• **MOWR**	➢ Chairs the Project steering committee ➢ Support the implementation of policy, legal and institutional reforms proposed under the project road map. ➢ Ensures adequate counterpart funding is provided to the EA ➢ Approve procurement of works and consultants or submit for approval to the inter-ministerial purchasing committee.
• **The executing agency (BWDB)**	**Dhaka office staff** ➢ Establish a PMU ➢ Oversee implementation of the project ➢ Prepare annual budget for counterpart funds financing and obtain timely approval. ➢ Monitor and ensure compliance of loan covenants and environmental and social safeguards and facilitate the implementation of corrective action ➢ Procure international consultant(s) and contractor(s) ➢ Lead MOM studies and planning and design for preparation of GKIP and TBP. ➢ Prepare quarterly reports to ADB, disbursement projections, updated implementation plans, etc. ➢ Financial management: preparation of withdrawal applications and Statement of expenditures, centralized payments to contractors and consultants (including C-IMO), arranging for financial audits and implement recommended financial

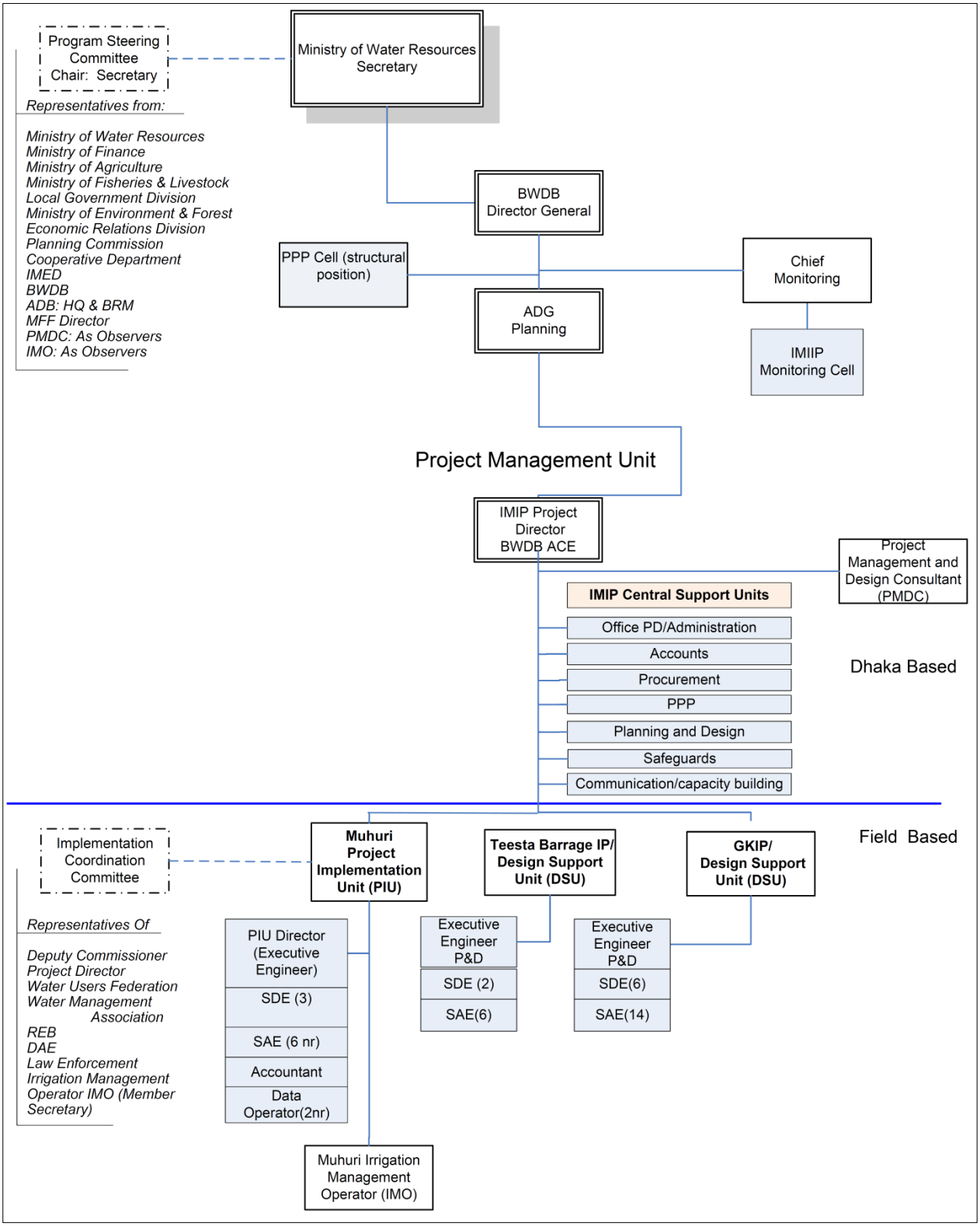
	management improvements actions ➢ Administer PMDC and C-IMO contract ensuring timely processing of payments and contract variations. ➢ Implement the participation and communication plan ➢ Monitor C-IMO key performance payment indicator achievement **Sub-Project office staff** ➢ Facilitate and support- IMO work in the field ➢ Ensure maintenance of primary system and timely and adequate water delivery to secondary and tertiary level ➢ Review C-IMO construction supervision report/recommendations for payment to contractors and submit to PMU for payment ➢ Support PMU design, monitoring and safeguards cells
• **Project Steering Committee (PSC)**	➢ The PSC will be chaired by MOWR and will include members from, Planning Commission BWDB, MOA, LGC, MOEF, ERD, ARDRS, DAE, BRMMOF and EPD. ➢ Ensure inter-ministerial coordination ➢ Oversee implementation of the project ➢ Monitor progress of the project including safeguards and development objectives ➢ Rectify issues hindering progress of the project ➢ Guide the Executing Agency ➢ Meet at least once each quarter
• **Project Management and Design Consultant (PMDC)**	➢ Prepare feasibility and detail designs for GK and TBP irrigation project including detailed options for structural and management modernizations ➢ Prepare detail design for pump electrification and MIP hydraulic structures. ➢ Prepare lease agreement for M-IMO and support tendering process. ➢ Provide overall project management support on reporting, financial management, M&E, ➢ Prepare tenders for GKIP and TBP works and support procurement. ➢ Set up a monitoring and evaluation system including PPMS.
• **Irrigation Management Operator (C-IMO)**	➢ Ensure MIP civil works supervision ➢ Prepare detail design of prepaid pumps and piped prepaid systems in MIP ➢ Prepare O&M annual plan and implement them ➢ Collect water charges and ISF ➢ Provide agriculture support services ➢ Ensure quality water service delivery to the farmers ➢ To engage with farmers and other stakeholders to ensure of understanding of the new systems and promote the effective use of the irrigation facilities to improve crop productivity. ➢ To establish and manage customer relations including complaints mechanisms.
• **Implementation coordination committee**	➢ Provide tripartite conflict resolution at field level ➢ Review performance of the parties involved at field level ➢ Review of C and later M- IMO annual O&M work plan
• **Water Management Organizations**	➢ Provide feedback to the C- IMO on the quality of water service delivery

	➢ Support participatory planning and design ➢ Support participatory work construction supervision ➢ Support conflict resolution between farmers and between farmers and C- IMO and later M-IMO ➢ Ensure water users are kept inform about ICC decision, project progress and implementation issues. ➢ Support/guide IMO agricultural support activities
• **ADB**	➢ Recruit PMDC and C- IMO consultants for the Project ➢ Conduct regular loan review missions ➢ Review and issues no-objection to procurement and disbursement documents ➢ Overall coordination and advisory support

F. Key Persons Involved in the Implementation

Executing Agency Bangladesh Water Development Board Project Director	Officer's Name: Md Shahidul Rahman Position: Director General BWDB Telephone:+88-02-9552194,+88-02- 9564665 Fax: +88-02-9564763 Email address: dg.bwdb.bd@gmail.com Office address: WAPDA Building. Motijheel C/A. Dhaka, Bangladesh. Officer's Name: Mr Md Masud Ahmed Position: Director, Directorate of Planning III, BWDB Telephone: .+88-02-7126211 Email address: masud.bwdb@yahoo.com Office address: BWDB, Hasan Court (7th floor) 23/1 Motijheel C/A. Dhaka, Bangladesh.
ADB	Officer's name: Takashi Matsuo (Mr.) Position: Director Environment, Natural Resources and Agriculture Division (SAER) South Asia Department (SARD) Telephone:(632) 632-5579 (direct), 632-6834 Email address:tmasuo@adb.org Address: Asian Development Bank 6 ADB Avenue Mandaluyong City 1550 Metro Manila, Philippines
Mission Leader	Officer's name: Arnaud Cauchois Position: Senior Water Resources Specialist Environment, Natural Resources and Agriculture Division South Asia Department (out posted Nepal Resident Mission) Telephone: +977 1 422 7779 Email address:acauchois@adb.org Address: Asian Development Bank Nepal Resident Mission Metro Park Building, Lazimpat, Ward No. 2 P.O. Box 5017, Kathmandu, Nepal

Figure 1: Project Implementation Arrangements



IV. COSTS AND FINANCING

A. Investment Cost and Financing Plan of IMIP

20. The project is estimated to cost $58 million. This includes taxes and duties of $5.3 million to be financed by the government. The government has requested a loan in various currencies equivalent to $46.0 million. The contribution to irrigation operation and maintenance costs of MIP will be funded by water charges levied on farmers by the IMO. The beneficiaries will finance $4.4 million for O&M of level 2 and 3. This will include an upfront contribution towards the OM not exceeding $0.15 million (equivalent $9/ha [Tk3/decimal]), which is designed to develop the sense of ownership by farmers of the pipeline distribution systems. The government will finance the balance of $7.6 million as counterpart funding, including costs allocated to BWDB for a contribution to rehabilitation and operation and maintenance of MIP Level 1 infrastructure. The ADB loan will have a term of 25 years, including a grace period of 5 years, with an interest rate of 2% throughout the loan period, and such other terms and conditions set forth in the loan and project agreements. The Project Investment Plan and Financing Plan are shown in Table 2.

Table 1 : Project Investment Plan ($ million)

Item	Amount [a]
A. Base Cost[b]	
1. Performance Based Irrigation Management Established	7.7
2. Rehabilitated and Modernized Irrigation Schemes	34.2
3. Improved Project Management	9.1
Subtotal (A)	51.0
B. Contingencies[c]	5.1
C. Financing Charges during Implementation [d]	1.8
Total (A+B+C)	58.0

[a]. Including taxes and duties of $5.3 million to be financed by the government.
[b]. In mid-2013 prices.
[c]. Physical contingencies are computed at between 0% and 10%. Price contingencies computed on foreign exchange costs at 2.2% in year 1, 1.9% in year 2 and 1.9% thereafter, and on local currency cost at 8.5% in year 1, 7.5% in years 2 and 7.0% thereafter, including provisions for exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
[d]. Includes interest computed at 2.0% per year.
Source: Asian Development Bank estimates.

Table 2: Financing Plan

Source	**Amount ($ million)**	**Percent of Total**
ADB	46.0	79.4
Beneficiaries[a]	4.4	7.6
Government[b]	7.6	13.1
Total	58.0	**100.0**

[a] Contribution to irrigation operation and maintenance costs of each project funded by water charges levied on farmers. IMO costs for initial five years paid by ADB.
[b] Includes financing by BWDB of project Level 1 infrastructure and project management.
Figures may not sum up to total due to rounding.
Source: Asian Development Bank estimates.

B. Detailed Cost Estimates by Expenditure Category for the Project

	Item	(Tk million) Foreign Exchange	Local Currency	Total Cost	($ million) Foreign Exchange	Local Currency	Total Cost	% of Total Base Cost
A.	**Investment Costs**							
1	Civil Works	338.5	2,086.8	2,425.3	4.2	26.1	30.3	59
2	Vehicles and Equipment (PMU)	10.9	22.4	33.3	0.1	0.3	0.4	1
3	Consulting Services (including PDMC and IMO)	317.7	706.1	1,023.8	4.0	8.8	12.8	25
4	Training, Workshops, Extension	3.0	113.4	116.4	0.0	1.4	1.5	3
6	Land Acquisition	-	-	-	-	-	-	0
	Subtotal (A)	**670.0**	**2,928.8**	**3,598.8**	**8.4**	**36.6**	**45.0**	**88**
B.	**Recurrent Costs**							
1	Scheme Operation and Maintenance	29.7	280.7	310.4	0.4	3.5	3.9	8
2	Staff and Office Expenses (PMU)	1.0	156.1	157.1	0.0	2.0	2.0	4
3	Vehicle Operation and Maintenance (PMU)	1.4	13.0	14.4	0.0	0.2	0.2	0
	Subtotal (B)	**32.1**	**449.7**	**481.9**	**0.4**	**5.6**	**6.0**	**12**
	Total Base Cost	**702.1**	**3,378.6**	**4,080.6**	**8.8**	**42.2**	**51.0**	**100**
C.	**Contingencies**							
1	Physical	28.8	143.6	172.4	0.4	1.8	2.2	4
2	Price	135.6	714.0	849.6	0.5	2.5	3.0	6
	Subtotal (C)	**164.4**	**857.5**	**1,022.0**	**0.8**	**4.3**	**5.1**	**10**
D.	**Financing Charges During Implementation**							
1	Interest During Implementation	157.7	-	-	1.8	-	1.8	4
2	Commitment Charges	-	-	-	-	-	-	0
	Subtotal (D)	**157.7**	**-**	**-**	**1.8**	**-**	**1.8**	4
Total Project Cost (A+B+C+D)		**1,024.2**	**4,236.1**	**5,102.6**	**11.4**	**46.5**	**57.9**	**114**

IMO = irrigation management operator; PDMC = Project Design and Management Consultants; PMU = program management unit.

Figures may not sum due to rounding.

C. Allocation and Withdrawal of Loan Proceeds for the Project

Number	Item	Amount Allocated (SDR million)		ADB Financing Percentage and Basis for Withdrawal from the Loan Account
		Category	Subcategory	
1	Civil Works	17,448,000		
1A	Electrification		1,902,000	100 percent of total expenditure claimed*
1B	Other Works		15,546,000	90 percent of total expenditure claimed
2	Vehicles and Equipment	109,000		100 percent of total expenditure claimed*
3	Consulting Services	7,465,000		100 percent of total expenditure claimed*
4	Training, Workshops and Extension	810,000		100 percent of total expenditure claimed*
5	Interest Charge	1,156,000		100 percent of total amount due
6	Unallocated	2,563,000		
	Total	29,551,000		

* Exclusive of taxes and duties imposed in the territory of the Borrower.

D. Detailed Cost Estimates by Financier Project

($ million)

Item	ADB Amount	ADB % of Cost Category	IMO Amount	IMO % of Cost Category	Farmers Amount	Farmers % of Cost Category	Government Direct Cost Amount	Government BWDB Amount	Government Taxes Amount	Government Total Amount	Government % of Cost Category	Total Cost
A. Investment Costs												
1 Civil works	27.16	89.6	-	-	-	-	0.2	-	3.0	3.2	10.4	30.3
a Electrification	3.0	87.0							0.4	0.4	13.0	3.4
b Other Works	24.2	89.9							2.5	2.7	10.1	26.9
2 Vehicles and Equipment (PMU)	0.2	39.7	-	-	-	-	0.0	-	0.2	0.2	59.5	0.4
3 Consulting Services (including PDMC and IMO)	11.6	90.7	-	-	-	-		-	1.2	1.2	9.2	12.8
4 Training, Workshops, Extension	1.3	86.7	-	-	-	-	-	-	0.2	0.2	13.3	1.5
Subtotal (A)	**40.2**	**89.3**	**-**	**-**	**-**	**-**	**0.2**	**-**	**4.6**	**4.8**	**0.4**	**45.0**
B. Recurrent Costs		-		-		-					-	**-**
1 Scheme Operation and Maintenance	-	-	3.7	96.2	0.1	3.8	-	-	-	0.0	0.0	3.9
2 Staff and Office Expenses (PMU)	-	-	-	-	-	-	-	1.7	0.2	2.0	100.0	2.0
3 Vehicle Operation and Maintenance (PMU)	-	-	-	-	-	-	-	0.2	0.0	0.2	100.0	0.2
Subtotal (B)	**-**	**-**	**3.7**	**62.1**	**0.1**	**2.5**	**-**	**1.9**	**0.2**	**2.1**	35.6	**6.0**
Total Base Cost	**40.2**	**78.8**	**3.7**	**7.3**	**0.1**	**0.3**	**0.2**	**1.9**	**4.8**	**6.9**	13.6	**51.0**
C. Contingencies	4.0	78.1	0.4	8.4	0.0	0.3	0.1	0.2	0.4	0.7	13.1	**5.1**
D. Financing Charges During Implementation	1.8	100.0	-	-	-	-	-	-	-	-	-	**1.8**
Total Project Cost (A+B+C+D)	**46.0**	**79.4**	**4.2**	**7.2**	**0.2**	**0.3**	**0.3**	**2.1**	**5.3**	**7.6**	**13.1**	**57.9**

IMO = irrigation management operator; PDMC = Project Design and Management Consultants; PMU = program management unit.

Figures may not sum due to rounding.

E. Detailed Cost Estimates by Outputs/Components for Project

($ million)

	Item	Total Cost	Performance-Based Irrigation Management Established		Rehabilitated and Modernized Large-Scale Irrigation Schemes		Strengthened Program Management and Institutional Development	
			Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category
A.	**Investment Costs** [a]							
1	Civil Works	30.3	-	0	30.3	100	-	0
2	Vehicles and Equipment (PMU)	0.4	-	0	-	0	0.4	100
3	Consulting Services (including PDMC and IMO)	12.8	6.0	47	-	0	6.8	53
4	Training, Workshops, Extension	1.4	1.2	86	-	0	0.2	14
	Subtotal (A)	**44.9**	**7.2**	**16**	**30.3**	**67**	**7.4**	**16**
B.	**Recurrent Costs**			0		0		
1	Scheme Operation and Maintenance	3.7	-	0	3.7	100	-	0
2	Staff and Office Expenses (PMU)	2.0	0.4	22	-	0	1.5	78
3	Vehicle Operation and Maintenance (PMU)	0.2	-	0	-	0	0.2	100
	Subtotal (B)	**5.9**	**0.4**	**7**	**3.7**	**63**	**1.7**	**29**
	Total Base Cost	**50.8**	**7.7**	**15**	**34.0**	**67**	**9.1**	**18**
C.	**Contingencies**							
1	Physical	5.1	0.7	15	3.6	70	0.8	15
2	Price	0.2	0.0	15	0.1	70	0.0	15
	Subtotal (C)	**5.3**	0.8	15	3.7	70	0.8	15
D.	**Financing Charges During Implementation**							
1	Interest During Implementation	1.8	0.3	15	1.2	67	0.3	18
2	Commitment Charges					0		
	Subtotal (D)	**1.8**	**0.3**	**15**	**1.2**	**67**	**0.3**	**18**
Total Project Cost (A+B+C+D)		**57.9**	**8.7**	**15**	**39.0**	**67**	**10.2**	**18**

IMO = irrigation management operator; PDMC = Project Design and Management Consultants; PMU = program management unit.

a. In mid-2013 prices

b. Computed at between 0% and 10%.

c. Computed on foreign exchange costs at 2.2% in year 1, 1.9% in year 2 and 1.9% thereafter, and on local currency cost at 8.5% in year 1, 7.5% in years 2 and

d. Includes interest computed at the five-year forward London interbank-offered rate plus a spread of 0.4% .

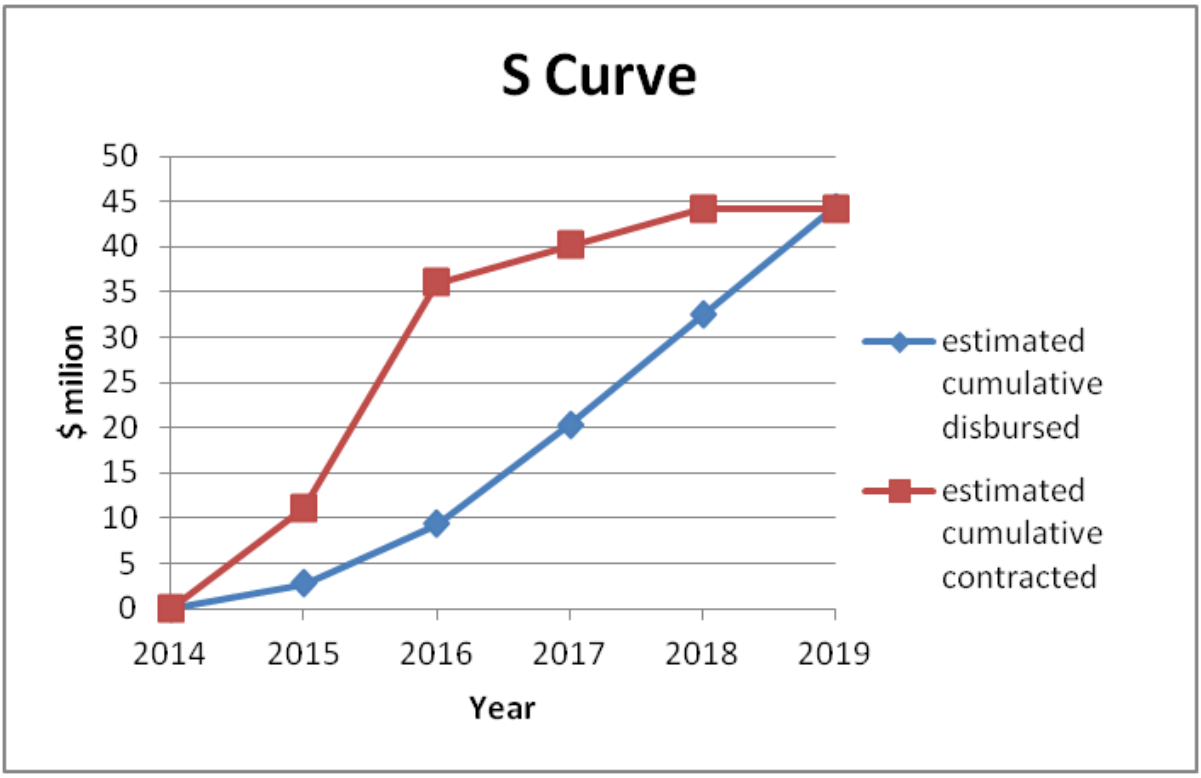
Figures may not sum due to rounding.

F. Detailed Costs Estimates by Year for Project

Item	Total Cost	2014	2015	2016	2017	2018
		($ million)				
A. Investment Costs						
1 Civil Works	30.3	0.9	4.2	8.3	10.4	6.4
2 Vehicles and Equipment (PMU)	0.4	0.4	0.0	0.0	0.0	0.0
3 Consulting Services (including PDMC and IMO)	12.8	3.5	3.9	2.2	1.6	1.6
4 Training, Workshops, Extension	1.5	0.1	0.3	0.4	0.4	0.3
Subtotal (A)	**45.0**	**5.0**	**8.4**	**10.9**	**12.4**	**8.3**
B. Recurrent Costs						
1 Scheme Operation and Maintenance	3.9	0.0	0.5	0.8	1.1	1.4
2 Staff and Office Expenses (PMU)	2.0	0.3	0.4	0.4	0.4	0.4
3 Vehicle Operation and Maintenance (PMU)	0.2	0.0	0.0	0.0	0.0	0.0
Subtotal (B)	**6.0**	**0.4**	**1.0**	**1.2**	**1.6**	**1.8**
Total Base Cost	**51.0**	**5.4**	**9.4**	**12.2**	**13.9**	**10.1**
C. Contingencies	**5.1**	0.3	0.7	1.1	1.6	1.4
D. Financing Charges During Implementation	**1.8**	0.0	0.1	0.3	0.5	0.8
Total Project Cost (A+B+C+D)	**57.9**	**5.7**	**10.3**	**13.6**	**16.0**	**12.3**
% Total Project Cost	**100.0**	**9.8**	**17.8**	**23.5**	**27.7**	**21.2**

IMO = irrigation management operator; PDMC = Project Design and Management Consultants; PMU = program management unit.
Figures may not sum due to rounding.

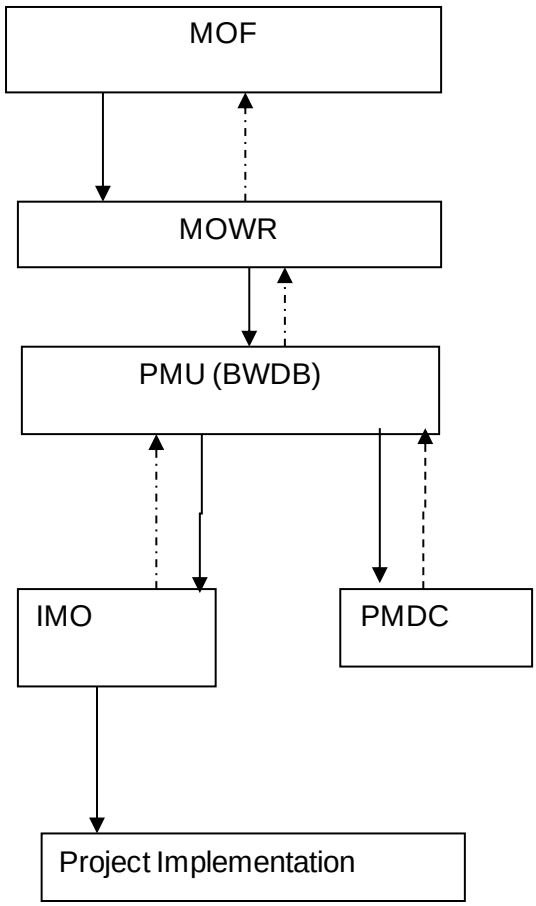
G. Contract and Disbursement S Curve



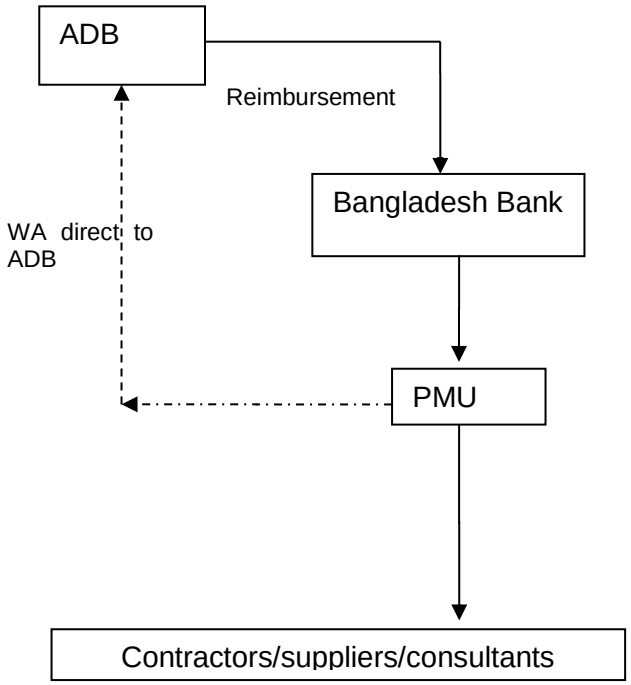
H. Fund Flow Diagram

Figure 2: Authority flow and Reimbursement procedure fund flow

Budget Authority Flow and Reporting

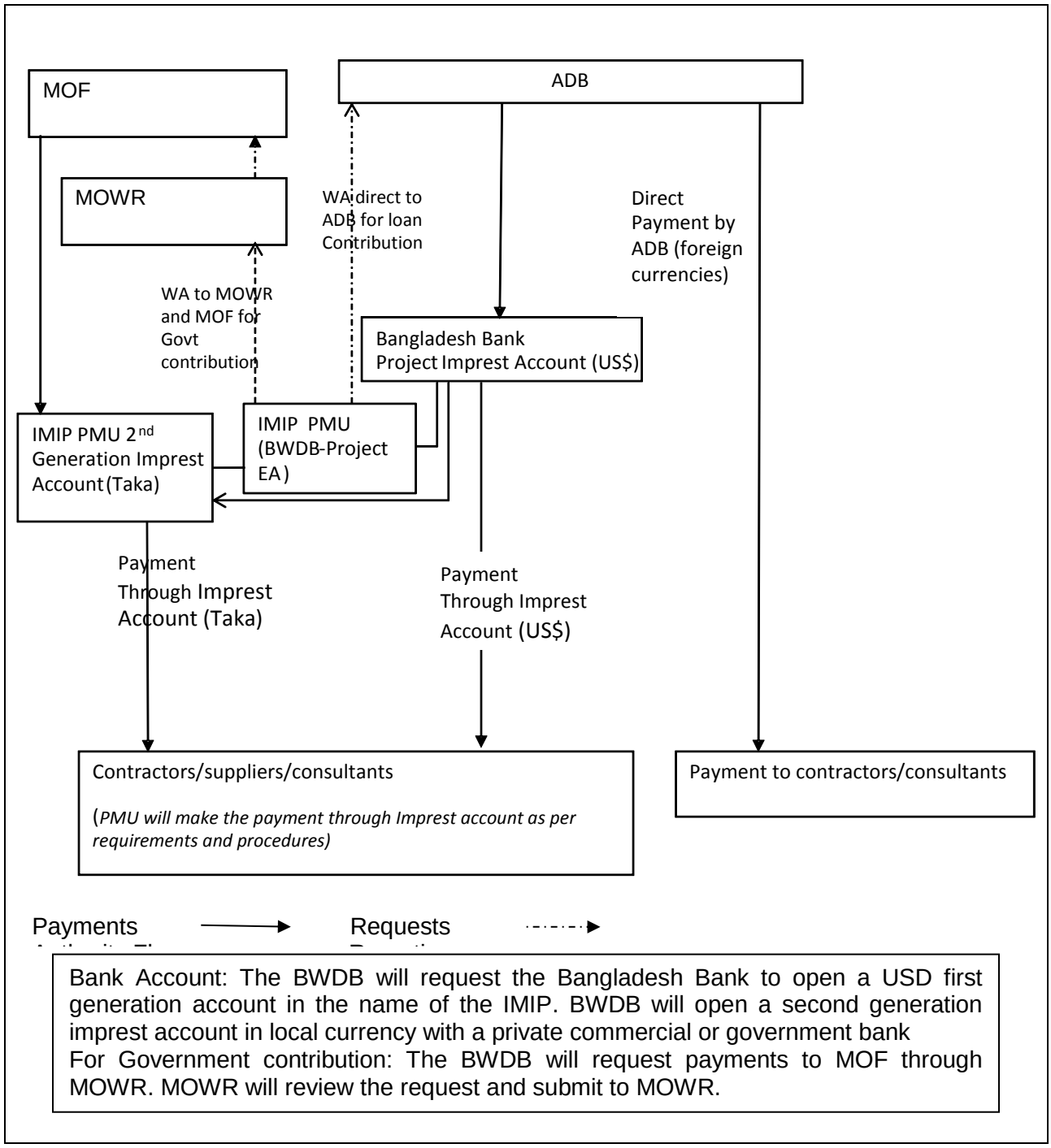


Reimbursement Procedure: Fund flow and Reporting



Bank Account: The BWDB will request the Bangladesh Bank to open a USD account in the name of the IMIP; the bank will issue a certificate once this is opened. The BWDB can submit a withdrawal application (WA) for imprest funds through the MOWR attaching 6 months estimates of expenditures together with the bank certificate.

Figure 3: Imprest Fund and direct payment fund flow



V. FINANCIAL MANAGEMENT

21. A financial management assessment (FMA) of BWDB was undertaken by the PPTA consulting team in February 2013 in accordance with ADB guidelines for Financial Management

and Analysis of Projects[8] and Financial Due Diligence: a Methodology Note, and Technical Guidance Notes.[9] The FMA considered the capacity of the executing agency and implementing agencies, including funds-flow arrangements, governance, staffing, budgeting, accounting and financial reporting systems, internal control procedures, financial information systems, and internal and external auditing arrangements. The assessment concludes that BWDB has sufficient experience and capacity to manage the project funds as well as adequate fund flow, accounting and budgeting arrangements. However, improvements are required in several areas including (i) the need for a full time accountant at the PMU (ii) training in ADB disbursement and procurement guidelines (iii) requirement to produce internal audit reports for the relevant zones and circles for each project prior to the first disbursement under each project (iv) provision of a Statement of Audit Needs to ensure that audited project financial statements are received on a timely basis and in accordance with accounting standards as well as to encourage the submission of entity level financial statements on a timely basis. Key findings are summarized in table 1[10].

Table 1: Summary Financial Management Assessment

Area of Assessment	**Findings**
Executing and Implementing Agencies	The Executing Agency is the Bangladesh Water Development Board.
Major Experiences of Managing Externally-financed projects	BWDB is currently implementing a number of bilateral and multilateral projects including; the South West Area Integrated Water Resources Management Project (ADB), the Char Development and Settlement Project (IFAD, Gov't Netherlands), Secondary Town Integrated Flood Protection Phase II (ADB and OPEC) and the Water Management Improvement Project (World Bank).These are largely implemented adequately and there are no major financial management related issues.
Fund Flow Arrangements	Funds received from donors including ADB are deposited into an Imprest account of an approved commercial bank. The proposed arrangement generally follows approved government protocols, and while it is generally satisfactory, the approval processes to transfer funds involves many steps, is tedious and often time consuming, and improvements can be made to shorten this processes going forward. BWDB does not have the capacity to manage foreign exchange risk as this task is undertaken by the MOF on behalf of BWDB. The MOF, at the request of BWDB, will usually approve the opening of an imprest account to any authorized commercial bank in Bangladesh under a foreign aided project against the specific project. Counterpart funds are assessed based on the approved ADP and are usually released in 4 quarterly installments made through the Finance Division of the MOF into the Central Account of BWDB. The fund request is usually done by BWDB request for funds to the Ministry of Finance through MOWR. Payments of GOB counterpart fund are disbursed by MOF in 4 quarterly installments through the Central Account of the BWDB for further disbursement through the various Regional Accounting Centers (RACs) for payment against the said project.

[8] ADB. 2005. *Financial Management and Analysis of Projects*. Manila. Available: http://www.adb.org/Documents/Guidelines/Financial/default.asp

[9] ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila. Available: http://www.adb.org/documents/financial-due-diligence-methodology-note

[10] Supplementary linked document no. 18. Available upon request.

Area of Assessment	Findings
	Fund flow arrangements are further described in para 23-33 below and are deemed adequate for the Project.
Organization and Staffing	BWDB's finance and accounting department is headed by the Additional Director General (Finance). There is a comptroller of Finance and Account who is in charge of two directors - Directors of Finance and Director of Accounts. Director of Audit reports directly to the ADG -Finance. Currently under the ADG Finance Department, there is a sanctioned headcount of 220 against the current staff of 168 positions or about 24% staff shortage. Under the Feni Circle Line office – which is where the MIP project is expected to reside, there is an acute shortage of staff i.e.147 vacant positions against 299 sanctioned positions. This will need to be addressed before commencement of the MIP project. Stage 1 of the PMU requires a full time financial accountant to be assigned from the BWDBs accounting department by 31 December 2013. The account staff are graduates from the commerce or accounting field with experiences in different operations of BWDB. Key staff are graduates and permanent members of BWDB with regular training on the latest financial government regulations and BWDB's accounting system and policies if any but have not been trained in ADB project management procedures but have experience in working with Foreign Aided Projects. ADB training procedures is therefore recommended. Staff rotation occurs every few years.
Accounting Policy and Procedures	Yes, the accounting system adopted by BWDB allows for proper recording of all project financial transactions based on an entity accounting system. The control mechanism are guided by BWDB Financial procedure and other administrative and government manuals which stipulates the payment and disbursement approval process; and including the assignment of accounting code which follows the prescribed government accounting codes which specify how all these transactions should be followed and recorded by the accounting department. The Chart of Accounts shows that it is adequate to record and report on project activities and its disbursement categories, and meet the requirements of IMED. The chart of account is also consistent with the government prescribed economic and financial code - universal to all government offices.
Segregation of Duties	Yes the duties are well segregated.
Budgeting System	The budgets include physical and financial targets and are prepared according to ADP requirements – which undergo stringent checks from within BWDB and inter-ministerial approval for all approved foreign aided projects. Reports on project progress are regularly reported to MOWR, IMED and MOF for ADB funded projects, and other reports will follows ADB report requirements to monitor project performance. Actual expenditures are compared to the budgeted expenditures on monthly, quarterly and annual basis. Any variation thereof will require an explanation to the MOWR and IMED. In addition, if the yearly expenditures / achievements are below 95% of the overall budget target, further explanation will be provided by BWDB to MOWR and IMED. Approvals for budget variation are required in advance from the MOWR and the Planning Commission and approved by MOF. Yes, procedures are in place for field offices and for project consultants to plan the project activity requirements with the assistance from the field Zone, Circle Line and Divisional Line under the command area. These are checked by PD before finalizing the budgets. Yes, project plans and budgets are generally realistic as it goes through vigorous checks from the technical and planning departments before it gets adopted into the budget.
Policies/	BWDB has adopted a Cash Accounting System in accordance with the

Area of Assessment	Findings
Procedures	Bangladesh Accounting Standard (BAS) as adopted by the Institute of Chartered Accountants of Bangladesh (ICAB). Its accounting policies and procedures are guided by a few written procedure manuals in accordance to the Bangladesh Accounting System (BAS), Financial Administrative Regulations (FAR), Financial Rules and Policies.
Internal Audit	BWDB internal audit department audit the financial performances of all the RACs including its circle lines and divisional offices in order to ensure that each office complies with policies and operating procedures in accordance to the procedure manual with respect to payments, receipts, record keeping and debt recovery. It also audits the accounting vouchers to ensure that it complies with the correct accounting codes as prescribed by the GOB. The Director of Audit reports its audit findings to the ADG Finance and ADG Finance will in turn submit this to DG. Audit reports, are often delayed due to shortage of staff. BWDB will be required to produce audits of the relevant zones and circles for each project prior to the first disbursement under each project.
External Audit	The Comptroller and Auditor General (CAG), the independent Supreme Audit Institution, typically audit the projects funded by the GOB. For FAP activities, the current audit practice is to use the Office of Director General – Foreign Aided Project Audit Director (FAPAD) under the auspices of the CAG to perform this task. FAPAD auditors perform its audit annually – usually 4 months after the end of the fiscal year. A Statement of Audit Needs shall be provided to FAPAD to ensure that ADBs audit requirements are met. BWDB is also subject to a statutory audit, although historically there are delays in the submission of the audited financial statements to the Governing Council of BWDB. ADB shall also work with BWDB to encourage more timely submission of BWDB financial statements.
Reporting and Monitoring	All accounting records and supporting documents are retained by the respective RAC offices in charge of the specific project and allows for proper auditing to take place by both internal and external auditors. Monthly reporting is also sent by the respective RAC offices to the Director of Accounts informing them about all project disbursement activities and amount utilized. The financial and procurement reports of the agencies are prepared according to the accounting standard of government, which is consistent to International Standards. The reporting of the financial statement is on a monthly basis.
Information System	Currently, BWDB's accounting system software uses a 2006 version of MS Great Plains Dynamic Accounting Software. This system is not fully integrated with the project accounting system at the RAC level and most information transmitted is via email and 'post mailing' of thumb drive raising issues of sensitive data security. The accounting system software has not been updated since 2006. This is being addressed by WB under their WMIP program.

ADB = Asian Development Bank, MOWR = Ministry of water resource, IME = Implementation Monitoring and Evaluation Division, CAG = Comptroller and Auditor General, RAC = Regional Accounting Centre, IMED = Implementation Monitoring and Evaluation Division.

22. BWDB is a statutory organization tasked with numerous responsibilities from building, operating and maintaining physical infrastructures, to providing and improving irrigation, drainage and navigation services. Its on-going reorganization, a tedious and time consuming approval process, information technology constraints, limited operational capacity and staff shortages poses many challenges to its continued efforts to improve and 'right sized' its organizational and operational needs.

23. **Conclusions and recommendations:** one of the main issues to address is highlighted below and it is recommended that this be considered as follows:

(i) BWDB needs to ensure that adequate and competent staff is assigned to the PMU as per the provision set in the PAM.

(ii) A Project Performance and Management System (PPMS) whose task is to monitor and evaluate project impacts to ensure that the project facilities are managed effectively and benefits, particularly to the poor needs to be established at the beginning of the project.

(iii) Internal Audit of zones and circles are often delayed due to staff shortage. BWDB has committed to completing the audit for MIP zones and circles prior to the first disbursement under each project. In addition, the current practice of the internal auditor's report being sent to the Additional director general - Finance is not in accordance with best industry practice. ADB will develop a governance action plan with BWDB including changes to the Internal Audit reporting procedure, so that the audit report is sent directly to the Governing Council.

(iv) A Statement of Audit Needs shall be provided to BWDB and communicated to FAPAD to ensure that ADBs audit requirements are met, including the timely submission of audited project financial statements and the submission of BWDBs own audited financial statements within one month of their approval by the governing body.

(v) For all of ADB's projects under the project, it is recommended that the assets be insured during constructions and after completion of the projects, and these assets should remain insured during the life of the loan repayment period. BWDB currently does not insure its asset after the project construction period.

(vi) Improvements to BWDB's ICT system are currently being undertaken by WB under their WMIP program. The PMDC should review the ICT proposal to develop modern approaches to Project Management System and other system integrations will be necessary to improve administrative controls, data accuracy, efficiency, and ultimately produce an on-line and on-demand MIS to meet the expectation for better management decision making process.

(vii) For the preparation of the Project, BWDB would benefit from training its designated PMU - PD and its staff in ADB's procedures in Financial Management, Procurement and Disbursement (especially on the latest ADB User's Guide to Prequalification of Bidders, Jan 2013 - in view of the advance procurement action to be undertaken), and Project Management Reporting System.

A. Disbursement Procedures

1. Disbursement Arrangements for ADB Funds

24. The Loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2012, as amended from time to time),[11] and detailed arrangements agreed upon between the Government and ADB.

[11] Available at: http://www.adb.org/documents/loan-disbursement-handbook

25. **Types of Disbursement Arrangements**. There are four major types of disbursement:

(i) **Direct payment** procedure where ADB, at the borrower's request, pays a designated beneficiary directly (Chapter 7 of the *Loan Disbursement Handbook*);

(ii) **Commitment procedure** where ADB, at the borrower's request, provides an irrevocable undertaking to reimburse a commercial bank for payments made or to be made to a supplier against a letter of credit financed from the loan account (Chapter 8 of the *Loan Disbursement Handbook*);

(iii) **Reimbursement procedure** (with or without full supporting documents) where ADB pays from the loan account to the borrower's account for eligible expenditures which have been incurred and paid for by the project out of its budget allocation or its own resources (Chapter 9 of the *Loan Disbursement Handbook*); and

(iv) **Imprest fund procedure** where ADB makes an advance disbursement from the loan account for deposit to an imprest account to be used exclusively for ADB's share of eligible expenditures (Chapter 10 of the *Loan Disbursement Handbook*). The government EA who established the imprest account in its name is accountable and responsible for proper use of advances to the imprest account.

26. The government will make funds available to BWDB. A separate imprest account in USD for the Project loan should be established by the Bangladesh Central bank at the request of BWDB and maintained by funding source. The ceiling of the advance to the Imprest Account is 10% of the respective loan amount. The EA through the PMU may request for initial and additional advances to the imprest account based on an Estimate of Expenditure Sheet setting out the estimated expenditures to be financed through the account for the forthcoming six (6) months, and submission of evidence satisfactory to ADB that the imprest account has been duly opened.

27. BWDB will establish sub-account for the Project in separate bank account(s) in local currency for the exclusive use of the project. The sub accounts will be opened in a private commercial or Government commercial bank acceptable to ADB.

28. Before the submission of the first withdrawal application, BWDB should submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the borrower, together with the authenticated specimen signatures of each authorized person.

29. For all withdrawals of loan and grant proceeds, ADB must receive a withdrawal application in the prescribed format. The *Loan Disbursement Handbook* contains withdrawal application forms that can be used for the project. Each withdrawal application is to be signed by representatives duly designated and/or authorized to withdraw from the loan account.

30. For every liquidation and replenishment request of the imprest account, BWDB will furnish to ADB (a) the corresponding bank statement where the imprest account is maintained, (b) the imprest account reconciliation statement and estimation of imprest account turnover

ratio[12] (Appendix 10C of the *Loan Disbursement Handbook).* The withdrawal application for liquidation and replenishment must be prepared in the currency of the imprest account.

31. The BWDB should ensure that every liquidation and replenishment of each sub-account is supported by (i) the statement of bank account (bank statement) prepared by the bank where the sub-account is maintained, and (ii) a sub-account reconciliation statement (Appendix 10D of the *Loan Disbursement Handbook*) reconciling the above-mentioned bank statement against the sub-account's records. Supporting documents should be retained by BWDB, as appropriate, and be made available to ADB upon request.

32. Withdrawal application forms and other loan financial information can also be downloaded from ADB's Loan Financial Information System (LFIS) at http://lfis.adb.org. BWDB should request access to the LFIS from this site or by sending an e-mail to lfis@adb.org.

33. To facilitate reimbursement and liquidation of small contracts from the imprest account, ADB's statement of expenditure procedure (SOE) will be followed for individual payment transactions not exceeding $100,000. SOE records should be maintained and made readily available for review by ADB's disbursement and review mission or upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit. A Central Accounts Unit will be established within the PMU as a regional accounts centre (RAC) which will issue payments from the imprest account.

34. For efficiency, the minimum value per withdrawal application is $100,000 equivalent, unless otherwise approved by ADB. Individual payments below this amount should generally be paid from the imprest/sub-account, or by the BWDB and subsequently claimed to ADB through reimbursement. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

35. **Institutional Responsibility.** BWDB will be responsible for (i) preparing disbursement projections, (ii) requesting budgetary allocations for counterpart funds, (iii) collecting supporting documents, and (iv) preparing and sending withdrawal applications to ADB.

2. Government counterpart Funds and contract award /disbursement projections

36. All disbursements under government financing will be carried out in accordance with regulations of Government of Bangladesh relevant to co-financing of the projects financed by the Multilateral Financing Organizations. BWDB shall open and maintain the separate account for government's counterpart funds.

37. GOB will provide counterpart fund as well as ADB's reimbursable fund to the project as per financing and disbursement percentage. The expenditures to be funded by the donor funding is first made by the government and later on it is reimbursed from the donor as per eligible expenditure. GOB will provide counterpart fund as well as ADB's reimbursable fund to the project as per financing and disbursement percentage. The expenditures to be funded by the donor funding is first made by the government and later on it is reimbursed from the donor as

[12] The target turnover ratio of the imprest account is 2.0 per annum (calculated as cumulative amount of liquidation divided by average of imprest advance amount). See Appendix 10C of the *Loan Disbursement Handbook* for sample calculations. If the turnover ratio of the imprest account is lower than the target, ADB may reduce the level of advance to the imprest account by adjusting the amount of replenishment or by requesting a refund to ADB, as appropriate.

per eligible expenditure. For the disbursement of fund from the GOB, the MOWR will send the fund release proposal received from BWDB to the Finance Division of MOF for their concurrence before fund is ultimately deposited into a Central Account of the BWDB. Fund disbursement from GOB is usually disbursed in 4 quarterly instalments, and this fund will then be further disbursed through to the various Regional Accounting Centers (RACs) and subsequently payments to the respective service providers. However for the Project, the RAC office will be established in the PMU and all payment issued from the PMU RAC office.

38. PMU will then consolidate and verify the eligible expenditures and prepare/submit withdrawal application to ADB along with supporting documents or the SOEs. The Project director will be the entity authorised to sign on the withdrawal applications. A copy of the bank statement of Imprest account, Imprest account turnover ratio, and Imprest account reconciliation statement will be also submitted along with the withdrawal application for replenishment.

39. **Disbursement practice**. PMU should submit to ADB, annual contract awards and disbursement projections at least a month before the start of each calendar year using the templates in **Appendix 1.** PMU is responsible for (i) requesting budgetary allocations for counterpart funds, and (ii) collecting supporting documents. PMU is responsible for preparing and sending withdrawal applications to ADB.

B. Accounting

40. BWDB will maintain separate project financial statements and accounts adequate to identify the goods and services financed by the loan proceeds, financing received by al funding sources, expenditure incurred, and use of counterpart fund. Project financial statements will be prepared in accordance with international accounting principles and practices or those prescribed by the Government's accounting laws and regulations.

C. Auditing

41. BWDB will cause the detailed consolidated project financial statements to be audited in accordance with International Standards on Auditing by an auditor acceptable to ADB. The audited financial statements will be submitted in the English language to ADB within 6 months of the end of the fiscal year by the executing agency. The annual audit report for the project financial statements will include an audit management letter and audit opinions which cover (i) whether the project financial statements present a true and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting framework; (ii) whether loan proceeds were used only for the purposes of the project or not; (iii) the level of compliance for each financial covenant contained in the legal agreements for the project; (iv) use of the imprest fund procedure; and (v) the use of the statement of expenditure procedure certifying to the eligibility of those expenditures claimed under SOE procedures, and proper use of the SOE and imprest procedures in accordance with ADB's Loan Disbursement Handbook and the project documents.

42. BWDB will also cause the entity-level financial statements to be audited in accordance with International Standards on Auditing and with the Government's audit regulations, by an independent auditor acceptable to ADB. The audited entity-level financial statements, together with the auditors' report and management letter, will be submitted in the English language to ADB within one month after their approval by the competent authority.

43. Public disclosure of the project financial statements, including the audit report on the project financial statements, will be guided by ADB's Public Communications Policy (2011). After review, ADB will disclose the project financial statements for the project and the opinion of the auditors on the financial statements within 30 days of the date of their receipt by posting them on ADB's website. The entity level financial statements and the management letter will not be disclosed.

44. The Government, BWDB and the PMU have been made aware of ADB's policy on delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements. ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

45. A formal request for the project to be included in the OAG audit schedule should be sent through the ERD to OAG office. This request is best sent when the loan and project agreements are signed, and the request should include a copy of the loan and project agreements, and any other relevant documents. OAG would then advise the appropriate field office to include the project in its audit schedule.

46. In addition, to ensure that audited financial statements are submitted on a timely basis, DWDB through the PMU should submit its project financial statements for audit to OAG within 3 months from the close of the financial year. PMU shall be responsible for the Project financial statements. By 15 October of each year, OAG should receive the unaudited financial statements. It will then take 3 months to complete the audit, and issue an opinion no later than 6 months from the end of the financial year. A statement of audit needs is provided in Appendix 2.

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting and Retroactive Financing

47. In order to expedite project implementation, the Borrower has requested and ADB has approved advance contracting actions for the procurement and consulting service. All advance contracting and retroactive financing will be undertaken in conformity with ADB's *Procurement Guidelines* (February 2013, as amended from time to time) (ADB's *Procurement Guidelines)*[13] and ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time) (ADB's *Guidelines on the Use of Consultants).*[14] The issuance of invitations to bid under advance contracting and retroactive financing will be subject to ADB approval. The borrower and the BWDB have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the Project.

48. Except as otherwise agreed with ADB, the expenditures incurred for equipment, civil works, and consulting services will be eligible for retroactive financing, provided that these are incurred before the effectiveness of the related loan agreement, but not earlier than 12 months preceding the signing of the related loan agreement, and as long as they do not exceed an

[13] Available at: http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf
[14] Available at: http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf

amount of 20% of the individual loan. Five Advance contracting actions are proposed, these and the procurement stages are presented below.

Project Management and Design Consultants

No	Activity	Days	Timeframe	Action By	Status
1	Prepare RFP documents		31/08/2013	PPTA	Completed
3	EOI in newspaper and CSRN	10	20/09/2013	ADB	Completed
4	EOI submission	30	22/10/2013	ADB	Completed
5	Issue Request for Proposal	30	10/02/2014	ADB	Completed
7	Receive proposals from shortlisted firms	45	30/04/2014	ADB	Completed
8	Tech proposal evaluation	25	23/05/2014	ADB	Completed
10	Price proposal opening	8	31/05/2014	ADB	Not yet due
11	Combined (tech + price) evaluation	9	09/06/2014	ADB	Not yet due
13	Negotiations & contract drafting	16	25/06/2014	ADB	Not yet due
14	Approval of draft contract by Purchasing committee, Bangladesh	45	10/08/2014	MOWR	Not yet due
15	ADB approval of negotiated contract	0	05/08/2014	ADB	Not yet due
16	Contract signing	15	25/08/2014	BWDB	Not yet due

Muhuri Irrigation Management Operator (C-IMO)

No	Activity	Days	Timeframe	Action By	Status
1	Prepare RFP documents		31/08/2013	PPTA	Completed
3	EOI in newspaper and CSRN	10	20/09/2013	ADB	Completed
5	EOI submission	30	22/10/2013	ADB	Completed
6	Issue Request for Proposal	30	25/06/2014	ADB	Not yet due
7	Receive proposals from shortlisted firms	45	10/08/2014	ADB	Not yet due
8	Tech proposal evaluation	25	05/09/2014	ADB	Not yet due
9	Price proposal opening	8	13/09/2014	ADB	Not yet due
10	Combined (tech + price) evaluation	10	23/09/2014	ADB	Not yet due
11	Negotiations & contract drafting	16	08/10/2014	BWDB	Not yet due
12	Approval of draft contract by Purchasing committee, Bangladesh	45	23/11/2014	MOWR	Not yet due
13	ADB approval of negotiated contract	0	15/11/2014	ADB	Not yet due
14	Contract signing	15	07/12/2014	BWDB	Not yet due

Khal-1&2 works ICB

No	Activity	Days	Timeframe	Action By	Status
1	Prepare ICB / NCB bid documents		15/02/2014	PPTA	Completed
2	EA approves bid documents and submit to ADB	13	28/05/2014	BWDB	Not yet due
3	ADB approval of bid documents	21	21/06/2014	ADB	Not yet due

4	Invitation for bids (single stage two envelope)	45	07/08/2014	BWDB	Not yet due
5	Technical bid evaluation	20	27/08/2014	BWDB	Not yet due
6	EA approval of TBER	20	13/09/2014	BWDB	Not yet due
7	ADB approval of TBER	20	03/10/2014	ADB	Not yet due
8	Price bid opening	10	13/10/2014	BWDB	Not yet due
9	Price bid evaluation	20	03/11/2014	BWDB	Not yet due
10	EA approval of PBER	15	18/11/2014	BWDB	Not yet due
11	Approval of PBER by higher authorities, Bangladesh	20	08/12/2014	MOWR	Not yet due
12	ADB approval of PBER	20	28/12/2014	ADB	Not yet due
13	Contract signing	30	28/01/2015	BWDB	Not yet due
14	Mobilization	30	28/02/2015	Contractor	Not yet due

Pipes-1 works ICB

No	Activity	Days	Timeframe	Action By	Status
1	Prepare ICB / NCB bid documents		28/02/2014	PPTA	Completed
2	EA approves bid documents and submit to ADB	15	15/06/2014	BWDB	Not yet due
3	ADB approval of bid documents	21	07/07/2014	ADB	Not yet due
4	Invitation for bids (single stage two envelope)	45	21/08/2014	BWDB	Not yet due
5	Technical bid evaluation	20	08/09/2014	BWDB	Not yet due
6	EA approval of TBER	20	28/09/2014	BWDB	Not yet due
7	ADB approval of TBER	20	18/10/2014	ADB	Not yet due
8	Price bid opening	10	28/10/2014	BWDB	Not yet due
9	Price bid evaluation	20	17/11/2014	BWDB	Not yet due
10	EA approval of PBER	15	02/12/2014	BWDB	Not yet due
11	Approval of PBER by higher authorities, Bangladesh	20	23/12/2014	MOWR	Not yet due
12	ADB approval of PBER	20	13/01/2015	ADB	Not yet due
13	Contract signing	30	13/02/2015	BWDB	Not yet due
14	Mobilization	30	13/03/2015	Contractor	Not yet due

B. Procurement Plan

49. The procurement plan has been prepared based on the ADB generic templates.

Basic Data

Project Name: Irrigation Management Improvement Project	
Country: Bangladesh	**Executing Agency**: Bangladesh Water Development Board
Loan Amount: $46 million	**Loan (Grant) Number:** To be determined
Date of First Procurement Plan:	**Date of this Procurement Plan**: 11 May 2014

a. Process Thresholds, Review and 18-Month Procurement Plan

1. Project Procurement Thresholds

50. Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

Procurement of Goods and Works

Method	Threshold
International Competitive Bidding (ICB) for Works	2,000,000
International Competitive Bidding for Goods	$1,000,000
National Competitive Bidding (NCB) for Works	Beneath that stated for ICB, Works
National Competitive Bidding for Goods	Beneath that stated for ICB, Goods
Shopping for Works	Below $100,000
Shopping for Goods	Below $100,000

2. ADB Prior or Post Review

51. Except as ADB may otherwise agree, the following prior or post review requirements apply to the various procurement and consultant recruitment methods used for the project.

Procurement Method	Prior or Post	Comments
Procurement of Goods and Works		
ICB Works	Prior	
ICB Goods	Prior	
NCB Works	Prior for the first NCB	Post review for subsequent NCBs
NCB Goods	Prior for the first NCB	Post review for subsequent NCBs
Shopping for Works	Prior for the first shopping	Post review for subsequent shopping
Shopping for Goods	Prior for the first shopping	Post review for subsequent shopping
Recruitment of Consulting Firms		
Quality- and Cost-Based Selection (QCBS)	Prior	quality : cost ratio 90:10
Least-Cost Selection (LCS)	Prior	
Recruitment of Individual Consultants		
Individual Consultants	Prior	

3. Goods and Works Contracts Estimated to Cost More Than $1 Million

52. The following table lists goods and works contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

General Description	Contract Value ($million)	Procurement Method	Prequalification of Bidders (y/n)	Advertisement Date (quarter/year)	Comments
CW-1; Excavation of khal-1, rehabilitation of coastal embankment	4.8	ICB	n	Q3/2014	
CW-2; Excavation of khal-1	4.8	ICB	n	Q3/2014	
CW-3; Farmer distribution, pumps and prepayment meters-stage-1: 2,000ha	2.0	ICB	n	Q3/2014	
CW-4; Upgrading of electrical distribution	3.4	ICB	n	Q4/2014	
CW-5;Farmer distribution, pumps and prepayment meters-stage 2 :5,000 ha	5.0	ICB	n	Q2/2015	
CW-6; Farmer distribution, pumps and prepayment meters-stage 3: 5,000 ha	5.0	ICB	n	Q1/2016	
CW-7; Farmer distribution, pumps and prepayment meters-stage 4: 5,000 ha	5.0	ICB	n	Q1/2017	
CW-8; New structures, rehabilitation of structures, rehabilitation of BWDB buildings	4.0	ICB	n	Q4/2014	

4. Consulting Services Contracts Estimated to Cost More Than $100,000

53. The following table lists consulting services contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

General Description	Contract Value ($million)	Recruitment Method[1]	Advertisement Date (quarter/year)	International or National Assignment	Comments
CS-1; Project Management and Design Consultancy for IMIP	7.1	QCBS	Q4/2013	International and national	quality : cost ratio 90:10
CS-2; Muhuri	8.0	QCBS	Q4/2013	International	quality : cost ratio

Irrigation Management Operator (C-IMO)		and national	90:10

5. Goods Contracts Estimated to Cost Less than $1 Million and Consulting Services Contracts Less than $100,000

54. The following table groups smaller-value goods, works and consulting services contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

General Description	Value of Contracts (cumulative $million)	Number of Contracts	Procurement / Recruitment Method[1]	Comments
Consulting Services				
CS-3; various lots for specialist Water and Land Institutes including CEGIS and IWM for Action Research, Monitoring, Studies and Training	0.3	Various lots (as required)	LCS (depending on estimated cost) National	Each contract less than $100,000
CS-4; Independent Panel of Experts	0.15	Various individual consultants (as required)	Individual Consultant Selection International & National	
Goods				
Office equipment	0.28	Various lots	Shopping	Each lot less than $ 100,000
Hardware and software	0.03	Various lots	Shopping	

b. Indicative List of Packages Required Under the Project

55. The following table provides an indicative list of all procurement (goods, works and consulting services) over the life of the project. Contracts financed by the Borrower and others should also be indicated, with an appropriate notation in the comments section.

General Description	Estimated Value (cumulative $million)	Estimated Number of Contracts	Procurement Method	Domestic Preference Applicable[1]	Comments
Goods					
Office equipment	0.28	various lots	Shopping	No	Each lot will cost less than $ 100,000
Hardware and software	0.03	various lots	Shopping	No	
Works					

CW-1; Excavation of khal-1, rehabilitation of coastal embankment	4.8	one	ICB	Yes
CW-2; Excavation of khal-1	4.8	one	ICB	Yes
CW-3; Farmer distribution, pumps and prepayment meters-stage-1: 2,000ha	2.0	one	ICB	Yes
CW-4; Upgrading of electrical distribution	3.4	one	ICB	Yes
CW-5;Farmer distribution, pumps and prepayment meters-stage 2 :5,000 ha	5.0	one	ICB	Yes
CW-6; Farmer distribution, pumps and prepayment meters-stage 3: 5,000 ha	5.0	one	ICB	Yes
CW-7; Farmer distribution, pumps and prepayment meters-stage 4: 5,000 ha	5.0	one	ICB	Yes
CW-8; New structures, rehabilitation of structures, rehabilitation of BWDB buildings	4.0	one	ICB	Yes

	Estimated Value (cumulative $million)	Estimated Number of Contracts	Recruitment Method	Type of Proposal	Comments
Consulting Services					
CS-1; Project Management and Design Consultancy for IMIIP	7.1	one	QCBS International	FTP	
CS-2; Muhuri Irrigation Management Operator (C-IMO)	8.4	one	QCBS International	FTP	

CS-3; various lots for specialist Water and Land Institutes including CEGIS and IWM for safeguard independent, Monitoring, Studies and external audits	0.104	various lots	LCS national	STP
CS-4; Independent Panel of Experts	0.15	various lots	Individual consultant selection International & National	Biodata

c. Procurement of Goods, Works and Consulting Services

56. A procurement capacity assessment was undertaken by the PPTA procurement experts mid 2013 for BWDB and concluded that BWDB had already substantial experience with external aided project procurement including with ADB. However recommendations were made to enhance BWDB staff and private sector staff capacity including training on (i) civil works technical specification and consultant TORs preparation, (ii) tender proceedings including development of procurement plan up to evaluation and approval processes, (iii) contract administration and management particularly focusing on contract variations and settlement of claims and disputes, adjudication and arbitration, (iv) private sector skill development on bid submissions, understanding of contract conditions. In addition recommendations were made to strengthen the existing BWDB procurement unit and ensure it is supported by adequate staff number and regular training budget.

57. All procurement of goods and works will be undertaken in accordance with ADB's *Procurement Guidelines.*

58. Procurement packages for civil works will be split into eight packages. Three work contracts with a total estimated value of $ 11.6 million have been designed under the PPTA will be tendered starting in August 2014. All the procurement for works packages will be ICB. All the remaining works will be designed under the loan and tendered in year 2.

59. All consultants will be recruited according to ADB's Guidelines on the Use of Consultants. There are two consultancy packages under the Project.

d. Consultant's Terms of Reference

60. There are two consultancy packages proposed for the Project.

61. **Project Management, Planning and Design**: A Project Management and Design Consultant (PMDC) will be engaged to support the PMU over the ten year period of the loan. Given the extended duration of the PMDC contract, it is envisaged that two performance-based contracts will be required – one for the first five-year period and another for the second five-year period. During the Project five-year period, the PMDC will support the PMU in a range of tasks including:

(i) Designing and supporting the procurement of the MIP civil works not included in the advance packages.
(ii) Preparing feasibility studies, designs and the bid documents for GK and TBP irrigation projects modernization.
(iii) Support and supervise the Irrigation Management Operator,
(iv) Monitoring construction and related activities (construction supervision would be by the C-IMO).

(v) Designing and conducting training related to managing PPP contracts, project management, and other technical areas as required.
(vi) Preparing a review of the progress of the Muhuri C- IMO and support the preparation of bidding documents for the 2nd stage lease contract MOM for at Muhuri.

62. A total of 580 pm of consulting services have been provided for the PMDC which 82pm would international and 498 national.

63. **Muhuri Irrigation Management Operator.** A "Construction phase Irrigation Management Operator (C-IMO) will be engaged MIP; his will be the Muhuri Irrigation Management Operator.

64. The IMO will be located and operate within or near their project areas. The role of the IMO will be to develop and implement MOM of the completed works after completion of modernization and rehabilitation. During the development stage the C-IMO will also implement field level design of the piped irrigation systems and upgrading of electricity as well as being responsible for construction supervision of the investment works. It is envisaged that the IMO would seek to engage some BWDB technical staff with interest and appropriate qualifications and skills to continue to work within the respective systems. For the system modernization stage, which is proposed to have five year duration, the C-IMO would be contracted through a management contract by the PMU. During this period, the C- IMO will:

(i) Develop operation, maintenance, and management systems and procedures that will carry on following completion of physical work,
(ii) Establish a better understanding of system operating costs and revenue streams as input to the longer-term lease arrangements that follow-on the system modernization stage.
(iii) Liaise with BWDB and the newly established Implementation Coordination Committee (ICC).
(iv) Undertake participatory design of farmer distribution systems,
(v) Supervise the contractors engaged for system modernization.
(vi) Ensure compliance with environmental and social requirements.
(vii) Conduct demonstrations and other agricultural support activities.
(viii) Conduct pilots to investigate complementary cost recovery.

65. For MIP IMO, the provision has been made for 868 pm of high level professional management experts; of which 47pm are international and 821 pm national. It also includes 911 pm of support staff.

66. Details for the two consultancy packages are presented in Appendix 3.

VII. SAFEGUARDS

67. An Initial Environment Examination (IEE) was prepared for the project and includes an Environmental Management Plan which describes mitigation measures to be adopted during design, construction and operation of the Muhuri irrigation project.

68. A safeguards cell will be established in the PMU. The safeguards cell will be responsible to oversee overall monitoring and verification of environment and resettlement activities of the IMIP. Two counterpart personnel with relevant experience will be assigned to the safeguards cell

which will have responsibility for ensuring compliance of the safeguards requirements including (i) environment and (ii) resettlement including gender.

69. The MIP PIU Director will assume primary responsibility for the environmental assessment as well as implementation of EMP for their respective components. An environmental officer will be assigned to the project team under the PIU Director. The duties of the environmental officer will include: (i) oversight of construction contractors for monitoring and implementing mitigation measures; (ii) preparing and implementing environment policy guidelines and environmental good practices; (iii) liaising with the environmental agencies and seeking their help to solve the environment-related issues of project implementation; (iv) providing awareness training on environmental and social issues related to irrigation modernization under the IMIP; (v) preparation of environmental monitoring reports once a year for the IEE (as required by ADB).

70. In addition the environmental officer with assistance from the environmental consultant engaged by the Project Management and Design Consultant (PMDC) will: (ii) update the environmental assessment including EMP based on detailed designs; (iii) ensure the EMP is included in bidding documents and civil works contracts; (iv) provide oversight on environmental management aspects of the project and ensure EMPs are implemented by the contractors (v) facilitate and ensure contractors comply with all government rules and regulations regarding permits as well as any other relevant approvals required for works; (vi) supervise and provide guidance to the contractors to properly carry out implementation of the EMPs; (vii) review, monitor and evaluate the effectiveness with which the EMP is implemented, and recommend necessary corrective actions to be taken as necessary; (viii) consolidate periodic environmental monitoring reports to ADB; (ix) ensure timely disclosure of final environmental assessment in locations and forms accessible to the public; (x) take corrective actions when necessary to ensure no environmental impacts; (xi) conduct ongoing consultation with the community during implementation of the project; and (xii) establish a grievance redress mechanism and ensure it is operated satisfactorily.

71. The C-IMO will be responsible to monitor and supervise implementation of EMP on works contracts in the irrigation systems managed by the C-IMO. During operations of these schemes the C-IMO will be responsible to implement any activities identified in the EMP.

72. **Involuntary Resettlement.** No resettlement is foreseen under the Project. Nevertheless, a Resettlement Framework (DRF) has been prepared as a prudent measure to address any involuntary resettlement-related uncertainty during the project implementation, should any issue arise. (b) **Indigenous Peoples**. No IP issues are foreseen to be addressed during the project implementation.

73. **Prohibited investment activities**: Pursuant to ADB's Safeguard Policy Statement (2009) (SPS), ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the SPS.

VIII. GENDER AND SOCIAL DIMENSIONS

74. The Project has been categorized as a gender mainstreamed project (effective gender mainstreaming). The project components have been designed to ensure involvement and benefits for women as well as reduction of gender inequality. A Gender Action Plan (GAP) as described below has been prepared integrating action areas, targets and indicators for gender equality and women's benefits within the various components of the project. A focal point on

gender and development will be established in the PIU. The PIU will ensure establishing the MIS system with sex-disaggregated data collection, gender based analysis, and review and reporting on the implementation of the GAP within all reports.

75. A separate Stakeholder Consultation Strategy (SCS) has been prepared for the project to provide methodology and processes for continued consultations with various stakeholders particularly the poor and vulnerable groups during the course of project implementation. Local communities will be involved in consultations for project planning, implementation and for any safeguard issues with special attention given to include the poor and female headed households. Orientation on HIV/AIDs and other safety measures will be provided to the contractors and laborers in package training.

76. BWDB will ensure implementation of the GAP and SCS and will be supported by the PMU and the PIU team. The Social Development and Gender Specialist in the PMDC will provide support in monitoring and reporting on gender and social aspects in close coordination with the PMU and the PIUs. Adequate budget is allocated to implement these strategies.

77. The project in its broad based objectives will address gender issues in the following manner:

(i) Create scope for women's participation in the activities during the project planning, implementation, monitoring and evaluation.
(ii) Generate jobs for women by involving them in different construction and maintenance and agricultural support activities.
(iii) Facilitate linkages of rural women beneficiaries with different resources for sustainability of their livelihood.
(iv) Facilitate social and economic development programs aiming at women as the user groups to increase their access to the infrastructure development activities.
(v) Help promoting and building capacity of Union Parishads in particular with women members so that they are able to plan, coordinate and monitor social and gender related development activities in the project area and can play an effective role assigned to them under the project and through the various government circulars.
(vi) Gender friendly working environment with safety and security will be ensured in implementation of all possible activities in the project.
(vii) Promote gender equality in the context of Millennium Development Goal (MDGs).

78. A Gender Action Plan (GAP) as described below has been prepared integrating action areas, targets and indicators for gender equality and women's benefits within the various components of the project. It is noted that considering social constraints due to conservatism and seclusion and the purdah system, some of the gender targets have been set quite low.

Activities	Targets and Indicator	Monitoring mechanism	Time Frame	Responsibility
Output 1: Independent Performance Based Irrigation Management for Selected Large Scale FCDI Schemes				
Self-sustaining independent management operators (IMOs) established for	One staff engaged in IMO to support social and vulnerable groups. Technically qualified women prioritized for	Contract agreement, Annual Report of the IMO	During selection of Large Scale FCDI Schemes During selection of	IMO,PMU, BWDB, Chief Engineer Zonal Office

Activities	Targets and Indicator	Monitoring mechanism	Time Frame	Responsibility
selected large scale irrigation projects for the general purpose of supervising the work associated with rehabilitating and modernizing the systems. Agricultural support services and pilot cost recovery activities through the IMOs will be planned and implemented by the IMO.	recruitment in IMO Agriculture support services and cost recovery activities (ASCR) designed in year 1 incorporating activities with potential for long term sustainable roles for women, such as, crop diversification, post-harvest processing, social forestry and other appropriate activities. At least 30% women's participation ensured in planning ASPR Women constitute 20% of all extension trainees	 Agriculture support services and cost recovery project design reports. Monitoring	IMOs Year 2-5	IMO, PMU, BWDB, Chief Engineer Zonal Office IMO
Output 2: Rehabilitation and Modernization of Selected Large-Scale FCDI Schemes				
Implementation of rehabilitation and modernization and investment activities	Women (50% of all trainees) trained as pump operators, pre-paid card vendors and on other livelihood skills Women constitute minimum 10% of pump operators Women constitute minimum 30% of mobile smart card unit vendors	Meeting minutes, Video footage, Progress reports	Prior to the rehabilitation and up gradation	PMU, BWDB

Activities	Targets and Indicator	Monitoring mechanism	Time Frame	Responsibility
	Women selected for at least 20% of smart card vending. At least 30% of the LCS work allocated for women's groups. Provision for at least 5% women's employment as unskilled workers incorporated in the contractors' bidding document and implementation monitored.			
Output 3: Strengthened Project Management and Institutional Development				
Planning and design of GK and Teesta Irrigation Projects modernization	One Gender Consultant included in the Project Management Design Consultants (PMDC) during feasibility studies and detail design of GK and Teesta Irrigation Projects At least 10% women's representation ensured in each consultation session and document and address their needs.	PMDC report. Gender assessments minutes of meetings	Years 1 to 3	PMU, PMDC
Establishment of Program MIS with sex disaggregated data	M&E reports includes sex disaggregated data when relevant	PMU quarterly reports	Year 1 to 5	PMU, PMDC
Ensure effective participation of women in the activities of the Implementation Coordination Committee (ICC)	At least one woman deployed as member of the ICC to deal with gender issues. Women identified and employed as at least 10% of the electrified pump operators At least 30% LCS membership ensured for women.	ICC records	Year 1	PMU/PMDC

Activities	Targets and Indicator	Monitoring mechanism	Time Frame	Responsibility
Incorporation of gender aspects into the WMO training.	WMO training curricula developed integrating gender aspects	WMOs (WUG,WMA, WMF) formation sheet, WMOs Contract Training reports	Year 1	PMU, IMO
Recruit and deploy Gender Specialist and Sociologist at PMU HQ level Deploy female staff at BWDB field level offices	Gender Specialist and Sociologist deployed at PMU Women deployed at 10% of officers and 15% of staff positions as per Govt. employment regulation	Project progress report	Year 1	PMU, BWDB
Institutional development, awareness, and training of key stakeholders to incorporate training in Gender and Development issues	All training modules included project related gender issues All relevant project staff oriented on gender aspects of the Project and their own responsibilities	Training reports/ Trainees attendance sheet. M&E Report, Project progress reports Training curriculum.	During years 2-5	PMU, BWDB
Ensure gender inclusive surveying, data collection, monitoring, recording and reporting of all project activities	Sex segregated data collected, collated, and gender analysis based report prepared regularly	All Formats and tool.	Prior to implementation of survey	PMU, BWD
Gender budgeting	Budget allocation for mainstreamed GAP implementation ensured.	Development Project Proforma	During project preparation	PMU, BWD

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING AND COMMUNICATION

A. Project Design and Monitoring Framework

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Sustained high growth of agriculture in Bangladesh	By 2025: Annual real agricultural growth remains at 4.5% (baseline: average of 4.5% for 2010–2012)	Bangladesh Bureau of Statistics reports BWDB annual reports	**Assumption** Government remains committed to financing the agriculture and natural resources sector. **Risk** Input prices (i.e., fertilizer, pesticides, electricity) increase sharply.
Outcome Increased productivity and sustainability of the MIP	By 2019: Dry season irrigation area in the MIP increased by 50% to 17,000 ha (baseline 2013: 11,300 ha) O&M funding (from farmers and government) increased to 100% (baseline 2013: 84%) Average yield of irrigated winter paddy (boro) increased to 4 tons/ha (baseline 2013: 3 tons/ha)	BWDB project monitoring and evaluation reports Annual statements of cost recovery by PPP operators and government records BWDB annual reports for MIP	**Assumption** Rural Electrification Board supplies power to the MIP as per agreement (memorandum of understanding signed with BWDB). **Risk** Future climate change impact exceeds projections and affects negatively the project.
Outputs 1. Performance-based irrigation management and agriculture support services established	By 2019: Long-term lease contract in place for MIP large-scale irrigation project Efficient irrigation management in place with 100% recovery of cost of management, operation, and maintenance for levels 2 and 3 achieved (baseline 2013: 63%)[a] 300 trained farmers adopt more productive irrigated agriculture methods; at least 20% of trainees are women	Signed lease agreement Annual statements of cost recovery by PPP operators and government records PPP operator records	**Assumptions** Private sector shows interest in PPP for irrigation. Government continues to promote PPP for irrigation.
2. Irrigation system infrastructure rehabilitated and modernized	By 2019: The MIP rehabilitated and modernized with construction workers comprising 5% women and 20% poor and socially excluded 23 km of coastal embankment repaired, 460 km of canal drains re-excavated	For all indicators: BWDB, C-IMO records, and MIS data	

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
	One barrage rehabilitated, 800 lift pumps with prepaid meters installed, employing at least 10% women as pump operators and 30% as mobile water unit vendors 17,000 ha modernized with piped tertiary distribution		
3. Project efficiently managed with effective institutional development	By 2015 : The project MIS established with sex-disaggregated database By 2018: PPP unit permanently established with adequate capacity By 2019: The project meets annual contract award and disbursement schedule	BWDB project progress reports BWDB project progress reports ADB records Financial records	
Activities with Milestones **1. Performance-based irrigation management and agriculture support services are established** 1.1 Award PPP management contract for one large-scale irrigation scheme by September 2014 1.2 Establish implementation coordination committee to support scheme management for the Muhuri subproject by October 2014 1.3 Assess C-IMO viability (October 2017) and prepare lease bidding documents (January–October 2016) 1.4 Award long-term irrigation management lease contract for Muhuri M-IMO (April 2019) **2. Irrigation system infrastructure rehabilitated and modernized** 2.1 Award contract for 30% of works including (i) *khal* excavation and embankment rehabilitation and (ii) 2,000 ha pumps and pipe irrigation (September 2014) 2.2 Undertake detail design for remaining works including (i) structures, river protection, and buildings; (ii) electrification; and (iii) remaining pumps and pipe irrigation (September 2014– September 2016) 2.3 Award all civil works contracts (October 2017) 2.4 Complete detail designs of Ganges–Kobadak and Teesta irrigation project modernization (April 2016) **3. Project efficiently managed with effective institutional development** 3.1 Establish PMU (July 2014) 3.2 Award PMDC contract (July 2014) 3.3 Establish project MIS (August 2014) 3.4 Establish BWDB PPP unit (December 2014)		**Inputs** **ADB: $46 million** **Government: $7.6 million** **Beneficiaries: $4.4 million**

ADB = Asian Development Bank, BWDB = Bangladesh Water Development Board, ha = hectare, IMO = irrigation management operator, km = kilometer, MIP = Muhuri Irrigation Project, MIS = management information system.
[a] Levels 2 and 3 correspond to secondary and tertiary drainage and irrigation networks.
Source: Asian Development Bank.

B. Monitoring

1. Project performance monitoring:

79. Within six months of loan effectiveness BWDB with the support of the PMDC will establish a Monitoring Cell for the Project. The Monitoring Cell will be established to provide independent verification of the performance of various stakeholders as well as assessing impacts associated with investment objectives. The monitoring cell will be linked to the existing monitoring division within BWDB under the Chief Monitoring who reports to BWDB's Director General. The monitoring cell will monitor the project progress against the outputs and targets set out in the Design and Monitoring Framework (DMF). The monitoring cell with support of the PMDC consultants will, establish a project performance monitoring system in line with the targets, indicators, assumptions and risks described in the DMF. The monitoring cell will consolidate the results and prepare the quarterly progress reports and an annual report which will include the required indicators and provide information necessary to update ADB's project performance reporting system[15].

2. Compliance Monitoring

80. The status of compliance with loan covenants, including policy, legal, financial, economic, environmental, and others, will be monitored and reported by PMU through the quarterly progress reports, which will be consolidated and submitted by the PMO to ADB. The results will be reviewed in detail during ADB's review missions. In particular, the status of the implementation of safeguard measures described in EMP, as well as implementation of measures described in SPRSS and GAP, will be monitored and reported by the PIU in quarterly project progress reports.

3. Safeguards monitoring

81. Within six months of loan effectiveness BWDB with the support of the PMDC will establish a Safeguards Cell for the Project. The Safeguards Cell will be established to provide independent verification of the project safeguards including the environmental management plan (EMP) and gender and social dimensions monitoring including the gender action plan (GAP). The monitoring cell will be linked to the existing monitoring division within BWDB under the Chief Monitoring who reports to BWDB's Director General.

82. The safeguards cell which will be staffed by three Government officers (environment, resettlement and social dimensions and gender) with support of the PMDC consultants will, establish a project performance monitoring system in line with the targets, indicators, assumptions and risks described in the IEE and GAP. The monitoring cell will consolidate the results and prepare the quarterly progress reports and an annual report which will include the required indicators and provide information necessary to compliance with safeguards.

83. It is proposed that an independent third party consultant or institute is engaged to implement safeguards monitoring. Data will be collected from the Irrigation Management

[15] ADB's project performance reporting system is available at: http://www.adb.org/Documents/Slideshows/PPMS/default.asp?p=evaltool

Operator as well as the Implementing NGO who will be implementing the resettlement as well supported by direct collection of data to ensure adequate verification.

84. The status of the implementation of the safeguards including the initial environmental examination IEE/EMP and social dimensions including GAP will be discussed at each ADB review mission and integrated into semi-annual reports for IEE/EMP and GAP implementation. These will be prepared by the safeguards cell and sent to the PMU to be forwarded to the ADB.

C. Evaluation

85. Within 24 months of loan effectiveness, ADB will conduct a mid-term review to identify problems and constraints encountered and suggest measures to address them, including appropriateness of scope, design, implementation arrangements, schedule of activities and compliance with safeguard and other covenants.

D. Reporting

86. The PMU will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports including (a) progress achieved by output as measured through each indicator's performance targets, (b) key implementation issues and solutions; (c) updated procurement plan; (d) semi-annual safeguards monitoring reports; annually for environment and semi-annual for resettlement; (e) annual monitoring report on implementing the GAP and (f) updated implementation plan for next 12 months; and (iii) a project completion report within six months of physical completion of the project. To ensure projects continue to be both viable and sustainable, project financial statements and the executing agency AFSs, together with the associated auditor's report, should be adequately reviewed.

E. Stakeholder Communication Strategy

87. The project will maximize transparency by communicating relevant project information to stakeholders in various means. The PMU will set up a website within two months of loan effectiveness and disclose all key project-related information, including the scope, cost, and financial and institutional arrangements of the project, project safeguard reports such as IEE, GAP and project progress such as procurement, contract award and disbursement. The PMO will also fully disclose through the website and its information center relevant project-related information, such as subproject cost, cost-sharing arrangement, contractor's name, contract price, progress of construction, financial status of municipalities, through public briefings, bulletin boards, municipal annual reports, etc. The safeguard documents will also be disclosed in ADB website.

88. Participation is an important aspect of the project. Public awareness programs for gender, social, and infrastructure subproject related measures will be implemented by the PMU supported by PMDC during the planning and design of TBP and GKIP and the project C-IMO during the implementation stages. The PMU with the support of the PMDC working with the C-IMO will prepare a consultation awareness and participation plan (CAPP) within six months of loan signing. The CAPP will be used to guide consultation and awareness building activities under the project to be conducted in parallel with physical investment activities. The GAP and CAPP plans will ensure sufficient consultation and participation with beneficiaries, including women, the poor and vulnerable groups.

4. Information Disclosure

89. The Stakeholders Communication Strategy implementation will engage and inform relevant IMIP stakeholders and sectors with timely, accurate, and comprehensive information shared among stakeholders. Such information sharing will help to build consensus and ensure continuous stakeholder support throughout the Project. The stakeholder Engagement and Communication Strategy (SE&C)is to significantly increase stakeholder and community awareness of the Project strategy, proposals activities and outputs in order to improve stakeholder engagement and to develop greater community support for the project proposals and the decision making process. The guidelines for SE&C will include:

(i) **Clarify** the objectives and goals of engagement and evaluate the appropriateness of techniques.
(ii) **Understand** related processes and be clear about how the engagement fits in with official decision-making processes.
(iii) **Manage** information in an accessible way without using complex concepts or jargon.
(iv) **Support** the development of capacity in understanding and applying the research concepts.
(v) **Ensure** transparent identification of stakeholder groups and invitations to be involved.
(vi) **Build** trust with and between participants for the long term.
(vii) **Allocate** sufficient time to develop process, build partnerships and strengthen networks.
(viii) **Encourage** feedback and ensure flexibility to adapt to that feedback.

90. Stakeholder Engagement and Communication Objectives. The main stakeholder engagement and communication objectives include:

5. Awareness:

91. The PPTA has implemented an intensive program of communication and awareness however it is assessed that the majority of farmers and other stakeholders do know about the proposed project do not know the detail of the project components. Stakeholders are somewhat disappointed in the delays in the project start for the Muhuri project but also in TBP and GKIP. The following aspects need to be addressed to attain the awareness among the different stakeholders of the project.

(i) Awareness
- To raise overall awareness of the project, its intent, activities and outputs including opportunity for women employment and women development activities.
- To promote the benefits and positive aspects of the project.
- To raise awareness of the linkages between the MIP and other related projects.
- To ensure stakeholders are aware of the project and how to be involved.
- Attitude:
- To reduce communications risks by encouraging a positive view of the project.
- To manage expectations of what the project can and can’t deliver.

(ii) Behaviors*:*

- To encourage public demonstrations of support for the project*.*
- To encourage key stakeholders to engage in project activities.
- To provide tools for project partners and collaborators to communicate the project intent, activities and outputs.

(iii) The SE&C will be based on a strategic approach including:

- Building direct, positive relationships wherever possible
- Utilizing media and stakeholder networks where direct relationships are not possible
- Building strong linkages between MIP and other relevant projects
- Facilitating information sharing and information sharing networks
- Demonstrating how MIP is contributing to a broad range and societal goals
- Using a matrix of communication tools in a sustained program

92. There are three distinct approaches to communication that can be used for successful implementation of the campaign for the implementation of the MIP as well as the planning and design activities for the GKIP and TBP:

(i) Behaviour change communication: This approach addresses the knowledge, attitudes, behaviour and skills of individuals, families and communities as they relate to specific program goals. Within a participatory communication framework, individuals and communities gain knowledge, appreciation and skills that motivate them to develop positive and healthy behaviour and practices.

(ii) Communication for social mobilization: This approach moves beyond the individual behaviour change communication to a more comprehensive model of communication. It provides an opportunity for greater levels of community participation in social change. It involves planned actions to reach, influence, enable, and involve key segments of the community in order to collectively create an environment that will affect positive behaviour and bring about desired social change. Segments include influential groups or individuals as well as formal and informal leaders among those who will directly benefit from the desired social change.

(iii) Communication for advocacy: It is an organized attempt to influence the political climate, policy and program decisions, public perceptions of social norms, funding decisions, and strengthen the voices of communities and societies for social and policy change.

93. Planning and research is required to ensure the message reaches the key stakeholders with optimum impact and frequency.

94. Experience has shown that the communication plan and activities must be targeted to the proposed requirements of behavioural and social change; experience has shown that communication activities are more successful when consistent messages are conveyed through a mix of channels and tools, specially combining the community media (interpersonal communication) with mass media programs:

(i) **Community-based communication.** A range of communication activities can be carried out using participatory and interpersonal communication tools. The

success of this communication requires the active involvement of the participants in the communication development process. Informal discussion meeting and workshop with the particular stake holder is proposed. Interpersonal communication tools and community media like folk media, theatre, folk songs and festivals. The success of this communication requires the active involvement of the participants in the communication development process. Activities suggested include farmer group discussions, courtyard meetings and group discussions.

(ii) **Mass media campaign**. The mass media can be a strong source of information for raising awareness, building knowledge and influencing public opinion. The following devices can be used National and local level seminar/workshop, Electronic media -Radio, Television, video, film, internet. Print media - Newspapers, newsletters, fact sheets, handouts, posters, research findings and reports.

(iii) **Participative Planning and Design**: Farm level design will be done in participative approaches including briefing meetings and walk through with farmers.

F. Phases of Communication and Engagement Strategy and Outputs

95. It is proposed that both the PMDC and the C-IMO implement a focused programme of stakeholder engagement, communication and awareness during the Project. The PMDC will focus on the development of participative planning and design for the GKIP and TBP modernization; while the C-IMO develops a highly focused campaign to engage with farmers, WMO's and other stakeholders to implement the new initiatives for OM as well as the programs of agricultural support.

96. Planning the program

(i). Planning and design of the approach: this will be done in Month 3 based on an assessment of the communication work implemented under the PPTA together with consultation with Government and Non-Government stakeholders to assess current levels of knowledge and awareness of the project objectives.

(ii). Communication and engagement with selected stakeholders to support the preparation of the project design.

(iii). Upscaled communication and awareness to the wider stakeholders

(iv). Monitoring and response to provide feedback on the response to the proposed project proposals.

97. The proposed communication and engagement programme for the PMDC is summarised in Table 1 below. This program is designed to inform the stakeholders of the IMIP and to engage with stakeholder to support the project planning and design for TBP and the GKIP.

Table 1: Proposed Communication and Engagement Program for the PMDC

	Activity	**Consultation method**	**Participants**	**Objective**	**When Implemented**
1	Initial Public Meeting	PM	WUA, WUF, Farmers, ~45 persons. About twenty meetings	Feedback on farmer perceptions	Initial mobilisation of the PMDC at the field sites
	Media	Media	To publicise the meetings	To widen the	1 month before

			and improve the awareness of the project objectives	awareness beyond the workshops	and after the workshops
2	Focus Group Discussions	FGD	About 20 FGD to be held with WUG, WMA, WMF, Farmers, and representative stakeholder	Feedback on current issues and perceptions of proposed changes.	Month 3
3	Individual meetings with key stakeholders	IDI	About 25 direct interviews with farmers, REB, BWDB, WMF, WMA and women	Feedback on current perceptions of the project design.	Month 3
4	Rapid Rural Appraisal	RRA	Teams of enumerators mobilised to support more definitive and information	Statistical information of agricultural practices, responses to change etc. Special information needs can be targeted including gender, environment poverty	Month 4 design of project Month 5 implementation
4	Preliminary Surveys	SVS	Farmers, WUA, WUF	Surveys to meet specific socio economic information	Month 5
5	Upazila Level Public Meetings	PM	WUA, WUF, Farmers, other stakeholders	Dissemination of preliminary strategies for .modernization and improvement	Month 12 onwards once strategies have prepared
6	Focus group discussions and Individual Meetings with key Stakeholders	FGD/IDI	Government, WUA, WUF, ,	Consultative meetings with key stakeholders to support the preparation of the detailed design.	Month 13 onwards
7	Participative Planning and Design	PM/FGD	Focused meetings and discussions to review specific planning and design activities	Engagement and feedback from farmers on planning and design scenarios and options.	Month 15 onwards
8	Final Workshops	PM	Public meetings to obtain final engagement		Month 18

98. The proposed communication and engagement program for the Muhuri C-IMO is different with the objectives for the stakeholder to better understand the project implementation objectives. The program is described in Table 2.

Table 2: Communication and Engagement Program for the IMO

Activity	Consultation method	Participants	Objective	Timing
Public Meeting	PM	WUA, WUF, Farmers, ~45 persons. One meeting proposed for each Upazilla. Brochures would be prepared to widen the information base	Create awareness of the project objectives	Month 3
Focus Group Discussions	FGD	About 20 FGD have been held with WUG, WMA, WMF, Farmers, Pump Operators, Women's groups	Create awareness and obtain feedback on current issues and perceptions of proposed changes.	Month 3-6
Individual meetings with key stakeholders	IDI	About 25 direct interviews held with farmers, REB, BWDB, WMF, WMA and women	Feedback on current perceptions of the project design.	Month 6
Participative design activities	SVS	Farmers, pump operators, WUA, WUF. - stage 1-reengaging with farmers for the 2000ha advance systems -stage 2 5000ha second stage	To ensure farmers previously signed up remain committed. Participative design for the Stage 2 pipe systems	Month 2-3 Month 3-6
Upazila Level Public Meetings	PM	WUA, WUF, Farmers, Pump Operators	To brief on the steps to initiate the pumps and prepaid meters.	Month 12
Focus group discussions and Individual Meetings with key Stakeholders	FGD/IDI	Government, WUA, WUF, Pump Operators, within each command to be taken up for pipe systems	Consultative meetings with key stakeholders to support the preparation of the detailed design.	Month 5-24
Agricultural support programs	IMO	Extension, farmer training school, demonstration plots	Activities to be planned and designed by the IMO	Year 2-5

X. ANTICORRUPTION POLICY

99. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the Project.[16] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all Project contractors, suppliers, consultants and other service providers.

[16] Available at: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf

Individuals/entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the Project.

100. To support these efforts, relevant provisions are included in the financing agreements and the bidding documents for the Project. Risks associated with project management, including procurement and disbursement, will be mitigated by (i) providing consulting inputs to advise and assist in the procurement of goods and services; (ii) requiring that civil work contracts include a condition that contractors adhere to ADB"s Anticorruption Policy (1998, 29 amended, from time to time); (iii) the PMU periodically inspecting the contractors fund withdrawals and settlements; and (iv) reporting on project activities and implementation on the website to foster transparency and timely awarding of contracts.

101. The government will ensure that (i) BWDB conducts periodic monitoring inspections on all contractors" activities related to fund withdrawals and settlements; and (ii) all contracts financed by ADB in connection with the project include provisions specifying the right of ADB to audit and examine the records and accounts of BWDB and all contractors, suppliers, consultants and other service providers as they relate to the project.

XI. ACCOUNTABILITY MECHANISM

102. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make a good faith effort to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[17]

XII. RECORD OF PAM CHANGES

103. The first draft of PAM has been prepared and agreed upon at the loan fact-finding. All revisions/updates during the course of implementation will be retained in this Section to provide a chronological history of changes to implementation arrangements recorded in the PAM.

[17] For further information see: http://www.adb.org/Accountability-Mechanism/default.asp.

APPENDIX 1: DETAILED PROCEDURES FOR DISBURSEMENTS, ACCOUNTING, AND AUDITING

Worksheet for Quarterly & Yearly Contract Awards/Commitments & Disbursement Projections ($ Million)

Asian Development Bank ADB

*(**Important:** Before completing this form, please read carefully the instructions printed at the back of this form. Refer to PAI Nos. 5.02. Issued in December 2001.)*

PROJECT: _____ LOAN/GRANT NO. _____ SEGMENT NO. _____ FUNDS (OCR, SF, ADF-IX, ATF[2]) _____ COUNTRY (Acronym) _____ PROJECTIONS MADE IN: _____ (Month, Year)

Ref. Line No.	Category [1]	CONTRACT/COMMITMENT ITEM [1]	Contracts Awarded on Previous Year(s)	QUARTER 1 Jan, Feb, Mar 20____				QUARTER 2 Apr, May, Jun 20____				QUARTER 3 Jul, Aug, Sep 20____				QUARTER 4 Oct, Nov, Dec 20____				TOTAL PROJECTED FOR THE YEAR 20___ (YP)=(QA) + (QP)	
			Month, Year Contract Awarded	QP/QA	Month Awarded/ Committed or To be Awarded/ Committed	QP/QA	Disbursement Amount Related to the Contract/ Commitment (2)	QP/QA	Month Awarded/ Committed or To be Awarded/ Committed	QP/QA	Disbursement Amount Related to the Contract/ Commitment (4)	QP/QA	Month Awarded/ Committed or To be Awarded/ Committed	QP/QA	Disbursement Amount Related to the Contract/ Commitment (6)	QP/QA	Month Awarded/ Committed or To be Awarded/ Committed	QP/QA	Disbursement Amount Related to the Contract/ Commitment (8)	Contract Value/ Commitment (9)=(1+3+5+7)	Disbursement Amount Related to the Contract/ Commitment (10)=(2+4+6+8)
			Contract Value (Bank Financed)	QP/QA	Contract Value/ Commitment (1)			QP/QA	Contract Value/ Commitment (3)			QP/QA	Contract Value/ Commitment (5)			QP/QA	Contract Value/ Commitment (7)				
TOTAL (Carried Forward) FROM PREVIOUS PAGE ___ OF ___ PAGES																					
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
TOTAL OF THIS PAGE___ OF___PAGES (To be carried on next page)																					
GRAND TOTAL (LAST PAGE)																					

[1] In accordance with the allocation of loan proceeds as defined in the loan documents, or any other detailed breakdown if found useful.

[2] ATF = Asian Tsunami Fund; Projections should be for the ADB-ATF financed component only.

QA = Quarterly Actual (already awarded/committed/disbursed, when projections are prepared).

QP = Quarterly Projected (to be awarded/committed/disbursed), when projections are prepared).

NOTES AND REMARKS:

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Page ___ of ___ pages

QP-01-20_____

ADB Form No. 16/06

Revised September 2005

Summary Form
Contract Awards and Disbursement Projections for 2010

2010 Projections
(in US$'000)

Description of Contracts/Loan Category	Contract Awards						Disbursements				
	Q1	Q2	Q3	Q4	Total		Q1	Q2	Q3	Q4	Total

APPENDIX 2: STATEMENT OF AUDIT NEEDS

STATEMENT OF AUDIT NEEDS

A. BACKGROUND

1. The Asian Development Bank (ADB) and the Government of Bangladesh (GOB) have entered into a Loan and Grant Agreement whereby, ADB shall provide $46 million for the purpose of financing the Project of the Irrigation Management Improvement Project (IMIP) in Bangladesh. The GOB shall contribute $9.3 million against this funding. This will be carried out through the Bangladesh Water Development Board (BWDB). BWDB shall maintain separate books of account which will be consolidated by the PMU with respect to this Project, including all items of expenditure financed out of the proceeds of the loan and grant agreement.

B. PROJECT DEVELOPMENT OBJECTIVES

2. The Project is designed to realize the full production potential of large scale irrigation schemes in Bangladesh. It will address the recurrent lack of sustainable management, operation and maintenance (MOM) and increase water productivity by transferring the MOM schemes to private operators and by introducing innovative infrastructure modernization.[18] The Project will focus on the modernization of Muhuri Irrigation Project[19] (MIP) in the Chittagong division. It will also finance the feasibility study and detail design of the modernization of the Ganges-Kobadak (GK) and Teesta irrigation projects which are located respectively in the Khulna and Rangpur divisions. The project outputs will be:

(i) **Performance-based irrigation management and agriculture support services established.** This output will include contracting private irrigation management operators under 5 years performance-based management contracts. This “Construction phase” irrigation management operators (C-IMO) will supervise modernization works, establish sustainable MOM and provide agricultural support services in MIP. Efficient management systems will be adopted to maximize water use efficiencies and develop sustainable and reliable irrigation service delivery. Viable and effective operations and maintenance (OM) cost recovery mechanisms will be setup to achieve 100 % cost recovery. The objective will be to bring MIP scheme to the level of profitability and sustainability required for enabling the recruitment of a long term (15 years) “Management phase” irrigation management operator (M-IMO) through a PPP modality. The project will also support the preparation of the long-term PPP transaction.

(ii) **Irrigation system infrastructure rehabilitated and modernized.** This output will include physical rehabilitation and modernization of irrigation infrastructure including (i) repair of 450 km of canals and 22.6 km of coastal embankments with ancillary facilities; (ii) development of 17,000 ha of modern and highly efficient piped water distribution system to improve timely water access and reduce water losses; (iii) provision of prepaid card meters to allow water allocations to be based on a volumetric basis and ensure full and transparent payment and accounting, (iv) full electrification of the pumping to reduce the operational costs

[18] ADB. 2012. *Technical Assistance to Bangladesh for Preparing the Irrigation Management Improvement Project*. Manila (TA 8154-BAN).

[19] This includes the original Muhuri Irrigation Project area completed in 1998 as well as the expansion area to the north under the Muhuri -Kahua Project area completed in 2006.

and increase management flexibilities and; (v) pilot solar panels and pumps for 60ha.

(iii) **The Project is efficiently managed with effective institutional development.** This output will include (a) establishment of competent project management and project implementation unit; (b) timely procurement and disbursement; (c) timely appraisal of GK and Teesta irrigation projects modernization and provision of required feasibility studies and detail designs and strategies to transfer MOM to private sector; and (d) institutional support and capacity and awareness building of BWDB and water management organizations to successfully administer and support PPP contracts.

C. FINANCIAL REPORTING AND AUDIT REQUIREMENTS

3. BWDB will prepare the Project financial statements on a cash basis, in accordance with the Bangladesh Accounting Standard (BAS) as adopted by the Institute of Chartered Accountants of Bangladesh (ICAB) and its Financial Administrative Regulations (FAR). This shall not be construed to refer to the financial statements of IMIP as a whole.

4. The audit of the project financial statements shall be carried out by the Foreign-Aided Project Audit Directorate (FAPAD) within the Comptroller and Auditor General of Bangladesh (CAG) in accordance with CAGs Audit Manual20, as supplemented by this Statement of Audit Needs. The auditor will review that the funds received from all sources and expenditures incurred during the reporting period are as per agreed terms and conditions. This will include all expenditure to the extent that it relates to the activities of the IMIP and BWDB supporting this Project.

5. BWDB will submit to ADB audited project financial statements as of June 30 each year, within 6 months of the end of the fiscal year in English. A complete set of audited project financial statements includes:

(i) Audit Opinion on the Project Financial Statements
(ii) Audit Opinion on Specific Donor Requirements[21]
(iii) Project Financial Statements and Statement of Budget Vs. Actual along with complete notes to the financial statements including necessary break downs and details, summary of accounting policies and explanatory notes
(iv) Management Letter (paragraph F below)

6. To ensure the timely submission of audited project financial statements, BWDB will formally request the CAG to include IMIP audits in their yearly work plan through the Economic Relations Department (ERD), at the time of loan negotiations. To support timely submission, unaudited project financial statements should be submitted to the CAG for audit within 3 months of the end of the fiscal year.

7. In addition, BWDB shall also submit a copy of their own entity level audited financial statements within one month of the date of their approval by the governing body of BWDB.

[20] Audit standards for CAG directorates are set out in an Audit Manual and are based on INTOSAI and Asian Organization of Supreme Audit Institutions standards

[21] Separate or combined opinions on the Project's financial statements and specific ADB requirements may be provided

D. SPECIFIC AUDIT NEEDS

8. The audit would cover the entire Project, i.e. covering all sources and application of funds, including ADB and the GOB. The Financing Arrangement as currently agreed with ADB, includes Direct Payments by ADB to suppliers (DPs). The Project Director shall provide all pertinent information to the Auditors including preservation and use of resources procured and its reflection in the project financial statements, so as to facilitate comprehensive audit coverage. The audits should be carried out annually from commencement of the Project. The audit for the first year should also cover transactions, which occurred from the commencement of the project, i.e. till the end of the fiscal year. In case the period is less than 6 months, GOB may agree with ADB to provide audited project financial statement (APFS) from the commencement of the Project to the end of the subsequent fiscal year.

9. The auditor will provide assurance as to whether the program's financial statements present a true and fair view of the receipts and expenditures, or are presented fairly, in all material respects, in accordance with the applicable financial reporting framework.

10. In addition, ADB will also require an assessment by the auditors of compliance with provisions of the financing agreement with ADB, especially those relating to accounting and financial matters. Positive assurance should be provided in accordance with International Standard on Assurance Engagement – 3000. An audit opinion shall be provided that will inter alia include verification that:

(i) All funds, including counterpart funds, have been used in accordance with the conditions of the loan agreements, with due regard to economy and efficiency, and only for the purposes for which the funds were provided;
(ii) The BWDB were in compliance as at [insert date] with all financial covenants of the loan agreement
(iii) With respect to statement of expenditures, (a) adequate supporting documentation has been maintained to support claims to ADB for reimbursement of expenditures incurred; and (b) except for ineligible expenditures as detailed in the audit observations, if any, appended to this audit report, expenditures are eligible for financing under the Loan Agreement
(iv) The Imprest Account gives a true and fair view of the receipts collected and payments made during the year ended [insert date], and (ii) these receipts and payments support the Imprest Account Liquidation/ replenishments during the year

11. ADB would expect that the auditors should advise a calendar for discussion/review of audit observations (particularly any serious matters) through tri-partite meetings and review meetings to facilitate executive follow-up on audit observations and recommendations. Moreover, ADB would need a review of actions taken on the recommendations presented in the previous audit report on the progress made.

E. PROJECT FINANCIAL STATEMENTS (PFSs)

12. The Project's APFSs shall be prepared in accordance with international accounting best principles and practices as well as government's accounting laws and regulations. These should include:

(i) Sources and Consolidated Uses of Funds showing the funds received and expended from ADB and GOB for IMIP, as well as imprest account balances
(ii) Statement of Budget Vs. Actual showing expenditure for the current year and

cumulative year to date

(iii) Detailed notes to the financial statements including explanatory notes, breakdown of expenditure, reconciliation of reimbursements, details of expenditure by currency/method of funding/output component, statement of imprest account, and accounting policies

13. Project Books of Account shall be maintained by the Project Management Unit (PMU).

14. Project Financial Statements shall provide sufficient level of detail to identify types of expenditures as identified in the allocation table of the loan Agreement; namely civil works, consulting services, training, workshops and extension, vehicle and equipment.

15. The project financial statements shall also provide sufficient level of detail to be able to identify expenditure relating to each of the 3 Outputs of the Project; namely, (i) Output1: Performance based irrigation management and agriculture support services are established, (ii) Output 2: Irrigation system infrastructure is rehabilitated and modernized, and (iii) Output 3: the Project is efficiently managed with effective institutional Development.

16. Draft template for the Financial Statements shall be provided to the PMU during implementation to ensure maximum alignment with Cash Basis International Public Accounting standards as well as conformity with IBAS.

17. Please note that any financial statement template is a working draft, which may require adjustment based on the actual activities of the Project.

F. MANAGEMENT LETTER

18. In addition to the audit report, ADB will require a separate management letter.

19. The management letter should specifically:

(i) Give comments and observations on the notes to the accounts, accounting records, systems, and internal controls that were examined during the course of the audit;
(ii) Identify specific deficiencies and areas of weakness in systems and internal controls and make recommendations for their improvement including MOE response to the identified deficiencies;
(iii) Communicate matters that have come to attention during the audit which might have a significant impact on the implementation of the Project;
(iv) Bring to GOB and ADB attention any other matters that the auditor considers pertinent; and
(v) The auditor should also make follow-up of audit recommendations to their conclusion.

20. Serious issues, which affect the auditor's opinion as to whether the financial statements give a true and fair view, should be referred to in the audit opinion. Management Letter should include only those issues which do not affect the fairness of the financial statements.

G. GENERAL

21. Review missions and normal project supervision will monitor compliance with financial reporting and auditing requirements and will follow up with concerned parties, including the external auditor.

22. ADB has made BWDB aware of ADB's policy on delayed submission, and the requirements for satisfactory and acceptable quality of the audited financial statements[22]. ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower, or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed.

23. ADB retains the right to verify or have audited (i) the project (ii) the validity of BWDB's certification for each withdrawal application, and (iii) that ADB's financing is used in accordance with ADB's policies and procedures.

24. In case an external auditor needs to be commissioned for a supplementary audit, the auditor should be given access to all legal documents, correspondences, and any other information associated with the commission and deemed necessary by the auditor. Confirmation should also be obtained of amounts disbursed and outstanding with ADB and government, etc.

H. PUBLIC DISCLOSURE

25. Public disclosure of the project financial statements, including the audit report on the project financial statements, will be guided by ADB's Public Communications Policy (2011).[23] After review, ADB will disclose the project financial statements for the project and the opinion of the auditors on the financial statements within 30 days of the date of their receipt by posting them on ADB's website. The Audit Management Letter will not be disclosed.

Note: This is a statement of audit needs for ADB and does not in any way intend to limit the scope of the statutory audit.

[22] ADB Policy on delayed submission of audited project financial statements:
- When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (i) the audit documents are overdue; and (ii) if they are not received within the next six months, requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed.
- When audited project financial statements have not been received within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement and issuance of new commitment letters. ADB will (i) inform the executing agency of ADB's actions; and (ii) advise that the loan may be suspended if the audit documents are not received within the next six months.
- When audited project financial statements have not been received within 12 months after the due date, ADB may suspend the loan.

[23] Available from http://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications

APPENDIX 3: DRAFT TERMS OF REFERENCE FOR THE CONSULTANTS

1- DRAFT TERMS OF REFERENCE FOR PROJECT MANAGEMENT AND DESIGN CONSULTANTS

A. Background

1. In Bangladesh, agricultural development and sustainable natural resource management are critical for poverty reduction, as the majority of the poor (85%) live in rural areas and depend on agriculture for their livelihood. Agriculture generates 50% of employment, contributes 20% of gross domestic product, and provides a secure food supply for the whole population. Major causes of poverty are recurrent floods and riverbank erosion, as well as drainage congestion, salinity, cyclones and tidal surges, arsenic contamination, over-exploitation of groundwater, chemical and biological contamination of surface water, and drought. Climate change is expected to affect the future incidence and severity of disasters, necessitating more attention to managing disaster risk and adapting to change.

2. Extensive irrigation facilities have been constructed that include privately owned and operated groundwater abstraction technologies, and publicly owned and financed large surface water irrigation schemes.[24] The large irrigation schemes suffer from inefficient water utilization, inadequate maintenance, and a large backlog of needed repairs. More effort is required to foster community participation in sustainable management, and to include women and the private sector. The productivity of these schemes continues to be weakened by inadequate management, operation and maintenance (MOM), and now the infrastructure of most large schemes requires rehabilitation. This weakness is due to inadequate financing,[25] lack of beneficiary participation in management, and poor service delivery. The present low performance may be aggravated in future by changes in temperature and rainfall patterns owing to climate change. Such risks need to be considered when rehabilitating the infrastructure and modernizing system operations.

3. Government provides distribution systems down to secondary or tertiary levels for 15 existing large irrigation schemes, with a total command area of around 550,000 hectares (ha).[26] For the period 1996-98, only about 46% of their net command area was irrigated from BWDB sources in the main irrigation season, and there is little evidence of improvement since then. Increasing the areas irrigated and recovering fees would assist economic growth through increased production and reduced subsidies. Also, developing sustainable approaches for MOM of the existing schemes would provide a sound basis for developing new schemes: the National Water Management Plan (2001) identified an additional 1 million ha that could be irrigated with new surface water schemes in areas where groundwater resources are limited.

4. Enhancing land, water and labour productivity is a high priority under the Government of Bangladesh's (the Government) Sixth Five-Year Plan, FY2011–FY2015.[27] Robust and well managed irrigation systems are central to boosting productivity and contributing to food security. Agriculture growth is driven by a shift from subsistence rice-based cultivation to commercial

[24] In Bangladesh, large irrigation schemes are classified as be larger than 2,000 hectares.
[25] Funds provided by Government for maintenance of these schemes is less than 50% of requirement and irrigation service charges collected from end-users amounts to only about 10% of the assessed amount.
[26] 2000. National Water Management Plan. Volume No 3: Investment Portfolio. Ref AW001.
[27] Government of Bangladesh, Planning Commission, Ministry of Planning. 2011. Sixth Five-Year Plan: FY2011–FY2015. Dhaka.

high-value agriculture commodities, which is instrumental in advancing rural economic growth and contributing to long-term food security. The Government promotes diversification in agriculture by encouraging private agribusiness as well as providing access and improvements to rural infrastructure. The Government's objectives for surface irrigation are, among others: (i) promote peoples participation in conformity with Integrated Water Resources Management principles; (ii) achieving food security of food grains through ensuring year-round sustainable irrigation; (iii) ensuring climate change resilience; (iv) strengthening and capacity building of water resource institutions; (v) command area development and irrigation expansion; (vi) increase beneficiary participation and, where possible, transfer management to beneficiary organizations, local government and the private sector; (vii) introduction of public-private partnerships (PPPs) to provide support to agriculture and for selected-services; and (viii) provide agricultural extension services including irrigation technology and on-farm water management.

5. Following the completion of the First Command Area Development (CAD-I) Project in 2003,[28] the Government requested the Asian Development Bank (ADB) to provide assistance with preparing a Second Command Area Development Project (CAD-II) aimed at improving the performance of large flood control drainage and irrigation schemes (FCDI) schemes.[29]During preparation of CAD-II two principal constraints to sustainable performance of major water schemes emerged: (i) limited capacity and resources of public agencies in effective maintenance of public agencies in effective MOM of large irrigation schemes; and (ii) chronic system deterioration as a result of inadequate operation and maintenance planning and financing mechanisms. The CAD-II investment project did not proceed and instead, the ADB supported the Government with capacity development TA7260-BAN: Developing Innovative Approaches to Management of Major Irrigation Schemes (DIAMMIS).[30] DIAMMIS investigated the potential for alternative service delivery agreement and management arrangements including using independent entities that would better manage and operate the systems. DIAMMIS developed innovative MOM approaches for the Muhuri Irrigation Project (MIP) based on establishing an independent entity to operate and maintain the scheme.

6. Subsequently, the Government and ADB agreed to a $46 million to support the $59.6 million Irrigation Management Improvement Project (IMIP, the "Project"). IMIP will improve the management, infrastructure and productivity of MIP and undertake the feasibility study and detail design of the modernization of the Ganges-Kobadak (GKIP) and Teesta (TBP) surface irrigation projects TBP. These terms of reference are for engaging an international consulting firm to support design and implementation of the Project as the Project Management and Design Consultant (PMDC).

7. In 2013 the ADB financed the TA Innovations for More Food Less Water[31] which is currently in progress and is supporting the identification, assessment, and preliminary design of new investments for more sustainable, water-efficient irrigated agriculture in Bangladesh, India and Nepal. The RDTA is divided between two tasks: Task 1 the research and compilation of international best practices, and Task 2 (the subject of this Inception Report) for the identification of methods for improving water productivity – *growing more food with less water*. The studies in Bangladesh especially the GKIP are especially relevant.

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[28] ADB First Command Area Development Project 2003
[29] ADB Second Command Area Development Project Haskoning, BETS 2008
[30] ADB. 2009. *Technical Assistance to Bangladesh for Developing Innovative Approaches for Management of Major Irrigation Systems*. Manila (TA 7260-BAN).
[31] ADB Regional Technical Assistance TA7967-REG Innovations for More Food Less Water Task 2 2013

B. The Overall Program

8. The impact of the Project will be sustained high growth in irrigated agriculture. The Project's outcome will be increased productivity and sustainability of MIP producing higher yields, with expanded irrigated areas, and with a higher cropping intensification including diversification into higher value crops. The Project will be implemented over 5 years from 2014 to 2019[32].The Project will have the following three key outputs:

(i) **Performance-based irrigation management and agriculture support services established.** This output will include contracting private irrigation management operators under 5 years performance-based management contracts. This "Construction phase" irrigation management operators (C-IMO) will supervise modernization works, establish sustainable MOM and provide agricultural support services in MIP. Efficient management systems will be adopted to maximize water use efficiencies and develop sustainable and reliable irrigation service delivery. Viable and effective operations and maintenance (OM) cost recovery mechanisms will be setup to achieve 100 % cost recovery. The objective will be to bring MIP scheme to the level of profitability and sustainability required for enabling the recruitment of a long term (15 years) "Management phase" irrigation management operator (M-IMO) through a PPP modality. The project will also support the preparation of the long-term PPP transaction.

(ii) **Irrigation system infrastructure rehabilitated and modernized**. This output will include physical rehabilitation and modernization of irrigation infrastructure including (i) repair of 450 km of canals and 22.6 km of coastal embankments with ancillary facilities; (ii) development of 17,000 ha of modern and highly efficient piped water distribution system to improve timely water access and reduce water losses; (iii) provision of prepaid card meters to allow water allocations to be based on a volumetric basis and ensure full and transparent payment and accounting, (iv) full electrification of the pumping to reduce the operational costs and increase management flexibilities and; (v) pilot solar panels and pumps for 60ha.

(iii) **The Project is efficiently managed with effective institutional development**. This output will include (a) establishment of competent project management and project implementation unit; (b) timely procurement and disbursement; (c) timely appraisal of GK and Teesta irrigation projects modernization and provision of required feasibility studies and detail designs and strategies to transfer MOM to private sector; and (d) institutional support and capacity and awareness building of BWDB and water management organizations to successfully administer and support PPP contracts.

C. Implementation Arrangements

9. The Executing Agency for the Project is the Bangladesh Water Development Board (BWDB) in which a Project Management Unit (PMU) will be established and led by the Project Director (PD). A Project implementation unit (PIU) will be established in MIP. A PIU Director will be appointed to supervise MIP modernization field implementation and manage the Irrigation Management Operator (IMO). The PMDC will support the PMU and the PD and PIU Director. Design support units led by an executive engineer will be established in GKIP and TBP sites to support feasibility and detail design preparation for the 2 schemes modernization The PIU

Director will be supported by a team of planning, design and construction, procurement, accounts and administration staff. A Project Steering Committee (PSC) will be established within the Ministry of Water Resources (MOWR) to provide overall coordination of the Project and facilitate inter-ministerial coordination. The PSC will be chaired by the Secretary, MOWR. The PD will be the PSC's secretary and all concerned ministries and agencies will be represented.

10. Also supporting the PMU will be a new PPP Cell that will provide guidance on tendering, private public partnerships, contract management, negotiating, legal, and communication. BWDB's Monitoring Division will be supported with a new Monitoring Cell that will provide independent verification of the performance of various stakeholders as well as assessing impacts associated with Project's objectives. A Safeguards Desk will also be established to support the Monitoring Division with safeguard compliance management.

11. An Implementation Coordination Committee (ICC) will be established for MIP to manage field implementation issues that arise related to conflicts, safeguards, security, and more generally concerns about the performance of the implementing parties. The ICC will be chaired by the project's BWDB Zonal Chief Engineer and committee members will comprise representatives from the offices of the Deputy Commissioner, the Water Users Associations and the IMO.

12. The EA will provide appropriate, furnished and air conditioned offices in Dhaka and two field offices in TBP and GKIP to accommodate the consulting team. The EA will also provide counterpart staff, equipment, maps and other necessary information, if it is available.

D. Purpose of Consulting Services

13. The PMDC will support the PMU over a five year period. It will: (i) design and support the procurement of the Project civil works not included in the advance packages;[33] (ii) prepare modernization strategies, feasibility studies, detailed engineering designs, and civil works bid documents for GIK and TBP and required project documents required for ADB financing included but not limited to safeguards documents, economic and financial analysis, PAM, etc.(iii) support and supervise the Irrigation Management Operator (IMO); (iv) monitor construction and related activities (construction supervision would be by the IMO); (v) plan and implement training for the PMU on ADB's project administration procedures, managing public-private partnership (PPP) contracts, and other technical issues as required; and (vi) prepare a review of the performance of the Muhuri IMO and support the development of a PPP pursuant to which the long-term management, operation and maintenance (MOM) for MIP will be transferred to a third-party IMO, including preparation of bidding and contract documents.

E. Scope of Services

14. The PMDC will support implementation of all three outputs and provide the following four main services:

[33] The advance packages are the works designed under the PPTA and include repairs to the coastal embankment,

1. Strengthened Project Management

15. The consultant will provide overall support to the PMU to ensure the effective and timely delivery of the project work including:

(i) Working with the PD and PIU Director to identify the project management needs, planning, strategies and schedules for execution.
(ii) The design and establishment of a project performance management system (PPMS) that will allow the PMU to monitor and evaluate implementation of the project, identify performance constraints, and formulate and implement practical measures to address shortcomings. Annual performance evaluations will be carried out based on assessment of the projects. Outputs of the PPMS will be supplied to the PSC and ADB.
(iii) Establish a project financial management and accounting system within the PMU.
(iv) Facilitating the PSC establishment and preparation of briefing materials on progress and issues.
(v) Develop the projects through participative and integrated planning and management.
(vi) Assisting the PMU, the PSC and ADB prepare the additional financing/ project documents for GKIP and TBP modernization financing.
(vii) Ensuring the implementation schedules reflect the envisaged integrated approach with phasing of all the inter-related activities.
(viii) Assisting the PMU to manage the project implementation schedule including giving special attention to items on the critical path, and ensuring these are given particular attention. Assisting with project administration, performance and monitoring and preparation of project reports.
(ix) Assisting the PMU with preparing tender documents and support the tender processes for the MIP construction/rehabilitation program as well as the recruitment of IMO if required.[34]

2. Rehabilitation and Modernization of Large Irrigation Projects and preparation of the follow-on project

16. Improving the sustainability and productivity of large irrigation schemes under the Project will include: preparing feasibility studies, detailed engineering designs and bid documents as summarised below:

Muhuri Irrigation Scheme

(i) Prepare the detailed designs, specification and bid documents for the new and structures proposed for rehabilitation in the MIP. These will include but not limited to (i) the rehabilitation of coastal sluice structures 05, 06, structure between 06 and 07 and sluice 08; (ii) rehabilitation of river sluices including the main Feni regulator, and the little Feni river sluices 10 and 11; (iii) new coastal protection/drainage structures sluice 07 and Sluice 09; and (iii) new water and flood control structures , north Daulatpur, South Daulatpur and water retention structures Bhalukia Khal Madhya Khal and Ichakhali Khal.

[34] The IMO would be selected and contracted based on their capacities and skills to deliver key outputs, keeping the water tariff at a reasonable and acceptable level for the water users.

(ii) Prepare the detailed designs for the rehabilitation of the BWDB offices and houses at Feni. Prior to embarking on the designs the PMDC will prepare an appraisal report including a technical appraisal estimate of requirements, the scope of the works and the proposed approach and methodology.

TBP and GKIP Schemes:

(i) Undertake system assessments for TBP and GKIP to identify the strengths, weaknesses, opportunities and constraints for improving their productivity.
(ii) The system assessment will review will incorporate the findings of the ADB More Food Less Water (MFLW) TA[35] which has carried out studies in the GKIP during 2013/14. The analytical tools used for the GKIP by the MFLW study will be reviewed and with appropriate should be applied to the TBP. The analytical tools include Benchmarking using the FAO Rapid Appraisal Process (RAP) and Participatory Rural Appraisals (PRA) should be applied for the TBP.
(iii) Identify outstanding infrastructure investments required at MIP.
(iv) For the above, prepare feasibility studies including sustainable MOM strategies, preliminary costs, safeguard assessments, and economic and financial assessments. These will be presented to the PSC and PMU for approval.
(v) Prepare detailed engineering designs, engineering cost estimates and specifications of agreed improvement works along with civil works contract bidding documents.
(vi) Prepare project documents to meet ADB requirement including but not limited to safeguards documents, economic and financial analysis, PAM, cost estimates, Design and monitoring frameworks, etc.
(vii) Assist the PMU with the bidding and procurement process to verify compliance, transparency of bidding as well as ensure the quality and price selection parameters.
(viii) Identify and organize the implementation of supporting technical, management, institutional and social studies as required for all 3 irrigation projects.

3. Support Improved Irrigation Management of Large Irrigation Projects

17. The MOM of MIP will be assigned to third-party C-IMO initially through five-year fixed-term performance-based management contracts. During this period, the PMU, the C-IMO and the Implementation Coordination Committee established for MIP (“ICC”) shall jointly undertake a public consultation program to understand the service delivery requirements of the beneficiaries of the Project. Following such consultation program, the PMU, the IMO and the ICC shall collaborate with PMDC to develop a PPP pursuant to which the long-term management, operation and maintenance (MOM) for MIP will be transferred to a third-party IMO. In undertaking this task, the PMDC will:

(i) Build capacity of the PMU to monitor IMO management contracts.

[35] ADB Regional Technical Assistance TA7967-REG Innovations for More Food Less Water Task 2

(ii) Together with the IMO, provide support for the public consultation program and, more generally, for communication to assist the transition processes and ensure stakeholder understanding and support.
(iii) Support the establishment of a PPP Cell within BWDB to monitor and manage the PPP contracts.
(iv) Support the establishment of MIP ICC.
(v) Prepare reservoir operating guidelines for MIP in agreement with BWDB and Muhuri IMO
(vi) Assist PMU with evaluating the performance of MIP's first-term IMO.
(vii) Assist the PMU with development of a 2nd stage public-private partnership modality, suitable for MIP, that (a) allocates risks and responsibilities among the stakeholders in the irrigation scheme in accordance with sound international practice; and (b) includes a transparent, objective and comprehensive water service tariff regulation mechanism that is aimed at cost recovery and provides for a reasonable return on equity for the IMO concerned in accordance with sound international practice.
(viii) Assist PMU with the preparation of the contract and bidding documents and conduct of the bidding procedures pursuant to which the PPP will be tendered.
(ix) Develop, prepare and support the endorsement of guidelines to support the long-term delegation of MOM activities for large irrigation projects to private sector operators including strategies for cost recovery.
(x) To design a monitoring and evaluation (M&E) system appropriate for large scale irrigation projects .The M&E should incorporate irrigation efficiencies, OM funding and cost recovery, OM activities, agriculture financial and production estimates. The M&E system will be piloted by the IMO for the MIP and later incorporated into the project plan for the TBP and GKIP and other large scale irrigation projects in Bangladesh.

4. Institutional Development Awareness and Training

18. The PMDC will provide support for a broad program of institutional development as well as informal and formal training of key stakeholders. The tasks will include:

(i) Establish and implement an extensive program and communication and engagement; the program will build on the proposals in the Project Administration Manual (PAM). The communication and engagement plan will be defined in the inception report.
(ii) Prepare an institutional review and assessment of the capacities and needs for sustainable MOM of large irrigation projects.
(iii) Undertake training and resource needs assessments for the Government, WUAs and other organizations to manage and support IMOs achieve sustain MOM of large irrigation schemes. This applies to all relevant institutions at Central, District, Upazila and community levels.
(iv) Prepare a detailed training plan, schedule and budget for training to be implemented under the Project.
(v) Working with the PMU and the IMO, develop and implement the training program, including programming, scheduling and implementation of the training, institutional development and awareness programs.

F. Consulting Services

19. The Project Management and Design Consultancy will be for a period of five years to be provided during the Project implementation. Recruitment will be undertaken in accordance with ADB's *Procurement Guidelines* (2013, as amended from time to time)[36] and ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time).[37] Firms will be recruited using quality and cost-based selection with a 90:10 quality to cost ratio. This ratio is justified as the priorities for the PMDC are high quality outputs including designing and preparing innovative and modern infrastructure and management improvements for TBP and GKIP. A full technical proposal will also be required. The total international input will be for 82 person-months (pm) and 498 pm for national consultants. The overall requirement is 580 pm. Outline terms of reference for individual PMDC specialists are given below and a summary of specialist inputs is shown in Table 1.

Table 1: Summary of consulting services inputs

	Person-Months	
Position	**International**	**National**
Irrigation Management Specialist / Team Leader	34	
Irrigation Specialist / Deputy Team Leader		53
Irrigation Planning and Design Engineer(s)	15	50
Irrigated Agricultural Specialist	6	21
Irrigation Design Engineer(s)		84
Junior Irrigation Design Engineers		168
Mechanical and Electrical Engineer		4
Hydrologist	2	4
Hydrogeologist	2	
Groundwater Modeller		22
River Morphologist	1	
Agricultural Economist	4	8
Public-Private Partnership and institutional Specialist	6	
Commercial Lawyer		2
Participatory Irrigation Management Specialists		56
Procurement Specialist	3	5
Financial Specialist	3	2
Resettlement and Social Development Specialist	2	
Resettlement Specialist		5
Gender and Social Development Specialist		5
Environmental Safeguard Specialist	2	6
Communications Specialist	2	3
Overall Total	**82**	**498**

1. International Consultants (total: 82 pm)

a. Irrigation Management Specialist / Team Leader (34 pm)

20. The Irrigation Management Specialist / Team Leader will be required to work closely with PMU and will be responsible overall management of the consulting team to achieve the Project's outputs including providing the four main services described above. The specialist will

[36] Available at: http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf
[37] Available at: http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf

have a Master's degree in water resource management or equivalent, or a related field, and will have at least 20 years of technical project experience with at least 5 of those years leading the implementation of the projects. Experience of working in irrigation and water resources development in South Asia on major irrigation systems is highly desirable. The specialist will be responsible for:

(i) Overall direction of the TA team, coordination of inputs, and management of individual specialists.
(ii) Ensuring the timely progress of the project implementation including planning, design, construction and institutional development.
(iii) Ensuring timely delivery of all TA outputs as listed under Table 4 including the various progress reports.
(iv) To support the necessary approval processes of deliverables including BWDB, ADB and stakeholders.
(v) Guide the management and coordination with the government, and other stakeholders including the facilitation of regular management dialogue between the EA, other associated agencies and stakeholders at central and project levels.
(vi) Support the establishment and guide the activities of the Project Management Unit (PMU), the Implementation Coordination Committee (ICC), the PPP Cell, the Safeguards Cell and other proposed institutional arrangements.
(vii) Support the development of the PPP models for irrigation management including maintaining close liaison and supporting the Muhuri IMO, and defining the roles for the proposed management operators for the GKIP and TBP including development of viable mechanisms for OM cost recovery.
(viii) Lead policy dialogue with the Government and support the implementation of the loan covenants including the sector roadmap.
(ix) Support the PMU in the liaison and coordination and supervision of the Muhuri IMO including the implementation of the Muhuri Management Review.
(x) Support the Irrigation Planning and Design Engineer to assess the feasibility and prepare the detailed engineering designs for GIKP and TBP modernization.
(xi) Undertake a review of other large irrigation schemes and outline tailored infrastructure modernization and management models incorporating early lessons learnt from MIP.

b. Irrigation Planning and Design Engineer (15 pm)

21. The Irrigation Planning and Design Engineer will be responsible for the overall preparation of feasibility studies and the detailed engineering design for GIKP and TBP. The Engineer will have at least a Master’s degree in Civil Engineering, be a chartered, professional engineer, and have at least 15 years of experience in planning and designing irrigation schemes, preferably in South Asia or other geographically similarly regions. The Engineer’s tasks will include:

(i) Reviewing previous studies including the MFLW TA and understand the current norms for irrigation planning and design in Bangladesh and within the region.
(ii) Leading and supporting the design team with: (a) assessing cropping and water use patterns; (b) review of the current water use, water allocations and water use efficiencies for surface and groundwater; (c) prepare water balances for the current water and cropping systems including surface and groundwater; (d) develop strategies to increase the water use efficiencies through modernised water management systems and infrastructure, reduction of losses, improved

water allocations, and scheduling of planting; (e) develop water balances for alternative future investment and management options; and (f) assess the investment costs and management implications.

(iii) Leading the preparation of feasibility studies and detailed designs, including working with the team to prepare the engineering cost estimates, and economic and financial appraisals.

(iv) Preparing and managing the trial survey of using remote sensing / satellite imagery to: (a) support activities of the PMDC; (b) define water use by surface and groundwater; (c) benchmark key irrigation production and management performance indicators; and (d) assess continued use of remote sensing to assist scheme operation and facilitate improving productivity of water (POW) and water conservation at the scheme level, including its financial viability.

(v) Compiling the technical aspects of the feasibility studies for GKIP and TBP including the investment and management interventions to improve the sustainability and efficiency of the TBP and GKIP.

c. Irrigated Agriculture Specialist (6 pm)

22. The Irrigated Agriculture Specialist will have at least a Master's degree in agricultural sciences (preferably agronomy) or related subjects, with at least 15 years of experience of planning and implementing agriculture programmes, preferably within South Asia or other geographically similar regions. The Specialist will:

(i) Engage with farmers and stakeholders to identify the main constraints to crop production in TBP and GKIP.

(ii) Assess the scope and capacities of the existing agricultural extension services and other related organizations working in the project area. Identify gaps and possible areas of support from the project.

(iii) Review the requirements and propose strategies for increasing agricultural productivity, increasing POW, improving farm water application efficiencies and overall scheme efficiencies, reducing water use, and assessing potentials and strategies for crop diversification for TBP and GKIP. The review will assess the irrigation needs for the main boro crop as well as supplementary irrigation during other seasons.

(iv) From lessons learnt from MIP and other international projects, assess how new initiatives for modern irrigated agriculture could be applied in TBP and GKIP. Liaise and support the planning and implementation of the agricultural support pilots for MIP.

(v) Identify the key requirements for efficient irrigation to meet the needs of crop productivity including: timely water availabilities, crop diversification, scheduling of planting, reduced water use. Discuss with stakeholders to identify irrigation management strategies to help meet requirements to meet targets for increased productivity.

(vi) Prepare detailed proposals of future cropping, farm budget and cropping patterns that can be used for the analysis of crop water requirements and economic analyses.

(vii) Work with the other specialists to develop strategies for investment and management of TBP and GKIP, and show how these strategies can incorporate the requirements and help meet the needs and full potentials of irrigated agriculture.

(viii) Identify for opportunities linked to agriculture with potentials to support the OM cost recovery mechanisms.
(ix) Develop a plan and costs for agricultural support services to be implemented by the IMO's for TBP and GKIP. The plan should build on the existing agriculture extension and support programmes within those areas.

d. Hydrologist (2 pm)

23. The Hydrologist will be responsible for the assessment of surface water availability and leading the assessment of crop water requirements for the MIP and GKIP and TBP. The specialist will have at least a Master's degree in Earth Sciences or equivalent, with at least 15 years of experience in assessing and modelling meteorological and hydrological regimes, preferably in South Asia. Ideally the specialist will have direct experience and practical knowledge of the hydrological regimes within the Ganges and Teesta Rivers, and their respective international water sharing agreements. The main tasks of the specialist are:

(i) Compile and analyse rainfall and river flow information for all three projects.
(ii) Review and assess current and future international water sharing agreements, previous hydrological studies, and assessments of upstream water use.
(iii) Assess the quality of all hydro-meteorological data and identify the needs for improving to support planned water and scheme management arrangements of the projects.
(iv) Review recently prepared local climate change studies and assess how they will impact on future water availability and crop water requirements, with support from the Agricultural Specialists.
(v) Using best practices, estimate average, reliable and extreme statistics for seasonal water resource availability. Assess the probability of various dry season flood events including the maximum and average flow and the period of flow.
(vi) With the Agricultural Specialists, assess the present and future water demands at the field level and scheme level including assessments of the losses, using FAO Cropwat 8 (or other approved) and other assessment tools, based on the current and planned cropping information.
(vii) Prepare a comparative assessment of the theoretical current crop water requirements with actual water use over the last five years.
(viii) Assess the potential role of tube wells to support water deficits in coordination with the Hydro-geologist and Groundwater Modeller.
(ix) Compile long-term records for water level and gate operations at the Feni Regulator to assess the water balance of the Muhuri Reservoir. If necessary use appropriate hydraulic formula to calculate water passing through and over the regulator taking note of the times, duration and numbers of gates open.
(x) Within MIP assess the potential additional storage that could be obtained in each khal by provision of (minor) regulator gates inside the khal. These minor storage regulators would be located to provide higher level storage than the Feni regulator through conservation of small flood flows during the boro season. Assess the potential future irrigable area of the Muhuri scheme from surface water.

e. Hydrogeologist (2 pm)

24. The Hydrogeologist will have at least a Master's degree in Earth Sciences, or equivalent, and have 15 years of experience in assessing, modelling, and developing groundwater

resources, preferably with working experience of the lower Ganges Plains. The specialist will be responsible for the assessment and development of strategies for the conjunctive use of surface and groundwater at TBP, GKIP and MIP. Specific tasks will include:

(i) Review existing geological and hydro-geological information and groundwater studies relating to hydrogeology.
(ii) Check the conditions in the field to assess typical yields from tube wells, water quality and possible issues.
(iii) Define the requirements for feasibility level studies including data collection and groundwater modelling to assess sustainable levels of groundwater withdrawals for MIP. GKIP and TBP.
(iv) Prepare proposal for groundwater modelling and assessment and work with the national Groundwater Modeller to implement the groundwater studies including the development of groundwater models.
(v) Assess the current recharge to the aquifers and identify the contribution from irrigation. Assess the potentials to improve the recharge through surface water management and other methods.
(vi) Prepare an interpretation of the models and, in collaboration with the other specialists, prepare a development strategy for conjunctive surface and groundwater management.

f. River Morphologist (1 pm)

25. The River Morphologist will have at least a Master's degree in Earth Sciences, or equivalent, with at least 15 years of experience of studying fluvial morphology and assessing, modelling and designing river revetment projects. Preferably the specialist will have working knowledge of the fluvial morphology of the Padma River. The tasks of the specialist will include:

(i) Compiling information on previous morphological studies and archived aerial/satellite imagery of the Teesta and Padma River, particularly in the vicinity of the intakes to the TBP and GKIP, and assess long-term period changes in the river's thalweg (deepest point theory) and likely drivers for the changes.
(ii) Assess the general river morphology of the Teesta and Padma Rivers and identify fluvial issues affecting the intakes of TBP and GKIP.
(iii) Prepare an assessment report of the requirements for investment in river works, assessment of OM requirements and other management measures.
(iv) Identify the requirements for further investigations.
(v) Prepare preliminary designs for possible river investments and assessments of requirements for dredging.

g. Agricultural Economist (4 pm)

26. The Agricultural Economist will have at a least of Master's degree in Agriculture or Economics with at least 15 years of experience of undertaking economic appraisals in the agricultural sector, preferably with experience of working in South Asia or similar geographical regions. Specific tasks for the specialist include:

(i) Prepare detailed cost tables and investment plan for financing GKIP and TBP through additional financing or a new standalone project.
(ii) Analyse the current and future farm budgets for the GKIP and TBP.

(iii) Review project benefits and undertake economic appraisals for the GKIP and TBP including estimated cash flows and economic internal rate of returns, in accordance with ADB's Guidelines for the Economic Analysis of Projects (1997).
(iv) Identify the economic and financial risks associated with the projects and carry out sensitivity and risk analyses.
(v) With the support of the Social Specialists, identify the beneficiaries and undertake a distribution analysis of project benefits and a poverty impact analysis of the projects consistent with ADB guidelines.
(vi) Together with other specialist prepare the design of a Project Monitoring and Evaluation (PME) system for large scale irrigation. The PME will be piloted in the MIP by the IMO.
(vii) Prepare guidelines for project economic monitoring systems.

h. Public Private Partnership and Institution Specialist (6 pm)

27. The Public Private Partnership Transaction Specialist will have at least a Master's degree in law or finance, with at least 15 years of experience in planning and implementing PPP transactions generally, and at least 10 years of experience in planning and implementing PPP transactions in the water sector specifically. The specialist must also have special experience of the integration of PPP with the Government and water user institutions. The specialist will:

(i) Support the establishment and provide guidance to the new PPP Cell within the PMU.
(ii) Engage with the stakeholders to identify the key issues, causes and identify potential opportunities to improve the irrigation management systems generally and the Muhuri MIP and the GKIP and TBP specifically.
(iii) Review the performance of the Muhuri IMO and the findings of the public consultation program for service delivery standards of the Muhuri MIP and assist in the development of a PPP pursuant to which the long-term management, operation and maintenance (MOM) for MIP will be transferred to a third-party IMO, including preparation of bidding and contract documents and support for the conduct of the bidding process.
(iv) Assess the necessary financing for the MOM of the TBP and GKIP schemes and assess how effective cost recovery of MOM can be achieved. Support the development of pilot cost recovery initiatives for the Muhuri scheme and assess how these could be replicated for the TBP and GKIPs.
(v) Carry out a review of the current management arrangements of the TBP and the GKIP and identify how lessons learnt from Muhuri could be applied to the planned IMO's for GKIP and TBP.
(vi) Support the team leader and other members of the team in the design of the institutional management arrangements and the management contract for the GKIP and TBP as well the necessary the necessary institutional linkages
(vii) Prepare a training needs assessment programme and prepare an overall training, awareness and communication plan to: (a) support institutionalisation .of PPP management of large irrigation schemes within MOWR and BWDB; and (b) raise BWDB's awareness and knowledge of managing modernized irrigation schemes as proposed under IMIP.
(viii) Support the national Institutional Specialists to implement the needs assessment, training and awareness program.

i. Procurement Specialist (3 pm)

28. The Procurement Specialist will have at least a Degree in Civil Engineering or equivalent, with at least 15 years of experience on similar development projects in Asia, preferably South Asia, and should have demonstrated experience with procurement processes for externally financed projects, mainly those funded by ADB or World Bank. The specialist should preferably have experience of PPP contracts. The specialist's main tasks include:

(i) Assist PMU with procurement of Project outstanding contracts, review their progress, recommend adjustments, and identify lessons learnt that can be applied to procurement under the follow-on additional financing of Project to finance GKIP and TBP.
(ii) Undertake capacity assessment of the EA and PMU to assess what requirements are required for the procurement activities and what supplementary personnel and resources need to be provided
(iii) Together with the Team Leader and the national Procurement Specialist, prepare of a procurement plan for the follow-on project/additional financing incorporating the procurement requirements for the various works packages and engagement of private sector IMOs.
(iv) Review the requirements for the Muhuri stage 2 IMO contract which will be a lease contract. Design the tendering plan and prepare the tender documents for the lease contract for the Stage 2 of the MIP.
(v) Carry out an examination of the national and/or international market capacity in the relevant sectors and recommend technically and economically sound procurement packaging.
(vi) With the national Procurement Specialist, prepare tender documents for civil works and consultancies to be contracted through advance contracting or during project start-up phase, in accordance with ADB's Guidelines on the Use of Consultants and ADB's Guidelines on Procurement.
(vii) Advise on procurement strategies in accordance with the Government's and ADB's procurement guidelines and identify areas of discrepancy between the two if any; advise on appropriate procurement for PPP projects;
(viii) Advise on the timelines for procurement and develop strategies to ensure the optimum phasing of the startup of the various packages.
(ix) Work with the national Procurement specialist and the EA to prepare and review the necessary procurement notices.
(x) Assist the PMU prepare the procurement documents for the Muhuri Stage 2 lease contract IMO.
(xi) The specialist will also provide specific actions for integrity, ease of fund flow, and transparency.

j. Financial management Specialists (1 pm)

29. The Financial management consultant will have, at minimum, an advanced degree in accounting, or equivalent, with at least 15 years of experience in undertaking financial evaluations of commercial entities. The tasks of the Specialist are:

(i) Support the EA and PMU in establishing and using proper project financial management and accounting systems to support financial management of the Project and adopting the financial management improvement proposed in the PAM

(ii) Preparation and revision of the project cost estimates, financial monitoring and financial analysis

k. Financial modeling Specialists (2 pm)

30. The Financial Consultant will have, at minimum, an advanced degree in finances, or equivalent, with at least 15 years of experience in undertaking financial evaluations of commercial entities. The tasks of the Specialist are:

(i) Support the PPP expert in assessing the financial viability of the irrigation schemes to be placed under PPP. Including:

(a) Development of the financial model for the PPP transaction models : the model will have to provide results such as:

- Simulating the distribution of public and private sector funding (and, if applicable, user funding if the users are required to make a contribution to investment funding),
- Measuring the consequences for the price that has to be charged to the users for the water.
- Review farmers capacities or willingness to pay the irrigation fee (including higher fee) and design/supervise necessary additional surveys as per requirement

(b)The financial model will be built with:

- Estimate of CAPEX (capital expenditures) in constant and current prices,
- Estimate of Operation and Maintenance costs (staff, energy, maintenance, renewals, etc.),
- Estimate of volume of water to be sold by the private operator (based on water requirements and efficiency of the irrigation system),
- Definition of main assumptions like: minimum internal rate of Return for private operator, exchange rate, inflation, insurance, financial interests, taxes, dividends, depreciation of assets, etc.

To build his model the financial expert will have to receive support from the irrigation expert to provide CAPEX and O&M costs, volume of water to be sold by the private operator, etc.

l. Resettlement and Social Development Specialist (2 pm)

31. The Resettlement and Social Development Specialist will have at least a degree in social sciences with at least 10 years of experience undertaking similar assignments, preferably in South Asian countries. The specialist will work closely with the national safeguards and social development specialists to assess and incorporate adequate and workable measures to ensure the needs of resettlement and social development are properly provided for. Other main tasks will include:

(i) Design, commission, and supervise the implementation of appropriate socio-economic surveys on GIK and TBP and provide inputs for the preparation of the follow on project, safeguard documents, summary poverty reduction and social strategy (SPRSS) and the gender action plan (GAP).

(ii) Update the resettlement framework, if necessary, for the follow-on project/additional financing according to ADB's Safeguard Policy Statement (2009).
(iii) Prepare subproject safeguards assessments that include resettlement plans for GKIP and TBP.
(iv) Draw lessons to be learned from comparable projects and propose practical and implementable options for improvement in resettlement implementation.
(v) Prepare BWDB's capacity assessment and involuntary resettlement training program if gaps are identified.
(vi) Assist BWDB in: (a) identifying the affected persons and the impact of the project; (b) making a detailed inventory of assets for compensation; (c) making swift payments, along with other relevant agencies; and (d) keeping detailed records of progress on resettlement.
(vii) Provide or organize training program or other support for income restoration.
(viii) Plan and implement consultations with the affected people in accordance with the participation plan.

m. Environmental Safeguards Specialist (2 pm)

32. The Environment Specialist will have at least a Master's degree in environmental sciences, environmental engineering, or similar, and have at least 10 years of experience undertaking similar assignments, preferably in South Asia. The main tasks of the specialist will be:

(i) Taking the lead in preparing the environmental assessments for GKIP and TBP to meet ADB's and GOB's environmental safeguard requirements.
(ii) Supporting the national environmental consultant in: (a) training and capacity building of BWDB staff on environmental management, supervision, reporting and monitoring of implementation of environmental management plans (EMP); and (b) orienting contractors on implementation of EMP.
(iii) Guiding BWDB on reporting requirements on environmental monitoring to ADB and BWDB.
(iv) Recommending any corrective actions on any unforeseen environmental impacts.

n. Communications Specialist (2 pm)

33. The Communications Specialist will have master degree in communication or equivalent with at least 10 years successful experience in development communication. The main task will consist in supporting the implementation of the participation and communication plan of the project.

(i) Review and define in detail the program communication and participation plan objectives, proposed approach and deliverables
(ii) Review the Muhuri communication program and provide guidance on how the program can be improved and effectively applied to GKIP and TBP.
(iii) Identify Media, NGOs or other communications agencies that can efficiently support the project communications
(iv) Supervise the preparation of the project communications campaigns and communications materials
(v) Supervise the design of the project website

(vi) Train PMU communication specialists

2. National Consultants (total: 498 pm)

a. Deputy Team Leader / Irrigation Specialist (53 pm)

34. The Deputy Team Leader / Irrigation Specialist will support the Team Leader with overall management duties of the team, help lead the design process, and liaise with the main government and project stakeholders. The specialist will have at least a Master's in Civil Engineering or Agricultural Sciences, with at least 15 years of experience in preparing and implementing irrigation projects. Preferably the specialist will have previously co-led international donor-funded development projects. The main tasks of the specialist will be:

(i) Support the Team Leader in managing the overall assignment and be responsible for the national consultants' outputs.
(ii) Collect and compile all relevant studies including designs, drawings, survey information and data for all projects under MIP, GKIP and TBP.
(iii) To support the timely submission of the deliverables.
(iv) To support the necessary approval processes of deliverables including BWDB, ADB and stakeholders.
(v) Work closely with the Team Leader to guide the management and coordination with the government, and other stakeholders including the facilitation of regular management dialogue between the EA, other associated agencies and stakeholders at central and project levels.
(vi) To ensure all the project monitoring activities are established a data is properly collected compiled and analysed.
(vii) Support the establishment and guide the activities of the Project Management Unit (PMU), the Implementation Coordination Committee (ICC), the PPP Cell, the Safeguards Cell and other proposed institutional arrangements.
(viii) Lead policy dialogue with the Government and support the development of the policy/institutional loan covenants including the sector roadmap.
(ix) Support the PMU in the liaising, coordinating and supervising the Muhuri IMO including supporting the implementation of the Muhuri Management Review and the implementation of the Project Monitoring and Evaluation and safeguards monitoring programs.
(x) Support irrigation scheme modernization analyses, and review technical design outputs and costing estimates.

b. Irrigation Planning Engineers (2 positions, total 50 pm)

35. The Irrigation Planning Engineers will have at least civil engineering degrees, or equivalent, and have at least 15 years of relevant experience. The engineer's will work closely with the international Irrigation Planning and Design Engineer to support the overall planning and preparation of feasibility studies and detail designs. Their tasks will include:

(i) Collect and compile all relevant data for the project.
(ii) Review of previous studies and current norms for irrigation planning and design.
(iii) Assess current patterns of water use and cropping including the application of satellite imagery to define water use by surface and groundwater.
(iv) Support the international Hydrologist with assessing crop water requirements.

(v) Work with other specialists to develop a review of the current water use, water allocations and water use efficiencies for surface and groundwater.
(vi) Prepare a water balance for the current water and cropping systems including surface and groundwater.
(vii) Working with the various specialists to develop strategies to increase the water use efficiencies through reduction of losses, improved water allocations, scheduling of planting.
(viii) Develop water balances for alternative future investment and management options. Assess the investment costs and management implications.
(ix) Compile the technical aspects of the feasibility studies for GKIP and TBP including the investment and management interventions to improve the sustainability and efficiency of TBP and GKIP.
(x) Prepare specific water management guidelines for TBP and GKIP to guide the respective IMOs on improved water management systems and procedures accounting for investment works implemented under the follow on project/additional financing.

c. Irrigated Agriculture Specialists (21 pm)

36. The Irrigated Agriculture Specialists will have at least advanced degrees in agricultural sciences and at least 15 years of experience in working on similar projects. The specialist's will closely with the international specialist including:

(i) Undertaking rural appraisal and engaging with farmers in TBP and GKIP to identify the main constraints to their crop productions.
(ii) Assess the scope and capacities of existing agricultural extension services and other related organizations working in the project areas. Identify gaps and possible areas of support under the follow-on project.
(iii) Review the requirements and propose strategies for increasing agricultural productivity, reducing water use and assessing potentials and strategies for crop diversification for TBP and GKIP. The review will assess the irrigation needs for the main boro crop as well as supplementary irrigation during other seasons for all crop types and varieties.
(iv) Review progress and lessons learned from MIP and other projects internationally and assess how these could be applied in TBP and GKIP. Liaise and support the planning and implementation of agricultural support pilots for MIP.
(v) Identify the key requirements for efficient irrigation to meet the needs of crop productivity including: timely water availabilities, crop diversification, scheduling of planting, reduced water use. Discuss with stakeholders and to identify irrigation management strategies to help meet requirements to meet targets for increased productivity.
(vi) Work with other specialists to develop strategies for investment and management of TBP and GKIP, and show how these can incorporate the requirements and meet the full potential needs of irrigated agriculture.
(vii) Develop a plan and costs for agricultural support services to be implemented by the Irrigation Management Operators for TBP and GKIP. The plan should build on the existing agriculture extension and support.
(viii) Develop and establish systems for agriculture monitoring compile and prepare monitoring analysis reports.

d. Irrigation Design Engineers (4 positions, total 84 pm)

37. The Irrigation Design Engineers will have civil engineering degrees, or equivalent, at least 10 years of experience designing irrigation schemes and similar hydraulic structures, and practical experience of using AutoCAD design software. They will support the senior international and national irrigation design engineers. Their main tasks will include:

(i) Review the original design standards of TBP and GKIP, the current status of the schemes.
(ii) With the other specialists, develop proposals for adjustments changes in the design standards incorporating international best practices for modernizing canal designs, hydraulic structure designs, gate systems, and measurement facilities.
(iii) Develop the design criteria for the rehabilitation and modernization of the projects. Present the criteria to the BWDB and obtain their and other government agency's approvals.
(iv) Plan the necessary surveys and investigations for the design for rehabilitation and modernization including remote sensing surveys, topographical surveys, geotechnical investigations, and structural condition assessments.
(v) Assess the potential for conjunctive use of groundwater in TBP and GKIP and prepare structural and water management proposals that can integrate tube wells into the existing system layouts.
(vi) Prepare the feasibility studies, detailed engineering designs, bill of quantities, engineering cost estimates and specifications for rehabilitation and modernization of TBP and GKIP.

e. Participatory Irrigation Management Specialists (2 positions, 56 pm)

38. The Participatory Irrigation Management Specialists will have at least degrees social sciences or civil engineering and at least 10 years of experience on PIM/IMT projects. They will be responsible for consulting with farmers and stakeholders during project and design preparations and ensuring their requests are appropriately addressed by the project. The main tasks of the specialist's will include:

(i) Review the performance status of WUAs, WMOs and their federal structure of GK and Teesta irrigation schemes.
(ii) Implement Focal Group Discussions (FGDs) and Participatory Rural Appraisals (PRAs) to assess and understand current constraints and bottlenecks to improve irrigation management.
(iii) Review the options and approaches for OM cost recovery. Undertake dialogue with stakeholders as to how these could be effectively achieved.
(iv) Identify training and support measures required to strengthen the organizational capacity of the WUAs
(v) Identify specific institutional arrangement required to facilitate the working collaboration between the WUAs and the future IMOs
(vi) Undertake necessary dialogue and training with WUAs of GKIP and TBP to facilitate the transition from public MOM to private MOM
(vii) Support the formation of MIP, GKIP and TBP Implementation Coordination committee and assist the organization of the quarterly meetings.
(viii) Support design team in implementing participatory design with the farmers
(ix) Support the works supervision team and IMO in implementing participatory works supervision with the farmers. Apply lessons learnt to GKIP and TBP.

(x) Identify potential areas of conflict between the farmers and IMOs and develop mechanisms to reduce conflict. Work with IMO in Muhuri and provide support as required and identify lessons learnt to be incorporated into the project design for TBP and GKIP.
(xi) Support the establishment and review the performance of the customer's support services of the IMO at Muhuri. Analyse the data and prepare evaluation reports.
(xii) Support the implementation of the Project communication and participation plan at field level.

f. Commercial lawyer (2 pm) [intermittently]

39. The lawyer will be a partner or senior lawyer with a commercial law firm and have at least 10 years of experience in structuring, negotiating and drafting bidding and/or contract documentation for PPP transactions, including relevant experience in PPP transactions or regulatory matters involving the water sector. The lawyer will:

(i) Work closely with the Public Private Partnership Transaction Specialist and the PMU on the structuring of a PPP transaction pursuant to which the long-term management, operation and maintenance (MOM) for MIP will be transferred to a third-party IMO.
(ii) Identify and advise on any legal issues and risks arising from the proposed PPP transaction.
(iii) Prepare, draft, negotiate and finalize all contract documents required for the PPP transaction and work with the international and national procurement specialists to incorporate these in bidding documents, as required;
(iv) Identify all governmental or regulatory approvals, third party approvals, consents, registrations or permits required in connection with the PPP transaction and assist in obtaining any such approvals, consents, registrations or permits;
(v) Advise and assist in all legal and documentary arrangements required for completion of the PPP transaction, including the satisfaction of conditions precedent to the effectiveness of the PPP transaction.

g. Junior Design Engineers (8 positions, total 168 pm)

40. The Junior Design Engineers will have civil engineering degrees, or equivalent, with at least 2 years of post-graduation experience including practical experience with using AutoCAD design software. They will support the Irrigation Design Engineers.

h. Hydrologist (4 pm)

41. The Hydrologist will support the International Hydrologist with assessing surface water availability for all three projects. The specialist will have at least a Master's degree in Earth Sciences or equivalent, with at least 15 years of experience in assessing and modelling meteorological and hydrological regimes. Ideally the specialist will have direct experience and practical knowledge of the hydrological regimes within the Padma and Teesta Rivers, and the international water sharing agreements of these rivers and those affecting MIP.

i. Groundwater Modeller (22 pm)

42. The Groundwater Modeller will work closely with the Hydro-geologist to prepare the groundwater models for MIP, GKIP and TBP projects. The specialist will have an advanced

qualification in earth sciences, or equivalent, and at least 15 years of experience in assessing and modelling groundwater reservoirs. Ideally the specialist will have experience in assessing groundwater within the lower Ganges Plains. The main tasks of the specialist will include:

(i) Review existing information geological and hydro-geological and groundwater studies relating to hydrogeology of the MIP, GKIP and TBP.
(ii) Check the conditions in the field to assess typical yields from tubewells, water quality and possible issues.
(iii) Define the requirements for feasibility level studies, including data collection and groundwater modelling to assess sustainable groundwater abstraction levels.
(iv) Develop and undertake groundwater modelling and assessment for MIP, TBP and GKIP areas.
(v) Assess the current recharge to the aquifer and identify the contribution from irrigation. Assess the potential to improve the recharge through surface water management and other methods.
(vi) Prepare an interpretation of the model and workings with the other specialists prepare a development strategy for conjunctive surface and groundwater management for TBP and GKIP.

j. Mechanical and Electrical Engineer (4 pm)

43. The Mechanical and Electrical Engineer will have at least an advanced degree in mechanical engineering, or equivalent, and at least 15 years of experience in designing and implementing similar projects. The main tasks of the Engineer will include:

(i) Support the planning and design for the electrical aspects of MIP, GKIP and TBP.
(ii) For MIP, coordinate with the REB Central Office and the REBs Feni and Mirsherai to keep them informed and engage support for the proposed expansion of the electrical distribution system to energize the pumps and pre-paid smartcard systems. Prepare the associated detailed engineering designs, bill of quantities, engineering cost estimate, specifications and contract documents.
(iii) Liaise and support the Muhuri IMO with the electrification of the low lift pumps and operating systems.
(iv) For TBP and GKIP, support the assessment, feasibility studies and detailed engineering designs of electrical aspects of the project rehabilitation including: electrical control systems for the gates, rehabilitation of the pumping units, electrical requirements for flow measurement, telemetry etc.
(v) Support the assessment of the requirements for gate and pump rehabilitation and modernization.
(vi) Prepare detailed engineering designs, specifications, bill of quantities, and cost estimates for rehabilitation and modernization of mechanical equipment including transport, dredgers and other requirements.

k. Resettlement Specialist (5 pm)

44. The Resettlement Specialist will have an appropriate social sciences qualification and at least 10 years of relevant work experience, preferably with at least 5 years of experience working on international donor-funded projects. The Specialist will work closely with the international Resettlement and Social Development Specialist to assess and incorporate

adequate and workable measures to ensure resettlement needs are properly addressed. The main tasks will include assisting the international resettlement specialist with:

(i) Updating the resettlement framework, if necessary, for GKIP and TBP according to ADB's Safeguard Policy Statement (2009);
(ii) Preparing subproject safeguards assessments that will include resettlement plans.
(iii) Drawing lessons to be learned from comparable projects and propose practical and implementable options for improvement in resettlement implementation.
(iv) Prepare BWDB's capacity assessment and involuntary resettlement training program if gaps are identified.
(v) Assist BWDB in: (a) identifying the affected persons and the impact of the project; (b) making a detailed inventory of assets for compensation; (c) making swift payments, along with other relevant agencies; and (d) keeping detailed records of progress on resettlement.
(vi) Provide or organize training program or other support for income restoration.
(vii) Plan and implement consultations with the affected people in accordance with the participation plan.

l. Gender and Social Development Specialist (5 pm)

45. The Gender and Social Safeguards Specialist will have at least an advanced social sciences degree or equivalent, with at least 10 years of experience working international development projects. The main tasks of the specialist will include:

(i) Take the prime responsibility for analyzing GKIP and TBP from a gender perspective (with reference to the relevant ADB gender sector checklists) and developing project components and implementation mechanisms to ensure women's and girl's participation in the project.
(ii) Designing, commissioning, and supervising the implementation of appropriate socio-economic surveys on GKIP and TBP and provide inputs for the preparation of the follow-on project, safeguard documents, summary poverty reduction and social strategy (SPRSS) and the gender action plan (GAP).
(iii) Conduct a social impact assessment through a combination of field appraisal, stakeholder consultation and review of existing studies/projects to collect sex disaggregated data with which to inform the Project Poverty Reduction and Social Strategy.
(iv) Contribute a gender perspective to the activities and outputs of other team members, particularly the institution and resettlement specialists.
(v) Undertake a comprehensive review of gender and women's development opportunities that may be considered for inclusion under the project.
(vi) Monitor the implementation of the GAP under MIP and report on the GAP on a regular basis, consistent with the GAP.

m. Environmental Safeguards Specialist (6 pm)

46. The Environment Specialist will have a Master's degree in environmental sciences, engineering or a related field, and at least 10 years of relevant work experience, preferably with at least 5 years of experience working on international donor-funded projects. The Specialist will work closely with the international Environment Specialist to: (i) prepare environmental assessments as per ADB requirement and formats for GKIP, TBP under the follow-on project;

(ii) train BWDB on supervision and management and contractors on implementation of EMP; (iii) carry out periodic monitoring on implementation of EMP; and (iv) support the BWDB in its reporting requirements on environmental monitoring to ADB and GOB.

n. Agricultural Economist (8 pm)

47. The Agricultural Economist will have at least an advanced degree in Economics or Agriculture Sciences and have at least 10 years of appropriate work experience. The specialist will support the international Agricultural Economist.

o. Procurement Specialist (5 pm)

48. The Procurement Specialists will have at least a civil engineering degree or equivalent, with at least 10 years of experience on similar development projects. Preferably the specialist will have demonstrated experience with procurement processes for externally financed projects, mainly those funded by ADB or World Bank. The specialist will support the international Procurement Specialist.

p. Financial Specialist (2 pm)

49. The Financial Consultant will have, at minimum, an advanced degree in accounting, or equivalent, with at least 10 years of experience in undertaking financial evaluations of commercial entities. The tasks of the Specialist is to support the international financial specialist including (i) support the EA and PMU in establishing and using proper project financial management and accounting systems to support financial management of the Project and adopting the financial management improvement proposed in the PAM, (ii) Preparation and revision of the project and program cost estimates, financial monitoring and financial analysis and (iii) Support the PPP expert in assessing the financial viability of the irrigation scheme to be placed under PPP.

q. Communication Specialist (3 pm)

50. The Communications Specialist will have master degree in communication or equivalent with at least 10 years successful experience in development communication. The main task will consist in supporting the international specialist in the implementation of the participation and communication plan of the project including (i) Review and define in detail the project communication and participation plan objectives, proposed approach and deliverables, (ii) Review the Muhuri communication program and provide guidance on how the project can be improved and effectively applied to GKIP and TBP, (iii) Identify Media, NGOs or other communications agencies that can efficiently support the project communications, (iv) Supervise the preparation of the project communications campaigns and communications materials, (v) Supervise the design of the project website, (vi) Train PMU communication specialists.

3. Supporting Office Staff

51. PMDC will also provide adequate office support staff to meet the needs of the central office as well as the establishment of field offices in TBP and GKIP. Suggested positions are shown in Table 2.

Table 2: Project Support Staff

Position	No.	Qualification /experience	Tasks
Office Manager	1	At least 10 years of good office management experience preferably with an international company for international development projects	Office management, team logistics, support for field trips, preparation of workshops, etc.
Accountant	1	Degree in accounting, or equivalent with 5 years book keeping experience	Maintaining project financial statements and submission of invoices and payment requests to the PMU according to government and ADB's standards.
Assistant Office Manager / Secretary	3	Good English and computing skills (with appropriate certificate)	Office support, data entry, preparing letters, organising printing. There will be one position in each office.
Computer Operators Office Assistants	3	Good English and computing skills (with appropriate certificate)	Support the Office Manager, Secretary and Accountant. There will be one position in each office.
Office Caretaker / Messengers / Guard	3		Maintaining the office, carrying messages, and other minor tasks. There will be one position in each office.

G. Procurement of Additional Studies, Equipment and Training

52. Provisional sums have been included in the consultancy agreement for the procurement of various requirements to support the project. The exact implementation arrangements, specifications and detailed costs estimates of the procurement will be approved by the Project Director and procurement procedures will follow ADB Procurement Guidelines. The tentative scopes of works for the additional studies are summarized in Table 3.

Table 3: Additional Procurement

Name	Tasks
Surveys and studies	Supporting surveys and specific studies including topographic surveys, geotechnical investigations, flow monitoring, and resettlement and socio-economic surveys.
Remote Sensing	Trialling remote sensing systems for assessing crop growth, yields and water consumption for TBP and GKIP. The results will be used for supporting feasibility studies and designs. The long-term viability for using remote sensing for managing these projects will be assessed with the aim of lowering pumping needs and improving crop rotations to increase command areas.
Procurement of office equipment	Procurement of office equipment including computers, printers, photocopiers, GPS power invertor, etc. for central and field offices using shopping, mode of procurement following ADB Procurement Guidelines.
Training and awareness	Costs for the implementation of the training and awareness program including workshops.

H. Reporting and Other Deliverables

53. The list of main deliverables by PMDC is summarized in Table 4. Other occasional deliverables maybe required from time to time on an informal basis.

Table 4: List of Deliverables

No	Output	Description	Due Date [a]
A	**Project Management and Institutional Development**		
1	Inception Report	(i) Confirmation, elaboration and adjustment of the consultants approach and methodology based on information received during the inception phase. (ii) Detailed plan of the consultant's activities and confirmation and adjustment to the tasks of each expert with further elaboration as required. (iii) Detailed implementation plan for the project's activities. (iv) Issues identified during the inception phase and. (v) procurement plan and timeframe for items under provisional sums	3
2	Mid-Term Report	Scheduled approximately half way through the consultancy period and should be produced prior to the ADB mid-term mission. The contents would include: (i) summary of the progress including issues, confirmation elaboration and/adjustments to the consultants program; and (ii) detailed implementation plan.	30
3	Draft Final Report	Summary of the project progress and other aspects to be agreed.	55
4	Final Report	Not later than the completion of the consultants contract.	60
5	Monthly Reports	Concise mainly tabular report with 2 page maximum summarizing monthly progress of the project, implementation status and highlighting any critical issues that require government or ADB support with resolving.	1-60
6	Quarterly Reports	Concise reports giving more details of the project and key issues. For every year, the first three reports will be incremental reports detailing activities, progress and issues during the previous quarter, and planned activities for the next quarter. The fourth report (which will become the Annual Report) will also be cumulative for the full year period.	Every 3 months
7	Briefing Reports	Special briefing reports as requested by the EA and/or ADB	As required
8	Project documents for the follow-on Project	Project documents for the follow-on project including technical, safeguards, economic, social due diligences based on standard ADB format including the cost estimates and financial management assessment	15
9	Environmental Monitoring Reports	Annually after start of construction to meet ADB requirements and as and when required by GOB. PMDC to work with the Muhuri IMO to prepare and analyse monitoring reports.	Once every 12 months/ as required by GOB
10	Project Monitoring and Evaluation (PME)	Design of a project monitoring and evaluation (PME) system appropriate for large scale irrigation projects .The M&E should include irrigation efficiencies, OM funding and cost recovery, OM activities, agriculture financial and production estimates. The M&E system will be piloted by	ME Design by month 12 Annual M&E report for MIP

No	Output	Description	Due Date [a]
		the IMO for the MIP and later incorporated into the project plan for the TBP and GKIP and other large scale irrigation projects in Bangladesh.	(in coordination with IMO)
11	Training and awareness plan	Institutional review and training needs assessment of MOWR and BWDB to support their needs for managing IMOs and improving MOM for large scale irrigation. Prepare a training and awareness plan for IMIP which should be based on the integrated roles of IMOs working in coordination with the Government and WUAs.	12
12	Implementation of the training and awareness program	Working closely with the PMU to support the implementation of the training and awareness program, including programming, scheduling and implementation of the training program.	15 onwards
B	**Planning and Design for Rehabilitation and Modernization**		
1	Detailed feasibility studies for TBP and GKIP	Feasibility studies including: (i) surface and groundwater availability; (ii) cropping assessments and water requirements; (iii) studies and proposals for rehabilitation, modernization, and strategies for increased efficiency and productivity; (iv) economic and financial assessments; (v) institutional assessments including proposals for the PPP management model; (vi) proposals for OM cost recovery mechanisms; and (vii) environmental, gender, social and resettlement safeguard frameworks and documents.	12
2	Detailed Engineering Design (DED) for MIP	For outstanding works to be implemented under the Project , prepare DED including geotechnical investigations, specifications, bills of quantities, and engineering cost estimates for new and rehabilitated structures, and building rehabilitation for MIP (excludes pipe design and upgrading of the electrification which is being undertaken by the Muhuri IMO). Assist BWDB obtain the necessary design approvals.	6
3	Detailed Engineering Design (DED) for TBP and GKIP.	Prepare DED including geotechnical investigations, specifications, bills of quantities, and engineering cost estimates for investment works selected for TIK and GKIP. Assist BWDB to obtain the necessary design clearances and prepare detailed resettlement plans.	24
4	Preparation of bid documents for out-standing Project works	Prepare bid documents according to Government and ADB guidelines for the Project outstanding civil works. Assist BWDB with bidding and selection process, and approval procedures.	12
5	Preparation of bid documents for Project 2 works Bidders contracted	Prepare bid documents according to Government and ADB guidelines for the follow-on project works. Assist BWDB with bidding and selection process, and approval procedures.	24
C	**Efficient Project Management and Effective Institutional Development**		
1	Institutional frameworks and	Based on current Government policy and lessons learnt under the IMIP, prepare a review and recommendations for third-party	18

No	Output	Description	Due Date [a]
	strategies for PPP for large scale irrigation.	MOM of large irrigation projects by private sector. The strategies should include the necessary mechanisms to support OM cost recovery. Develop a strategy document for official endorsement by MOWR and BWDB.	
2	Establishment of the PPP Cell	Facilitate establishment and provide support for the PPP cell to monitor and supervise the activities of the IMOs.	6
3	Establishment of the ICCs	Facilitate the establishment and support strengthening and activities of the ICC for each project.	MIP: 6 TBP and GKIP: 30
4	Review of Muhuri IMO	Working BWDB, an independent panel of experts, and other stakeholders including the ICC, undertake a review of the Muhuri IMO's performance. Recommend improvements and prepare options and preferred strategies for the Stage 2 lease contract.	36
5	IMO Management Contracts for TBP and GKIP	With the PPP Cell, assist PMU with preparation of bid documents, tendering and approval processes for the TBP and GKIP IMO management contracts.	Bid Docs: 18 IMO engaged: 24
6	IMO Lease Contract for MIP	With the PPP Cell, assist PMU with preparation of the bid documents for the Muhuri Stage 2 IMO lease contract. Support the bidding processes and award process.	Bid Docs: 40 IMO engaged: 60

Notes: a/ months from project start date

DRAFT TERMS OF REFERENCE

2- MUHURI IRRIGATION MANAGEMENT OPERATOR

I. INTRODUCTION

A. Project Background

54. In Bangladesh, agricultural development and sustainable natural resource management are critical for poverty reduction, as the majority of the poor (85%) live in rural areas and depend on agriculture for their livelihood. Agriculture generates 50% of employment, contributes 20% of gross domestic product, and provides a secure food supply for the whole population. Major causes of poverty are recurrent floods and riverbank erosion, as well as drainage congestion, salinity, cyclones and tidal surges, arsenic contamination, over-exploitation of groundwater, chemical and biological contamination of surface water, and drought. Climate change is expected to affect the future incidence and severity of disasters, necessitating more attention to managing disaster risk and adapting to change.

55. Extensive irrigation facilities have been constructed that include privately owned and operated groundwater abstraction technologies, and publicly owned and financed large surface water irrigation schemes.[38] The large irrigation schemes suffer from inefficient water utilization, inadequate maintenance, and a large backlog of needed repairs. More effort is required to foster community participation in sustainable management, and to include women and the private sector. The productivity of these schemes continues to be weakened by inadequate management, operation and maintenance (MOM), and now the infrastructure of most large schemes requires rehabilitation. This weakness is due to inadequate financing,[39] lack of beneficiary participation in management, and poor service delivery. The present low performance may be aggravated in future by changes in temperature and rainfall patterns owing to climate change. Such risks need to be considered when rehabilitating the infrastructure and modernizing system operations.

56. Government provides distribution systems down to secondary or tertiary levels for 15 existing large irrigation schemes, with a total command area of around 550,000 hectares (ha).[40] For the period 1996-98, only about 46% of their net command area was irrigated from BWDB sources in the main irrigation season, and there is little evidence of improvement since then. Increasing the areas irrigated and recovering fees would assist economic growth through increased production and reduced subsidies. Also, developing sustainable approaches for MOM of the existing schemes would provide a sound basis for developing new schemes: the National Water Management Plan (2001) identified an additional 1 million ha that could be irrigated with new surface water schemes in areas where groundwater resources are limited.

57. Enhancing land, water and labour productivity is a high priority under the Government of Bangladesh's (the Government) Sixth Five-Year Plan, FY2011–FY2015.[41] Robust and well managed irrigation systems are central to boosting productivity and contributing to food security. Agriculture growth is driven by a shift from subsistence rice-based cultivation to commercial

[38] In Bangladesh, large irrigation schemes are classified as be larger than 2,000 hectares.

[39] Funds provided by Government for maintenance of these schemes is less than 50% of requirement and irrigation service charges collected from end-users amounts to only about 10% of the assessed amount.

[40] 2000. National Water Management Plan. Volume No 3: Investment Portfolio. Ref AW001

[41] Government of Bangladesh, Planning Commission, Ministry of Planning. 2011. Sixth Five-Year Plan: FY2011–FY2015. Dhaka.

high-value agriculture commodities, which is instrumental in advancing rural economic growth and contributing to long-term food security. The Government promotes diversification in agriculture by encouraging private agribusiness as well as providing access and improvements to rural infrastructure. The Government's objectives for surface irrigation are, among others: (i) promote peoples participation in conformity with Integrated Water Resources Management principles; (ii) achieving food security of food grains through ensuring year-round sustainable irrigation; (iii) ensuring climate change resilience; (iv) strengthening and capacity building of water resource institutions; (v) command area development and irrigation expansion; (vi) increase beneficiary participation and, where possible, transfer management to beneficiary organizations, local government and the private sector; (vii) introduction of public-private partnerships (PPPs) to provide support to agriculture and for selected-services; and (viii) provide agricultural extension services including irrigation technology and on-farm water management.

58. Following the completion of the First Command Area Development (CAD-I) Project in 2003,[42] the Government requested the Asian Development Bank (ADB) to provide assistance with preparing a Second Command Area Development Project (CAD-II) aimed at improving the performance of large flood control drainage and irrigation schemes (FCDI) schemes.[43]During preparation of CAD-II two principal constraints to sustainable performance of major water schemes emerged: (i) limited capacity and resources of public agencies in effective maintenance of public agencies in effective MOM of large irrigation schemes; and (ii) chronic system deterioration as a result of inadequate operation and maintenance planning and financing mechanisms. The CAD-II investment project did not proceed and instead, the ADB supported the Government with capacity development TA7260-BAN: Developing Innovative Approaches to Management of Major Irrigation Schemes (DIAMMIS).[44] DIAMMIS investigated the potential for alternative service delivery agreement and management arrangements including using independent entities that would better manage and operate the systems. DIAMMIS developed innovative MOM approaches for the Muhuri Irrigation Project (MIP) based on establishing an independent Irrigation Management Operator (IMO).

59. Subsequently, the Government and ADB agreed to a $46 million to support the $59.6 million Irrigation Management Improvement Project (IMIP, the "Project"). IMIP will improve the management, infrastructure and productivity of MIP and undertake the feasibility study and detail design of the modernization of the Ganges-Kobadak (GKIP) and TBP (surface irrigation projects TBP. These terms of reference are for engaging an international or national private entity to undertake the role and responsibilities of the IMO for the first five years of the Project, to prepare detailed designs for some of the MIP modernization investments, to supervise construction works, to ensure the Management Operation and Maintenance of the modernized irrigation infrastructure (secondary and tertiary level only) and ultimately to provide satisfactory irrigation services to the farmers on behalf of BWDB.

B. The Overall Project

60. The impact of the project will be sustained high growth in irrigated agriculture. The Project's outcome will be efficient and sustainable management for large scale irrigation schemes producing higher yields, with expanded irrigated areas, and with a higher cropping

[42] ADB First Command Area Development Project 2003.
[43] ADB Second Command Area Development Project Haskoning, BETS 2008.
[44] TA7260-BAN: Developing Innovative Approaches to Management of Major Irrigation Schemes (DIAMMIS) 2011.

intensification including diversification into higher value crops. The project will be implemented over five years 2014 to 2019.The project will have the following three key outputs:

(i) **Performance-based irrigation management and agriculture support services established.** This output will include contracting private irrigation management operators under 5 years performance-based management contracts. This “Construction phase” irrigation management operators (C-IMO) will supervise modernization works, establish sustainable MOM and provide agricultural support services in MIP. Efficient management systems will be adopted to maximize water use efficiencies and develop sustainable and reliable irrigation service delivery. Viable and effective operations and maintenance (OM) cost recovery mechanisms will be setup to achieve 100 % cost recovery. The objective will be to bring MIP scheme to the level of profitability and sustainability required for enabling the recruitment of a long term (15 years) “Management phase” irrigation management operator (M-IMO) through a PPP modality. The Project will also support the preparation of the long-term PPP transaction.

(ii) **Irrigation system infrastructure rehabilitated and modernized**. This output will include physical rehabilitation and modernization of irrigation infrastructure including (i) repair of 450 km of canals and 22.6 km of coastal embankments with ancillary facilities; (ii) development of 17,000 ha of modern and highly efficient piped water distribution system to improve timely water access and reduce water losses; (iii) provision of prepaid card meters to allow water allocations to be based on a volumetric basis and ensure full and transparent payment and accounting, (iv) full electrification of the pumping to reduce the operational costs and increase management flexibilities and; (v) pilot solar panels and pumps for 60ha.

(iii) **The Project is efficiently managed with effective institutional development**. This output will include (a) establishment of competent project management and project implementation unit; (b) timely procurement and disbursement; (c) timely appraisal of GKIP and TBP modernization requirements and provision of required feasibility studies and detail designs and strategies to transfer MOM to private sector; and (d) institutional support and capacity and awareness building of BWDB and water management organizations to successfully administer and support PPP contracts.

C. Implementation Arrangements

61. The Executing Agency (EA) for the Project is the Bangladesh Water Development Board (BWDB) in which a Project Management Unit (PMU) will be established and led by the Project Director (PD). A Project implementation unit (PIU) will be established in MIP. A PIU Director will be appointed to supervise MIP modernization field implementation and manage the Irrigation Management Operator (IMO). The PMDC will support the PMU and the PD and PIU Director. Design support units led by an executive engineer will be established in GKIP and TBP sites to support feasibility and detail design preparation for the 2 schemes modernization The PIU Director will be supported by a team of planning, design and construction, procurement, accounts and administration staff. A Project Steering Committee (PSC) will be established within the Ministry of Water Resources (MOWR) to provide overall coordination of the Project and facilitate inter-ministerial coordination. The PSC will be chaired by the Secretary, MOWR.

The PD will be the PSC's secretary and all concerned ministries and agencies will be represented.

62. Also supporting the PMU will be a new PPP Cell that will provide guidance on tendering, private public partnerships, contract management, negotiating, legal, and communication. BWDB's Monitoring Division will be supported with a new Monitoring Cell that will provide independent verification of the performance of various stakeholders as well as assessing impacts associated with Project's objectives. A Safeguards Desk will also be established to support the Monitoring Division with safeguard compliance management.

63. An Implementation Coordination Committee (ICC) will be established for Muhuri Irrigation Project to manage field implementation issues that arise related to conflicts, safeguards, security, and more generally concerns about the performance of the implementing parties. The ICC will be chaired by the project's BWDB Zonal Chief Engineer and committee members will comprise representatives from the offices of the Deputy Commissioner, the Water Users Associations and the IMO.

64. The IMO will liaise with the BWDB regarding the arrangements for office facilities; BWDB office facilities will be rehabilitated under the project and it is possible that some of these may be made available for use by the IMO after the office rehabilitation works are completed in year 2. Depending on the actual requirements the IMO will arrange the rental of appropriate, furnished offices in Feni as well as small field offices in each Upazila to accommodate IMO staff. The EA will also provide counterpart staff, equipment, maps and other necessary information as available.

II. MUHURI IRRIGATION PROJECT

A. Introduction

65. The Muhuri Irrigation Project (MIP) is located in the middle of the Southeastern Region of Bangladesh adjacent to the coastal belt of the Bay of Bengal.[45] It has an approximate a total area of about 43,900ha and covers the four Upazilas of FeniSadar, Sonagazi, Chagalnaiya and Parsuram Upazilas under Feni District, and the Mirsarai Upazila of Chittagong District. Immediately north of MIP is the Muhuri-Kahua Irrigation Project (MKIP) which has a total area of about 21,700 ha, and is contiguous with MIP. Both schemes rely on the same water supply and hence will be considered combined under IMIP and referred to as MIP (Figure 1). A summary of their total, settled, cultivated and commanded areas is shown in Table 1.

Table 1: Muhuri and Muhuri-Kahua Areas

Irrigation Project	Land Use (ha)				Rabi Season Cropping (ha)		
	Total	Settlements	Cultivated	Other	Boro Rice	Fallow	Other
Muhuri	43,892	15,265	24,776	3,851	11,843	9,773	3,160
Muhuri-Kahua	21,731	7,168	13,783	780	6,108	7,136	539
Total	65,623	22,433	38,559	4,631	17,951	16,909	3,700

Source: Analysis of 2011 satellite imagery prepared for the project by CEGIS, 2013

[45] Between latitudes 22°45´N to 23°09´N and longitudes 91°21´Eto 91°35´E

66. Topographic relief of the project area is generally low lying with ground elevations varying from 8m PWD in the north to 4m PWD in the south; and 5.3m in the west to 6m PWD in the east. The area comprises smooth, broad ridges and basins which are underlain by silty-soil deposits. Land types classified according to seasonal depth of flooding are shown in Table 2 which shows about 70% of the area floods to a depth of 0.9 m of more during the Kharif season.

Table 2: Geographic and Crop Data

Land Type	Description	Flood depth (cm)	Percentage (%)	Remarks
F0	High land	0 - 30	20	Triple cropping possible with irrigation
F1	Medium high land	30 – 90	51	during Rabi
F2	Medium low land	90 – 180	21	Double cropping possible with deep
F3	Lowland	>180	8	water Aman and irrigation during Rabi
	Total		**100**	

Source: CAD-II Agriculture Report 2008

67. Geologically, MIP comprises parts of the physiographic unit of Meghna Esturine Flood Plain, Chittagong Coastal Plain, and the Northern and Eastern Hills. The area has the following soil characteristics:

(i) Old Meghna Estuarine Flood plain: Silt-loam soils predominate on highlands and silty-clay to clay in lowlands. Non-calcareous Dark Grey Flood plain soils are the only general type of the area. Organic matter content of the soils is moderate, moisture holding capacity is medium. Top soils are moderately acidic but sub soils neutral in reaction. General fertility level is medium.

(ii) Chittagong Coastal Plain: Non-calcareous Grey Floodplain Soils, Non-calcareous Alluvium and acid sulphate soils are the major components of general soil types of the area. Generally the fertility level of soils is medium. Organic matter content is low to moderate.

68. Based on sample surveys, landholdings comprise: (i) 37% are landless or functionally landless with less than 0.2 ha of landholdings; (ii) 47% have small or marginal land holdings ranging from 0.2 ha to 1.0 ha; (iii) 13% have medium landholdings ranging from 1 ha to 3 ha; and (iv) 3% have large landholdings greater than 3 ha.[46]

69. The MIP area experiences three seasons:

(i) Southwest Monsoon, usually starting in May and lasting until October. Almost 90% of the total annual rainfall occurs during this period, when temperatures and relative humidity are high.

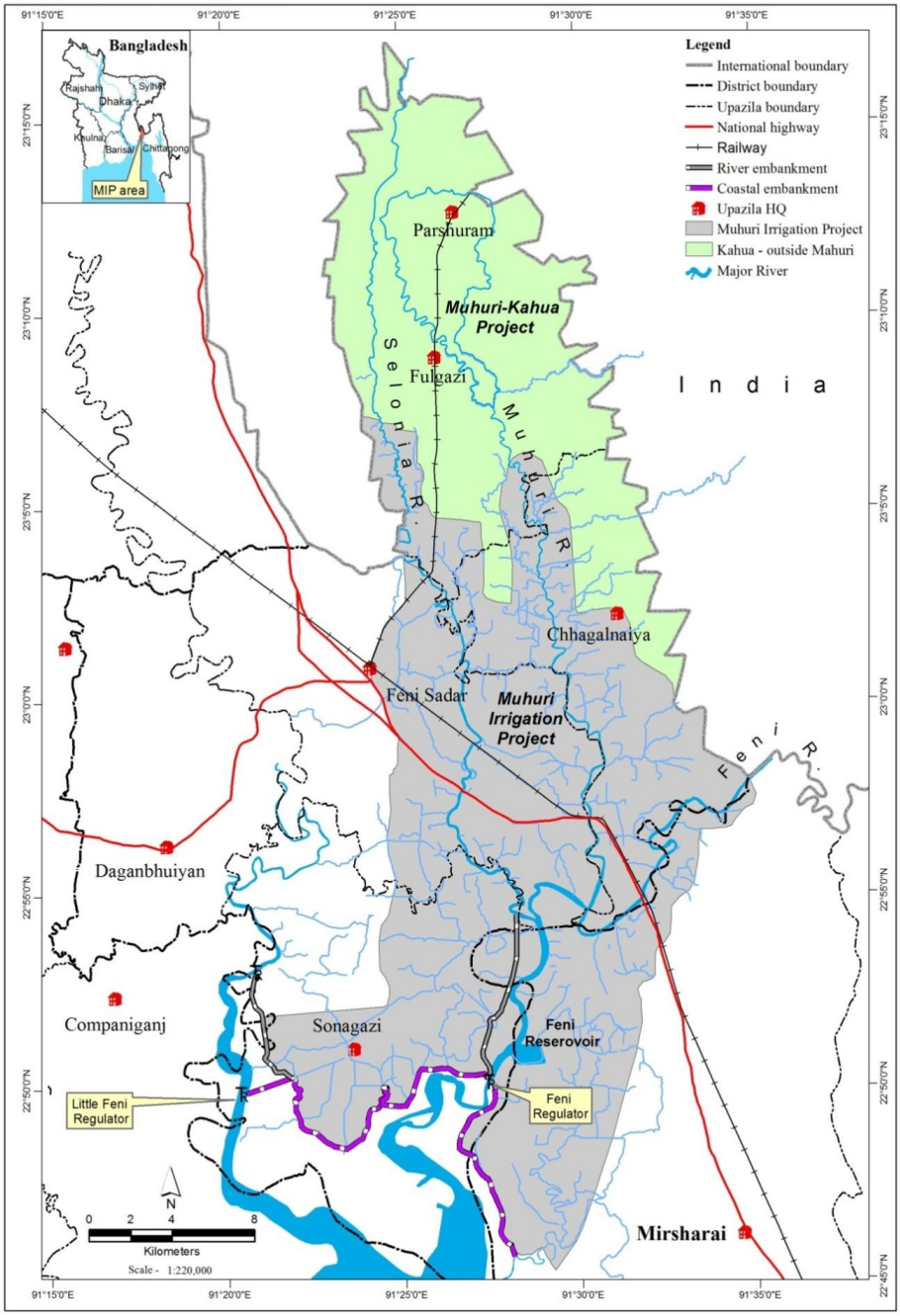
(ii) Northeast Monsoon, usually lasting from November to March. This is the dry, cold season but occasionally rainfall occurs.

(iii) Hot Season, usually a short period that extends from about late March to May. The highest daily temperatures generally occur at this time and, owing to cloud burst events, flash floods often occur from the rivers flowing from the Tripura Hills located in the eastern region.

[46]CAD-II Agriculture Report 2008

70. MIP has a three tiered system: (i) the Level 1 primary system comprises the coastal embankment, main regulator structures, the Feni Reservoir and the Feni, Muhuri and Kalidash-Pahaliamain river channels; (ii) the Level 2 secondary system comprises the khals; and (iii) the Level 3 tertiary system comprises the low lift pumps (LLPs) and farm distribution systems. The embankment and regulator raises water levels in the upstream rivers which in-turn flood the khals. LLPs are positioned along the khals and raise the water from the khal into the farm distribution systems, each servicing command areas ranging from 5ha to 40ha. In addition to irrigation, the Level 1 system also manages the risk of both river and tidal flooding.

Figure 1: Map showing Muhuri Irrigation Project and Muhuri-Kahua Irrigation Project



Source: PPTA, 2013

B. Main Issues Affecting MIP Productivity

71. MIP has lost productivity, in terms of irrigated area and cropping intensities, owing to limited access to water and poor drainage. The main causes are complex and include:

(i) Major siltation in the khals and rivers which: (a) limits sufficient irrigation water in the khals from reaching the LLPs; and (b) restricts drainage from flowing back to the rivers.
(ii) Significant reduction in Feni Reservoir storage due to siltation. The original reservoir storage was about 32Mm^3 but this has reduced to about 7Mm^3. The current overall storage in reservoir, rivers and khals is 54Mm^3 of which 18Mm^3 is live storage.
(iii) There are large annual climatic variations which are affecting water availability. Delayed planting due to cold winters and slow mobilisation of the pumps are delaying the planting dates of boro rice and putting additional pressure on the scarce water resources during February and March which coincide with the lowest river flows.
(iv) The low prices of rice and high prices of inputs including pumping has resulted in many farmers not planting rice.
(v) Pump operators find it too expensive to provide water to plots located far from the pumps and most of the irrigated land is a nucleus around each pump.
(vi) There is a significant drop in the number of operational pumps and the irrigated areas. Pump inventories in 2013 show there are only about 440 operational pumps from an original 800 pumps. The irrigated area from surface water based on 2013 satellite imagery is estimated to be 11,300 ha in MIP (including the Muhuri-Kahua area) reduced by 50% from the original target of 23,000ha.

72. Other issues include deterioration of the coastal embankment and associates structures which are causing salinity intrusion and impediments to drainage as well as risk from sea water inundation during high sea level periods.

C. Planned MIP Infrastructure Investments

73. In the framework of the IMIP an investment plan is designed to increase the productivity and long term sustainability of the MIP. The investments have been targeted to improve the irrigation performance and cost recovery and include:

(i) Repair of the coastal embankment and associated structures to prevent saline intrusion and ingress of sea water during storms.
(ii) Repair of 10 existing flow control structures including the main Regulator and provision of 8 new small water/ flood control structures.
(iii) Excavation of about 3.8 million m^3 from the 460km of khals to provide full access to irrigation water for all irrigation water users and to improve drainage.
(iv) Upgrading and modernization of the Level 3 system including: (a) the replacement of existing (mostly diesel) pumps with electric pumps; (b) replacement of the existing open canals with buried PVC pipe distribution system; and (c) installation of a prepaid meter system to allow water allocations to be based on a volumetric basis and ensure full and transparent payment and accounting.
(v) Upgrading and expansion of the local electrical distribution system to energize all new pumps to reduce operation costs and allow for the introduction of prepaid card meters and control systems. Four pilot solar power pumping units will also be installed to irrigate 60ha.

(vi) Provision of the prepaid card meters and control systems.
(vii) Repair of BWDB office space for use by BWDB and the IMO.

74. The investment to modernize the tertiary (farmer) distribution system forms about 40% of the investment and is designed to increase the water efficiencies to maximize the irrigable area, as well as reduce operation and maintenance (OM) costs. The prepaid metering and piped distribution will enable provision of on-demand water to farmers throughout the year. It will open opportunities for farmers to increase cropping intensities, support crop diversification and facilitate collection of water charges. The use of low pressure pipes offers the best to solution to meeting the needs of water and power efficiencies.

75. All the existing diesel pumps will be replaced with electric pumps to reduce the operating costs and improve efficiencies. For about 60 ha (4 schemes), provision of solar panels will also be installed as pilots to demonstrate the potential for supplementary electric power.

76. To advance project preparedness and allow construction activities to begin during the IMO's first year of operation, detailed designs of new Level 3 systems have been prepared and approved by the government. These cover about 2,000 ha of MIP, including a 60ha pilot with solar pumping as well the preparation of designs for the earthworks (khal excavation and repairs to the coastal embankment).

D. Planned Pre-paid Smartcard Pump Operation and Revenue Collection System

77. Prepaid smartcard meter and control systems offer a highly efficient and transparent collection of service fees from farmers. The system also allows the farmers to pay based on the volume of water received which has shown to result in significant water use reduction over current systems that charge on seasonal payments per area basis. Prepaid meter have been tested and are proving very effective under the Barind Multipurpose Development Authority Project.[47] In conjunction with a buried pipe tertiary distribution system, this modernized system is expected to result in the following: (i) water use efficiency gains; (ii) flexible on-demand irrigation supply to farmers; (iii) 100% financial cost recovery from users (farmers) according to amount of water each uses; and (iv) elimination of possible "rent seeking" from pump owners and operators, corruption, or loss of project funds. These in turn will enable: (i) considerable expansion in cropped area; (ii) reduced pumping volumes and costs; (iii) a variety of crops to be cultivated with different planting dates, crop durations and irrigation water requirements, to suit individual farmers; (iv) improved crop yields arising the individual farmers being able to control timing and amounts of irrigations; and (v) sustainable funding for operation and maintenance.

E. Planned MIP Management Arrangements

78. The MOM of the Level 1 will remain with the BWDB; although there is some discussion that the OM of some minor structures (including minor sluice gates in the coastal and river embankment) might be assigned to the IMO. This transfer of the responsibility will however not occur during the stage 1 management contract.

79. Under the IMIP it has been agreed that the MOM of Levels 2 and 3 will be assigned to the IMO. The IMO will be contracted by BWDB in two stages: (i) Stage 1 IMO will be a performance-based management contract for Years 1 to 5 (inclusive) during which the IMO will design and supervise construction of the investment works while also managing, operating and

[47] http://www.bmda.gov.bd/

maintaining Levels 2 and 3 of the project; and (ii) Stage 2 IMO will be a 15 year lease contract for years 6 to 21 (inclusive) to undertake MOM of Level 2 and 3 of the project. The Stage 1 IMO will be financed by IMIP according to the terms of the contract, whereas the Stage 2 IMO should be financed solely from water tariff revenues. During Stage 1 there will be an independent review of the IMO arrangements and terms of reference (TOR) for Stage 2 will be prepared with support from PMDC. The present TOR applies to the Stage 1 IMO only.

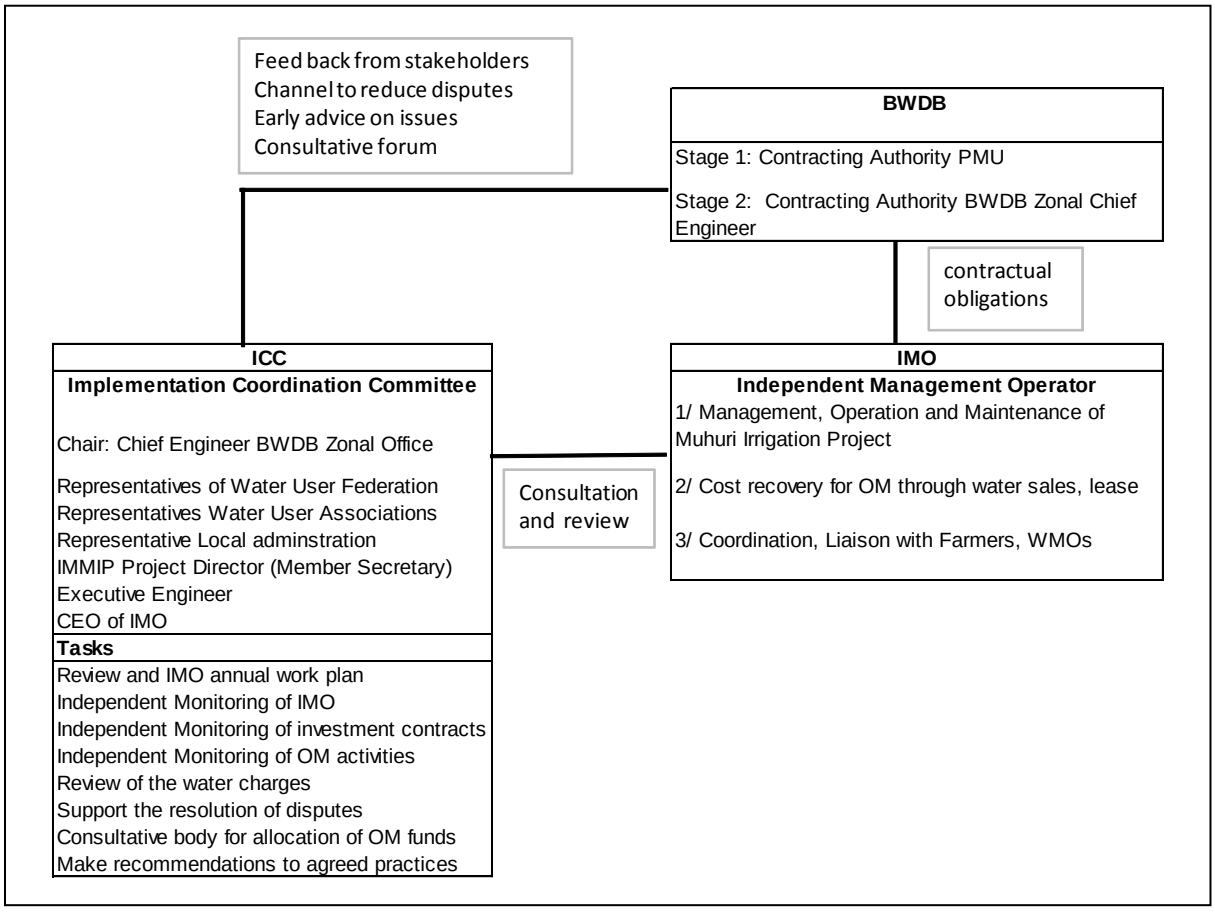
80. The stage 1 IMO will be a private company or consortium contracted by BWDB through international competitive bidding based on a two-envelope technical and financial offer. The contract will be for a five year period. During this period**,** the IMO will be responsible for MIP's MOM (Levels 2 and 3) and will include the establishment and management of efficient revenue collecting through the prepaid meter systems. The IMO would also be responsible for: (i) the design for tertiary level infrastructure (LLPs with prepaid smartcard systems and water distribution system), (ii) supervision of construction of all the investment contracts (including those for the Level 1 system that will be designed by the PMDC); and (iii) the development of pilot agricultural demonstrations and pilot cost recovery activities. All MIP assets will remain in the ownership of the Government. A summary of the design and construction supervision responsibilities are summarised in Table 3 below.

Table 3 Summary of Design and Supervision Responsibilities

III. Works Package	Design	Construction Supervision
CW-1; Excavation of khal-1, rehabilitation of coastal embankment	PPTA 2013/14	IMO 2014-18
CW-2; Excavation of khal-1	PPTA 2013/14	IMO 2014-18
CW-3; Farmer distribution, pumps and prepayment meters-stage-1: 2,000ha	PPTA 2013/14	IMO 2014-15
CW-4; Upgrading of electrical distribution	IMO 2014	IMO 2015-17
CW-5;Farmer distribution, pumps and prepayment meters-stage 2 :5,000 ha	IMO 2014/15	IMO 2015-16
CW-6; Farmer distribution, pumps and prepayment meters-stage 3: 5,000 ha	IMO 2014/15	IMO 2016-17
CW-7; Farmer distribution, pumps and prepayment meters-stage 4: 5,000 ha	IMO 2015/16	IMO 2017-18
CW-8; New structures, rehabilitation of structures, rehabilitation of BWDB buildings	PMDC 2014	IMO 2015-16

81. The Water Management Organizations (WUG, WMA and WMF) will play a supporting and guiding role for the IMO through the Implementation Coordination Committee (ICC) as shown in Figure 2. The ICC would meet quarterly. The costs including honorarium of the ICC would be paid through the ISC fund.

Figure 2 Implementation Coordination Committee



F. Financing of Operation and Maintenance

82. The recovery of operation and maintenance (O&M) costs at MIP will be via irrigation charges levied through the prepaid meters. The irrigation charge will be based on a tariff per **cubic** meter (m3) pumped measured against the volume of water pumped by each farmer. The financial analysis incorporates an evaluation of the current and future O&M costs at 2013 prices. The current costs of O&M are estimated to be $26/ha for Level 1, $20/ha for Level 2, and for Level 3 $99/ha for electric pumps and $137/ha for the diesel pumps. The estimated future costs of O&M for Levels 2 and 3 under Stage 2 (year 7 onwards) are summarised in Table 4 below[48].

[48] Under Stage 1, an IMO will be recruited through a 5 year performance based management contract to supervise the modernization works and bring the scheme to the required level of efficiency and profitability. Under Stage 2, an IMO will be contracted for 15 years through a public private partnership.

Table 4 Estimated Future Costs of Operation and Maintenance of Levels 2 and 3

Category	Annual Outgoings ($ million)	Cost ($/ha)	Cost (Tk/ha)
1. O&M Level 3 Pumps Pipe Distribution	0.912	53.6	4290
2. O&M Level 2 Khals and other secondary structures	0.338	19.9	1592
3. Irrigation Service Charge Tk260/ha ($3.25/ha)	0.055	3.3	260
4. IMO Organization Costs	0.399	23.5	1876
5. IMO Margin (10%) on Operational Costs (1, 2 and 3)	0.131	7.7	614
6. VAT 15%	0.275	16.2	1295
Total Outgoings	**2.110**	**124.1**	**9,928**

83. The estimated annual volume of water pumped is around 200 million m3 mainly to meet the requirements of 17,000 ha of boro rice at a water requirement of 11,600 m3/ha. It is anticipated that additional pumped irrigation would take place outside the boro season but this has not been included in the estimates. To meet the needs of full O&M cost recovery for Levels 2 and 3 requires an annual revenue of $2.1 million (Tk168 million) per year which requires the water tariff to be set at $10.55 per 1,000 m3 based on 200 million m3 pumped per year.

84. A comparison of current levels of charging and the estimated future costs of O&M is in Table 5. The full O&M cost recovery tariff is equivalent to $124/ha, equal to approximately 90% of the current water charge for diesel pumps ($138/ha) and 25% higher than the charge for electric pumps ($99/ha).

Table 5: Comparison of Current and Estimated Future Costs

		Analysis of Costs					
Category	Basis of Charges	Cost ($ per '000 m3)	Volume pumped (m3/ha)	Equivalent Cost ($ per ha)	Equivalent Cost (Tk/ha)	Estimated Current Charges (Data from Field Surveys)	
Current Levels of Charging						**$/ha**	**Tk/ha**
Diesel Pump Earth Canal	Level 3 only	8.46	16,274	137	10.960	138	11,000
Electric Pump Earth Canal	Level 3 only	3.02	16,274	49	3,920	99	7,900
Estimated Costs of O&M Levels 2 and 3 (based on full recovery of O&M costs in stage 2 year 7 onwards)							
New Electric Pumps Pipes, Prepaid Meters	Levels 2 and 3	10.55	11,760	124	9,928		

85. Farmers have reported difficulty in meeting current water charges due to the low price of rice. The new irrigation system will improve opportunities to increase crop returns. While keeping tariffs low may seem desirable, an underfunded IMO will not deliver an adequate service. In theory, keeping the tariff below the full cost recovery level can be compensated by periodic government transfer. In practice however, budgetary allocations are very often subverted resulting in operators not being able to meet their operational obligations. A strategy of self-financing of the IMOs was adopted. Alternative and supplementary cost recovery mechanisms will be investigated and piloted by the IMO during the first stage of MIP development including the lease of land and water assets, agricultural services, and royalties from sand abstraction.

86. During Stage 1 the IMO staffing and administration costs would be paid for by the loan with no linkage to the irrigation charges. This will allow the IMO to operate and establish the O&M systems independent of revenue. However, six months' operational revenue will be built

up during Stage 1 to as a fund for Stage 2 to cover, for instance, the requirements of deferred maintenance and renewals. The irrigation service charge (ISC) is currently $3.25/ha (Tk260/ha) which is about 2% of the cost of the O&M of levels 2 and 3. It is proposed that out of the ISC, the IMO would be paid a fee of 20% for collection, 50% would support Level 2 and 3 maintenance costs, and the remaining 30% would be split between the water users' association (WUA) and BWDB. The costs of the Implementation Coordination Committee (ICC) would be paid from BWDB's share.

87. Based on an analysis of 2013 prices it is recommended that initial water charge is set at $9.00 (Tk720) per '000 m3, which is 15% less than the requirement for full O&M cost recovery. This will have to be adjusted annually incorporating escalation especially with respect to electricity tariffs. Future adjustments to the irrigation tariff would be determined by BWDB working in close liaison with the IMO and the ICC. By year 6, however, the tariff should be at an adequate level to meet the needs of full O&M cost recovery. The IMO will be working in Stage 1 to support increased crop productivity as well as investigating alternative and supplementary opportunities for cost recovery. For Stage 2 the level of the irrigation tariff can be incorporated into the evaluation of bids for MIP operation. This provides a clear incentive for the IMO to reduce costs and establish supplementary cost recovery mechanisms.

88. For Level 1 infrastructure, current annual maintenance costs are estimated at $0.5 million (Tk40 million), excluding BWDB costs estimated at $0.3 million (Tk24 million) per year. Current government allocations are sufficient to meet these requirements. The estimated overall O&M budgets for MIP are shown in Table 6. Under the project BWDB will transfer the responsibility for Level 2 O&M to the IMO and BWDB allocations for Level 2 O&M will be transferred to Level 1. With this reallocation of resources and recent increases in O&M funding it is estimated that government funding would be sufficient to meet the requirements of Level 1 O&M.

Table 6: Overall Operation and Maintenance Budgets for MIP ($ million)

	Current Requirement[a]			Current Allocation[b]			Future Requirement[c]		
Level	**O&M**	**Estab**	**Total**	**O&M**	**Estab**	**Total**	**O&M**	**Estab**	**Total**
1	0.5	0.3	1.1	0.5	0.3	0.8	0.5	0.3	0.8
2	0.3						0.3	0.5[d]	1.8
3	2.1	-	2.1	1.3		1.3	1.0		
Total	**2.9**	**0.3**	**3.2**	**1.8**	**0.3**	**2.1**	**1.8**	**0.8**	**2.6**

Estab = establishment costs. O&M = physical O&M costs. Future Levels 2 and 3 O&M costs funded from irrigation revenues. $0.055million costs for ISC incorporated into the Level 3 costs

a. Based on 17,000 ha 75% diesel pumps, earth canals, full management by BWDB

b. Based current area of boro crop 11,300 ha 75% diesel pumps, full management by BWDB

c. Based on 17,000 ha full electric pumping, pipe distribution, Level 1 managed by BWDB, Levels 2 and 3 managed by IMO. Excludes VAT.

d. Costs of IMO.

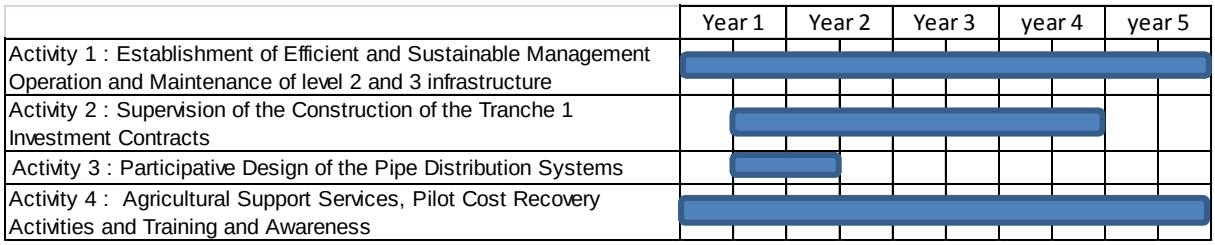
IV. SCOPE OF SERVICES

A. Introduction

89. The IMO will be engaged under a Management Services Contract for the provision of services for design, construction supervision, MOM, and agricultural support services for MIP. A general schedule of the following activities is shown in Figure 2:

(i) Activity 1: Establishment of efficient and sustainable MOM of Level 2 and 3 infrastructures on rehabilitated areas.
(ii) Activity 2: Construction supervision of MIP investment works.
(iii) Activity 3: Participatory design of the Level 3 distribution systems.
(iv) Activity 4: Agricultural support services, pilot cost recovery activities, and implementation of training and awareness programmes.

Figure 2: Activity planning during over the contract time



90. Given the importance of all aspects of the contract in the long-term sustainability of the provision of irrigation services for MIP, bidders should submit as part of their technical proposal a detailed plan showing their proposed approach to the integration of the four activities, an appreciation of the key issues involved, and their approach to staffing and project management. The services and outputs of the IMO are described in detail below.

B. Activity 1: Efficient and Sustainable MOM of Level 2 and 3 Infrastructure

1. Scope of Services

91. Efficient and sustainable MOM for MIP is the core activity for the IMO and includes:

(i) The establishment and implementation of effective OM systems of the Levels 2 and 3. Costs of maintenance would be paid for through water tariffs. Physical maintenance activities would be done by the most appropriate method as decided by the IMO.
(ii) Effective OM on the rehabilitated structures, after completion of the works, accordingly to the provisional schedule.
(iii) Annually agreeing with BWDB and ICC the water tariff rate.
(iv) Once investment works are completed ensure full cost recovery for MOM activities are achievable through tariff collection using the prepaid meter systems.
(v) Maintain close coordination and liaison with water users and other stakeholders, and implement programs of communication and awareness to ensure stakeholders are well informed and engaged with the project process. This will include the close liaison and support for the implementation coordination committee (ICC) which comprises of the BWDB, Key Stakeholders including the WUA and the IMO>
(vi) Establishing transparent and open systems of financial management through an Escrow[49] bank account for the project which would be used for collected revenue and payment of pump operations including pump operators, payment of electricity and telecom tariffs, and seed money for financing the IMO in Stage 2.

[49] Escrow refers to money held by a third-party on behalf of transacting parties. The escrow manager has the duty to properly account for the escrow funds and ensure that usage of funds is explicitly for the purposes intended.

(vii) The water tariff will incorporate the collection of the irrigation service charge. A portion of the ISC currently levied at $3.25/ha will be paid to BWDB, the Implementation Coordination Committee (ICC) and to the WUAs. The allocation of the ISC funds will be decided by the ICC.

(viii) Preparation of an annual report and work plan, preparation of quarterly progress reports showing revenues and disbursements.

(ix) Maintaining a professional approach to undertaking all tasks and keeping the highest possible level of cooperation and relationship with water users and other stakeholders.

(x) Selecting and contracting individual pump operators. The IMO will prepare a standard form of contract for engaging all pump operators which will be amended and updated as necessary on a collective basis. Selection will be based on their skills, attitude and experience. The experience of existing pump operators will be taken into account.

(xi) For OM works funded by revenue engage for small works or service contracts as required. Procurement will follow government and ADB Procurement Guidelines (2013, as amended from time to time) and ADB's Guidelines for the Use of Consultants (2013, as amended from time to time).

(xii) Monitoring, developing and maintaining a water resources management plan for the project area that includes surface and ground water. The plans will be developed in coordination with the PMDC consultants who will undertake hydrological and hydro-geological studies for MIP and he IMO will be responsible to apply the outputs of the technical studies and engage with stakeholders to develop long-term sustainable management including balancing and optimising the available water resources with the cropping systems. The management plan will include; (i) working with BWDB hydrology unit to improve the quality of flow measurement (budget has been allocated to the PMU to procure ADCP flow measurement equipment); (ii) to apply the outputs of the PMDC hydrological studies to improve the operation procedures for the MIP including the operation of the main barrage gates; (iii) applying rainfall and flow monitoring information provide annual forecasting information to farmers of likely dry season flow conditions which can be applied to improve crop planning; (iv) apply the outputs of the hydrological studies to develop mechanisms for farmers better fit cropping to the water availabilities, these could include adjusting the water tariffs during certain months to encourage/discourage water use; (v) develop improved assessments of trends of river flows and engage with farmers to adapt cropping patterns to meet possible future water shortages; (vi) based on the hydro-geological assessments by the PMDC improve the conjunctive management of surface and groundwater in the MIP.

(xiii) Liaise with the Rural Electrification Board (REB) and Palli Bidyut Samity (PBS) to ensure the best quality of service is made available for irrigation including reducing wherever possible power cuts especially during the periods of peak irrigation requirements and the sensitive periods of crop growth. The provision of power for the MIP will be based on a Memorandum of Understanding (MOU) between the BWDB and the REB; the MOU will be signed in early 2014.

(xiv) Supporting the farmers to manage pumping to meet the needs of crops within the constraints of electrical power outages. Mitigation measures to meet power shortages will include; (i) the optimum use of the two pumps to be provided at each location. (for each irrigation unit, two pumps will be provided-the main pump will meet the peak irrigation requirements based on 24 hours electricity supply, a second booster pump will provide additional capacity to allow the peak water

requirements to be met within 16hours of power per day which is the current average power availability); (ii) organising some staggering of the peak requirements especially land preparation in case of severe shortages; (iii) preparation of emergency contingency plans in case of very severe power cuts including the use of farmer owned portable pumps, existing diesel pumps and tubewells; payments for emergency supplies would be paid for through the water charges, the details to be agreed with farmer pump owners.

(xv) Ensuring environmental, social and gender safeguard compliances are maintained during implementation of investment works and regulation MOM activities.

(xvi) In coordination with the PMDC develop a Project Monitoring and Evaluation System (PME) including the necessary management information systems (MIS) to meet the needs of project management. The PME would include, among other things: (i) GIS spatial database of infrastructure, assets and landholdings;(ii) time-series database of operational data including rainfall, water levels and flows throughout the Level 1 to 3 system including pump flows;(iii) records of maintenance needs and actions detailed by their nature, type, and location; (iv) record of all tariff and ISC revenues collected; (v) records of all OM expenses; and (vi) records of crops, yields and marketed surpluses based on the monitoring of a representative sample of farmers and other sampling methods; and (vi) cost recovery.

(xvii) Preparing OM Manuals to meet all OM needs and procedures based on an assessment of requirements as well as lessons learnt during the initial four years. The manuals will be the key documents to support the bidding process for the Stage 2 IMO. Three manuals will be prepared: (i) scheme operational manual; (ii) scheme maintenance manual; and (iii) a scheme administration manual.

2. Management of the Operation and Maintenance of Level 2 and 3

92. The IMO will be required manage, operate and maintain the Level 2 and 3 infrastructure including:

(i) OM of the LLPs and smart card metering system.
(ii) Management of revenue collection using the smartcard metering systems.
(iii) Maintenance of the pipe distribution systems.
(iv) Maintenance of the khals and other secondary infrastructure.

93. There are an estimated 450km of khal within the overall MIP project area, most but not all will be re-excavated under the project. The selection of priority khal for maintenance will be a key task of the IMO; optimising and efficient use of the limited maintenance funds will be essential. Priority will be given to ensuring access to irrigation water for the 17,000ha development area; other requirements will be to maintain adequate drainage capacity. The secondary infrastructure will be limited to the small structures (small hydraulic structures, bridges and protection works on the secondary and tertiary water courses currently owned by the BWDB (excluding the main river and coastal embankments). The IMO will also play an important role in controlling other structures erected or to be erected in the khal waterways; this includes structures built by various government departments as well as privately owned structures. Special action is required for structures that are encroaching into the canal hydraulic section and are obstructing the irrigation flows and/or drainage flows. The IMO will liaise with

BWDB and the local government organisations to ensure appropriate design of new infrastructure and removal of structures affecting the hydraulic flow.

94. The estimated OM requirements for the Level 2 and 3 systems are summarized in Table 3. The IMO will establish an escrow account for all the revenues and OM expenditures including the collection and allocation of the irrigation service charges (ISC). The IMO will be responsible for the technical and financial management for the operation and maintenance of the level 2 and level 3 irrigation facilities. The IMO Project Manager and the Deputy Project Manager will be signatories to the escrow account. The revenue for the OM will be derived from the cost recovery for the OM derived from the water revenues from the smart card systems as well other supplementary revenue systems to be established. The allocation of funds for OM must follow the approved Annual Work Plan and would follow the administration procedures defined in the Project Management and Administration Manual. The payments for OM work will include: (i) electricity payments; (ii) pump operator fees; (iii) smartcard vendor fees; (iv) maintenance of the Level 2 and 3 irrigation systems; and (v) other miscellaneous payments relating to the field activities. During stage 1 all the operational costs of the IMO including staff costs, transport, office costs, training and meetings would be paid through the IMO contract. The IMO will be required to prepare independently audited accounts which will incorporated into the annual report to be prepared by 30th of June each year and presented to the Annual General Meeting of Implementation Coordination Committee.

Table 3: Estimated OM Costs for Years 1 to 5

Cost Categories		Year						
		1	2	3	4	5	6	7 onwards
		Stage 1 Management Contract					Stage 2 Lease	
Area of Irrigation under new management		500	2,000	6,000	12,000	17,000	17,000	17,000
Volume Pumped	Mm3	6	24	71	141	200	200	200
Income $ million								
Tariff $/'000m3	10.6	0.062	0.248	0.745	1.489	2.110	2.110	2.110
Outgoings $ million								
OM/deprectiation Level 3 pumps/pipe distribution		0.027	0.107	0.322	0.644	0.912	0.912	0.912
OM Level 2 Khals and other costs		-	0.100	0.100	0.100	0.100	0.150	0.338
Irrigation Service Charge Tk260/ha ($3.25/ha)		0.002	0.007	0.020	0.039	0.055	0.055	0.055
IMO Organisation Costs		-	-	-	-	-	0.399	0.399
IMO margin 10% on operational costs							0.112	0.131
VAT 15%		0.004	0.032	0.066	0.117	0.160	0.244	0.275
Total Outgoings		0.033	0.246	0.507	0.900	1.227	1.871	2.110
Net Balance $ million		0.029	0.002	0.237	0.589	0.883	0.238	-
Cum Balance $ million per year		0.029	0.032	0.269	0.858	1.741	1.979	1.979

3. Tasks Required for Bid Submission

95. A methodology for MOM of MIP to ensure a consistently high standard of service for delivery of irrigation water services to the farmers that also takes into account the issues discussed in the following paragraphs.

96. With the proposed Level 3 system with pipes and prepaid meters, the operation of the rehabilitated areas may become relatively simple; however the Bidder should describe in their technical proposal the main aspects of the work to be undertaken. The methodology should: (i) demonstrate that the Bidder understands the tasks needed to be carried out and their ability to plan, manage and guarantee dependable, efficient and cost-effective water delivery service; (ii)

describe the organization of its team to guarantee the water services during irrigation season (Rabi season and Kharif 1 and 2 seasons) and the organization of the team and their activities during the non-irrigation season (Kharif 2 season: July to December). The Bidder will: (i) specify the level of labour intensity they intend to apply for scheme operation and how local staff (pumps operators) will be hired/contracted and supervised, to ensure quality of service; (ii) propose how the electrical pumps can be effectively managed including actions to mitigate against severe power shortages; (iii) describe the procedures to cooperate with BWDB that will keep the responsibility of MOM of the Level 1 system; and (iv) describe the mechanisms for data collection from the prepaid meter system.

97. Draft maintenance Manual: The proposed mechanisms for routine, emergency and preventative maintenance should be developed by the IMO as part of its bid. It should demonstrate a planned approach to maintenance of the infrastructure with a planned program of activities, and measurable parameters to ensure potential for effective monitoring and control as well as record keeping system. The Draft Manual to be presented as part of bid submission will be used to evaluate the Bidders' approach and methodology. During the contract period the successful bidder has the task of updating and developing fully this draft.

98. Draft Maintenance Program: a fully resourced and time bound maintenance program for the completed Scheme including resources to be mobilized by the IMO, e.g. use of own labour, equipment, renting or outsourcing to local or regional contractors; the bidder will specify the level of labour intensity he intends to apply for maintenance works and how local labour would be hired and supervised to ensure adequate quality of works; detailed specifications, time-bound and priced proposals for items of major plant and equipment that the bidder intends to purchase or hire to carry out maintenance are to be provided by the bidder in the respective technical and financial forms of the bid.

99. Information system proposals to develop the data bases and SIG linked to infrastructures, O&M, water users; agricultural situation; hydraulic and climatic data collection; etc. The bidder will describe its staff organization and effective means of implementation.

100. Management reporting approach: To show the items of financial, technical and operational data collection and reporting that will be provided on a regular basis. This to show the program and procedures for reporting both internally and to BWDB.

101. Customer Service Plan to include levels of service response, dispute resolution, interaction with farmers and IWUA, as well as to incorporate approaches to office staffing, equipment.

102. The bidder will describe the effective means of implementation to guarantee efficient and sustainable operation and maintenance of the rehabilitated infrastructures (transport means for operation staffs, organization chart; office requirement at Upazila level; workshop; etc.)

C. Activity 2: Construction Supervision of MIP Investment Works

1. Scope of services

103. The construction contracts for the MIP rehabilitation will be let by BWDB through the nominated Project Director who will act as the "Employer". The BWDB will appoint the IMO as the resident engineer with full responsibilities for the supervision of the construction contracts under the IMIP. The General Manager of the Irrigation Management Operator, or the Deputy

General Manager in the absence of the General Manager will be the nominated “Engineer" as defined in the works contracts.

104. The IMO will be responsible for the supervision of construction of all the investment contracts under IMIP (including the coastal embankment, khal excavation, rehabilitation and new structures, pipe distribution/pumps/prepaid meters, upgrading of the electricity network, rehabilitation of offices). The proposed works for MIP are summarised in **Table 4** below. Payments would be made by BWDB based on progress certificates by the IMO. The IMO staff supported surveyors will develop a very high level of supervision to international ISO or equivalent standards which can form a model for future supervision under the IMIP. The construction time schedule is as shown in **Figure 3**.

Figure 3: Construction Implementation Schedule

	Year 1					Year 2				Year 3				Year 4				Year 5		
	2014	2015				2016				2017				2018				2019		
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Wet Season			x	x			x	x			x	x			x	x			x	x
Coastal embankment works [a/]	x	x			x	x			x	x			x	x						
Khal excavation [b/]	x	x			x	x			x	x			x	x						
New and rehabilitation of hydraulics structures and BWDB offices [c/]	x	x			x	x														
Level 3 system works [d/]	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
Upgrading of the electricity network [e/]	x	x	x	x	x	x	x	x	x	x	x	x	x	x						

Notes:
[a/] Number of km of coastal embankment works = 22.4 km;
[b/] The new and structures proposed for rehabilitation include (i) the rehabilitation of coastal sluice structures 05,06, 06/07 and 08; (ii) rehabilitation of river sluices including the main Feni regulator and the little Feni river sluices 10 and 11; (iii) new coastal protection/drainage structures sluice 07 and Sluice 09; and (iv) new water and flood control structures , north Daulatpur, South Daulatpur and water retention structures Bhalukia Khal, Madhya Khal and Ichakhali Khal; and (v) rehabilitation of the BWDB offices and houses at Feni.
[c/] Excavation of Khal to support irrigation and drainage, estimated volume is 3.8 million m3;
[d/] 17,000 ha need to be modernized, 2000ha advance systems have been designed through the PPTA
[e/] estimated to be about 160km of new electrical distribution of which it is estimated 70% would high tension and 30% low tension.

Table 4 Summary of the Proposed Civil Works for MIP

Ref		Item	Unit	Qty	Cost (Tk Million)	Cost ($ Million)	Sub Total Tk million	Sub Total $ million	%
1	**Coastal Flood Protection**								
1.1		**Repairs to the coastal embankment Polder 60**	m3	325,000	66.625	0.833	66.6	0.8	2.7
1.2		**Coastal Flood Protection Stuctures**							
	1.2.1	**Rehabilitation of Coastal Protection/Drainage Structures**							
	1	Polder 60 Sluice 05 Rehabilitation	nr	1	0.826	0.010			
	2	Polder 60 Sluice 06 Rehabilitation	nr	1	0.839	0.010			
	3	Polder 60 Sluice between 6 and 7 Rehabilitation	nr	1	1.774	0.022			
	4	Polder 60 Sluice 08 Rehabilitation	nr	1	10.925	0.137			
	1.2.2	**New Coastal Protection/Drainage Structures**							
	1	Polder 60 Sluice 07 New 2 Vent	nr	1	23.485	0.294			
	2	Polder 60 Sluice 09 New 2 Vent	nr	1	21.136	0.264	59.0	0.7	2.4
2	**Main River System**								
2.1		**Repairs to Water and Flood Control Structures**							
	2.1.1	Feni Regulator Structure-gate and lifting system	Ls	1	9.900	0.124			
	2.1.2	Little Feni River Sluice 10 Rehabilitation	nr	1	2.640	0.033			
	2.1.3	Little Feni River Sluice 11 Rehabilitation	nr	1	0.350	0.004			
2.2		**New Water and Flood Control Structures**							
	2.2.1	North Daulatpur New 2 Vents	nr	1	23.340	0.292			
	2.2.2	South Daulatpur New 4 Vent	nr	1	42.639	0.533			
	2.2.3	Bhalukia New 2 Vent	nr	1	28.340	0.354			
	2.2.4	Madhya Khal New 4 Vent Water Retention Structure	nr	1	41.672	0.521			
	2.2.5	Ichakhali Khal New 7 Vent Water Retention Structure	nr	1	62.571	0.782	211.5	2.6	8.7
3		**Excavation of khals**	m3	3,825,000	688.500	8.606	688.5	8.6	28.4
4		**Repair of BWDB Offices,stores**	Ls	1	15.000	0.188	15.0	0.2	0.6
5	**Farmer Canal Systems**								
5.1		New low lift pumps with electric motors	ha	17,000	81.600	1.020			
5.2		Buried UPVC Pipe and associated structures	ha	17,000	952.000	11.900			
5.3		Prepaid meters and system	ha	17,000	68.000	0.850			
5.4		Pilot solar pumps and panels	ha	60	14.400	0.180	1,116.0	14.0	46.0
6	**Upgrading of electrical distribution system**								
6.1		Upgrading of electrification	ha	17,000	272.000	3.400	272.0	3.4	11.2
		Total			**2,428.562**	**30.357**	**2,428.6**	**30.4**	**100.000**

105. The scope of services of the IMO for construction supervision will include the following:

(i) Represent the interests of BWDB under the Works Contracts, in any manner related to the Works Contracts and the proper execution thereof.
(ii) Review and comment or recommend acceptance of Contractor's performance security, insurances and other legal documents.
(iii) Deliver instructions to commence or suspend works according to the provisions of the contract on behalf of BWDB.
(iv) Review and comment or approve the Contractor's work program, method statements, proposals for materials sources, quality management plan, including: testing laboratories and procedures for testing, Environmental Management Plan (EMP), Health and Safety Plan (HSP), Public Health and Public Safety Awareness (PHPSA) Plan, including HIV/AIDS Awareness Program, Traffic Management Plan, and other deliverables that the Contractor is obliged to furnish for the Engineer's approval.
(v) Prepare and submit to BWDB for approval a disbursement schedule based on the Contractor's proposal in accordance with the requirements of the construction contract.
(vi) Verify the Contractor's pre-construction survey and setting out.
(vii) Prepare a quality assurance plan, in consultation with the Contractor, including arrangements to check the quality of materials brought to the site, to ensure that the quality of construction is consistent with the technical specifications, and to maintain test records.
(viii) Prepare a program for inspections and load testing of existing structures (as applicable), review test results and make recommendations for any further actions.
(ix) Review and approve the Contractor's construction drawings, and drawings for temporary site works.
(x) Review and approve the as-built construction drawings prepared by the contractor. The as-built drawings will be based on detailed design drawings with amendments for changes during construction.
(xi) Visit the site on a routine basis to observe the progress and quality of the Contractor's work, and maintain representatives at the site in such a manner that adequate supervision of construction works is provided at all times the Contractor is working.
(xii) Organize the supervision of the works with proper allocation of responsibilities to individual inspectors and supervise their work to ensure effective execution, including proper conduct, attendance and performance of their duties.
(xiii) Ensure the Contractor supplies to the site all material, equipment and machinery that have been committed in its bid, and ensure that all items remain on site until their release has been authorized. Ensure that the Contractor properly records all equipment, materials and labour which have been supplied under the Works Contract.
(xiv) Assess the adequacy of all inputs, such as equipment, labour and materials provided by the Contractor and its methods of work in relation to the required rate of progress and, when required, take appropriate action in order to maintain agreed schedule.
(xv) Inspect and evaluate all Contractor's installations, shops and warehouses and other accommodation to ensure compliance with the terms and conditions of the Contract.

(xvi) Provide timely assistance and direction to the Contractor in all matters related to the interpretation or clarification of the Works Contract, ground survey controls, quality control testing and other matters related to Works Contract compliance and progress of the Works; and ensure prompt responses when the Contractor calls for inspections and approvals.

(xvii) Issue instructions, in accordance with the authority specified in the Conditions of Contract, to Contractors to ensure Works will proceed according to agreed schedule.

(xviii) Collect, track and furnish BWDB with indicators of Construction Performance, against contractual requirements as enumerated in the Construction Contract.

(xix) Ensure that the Works are executed in accordance with the detailed design drawings and that the quality of workmanship and materials is in compliance with the technical specifications. Evaluate and determine acceptability of substitute or “equal” materials and equipment proposed by the Contractor.

(xx) Perform or oversee all laboratory and field testing of Contractor’s work, materials and products required to ensure that the quality as specified in the Contract is attained. The Construction Contractor will provide testing facilities and will establish routine testing related to construction works. Review all certificates of inspections, tests and approvals.

(xxi) Assure the receipt of, and maintain as permanent records, all warrants required under the terms of the Construction Contract for materials and equipment accepted and incorporated in the Scheme. All local materials incorporated in their source are also to be approved.

(xxii) Monitor implementation of Environmental and Social Management Plan of the Scheme during construction phase.

(xxiii) Monitor implementation of the Health Safety Plan. Check and ensure that the Contractor has taken suitable measures with regard to the safety and health of its workers (e.g. provision of potable water, lodging, mosquito nets, and first aid kits), site safety, and accident prevention measures. Inspect the security and safety aspects of construction and temporary works to ensure that every reasonable measure has been taken to protect life and property.

(xxiv) Monitor implementation any public health requirements including HIV/AIDS awareness and prevention.

(xxv) Liaise with communities and businesses affected by any of the works undertaken under the Project.

(xxvi) Ensure that Contractor complies with its contractual obligations in respect of labour standards (including the monitoring of trafficking in persons), mitigation of impacts on the environment, health and safety, by withholding payment against appropriate items in applications for interim payment, as applicable in accordance with the provisions of the Works Contract.

(xxvii) Prepare and maintain inspection and engineering reports and records to adequately document the progress and performance of the works.

(xxviii) Prepare incident reports, covering accidents, environmental and other incidents, and take appropriate follow on action.

(xxix) Perform all survey measurements of completed or partial works where required for the determination of quantities. Compute quantities of approved and accepted work and materials and check, certify and make recommendations to BWDB on the Contractor's interim and final payment certificates. All payment certificates shall be checked and countersigned by the IMO.

(xxx) Review and comment on, or recommend approval of, Contractor’s proposals for variations.

(xxxi) Propose and present for the approval of IMO any variations in the Works Contract that may be deemed necessary for the completion of Works, including information on any effect that the variations may have on the Works Contract amount and the time for completion of the Scheme, and prepare all necessary variation orders, including alterations of plans, technical specifications, and other details for the approval of BWDB.

(xxxii) Inform BWDB about problems or potential problems, which may arise in connection with the Works Contract and make recommendations for possible solutions.

(xxxiii) Examine and make recommendations to BWDB on all claims from the Contractor for extension of time, additional compensation, extra work or expenses or other similar matters. Attend claims meetings between BWDB and Contractor.

(xxxiv) Arrange and preside at periodic coordination and progress meetings on site, and prepare the minutes of meetings.

(xxxv) Review reports and documents submitted by Contractor.

(xxxvi) Prepare and submit reports on the progress of the Works, the Contractor's performance, quality of works and the Project's financial status and forecasts.

(xxxvii) Keep on site full and complete records of all matters pertaining to the Works including, but not limited to, programs, correspondence, instructions, variations, revised drawings, site sketches, minutes of meetings, testing, inspections, approvals, measurements, interim payments, progress reports, insurances, visitors to site, completion certificates, day works, Contractor’s labour and equipment, site diaries and inspector’s daily reports.

(xxxviii) Arrange and make public presentations of the work done to date at the request of BWDB.

(xxxix) Upon completion of the Works, carry out the necessary inspection, specify and supervise any remedial works to be carried out and, upon completion, propose to BWDB a date for a joint inspection, prior to the issuance of the Certificate of Substantial Completion.

(xl) Review and comment on or approve as-built drawings prepared by the Contractor.

(xli) Submit supervision Plan for Investment Works and supervision progress report.

(xlii) Perform all other tasks, not specifically mentioned above, but which are necessary and essential to ensure the successful supervision and control of all the construction activities, in accordance with the terms of the Works Contract.

106. The IMO will also be responsible for post construction services that take place during the Contractor’s defect liability period. Also, during the defect liability period the Contractor should provide an active maintenance program to maintain the elements of the scheme in good order until Final Acceptance. During this period, the IMO will act on behalf of the Employer in all matters related to the full performance by the construction contractor of its obligations under its defect liability warranty. The IMO’s tasks shall include the following:

(i) Inspect the Works at appropriate intervals during the Contractor’s Defects Liability Period and ensure that the Contractor is maintaining all scheme elements in good condition.

(ii) Inspect the Works at appropriate intervals during the Contractor’s Defects Liability Period; and, prior to expiration of the Defects Liability Period, prepare a final deficiency list, supervise remedial works and recommend to BWDB the date of the Final Inspection of the Works.

(iii) Carry out the Final Inspection of Works together with representatives of BWDB, and the Contractor.
(iv) Prepare and issue the Final Acceptance Certificate in consultation with BWDB and the collaborating agencies.
(v) Prepare the Final Payment Certificate.

2. Tasks Required for Bid Submission

107. A methodology and program of work will be submitted as part of the bid submission including:

(i) Detailed methodology for supervision of rehabilitation work (preparation of construction; technical management; administrative management ; communication with stakeholders; financial management; agreement with quality, health, environmental plans); Post construction services (periodical inspection of infrastructure and reparation of defects; issuing of final certificates).
(ii) Scoping: A statement confirming limits of work, including: (a) a clear definition of the work to be carried out for the various components of the activity (coastal embankment; khal excavation; rehabilitation of new structures; distribution system; electricity network; rehabilitation of offices), noting any difficulties that may be expected and how they may be overcome; (b) proposed timetable of each components; and (c) IMO team and specialist needs.
(iii) Outline program of work, showing expected time, duration and personnel as well as the interrelationship between components.
(iv) Regarding excavation of the khal, the bidder shall describe in their proposal the best method to estimate and control the amount of sediment excavated from the khal.

108. The bidder will describe the effective means of implementation to guarantee efficient and supervision of work (transport means for field staffs; organization chart; etc.)

D. Activity 3: Participatory Design of the Level 3 Distribution Systems

1. Scope of services

109. The IMO is responsible for preparing the detailed engineering design, bill of quantities (BOQ), engineering cost estimates, specifications and contract bidding documents for the Level 3 distribution systems for the remaining 15,000ha which includes: (i) the LLPs and associated civil structures; (ii) the buried pipe distribution network including storage tanks, pressure risers, and outlet valves and associated civil structures; (iii) expansion and necessary upgrading of the electricity distribution network; and (iv) installation of the smartcard prepaid meters and control systems. The designs should generally follow the design criteria for the advance designs already prepared for the initial 2,000ha. Upgrading of the electricity will require following the requirements and specifications of the Rural Electrification Board (REB). The IMO will prepare the layout designs of the distribution systems with participation of the farmers, landowners, local water user associations, ICC and local communities. The participatory approach to be followed by the IMO during the design consultation process will be firstly agreed with ICC and BWDB. A tentative schedule for the design and implementation of Level 3 works is shown in Figure 4 which shows the design and implementation of investment works taking a phased approach with the initial 2,000ha systems being implemented in the first year followed by three phases of participatory design and implementation of 5,000ha units of investment works. The preparation

of the tender documents and the tendering will be implemented by the PMU with the support of the PMDC.

Figure 4: Tentative Design and Implementation Schedule for Level 3

	Year 1				Year 2				Year 3				Year 4				Year 5			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Wet Season			x	x			x	x			x	x			x	x			x	x
Phase 1 (2,000 ha)																				
Construction	x	x																		
Defeats Period			x	x	x	x														
Phase 2 (5,000 ha)																				
Consultations	x	x																		
Design		x	x																	
Bidding				x																
Construction					x	x														
Defeats Period							x	x	x	x										
Phase 3 (5,000 ha)																				
Consultations					x	x														
Design						x	x													
Bidding								x												
Construction									x	x										
Defeats Period											x	x	x	x						
Phase 4 (5,000 ha)																				
Consultations									x	x										
Design										x	x									
Bidding												x								
Construction													x	x						
Defeats Period															x	x	x	x		

110. The design process will generally follow:

(i) Review of existing data and reports made available to the consultant including: (a) available topographical information and digital elevation models; (b) layout map of MIP showing the reservoir, rivers, khal, roads, etc., and boundaries of project area; (c) design criteria for the buried pipe system including cropping patterns, and crop water requirements and design duties; and (d) specifications and a blank (sample) Bill of Quantities.

(ii) Identification of pumped systems for about 15,000 ha (net) irrigation based on the current layout of pumps and farm distribution systems in consultation with the farmers and needs for improvements. The number of systems will depend on their size but is likely to be about 600 assuming an average of 25ha/system. Selection of the schemes to be taken up for investment will include a technical

assessment of the viabilities including; avoiding areas where there is risk of flood damage, good soils, avoiding schemes where khal siltation will be very problematic, minimising the costs of the electrical interconnections, minimising the length of pipelines, avoiding high pumping lifts etc.

(iii) Organise and undertake consultations with farmers, landowners, land holders, ICC and WUAs, including detailed stakeholders identification for consultations, providing awareness campaigns, organising meetings, and signing of Memorandum of Understanding (MOU) for every system for which detailed designs are prepared. On signing of the MOU's, each farmer must commit to making an upfront payment of BTK1, 500 prior to construction of the buried pipe systems. Payment would be made at the time of mobilisation of the contractor to the IMO whom will deposit the payments into the escrow account.

(iv) Preparing detailed engineering designs of each distribution system including preparation of drawings, bill of quantities, and cost estimates that are disaggregated for each scheme. Drawings shall be done showing for: (a) layouts of the khal, pumps and pipe systems; (b) long sections for systems; (c) all for associated civil structures; and (d) all associated electro and mechanical equipment. However, except for the header tank and any other one-off structures, all drawings should be standardised as much as possible.

(v) Assessment of required electric power supply and LLP requirements including pump and motor capacity, control systems, and power and energy requirements for the systems for which detailed designs are prepared. Design and specifications of electricity distribution extensions to energize the LLPs shall be prepared. Extensions to the electric distribution system will include extension to existing substations, if necessary, distribution lines, poles and transformers, if required.

2. Tasks Required for Bid Submission:

111. A methodology and program of work and staffing schedule will be submitted as part of the bid. This will include the participative approach proposed to plan and design the distribution system, along with undertaking the detail designs. The Bidder will also provide a detailed time schedule for this activity to guarantee that the participative design will be in accordance with the proposed deadline for the rehabilitation of the distribution system.

E. Activity 4: Agricultural Support Services, Pilot Cost Recovery Activities, and Implementation of Training and Awareness Programs

1. Scope of services

112. Provisional sums have been allocated to support this work and the IMO is required to arrange the engagement of appropriate organizations to implement Activity 4 as sub-contractors.

113. **Agricultural Support Services** are a responsibility of the IMO with the objective of enabling small farmers to take up more efficient water use, crop diversification through sustainable practices, and developing opportunities for commercial farming and agribusiness. The intention is for IMO to offer a nucleus of localised self-financing support services either directly or by interacting and engaging with existing government and non-government organizations. Pilot programs will be established for MIP under the Project to assess viabilities and response agriculture support programs before up-scaling under the next phase IMO.

114. The objective of the agricultural services is to directly involve the IMO in agriculture extension services and providing technical support to farmers. The IMO will be required to prepare an annual training plan which, on approval by PMU, will be implemented by the IMO. The training will focus on, among other things: optimizing water use, expanding the service area, promoting and facilitating crop diversification, and increasing cropping intensity. The result of the training should raise farmer incomes and therefore their ability to pay the ISC and for irrigation services. The training program will be implemented using both in-house training capacities of the IMO, BWDB and DOA as well as subcontracting to local, regional and national qualified training institutes and individual specialists.

115. **Development of Pilot Cost Recovery Activities**: Opportunities for increasing the cost recovery of providing irrigation services, over and above revenue from water charges, will be explored to minimize the burden on farmers as well as minimize or avoid the need for Government subsidies. There are various opportunities that can be researched including, but not limited to: leasing of BWDB land assets; leasing of areas within the khal, rivers and reservoir for fisheries including stocking; royalties from sand abstraction; and agriculture support enterprises. Their concepts and viabilities will be studied by the IMO and presented to BWDB and ICC for endorsement. The most promising, viable and sustainable opportunities would be taken up as pilots by the IMO. A provisional sum within the IMO contract has been allocated to support this work.

116. **Awareness and Training**: The need for a strong program of awareness, communication and engagement with stakeholders has been identified as a key role for the IMO. This component is designed to provide continued support for the stakeholders including BWDB, Department of Agriculture, Local Government, Water Management Organizations, ICC, and most important the farmers to achieve the targets described in the project design. The roles of these supporting organizations are critical and how the stakeholders can work most effectively with the IMO is an essential requirement. Selected and focused training will be provided by the IMP and will include a mix of informal on-the-job training and formal institutional training to key stakeholders. The mechanisms to establish and develop effective engagement with the project stakeholder will form a key part of the IMOs responsibilities as part of the awareness and training program. The IMO will prepare and submit an awareness and training plan to the PMU, which on their approval, will be implemented under the IMO. It is anticipated that training and awareness would be a mix of; (i) activities implemented directly by the IMO staff without additional cost, (ii) direct engagement of individuals or procurement of materials to support the training which would be reimbursed at cost; (iii) subcontracted to third party organizations and (iv) establishment and development of training financed through commercial organizations.

117. The training plan and program must develop new initiatives to ensure the long term sustainability of training, including initiatives to reduce the dependencies on project funded training. The outline requirements for communication and awareness are described in the Project Administration Manual (PAM).

2. Tasks Required for Bid Submission

118. A methodology and program of work for undertaking these activities will be submitted as part of the bid submission. The Bidder will provide the method it will adopt to identify and carry out or sub contract: (i) agricultural support services; (ii) training and awareness programs including initiatives to effectively engage with the stakeholders aligned with the Project communication strategy; (iii) pilot cost recovery activities; and (iv) capacity building and capacity

strengthening programs of the main stakeholders. The Bidder will provide an outline work program and staffing schedule.

V. DELIVERABLES

119. The deliverables of the IMO contract will be in two parts: (i) reporting deliverables; and (ii) project deliverables.

A. Reporting Deliverables

120. The reporting deliverables are summarized in Table 5. All reports will be submitted in English, in both editable and fixed electronic form, and hard copies. All deliverables shall be uploaded to an electronic sharing network such as a File Transfer Protocol (FTP) site or Share point site that BWDB and their representatives can access. In addition, the IMO shall submit all backup Excel spread sheets and computer based analytical models, including models that are developed using specialized software applications. The format for AutoCAD and GIS data to be submitted by the IMO shall be agreed with BWDB.

121. The IMO shall establish and maintain a comprehensive inventory, both hard copy and electronic, of all relevant documents made available and collected. All such documents, which are considered confidential, will be compiled in usable form and delivered in an organized fashion to BWDB at the end of the contract.

Table 5: IMO Reporting and Documentation Deliverables

Ref.	Report	Description	Submission (month)
A	Establishment of Efficient and Sustainable MOM		
1	Project Management and Administration Manual	The Project Management and Administration Manual (PMAM) will be prepared at the beginning of the IMO contract and will be routinely updated as required. It will present the MIP development and MOM arrangements including documenting arrangements for, but not limited to: asset management; staffing logistics; financial management; stakeholder liaison and engagement; operational methodologies; maintenance and administrative procedures; extension services; cost recovery activities, and social and environmental requirements. It will also detail how assets will be catalogued, assessed and maintained. The initial and amended contents of the PMAM will be agreed by PMU and ICC. The PMAM will also present procurement plan and timeframe for items under provisional sums	1 and as needed
2	Water Resources Management Plan	Monitoring, developing and maintaining a water resources management plan for the project area that includes surface, ground water and agricultural water demands. The plans will be developed in coordination with the PMDC consultants who will undertake hydrological and hydro-geological studies for MIP.	12 with annual updates
3	Quarterly and Annual Reports	Progress reports to be submitted to BWDB on a quarterly and annual basis. The reports would show actual expenditures, revenues and MOM outputs. The quarterly reports will be concise and will report only on the previous three months. The annual report will be	Annual report: 12, 24, 36, 48, 60; Quarterly reports:

		comprehensive and present cumulative results throughout the preceding year. The annual report will be supported by an external independent audit. The annual report will include progress of the Key Performance Indicators (KPI).	every 3 months
4	Annual Work Plans	Annual work plans (AWPs) will be prepared in liaison with WUAs through the ICC and agreed with the PMU. The AWPs will present the IMO's plans for the year ahead, including: MOM activities; design and construction supervision activities; and, agricultural support services and pilot cost recovery activities. The AWP will also present estimated revenues and costs, and will present the agreed tariff for that year. The annual reports and annual work plan will be presented to the PMU and ICC annually by 30th June. The annual reports and work plan will be presented to the PMU and the ICC at the Annual General Meeting to be held by 31st July. The annual work plan would be approved not later than 15th August to allow the IMO to initiate the implementation. The year 1 work plan will be produced within 3 months of contract signing.	3, 12, 24, 36, 48
5	Asset Management Plans	Asset Management Plans (AMPs) will be an inventory of all scheme assets and will present their current conditions and indicate if maintenance or replacements are required. The AMPs will be prepared annually, three months prior to submitting the AWPs. The AMPs will be used to support planned OM activities presented within the AWPs. The IMO will routinely inspect the condition of all Level 2 and 3 scheme assets which will be documented within the AMPs. The initial AMP will outline the inventory reference and GIS database system.	9, 21, 33, 45, 57
6	Information System Report	Annual report on main data collected and up dated in the data base: rainfall, level and flow in the Khal, volumes pumped; land register; agriculture; etc.	Annual report
7	Implementation and monitoring of the environmental management and gender action plans.	Working with PMU, Stakeholders, the ICC and contractors to ensure the environmental management (EMP) and gender action plans (GAP) are effectively implemented and monitored.	Annual and periodic reports as described in the EMP and GAP
8	Project Monitoring and Evaluation(PME)	Implementation of the project monitoring and evaluation activities. Including setting up the system according to the system design (to be developed by PMDC) and preparing annual PME reports	PME established by month 6. Annual PME reports
B	Construction Supervision of MIP Investment Works		
1	Supervision Plan for Investment Works	Detailed plan for the supervision activities including requirements for surveys, quality control to ISO standards or equivalent	3
2	Supervision Progress Report	Monthly construction progress reports	monthly
3	Progress Certificates	Payment certificates as required.	monthly
C	Participatory Design of the Level 3 Distribution Systems		
1	Detailed Design Reports and Drawings	Detailed engineering design reports are prepared for the Level 3 Distribution system detailing the design process,	12, 24, 36

		assumptions, parameters, formulae, results, specifications and costs of the designs. The report will be accompanied by detailed designs drawings for all components. A single document will be prepared that will be updated and expanded following design of each implementation phase. The design and design reports will need to be submitted for design approval by the BWDB and the REB for the electrification works.	
2	Design Progress Reports	Periodic reports on the progress of design and accounts of farmer participation in the design process.	Quarterly
D	Agricultural Support Services and Pilot Cost Recovery Activities		
1	Awareness and Training Plan	The Awareness and Training Plan (ATP) will present the results of IMO's needs assessment of awareness and training of farmers, pump operators, WUAs, BWDB and other relevant stakeholders. It will outline an awareness and training programme that the IMO will implement during its term, using either internal or external resources.	4
2	Agricultural Support Services Plan	The Agricultural Support Services Plan (ASSP) will review of the scope and potential for agricultural support and present strategies and recommended plan for engaging external support for implementing the services. The plans should be prepared in detail with agricultural support pilots and demonstrations, and include budget estimates. These will be prepared in consultation with the WUA and ICC, and approved by BWDB.	6
3	Cost Recovery Opportunities Plan	The Cost Recovery Opportunities Plan (CROP) will identify and assess alternative cost recovery opportunities. It will present approaches and strategies for development of the pilot projects, for approval of BWDB.	6
4	Recruitment Documents	Prepare, in consultation with WUAs and ICC, contract documents and scope of works for agricultural support services and pilot cost recovery activities. These will be approved by BWDB.	9
5	Monitoring Reports	Quarterly monitoring reports of the agriculture support services, cost recovery pilot activities, and training and awareness activities.	quarterly
6	Agricultural Support Evaluation Report and Strategic Plan	The Agricultural Support Evaluation and Strategic Plan (ASERSP) will present the evaluation of the agricultural support pilots and preparation of strategies and recommend proposals for the long-term development of agriculture and water saving systems and the provision of agricultural support services.	36
7	Cost Recovery Opportunities Assessment Report	The Cost Recovery Opportunities Assessment Report (CROAR) will present the evaluation of the pilot cost recovery activities and recommend proposals for long-term cost recovery activities.	36

B. Project Deliverables

122. In addition to the reporting deliverables, the IMO is required to take a lead support role of the key project deliverables which as described in Table 4 below.

Table 6 : IMO Project Outputs

Ref	Output	Description	Submission (months)
A Establishment of Efficient and Sustainable MOM			
1	Pumps and pipe irrigation commissioned	17,000ha of piped irrigation including pumps, pipe distribution and prepaid meters are installed commissioned and operating. These will be constructed in a phased approach with 2,000ha completed in Year 1, and 5,000ha completed each year in Years 2 to 4.	12, 24, 36, 48
2	OM of pumps, pipes and prepaid meters	Efficient OM of the pumps, pipe distribution and prepaid meters. Breakdowns are repaired within 24 hours. Over the year all the pumps are operable 95% of the time.	Continuous
3	Cost Recovery	OM cost recovery systems are established and 100% of the OM costs are recovered for 17,000ha	48
4	Maintenance works	Maintenance work is properly planned and implemented.	Continuous
5	Irrigation Areas	Target cropping patterns and yields as estimated in the economic analysis are achieved.	60
B Construction Supervision of MIP Investment Works			
1	Investment Works	All investment works for MIP are constructed according to the target schedules and international standards and norms have been followed. Progress and final payments have been agreed and paid by BWDB.	48
C Participatory Design of the Level 3 Distribution Systems			
1	Designs of Level 3 Distribution System	Participatory designs of the Level 3 distribution systems	30
D Agricultural Support Services and Pilot Cost Recovery Activities			
1	Agricultural Support Services	Agricultural support services and demonstrations are implemented. Long-term sustainable and viable cropping systems are identified to increase farmer incomes and reduce water use. Up-scaling of improved systems models over 1,000ha are achieved.	36
2	Supplementary cost recovery pilots	Supplementary cost recovery pilots are identified and implemented. Supplementary cost recovery is achieved to fund 10% of the overall OM costs.	36
3	Awareness and training	Implementation of awareness and training based on the awareness and training plan	36
4	Farmer and Stakeholder Engagement	Farmers are fully aware of the project and support the objectives. The ICC is established and meets four times per year, the WUA and the WUF representatives attend the ICC meetings. Farmer and stakeholder complaints are compiled, assessed, and adequately addressed	36

VI. TERMS OF REFERENCE FOR PROFESSIONAL STAFF

123. The Irrigation Management Operator (IMO) consultant will be for a period of five years to be provided during the Project implementation. The total international input will be for 47

person-months (pm) and 821 pm for national consultants (key experts) and about 911 pm of non-key experts & support staff. The overall requirement is 1,779 pm. Outline terms of reference for individual IMO specialists are given below and a summary of specialist inputs is shown in Table 5.

Table 7: Estimated Requirements for Professional and Support Staff

Position	Person-Months Key Experts		Person-Months non key expert and staff
	International	**National**	**National**
MIP Management			
General Manager / Chief Irrigation Engineer	36		
Deputy General Manager / Executive Engineer		55	
Office Manager			55
Assistant Office Manager/Secretary			55
Accountant / Procurement		50	
Safeguards / Public Relations		50	
Computer / MIS Database Specialist			50
Upazila Field Offices (6 nos)			
Field Officer Managers (6 positions)		300	
Field Office Staff (Assistant OM Engineers and Agriculture Support) (6 Positions)			300
Agriculture Extension Office			
Agricultural Management Specialist	10		
Extension and Training Specialist		50	
Design Office			
Senior Irrigation Planning and Design Engineer		28	
Irrigation Design Engineers (2 positions)		56	
Assistant Design Engineers / AutoCAD Operators			112
Mechanical / Electrical Engineer[a/]	1	12	
Construction Supervision Office			
Chief Resident Engineer		36	
Assistant Site Engineers			240
Topographic Surveyors		50	
Assistant Surveyors / Chain-persons			99
Mechanical / Electrical Engineer (Supervision and OM)		48	
OM Office			
Senior OM Engineer		39	
OM Engineer		47	
Overall Total	**47**	**821**	**911**

Notes: The national Mechanical / Electrical Engineer can fulfill the responsibilities for both the design and supervision roles with a total input of 60 pm.

A. KEY EXPERTS

International Specialists (47 pm)

1. General Manager/ Chief Irrigation Engineer (36 pm)

124. The General Manager / Chief Irrigation Engineer will be required to work closely with PMU and will be responsible of the overall management of the IMO to achieve the four main activities describe in the scope of works above. The specialist will also lead the design team. The specialist will have a Master's degree in Civil or agriculture engineering, or a related field, and will have at least 20 years of technical project experience with at least 5 of those years leading the implementation and management of projects. Experience of working in irrigation and water resources development in South Asia on major irrigation systems is highly desirable. The specialist will be responsible for:

(i) Represent the IMO in all its contractual obligations and be in charge of the relationship with the PMU/BWDB and the regional authorities.
(ii) Overseeing the implementation of the various activities including design, construction supervision and MOM and be responsible for the preparing and maintaining quality insurance plans.
(iii) To act as the resident engineer for supervision of construction. As the employers (BWDBs) representative to take full responsibility for the quality control and effective supervision of the construction works.
(iv) Manage the teams of the four activities and specifically supervise the recruitment and evaluation of the operation and management local staff
(v) Overall direction of the team, coordination of inputs, and management of individual specialists.
(vi) Ensuring the timely progress of the project implementation including planning, design, construction and institutional development as well as the programmed Project and Safeguards Monitoring Systems.
(vii) Ensuring timely delivery of all deliverables as listed in Table 4 including the various progress reports.
(viii) To take overall charge of the development and updating of the water resources management plan for the project area that includes surface, ground water and agricultural water demands. The plans will be developed by the various technical specialists of the IMO in coordination with the PMDC consultants who will undertake hydrological and hydro-geological studies for MIP
(ix) To provide strong and effective management support to help guide the BWDB, other stakeholders and contractors to achieve the targeted project deliverables identified in Table 5.
(x) To support the necessary approval processes of deliverables including BWDB, ADB and stakeholders.
(xi) Guide the management and coordination with the government, and other stakeholders including the facilitation of regular management dialogue between the EA, other associated agencies and stakeholders at central and project levels.
(xii) Support the establishment and guide the activities of the Implementation Coordination Committees (ICC) and other proposed institutional arrangements.
(xiii) Supervise and organize the irrigation services with the national experts during the irrigation season. During the first years he/she will have to strengthen the capacity of the national irrigation engineers. He/she will also provide technical inputs to the O&M manuals with regard to irrigation management. With the

deputy team leader and the national irrigation O&M engineer, he/she will organize the operation services, maintenance services, customer relationship services.

(xiv) Be responsible for the review of distribution system prepared by the construction Contractor, and for the overall supervision of the structural components of the Works.

(xv) Coordinate the design review of distribution system gathering inputs from other subject specialists.

(xvi) Contribute to propose relevant training related to best irrigation practices on plot.

2. Agricultural Management Specialist (10 pm)

125. The Agricultural Management specialist must have a background in Agronomy or related field/discipline and a Master of Science in Agro-economics or related field/discipline. She/he must have a minimum of twelve (12) years of experience in agro-economics/agronomy with a minimum of at least two (2) successful agriculture development projects in the sub-region, with Bangladesh preferred. The Agricultural Management Specialist should have experience in the development of irrigated agriculture projects, economic value chains and market based crop production analysis. The Agricultural Management Specialist should have experience working in multi-disciplinary teams. Fluency in written and spoken English is mandatory.

(i) To take the lead role, in coordination with the other specialist to develop and maintain the project data collection and data base.

(ii) Agricultural aspects will be a core requirement for the data base including at the scheme level (record of crops, yields and marketed; other sampling methods for monitoring agriculture development within the scheme).

(iii) He/she will have to liaise with other agriculture, local government, WUA and other stakeholders and support agencies.

(iv) He/she will have to propose and assess the requirements of pilot cost recovery activities. He/she will advise the ICC and PMU on water tariff. He/she will contribute to the establishment of the training plan. He/she will build capacity of the local Extension officer/training specialist /agriculture extension, regarding the optimal use of the irrigation infrastructure (rise the cultural intensity) and diversification of crops (rise the ability of the farmers to pay for the water services).

(v) Engage with farmers and stakeholders to identify the main constraints to crop production in MIP.

(vi) Assess the scope and capacities of the existing agricultural extension services and other related organizations working in the project area. Identify gaps and possible areas of support from the project.

(vii) Review the requirements and propose strategies for increasing agricultural productivity, increasing POW, improving farm water application efficiencies and overall scheme efficiencies, reducing water use, and assessing potentials and strategies for crop diversification for MIP. The review will assess the irrigation needs for the main boro crop as well as supplementary irrigation during other seasons including Aman crop.

(viii) Identify the key requirements for efficient irrigation to meet the needs of crop productivity including: timely water availabilities, crop diversification, scheduling of planting, reduced water use. Discuss with stakeholders to identify irrigation management strategies to help meet requirements to meet targets for increased productivity.

(ix) Work with the other specialists to develop strategies for investment and management of MIP, and show how these strategies can incorporate the requirements and help meet the needs and full potentials of irrigated agriculture.
(x) To work with the other specialists and the PMDC to design and establish a Project Monitoring and Evaluation System for MIP.
(xi) Develop a plan and costs for agricultural support services to be implemented by the IMO's for MIP. The plan should build on the existing agriculture extension and support programmes within those areas.

3. Mechanical / Electrical Engineer (1 pm)

126. The international Electro-mechanical Engineer will be a highly qualified professional electrical and mechanical engineer, (at least BSc degree) with a minimum of 10 years of experience in all aspects of pumping station design and construction, in the design and rehabilitation of irrigation electromechanical equipment including but not limited to pumps, valves, modules, maintenance, operation. Fluency in written and spoken English is required:

(i) Contribute to drafting the OM manuals with regard to electro-mechanical maintenance activities and related training. With the support of other members of the team he/she will have to propose the best option for electrical pumps backup system. He/she will have to organize with the Computer IT specialist/Data base, the data collection regarding individual Low lift Pump at the scheme level.
(ii) To review the requirements for the upgrading and extension of the electricity network. To liaise with REB regarding the norms and standards for the electrical works to ensure the contract complies with the specification and standards of the REB.

(iii) Be responsible for the review and production of all pump, electrical materials designs and drawings, and for the overall supervision of the electro-mechanical components of the Works. He/she will work with the Computer IT specialist/Data base to fulfil the pumps register and define the average efficiency of each pump that will be used for operation KPI.
(iv) The Electro-mechanical engineer will undertake the design review for all electro-mechanical components of the Scheme.
(v) The Electro-mechanical engineer will contribute to propose relevant training related to pumps operation and maintenance.

B. National Specialists (821 pm)

1. Deputy General Manager / Executive Engineer (55 pm)

127. The Deputy General Manager (DGM) will have either a Degree in Civil Engineering, or equivalent; or at least a Diploma of Business Management, or equivalent. The DGM will have at least 12 years of business management experience and will be fluent in both English and Bengali. The DGM will work in closely with the General Manager / Chief Engineer and is responsible for the day-to-day management of the team, and relationship with the local authorities and project beneficiaries. It is intended the DGM will take over the role of General Manager following completion of the IMO's design activities. The main tasks of the specialist will include:

(i) To support the General Manager in all aspects of the management of the levels 2 and 3 of the Muhuri Irrigation Project.
(ii) In the absence of the project manager to act as the resident engineer for supervision of construction. As the employers (BWDBs) representative to take full responsibility for the quality control and effective supervision of the construction works
(iii) Ensuring the IMO undertakes the four main activities according to schedule, meeting key performance indicators and with inputs targeted on the design of the OM system and capacity building of stakeholders in the first years.
(iv) Monitoring and developing overall water resources management plan for the project area including surface and ground water.
(v) Liaising with the Rural Electrification Board (REB) and negotiate the best quality of service is made available for irrigation.

2. Accountant Specialist (50 pm)

128. The Accountant Specialist will have at least a Degree in Accounting, and have at least 10 years of experience in project/private business accounting and at least 5 years of experience in accounting and procurement of works, goods, services, preferably on international donor projects. The main tasks of the specialist will include:

(i) Preparing, developing, maintaining and using an accounting database system to maintain all transaction and procurement records of the IMO.
(ii) Setting up an Escrow Account in the name of the IMO
(iii) Making payments to suppliers, pump operators and smartcard vendors.
(iv) Preparing and submitting payment invoices to BWDB and ADB.
(v) Support the design team with packaging and procurement of civil works and the supply and installation of mechanical and electrical equipment.
(vi) Support the team with procuring additional surveys and studies.

3. Safeguards and Public Relations Specialist (50 pm)

129. The Safeguards and Public Relations Specialist will have at least an advanced social sciences degree or equivalent, with at least 10 years of experience working international development projects. The main tasks of the specialist will include:

(i) Be guided by ADB's Safeguard Policy Statement (2009) guidelines, procedures and best practices.[50]
(ii) Supporting BWDB and IMO staff with: (a) training and capacity building on environmental management, supervision, reporting and monitoring of implementation of environmental management plans (EMP); and (b) orienting contractors on implementation of EMP.
(iii) Guiding IMO staff on reporting requirements on environmental monitoring to ADB and BWDB.
(iv) Recommending any corrective actions on any unforeseen environmental impacts.

[50] Refer to http://www.adb.org/documents/safeguard-policy-statement for a copy of the SPS; and http://www.adb.org/site/safeguards/main for a copy of Involuntary Resettlement Safeguards: A Planning and Implementation Good Practice Sourcebook, and Environment Safeguards: A Good Practice Sourcebook.

(v) Plan and implement consultations with the affected people in accordance with the Support the implementation of the stakeholder communication strategy that was prepared during the PPTA.
(vi) As part of the annual work plans, prepare communications plan for disseminating information on consultation, design, construction and MOM activities throughout the project area.
(vii) Support IMO staff to implement the communications plan and facilitate consultation meetings.
(viii) Train and support the field office managers with customer relation skills and handling of complaints.

4. Field Office Managers (6 positions, total: 300 pm)

130. The Field Office Managers will have graduate qualifications in engineering or agriculture with at least 10 years of irrigation management experience. They will be the managers of the Upazila Field Offices and are responsible for day-to-day customer relations and provision of irrigation services. They will also be responsible for:

(i) Acting as the IMO representative at the Upazila level and being the focal point for all customer services issues, complaints, information dissemination, training activities, payment of services, etc.
(ii) Coordinating between the customers and technical and OM staff in main IMO office.
(iii) Liaising between the farmers and the irrigation design and OM engineers.
(iv) Catalogue and respond to customers' complaints and ensure prompt service and technical support is provided by the IMO.
(v) Provide support to the main IMO office on design, construction supervision, MOM activities, and agriculture support.
(vi) Assist IMO with preparing and implementing training activities for the farmers.
(vii) Plan and manage the work plan of ex-BWDB staff placed in the field offices.

5. Extension and Training Specialist (50 pm)

131. The Extension and Training Specialist will have an extended experience with regard to capacity building of farmers (at least 5 years of experience dedicated to this type of training). Experience with specific training requirements for irrigation scheme management and WUAs is a plus. Fluency in English and in Bengali is required. The national extension officer/training specialist will:

(i) Design the training program and supervise its implementation, including recruitment of trainers, training logistics, training materials.
(ii) Will support of the other members of the team he/she will specifically assess the training requirements for farmers as well as other stakeholders, with regard to OM of large scale irrigation scheme. He/she will then establish a detailed training program, and organize its implementation based on locally available training capacities or establishing them when required.

6. Senior Irrigation Planning and Design Engineer (28 pm)

132. The Irrigation Planning and Design Engineer will support the Chief Engineer with the overall preparation of detailed engineering designs and contract documents for the modernised

Level 3 system. The Engineer will have at least a Master's degree in Civil Engineering, be a chartered, professional engineer, and have at least 15 years of experience in planning and designing irrigation schemes, preferably on international donor assisted projects. The Engineer's tasks will include:

(i) Reviewing previous studies and understand the current norms for irrigation planning and design.
(ii) Review of the current design criteria and design of the advance 2,000ha and propose adjustments as considered necessary
(iii) Support the Chief Engineer with leading and supporting the design team with: (a) consulting the farmers; (b) assessing cropping and water use patterns; (c) reviewing current water use, water allocations and water use efficiencies; (d) preparing water balances for the current water and cropping systems; and (e) assessing future water balances based on the new system layouts and cropping patterns on which to base the system designs.
(iv) Develop standard designs, drawings and specifications for the modernised Level 3 systems based on the designs for the initial 2,000ha and incorporating international best practices for using pipes, LLPs and smartcard control systems. Present the criteria to the BWDB and obtain theirs and other necessary government approvals.
(v) Planning, preparing and managing all necessary surveys and investigations for the design for rehabilitation and modernization of infrastructure including surveys, geotechnical investigations, and structural analysis.
(vi) Leading the preparation of detailed designs, including working with the team to prepare the engineering cost estimates, specifications, BOQs and contract documents.
(vii) Assisting BWDB with packaging, tendering and awarding civil works and equipment supply and installation.

7. Irrigation Design Engineers (2 positions, total: 56 pm)

133. The Irrigation Design Engineers shall be a qualified and competent Irrigation Design Engineer (MSc degree) with a minimum of 10 years of experience and at least 4 years of experience in charge of the design of secondary or tertiary level irrigation schemes including some experience of pipe distribution. The Engineers will support the Senior Irrigation Planning and Design Engineer and will be responsible for the preparation of the pipeline design and pipe designs for 15,000ha, as well as coordination of design aspects of the main rehabilitation works including:

(i) Engage with farmers and surveyors to ensure a high level of participation to define the pipe layouts and locations of the pumps
(ii) Prepare the detailed design for the 15,000ha including the drawings, bills of quantities, specifications and cost estimates.
(iii) Liaise with the PMDC relating to the other design activities including upgrading of electrification, new and rehabilitation of structures, river bank protection and repairs to buildings.
(iv) Supporting training programmes related to best irrigation practices on plot.

8. Mechanical / Electrical Engineer Design Engineer (12 pm)

134. The Mechanical/Electrical Engineer shall be a qualified Mechanical Engineer (at least BSC degree) with a minimum of 5 years of experience in maintenance and operation of water pump or in the design and rehabilitation of irrigation electromechanical equipment. The Engineer must also be able to communicate in English. The Engineer will support the design as of the electro-mechanic systems. Main tasks of the Engineer include:

(i) Will support the international electromechanical engineer and the irrigation design engineers to undertake the design of the piped irrigation systems with special responsibility for all electro-mechanical components of the new modernized scheme.
(ii) To identify and requirements for extending the electrification for any new pump schemes.
(iii) To prepare the detailed specifications for the proposed electrical works.

9. Mechanical/Electrical OM Engineer (48 pm)

135. The Mechanical/Electrical Engineer shall be a qualified Mechanical Engineer (at least BSC degree) with a minimum of 5 years of experience in maintenance and operation of water pump. The Engineer must also be able to communicate in English. The Engineer will support the implementation and OM of the electro-mechanic systems. The same consultant can hold the position of the mechanical/electrical design and OM engineer as the inputs would be consecutive. The main tasks of the Engineer include:

(i) Providing support to the pump operators for maintaining the pumps, the prepaid meter system and electrical pump backup system.
(ii) Will periodically collect the pump data on behalf of the Computer IT specialist/Data base. He/she will also provide technical inputs to the OM manuals with regard to Pumps maintenance.
(iii) Supervise the construction of the pumps and transmission upgrading

10. Chief Resident Engineer (36 pm)

136. The Chief Resident Engineer (CRE) will have at least a Master's degree in Civil Engineer, be a charted professional civil engineer, and have at least 10 years of experience supervising the construction of civil works, preferably as the CRE. The main tasks of the CRE will include:

(i) Leading the overall supervision of the structural components of the implementation works (coastal embankment, khal excavation, rehabilitation and new structures, pipe distribution/pumps/ prepaid meters, upgrading of the electricity network, rehabilitation of offices)
(ii) Contributing to the preparation of the OM manuals with regard to regular structural checks to be included in the preventive maintenance program.
(iii) Support the design engineers with improving designs based on lessons learned during earlier construction.
(iv) Manage the site supervision engineers.
(v) To report to the General Manager/Deputy General Manager all construction supervision and construction quality issues.

11. Senior Topographic Surveyor (50 pm)

137. The Senior Topographic Surveyor will have at least a Degree in Land Surveying and at least 10 years of surveying experience. The specialist will be responsible for leading the surveying team, preparing work plans, and undertaking topographical surveys to support the design team and monitoring dredging works within the khals.

12. Senior OM Engineer (39 pm)

138. The Senior OM Engineer shall be a qualified and competent Irrigation Engineer (MSc degree) with a minimum of 10 years of experience. At least 4 years of experience in a service in charge of the Operation and Maintenance of Water scheme will be a plus. He shall be fluent in English and Bengali. With the deputy team leader and the international irrigation engineer the O&M Engineer will:

(i) Design the OM system. He/she will be in charge of writing the OM manual. He/she will be one of the main interlocutors with the final users. He/she will be in charge of the water services field team management. With the electromechanical engineers he/she will be in charge of organizing a reliable electrical pumps backup system. He/she will be in charge of organizing the team of water dealers.

(ii) Because of his close contact with Upazila irrigation engineers and with customers it will be particularly involved in the participative design review.

13. OM Engineer (47 pm)

139. The Senior OM Engineer shall be a qualified and competent Irrigation Engineer (MSc degree) with a minimum of 10 years of experience. At least 4 years of experience in a service in charge of the Operation and Maintenance of Water scheme will be a plus. He shall be fluent in English and Bengali. With the deputy team leader and the international irrigation engineer the OM Engineer will:

C. Non Key experts and supporting Staff

140. Table 8 presents the supporting staff requirements for the IMO required to be included in the technical proposal but would form a part of the financial proposal. The CVs of the supporting staff are however required to be approved by the EA prior to mobilization.

Table 8: **Supporting Staff**

Ref.	Role	Qualification / Experience	Tasks	Inputs (pm)
1	Office Manager	At least 10 years of good office management experience preferably with an international company. Good English and computing skills	Office management, logistics, support for field trips, workshops etc.	55
2	Assistant Office Manager / Secretary	Good English and computing skills.	Office support, data entry, preparing letters, organising printing.	55
3	Computer /MIS Data Base Manager	Degree in computing science or relevant degree Experience in information	In coordination with other team member to develop the scheme information system. To maintain the scheme	50

		systems including GIS	information systems including the preparation of the key outputs and reports. Maintain customer feedback and complaints mechanisms,	
3	Field Office Staff	Good experience in MOM of MIP irrigation infrastructure and experience with support agriculture services	Report to the Field Office Managers and support MOM operations, respond to farmer issues and complaints, etc.	300
4	Assistant Design Engineers / AutoCAD	Degree in Civil Engineer, or equivalent, with practical experience in using AutoCAD	Report to the senior irrigation design engineers, prepare design drawings, bill of quantities, cost estimates.	112
5	Assistant Site Engineers	Degree in Civil Engineer, or equivalent, with construction site experience	Report to the CRE and monitor construction activities.	240
6	Assistant Surveyors / Chain-persons	Diploma in Surveying, or equivalent with some experience in field surveying	Report to the Senior Topographic Surveyor, carry out topographic surveys.	99
7	Assistants and guards	None	Office cleaners, guards etc. as required	

D. Procurement of Additional Studies, Equipment and Training

141. Provisional sums have been included in the IMO contract for the procurement of various additional studies, equipment and training to support the project. The exact implementation arrangements, specifications and detailed costs estimates of the procurement will be approved by the PMU Programme Director. The tentative scopes of works for the additional studies are summarized in Table 9.

Table 9 : Additional Procurement

Name	Tasks
Surveys and studies	Supporting surveys and specific studies including topographic surveys, geotechnical investigations, flow monitoring, agriculture support, pilot cost recovery activities.
Flow Monitoring Stations	Equipment and associated structures for installing flow monitoring stations on the main rivers.
Procurement of office equipment	Procurement of office equipment including computers, printers, photocopiers, GPS, power invertor, etc. for central and field offices.
Vehicle Rental	Cars and motorbikes to support design construction supervision and MOM activities.
Survey Equipment Rental	For undertaking topographical surveys for design and construction supervision activities.
Training and awareness	Costs for the implementation of the training and awareness program including workshops.
Secondment of BWDB or other	To support the establishment and the good transition towards long sustainable management it is proposed to build on the existing skills of the BWDB staff at

Government Staff to the Irrigation Management Operator	MIP. The recommendation is that BWDB should allow appropriate skilled personnel to provide services to the IMO on 'lien[51]' with remuneration of the staff to be paid by the IMO as per the organizations own salary structure. The period of lien would be guided by the government's existing rules. The IMO would review the qualifications and experience of potential staff and prepare proposals for BWDB or staff from other Government organizations who might be assigned on lien. The recruitment of the staff on lien would be initiated at the time of mobilization of the IMO and would be outside the bidding process. Bidders would however present proposals in their bid how the staff on lien could be effectively incorporated into the IMO. The BWDB staff on lien depending on their qualification and experience would be assigned to selected professional and support positions as shown in Table 7. The IMO would have the full rights whether or not to accept any Government staff on lien and also has the right to terminate the lien agreement for any person assigned to the IMO by providing 30 days' notice.

VII. ADDITIONAL REMUNERATION

142. In addition to the remuneration paid according to the standard ADB time-based contract, the IMO will also receive management fee and performance-based bonus payments.

A. Management Fees

143. The IMO may charge a management fee of up to 5% of the total value of additional procurement activities as listed in Table 9. The management fees will be presented as a part of the Bidder's financial proposal. The estimated value of additional procurement is $1,800,000 as described below.

144. The IMO will manage the project Water Revenue and OM Expenditure Account. The following routine payments will be made solely from revenue collected from the irrigation service tariffs: (i) electricity tariffs; (ii) pump operator fees; (iii) smartcard vendor fees; (iv) maintenance of the Level 2 and 3 distribution system; and (v) and other miscellaneous field expenditures. No management fee will be payable for these activities. The IMO management costs including staff costs, office costs, training, transport will all be paid be paid under the IMO contract paid and not from the Water Revenue and OM Expenditure Account.

B. Performance Based Remuneration

1. Basis of Remuneration

145. To enhance the delivery of the IMO's outputs and the outcome of the project, additional payments will be paid to the IMO if key milestones or Key performance indicators (KPI) are met. The objective of the performance based remuneration is to support the serious engagement of the IMO as a stakeholder in the MIP and shares some of the benefit of achieving the project targets according to the time schedule.

146. Payments will be triggered based on the measurement of milestones/KPI as described below:

[51] Lien is leave of absence from Government with the job and salary level kept open for a pre-agreed period. The remuneration package would be provided by the new/host organization.

(i) The performance based remuneration will not exceed the equivalent of $250,000 over the period of the contract.

(ii) Only in exceptional circumstances will the he performance based remuneration in any one contract year exceed the equivalent of $50,000 (the Maximum Annual Performance Remuneration [APR]).

(iii) The actual amount paid to the IMO shall be determined by the extent by which the IMO achieves the performance criteria set out in the performance indicator tables and by the application of the calculations set out in the performance procedure notes for the applicable contract year.

(iv) The performance based remuneration would be assessed at the end of every contract year.

(v) All the activities of the IMO are to varying degrees influenced by externalities outside the control of the IMO. The payments of the KPIs have been designed to be triggered when selected key project deliverables are achieved. Key management tasks of the IMO include working with the various stakeholders to take a lead role in ensuring that the various the outputs defined in the project design targets are met according to the schedule.

(vi) The milestones/KPIs have been carefully selected and designed so that they can be easily verified; they also include a mix of more complex deliverables which are influenced by external factors as well as ones with less external influence. Criterion values have been set to allow for some level of delays or unforeseen circumstances.

(vii) Appropriate weightings have been assigned to each milestone/KPI to reflect its importance.

(viii) If the amount of the Annual Performance Remuneration (APR) is equal or less than zero the IMO shall neither receive nor pay any amount to the EA for the applicable contract year.

(ix) Except in exceptional circumstances (such as delays very substantially outside the control of the IMO) whereas judged by the EA if the IMO fails to achieve the maximum annual performance remuneration in any one year the shortfall will not be available to the IMO in subsequent contract years.

(x) The milestones/KPIs and the performance values would be discussed and agreed during the contract negotiations. Although the KPIs would not change some refinements to the measurement can be considered during the project period.

2. Method for Calculating Performance Based Remuneration in Each Contract Year

147. The basis of calculating the Performance Based Remuneration shall be as follows.

Annual Performance Remuneration (APR) payable =	**3.5- Composite Score X 2.5**	**Maximum Annual Performance Remuneration**

148. The composite score for each contract year shall be as follows.

Composite Score=	**Total of All Weighted Scores for the Performance Criteria**

Where:

(i) The weighted score for each performance criterion equals the indicator weight x indicator value.

(ii) The performance indicator value is measured from 'Excellent' to 'Poor' with corresponding values as set out in Table 9. The raw scores range from 1 for excellent to 5 for poor. For simplicity 4 raw scores are considered 1, 1.5, 2, 2.5, 3.5, 4, 4.5 and 5.

(iii) If the actual performance is in between the performance standards for two indicator values then the score for that performance shall be rounded to the nearest 0.5.

(iv) A composite score of 3.5 (between good and fair) is the cut off for performance remuneration, a score of above 3.5 results a zero composite score

(v) A composite score 'excellent' would have a composite score of 1 and would qualify for the full maximum annual performance remuneration.

Table 10: Performance Targets and Criterion Values

	Reference	Description of service	Milestones/Key Performance Indicators	5 year project targets.	Yearly Target					Performance Indicator Weight	Performance Indicator Values				
					Year 1	Year 2	Year 3	Year 4	Year 5		1 Excellent	2 Very Good	3 Good	4 Fair	5 Poor
A	Establishment of Efficient and Sustainable OM														
1	Annual Reports and Work Plans	Annual reports and work plans reporting on the previous year performance, and proposed activities,	Annual report Work plan to be submitted by 30 June. Annual general meeting held by 31 July.	5 annual plans and reports and AGMs prepared as per schedule= 100%, 0.5month delay deduct 10%.	100%	100%	100%	100%	100%	0.1	100%	90%	80%	70%	60%
2	Pumps and Pipe Irrigation Commissioned	17000ha of piped irrigation including pumps, pipe distribution and prepaid meters installed, commissioned and operating	Commissioned area as a percentage of the target 17000ha	Y2: 2000ha, Y3: 7000ha, Y4:12,000ha Y5:17000ha	100%	100%	100%	100%	100%	0.15	100%	90%	80%	70%	60%
3	OM of pumps pipes and prepaid meters	Efficient OM of pumps, pipe distribution. Breakdowns repaired in 24 hours.	All pumps are fully operational, repairs carried out within 24hours	Over the year 95% of the pumps in operating condition with 100% of repairs completed in 24 hours.	95%	95%	95%	95%	95%	0.15	95%	90%	80%	70%	60 %
4	Cost Recovery	OM cost recovery systems are established using prepaid meters.	90% of the estimated OM costs for levels 2 and 3 are recovered by year 5.	Target annual revenue $ million Y1:$0.05M Y2:$0.25M Y3:$0.75M Y4:$1.5M Y5:$2.1M	90%	90%	90%	90%	90%	0.15	90%	80%	70%	60%	50%
B Design and Construction															
5	Participatory Design of the Piped Irrigation Systems	Participatory detailed designs are prepared for the pumps,	17,000ha (100%) completed by year 3	Y1 7000ha (includes 2000ha already completed)	100%	100%	100%	100%	100%	0.1	100%	90%	80%	70%	60%

	Reference	Description of service	Milestones/Key Performance Indicators	5 year project targets.	Yearly Target					Performance Indicator Weight	Performance Indicator Values				
					Year 1	Year 2	Year 3	Year 4	Year 5		1 Excellent	2 Very Good	3 Good	4 Fair	5 Poor
		pipe and electrification.		Y2 12000ha Y3 17000											
C Agriculture Support Services and Pilot Cost Recovery															
6	Agriculture Support Services	Agriculture support services are implemented and new improved long term cropping systems to increase farmer incomes and reduce water losses are identified.	Successful upscaling of 1000ha of new farming systems by Year 5.	Target area of upscaling Y2 5ha Y3 20ha Y4 500ha Y5 1000ha	100%	100%	100%	100%	100%	0.15	100%	90%	80%	70%	60%
7	Supplementary Cost Recovery Pilots	Supplementary pilot cost recovery pilots in addition to water delivery charges are identified and pilot programs taken up	Supplementary cost recovery systems are identified and implemented to reduce burden on farmers of water charges	10% of OM costs are collected through supplementary cost recovery is achieved by year 5 (10% =$200,000) Y1 $10,000 Y2 $50,000 Y3 $100,000 Y4 $150,000 Y5 $200,000	100%	100%	100%	100%	100%	0.1	100%	90%	80%	70%	60%
8	Farmer and stakeholder Engagement	.	The Implementation Coordination Committee (ICC) Meetings form a key measureable parameter to assess farmer and stakeholder engagement. Each meeting to be attended	Four ICC meetings are programmed to be held each year. 100% = 4 meetings attended by the 7 WU representatives max score = 28	100%	100%	100%	100%	100%	0.1	100%	90%	80%	70%	60%

	Reference	Description of service	Milestones/Key Performance Indicators	5 year project targets.	Yearly Target					Performance Indicator Weight	Performance Indicator Values				
					Year 1	Year 2	Year 3	Year 4	Year 5		1 Excellent	2 Very Good	3 Good	4 Fair	5 Poor
			by 7 Water User Representatives (6 x WUA +1 x WUF)	25=90% 20=70% 17=60% 14=50%											
	TOTAL									1.0					

149. The procedure for the calculation of the “Composite Score” is shown in an example in Table 11. The Maximum Annual Performance Remuneration is $50,000. Then the annual performance remuneration payable to the IMO in respect of the sample year is calculated as:

Annual Performance Remuneration Payable= (3.5-2.975)/2.5 x $50,000
=$10,500

150. The annual performance remuneration will be assessed as part of the annual report to be submitted by the IMO at the end of June each year. The end of June corresponds with financial year as well as the end of the Rabi period.

Table 11: **Example Calculation of Performance Scoring**

	Reference	**Indicator Weight**	**Performance Indicator Values**					**IMO Achievement**	**Raw Score**	**Weighted Raw Score**
			1 Excellent	**2 Very Good**	**3 Good**	**4 Fair**	**5 Poor**			
1	Annual Reports and Work Plans	0.1	100%	90%	80%	70%	60%	62%	5	0.5
2	Pumps and Pipe Irrigation Commissioned	0.15	100%	90%	80%	70%	60%	90%	2	0.30
3	OM of pumps pipes and prepaid meters	0.15	95%	90%	80%	70%	60 %	78%	3	0.45
4	Cost Recovery	0.15	90%	80%	70%	60%	50%	66%	3.5	0.525
5	Participatory Design of the Piped Irrigation Systems	0.1	100%	90%	80%	70%	60%	100%	1	0.10
6	Agriculture Support Services-upscaling of new agriculture systems	0.15	100%	90%	80%	70%	60%	79%	4.0	0.6
7	Supplementary Cost Recovery Pilots	0.1	100%	90%	80%	70%	60%	77%	3.5	0.35
9	Farmer and stakeholder Engagement	0.1	100%	90%	80%	70%	60%	97%	1.5	0.15
	TOTAL COMPOSITE SCORE	**1.0**								**2.975**