



ASSET MANAGEMENT ROADMAP

Support to Institutionalisation of Asset Management
in BWDB

June 2026



**PARTNERS
FOR WATER**
CO-CREATING IMPACT

Author: Hala Al Hamed - InfraMorph

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EXECUTIVE SUMMARY

The final report presents a systematic assessment and strategic roadmap for institutionalising asset management (AM) within the Bangladesh Water Development Board (BWDB). Funded by the Netherlands Enterprise Agency under the Partners for Water programme, the study responds to BWDB's current reliance on reactive operations and maintenance practices and its lack of a formal AM framework. Through stakeholder consultations, field visits, literature reviews and maturity assessments, the report identifies key institutional gaps and proposes a phased, adaptive approach to reform.

The analysis reveals that BWDB operates through a centralised, engineering-dominated structure with limited integration between strategic planning and field operations. Asset management is a new and evolving concept within the organisation and existing data systems are fragmented and underutilised. Decision-making processes are often influenced by external and social considerations and budgeting for maintenance lacks transparency and evidence-based justification. Community-level actors such as Water Management Organisations are engaged informally but remain under-leveraged in planning and upkeep.

To address these challenges, the report recommends an organic growth strategy that builds capacity through iterative learning and practical engagement. This approach aligns with BWDB's institutional realities and stakeholder preferences for data-driven decision-making as a means to reduce uncertainty. The roadmap focuses on four foundational interventions:

- ▶ Asset Management Decision Framework
- ▶ Business Process Mapping and Integration
- ▶ Asset Management Master Plan and Data System (AMMP & ADMS)
- ▶ Strategic AM Core Team Development and organisational structure

Together, these initiatives aim to support BWDB transition from reactive maintenance to proactive asset stewardship, improve coordination across units, enhance data transparency and embed asset management into organisational culture and planning cycles. The report sets the stage for scalable reform, positioning BWDB to align with national development goals.

For exchange rates between BDT and Euro, we have considered 1 Euro = 143 BDT in our report.

LIST OF ABBREVIATIONS

BWDB	Bangladesh Water Development Board
RVO	Netherlands Enterprise Agency
CSAWM	Climate Smart Agriculture & Water Management Project
EKN	Embassy of the Kingdom of the Netherlands
AM	Asset Management
O&M	Operation and Management
GIS	Geographic Information System
GoB	Government of Bangladesh
IWM	Institute of Water Modelling
WMG	Water Management Group
KPIs	Key Performance Indicators
LGED	Local Government Engineering Department
MoWR	Ministry of Water Resources
MTBF	Medium-Term Budget Framework
PPP	Public Private Partnership
TA	Technical Assistance Team
ToR	Terms of Reference
USD	United States dollar
MWRD	Ministry of Water Resources Development
PC	Planning Commission

1 INTRODUCTION

1.1 Background

This assignment is financed through the Partners for Water (PfW) Programme, executed by the Netherlands Enterprise Agency (RVO), part of the Netherlands Ministry of Economic Affairs and Climate. The Partners for Water Programme is commissioned by the Ministry of Infrastructure and Water Management on behalf of the Interdepartmental Water Cluster.

The Netherlands is well-known internationally for its expertise on water management, which is therefore one of the cornerstones of the bilateral relationships the Netherlands maintains. Through the Netherlands International Water Ambition (NIWA), intensive relationships with seven so-called delta countries are aimed for through fostering strategic partnerships. The mission of PfW Bangladesh is to contribute to NIWA by strengthening local capacities, applying an integrated approach to water security and positioning the Netherlands as a centre of expertise.

The assignment falls under the Partners for Water strategy 2024-2025, with a focus on improving Asset Management (AM) within the Bangladesh Water Development Board (BWDB), as part of the broader implementation of the Bangladesh Delta Plan 2100 (BDP2100) which is in the process of being formalised under the Strategic Partnership Alliance (SPA) MoU between MoWR, BWDB and RVO.

1.2 Objectives and Activities

The primary objective of this assignment is to conduct a structured assessment of the maturity of asset management practices within the BWDB, evaluating their alignment with best practices, international standards and institutional goals.

The objective includes a structured assessment of existing systems, stakeholder consultations, data analysis and roadmap development:

1. Kick-off Workshop: Organise and facilitate a kick-off meeting in Dhaka with BWDB, MoWR, GED and other relevant stakeholders.
2. Desk Review: Review various plans (delta plan), policies (NWP) and regulatory bodies (MoWR) to understand their mandate related to the AM. Review of existing BWDB asset management structures and compare the benchmark against international standards (e.g., ISO 55000, IAM). Also, review of similar projects like CDSP, Irrigation Management Improvement Project and projects led by VEI to strengthen O&M in DWASA etc.
3. Stakeholder Consultations: Conduct key informant interviews and focus group discussions with BWDB personnel, local government bodies and relevant ministries. Capture insights into existing practices, institutional challenges and capacity gaps.
4. Assessment and Rating: Use an established maturity model (e.g., ISO 55001/IIMM Maturity Scale) to rate BWDB's asset management maturity across different dimensions. Assessment areas may include, AM policy, AM plans, levels of service and performance management, demand forecasting, asset register and information system, condition monitoring, operational planning, capital works planning, financial and funding strategies and AM Teams.

5. Recommendations and Roadmap: From the assessment and rating, identify key gaps and areas of improvement. Develop actionable and prioritised recommendations for enhancing asset management practices

1.3 Scope of the Study

Bangladesh Water Development Board (BWDB) is a key governmental organisation in Bangladesh responsible for managing water resources and infrastructure. The BWDB plays a crucial role in flood control, disaster risk management, river erosion protection, irrigation, drainage and river management, contributing significantly to the country's agricultural productivity and overall water management. Currently there is no asset management framework in BWDB for maintaining its huge set of assets. All the O&M plans are carried out by the Chief Engineer (O&M) under Director General (DG). Under the Chief Engineer there are three wings. (i) O&M directorate, (ii) Food for work directorate and (iii) P&D mechanical circle. The current focus may transition from a reactive (O&M) to a proactive (asset management) approach. This shift is part of a broader initiative to institutionalise asset management within BWDB, supported by structured assessments, stakeholder consultations, data analysis and the development of a consensual roadmap.

1.4 Structure of the report

The report is structured to guide the reader through the assignment and its key findings. Chapter 2 outlines the approach and methodology adopted for the assessment. Chapter 3 presents the outcomes of the self-assessment exercise, applying a systematic maturity assessment matrix to evaluate BWDB's asset management practices. Chapter 4 discusses the results in detail, while Chapter 5 draws conclusions and offers recommendations for the asset management roadmap. To maintain clarity and focus, only essential information is included in the main document. Additional details are provided in the appendices, which are presented separately.

1.5 Study Area

1.5.1 BWDB context

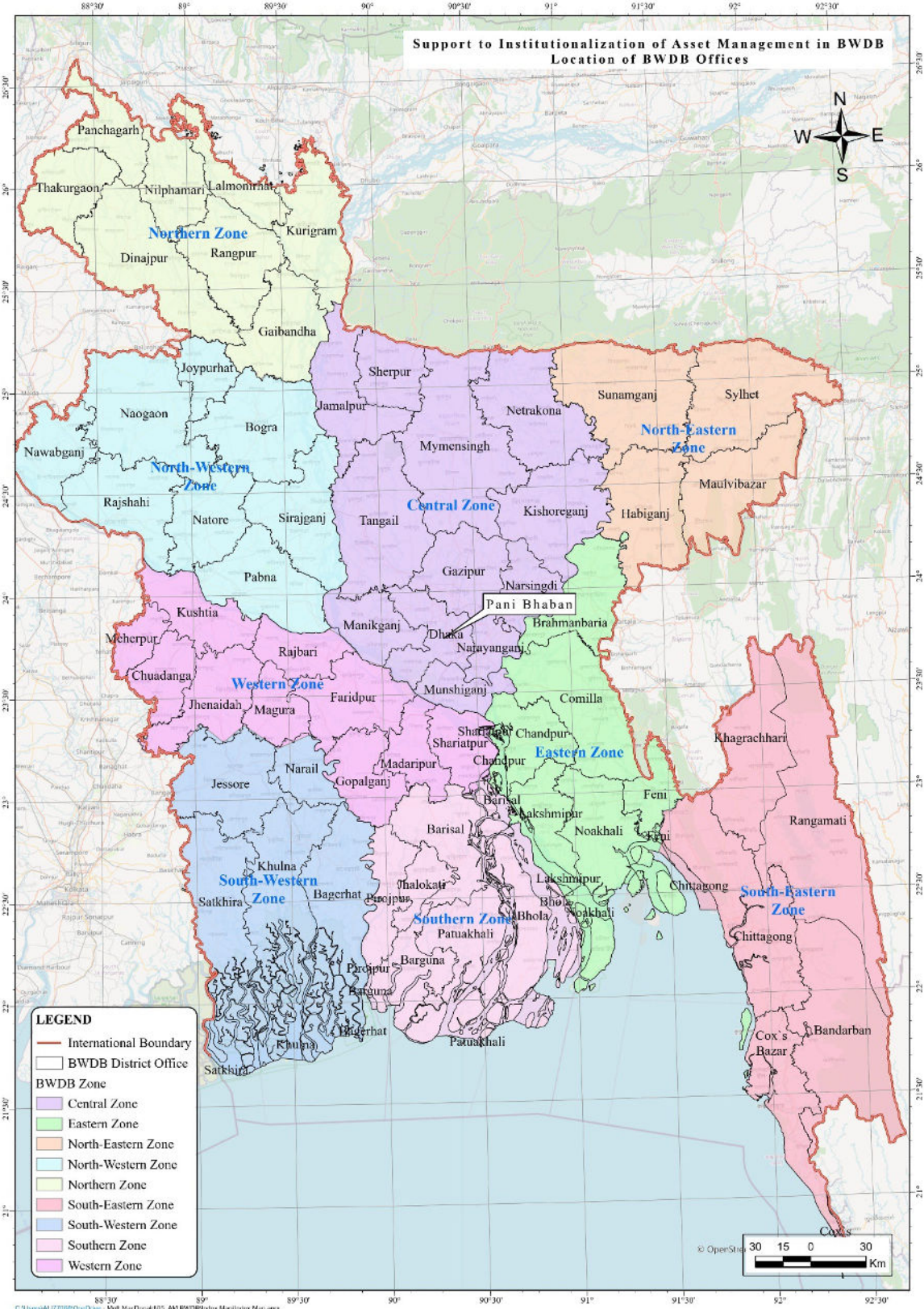
The BWDB has completed more than 1,000 projects to date. In these projects, about 16,000 hydraulic structures and 12,000 km of embankments have been constructed all over Bangladesh. Additionally, many kilometres of protective works and other types of structures, including buildings, equipment etc., have been constructed. BWDB wishes to have a manual on how to better manage these assets. This may include asset management strategy, what data is available, how this data is managed, how it is used as input for the decision-making process, how the data is recorded and how it is updated.

1.5.2 BWDB overview

The Bangladesh Water Development Board (BWDB), established in 1972 under the Bangladesh Water and Power Development Boards Order, functions as an autonomous organisation dedicated to managing the nation's water resources. Its primary focus includes flood control, drainage and irrigation initiatives aimed at enhancing agricultural productivity.

BWDB evolved from the former Water and Power Development Authority (WAPDA), which was restructured following Bangladesh's independence. Today, BWDB plays a pivotal role in the planning and execution of water-related infrastructure projects. Its mission centres on the sustainable development of water resources and the protection of lives and property from water-induced disasters.

Map 1.1 - BWDB District Level Offices





2 APPROACH AND METHODS: A STAKEHOLDER-DRIVEN AND ITERATIVE APPROACH

The foundation of this assessment and roadmap is the recognition that water infrastructure asset management (AM) challenges in Bangladesh are deeply context-specific and shaped by stakeholder perceptions. Rather than prescribing a universal best-practice model, the study acknowledges that solutions must be rooted in what stakeholders themselves identify as challenges. Accordingly, the project team adopted a participatory and adaptive approach, beginning with inception meetings aimed at understanding the institutional frameworks and regulatory structures governing AM within BWDB.

This phase involved a comprehensive review of relevant literature, policies, strategies and prior initiatives—including BWDB’s O&M manuals, the JICA (2017) study and the “Establish a Shared Agenda to Address BNR in Bangladesh” project. Consultations with government officials from BWDB and other agencies provided first-hand insights into existing practices and governance arrangements. These were complemented by field visits to BWDB and IWM, which helped contextualise the findings and explore the practical realities of AM implementation. Thus, this report builds on the foundation laid by earlier efforts including CDSP asset management recommendation, BNR report and JICA report. Rather than replicating previous work, it represents a deliberate step forward—translating the strategic recommendations of the BNR and CDSP into actionable pathways for implementation. By deepening stakeholder engagement and focusing on operational realities within BWDB, this study advances the agenda from conceptual framing to institutional integration, reinforcing continuity while driving progress.

The study focused on two key dimensions:

- ▶ Assessing the current maturity of AM practices in BWDB using a structured maturity matrix (Table A.1: Maturity Index Table)
- ▶ Identifying improvements needed in the enabling environment—spanning financial systems, institutional arrangements, human resources and data management—to support both strategic and operational AM.

Throughout the process, the team maintained a flexible methodology, adjusting tools and techniques in response to stakeholder feedback. For example, an introductory workshop on AM was organised to build a shared understanding of key concepts, followed by a field visit to examine the feasibility of decentralised AM systems. These engagements revealed the importance of tailoring approaches to local capacities, technical constraints and organisational culture.

The recommendations in this report embraced an organic growth approach, recognising that reform cannot follow a rigid, linear path. International best practices often present a roadmap from point A to Z, but in reality, stakeholder recognition of challenges evolves with experience. As institutions and individuals engage in initial reforms, they gain new insights that reshape their understanding and inform the next steps. This iterative advancement process—grounded in learning and adaptation—is essential for meaningful and sustainable AM reform in Bangladesh.

2.1 Review of Related Policies, National Plans and Projects

Earlier efforts to enhance the sustainability of water infrastructure in Bangladesh included reviews of existing policies and legislation related to Operations and Maintenance (O&M) and Asset Management (AM). Notably, the JICA-funded *Project for Capacity Development of Management for Sustainable Water Related Infrastructure in Bangladesh* (2017) compiled a list of relevant policies and plans for review in the context of AM. Building on these earlier initiatives, this study expanded the contextual review by identifying key regulatory and institutional documents, agreements and strategies that guide water resource management and development within BWDB.

As part of the context analysis, previous studies and initiatives on AM in Bangladesh were systematically reviewed, alongside literature analysis and stakeholder interviews. The root cause analysis provided deeper insight into the persistence of current challenges. This study further validated and extended these findings through a structured assessment of BWDB's institutional maturity and the broader environment in which it operates. This included engagement with key policy and planning-level stakeholders who influence the BNR cycle—such as BWDB, LGED, Dhaka Water Supply and Sewerage Authority (DWASA), Roads and Highways Department (RHD) and the Planning Commission. A summary of the literature reviewed is provided in Annex B.

2.2 Stakeholders Consultation

The inception mission was a critical component of the study, aiming to gather first-hand insights from key stakeholders, assess the existing O&M framework and identify challenges and opportunities for improvement. The mission involved semi structured interviews with a range of stakeholders across various organisational levels. These interviews provided valuable qualitative data to complement the review of regulatory and strategic documents.

Interview Key Stakeholders

As part of the inception mission, the study team conducted interviews with key stakeholders involved in water resource management and service delivery in BWDB. The objective was to understand their roles, responsibilities and perspectives on existing challenges and potential improvements in asset management. The following table provides details on the stakeholders interviewed, their organisational affiliations, positions and locations.

Table 2.1 - List of Personnel interviewed by the study team

Name	Position	Organization	Location	Date
Dr. Shyamal Chandra Das	Chief Engineer, Planning	BWDB	Pani Bhaban	18 June 2025
Dr. Robin Kumar Biswas	Superintending Engineer, Planning	BWDB	Pani Bhaban	18 June 2025
Mr. Shariful Alam	Executive Engineer	BWDB	Pani Bhaban	18 June 2025
Md. Amirul Islam	Deputy Executive Director	IWM	IWM Building	26 June 2025
Mantu Kumar Biswas	Strategic Planning Specialist	IWM	IWM Building	26 June 2025
Md. Musfequzzaman	Senior Specialist	IWM	IWM Building	26 June 2025
Tariq A. Al Fayyaz	Chief Engineer, O&M	BWDB	Pani Bhaban	30 June 2025
Md. Sazzad Hossain	Superintending Engineer, Hydrology	BWDB	Pani Bhaban	30 June 2025
Pijush Krishna Kundu	Superintending engineer	BWDB	Pani Bhaban	01 July 2025
M A Hannan Khan	Executive Engineer, Hydrology	BWDB	Pani Bhaban	02 July 2025
Md. Rakibul Hasan	Executive Engineer	BWDB, Kurigram	Kurigram	24 July 2025
Farhana Ahmed	Principal Specialist	CEGIS	Online	23rd July
Ms. Shamim Banu Shanti	Deputy Secretary	Ministry of Finance	Secretariate	12 August 2025

2.3 Field Visit to District Level - a Ground Reality Assessment

Asset management at the local level within the Bangladesh Water Development Board (BWDB) reveals a complex interplay between centralised authority, procedural rigidity and under-leveraged community institutions. The field-level insights from the Executive Engineer in Kurigram Division offer a candid view into how infrastructure is managed, maintained and responded to under current institutional arrangements.

2.3.1 Centralised Decision-Making and Limited Autonomy

The asset management process is centralised, with decision-making authority concentrated in Dhaka. Field engineers must navigate a hierarchical approval chain—Executive Engineer to Superintending Engineer, then to Zonal Chief Engineer, Additional Director General (ADG), Director General (DG) and finally to the Ministry of Water Resources and Ministry of Finance. This structure, while formalised, often results in procedural delays, particularly for routine maintenance and non-emergency works. Budget requests submitted in July may not be approved until November, leaving critical infrastructure vulnerable during peak seasons. A detailed organogram can be found in Figure 2.1.

In emergencies, the system allows for immediate action, but only after a formal declaration by the Superintending Engineer. Contractors may begin work based on this declaration, with budget approvals processed retroactively. While this workaround enables responsiveness, it underscores the rigidity of the standard process and the limited autonomy of field offices. The

Executive Engineer emphasised the need for delegated authority for minor and emergency works, suggesting that decentralisation could enhance efficiency and responsiveness.

2.3.2 Unclear Roles and Fragmented Responsibilities

The interviews reveal a lack of clarity in roles and coordination mechanisms. While BWDB has technical units such as the Design Circle and Mechanical Division, their engagement is episodic and often reactive. There is no designated focal point at headquarters for field engineers to communicate asset-related concerns, leading to fragmented reporting and inconsistent feedback. The recent creation of a focal officer at the Ministry level is a step forward, but coordination within BWDB remains ad hoc.

Field-level staff, including Sub-Assistant Engineers and Work Assistants, play a critical role in monitoring and reporting infrastructure conditions. However, their responsibilities are not formally integrated into a broader asset management system. Maintenance history is tracked manually through past work orders and there is no digital system in place for asset condition or location tracking. SIMS, once introduced by headquarters, is no longer actively used due to workload pressures and lack of institutional support.

2.3.3 Underutilised Role of Water User Groups and Local Institutions

Local stakeholders, including farmers and water user groups, regularly engage with BWDB to report issues and request interventions. However, their role remains informal and largely reactive. Sluice committees, for instance, are responsible for gate operations but lack the capacity and authority to respond effectively to technical issues. The field officer noted that these committees often fail to act promptly and there is no dedicated expert stationed at infrastructure sites to support operations.

Despite the presence of training centres and community engagement mechanisms, the institutional framework does not formally recognise or empower water user groups in asset management planning or decision-making. Their insights are valuable but not systematically captured or acted upon. This disconnect limits the potential for participatory management and undermines the sustainability of infrastructure investments.

The local-level asset management practices in BWDB reflect a system that is technically competent but structurally constrained. Centralised decision-making, unclear institutional roles and the underutilisation of community actors create bottlenecks that hinder effective maintenance and long-term planning. Empowering field offices with greater autonomy, clarifying responsibilities across units and integrating water user groups into formal asset management processes are essential steps toward building a more responsive and resilient water infrastructure system.

3 MATURITY ASSESSMENT

This assessment synthesises stakeholder perspectives across key AM criteria outlined in the maturity matrix. Each category includes a maturity rating based on evidence, quotes and observations from the interviews.

3.1 AM Strategy and Policy – Maturity Level: Core

Assessment: BWDB has shown strategic intent to adopt AM, demonstrated by the support of key personnel shown to this project and participation in the workshops and meetings. The Government commitment (0.5% of GDP to O&M) linked to the Delta Plan shows alignment to broader national goals. However, implementation and integration of this commitment remains a challenge. Furthermore, AM is still conceptually new in BWDB, with unclear internal strategy documents and no formal AM policy framework.

3.2 Performance Management and Levels of Service & Demand Forecasting – Maturity Level: Basic

Assessment: The periodic reporting to MoWR and PC mechanisms indicates that some progress tracking is in place. However, the focus of these reports remains largely on the implementation status of new projects, with limited attention to performance outcomes or service delivery impacts. Reporting on asset-related indicators is fragmented and there is a noticeable absence of metrics that link asset performance to broader organisational objectives. While the Delta Plan outlines strategic indicators, their operational integration into BWDB's asset management practices is weak. Efforts to prioritise assets by function—such as irrigation, flood control and drainage—are beginning to take shape, but these approaches lack consistency and formal standardisation across the organisation. An initiative led by CEGIS to develop a monitoring and evaluation system that links BDP indicators to BWDB performance is currently underway, signalling a potential shift toward more integrated performance tracking.

3.3 Asset Register and Data Management – Maturity Level: Core to Intermediate

Assessment: BWDB has made progress in developing its data infrastructure, with platforms such as PMIS and a central GIS unit indicating a growing capacity for asset tracking and spatial analysis. The 2017–2019 hydraulic structure survey was a commendable initiative, yet its limited integration into routine planning and decision-making reflects a lack of institutionalisation. Coordination across departments remains weak and data updating practices are inconsistent. Critically, the absence of structured data sharing with external stakeholders—particularly the Ministry of Finance and the Ministry of Planning—undermines their ability to conduct evidence-based evaluations of budget proposals. Without access to reliable and comprehensive asset information, these ministries

face difficulty in assessing actual O&M needs, which contributes to a low willingness to approve increases in the revenue budget.

3.4 Asset Condition and Performance – Maturity Level: Core

Assessment: Condition assessment practices remain largely informal, relying on visual verification and field experience. There is no standardised checklist, performance indicators, or digital monitoring system in place. Maintenance decisions are predominantly based on local consultation and field judgment, rather than structured criteria. Insights from the field indicate that asset condition tracking is conducted manually through individual surveys and maintenance history is referenced from past work orders. While some performance monitoring occurs, it is reactive and resource-constrained, with actions typically initiated only after issues are reported by local stakeholders. The absence of a cumulative inventory for certain asset types, such as bank protection structures, further limits systematic performance evaluation.

3.5 Decision Making & Risk Management – Maturity Level: Basic

Assessment: Decision-making processes show signs of transition from reactive responses to more strategic planning. While emergency interventions are mobilised rapidly—often within a day—routine approvals face delays due to bureaucratic procedures. Field-level input is considered, but autonomy remains limited, especially for minor or emergency works. There is recognition among stakeholders of the need for lifecycle-based asset management and proposed frameworks and decision-support tools (e.g., small operational indicators) are emerging. However, coordination between field offices and headquarters is inconsistent, with no dedicated focal point for asset-related concerns within BWDB. Prioritisation mechanisms exist in budget formats, but alignment between HQ priorities and local needs is often weak. Risk management remains largely experience-driven, with limited predictive tools or erosion forecasting systems in place.

3.6 Operations & Maintenance Practices – Maturity Level: Basic to Core

Assessment: Field engineers follow a consistent procedural pathway for defining emergency works, typically initiated through local stakeholder alerts and formalised via a declaration by the Superintending Engineer. While this reactive mechanism enables rapid mobilisation, it lacks formal guidance, delegated authority and budget flexibility for minor or preventive works. Emergency maintenance is executed immediately, but formal approvals and budget allocations follow later, creating a disconnect between responsiveness and institutional planning. Systematic O&M planning remains limited, with regular maintenance confined to select mechanical components and no structured asset condition tracking. The absence of a cumulative inventory for embankments and bank protection structures further complicates proactive maintenance. Resource constraints—particularly financial and staffing—are cited as major barriers and the reliance on post-event repairs continues to dominate O&M practices.

3.7 Governance and Organisational Readiness – Maturity Level: Core

Assessment: The governance structure within BWDB is highly centralised, with decision-making authority flowing from the Director General down to field-level engineers. This hierarchy restricts autonomy at the district level, particularly for small-scale or emergency interventions. The field officer emphasised the need for delegated authority to improve responsiveness and local relevance. Roles and responsibilities between headquarters, district offices and community actors such as Water Management Groups (WMGs) remain unclear, resulting in BWDB simultaneously acting as asset owner, manager and operator—often without formal delegation. While there is growing awareness of asset management principles, the organisational structure is skewed toward engineering functions, with limited representation from strategic planning, finance, or risk management disciplines. Staffing imbalances—both in numbers and skill sets—undermine strategic and tactical functions, leaving engineering roles and mind-set dominant. The lack of designated asset managers and operator posts in the organogram further constrains the institutional readiness to implement asset management effectively.

3.8 Stakeholder Engagement and Asset Management Culture – Maturity Level: Basic

Assessment: Engagement with Water Management Groups (WMGs) exists, but remains fragmented and largely informal. While stakeholders expressed enthusiasm during the initial introduction of asset management (AM), this has yet to translate into sustained institutional culture change. The BNR report highlights that WMGs and other local actors are often excluded from planning and design phases, which weakens their sense of ownership and accountability. This disconnect contributes to low service charge collection and poor maintenance outcomes. Moreover, the absence of clearly defined roles and responsibilities for WMGs in O&M limits their ability to contribute meaningfully to infrastructure upkeep. Although there is growing recognition of the potential for WMGs to support in-polder water management and localised asset operations, their involvement remains peripheral and under-leveraged.

3.9 Financial and Funding Strategies – Maturity level: Aware

Assessment BWDB's financial planning remains predominantly annual and reactive, with limited integration of long-term asset management principles. While the Medium-Term Budget Framework (MTBF) encourages three-year projections, BWDB has not yet developed comprehensive financial forecasts linked to asset condition or lifecycle needs. Budget proposals for Operations and Maintenance (O&M) often lack technical justification and are not supported by structured asset data, making prioritisation difficult for the Ministry of Finance and Planning Commission. There is no consolidated asset inventory with sufficient data confidence to support revaluation or long-term costing. Stakeholder feedback highlights the need for GIS-linked asset data and performance-based budgeting, but institutional tools and frameworks to support this transition are still underdeveloped.

3.10 Integration with Projects and Planning – Maturity Level: Core

Assessment: Asset Management (AM) is gradually gaining traction within BWDB’s project ecosystem, with initiatives such as Climate Smart Agriculture & Water Management Project (CSAWM), re-excavation works and Polder 31 serving as early entry points. These projects demonstrate potential for piloting AM practices, particularly through the inclusion of metadata and alignment with planning units. However, AM integration remains ad hoc and lacks a formalised institutional framework. This absence reinforces BWDB’s entrenched construction-centric approach, perpetuating the “build–neglect–rebuild” cycle and undermining long-term asset functionality.

Despite isolated efforts, AM is not yet embedded as a strategic planning principle. Existing project structures could be repurposed as AM pilots, but this would require a fundamental shift in organisational mind-set—from infrastructure delivery to lifecycle stewardship. Without this transition, AM will continue to be treated as a peripheral concern, limiting its impact on sustainability, cost-efficiency and service reliability.

BWDB sits between the *Basic* and *Core* levels of maturity overall, with strong institutional appetite and emerging AM infrastructure. Yet, systematic practices, data integration, condition monitoring and governance mechanisms need reinforcement.

Table 2.2 - Team Score vs AI Generated Score

	Criteria	Team score	AI generated score
1	AM Strategy and Policy- Maturity Level	Core	Core
2	Performance Management and Levels of Service & demand forecasting	Basic	Basic
3	Asset Register and Data Management	Core to Intermediate	Core
4	Asset Condition and Performance	Core	Basic
5	Operations & Maintenance Practices	<i>Basic to Core</i>	Basic
6	Decision Making and Risk Management	Basic	Core
7	Financial and Funding Strategies	Aware	Aware
8	Stakeholder Engagement and Asset Management Culture	Basic	Basic
9	Integration with Projects and Planning	Core	Basic
10	Governance and Organisational Readiness	Core	Basic

4 GAP ANALYSIS AND FINDINGS

4.1 Decision Making and Prioritisation Process

The decision-making process for O&M activities within the BWDB is shaped by a combination of field-level routines, institutional protocols and external influences. While certain procedures are consistently followed, the overall system remains fragmented, reactive and vulnerable to external factors and resource constraints.

At the field level, routine inspections form the backbone of maintenance identification. Sub-divisional engineers and sectional officers conduct monthly patrols of hydraulic structures, documenting their observations and submitting reports to the Executive Engineer of the respective O&M division. These inspections, while regular, rely heavily on visual verification and informal knowledge of asset locations, as there is no consolidated map or digital inventory covering all managed structures, beside the hydraulic structure inventory developed by IWM in 2019 and have remained underutilised and outdated ever since. Instead, field officers rely on ledger entries and personal familiarity, particularly for assets not tied to recent projects.

Once inspection reports are received, the Executive Engineer evaluates the necessity of maintenance interventions based on infrastructure condition and available budget. Maintenance needs are broadly categorised into general maintenance—typically small-scale repairs funded through the revenue budget—and rehabilitation works, which exceed Euro 0.70 million and fall under the development budget. For both categories, field surveys and investigation reports are required, though the process lacks standardised checklists or performance indicators.

Technical support is provided by the Design Circle office and the zonal Mechanical O&M Division, which assist in preparing designs and specifications for proposed works. However, coordination between these units and field offices is often inconsistent and the absence of a centralised asset management system limits strategic planning.

Community-level actors, particularly Water Management Organisations (WMOs), occasionally undertake minor maintenance activities. These efforts are usually low-budget and localised and while they reflect grassroots engagement, they are not systematically integrated into BWDB's planning framework. The BNR report and CDSP documentation both highlight that WMOs often lack the financial and institutional capacity to sustain meaningful contributions and their involvement is rarely aligned with broader infrastructure priorities.

Final prioritisation of maintenance and rehabilitation works is not solely determined by technical assessments. External pressure from influential stakeholders—such as Members of Parliament or senior government officials—can significantly shape decision-making. This influence often overrides need-based prioritisation, leading to resource allocation that may not correspond with actual infrastructure conditions or service delivery goals.

The field officers further illustrate the limitations of this system. While emergency works can be mobilised relatively quickly, routine approvals face delays due to bureaucratic bottlenecks and lack of delegated authority. Engineers at the district level have limited autonomy and budget flexibility is

minimal. Without a structured decision-making framework, BWDB's O&M activities remain reactive, underfunded and vulnerable to the "Build–Neglect–Rebuild" cycle described in the BNR report.

In essence, while BWDB has established procedural pathways for identifying and executing maintenance needs, the absence of linkages to organisational objectives and lack of integrated data systems, standardised criteria and transparent prioritisation mechanisms continues to hinder effective decision-making. Strengthening these processes is essential for transitioning from reactive maintenance to strategic asset stewardship.

4.2 Asset Data and Information Management System

BWDB currently operates two database systems:

- ▶ Each directorate or wing maintains its own database known as the Personal Management Information System (PMIS)
- ▶ Six Scheme Management Information Systems (SMIS) support broader asset data.

Between 2017 and 2019, IWM conducted a comprehensive assessment of BWDB's hydraulic structures across Bangladesh—evaluating their existing conditions and compiling the findings within the SIMS programme. This dataset was handed over to BWDB. However, according to various officials from both IWM and BWDB, the data and system have not been effectively utilized for asset maintenance decision-making. As a result, the dataset has remained largely untouched and not updated.

BWDB faces challenges in regularly using or updating the SIMS, primarily due to excessive workloads stemming from new project implementations.

Although BWDB possesses robust IT and GIS units capable of independently managing all GIS-related functions, including SIMS, there appears to be limited coordination between the GIS unit and the implementation teams. To address this gap, it is crucial to initiate an asset management information system to support the decision framework. This should be developed in coordination and involvement of three key units:

- ▶ the central GIS unit, responsible for providing up-to-date information,
- ▶ the planning and design unit, which utilises historical records for infrastructure development
- ▶ the operation and maintenance unit, tasked with field execution.

4.3 Budgeting and Financial Planning for Asset Management in the Water Sector

Bangladesh's adoption of the Medium-Term Budget Framework (MTBF) in FY 2005–06 marked a pivotal shift toward strategic public financial management. The MTBF links national development priorities with multi-year resource planning, requiring ministries to submit three-year budget frameworks in response to Budget Circular-1. This structure has contributed to improved fiscal discipline and policy alignment, particularly with long-term national strategies such as the Climate Policy, the National Adaptation Plan and the Bangladesh Delta Plan 2100 (BDP 2100).

Despite these institutional reforms, the budgeting process for water infrastructure, especially for O&M, remains constrained. Insights from the Ministry of Finance highlight a core challenge: the absence of a comprehensive and accessible asset database from the BWDB. Without reliable and integrated data, the Ministry struggles to evaluate budget proposals, distinguish between new development and rehabilitation needs and prevent duplication across projects. Although BWDB maintains internal databases, such as the IWM-developed sluice asset inventory, these are not shared with the Ministry of Finance in a format that supports budgetary analysis or decision-making.

Representative of the Ministry of Finance emphasised that accurate data and root cause analysis are essential for informed financing decisions, particularly in a climate-vulnerable country like Bangladesh. It is noted that project prioritisation is often influenced by external factors rather than evidence-based, which undermines the effectiveness of resource allocation. The Ministry of Finance favours needs-based prioritisation supported by GIS mapping and technical justification for both new investments and O&M activities.

While the Ministry maintains separate budget codes for various infrastructure categories (e.g. embankments, electricity, buildings), the absence of a structured decision-making framework within BWDB limits its ability to allocate funds strategically. Representatives of the Ministry of Finance expressed interest in collaborating with BWDB to develop such a framework—one that would enable comparison of alternatives, link objectives to outcomes and support performance-based budgeting.

Although the team was unable to secure a direct interview with a representative from the Ministry of Planning, documented observations in the *Built–Neglect–Rebuild (BNR)* report align closely with concerns raised by the Ministry of Finance. Both institutions point to systemic weaknesses in the budgeting process for water infrastructure, particularly in relation to O&M. The Planning Commission has noted that BWDB’s O&M proposals often lack sufficient detail and are not grounded in evidence-based assessments. This is largely due to the absence of a decision framework populated with a comprehensive inventory of infrastructure conditions—information such as location, specifications, construction history and maintenance records. As a result, it is difficult to determine actual O&M needs or justify budget allocations.

The Finance Division continues to view BWDB primarily as a project implementation agency, with limited sensitivity to the long-term functionality of water assets. This perception is reinforced by BWDB’s reluctance to share detailed engineering data and its tendency to prioritise new infrastructure over rehabilitation—even in cases where irrigation schemes are underperforming due to non-functioning components. Without a shift toward transparent data-sharing and lifecycle asset planning, both ministries remain constrained in their ability to allocate resources effectively and strategically.

The MTBF’s three-year planning horizon also poses limitations when juxtaposed with the 50-year National Adaptation Plan and the 100-year Delta Plan. Although long-term visions exist, resource constraints and short-term budget cycles hinder their full realisation. Additionally, BWDB’s lack of revenue self-sufficiency further restricts its ability to reinvest in asset sustainability, though the Ministry of Finance encourages exploration of new revenue-generating mechanisms.

In summary, while the MTBF provides a strong foundation for strategic budgeting, its effectiveness in supporting asset management in the water sector depends on improved data transparency, stronger inter-ministerial coordination and the institutionalisation of planning frameworks within

BWDB. Addressing these gaps is essential to ensure that financial resources are allocated efficiently and equitably across both new developments and the maintenance of existing infrastructure.

According to BWDB's annual reports submitted to the Ministry of Water Resources for the years 2021 to 2023, capital and operational expenditures are listed below

Table 2.3 - CAPEX

Sl. No.	Zone	Expense, BDT (million)		
		FY 2022-23	FY 2021-22	FY 2020-21
1	Central zone	9,131.44	12,451.89	7,876.16
2	Eastern zone	8,068.99	816.11	3,119.74
3	South-eastern zone	3,656.27	7,842.89	4,743.38
4	North-western zone	5,844.30	3,944.28	2,833.59
5	Western zone	19,385.28	6,756.00	1,339.77
6	Southern zone	3,897.01	12,736.50	15,260.43
7	South-western zone	2,291.31	3,699.08	3,820.22
8	Foreign loan	5,055.98	6,033.69	8,009.86
9	Special project	570.37	243.21	200.94
	TOTAL in BDT	57,900.94	54,523.64	47,204.09
	TOTAL in EURO	404.9	381.3	330.09

Table 2.4 - OPEX

Sl. No.	Sector	Expense, BDT (million)		
		FY 2022-23	FY 2021-22	FY 2020-21
1	Electricity	313.00	379.89	413.71
2	Residential building	299.28	294.86	240.65
3	Dam	12,996.85	11,383.84	8,901.53
5	Land development tax	156.77	157.74	127.25
6	Municipal tax	70.99	69.05	40.04
7	Survey	159.91	204.62	187.78
	TOTAL in BDT	13,996.81	12,490.02	9,910.96
	TOTAL in EURO	97.87	87.34	69.3

Table 2.5 - Comparison in CAPEX & OPEX

Sl. No.	Type	Expense, BDT (million)					
		FY 2022-23		FY 2021-22		FY 2020-21	
1	CAPEX	57,900.94	80.53%	54,523.64	81.36%	47,204.09	82.65%
2	OPEX	13,996.81	19.47%	12,490.02	18.64%	9,910.96	17.35%
	TOTAL in BDT	71,897.76		67,013.66		57,115.05	
	TOTAL in EURO	502.7		468.6		399.4	

4.4 Cost Recovery and Revenue Generation

In Bangladesh's water sector, the story of cost recovery and revenue generation is one of stark contrasts and persistent challenges. On one hand, the groundwater-based irrigation system stands out as a rare success. With over half a million farmer-owned shallow wells, this sector operates on a model of full cost recovery. Farmers invest in their own infrastructure, maintain it independently and reap direct benefits making it a vibrant example of private financing in action. The simplicity of the system, combined with its immediate utility, has allowed it to flourish without the need for complex institutional support.

But this success is not mirrored in other parts of the water sector. Large-scale surface water schemes, particularly those focused on flood control, drainage and irrigation (FCD and FCDI), tell a different story. These systems are heavily reliant on public funding, with no mechanisms in place to recover either capital investments or the costs of operations and maintenance. Despite efforts in coastal programmes to encourage WMOs to set aside internal funds for upkeep, the reality is that contributions are often symbolic—small, sporadic and disconnected from the actual financial needs of infrastructure maintenance.

Insights from the field visit add a layer of immediacy to this picture. On the ground, the constraints are not just financial—they are deeply institutional. Local engineers lack the autonomy to approve even minor works and budget allocations are slow and unpredictable. Without digital tools to track assets or plan maintenance, infrastructure is managed reactively, often only when it fails. Staffing shortages and limited resources further compound the problem, leaving field teams stretched thin and unable to conduct regular inspections or proactive repairs.

The Char Development and Settlement Project (CDSP) offers another lens into the complexity of revenue generation. In the coastal chars, where poverty is widespread and infrastructure is vulnerable to erosion and climate shocks, the idea of community-financed water management faces steep hurdles. While WMOs and WMGs have been established to manage local systems, their financial sustainability remains fragile. Many rely on donor support or government subsidies and structured user fee systems are either absent or ineffective. The willingness and ability of communities to pay for services is limited and without clear incentives or ownership, engagement remains superficial.

Across all these contexts, a common thread emerges: the absence of coherent strategies for cost recovery as not just a financial oversight—it reflects deeper governance and planning failures. The BNR report describes a recurring “Build–Neglect–Rebuild” cycle, where infrastructure is constructed, left to deteriorate due to poor maintenance and eventually rebuilt at greater cost. This cycle is perpetuated by fragmented institutional responsibilities, weak community involvement and a lack of asset management systems that could guide long-term planning and budgeting.

Ultimately, while Bangladesh has demonstrated that private financing can thrive under the right conditions, the broader water sector remains trapped in a pattern of dependency and neglect. Breaking this cycle will require more than financial reform—it demands a rethinking of institutional roles, community engagement and the integration of planning tools that can support sustainable infrastructure management.

4.5 Current O&M Human Resources and Capacities

4.5.1 BWDB's Organisational DNA: Engineering, Hierarchy and Project-Centric Operations

BWDB is fundamentally an engineering and project driven institution, structured through a robust governance and management hierarchy designed to oversee the planning, design, implementation and maintenance of water resource infrastructure. Its organogram reflects a technically oriented framework, beginning with central leadership and extending into specialised directorates and operational units that mirror the core engineering functions of the organisation. From hydraulic structure design to field-level execution, BWDB's divisions are organised to support a seamless flow of technical decision-making, with engineers at every tier playing a pivotal role in translating national water strategies into tangible infrastructure outcomes.

4.5.1.1 Top Leadership

- ▶ **BWDB Governing Council:** The highest decision-making body, responsible for strategic direction and overall governance.
- ▶ **Director General (DG):** Heads the BWDB and reports directly to the Governing Council. The DG oversees all operations and coordination among various departments.

BWDB's leadership is supported by a range of specialised units that provide technical, administrative and data-driven assistance to the Director General (DG), including IT, GIS, procurement and quality assurance cells. The organisation also includes several Assistant Director Generals (ADGs), each overseeing key domains such as administration, finance, planning and regional operations. Engineering leadership is reinforced through Chief Engineers and Directors who manage specialised functions like dredging, river morphology and surface water systems—ensuring BWDB's project-based operations are grounded in technical excellence and regional responsiveness.

4.5.1.2 Key Observations Based on the Organogram and Interviews

Regional Coverage and Decentralisation: The inclusion of regional circles—such as Dhaka Circle-1, Chittagong Circle and Mymensingh Circle demonstrates that BWDB's operations are locally embedded.

Vertical Coordination: A systematic vertical coordination exists between BWDB headquarters and its field offices, particularly in areas such as planning, technical analysis, field implementation and project monitoring.

Limited Horizontal Integration: Horizontal coordination among departments at the Dhaka headquarters appears to be limited, occurring mainly during exceptional circumstances or emergencies.

Project-Centric Structure: The functions and roles of various departments within BWDB are predominantly project-based. This orientation may restrict the long-term institutional integration of asset management

At present, the O&M activities of the hydraulic structures of BWDB are implemented by the field offices and assisted by the Design Circles concerned to the field offices. Hierarchy of the field offices are as follows:

Table 2.6 - Field Offices in BWDB

Field Office	Head	Manpower	Remarks
Zone	Chief Engineer	1	9 zones in the country
Circle	Superintendent Engineer	1	2 or 3 Circles in a zone
Division	Executive Engineer	1	2 or 3 Divisions in a Circle
Sub-division	Sub-divisional Engineer	3	2 or 3 Sub-division in a Division
Section	Sectional Officer	3	0 or 3 sections in Sub-division

Organisational reform of BWDB has progressed by support of World Bank since 1990s. The number of officers and staff has been decreasing as the organisational reform progresses. At present, the number of staff of BWDB has become less than the approved setup by the government, especially the number of staff at the field level. BWDB senior officers believe this is one of the causes leading to capacity reduction at the field level.

The budgets of the O&M activities of the field offices are evaluated and allocated by the office of the Director of O&M under the office of the Chief Engineer of O&M, based on the work plans proposed by the O&M division offices.

Map 2.1 - BWDB District Level Offices



5 ROAD MAP AND ACTION PLAN

5.1 Recommendations

The recommendations presented in this chapter are grounded in an organic growth approach, recognising that institutional reform—especially in complex environments like BWDB—cannot be imposed through rigid, linear models. While international best practices offer structured pathways, the reality in Bangladesh demands a more adaptive and iterative strategy. As stakeholders engage with initial reforms, their understanding of challenges and opportunities evolves, reshaping priorities and revealing new pathways for progress. This dynamic process of learning and adaptation is essential for building a resilient and context-sensitive asset management (AM) framework.

5.1.1 Criteria for Designing Interventions

The proposed interventions are informed by a comprehensive gap analysis (Chapter 4), BWDB's institutional strengths and stakeholder preferences. The following criteria guided their development:

- ▶ **Alignment with Identified Gaps:** Each intervention addresses specific weaknesses in decision-making, data systems, financial planning and operational practices.
- ▶ **Leverage of Institutional Strengths:** BWDB's engineering expertise, decentralised field structure, well developed and respected business process and existing data platforms (e.g. PMIS, GIS) are harnessed to support implementation.
- ▶ **Stakeholder Ownership:** Interventions reflect areas where stakeholders expressed readiness, interest and potential for sustained engagement.

5.1.2 Contextual Observations

- ▶ BWDB operates primarily through project-based structures/financing with a strong engineering orientation. Most top and mid-level management positions are held by engineers, with limited representation from disciplines such as business administration, finance, or strategic planning. This technical focus shapes both organisational culture and decision-making processes.
- ▶ Field operations are decentralised, yet budget decisions and allocation is centralised and institutional linkages between strategic planning and operational execution remain weak. This disconnect often leads to misalignment between long-term objectives and day-to-day maintenance prioritisation, reinforcing a reactive rather than proactive approach to infrastructure management.
- ▶ Asset management is a relatively new concept within BWDB. While there is growing awareness of its importance, formal frameworks, tools and practices have yet to be systematically adopted or embedded across the organisation.
- ▶ Stakeholders across BWDB and affiliated institutions consistently express a strong preference for data-driven approaches as a means to reduce uncertainty. There is a prevailing belief that comprehensive data collection—particularly on asset condition, location and performance—can serve as a stabilising force in decision-making. In the absence of structured planning tools or predictive models, data is seen not only as a technical resource but as a form of institutional reassurance. This mind-set reflects a broader tendency to equate data availability with control, transparency and credibility, especially in environments where political influence and resource constraints complicate prioritisation and budgeting.

5.1.3 Strategic Approach

The recommended approach for enhancing asset management practices in BWDB is one of *organic growth*—a dynamic and iterative process where each intervention stage builds upon the insights and experience gained from the preceding one. Rather than following a rigid blueprint, this pathway unfolds progressively as actors engage with the initial interventions. It prioritises practical learning and adaptation, ensuring that subsequent stages are informed by real-world implementation challenges and successes. The short-term focus is anchored in four interlinked initiatives.

1. **First**, a pilot-tested Asset Management Decision Framework introduces structured decision-making and tailored solutions to align future reforms.
2. **Second**, the Business Process Mapping and Integration ensures that workflows are refined and the framework is embedded into daily operations.
3. **Third**, the Asset Management Master Plan and Data System (AMMP & ADMS) provides a long-term roadmap supported by standardised digital data for informed budgeting and coordination.
4. **Fourth**, a Strategic AM Core Team will be established to lead the transformation, offering continuity, guidance and capacity-building across decentralised units. Starting with Initiative 1 is critical. It sets the strategic foundation, aligns stakeholders and generates the data and insights needed to inform and calibrate the remaining initiatives.

This sequencing ensures that reforms are not only technically sound but also institutionally embedded and politically feasible.

5.2 Intervention 1: Align Strategy with O&M through an Asset Management Decision Framework

Develop and demonstrate on a pilot an AM Decision Framework in a representative area (e.g. *Polder 31*):

The Framework will contain four components:

1. Strategic AM statement and policy Document.
2. AM objectives and performance indicators.
3. Catalogue of solutions based on asset types.
4. Decision matrix to evaluate alternatives.

The following diagram represents the components steps to create the framework.

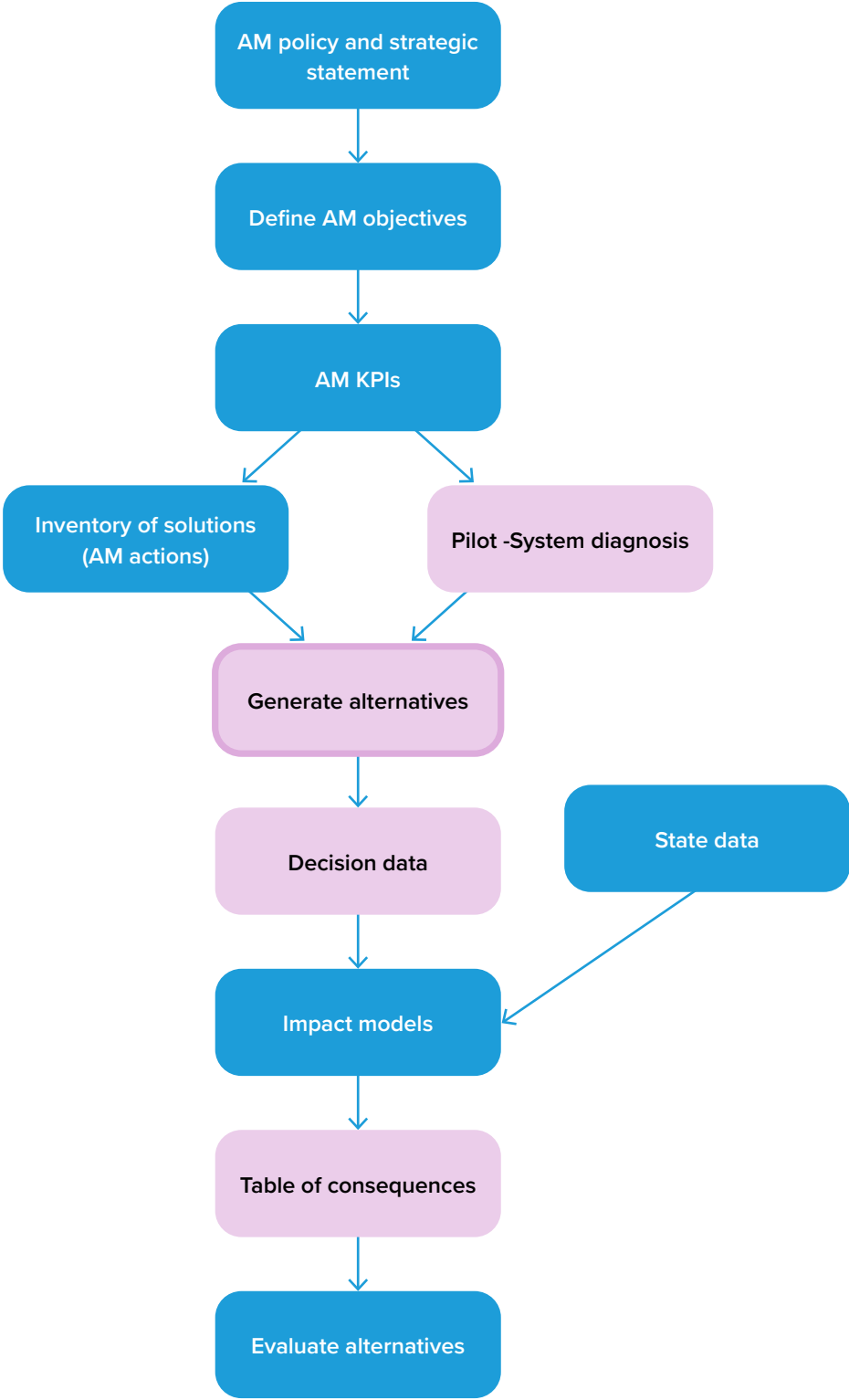


Chart 2.1 - Component Steps to Create the Framework

- ▶ Blue blocks: represent generic components that apply to system-wide.
- ▶ Pink blocks: are Area-specific tailored to the pilot.

Data generated through the pilot will support scaling across BWDB’s asset base. The framework should be recalibrated and reinforced during each planning cycle.

Key Benefits

- ▶ Data-informed decision-making improves value for money.
- ▶ Facilitates Monitoring & Evaluation linked to strategic goals.
- ▶ Introduces lifecycle costing into investment logic.
- ▶ Balances technical, environmental and social criteria.
- ▶ Provides a living catalogue of solutions for future adaptation.
- ▶ Enables future automation and lays groundwork for AI integration.

Responsible parties: ADG planning, CEGIS (M&E team), Planning Commission, MoWR, MoF.

5.3 Intervention 2: Embed AM into Business Processes through System Mapping

To operationalise the AM framework, business processes must be clearly defined and documented. The management system defines the key touch points that trigger activities, as well as the procedures and interactions within the organisation necessary for achieving its objectives. For the asset management decision framework (intervention 1) to be effectively utilised during both long-term and annual planning, it must be integrated into BWDB's core business processes. This calls for a thorough business process mapping exercise, aimed at capturing and documenting workflows to a simplified yet sufficiently detailed level. While this exercise can be time-consuming and at times complex—as evidenced by the Waternet of the Netherlands example, where their team had to revisit the level of detail multiple times due to practicality concerns—it is a crucial step toward institutionalising asset management. Once the documentation is complete, initial efforts should focus on adapting the AM needs process into the existing system. For instance, forms currently used to collect field data for new project planning—typically limited to basic asset information—should be modified to capture data aligned with the AM framework. The next priority is addressing workflows that contribute to underperformance, delays, or risk exposure, followed by implementing targeted process improvements. Given BWDB's project-based structure, it is essential to ensure coherence and alignment between projectised and functional activities when refining organisational processes. As Prof. Hans de Bruijn elaborates in *Management in Networks* (2008), understanding the dynamics between project-based and process-oriented structures can illuminate the interfaces and interdependencies that exist within institutions. In this context, process mapping emerges as a valuable tool to visualise interactions between asset management teams and project execution units, clarify responsibilities, assess resource needs and identify systemic gaps.

5.3.1 Steps to Implementation

- ▶ **Business Process Mapping:** Identify triggers, workflows, inputs/outputs, responsibilities and resources.
- ▶ **System Integration:** Modify existing tools (e.g., field data collection forms) to incorporate AM data needs.
- ▶ **Targeted Improvements:** Focus on underperforming processes that hinder responsiveness or introduce risks.
- ▶ **Structural Alignment:** Bridge the gap between projectised and functional structures to enhance coherence.
- ▶ Use mapping techniques to visualise interactions between water user associations, project teams and AM core team (see intervention 3).
- ▶ Consider introducing AI-powered document systems to improve data consistency and reduce strain caused by understaffing.

5.3.2 Benefits and Outcomes

- ▶ Institutionalisation of AM within organisational workflows.
- ▶ Transparent and efficient communication.
- ▶ Process clarity promotes continuous improvement.

Responsible parties: BWDB (ADG, Planning, Design and Research) and its affiliated district offices

5.4 Intervention 3: Asset Management Master Plan and Asset Data

The third initiative in the road map to transition from reactive infrastructure maintenance to strategic asset stewardship, BWDB needs to establish a comprehensive Asset Management Master Plan (AMMP) anchored in a robust and interoperable Asset Data Management System (ADMS). This dual initiative should serve as the operational arm for institutionalising asset management across BWDB and other water sector agencies.

5.4.1 Asset Management Master Plan (AMMP)

The AMMP should provide a long-term, phased strategy for embedding asset management principles into planning, budgeting and operations. It must align with national frameworks such as the Bangladesh Delta Plan 2100, the Climate Policy and the National Adaptation Plan, while remaining responsive to the realities of short-term budget cycles under the Medium-Term Budget Framework (MTBF).

Key components of the AMMP should include:

- ▶ Definition of asset management objectives linked to service levels, risk reduction and lifecycle cost optimisation
- ▶ Basic information including population, districts, weather and climate cycles, economic development and demand projection.
- ▶ Physical condition of existing assets including asset codification and registry plan
- ▶ Environmental considerations
- ▶ Future scenarios with sufficient demonstration of uncertainty
- ▶ Evaluated options and cost analysis

5.4.2 Asset Data Management System (ADMS)

The Asset Data Management System (ADMS) should be designed to consolidate, standardise and digitise asset information across BWDB's operational landscape. Its core function is to enable evidence-based decision-making, support budget justification and facilitate coordination with key institutions such as the Ministry of Finance and the Planning Commission.

Given that data collection is a resource-intensive process, careful planning is essential to balance scope and feasibility. The number of assets and the level of detail required directly influence the cost and complexity of data collection programmes. A staged approach is recommended, beginning with priority assets and gradually expanding coverage. To ensure long-term value, a programme for continuous data improvement and regular updates must be embedded within BWDB's operational processes. Without mechanisms to maintain data accuracy and currency, the initial investment in data collection risks becoming obsolete, as demonstrated by the IWM condition survey study of all the hydraulic structures of BWDB.

It is therefore advised that data management be integrated into business process development under Initiative 2. To ensure relevance and usability, the ADMS should prioritise a structured data collection programme focused on asset coding, condition assessment and comprehensive information capture with a focus on the following areas:

- ▶ **Asset Coding and Classification:** Develop a standardised coding system for all asset types (e.g., embankments, sluice gates, irrigation pumps) and include metadata such as asset function, ownership and operational status.
- ▶ **Condition Assessment Protocols:** Develop a formal checklists and performance indicators for visual and technical inspections. Incorporate historical maintenance records and damage reports to business processes and link condition ratings to risk levels and service delivery impacts.
- ▶ **Data Governance and Sharing Mechanisms:** Define protocols for data updating, validation and inter-agency sharing. To ensure transparency and accessibility for external stakeholders, including MoF and MoP, create a consolidated GIS-based inventory of all hydraulic structures that is compatible with Planning Commission and MoF systems for budget analysis.

Responsible parties: IWM, BWDB, 64 Districts, planning commission, MoF & WMG.

5.5 Intervention 4: Develop the Capacity of a Strategic Asset Management Core Team and Strengthen Organisational Structure

To institutionalise asset management (AM) within BWDB, a dedicated AM Core Team should be established and capacitated to lead governance, strategic planning, decision framework development and business process integration. This team will serve as the central driver of AM reform, ensuring continuity, coherence and alignment across BWDB's operational landscape.

We recommend building on the existing O&M team (currently three staff), expanding it with strategically recruited personnel from diverse disciplines—including engineering, finance, planning, IT and data science. Top management commitment is essential to define clear roles across strategic planning, framework development, system management and AI integration.

5.5.1 Organisational Structure and Role Differentiation

To deliver asset management effectively, BWDB must reinforce both the capacity (quantity) and capability (competence) across three distinct functional levels:

- ▶ **Asset Owners (Strategic Level)** – Located at BWDB headquarters, this group includes senior leadership and policy planners responsible for setting AM objectives, aligning with national strategies and ensuring regulatory compliance. Staffing at this level should be expanded to include experts from business administration, economics and systems thinking—not just engineering—to support multi-dimensional decision-making.
- ▶ **Asset Managers (Tactical Level)** – Represented by the 13 Additional Chief Engineers across BWDB's zones, these managers translate strategic goals into actionable plans. While technical expertise remains vital, staffing at this level can be optimised by leveraging digital tools and AI-assisted systems for forecasting, prioritisation and performance monitoring. This allows for a leaner structure with enhanced analytical capacity.

- ▶ **Asset Operators (Operational Level)** – Comprising the 64 Executive Engineers, Water Management Groups (WMGs) and private contractors, this level is responsible for day-to-day asset operation, inspection and maintenance. Capacity building is critical here, with tailored training programmes and employment opportunities to strengthen local engagement and technical responsiveness.

5.5.2 Tailored Training and Competency Development

Training programmes should be customised to reflect the distinct functions of each stakeholder group:

- ▶ **Strategic-level training** should focus on AM policy, financial planning, lifecycle costing and governance.
- ▶ **Tactical-level training** should emphasise planning tools, risk management and data interpretation.
- ▶ **Operational-level training** should cover inspection protocols, maintenance techniques and community engagement.

5.5.3 Staffing Balance and Reform

The current staffing imbalance—where engineering roles dominate across all levels—must be restructured. More strategic thinkers and planners are needed at the top, while tactical roles can be streamlined through automation and AI. At the operational level, increased staffing and skill development will enhance responsiveness and create employment pathways, especially in underserved regions.

5.5.3.1 Responsibilities of the AM Core Team

- ▶ Lead AM transformation and ensure compliance with the decision framework
- ▶ Coordinate updates of key documents and decision-support tools
- ▶ Provide structured guidance and capacity support to field teams
- ▶ Facilitate cross-level communication and feedback loops

5.5.3.2 Expected Outcomes

- ▶ Institutional leadership for AM evolution
- ▶ Strengthened coordination between asset owners, managers and operators
- ▶ Improved data flow and decision-making across organisational tiers
- ▶ Continuity of AM practices across planning cycles
- ▶ Enhanced stakeholder ownership and operational efficiency

This intervention not only builds technical capacity but also reconfigures BWDB's organisational DNA to support long-term, sustainable asset stewardship.

ANNEXES

A. MATURITY INDEX

Table A.1: Maturity Index Table

Section	Aware	Basic	Core	Intermediate	Advanced
2.1 AM Policy Development	Corporate awareness of the benefits of AM.	Corporate expectation expressed in relation to development of AM Plans and AM objectives.	AM Policy and AM Objectives developed, aligned to corporate goals and strategic context.	AM System scope is defined and documented. Strategic context (internal, external, customer environment) analysed and implications for the AM System documented in the Strategic AM Plan.	AM Policy and Strategic AM Plan fully integrated into the organisation's business processes and subject to defined audit, review and updating procedures.
2.2 Levels of Service and Performance Management. Demand Forecasting	Level of service requirements generally understood but not documented or quantified.	Asset contribution to organisation's objectives and some basic levels of service have been defined. Customer Groups defined and requirements informally understood.	Levels of service and performance measures in place covering a range of service attributes. Annual reporting against performance targets. Customer Group needs analysed. Level of service and cost relationship understood.	Customers are consulted on significant service levels and options.	Customer Communications plan in place. Levels of service are integral to decision making and business planning.
2.3 Demand Forecasting and Service Delivery Mechanisms	Future demand requirements generally understood but not documented or quantified. Demand forecasts based on mathematical analysis of past trends and primary demand factors. AM roles generally understood.	Demand forecasts based on experienced staff predictions, with consideration of known past demand trends and likely future growth patterns. Service delivery roles clearly allocated (internal and external), generally following historic approaches.	Demand Forecasts based on robust projection of a primary demand factor (e.g.: population growth) and extrapolation of history trends. Risk associated with demand change broadly understood and documented. Demand management considered as an alternative to major project development. Core functions defined Procurement strategy/policy in place. Internal service level agreements in place with the primary internal service providers and contract for the primary external service providers.	A range of demand scenarios is developed (e.g.: high/medium/low). Demand management is considered in all strategy and project decisions. Risks, benefits and costs of various outsourcing options considered and determined. Competitive tendering practices applied with integrity and accountability.	Risk assessment of different demand scenarios with mitigation actions identified. All potential service delivery mechanisms reviewed and formal analysis carried out to identify best delivery mechanism.

Section	Aware	Basic	Core	Intermediate	Advanced
2.4 Asset Register Data and Asset Condition	Asset Information in combination of sources and formats. Awareness of need for asset register. Condition and performance understood but not quantified or documented.	Basic physical information recorded in a spreadsheet or similar (e.g. location, size, type), but may be based on broad assumptions or not complete. Adequate data and information to confirm current performance against AM objectives.	Sufficient information to complete asset valuation (basis attributes, replacement cost and asset age/ life) and support prioritisation of programmes (criticality). Asset hierarchy, identification and attribute Systems documented. Metadata held as appropriate. Condition and performance information is suitable to be used to plan maintenance and renewals to meet over the short term.	A reliable register of physical, financial and risk attributes recorded in an information system with data analysis and reporting functionality. Systematic and documented data collection process in place. Future condition and performance ' information is modelled to assess whether AM objectives can be met in the long term. Contextual information, such as demand, is used to estimate likely performance.	Information on work history type and cost, condition, performance, etc. recorded at asset component level. Systematic and fully optimised data collection programme with supporting metadata. The type, quality and amount of data are optimised to the decisions being made. The underlying data collection programme is adapted to reflect the assets' lifecycle stage.
3.1 Decision Making	AM decisions based largely on staff judgement.	Corporate priorities incorporated into decision making.	Formal decision-making techniques (MCA / BCA) are applied to major projects and programmes, where criteria are based on the organisations' AM objectives.	Formal decision making and prioritisation techniques are applied to all operational and capital asset programmes within each main budget category. Critical assumptions and estimates are tested for sensitivity to results.	AM objectives/ targets are set based on formal decision-making techniques, supported by the estimated costs and benefits of achieving targets. The framework enables projects and programmes to be optimised across all activity areas. Formal risk-based sensitivity analysis is carried out.
3.2 Risk Management and Operational Planning	Risk management is identified as a future improvement. Risk framework developed. Operational processes based on historical practices.	Critical services and assets understood and considered by staff involved in maintenance / renewal decisions. Operating procedures are available for critical operational processes. Operations organisational structure in place and roles assigned	Critical assets and high risks identified. Documented risk management strategies for critical assets and high risks. Operating procedures are available for all operational processes. Operational support requirements are in place	Resilience level assessed and improvements identified. Systematic risk analysis to assist key decision-making. Risk register regularity monitored and reported. Risk managed and prioritised consistently across the organisation. Risk and opportunity planning completed.	Resilience strategy and programme in place including defined levels of service for resilience. Formal risk management policy in place. Risk is quantified and risk mitigation options evaluated. Risk is integrated into all aspects of decision making. Continual improvement can be demonstrated for all operational processes.

Section	Aware	Basic	Core	Intermediate	Advanced
				Operational objectives and intervention levels defined and implemented. Alignment with organisational objectives can be demonstrated.	Comparison with ISO 55001 requirements complete.
3.3 Capital Works Planning	Capital investment projects are identified during annual budget process.	There is a Schedule of proposed capital projects and associated costs for the next 3-5 years, based on staff judgement of future requirements.	Projects have been collated from a wide range of sources and collated into a project register. Capital projects for the next three years are fully scoped and estimated. A prioritisation framework is in place to rank the importance of capital projects.	Formal options analysis and business case development has been completed for major projects in the 3–5-year period. Major capital projects for the next 10-20 are conceptually identified and broad cost estimates are available.	Long-term capital investment programmes are developed using advanced decision techniques such as predictive renewal modelling.
3.4 Financial and Funding Strategies	Financial planning is largely an annual budget process, but there is intention to develop longer term forecasts.	Assets re-valued in compliance with financial reporting and accounting standards. 10-year financial forecasts are based on extrapolation of past trends and broad assumptions about the future. Expenditure categories compliant with FRS.	Asset revaluations have a 'B' grade data confidence. 10 year+ financial forecasts based on current comprehensive AMPs with detailed supporting assumptions / reliability factors.	Asset revaluations have a 'B' grade data confidence. 10 year+ financial forecasts based on current comprehensive AMPs with detailed supporting assumptions / reliability factors.	Asset revaluations have an 'A' grade data confidence. 10 year + financial forecasts based on comprehensive, advanced AM plans with detailed underlying assumptions and high confidence in accuracy. Advanced financial modelling provides sensitivity analysis, demonstrable whole of life costing and cost analysis for level of service options.
4.1 AM Teams	Leadership is supportive of AM	AM functions are carried out by small groups. Roles reflect AM requirements	Position descriptions incorporate AM roles. Ownership and support of AM by leadership AM coordination processes established Awareness of AM across most of the organisation	Organisational structures support AM Roles reflect AM resourcing requirements and reflected in position descriptions for key roles. Consistent approach to AM across the organisation Internal communication plan established.	Roles reflect AM requirements and defined in all relevant position descriptions Formal documented assessment of AM capability and capacity requirements to achieve AM objectives Demonstrable alignment between AM objectives, AM Systems and individual responsibilities

Section	Aware	Basic	Core	Intermediate	Advanced
4.2 AM Plans	Stated intention to develop AM Plans	AM Plans contains basic Information on assets, service levels, planned works and financial forecasts (5-10 years) and future improvements.	AM objectives are defined with consideration of strategic context. Approach to risk and critical assets described, top-down condition and performance assessment, future demand forecasts, description of supporting AM processes, 10-year financial forecasts, 3-year AM improvement plan.	Analysis of asset condition and performance trends (past/future), customer engagement in setting LoS, ODM/ risk techniques applied to major programmes. Strategic context analysed with risks, issues and responses described.	Evidence of programmes driven by comprehensive ODM techniques, risk management programmes and level of service/cost trade-off analysis. Improvement programmes largely complete with focus on ongoing maintenance of current practice.
4.3 Information and Management Systems	Intention to develop an electronic asset register/ AMIS and Awareness of need to formalise systems and processes.	Asset register can record core asset attributes - size, material, etc. Simple process documentation in place for service-critical AM activities.	Asset register enables hierarchical reporting (at component to facility level). Customer request tracking and planned maintenance functionality enabled. System enables manual reports to be generated for valuation, renewal forecasting. Basic Quality Management System in place that covers all organisational activities. Critical! AM processes are documented, monitored and subject to review. AM System meets the requirements of ISO 55001.	Spatial relationship capability More automated analysis reporting on a wider range of information. Process documentation implemented in accordance with the AM System to appropriate level of detail. Internal management systems are aligned.	Financial, asset and customer service systems are integrated and all advanced AM functions are enabled. Asset optimisation analysis can be completed. ISO certification to multiple standards for large asset intensive organisations, including ISO 55001. Strong integration of all management systems within the organisation.
4.4 Improvement Planning	Recognition of AM improvements.	Improvement actions identified and allocated to appropriate staff.	Current and future AM performance assessed and gaps used to drive the improvement actions. Improvement plans identify objectives, timeframes, deliverables, resource requirements and responsibilities	Formal monitoring and reporting on the improvement programme to Executive Team. Project briefs developed for all key improvement actions.	Improvement plans specify key performance indicators (KPIs) for monitoring AM improvement and these are routinely reported.

B. SUMMARY OF LITERATURE REVIEWED

B.1 National Water Policy, Jan/1999

The National Water Policy (NWPo) was approved and published by the National Water Resources Council (NWRC) in 1999. The NWPo has positioned water as the single most important resource for the well-being of people in Bangladesh and aims to provide direction to all agencies and institutions working with the water sector to achieve the comprehensive development and management of water, through methods such as decentralisation, stakeholder participation, research and information management etc..

B.2 National Water Management Plan, Dec/2001

In order to operationalise the directives given by the NWPo, the National Water Management Plan (NWMP) was prepared by the Water Resources Planning Organisation (WARPO) in 2001 and approved by the NWRC in 2004. In reflecting the objective of rationalising and decentralising management of the water sector, the NWMP is a framework plan with which line agencies and other organisations are expected to plan and implement their own activities in a coordinated manner.

B.3 BWDB Act, 2000

The BWDB Act 2000 stipulates that BWDB shall perform their services subject to fulfilment of guidelines provided by the NWPo and NWMP.

B.4 Guidelines for Participatory Water Management, 2001

The “Guidelines for the Participatory Water Management” was prepared by Ministry of Water Resources (MOWR) in 2001 within the framework of the NWPo and also on the basis of the experience of the previous guidelines used by the BWDB and the Local Government Engineering Department (LGED). This guideline is expected to be applied to all agencies working in the water sector. The Guideline provides detailed operational framework for stakeholder participation in water management, dividing the water management project.

B.5 Guidelines for Operation and Maintenance of Permanent Structures under BWDB

The “Guidelines for Operation and Maintenance of Permanent Structures of BWDB” (BWDB O&M Guidelines) was prepared by BWDB and approved by MOWR in 2010. The aim of the guidelines is to provide helpful guidance for transparent and efficient use of financial resources received for

maintenance works of permanent structures of BWDB. The Guidelines provides the operational framework of O&M activities of BWDB, including financial procedures in BWDB and less engineering matters.

In addition to the above, some O&M manuals had been prepared in different projects of BWDB. Out of these manuals, the O&M Plan in the System Rehabilitation Project (SRP) in September 1994 firstly introduced the framework of the integrated O&M and is regarded as an exemplary document of O&M of BWDB. Other manuals include the Netherland funded IPSWAM, WMIP by the World Bank and SAIWRMP by ADB. Those manuals are prepared on the premise that they are used together with other design reports of the projects and are stipulated mainly on the operation rules of the project facilities. Therefore, the function and assumed damage mechanism of facility, which are useful information to other projects, are not included sufficiently in those manuals.

B.6 BWDB Annual Report

Every year BWDB submit an annual report to Ministry of Water Resources consisting various indicators. In this report mainly public relation, annual development plan, finished projects of last year, upcoming projects, projects under climate change fund, planning of BDP-2100, contribution to agriculture and environment, irrigation service charge, flood forecasting, mechanical directorate activities, land acquisition activities, contract and procurement, ICT, success story, project technical and financial progress etc. are highlighted.

C. MEETING PHOTOS

Photo 2.1: Meeting Photos - 1



Photo 2.2: Meeting Photos - 2



Photo 2.3: Validation Workshop - 1



Photo 2.4: Validation Workshop - 2





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