Kingdom of the Netherlands

PARTNERS FOR WATER
CO-CREATING IMPACT

Why the BNR Cycle Exists and Why it Must be Addressed



National Stakeholder Validation Workshop, 10 November 2026

INNOVISION
Research | Technical Assistance | Project Management

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The question

Infrastructure is built, left without maintenance, and rebuilt at full cost. What factors contributes to this cycle and how can we break this cycle?

Context

Background

INNOVISION carried out the study for RVO under the Partners for Water Programme.

The study aims to enable the Bangladesh Water Development Board (BWDB) to transition from a project-driven organization to a process-driven organization.

Inform planning, budgeting, procurement, implementation, O&M, and accountability through standardized, data-informed, and continuously monitored procedures rather than by the ad hoc logic

Data Collection

Interviews	**38 key informant interviews**
Categories	**Seven stakeholder categories**
Field sites	**Dacope and Batiaghata upazilas, Khulna**
Approach	**Market Systems Development**
Systems Assessed	**Construction, operation and maintenance, asset management, financing**

Methodology: Qualitative research through the market systems approach to define underlying systemic constraints and incentives to reforms

Approach

The study applied market systems analysis framework.

For any project or infrastructure or solution there is a demand side- the actor who receives the solution, a supply side- the actor who supplies the solution, ranges of support functions- the services that enable the transaction between the demand side and the supply side, and rules- the formal and informal policies that govern the supply of the solution.

The study analysed the system to define the systemic constraints that trigger BNR and the incentives or disincentives of the actors to address BNR

Objectives of this presentation

This presentation responds to the following objectives:

01	**The causes of BNR**	The presentation explains the causes and the drivers of BNR. It explains how interconnected issues like finance, construction, O&M and asset management contribute to BNR
02	**The costs of BNR**	The presentation explains the economic, financial, institutional and social costs; human consequences; implications for the sustainability of water infrastructure.

Scope of the study

While the field evidence is coastal, most of the constraints are generic to BWDB.

The Build, Neglect, Rebuild cycle runs on river embankments and irrigation infrastructure as well as on the coastal polders. The study took the coastal polders as its case. But the findings are generic to BWDB.

The six structural drivers related to BNR were corroborated by institutionally distinct respondents across BWDB, MoWR, ADB, development partners, academia and local actors.

Rationale: Why study coastal polder system?

The system protects more than 20 million people; protection has clear economic value but finance is in short supply

The asset base is one of the largest of its kind anywhere. It carries the coastal delta's flood and salinity protection, and with it the agricultural and aquaculture economy behind the embankments.

Protection has a measurable value. A one percent reduction in flood risk cuts expected annual damages by an estimated USD 1.6 billion.

Concessional finance is narrowing. Bangladesh's graduation from least developed country status, now set for 2029, will reduce access to the concessional capital the sector has relied on.

Rationale: Evidence of BNR

Assets are failing well inside their design life, in the same places, repeatedly.

Cases documented during the field visit

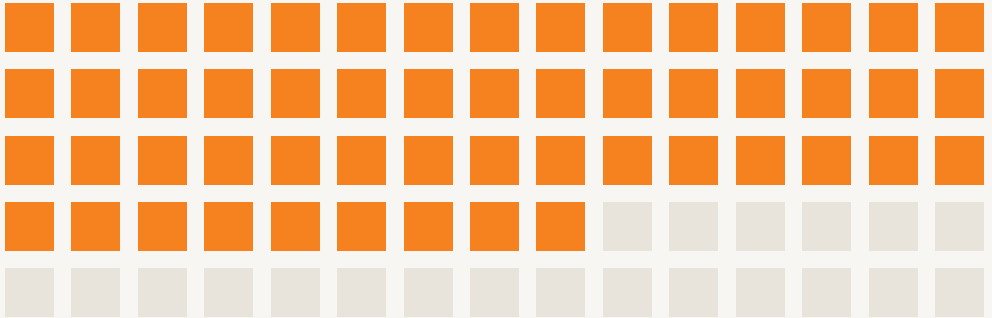
Polder 31, Khulna
Sluice gates operated out of step with the crop calendar.

Dacope upazila, October 2025
Embankment breached for saline aquaculture. Repair was delayed.

Batiaghata upazila
The same section rebuilt four times in fourteen years.

Bishkhali river, Bagerhat, 2023
A BDT 45 crore dredging project re-silting before completion.

Sluice gate condition, Dumuria upazila



54 of 75 gates are not operational

Figure 1 75 gates across 11 rivers in one upazila

What causes BNR?

Applying Systems Approach to Define the Drivers of BNR

Understanding the systems approach

Systems approach helps us to define the root causes of a dysfunction

When an infrastructure is built, it is demanded by an actor and supplied by another actor. The exchange between them happen through support functions and under formal and informal rules.

The users- demand side. The actors needing the service, and the demand they express for it.

The providers- supply side. The actors supplying it, and the terms on which they do.

The supporting services. Financing, market information, technical services and infrastructure.

The rules. Formal regulation and legal standards, and the informal norms alongside them.

The layers of a market system

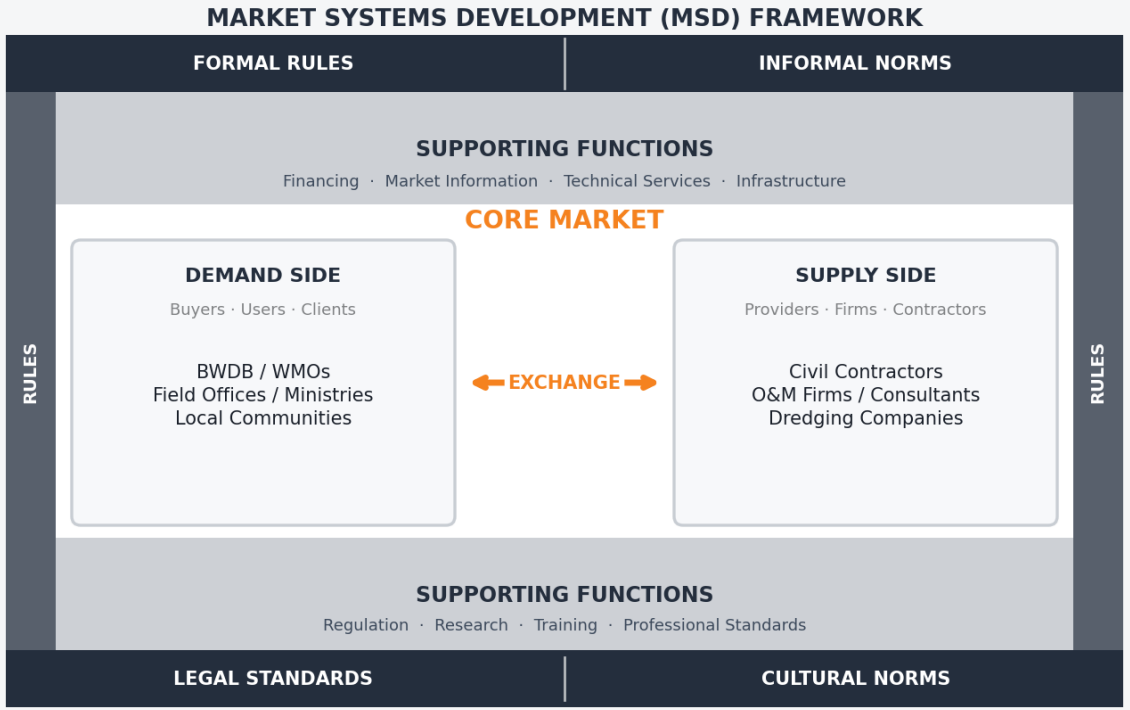


Figure 2 Market systems development framework

What causes BNR?

The Findings

BNR is caused by series of ‘systemic failures’ in four interconnected systems

Part of the system	Demand side	Supply side	Supporting services	Rules
Infrastructure construction	BWDB is judged on projects started and money spent, not on asset life.	Maintenance margins are too thin to sustain a business.	Donor finance is offered for capital works only.	Tenders go to the lowest evaluated responsive bid.
Operation and maintenance	A field office cannot approve a minor repair without central clearance.	Routine maintenance contracts are not commercially viable.	No asset information system feeds maintenance decisions.	No rule obliges BWDB to spend a minimum on maintenance.
Asset management	No one in BWDB is obliged to act on a condition report.	Assets are surveyed only when a project pays for the survey.	Bangladesh has no national register of water assets or condition score.	No rule requires asset condition to inform a budget decision.
Financing	BWDB asks for maintenance funds without evidence of deterioration.	Approval routes exist for construction, not for upkeep.	The budget framework does not ring-fence maintenance money.	Capital and revenue budgets are not coordinated.

Figure 3 Systemic dysfunctions in four interconnected systems

Market interdependency

The failure of one part makes the failure of the next certain.

Financing cannot act without condition data. A maintenance request cannot be substantiated inside the existing approval structures.

Asset management never produces that data. Field-level deterioration is not recorded, not aggregated, and never reaches the decision-makers.

Maintenance therefore activates only in emergency. That is the condition the cycle requires to complete itself.

The findings show that single-point reform will not hold. Reform has to act on all four systems at once.

The four markets and their condition

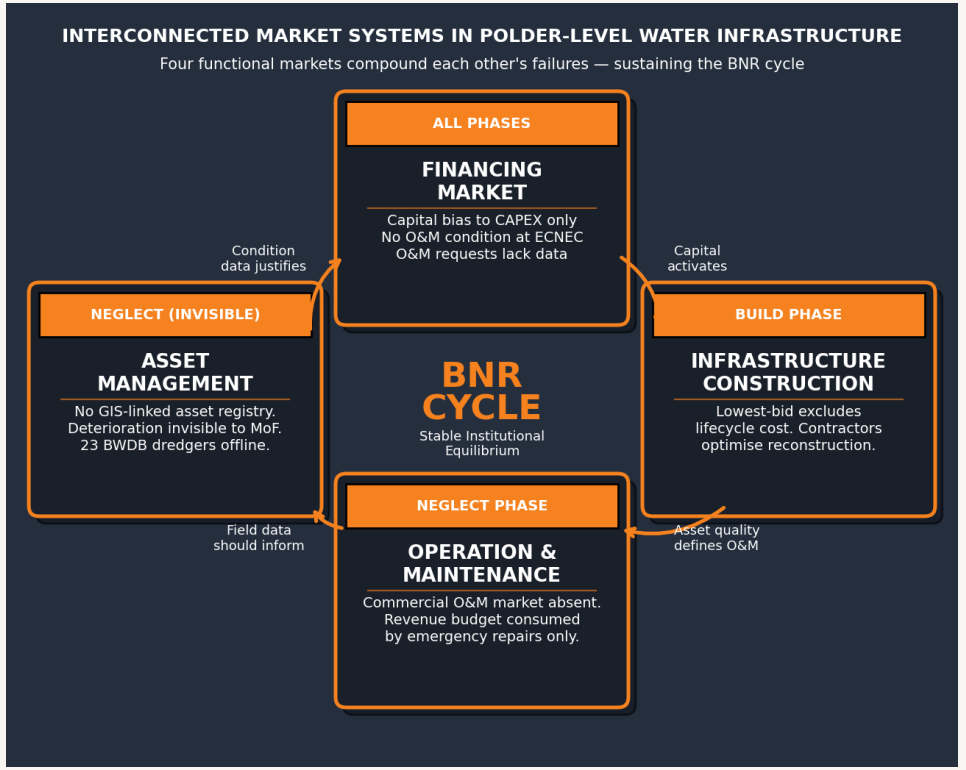


Figure 4 Interconnected market systems

The Build, Neglect, Rebuild cycle

Together the four parts produce a recurring BNR cycle

Build. Capital investment at approval stage, with no maintenance provision attached.

Neglect. The asset operates without maintenance, and deterioration stays administratively invisible until it fails.

Rebuild. An emergency breach triggers donor reconstruction, contractors are rewarded, and the cycle resets unchanged.

Therefore, there is a stable institutional equilibrium behind BNR

Three-phase institutional logic of the cycle

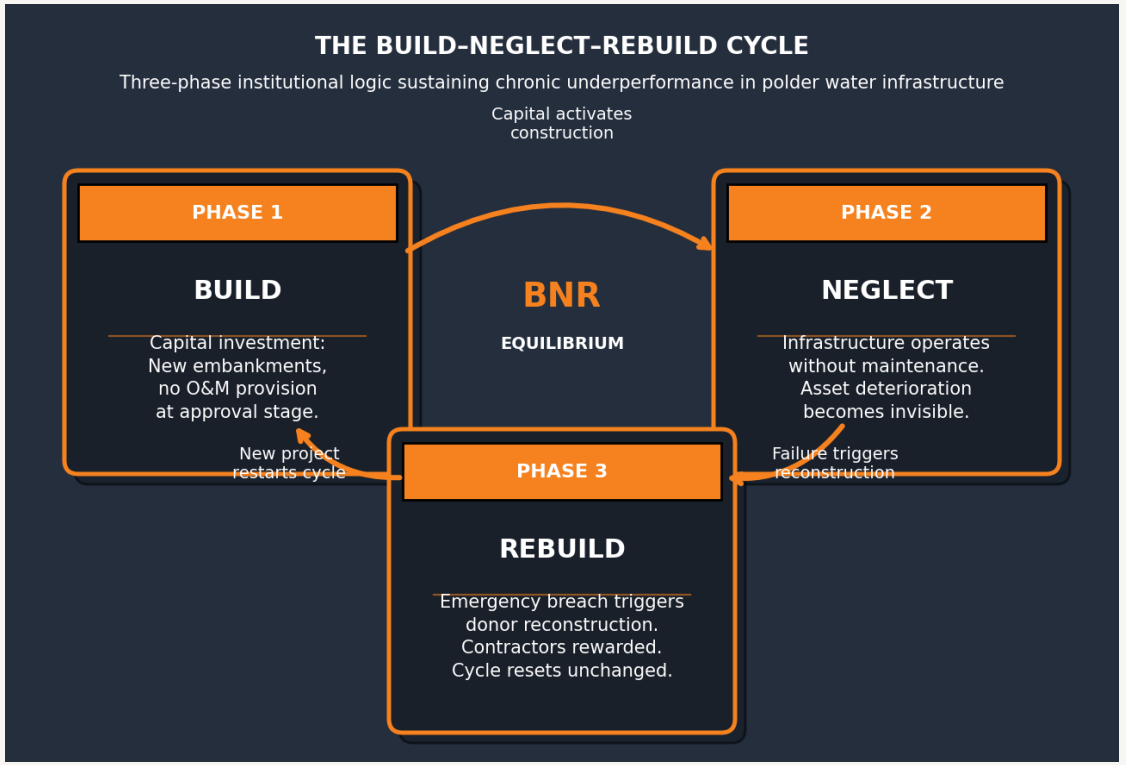


Figure 5 The Build, Neglect, Rebuild cycle

The six structural drivers/ causes of BNR

Six structural drivers hold the BNR cycle and these are the systemic constraints we need to solve

Reform of one driver leaves the other five holding the cycle.

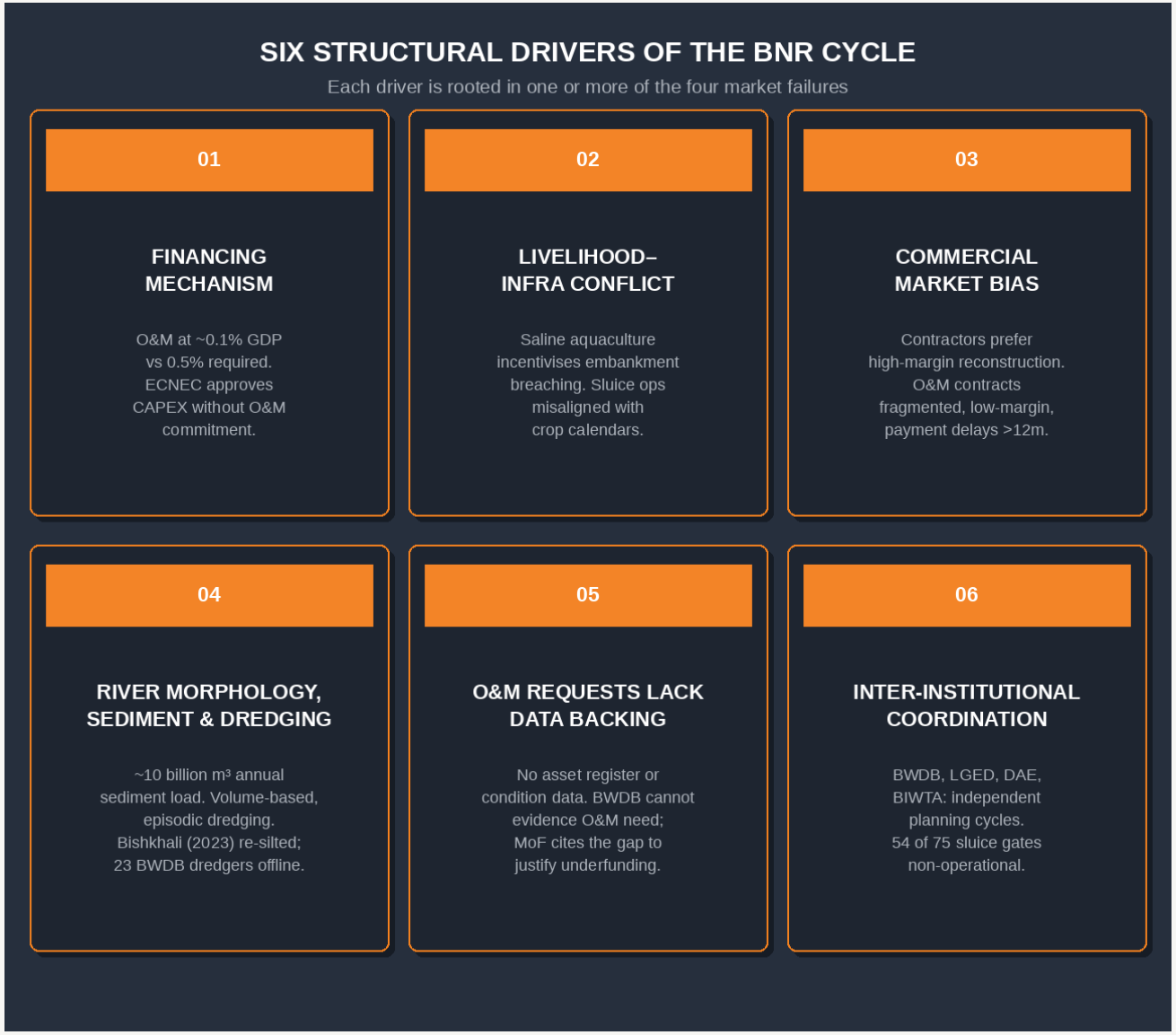


Figure 6 Structural drivers of the BNR cycle

The financing driver

Maintenance runs at a fifth of the Delta Plan target.

The Delta Plan sets the maintenance budget at 0.5% of GDP. Actual allocation stood at 0.1% of GDP at the time the target was set, and there is no current account of the expenditure.

Nine tenths of the allocation goes to emergency repair. Funds are released after catastrophic failure, so the budget behaves as a reward for failure.

No fiscal trigger responds to asset condition decline.



Figure 7 O&M allocation as a share of GDP, against the Delta Plan target

Report, Driver 1, Section 3.3.2

The livelihood driver

Infrastructure operation and local livelihoods pull against each other, and the asset is damaged.

Sluice operation is out of step with the crop calendar. Respondents identified a persistent mismatch between gate operation schedules and the agricultural calendar, so drainage and irrigation both suffer.

Embankments are cut to admit saline water for shrimp. Respondents confirmed that breaches are sometimes created deliberately by local actors for aquaculture.

The farming households behind the embankment lose the crop. Maintenance arrangements stay reactive, so the damage accumulates between repairs.

Where the conflict appears

Sluice operation and the crop calendar
Gate schedules do not match the cropping season.

Embankment cutting for aquaculture
Tildanga Union, Dacope upazila, October 2025. Multiple man-made and storm-driven breaches, with repair delayed.

Rigid structures and waterlogging
Fixed structures worsen drainage congestion where the land has subsided.

Figure 8 Forms of the livelihood and infrastructure conflict

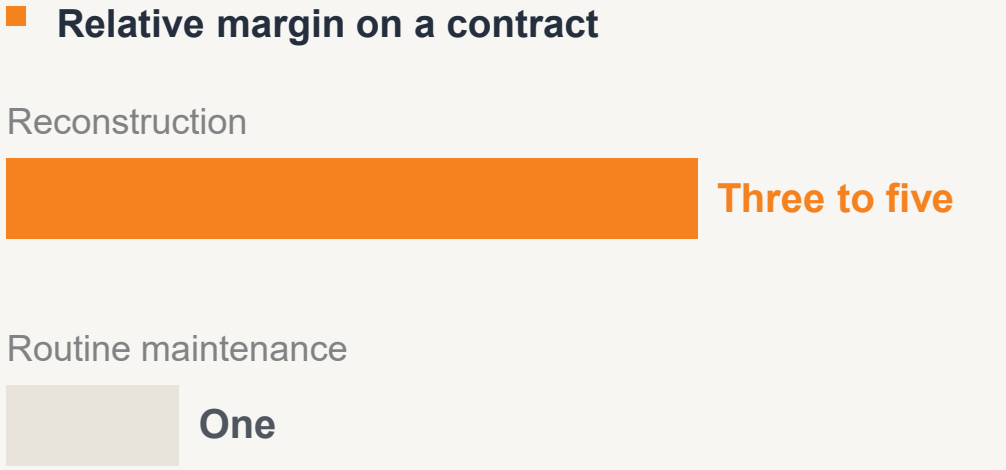
The contracting driver

Contractors earn more from rebuilding than from maintaining, so no maintenance market forms.

Reconstruction carries three to five times the margin of maintenance. It also offers higher contract values and more predictable cash flow, so major contractors prioritise reconstruction packages.

Routine maintenance contracts are fragmented and low margin. Payment delays exceed twelve months, which puts the work beyond the reach of most firms.

Contracts are written around volume rather than outcome. The Bishkhali river dredging project of 2023 re-silted before completion.



Payment on routine maintenance contracts is delayed beyond twelve months.

Figure 9 Margin on reconstruction against routine maintenance

The sedimentation driver

Sediment load exceeds what episodic dredging can hold, and contracts pay for volume not depth.

The rivers carry roughly 10 billion cubic metres of sediment a year. That volume makes project-based, episodic desilting structurally incapable of holding channel capacity.

Dredging contracts are structured around excavation volume. They reward repeated intervention in declining channels rather than durable improvement in hydraulic performance.

The Board depends on outsourced reactive campaigns. Twenty-three BWDB dredgers were non-operational at the time of the assessment.

Bishkhali river dredging project, Bagerhat, 2023

Contract value
BDT 45 crore.

Status past the deadline
25 percent incomplete.

Completed sections
Already re-silting before the project closed.

Sediment load is a natural characteristic of the delta, not a failure of effort.

Figure 10 A dredging project re-silting before completion

The data driver

BWDB cannot evidence the maintenance need, so the need is not funded.

Three records are missing. No asset register linked to location, no standardised condition assessment protocol, and no systematic record of preventive maintenance.

Deterioration therefore stays invisible until failure. The Ministry of Finance has said an asset register is needed before long-term maintenance funding can be committed.

Building the register is paid for from the allocation that the missing register holds down.

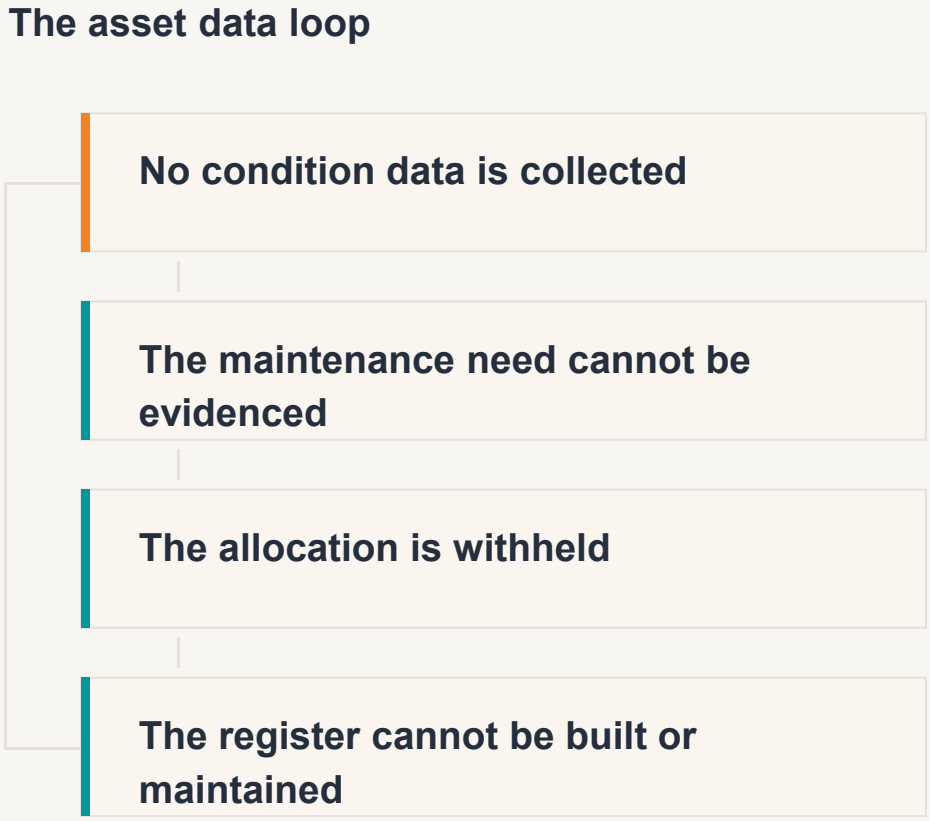


Figure 11 Condition data, allocation and evidence

The coordination driver

No agency is accountable for the cumulative outcome.

Four agencies operate on the same embankments, sluice gates, canals and channels.

Agencies on shared hydraulic infrastructure

BWDB

Embankments, regulators and drainage infrastructure

LGED

Rural roads and local water infrastructure

DAE

Agricultural calendars and irrigation demand

BIWTA

River channels and inland water transport

Figure 12 Mandates of the four operating agencies

Report, Driver 6, Section 3.3.2

Failures concentrate at the boundaries between the mandates. Roads are built on embankment crests without a hydraulic assessment, and sluices are operated out of step with the crop calendar. When either fails, no agency owns the result.

Decisions outside BWDB

BWDB cannot break the cycle alone. Every driver needs a decision taken elsewhere.

BWDB can prepare the evidence and write the contracts. But it cannot decide allocation, crop calendar or the coordination mandate.

The six drivers grouped by the institution that must decide

Ministry of Finance and Ministry of Water Resources Drivers 1 and 5	The size of the maintenance allocation and the evidence standard applied to it. The allocation is ultimately a political choice.
Local communities and local elites, with DAE and LGED Driver 2	Sluice operation aligned to the crop calendar, and the integrity of the embankment against cutting for aquaculture.
Contractors and dredging firms Drivers 3 and 4	Contract design decides whether a maintenance market can form.
LGED, DAE and BIWTA Driver 6	Joint planning and joint approval on shared infrastructure.

Figure 13 Decisions required outside BWDB

Report, Table 6, Section 3.3.2, and Section 4.5

Every actor earns more from reconstruction than from prevention.

Careers advance on large projects and emergency responses. Routine maintenance brings no comparable institutional reward.

Contractors earn more from rebuilding than from maintaining. Financing bodies retain discretion while condition data is absent.

Political visibility follows disaster response. Maintenance completed on time produces nothing to open.

No step in the cycle is irrational for the actor taking the decision. The cycle holds for that reason.

What BNR costs?

What the cycle costs

The largest cost falls on the communities behind the embankments. As they are not the buyers/ procurers of the infrastructure, their loss does not transform to institutional interest to solve BNR.

The fiscal cost

Reconstruction is paid for from capital budgets at full asset cost, repeatedly, in place of maintenance at a fraction of the cost. The pressure rises as Bangladesh approaches LDC graduation in 2029.

The social cost

The losses. Reduced flood protection, disrupted livelihoods, agricultural loss and waterlogging. Prolonged drainage congestion also affects drinking water security and public health.

The people affected. Farmers, water management committees and the households behind the embankments, and citizens as a whole through reduced protection.

The reason they never count. No government budget records them. They are diffuse and unquantified, so they have never competed successfully against a construction proposal.

Summary

Summary

Maintenance stays reactive because the system pays better for failure.

The Context

The assets are failing well inside their design life, repeatedly, in the same places. The coastal polder system protects more than 20 million people, and the concessional finance behind it is narrowing.

The systemic dysfunction

Neither weak engineering nor an insufficient budget explains the recurrence. A market systems analysis places the constraint in a named layer rather than in one organisation.

The systemic constraints and the drivers of BNR

Four parts of the system fail together, and six structural drivers hold the result in place. None of the six sits inside BWDB alone, and the largest cost falls where no government budget records it.

Report, Chapters 1, 2 and 3