

Resilience challenge

The resilience challenge is to facilitate the systematic integration of roads development for improved **flood resilience** and internal polder water management in the Coastal Bangladesh (Polders 26, 32, 43 2F and Khajuria, LGED, see Figure 1).

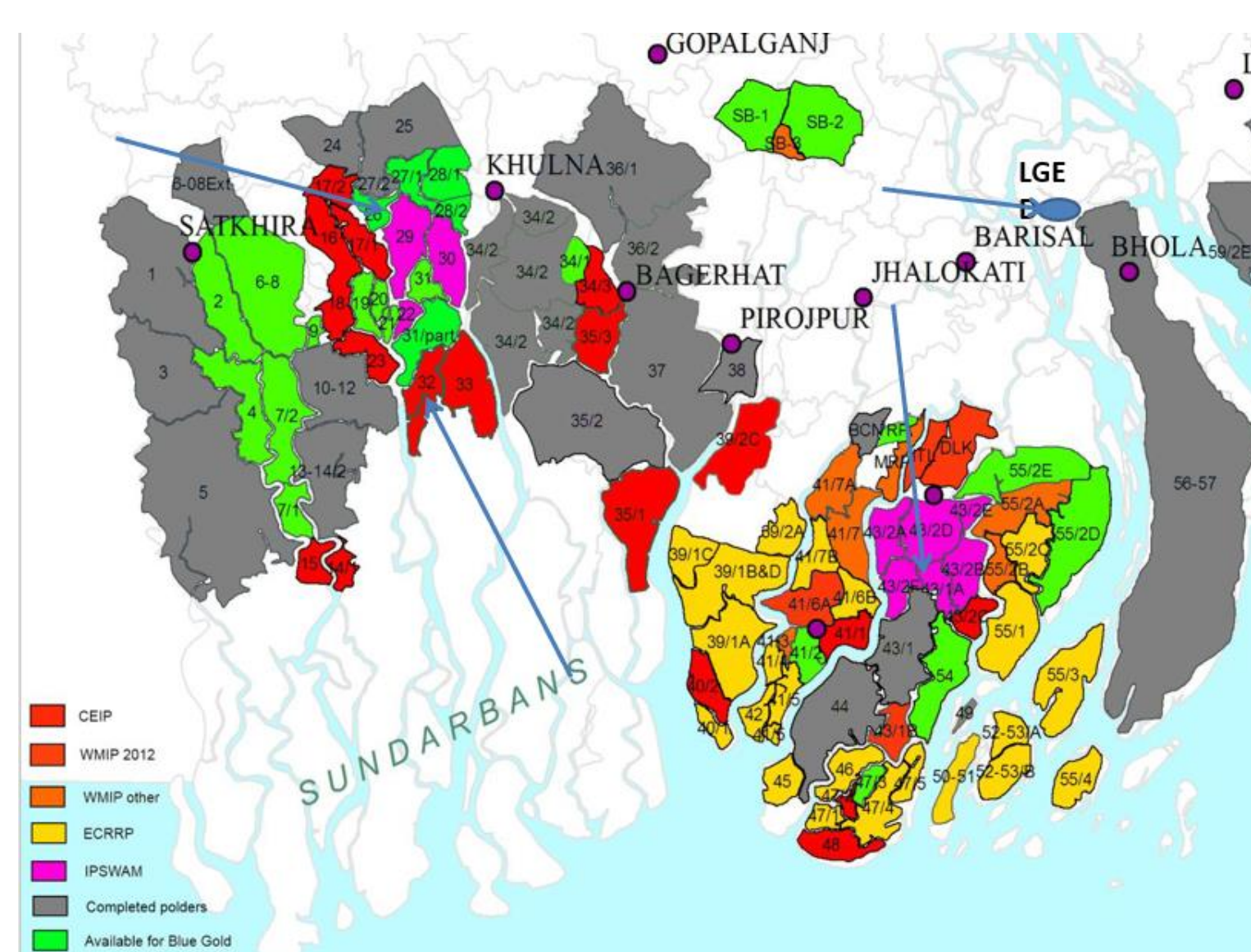


Figure 1. Location of the coastal polders, Bangladesh

Introduction

There is a strong connection between roads, water management, and flood protection in the polders of Coastal Bangladesh:

- Internal roads, bridges and culverts change and disrupt the natural drainage flows and khal connectivity, resulting in waterlogging
- many embankments double up as roads and flood shelters

The main issues local communities are facing is waterlogging due to drainage congestion, damaged water infrastructure, inaccessible roads, and embankment breaching (same Figures 2-7). Moreover, farmers are also facing water scarcity due to inadequate size cross drainage structures to control water levels.



Figure 2. Waterlogging



Figure 3. Drainage congestion



Figure 4. Damaged infrastructure



Figure 5. Silted sluices



Figure 6. Inaccessible roads



Figure 7. Embankment breaching

Methodology

The methodology used is the following:

- The fieldwork comprised of physical and household surveys of the state of road-water infrastructure (internal roads, embankment sections, culverts, bridges, sluice gates, inlets and outlets),
- Hydrological modelling for improved drainage in Polder 26
- Stakeholders engagement through focus group discussions, individual interviews with relevant design and planning engineers and consultative group meeting with relevant engineers from LGED, BWDB, WARPO and DDM.

Key highlights

Outputs:

A comprehensive document of recommended good practices (RGP) document is developed and validated based on the road-water assessment. If roads are used as instruments for polder water management, three main opportunities arise:

- 1) roads can improve water management inside the polders controlling water (figure 8) and create storage (figure 9) within the polders;



Figure 8. Internal roads



Figure 9. Gated culverts

- 2) roads and embankments act as flood defense;



Figure 10. Road embankment as flood defense

- 3) roads can be used as evacuation routes and temporary flood shelters.



Figure 11. Temporary shelter for people, goods and cattle

The accomplishment of these opportunities will strengthen governance and coordination among road (LGED, LGIs, and DDM) and water agencies (BWDB and WARPO).

Key highlights cont....

Outcomes:

- Reduction of water logging with improved drainage using gated culverts using hydrological modelling (figure 12).

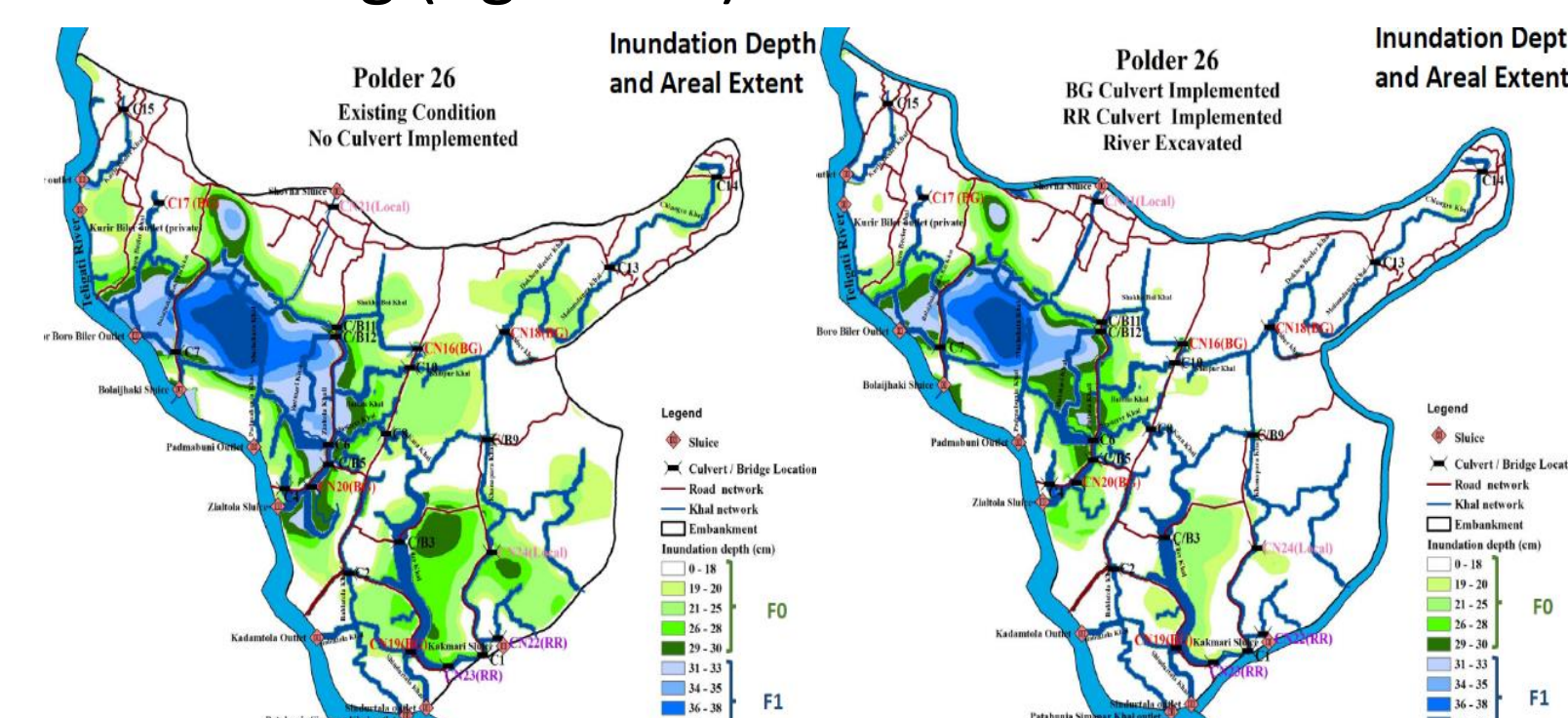


Figure 12. Drainage conditions in Polder 26 with and without 7 gated culverts

- Improved water retention in higher elevated lands for irrigation during the dry season.
- Possibility for multi-cropping with a significant increase agriculture productivity (3 times more) and farmers' income.



Figure 13. Increase in crop production

- Direct benefited people by improved water infrastructure will be a total of 15.175 in Polder 26. Thus, if this approach is extended to all Blue Gold polders will benefit 6 million people.
- 'Polder Development Plan' as a case study for Polder 26. If this plan is replicated to all coastal polders will benefit 8 million people.

Conclusions

- Decrease waterlogging and improve water drainage infrastructure.
- Available water for irrigation during dry season and more free land for agriculture
- Increase in crop yield leading to a more income.
- Better roads and transportation between villages and local markets.
- Overall improved livelihood conditions of rural communities.

Way forward

The 'Polder Development Plan' as a case study for Polder 26 is being developed by BUET and would be handed over to BWDB for replication. Water management and future internal road development (both alignment and design) would be done by considering hydrology, land use and socio-economic issues and vetted by the local stakeholders (WMG, UP, livelihood groups etc.). For road development, the local Upazila administration would follow the polder plan.

Contact

Frank van Steenbergen, fvasteenbergen@metameta.nl
MetaMeta <http://metameta.nl/>; <http://roadsforwater.org/>
Abul Fazal M. Saleh (BUET), saleh@iwfm.buet.ac.bd

Anisul Haque, anisul.buet@gmail.com
Rowshan Mamtaz, mamtaz@ce.buet.ac.bd
Flavia Simona Cosoveanu, flavia.cosoveanu@gmail.com

GRP and Z Zurich Learning and Sharing
Workshop: Lessons for a Flood Resilient Future
10-11th October 2018, Kathmandu, Nepal