



# Living Polders

## Dynamic Polder Management for Sustainable Livelihoods, Applied to Bangladesh

### Why Living Polders?

Deltas worldwide are under pressure due to land subsidence and sea level rise- the threats which make the Deltas vulnerable to flooding. The impact of these natural calamities is exacerbated by population growth and urbanization. These stresses affect institutional requirements for delta systems. The nature of these problems varies across deltas.

**Polders** can mitigate these threats by offering flood protection and increased food production. In Bangladesh, polders increased agricultural yields, but at the delta level, they affected rivers' drainage capacity and sedimentation, whereas, they caused land subsidence, waterlogging and salinity intrusion at the polder level.

After the devastating consequences of polders, **Tidal River Management (TRM)** has been experimented to solve the water logging issue. However, its full potential has not yet been reached due to fundamental knowledge gaps regarding physical and institutional boundary conditions. The **"Living Polders"** project was funded by NWO, Netherlands Organization for Scientific Research, aiming to bridge the gaps through physical modeling and designing governance approaches.

### Project Objectives

- i) Developing a decision support model for governing the 'living polders' by raising land through establishing cyclic polder re-sedimentation and changing food production schemes.
- ii) Understanding the institutional boundary conditions for developing a viable business model for optimizing institutional arrangements for deploying 'Living Polders' with sustainable livelihood opportunities.

### Main Research Questions

- How should inflow points into a polder and gate operation be designed for maximum sediment deposition – from river-dominated to tidal area?
- How much time is needed for sufficient sediment deposition inside a polder?
- To what extent does polder sedimentation reduce silting up of main channels?
- How productive is the land after suspended matter has settled on it?
- Which nutrients and contaminants accumulate with the sediment: is it fertile or toxic?
- How can TRM be applied with at the same time improving agricultural productivity?
- Is the agricultural yield sufficient for sustainable livelihood?

### Project Funding



Netherlands Organization for Scientific Research

### Project Consortium

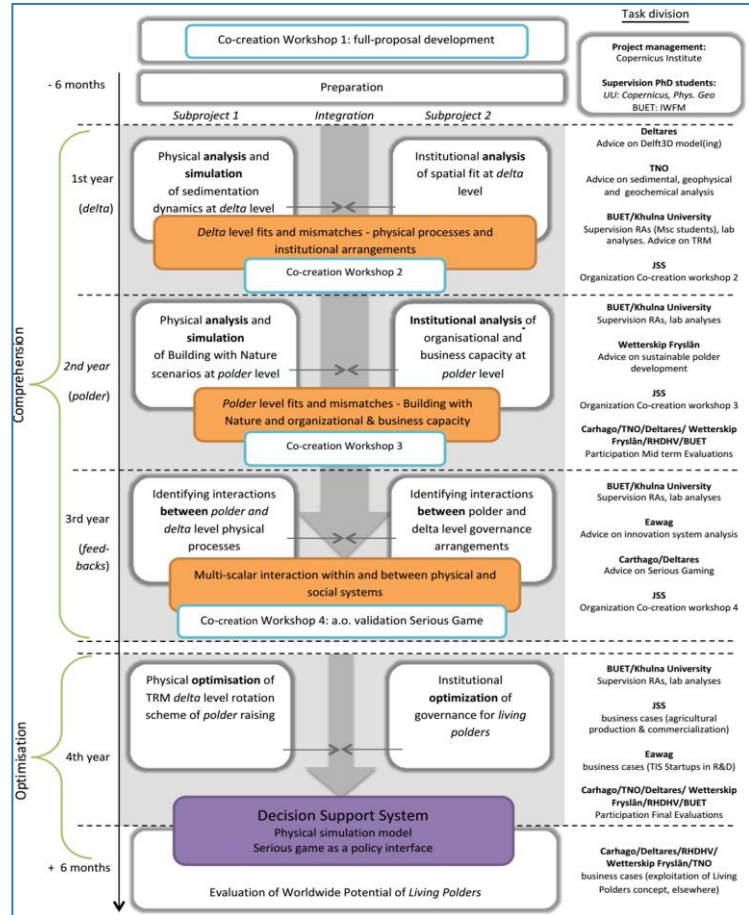


Institute of Water and Flood Management (IWFM)  
Bangladesh University of Engineering and Technology (BUET)



## Expected Outcomes

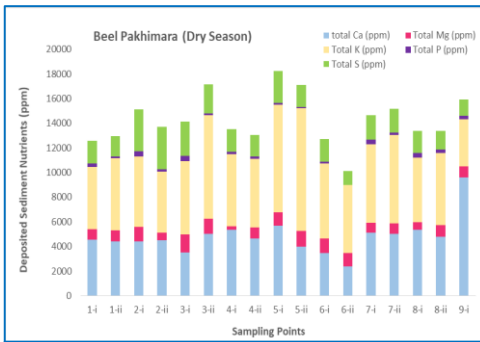
- **Research products** will lead to:
  - Design of spatial-temporal rotation schemes in planning efforts;
  - Alignment of local and regional governance arrangement with delta- and polder level physical interactions;
  - Participatory decision making, using the DSS, that will lead to legitimate proposals, raised awareness, and empowerment.
- **Communication & stakeholder engagement**
  - Co-creation workshops will lead to better research and higher awareness;
  - Briefs and website will increase the likelihood that the Living Polders concept will get taken-up, in BD and elsewhere.
- **Capacity building and knowledge sharing** output will lead to:
  - Continued use of the DSS in delta and polder planning;
  - Future leaders in delta management (PhDs, MScs, in BD and elsewhere).
- **Monitoring & evaluation** is aimed at improving the project's policy engagement processes to influence change improved.



## Project Activities



Credit: Nazim Uddin Rahi



Credit: Nureza Hafiz

In this project, 1 Post-Doc Fellow (UU), 1 PhD Fellow (UU), and 2 research assistants (MSc. Students in IWFM, BUET) are currently engaged.

- Post Doctoral Fellow (Dr. Sanchayan Nath) is working on socio-hydrological system and polder governance.
- PhD Fellow (Md. Feroz Islam) is designing hydro-morphological models at polder and delta scale.
- MSc. Student-1 (Nazim Uddin Rahi) is assessing the sediment dynamics and management system of a coastal polder.
- MSc. Student-2 (Nureza Hafiz) is working on the assessment of the nutrient content of water and deposited sediment.



Credit: Nazim Uddin Rahi



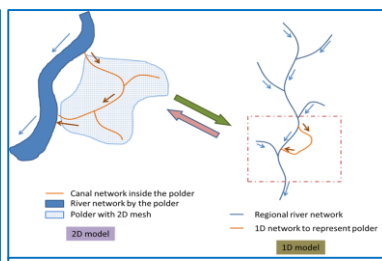
Credit: Nureza Hafiz

## Project Innovation and Practical Values

- Both the natural and human dimensions are considered to devise a successful strategy for sustainable livelihoods;
- The interdependency of local (polder) scale processes and regional (delta) scale processes is considered;
- A Decision Support System will provide stakeholders with the joint design of scenarios and policies for sustainable development of delta communities;
- Provide prospects of a worldwide potential of Living Polders.



Credit: Nureza Hafiz



Credit: Md. Feroz Islam



Credit: Nureza Hafiz

## BUET Research Team

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