10 Coastal Infrastructure

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Briefing Materials

The following materials illustrate concepts, interventions, outcomes and lessons learnt, including through stories from community members.

Thematic brochures

• Improved water distribution and drainage through rehabilitation of water management infrastructure

Videos

• PWM: an integrated approach - animation (Bangla with English subtitles)

The coastal zone in Bangladesh has a complex agro-ecology, with low lying land and huge tidal rivers. To provide protection to agricultural land from tidal and monsoonal flooding and saline water intrusion, around 1.2 million hectares are now enclosed in 139 polders, whose construction started from the 1960s and 1970s. Now, the polders are home to about ten million people.

The tidal rivers draining the coastal zone carry flood flows during the monsoon season but are highly saline during the dry season when outflows in the tidal rivers are at their lowest. The rivers cause greatest damage to polder infrastructure during times of flood and cyclonic storms – compounded during high water spring tides - when the erosive power of the rivers can damage and even breach the polder embankments. The consequence of a breach can have enormous social and economic impact, resulting in loss of life in severe cases; immediate loss of economic production - crops, fish, livestock, and businesses; damage to infrastructure – roads, utilities, homes, shops, schools; and longer term impacts on the productivity of agricultural lands. These problems will be increasingly exacerbated by climate change and sea-level rise over time.

During the monsoon, polder farmers are keen to capture and store the non-saline floodwaters in the khals or drainage channels. For this purpose, the new regulators constructed under Blue Gold are provided with a lifting frame (also known as ‘goal posts’) with a pulley and chain so that the flap gates on the river-side of the regulators can be lifted at high tide to admit freshwater (within BWDB these regulators are known as ‘flushing sluices’).

This chapter provides background to the development of infrastructure in the coastal zone as a result of Dutch/Bangladesh cooperation.

Background to Dutch-Bangladesh cooperation in the coastal region[Notes 1][edit | edit source]

During the 1950s and 1960s, two Dutch water engineers contributed to the mitigation of the impact of flooding in Bangladesh: Professor J.Th. Thijsse and Professor Willem Johan van Blommestein.

From 1951 to 1959, the Dutch water engineer, Professor Willem Johan van Blommestein, was posted to East Pakistan (now Bangladesh) by the Food and Agriculture Organisation (FAO). During this time, he prepared a series of plans to protect the country from storms, cyclones and floods: including a plan for the Brahmaputra-Ganges delta which consisted of a moveable weir in the Brahmaputra with horizontal hydropower turbines, a channel between the Brahmaputra and Ganges, sea dykes with weirs and locks, pumping stations, polders and large-scale irrigation systems.

Research by Professor J.Th. Thijsse from Delft resulted in "Report on hydrology of East Pakistan" (published in 1964) which concluded that the regulation of large and unstable rivers with massive discharges, such as the Ganges and the Brahmaputra, was impossible. The Thijsse report advised the government against the construction of embankments alongside these rivers before adequate knowledge had been gathered. A main concern was that sedimentation between embankments would lead to the rising of river-beds and flood levels, but he was also apprehensive about the potentially catastrophic consequences of embankment failure, given the deceptive sense of security felt by those living inside the 'protected' areas.

After the large-scale flooding of Bangladesh in 1954/55, a United Nations' mission (the Krug Mission) mobilised in 1956-1957 to advise the government about water and flood dynamics in East Pakistan. The Krug Mission Report of 1957 recommended *Inter alia the* setting up of a Department of Waterways (modelled after Rijkswaterstaat: the Dutch agency for public works and water management) – which resulted in the establishment of the East Pakistan Water and Power Development Authority (EPWAPDA).[Notes 2]

In December 1964, a Master Plan prepared by EPWAPDA, assisted by the International Engineering Company (IECO) of San Francisco, California USA, recommended large-scale flood control, drainage and irrigation projects.

Starting from the early-1960s, many polders and embankments were constructed in coastal areas, to protect coastal communities from salinity intrusion, daily tidal movement and occasional surges, and to support the population engaged in farming and aquaculture activities. The Coastal Embankment Project (CEP) was the first comprehensive plan for providing protection against flood and saline water intrusion in the coastal area. CEP constructed more than 4,000 km of embankment and 1,039 drainage sluices in fourteen coastal Districts between 1961 and 1978 in two phases: Phase I included 92 polders and provided protection to one million ha of land; and Phase II consisted of 16 polders covering another 0.40 million ha.

Throughout the 1970s, Dutch-Bangladesh cooperation focused on transport, water management and industry, reflecting the need to reboot the economy of a war-ravaged country. In 1972, an agreement was signed between the Netherlands and Bangladesh to carry out dredging activities in Bangladesh. The Early Implementation Project (EIP 1975-1997) introduced people's participation into the project development cycles through sub-project identification, feasibility, planning, design and implementation.

The construction of two cross-dams over branches of the river Meghna on the coast of the Noakhali District during 1957 and 1963 showed the positive potential of settling accreted land. During 1976,

encouraged by the tremendous accretion, the Government of Bangladesh requested the Netherlands Government for technical assistance in land reclamation. Based on the Identification Mission Report, the Land Reclamation Project (LRP) began to function in late 1977 and continued to 1991.

Building on the earlier success of the Early Implementation Project (EIP), the Netherlands supported the participatory water management (PWM) approach and, with IFAD, jointly funded the Local Government Engineering Department's (LGED) Small-Scale Project Water Resources Management Project (<1,000ha) from 1996 to 2002. SSWRMP successfully demonstrated people's active participation in taking responsibility for operation (100%) and routine maintenance of small-scale water infrastructure works.

Based on the positive outcome of the Land Reclamation Project (LRP), the Char Development and Settlement Project[6] (CDSP 1994-2022) was designed to facilitate settlement of government *(khash)* lands by the landless in Noakhali District; integrated development of reclaimed *(khash)* lands settled by the landless, including the construction of climate resilient infrastructure; poverty alleviation through livelihood improvement for the new land *(char)* dwellers; and a contribution to the accumulation and dissemination of data and knowledge on the coastal areas, including Integrated Coastal Zone Management (ICZM). In order to address all these aspects, a multi-sectoral and multi-institutional approach was employed.

Integrated Planning for Sustainable Water Management (IPSWAM 2002-2011) led to the rehabilitation of nine polders in the coastal zone and improved the lives of many thousands. The Guidelines on Participatory Water Management (GPWM) was published in in April 2001, bringing together and harmonising a number of project-level approaches. IPSWAM was the first project to adopt GPWM and put the principles into practice. Between 2006 and 2015 a renewed, a more practical and sustainable model of participatory water management was implemented with Dutch support through the South West Area Integrated Water Resources Planning and Management Project (SWAIWRPMP 2006-2022). The Blue Gold Program (2013-2021) was then designed on the back of this cumulative experience to empower rural communities to be the driving force for change.

Notes[edit | edit source]

1. ↑ This section supplements the discussion under 'Previous History' in Section A Chapter 4
2. ↑ The present Bangladesh Water Development Board was established in 1972 under presidential order no. 59 of 1972, when the former EPWAPDA was split into two organisations: BWDB dealing with water and the Power Development Board (PDB) dealing with power.

See more[edit | edit source]

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Section C: Water Infrastructure

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A defined set of temporary activities through which facilitators seek to effect change

river whose flow and level are influenced by tides

An area of low-lying land surrounded by an earthen embankment to prevent flooding by river or seawater, with associated structures which are provided to either drain excess rainwater within the polder or to admit freshwater to be stored in a khal for subsequent use for irrigation.

Bangladesh Water Development Board, government agency which is responsible for surface water and groundwater management in Bangladesh, and lead implementing agency for the Blue Gold Program

The practice of admitting (fresh or saline) water for irrigation (or shrimp production) through regulators or inlets.

Food and Agriculture Organization

Sedimentation is the process by which fine particles of silt and clay suspended in river water settle out, for example when there is a drop in velocity.

Earthen dyke or bundh raised above surrounding ground level, for example so that roads or railway lines are above highest flood levels, or so that an area is empoldered to protect it from external floods and saline waters.

human intervention in the capture, conveyance, utilisation and drainage of surface and/or ground water in a certain area: a process of social interaction between stakeholders around the issue of water control.

East Pakistan Water and Power Development Authority

hectare

A process through which stakeholders influence and share control over development initiatives and the decisions and resources which affect them.

Early Implementation Project

A process by which the local stakeholders are directly and actively involved in identification, planning, design, implementation, operation & maintenance and evaluation of a water management project.

A process by which the local stakeholders are directly and actively involved in identification, planning, design, implementation, operation & maintenance and evaluation of a water management project.

Local Government Engineering Department

the adjustment of gates in water management infrastructure to control hydraulic conditions (water levels and discharges) in a water management system.

actions taken to prevent or repair the deterioration of water management infrastructure and to keep the physical components of a water management system in such a state that they can serve their intended function.

Land Reclamation Project

Char Development and Settlement Project

assumed in this report to operate up to 0.5 acres (0.2 ha)

accreted sediment in a river course or estuary, including both lateral (point-bars) and medial (braid-bars). Chars (or sand bars) emerge as islands within the river channel (island chars) or as attached land to the riverbanks (attached chars), create new opportunities for temporary settlements and agriculture.

Integrated Coastal Zone Management (ICZM) - Assistance to the Programme Development Office of the Integrated Coastal Zone Management Programme (PDO-ICZM)

Integrated Planning for Sustainable Water Management

Guidelines for Participatory Water Management

Namespaces

- Page
- Discussion

Variants

Blue Gold Program Wiki

The wiki version of the Lessons Learnt Report of the Blue Gold program, documents the experiences of a technical assistance (TA) team working in a development project implemented by the Bangladesh Water Development Board (BWDB) and the Department of Agricultural Extension (DAE) over an eight+ year period from March 2013 to December 2021. The wiki lessons learnt report (LLR) is intended to complement the BWDB and DAE project completion reports (PCRs), with the aim of recording lessons learnt for use in the design and implementation of future interventions in the coastal zone.