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Case Study – Erosion Damage Blue Gold Program

Water Management for Development

Bangladesh Water Development Board
Department for Agricultural Extension
Embassy of the Kingdom of the Netherlands



24 April 2017

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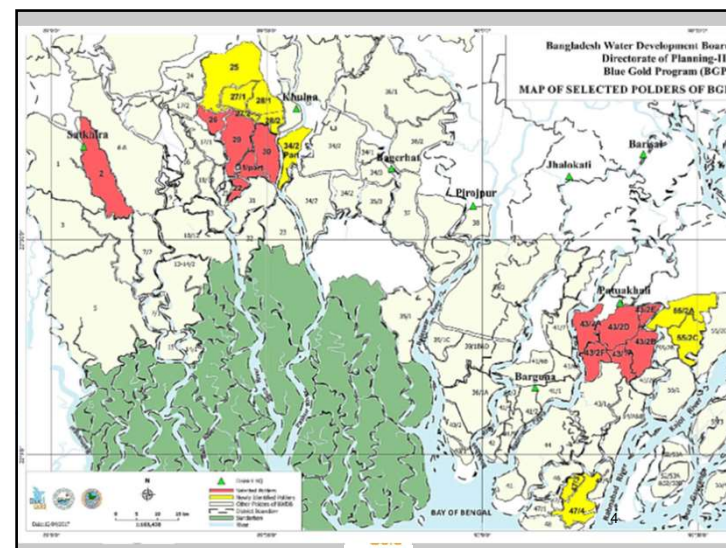
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Overview

1. Erosion Threats - Blue Gold Polders
2. Case study – Chadghar, Polder 29
 - Timeline and recent interventions
 - Pre-emptive emergency measures

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Erosion Reaches: Patuakhali/Kalapara

Erosion Reaches: Khulna

The map displays the Khulna region with various reaches and erosion points. The reaches are color-coded: pink for the northern and eastern parts, green for the central and southern parts, and light blue for the river areas. The erosion points are marked with red dots. The map includes a north arrow and a scale bar.

EROSION OVERVIEW MAP OF KHULNA REGION

Key locations and reaches shown on the map include:

- Reaches:** 25, 27/1, 28/1, 27/2, 26, 29, 30, 31(part), 22, 23, 34/2 Part, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
- Erosion Points:** Khornia, Chait Ziafata, Baro Aria, Bigordana, Durgapur, Koshorabad, Kallinagar, Darumullik, Kuchubunia, Sajubunia, Shialdanga, Baranpara.
- Other Features:** Khulna HQ, Khulna River, Khulna Canal, Khulna Barrage, Khulna Bridge, Khulna Port, Khulna Airport, Khulna Railway Station, Khulna Bus Station, Khulna Market, Khulna Hospital, Khulna Police Station, Khulna Fire Station, Khulna Post Office, Khulna Telephone Office, Khulna Electricity Office, Khulna Water Supply Office, Khulna Sewerage Office, Khulna Waste Management Office, Khulna Urban Development Office, Khulna Planning Office, Khulna Research Office, Khulna Training Center, Khulna Library, Khulna Museum, Khulna Art Gallery, Khulna Theatre, Khulna Cinema, Khulna Sports Ground, Khulna Park, Khulna Garden, Khulna Pond, Khulna Lake, Khulna Reservoir, Khulna Dam, Khulna Barrage, Khulna Bridge, Khulna Port, Khulna Airport, Khulna Railway Station, Khulna Bus Station, Khulna Market, Khulna Hospital, Khulna Police Station, Khulna Fire Station, Khulna Post Office, Khulna Telephone Office, Khulna Electricity Office, Khulna Water Supply Office, Khulna Sewerage Office, Khulna Waste Management Office, Khulna Urban Development Office, Khulna Planning Office, Khulna Research Office, Khulna Training Center, Khulna Library, Khulna Museum, Khulna Art Gallery, Khulna Theatre, Khulna Cinema, Khulna Sports Ground, Khulna Park, Khulna Garden, Khulna Pond, Khulna Lake, Khulna Reservoir, Khulna Dam.

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Erosion Reaches - Satkhira

The map, titled "EROSION OVERVIEW MAP OF SATKHIRA REGION", shows a green-shaded area representing Polder 2. A red triangle marks "Satkhira HQ" at the northern tip. Three red circles, labeled "Erosion Point", are located along the eastern coastline. From north to south, these points are near "Sudhata", "Chapra", and "Chapra". The "Sagar River" is shown flowing along the eastern side of the polder, and the "Satkhira River" is shown at the southern tip. A north arrow is located in the lower-left quadrant. A legend at the bottom left indicates that a red circle represents an "Erosion Point". The number "7" is in the bottom right corner.

Polder 34/2, Khulna – 29 March 2017



The photograph shows a coastal area with several palm trees leaning over a body of water. The ground is sandy and eroded, and the water is murky brown. The sky is overcast.



Case Study - Polder 29

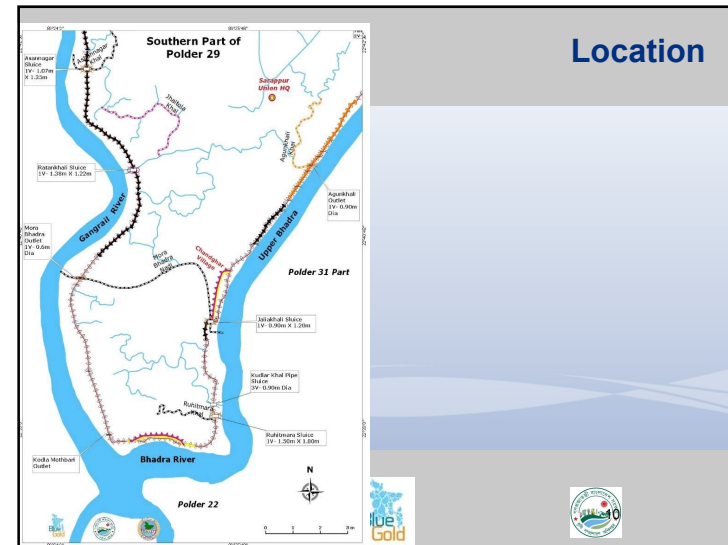
1. Location
2. Riverbank alignments

Recent Interventions

1. Timeline and recent interventions
2. Pre-emptive emergency measures
3. Conclusions/observations and questions

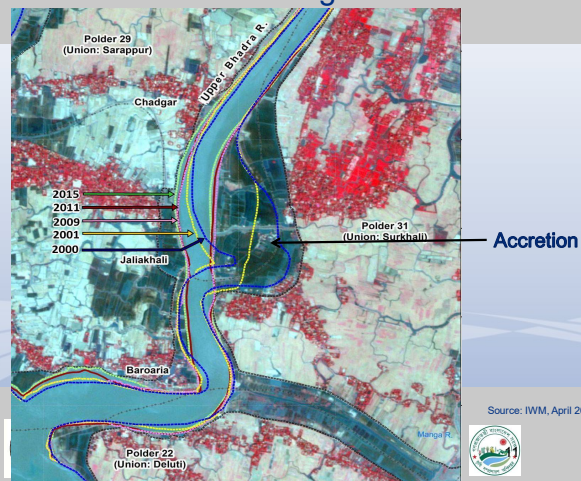
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Location



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Riverbank Alignments 2000-2015



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Recent Timeline 2014



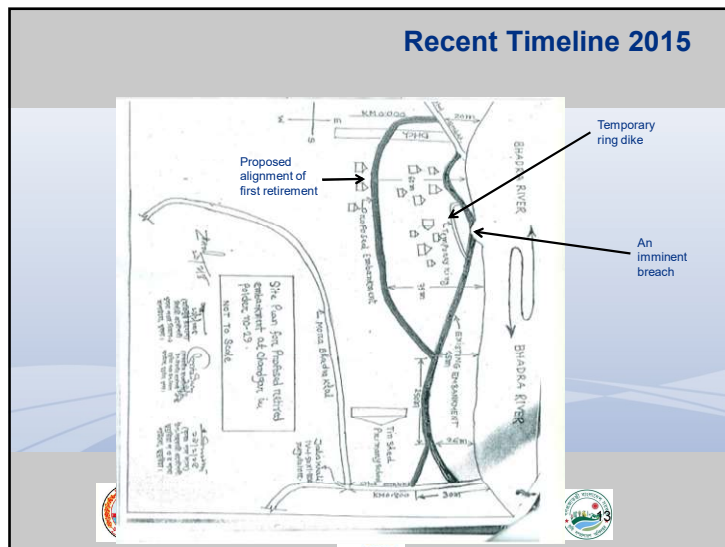
2014 Dry Season

- BWDB held meetings with WMGs, WMA and the UPs and proposed a retired embankment at a set-back distance of around 100m.
- The community objected because further land and homesteads would be put at risk

2014 Monsoon

- Embankment approached collapse

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31 July 2015 - Cyclone Komen

- On 30 July 2015 a depression developed in the bay of Bengal, which developed as “Cyclone Komen”, crossing the coastline on 31 July 2015.
- The original embankment breached and developed 3 deep channels across the line of the embankment.
- A large portion of BCG (Britti-Birala-Chandghar-Jaliakhali) and Akra Bahir Akra WMG areas was flooded. According to preliminary reports, 18 villages were affected, 1286 households more or less affected, 404 houses (mud/thatched) fully damaged and 325 houses partially damaged.



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2 August 2015



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Emergency Measures – 6 August 2015

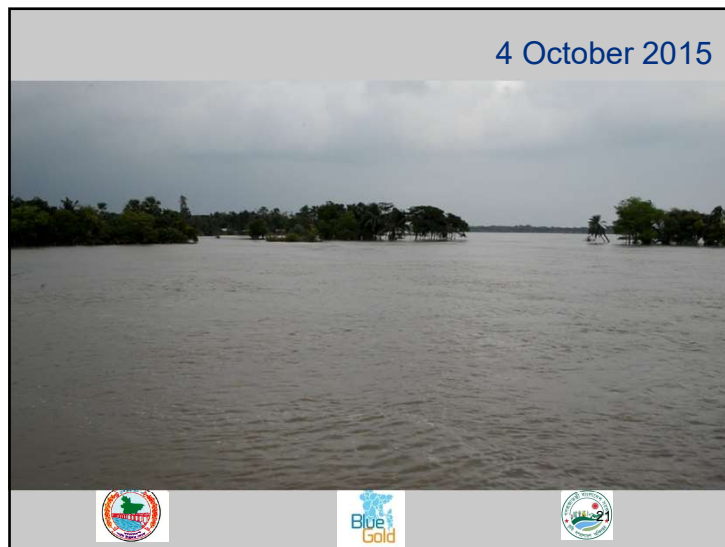


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Emergency Measures – 9 August 2015



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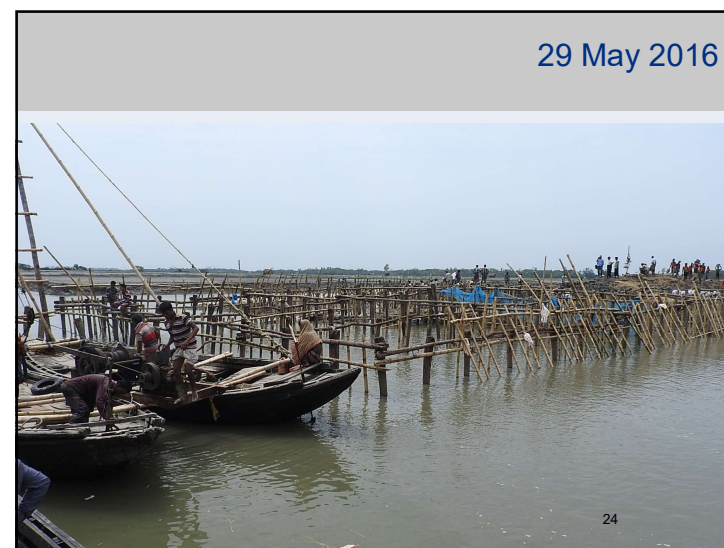
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June 2016

Contractor closes breaches 1 and 2 in early-June but was struggling with breach-3 which was closed on 13 June but failed the next day – and was finally closed on 28 June 2016.

Breach-3: Closed on 13 June



Breach-3: Failed on 14 June



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Monsoon 2016/Dry Season 2017

The embankment withstood monsoon 2016

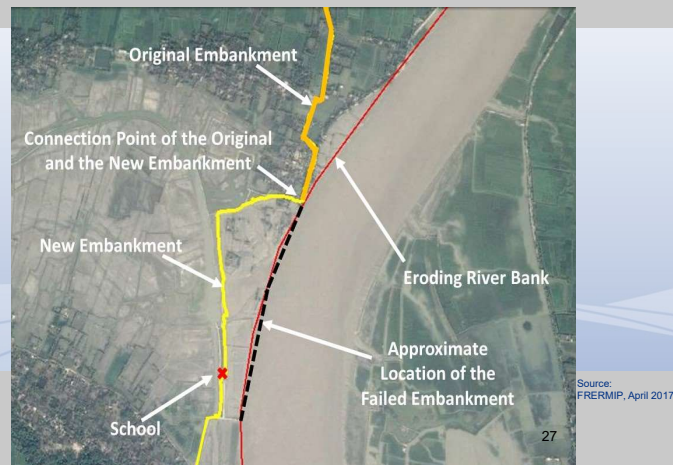
In Dry Season 2017, contractor is making slow progress

- Current progress is around 50%.
- Embankment and the breach closures need to be strengthened to full section
- Land acquisition is required for a length of around 100m of the proposed embankment
- Primary school needs to be relocated



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Present Situation (April 2017)



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Proposed Pre-Emptive Works



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Case Study Conclusions

- There was every effort to do the right thing
- A considerable investment has been made in repairing the infrastructure
- A significant economic impact on infrastructure and livelihoods
- The uncertainty for the local community has continued for the last 3 or 4 years
- There is a need to act quickly to finalise the current contract and take additional measures to prevent a breach



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Observations and Questions

- Pre-emptive action saves money
- Provision of technical and UP support to field XEN in presenting his preferred solution to those affected by his decisions
- Incentives for contractors to complete and to take responsibility for ensuring the integrity of the embankment over (say) two flood seasons
- Flexible funding arrangements
- Role of BWDB, UP and polder-level WMA in determining priorities



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Longer-Term Measures 1

IWM Study

- Blue Gold awarded a contract to IWM in February 2015 for the study of "River Bank Erosion Management in Polder 29, Khulna" to identify causes of erosion and develop a comprehensive and innovative adaptive approach for mitigating erosion
- IWM submitted their report in April 2016, recommending series of top-blocked semi-permeable spurs with wooden bullahs and sand filled geo-bags in the scour hole as erosion protection measure.



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Longer-Term Measures 2

BWDB Design

- Design Circle-5 of BWDB, advised by a design review committee, reviewed the IWM design and finalized it in October 2016 (to be presented by Md Mutaheer Hossain)
- Tender documents have been prepared



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