Bangladesh Learning Route of LDAI: Phase-I

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Structure Of The Presentation

- BANGLADESH IN THE REGIONAL CONTEXT
- CHALLENGES OF THE BANGLADESH DELTA
- SALIENT FEATURES OF LDAI ACTIVITIES IN PHASE-1
- SCOPING OF LEARNING AREAS IN BANGLADESH
- WAY FORWARD

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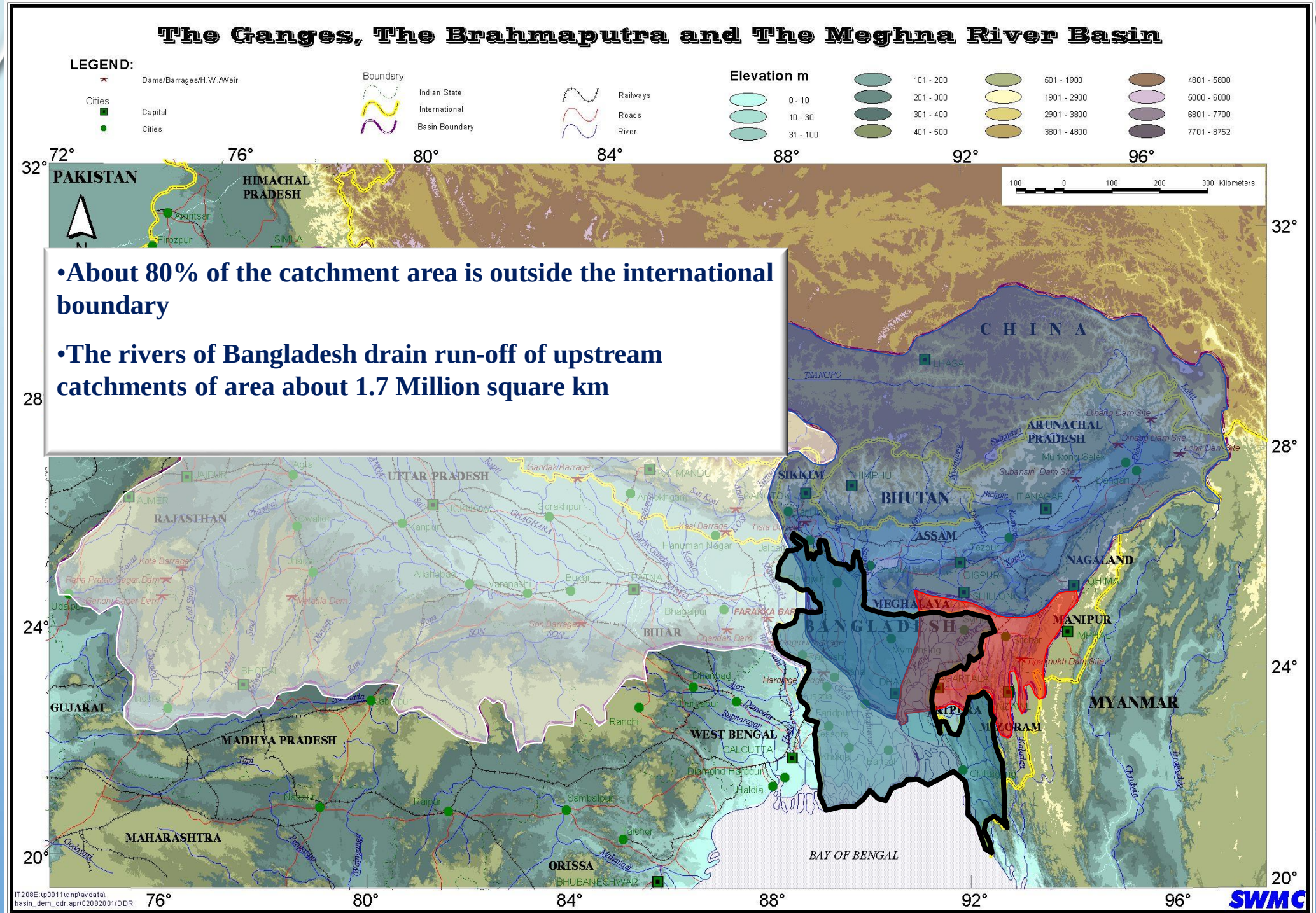


- About 80% of the catchment area is outside the international boundary
- The rivers of Bangladesh drain run-off of upstream catchments of area about 1.7 Million square km

Challenges of the Bangladesh Delta

Sea level rise

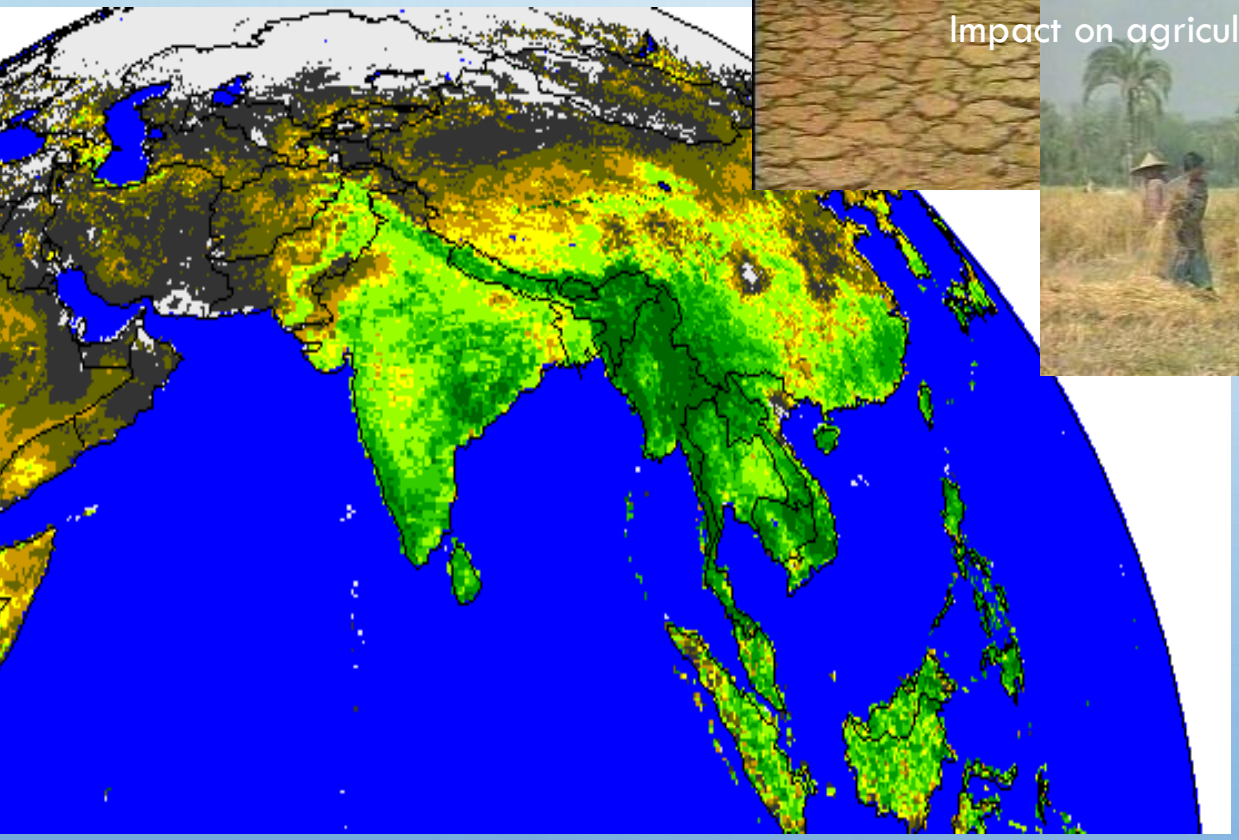
Increase in evaporation

Increase in snow melt in the Himalayas

Decrease in precipitation in dry season

Increase in precipitation in monsoon

Prolonged monsoon



Water: A Medium of Cooperation in GBM Basins

IWM Modelling Tools facilitate Climate Coherent Cooperation

Flow Augmetation

Net potential 5339 cumecs

Flood Management
Flood Forecasting

For around 400,000 sq.Km area

Hydropower

Theoretical potential 233,800 Mw
Present 22,722

Navigation

Opening up Nepal, Bhutan and the Northeast to the sea

Participatory Water Management

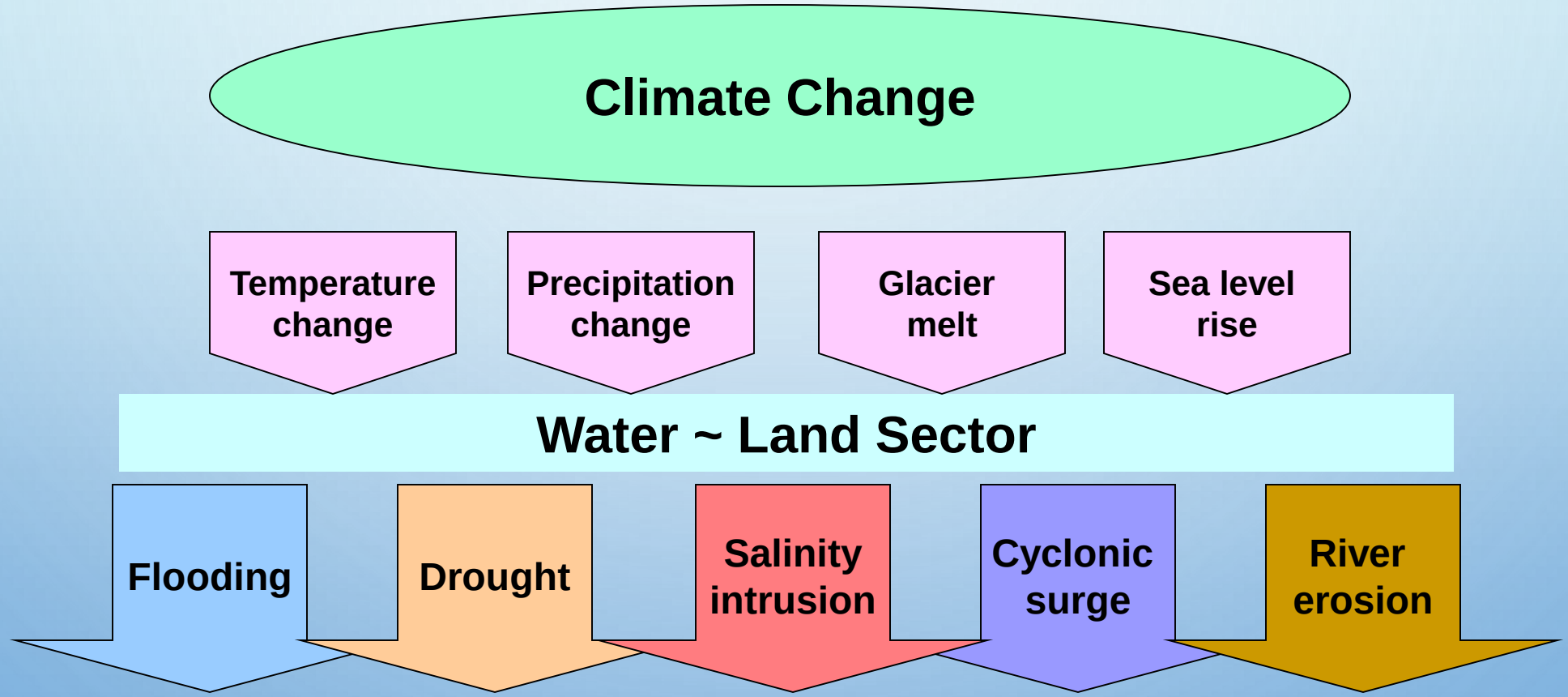
Private Public Partnership

Environmental Conservation & Restoration

Fragmented Development

Integrated Water Resources Management

IMPACTS IN LAND AND WATER MANAGEMENT



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LDAI´s Main Characteristics

OBJECTIVES

The LDA objective is to build up an effective South South Cooperation (SSC) learning and innovation Initiative that accompanies rural and urbanizing deltas in better connecting three processes that often unfold in relative isolation:

1. Enable IWRM planning and implementation Adaptive Delta Management;
2. Engage broader sectoral integrated and inclusive societal development processes that guide socio-economic resilience; and
3. Support the planning and implementation of investment projects through innovative learning and knowledge processes building commitment and capacities.

Salient Features: Phase-I

Learning Deltas Asia Initiative (LDAI) is a multi-stakeholder process-based approach **built to support in** the achievement of SDG

Progress so far:

- ❑ Workshop on GWP's "Learning Deltas" Initiative on October 2016
- ❑ Myanmar delegation team from Myanmar Water Partnership (MWP) & Delta Alliance Myanmar Wing (DAMW) visited in Bangladesh on February 2017
- ❑ Bangladesh delegation team from Institute of Water Modelling (IWM) visited in Myanmar on June 2017

Myanmar Delegation Team visit to Bangladesh

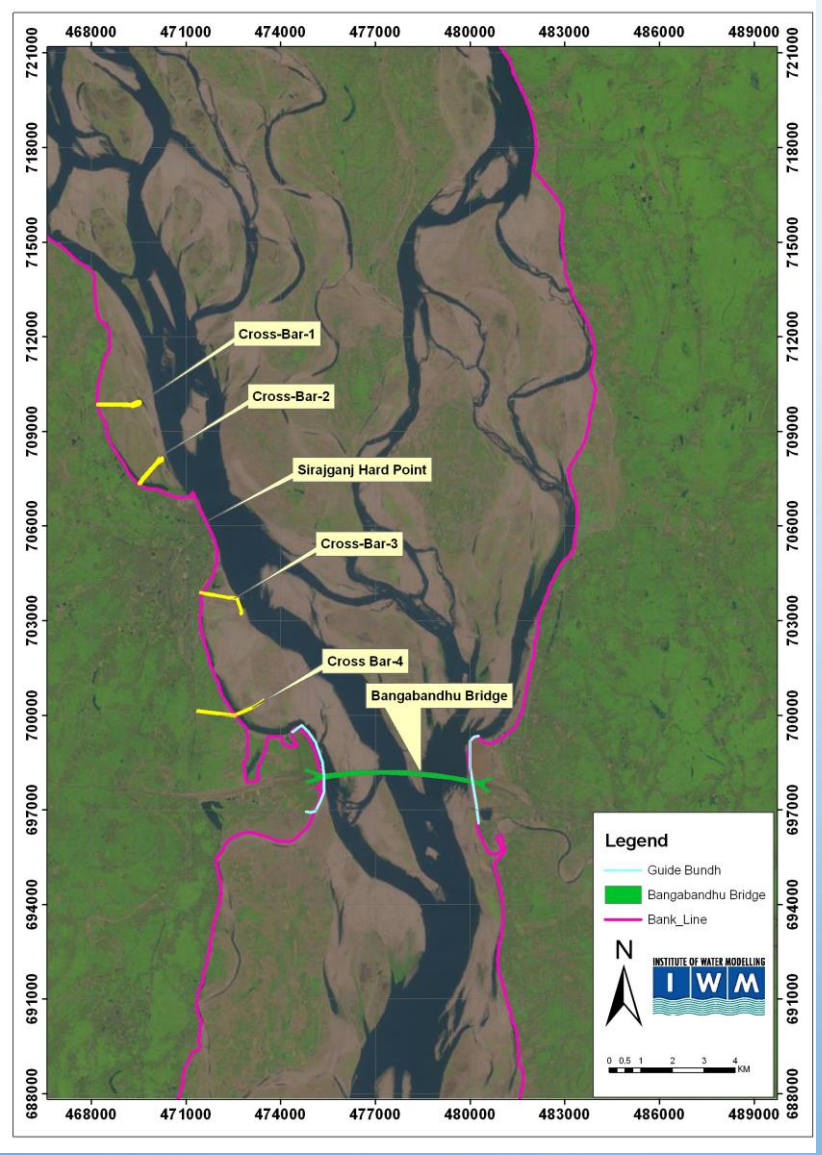
Myanmar Delegation Team Visit to Bangladesh

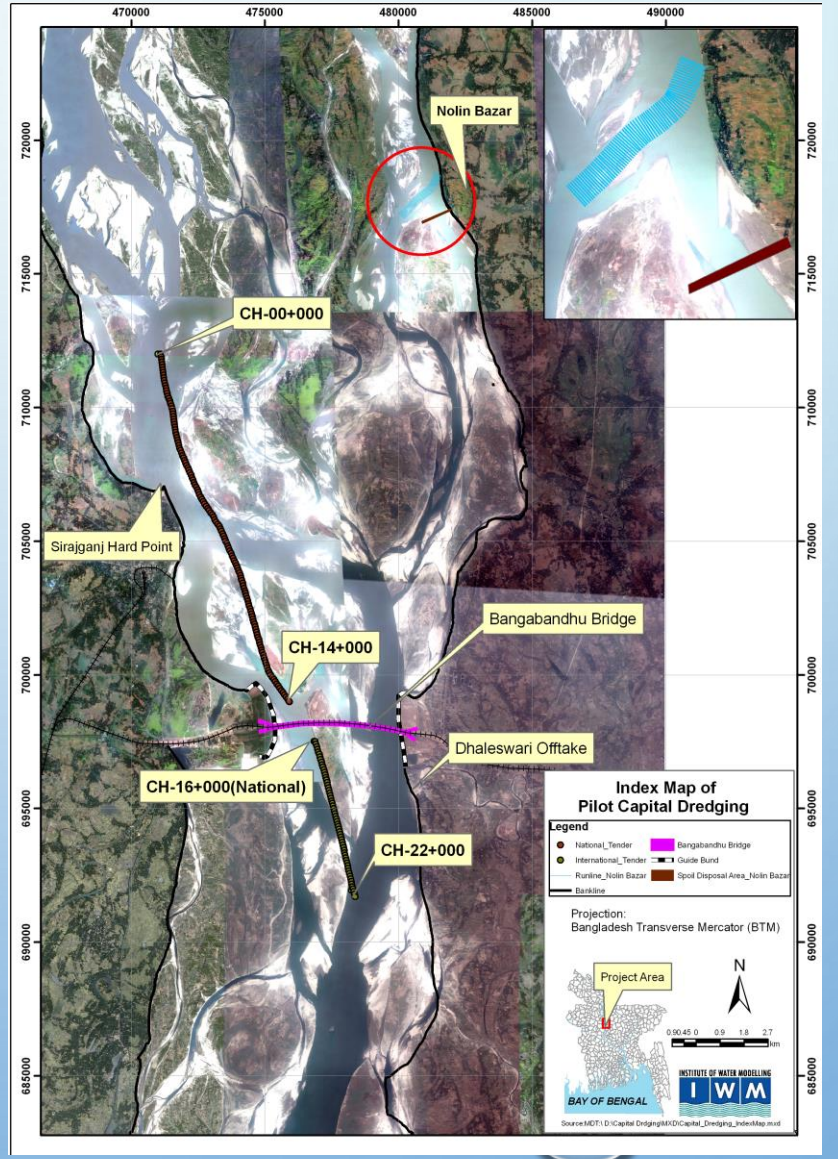
Presentation session

1. Presentation on Coastal Vulnerability and Resilience Measures in Times of Climate Change
2. Flood forecasting in Bangladesh and Implementation of Jason-2 Satellite Altimeter based Flood Forecasting System
3. Community Based Flood Early Warning System and Information Dissemination in Bangladesh Delta
4. Experiences from Ecosystem Services for Poverty Alleviation-ESPA Deltas Project
5. Climate Change Adaptation and Water Governance in Bangladesh Delta
6. Introduction and Salient features of Bangladesh Delta Plan (BDP) 2100
7. Tidal River Management
8. Mangroves in Bangladesh

Myanmar Delegation Team Visit in Bangladesh

Field Visit





Bangladesh Delegation Team Visit to Myanmar

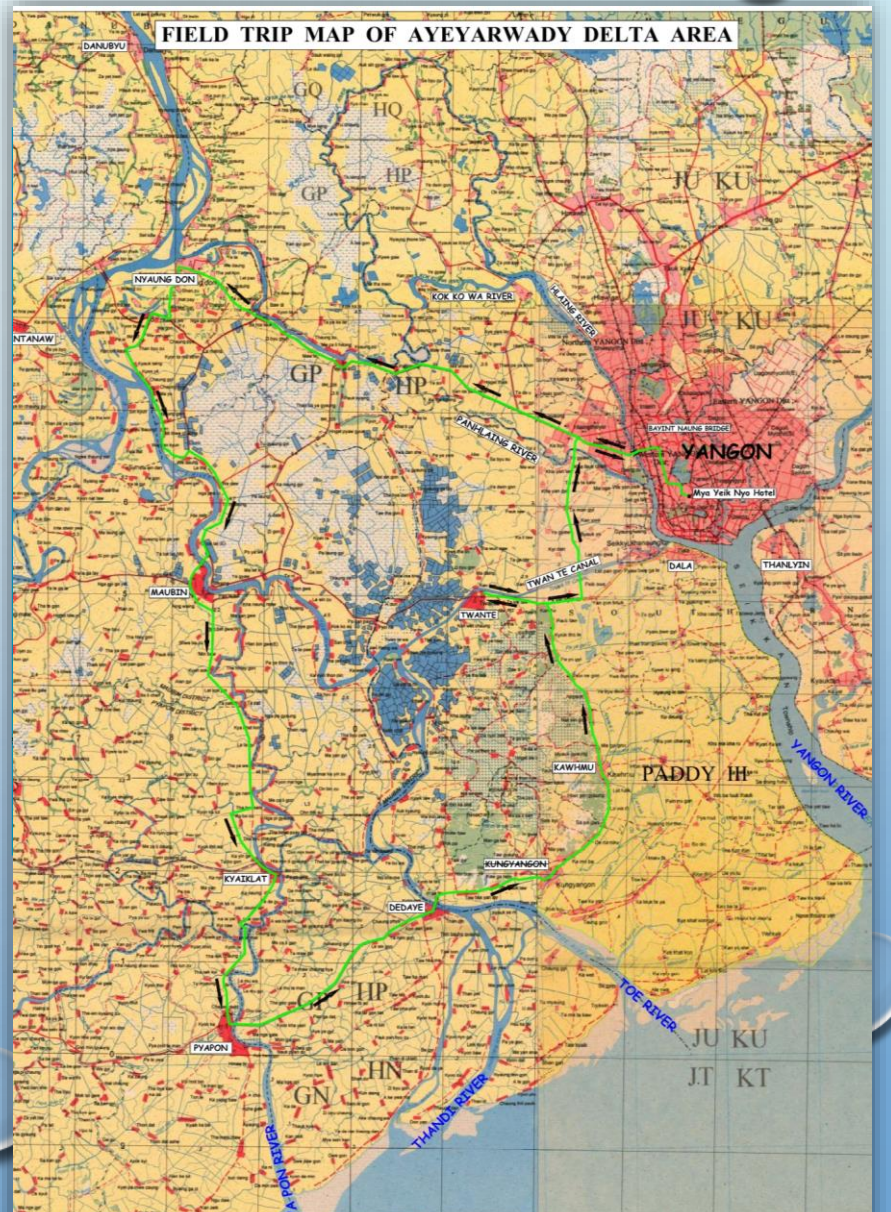
Learn from Myanmar delta situation and adaptive management specially after the devastated cyclone ‘Nargis’

Bangladesh Delegation Team Visit to Myanmar

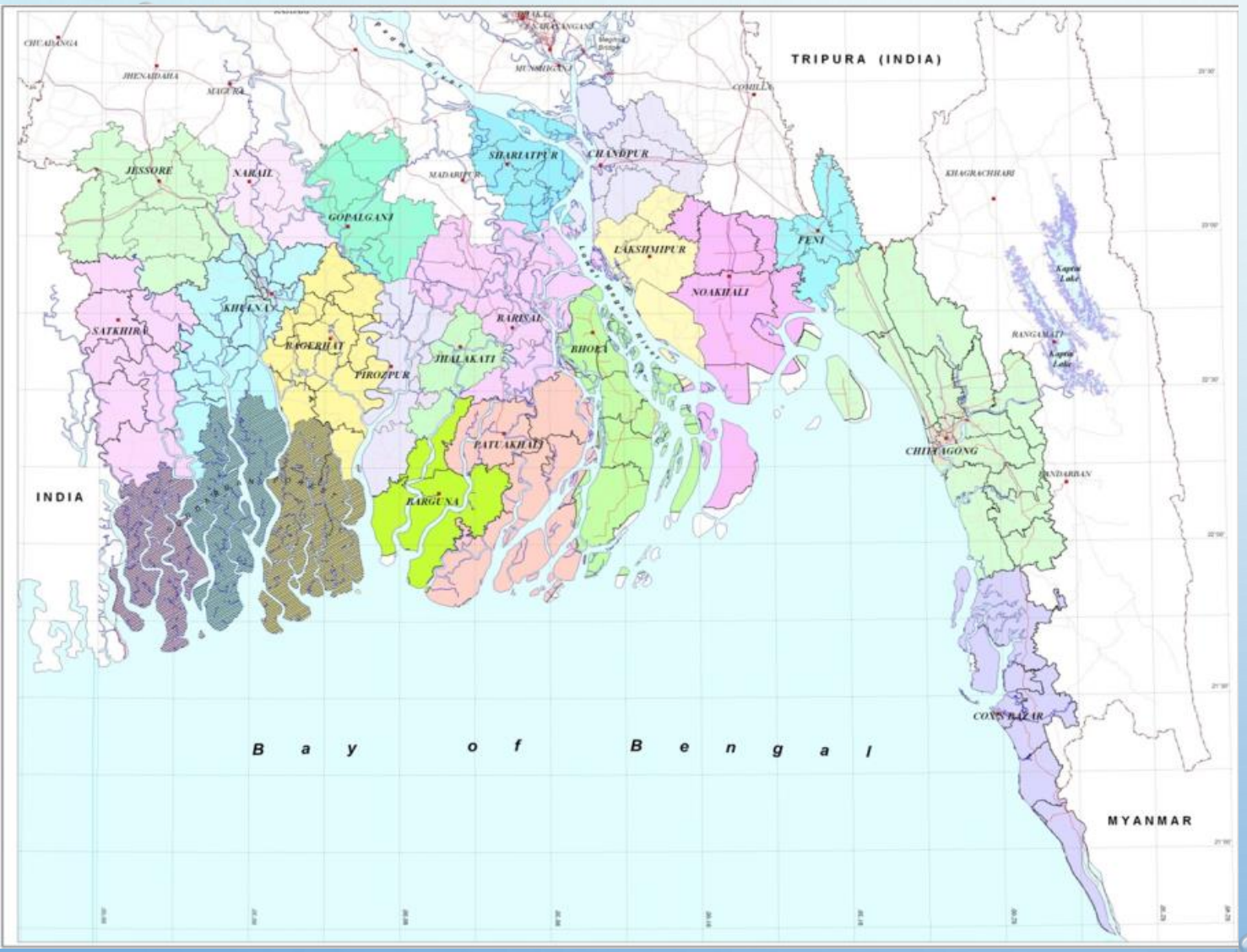
Field Visit Ayeyarwady Delta

Main Challenges of water sector in Ayeyarwady Delta

- Cyclone: Cyclone Nargis caused the worst natural disaster in the recorded history of Myanmar during early May 2008. About 2.4 million people were affected and the total damage is about 12.9 billion US$.
- Flood: Flood is a regular phenomenon in Myanmar. In 2015 flood about 1,676,000 people were affected.
- Water scarcity and salinity in dry season
- Pollution from mining, agriculture and industry
- River bank erosion
- siltation of reservoirs
- Arsenic and saline contamination in ground water
- Sea level rise
- Subsidence
- Degradation of the mangroves



Coastal Hot Spot Area



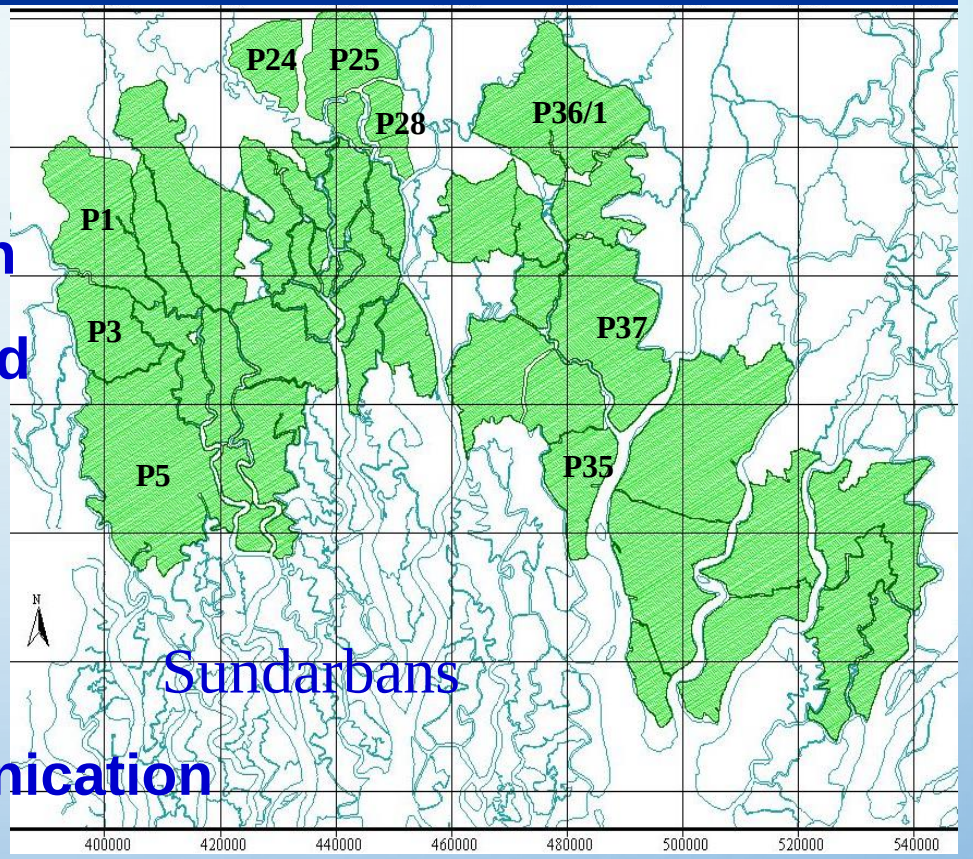
Main Challenges

- Climate change and sea level rise
- Land subsidence
- Change of freshwater flow pattern
- Increasing over population
- Unplanned urbanization
- Lack of cooperation among agencies

Southwest Area after Implementation of Coastal Embankment Project (CEP) in early 60's

Benefits of Coastal Polders:

- ❑ Prevention of Salinity Intrusion
- ❑ Agriculture Production doubled
- ❑ Increased Culture Fisheries
- ❑ Afforestation Developed
- ❑ Safety for life and livelihood
- ❑ Improvement of Road Communication
- ❑ Improvement of Socio-economic condition
- ❑ Increased employment opportunity



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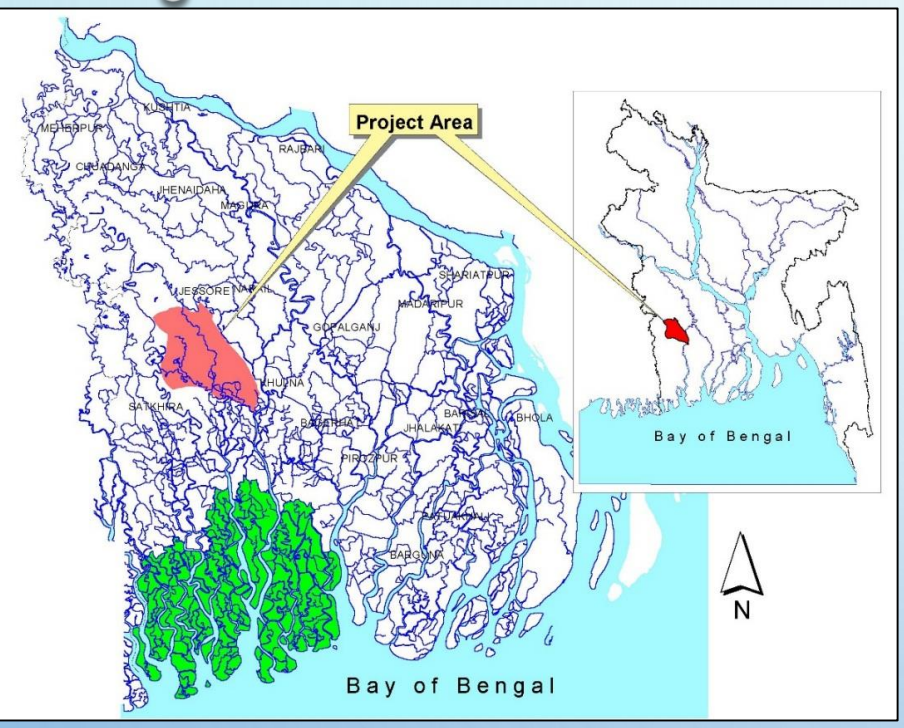
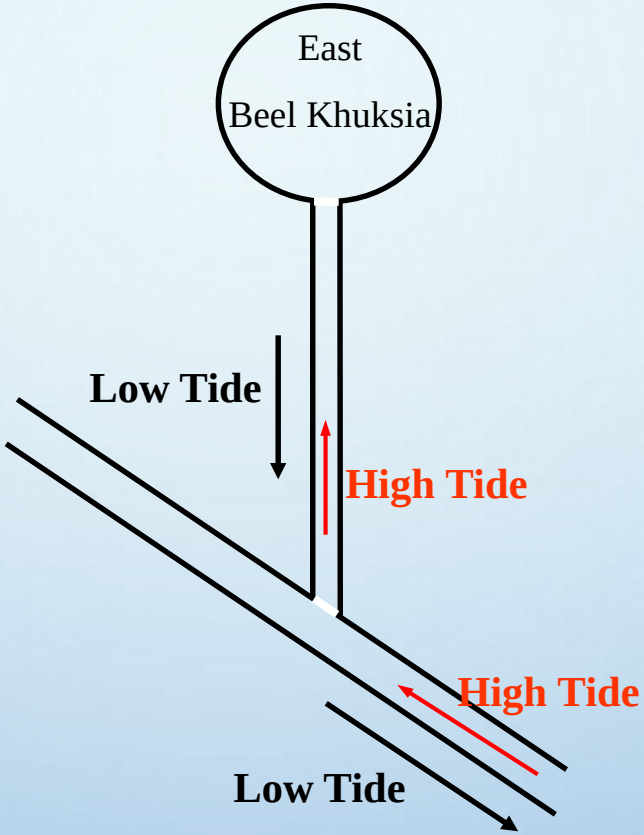
Drainage Congestion in Early Eighties(1983)

Causes:

- Decrease of upstream flow during dry season through Ganges distributaries
- Reduction of tidal flow due to embankment of coastal polders which prevented tidal flow entry
- Siltation of river bed which started from the upstream where velocity of tidal flow became zero and gradually river cross section started to reduce.
- Construction of unplanned village roads & construction of fish ‘Ghers’ by dwarf embankment for shrimp culture which obstructs natural runoff.

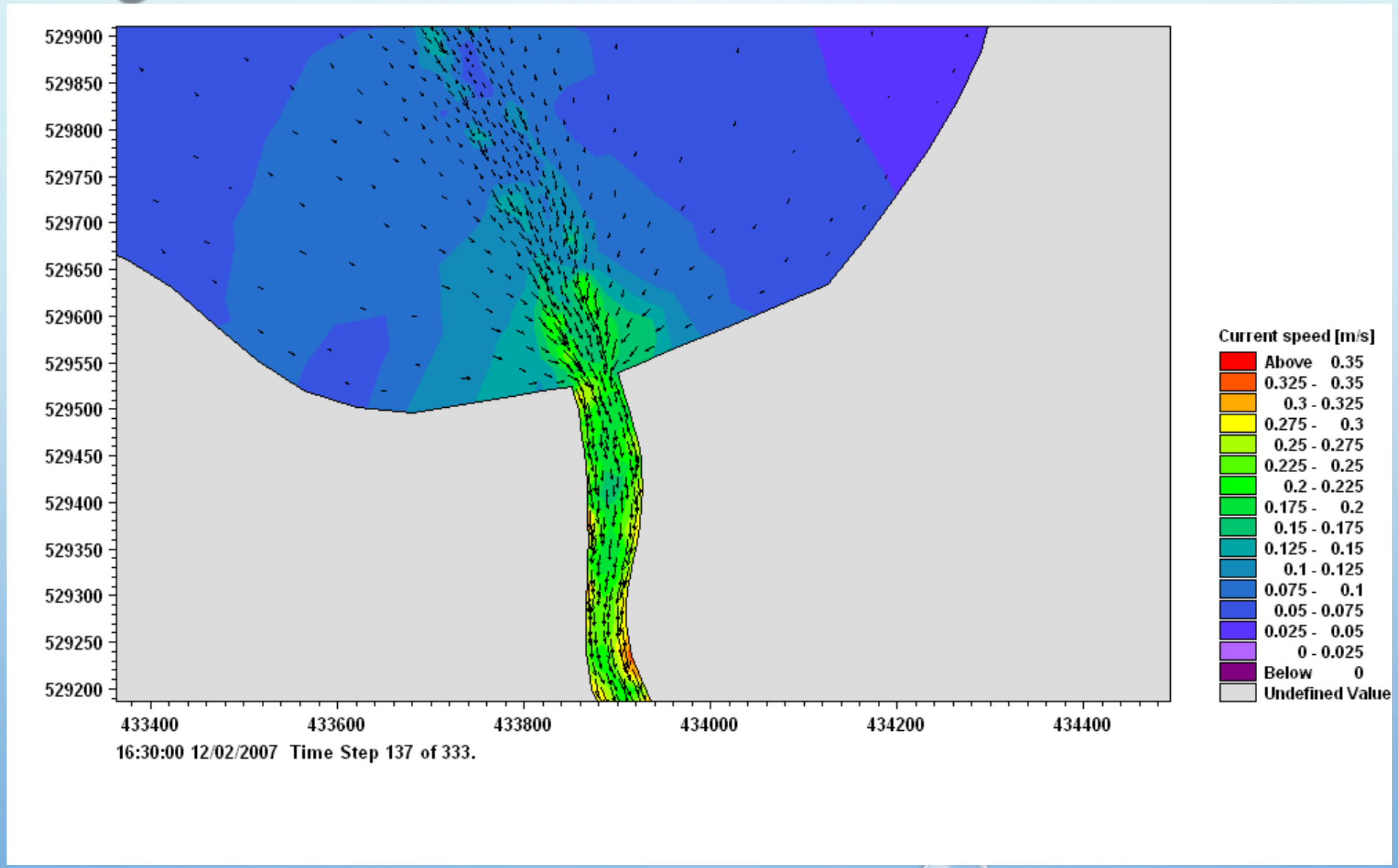
Coastal Hot Spot Area: Tidal River Management



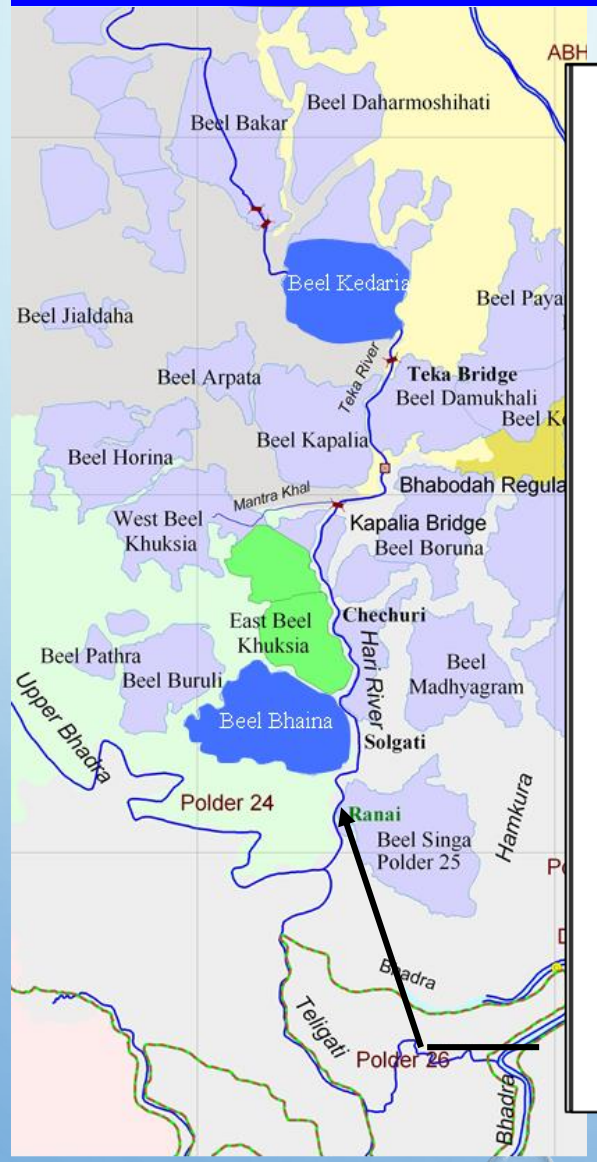


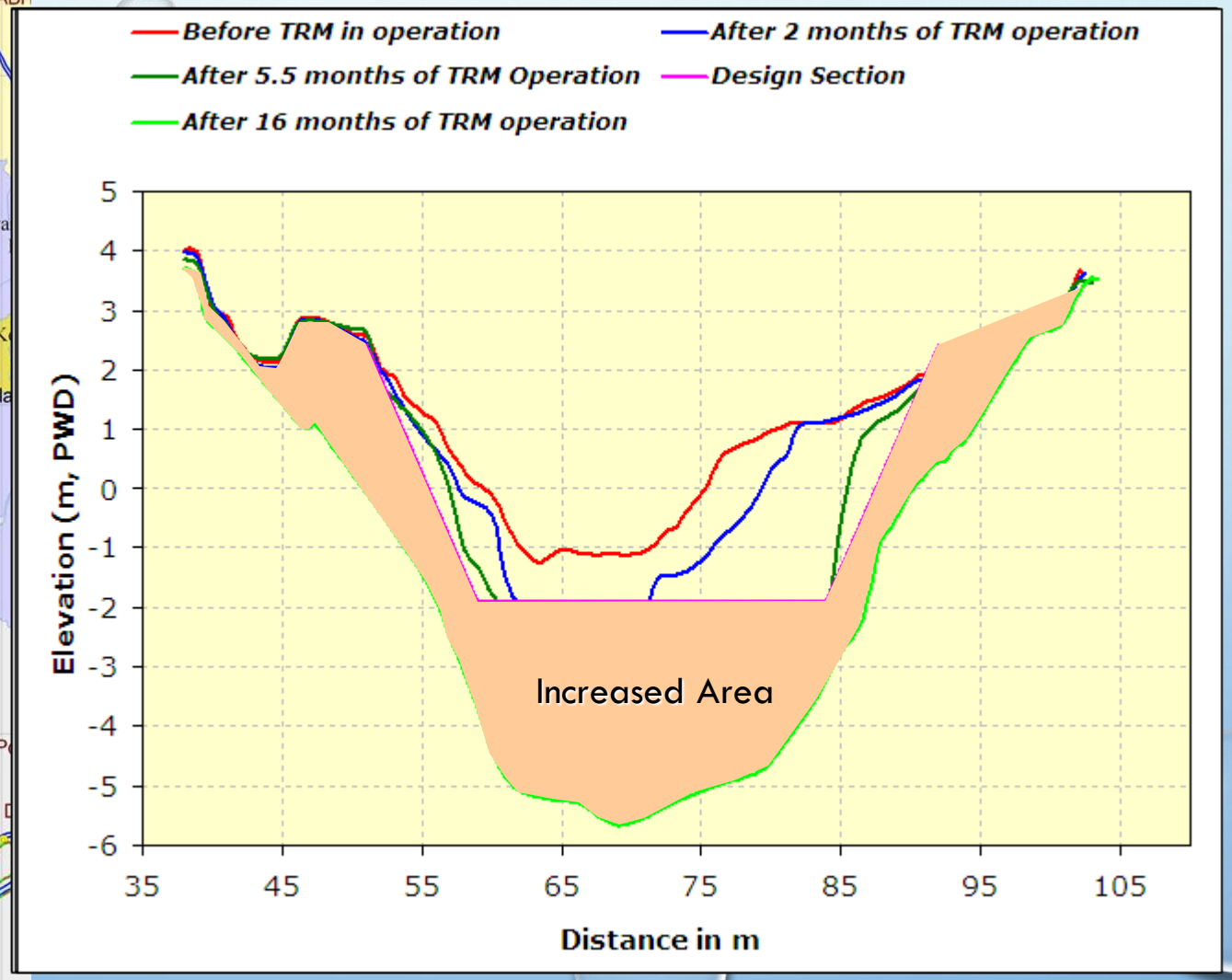
- To allow Natural Movement of Tide into a Beel.
- Tidal Basin store water during High Tide and release during Low Tide.
- Siltation takes place into the Basin during High Tide
- During low tide clear water erode the river bed and increase the drainage capacity

Selection of Tidal Basin for TRM Operation based on Hydraulic Modelling



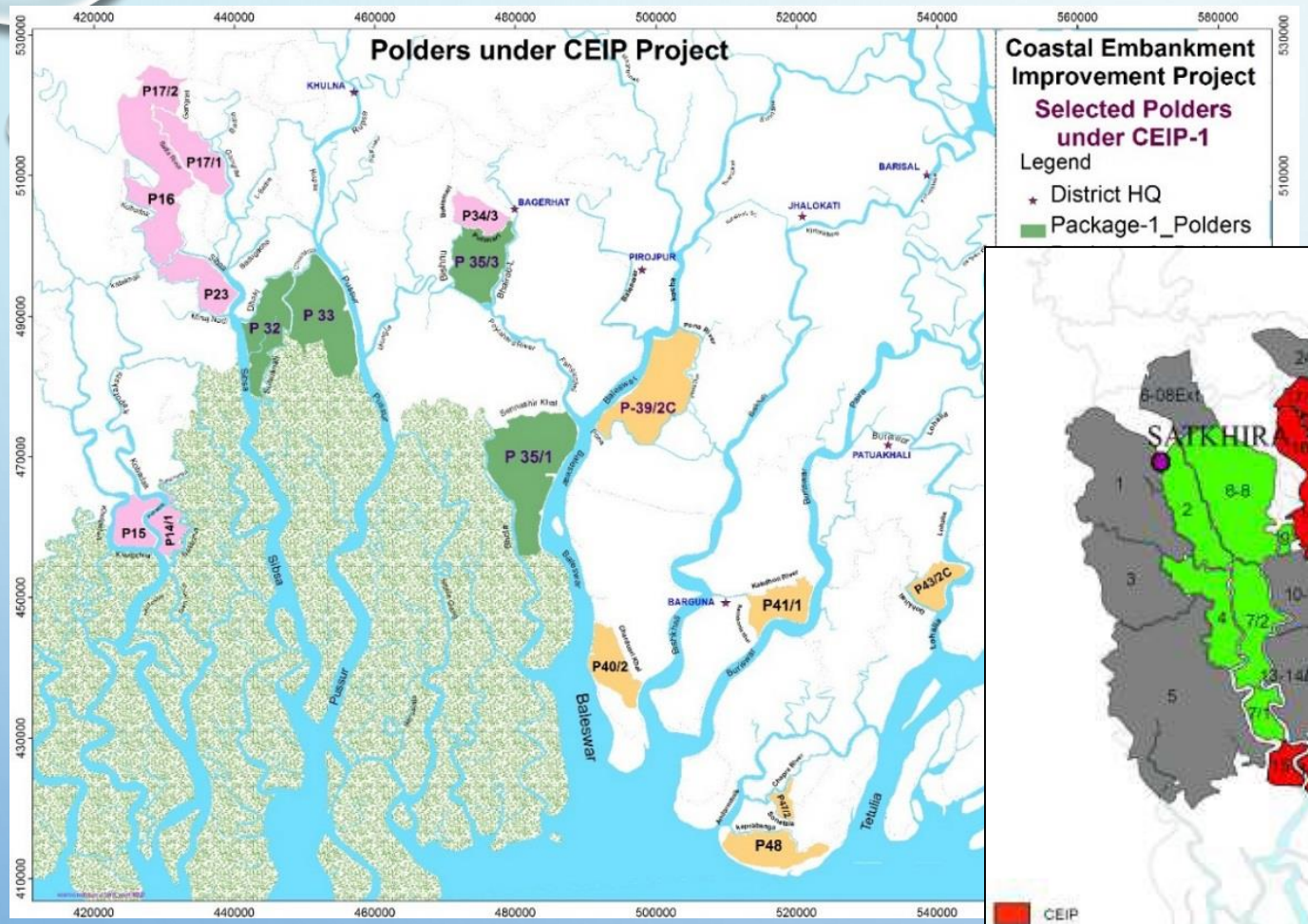
Change in Drainage Capacity of Hari River due to operation of East Beel Khuksia TRM Basin

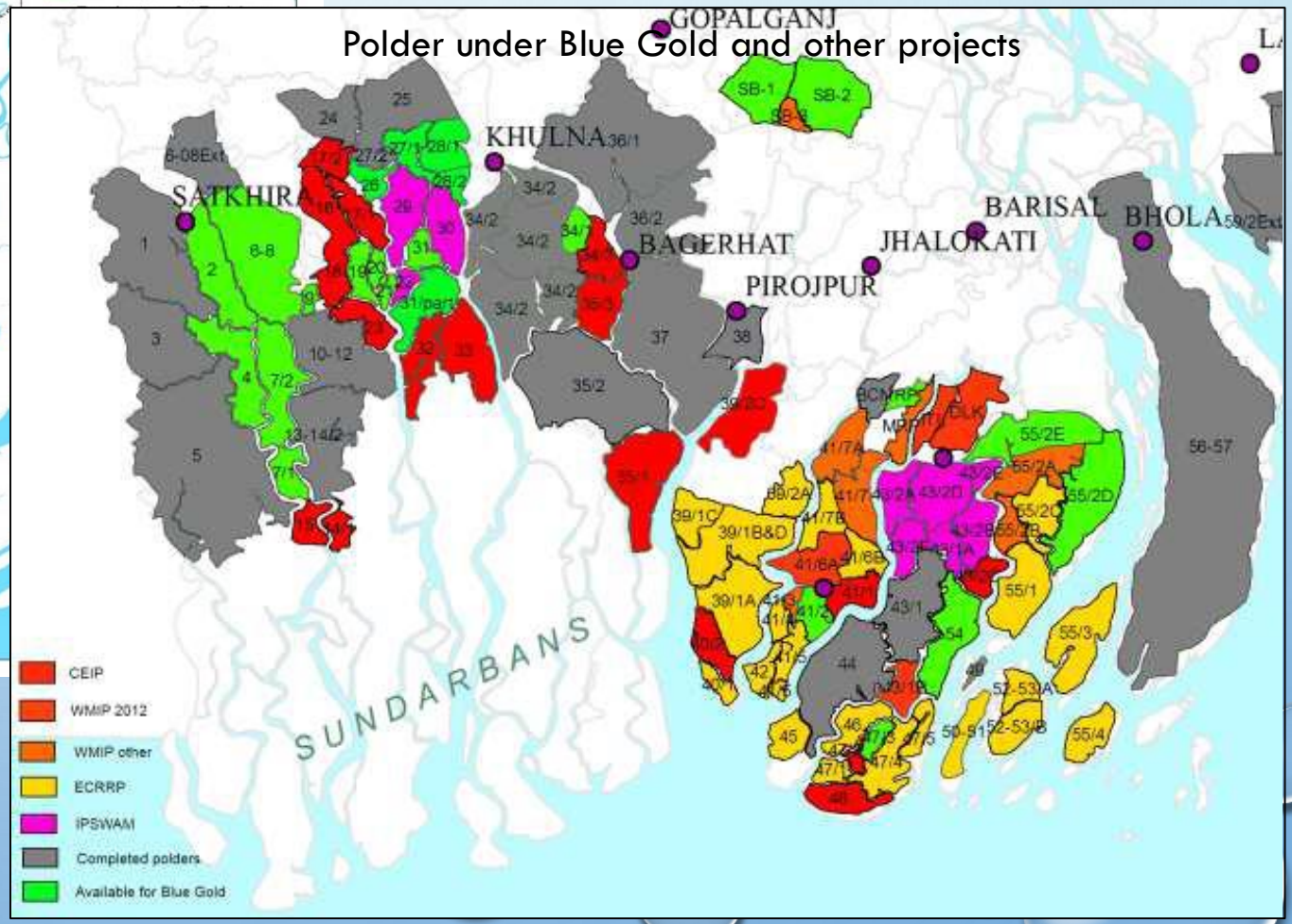




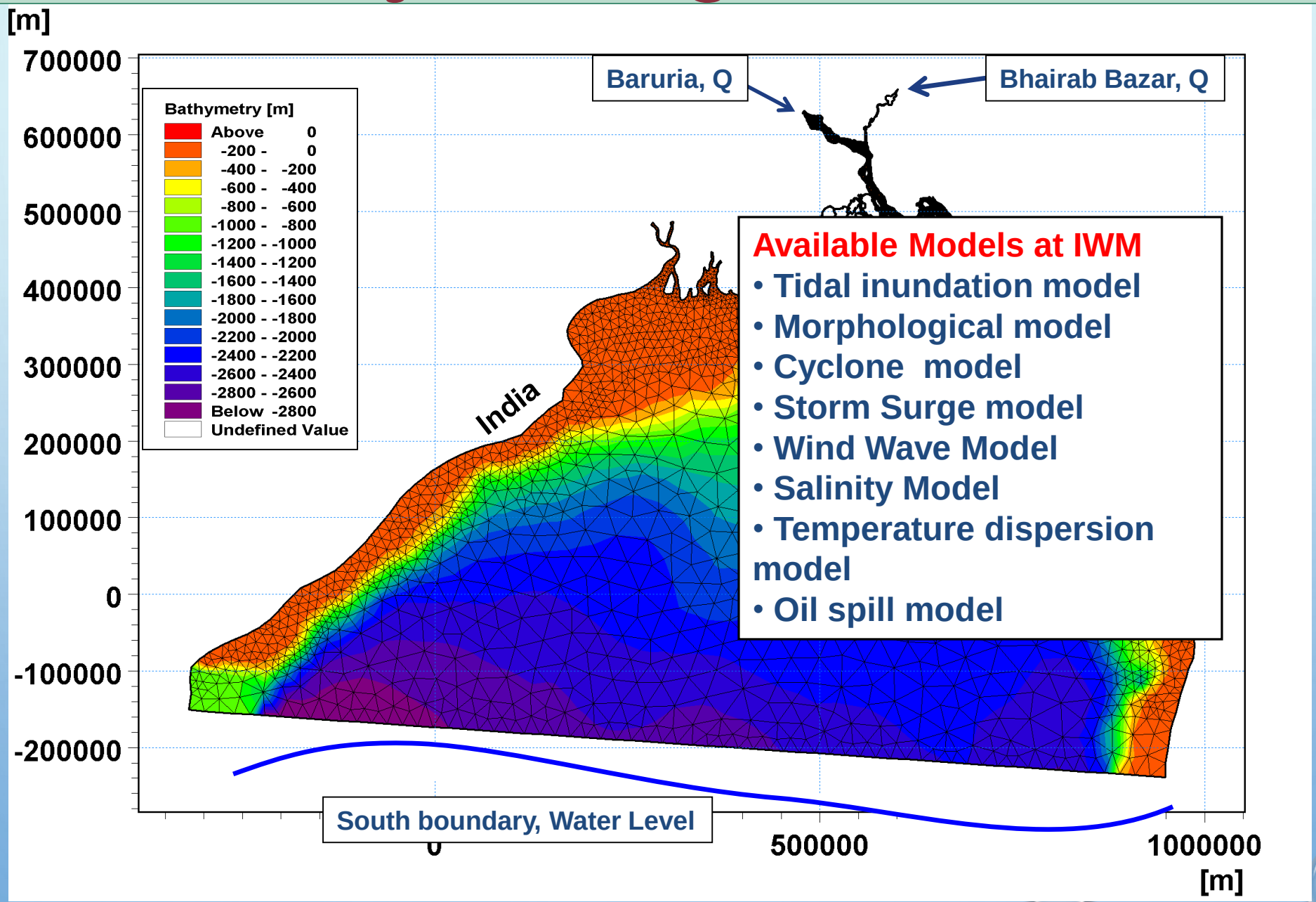
Improvement of drainage congestion after implementation of TRM in EBK

Coastal Hot Spot Area: Polder Management





Bay of Bengal Model



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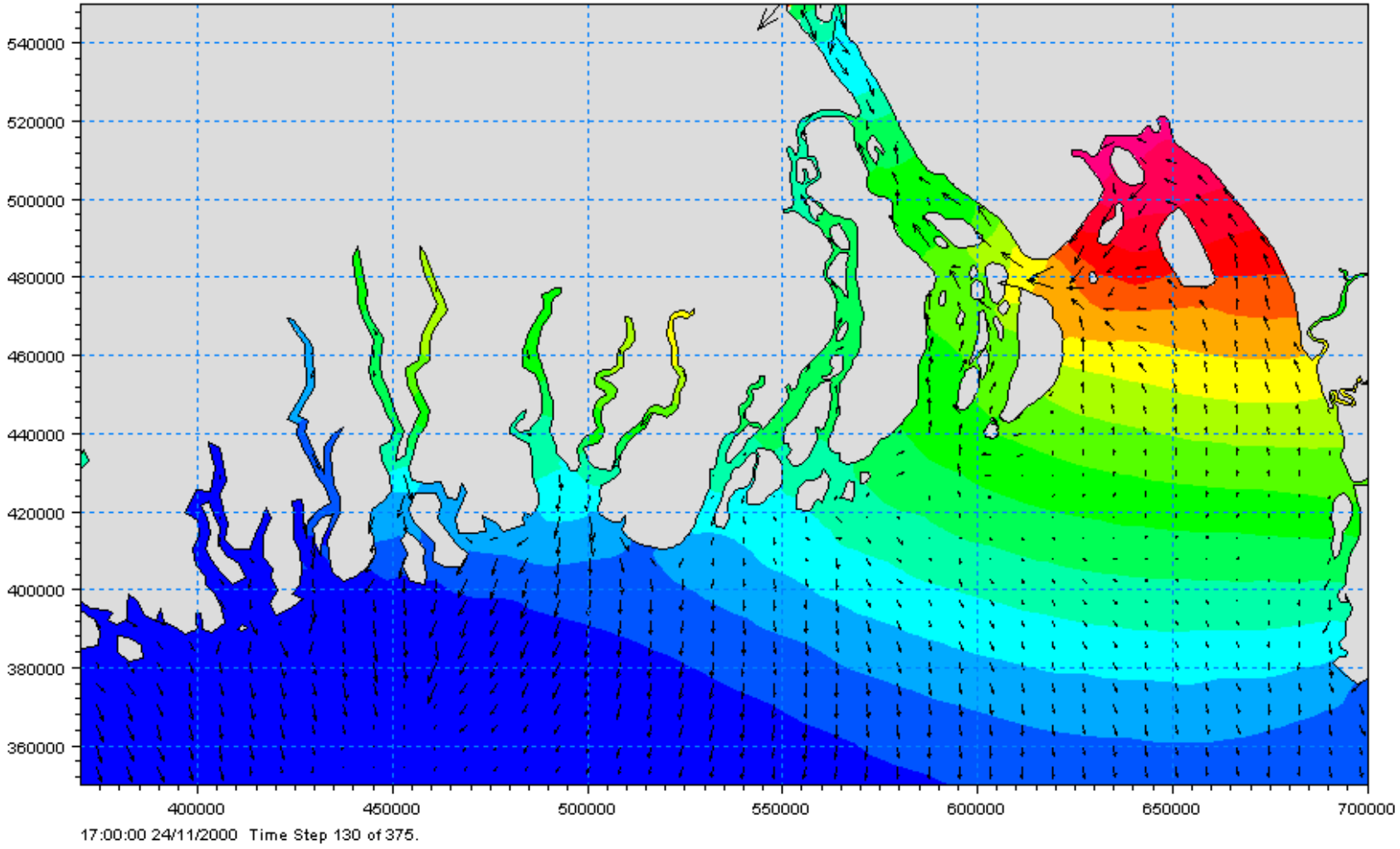
Output of Hydrodynamic Modelling System



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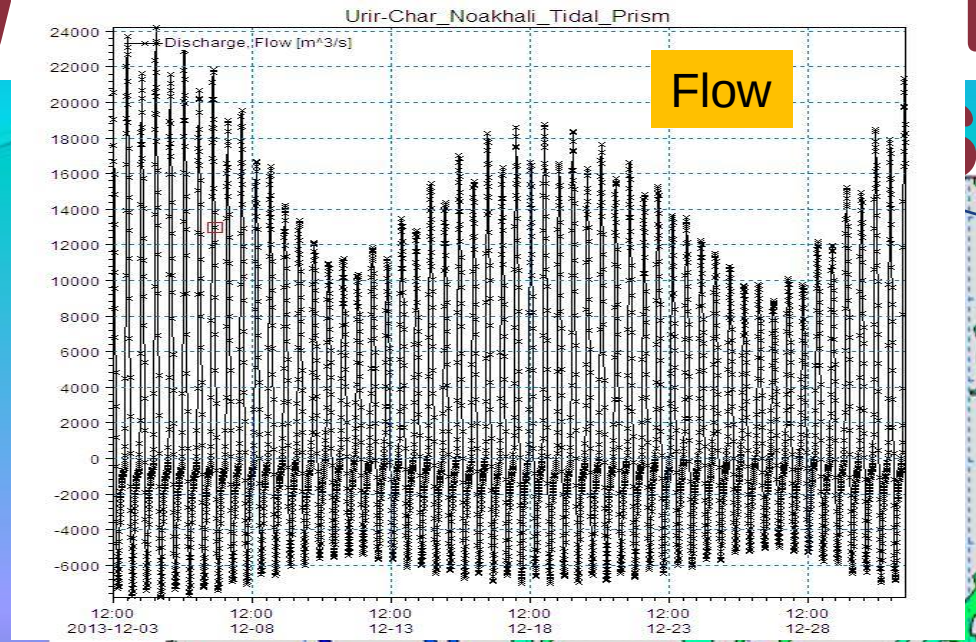
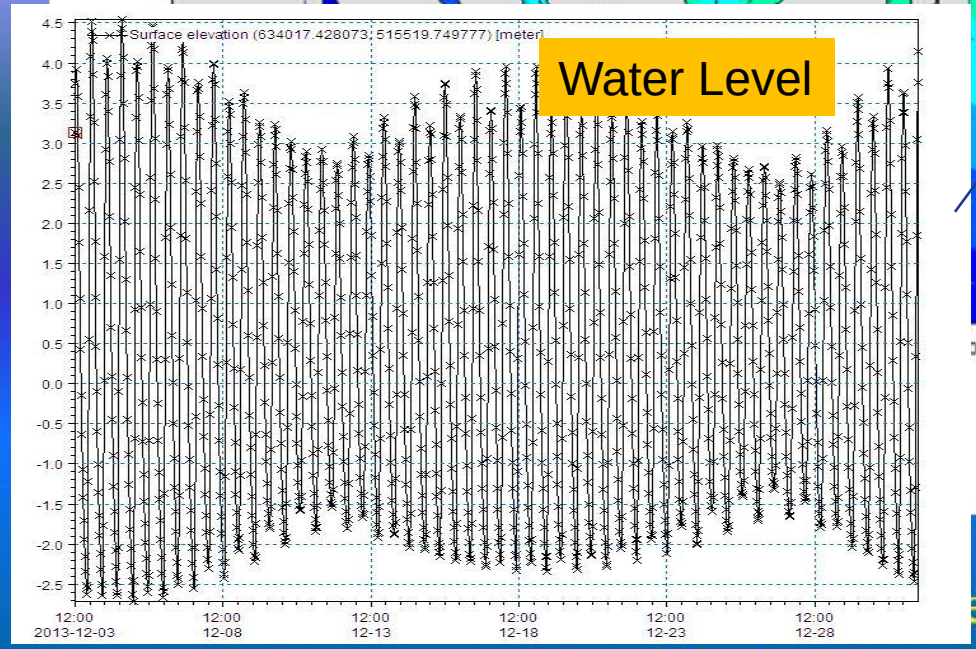
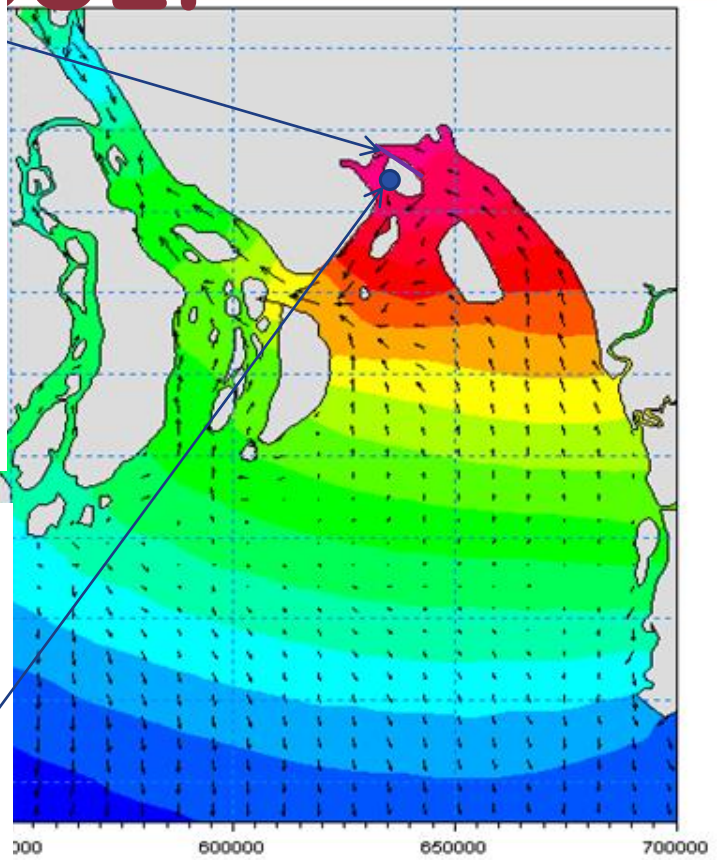
WATER LEVEL AND FLOW FROM MODEL RESULT

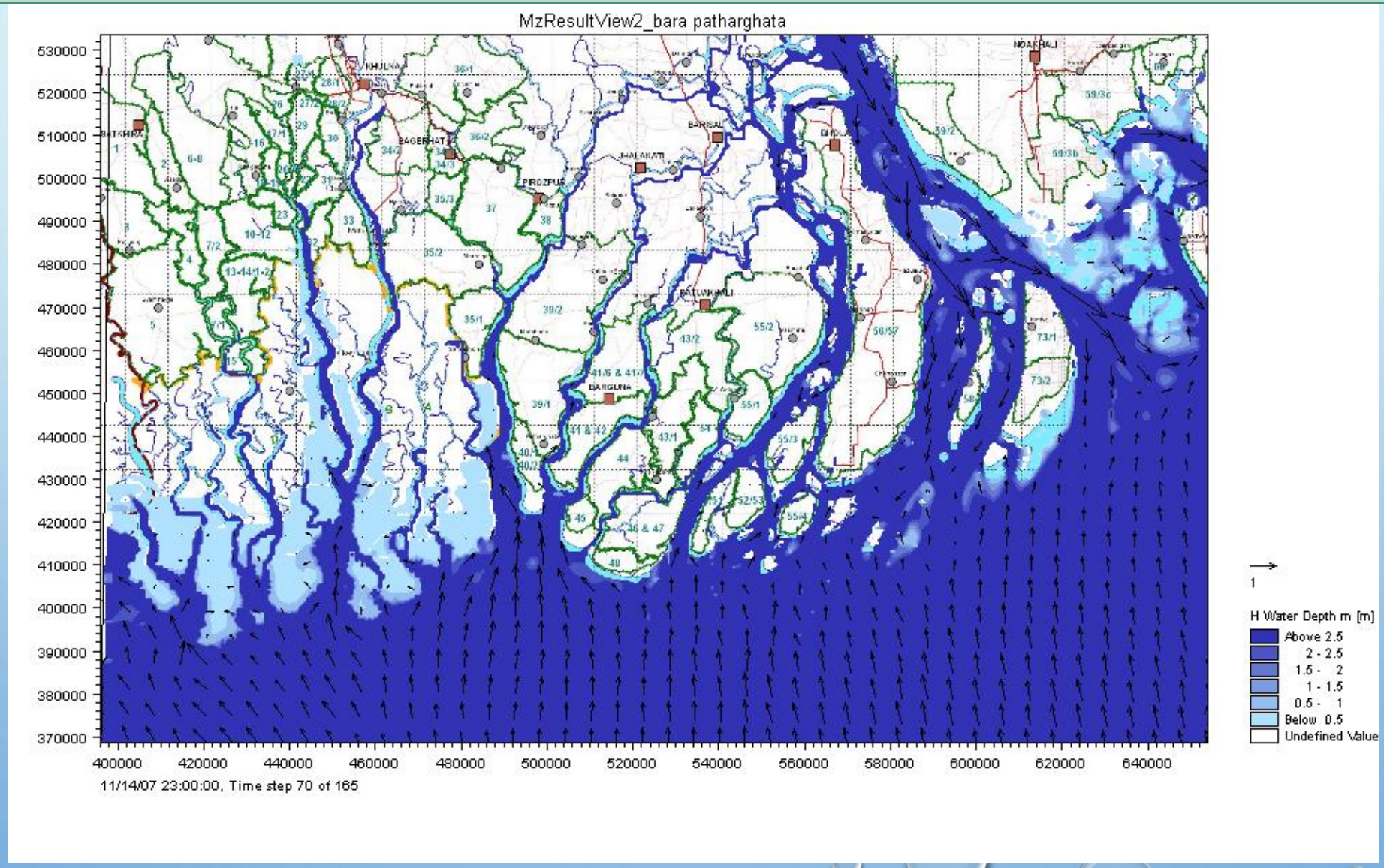






ent & Color for tidal water level

Storm Surge Flooding (Sidr)



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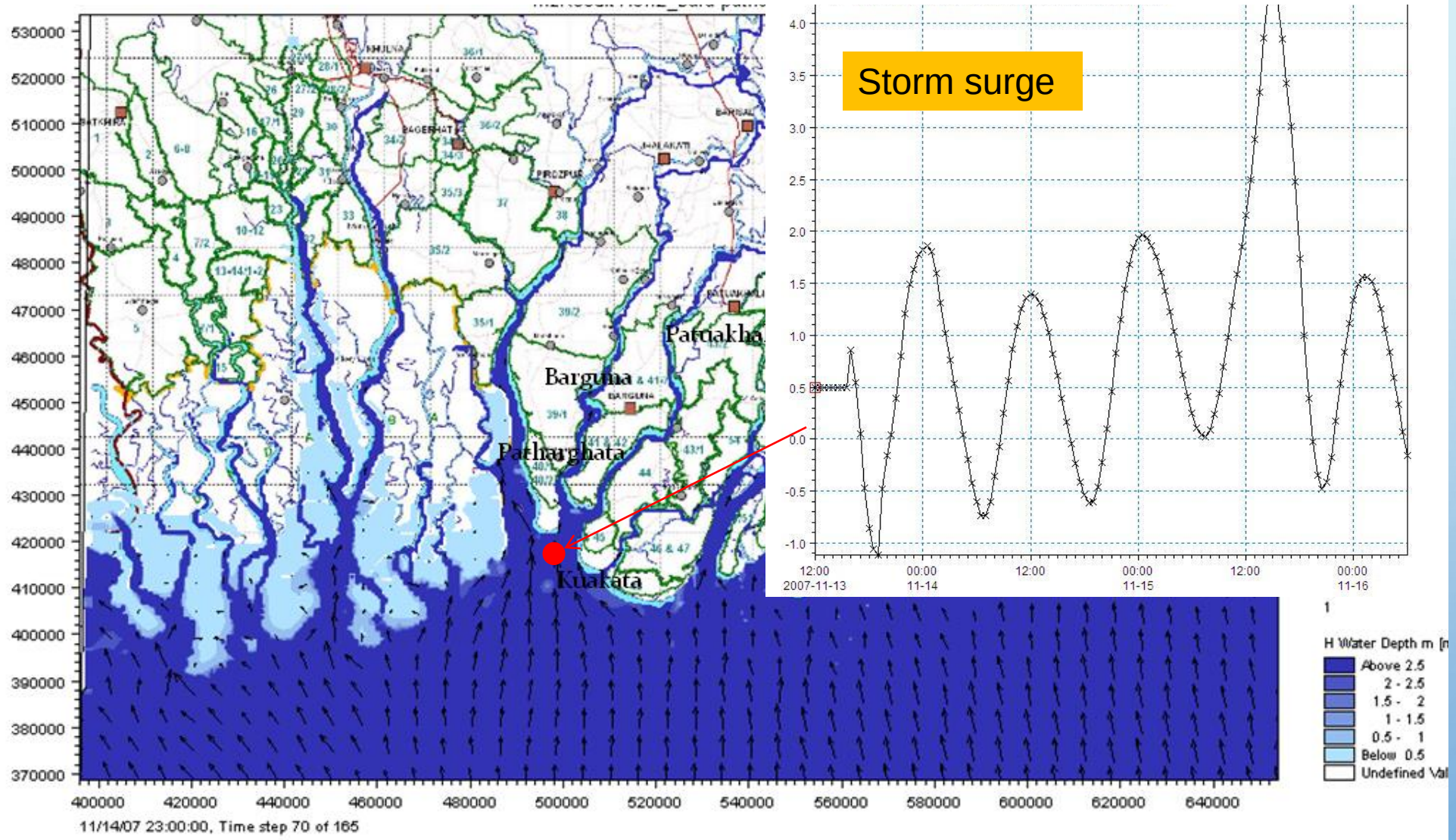
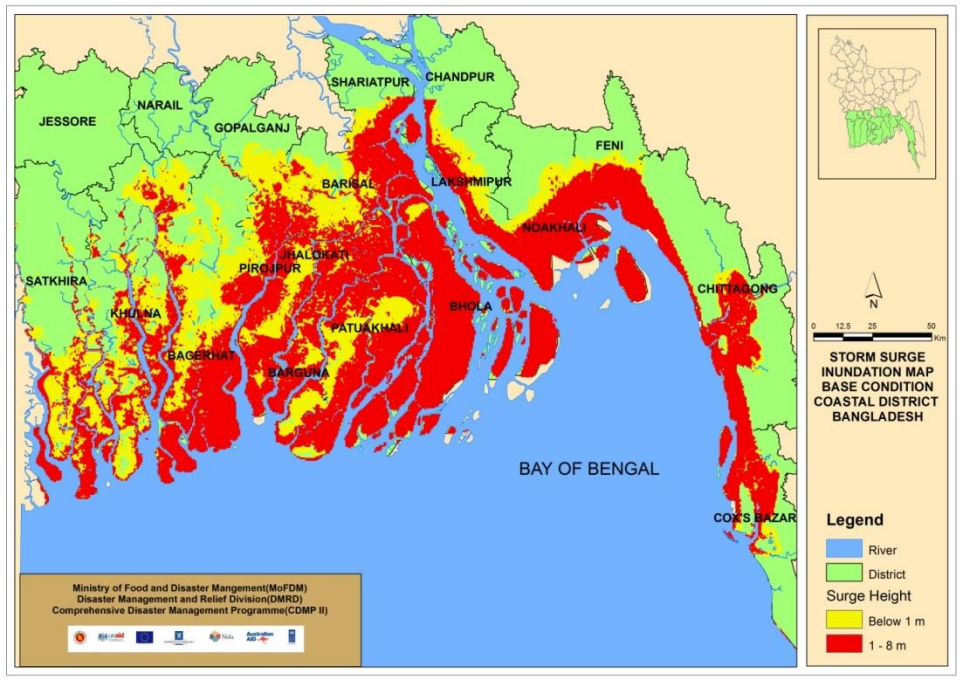
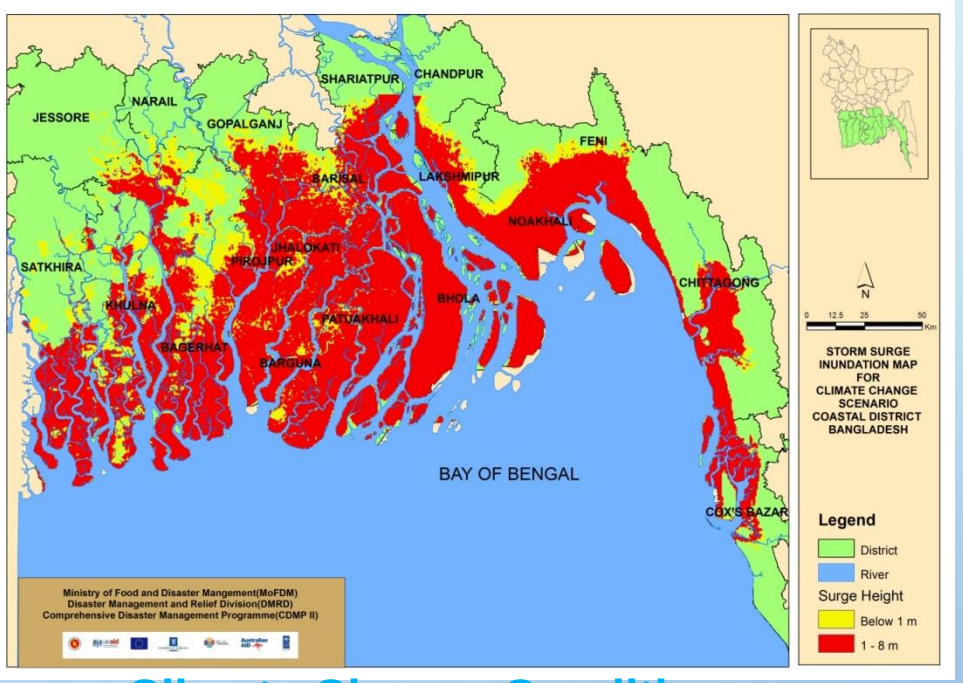
SURGE LEVEL FROM STORM SURGE MODELLING RESULT



Storm Surge Model Inundation Risk Maps



Base Condition



Climate Change Condition

An area of 20,745 km^2 will be inundated by more than 1m water depth in the changing climate

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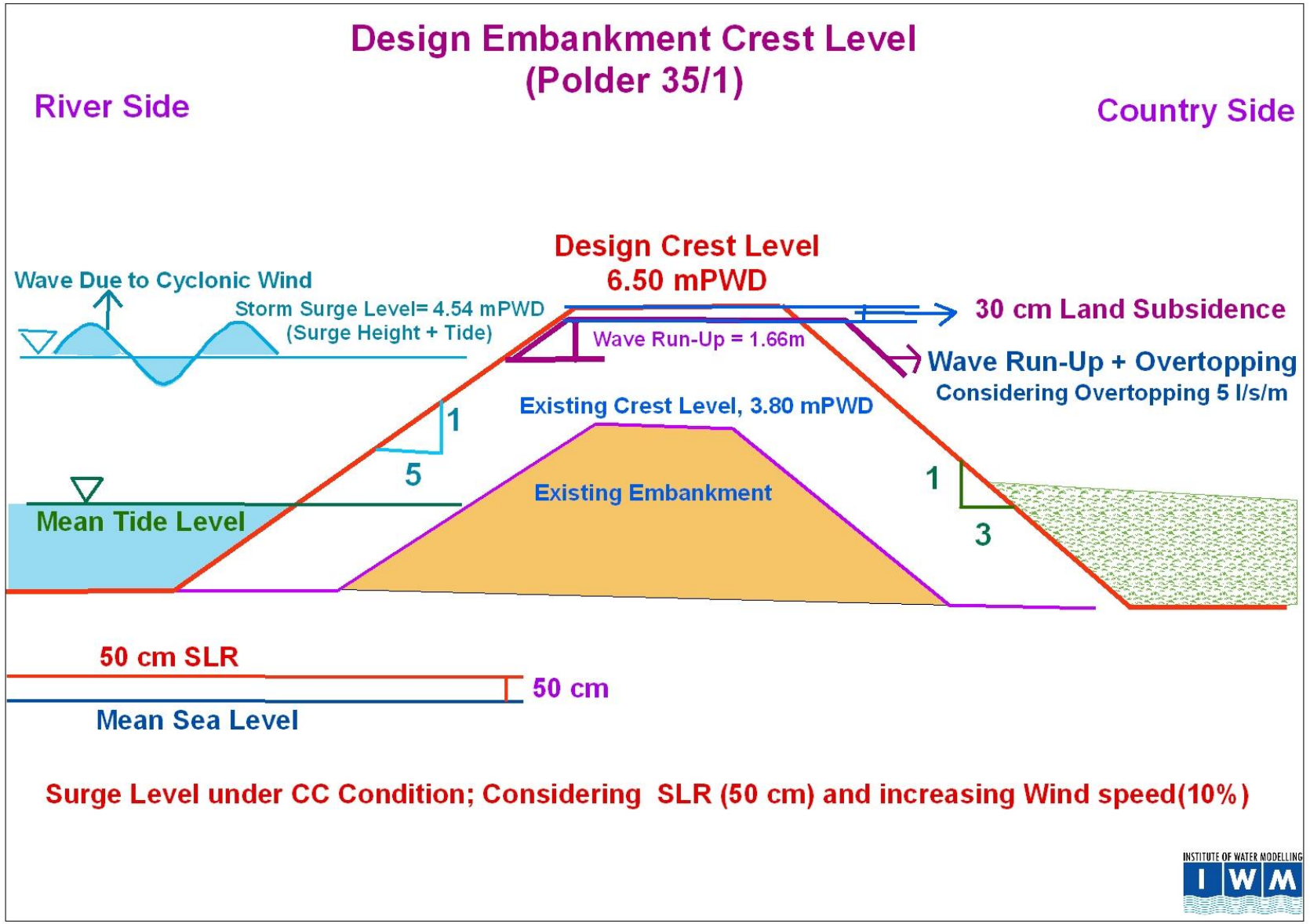
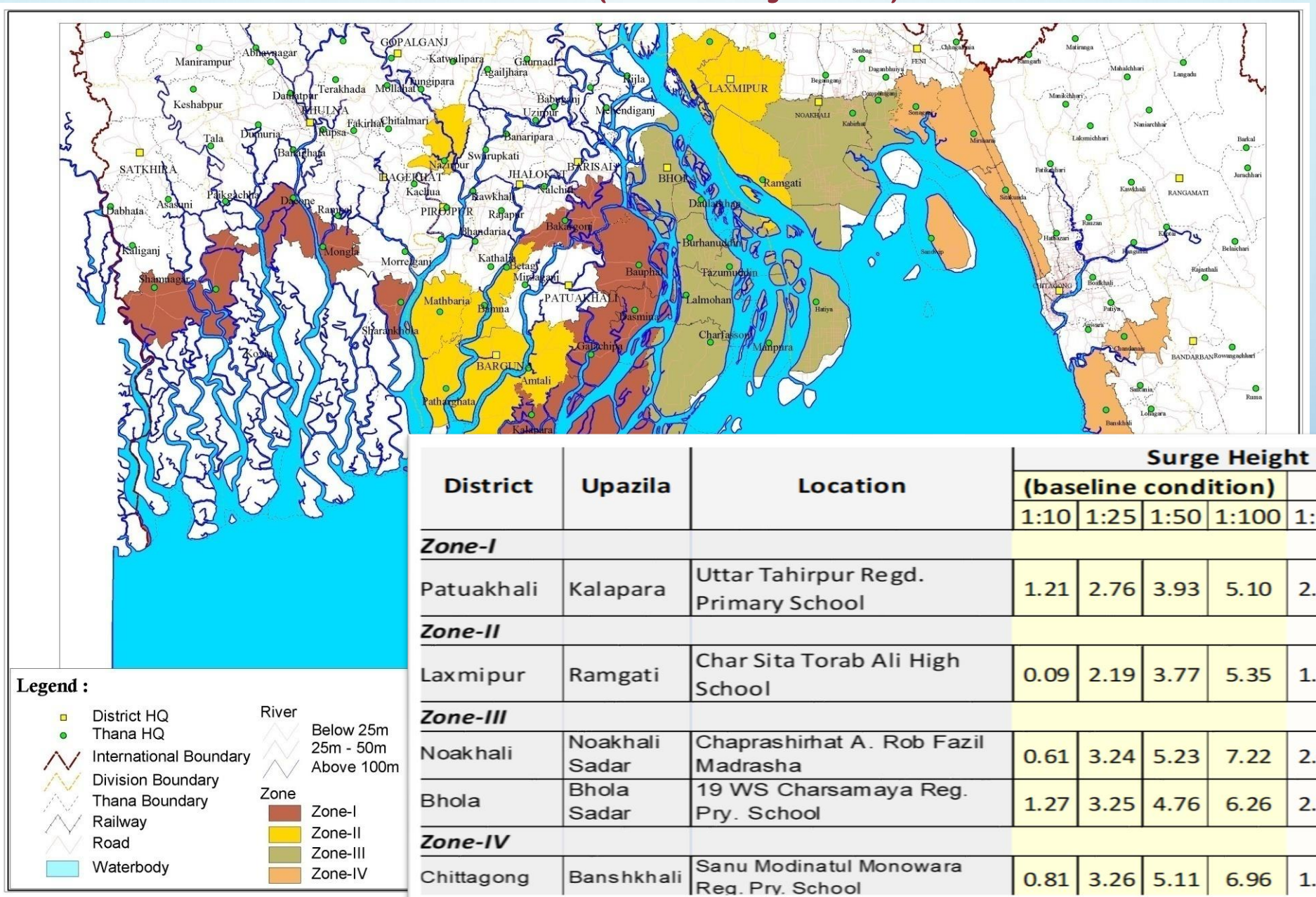
Coastal Flooding and Resilient Coastal Polders



Storm Surge Height at Potential Locations of Cyclone Shelter in Changing Climate (IDB Study-2011)



Legend :

- District HQ
- Thana HQ
- International Boundary
- Division Boundary
- Thana Boundary
- Railway
- Road
- Waterbody

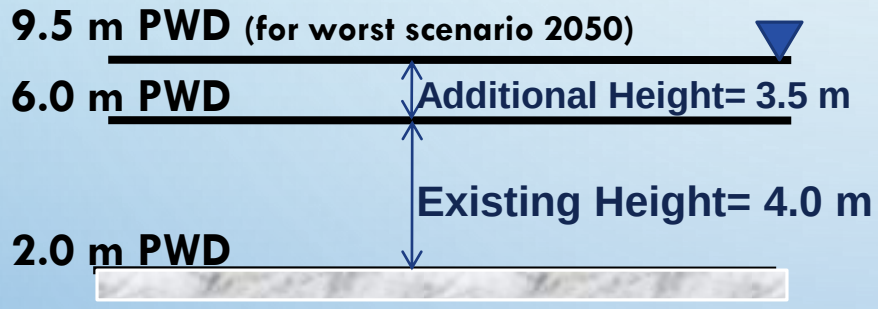
River
- Below 25m
- 25m - 50m
- Above 100m

Zone
- Zone-I
- Zone-II
- Zone-III
- Zone-IV

District	Upazila	Location	Surge Height in meter (baseline condition) 1:10	1:25	1:50	1:100	(climate change) 1:10	1:25	1:50	1:100
Zone-I										
Patuakhali	Kalapara	Uttar Tahirpur Regd. Primary School	1.21	2.76	3.93	5.10	2.04	3.98	5.45	6.92
Zone-II										
Laxmipur	Ramgati	Char Sita Torab Ali High School	0.09	2.19	3.77	5.35	1.54	4.29	6.37	8.45
Zone-III										
Noakhali	Noakhali Sadar	Chaprashirhat A. Rob Fazil Madrasha	0.61	3.24	5.23	7.22	2.35	5.66	8.17	10.67
Bhola	Bhola Sadar	19 WS Charsamaya Reg. Pry. School	1.27	3.25	4.76	6.26	2.72	5.07	6.85	8.63
Zone-IV										
Chittagong	Banshkhali	Sanu Modinatul Monowara Reg. Pry. School	0.81	3.26	5.11	6.96	1.95	4.97	7.25	9.54

Adaptation

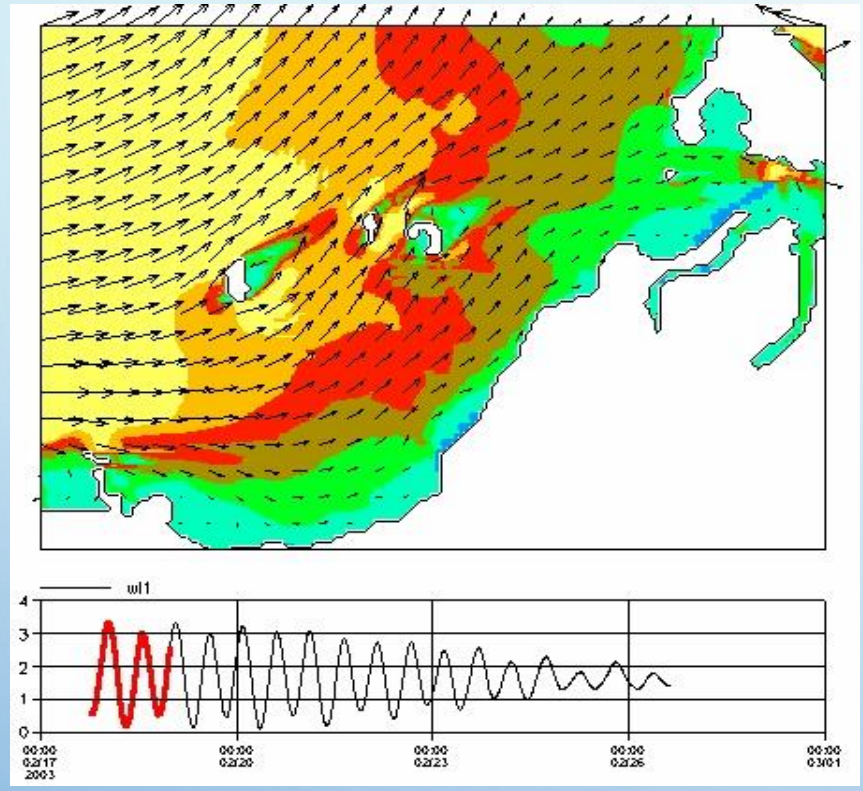
Height of the ground floor should be determined considering the inundation risk map of that area



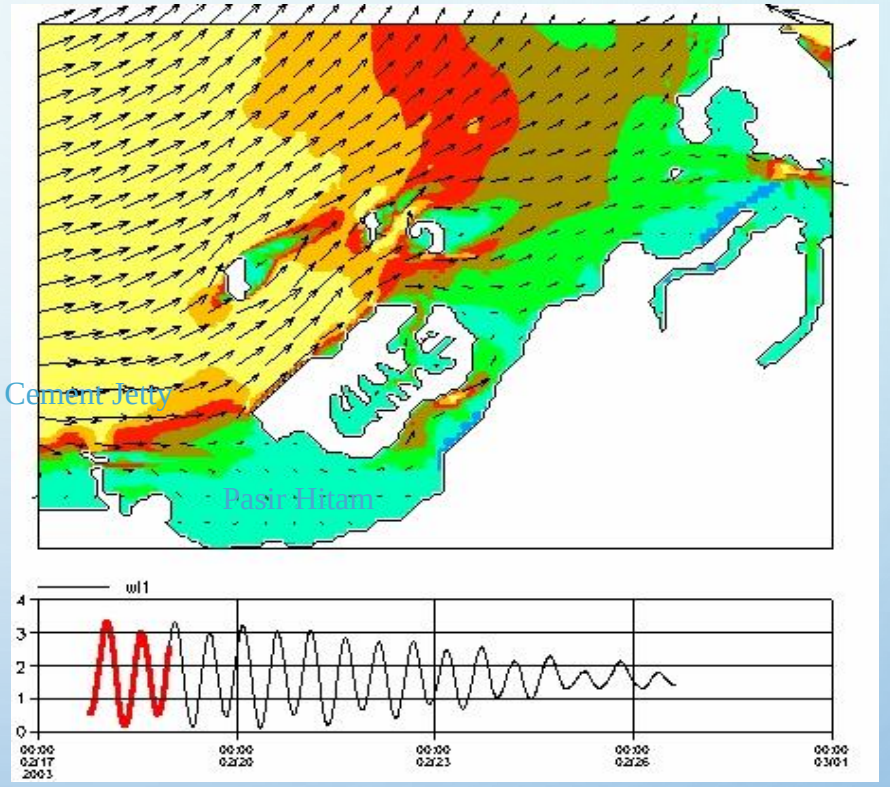
Kutubdia Island

Cyclone Shelter of Bangladesh Red Crescent Society (BDRCS)

Island Reclamation in Malaysian Coast



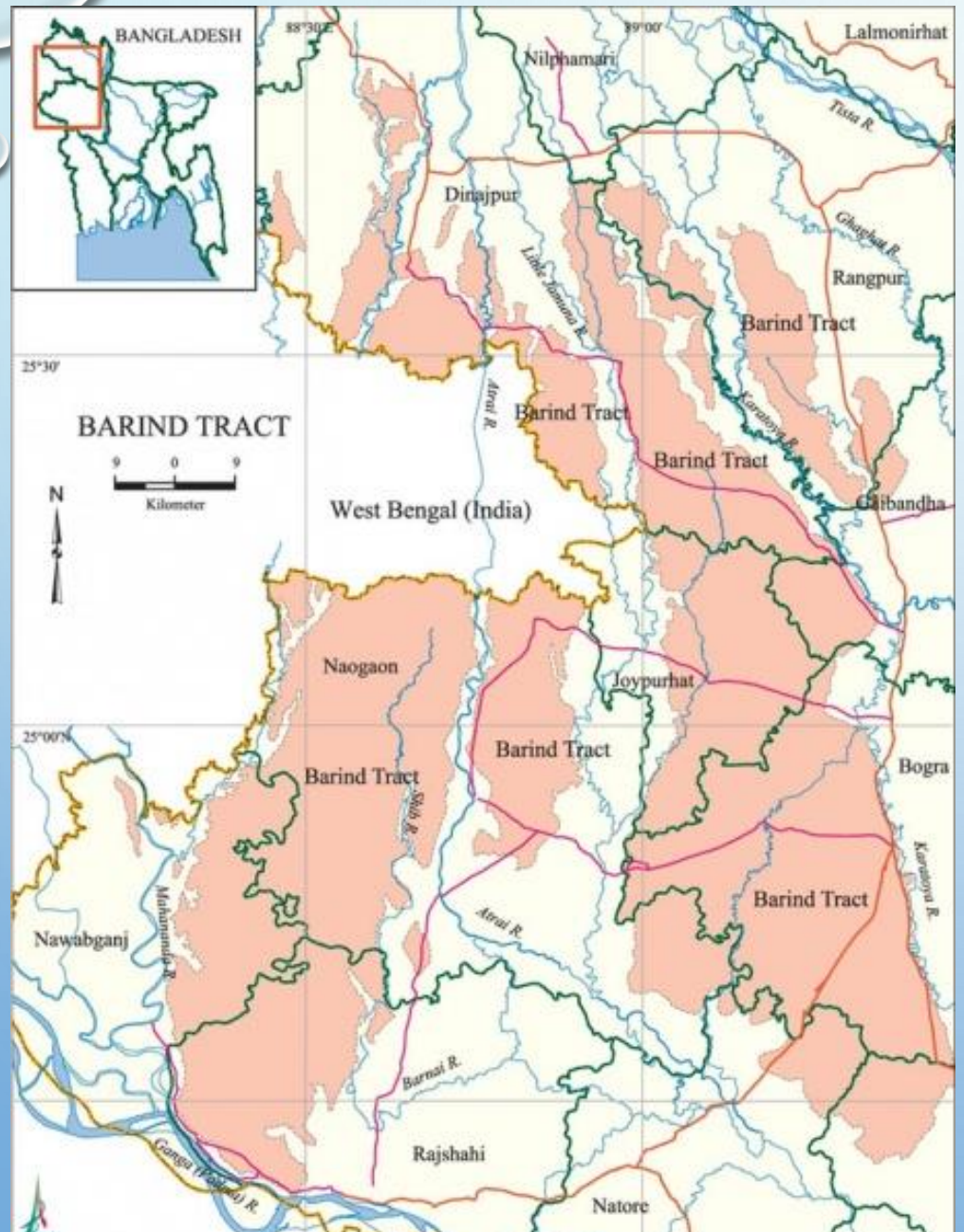
Current without Land Reclamation



Current with Land Reclamation

Experience gained in land reclamation in the Meghna estuary is adapted here

Barind Hotspot Area: Water Resources Management

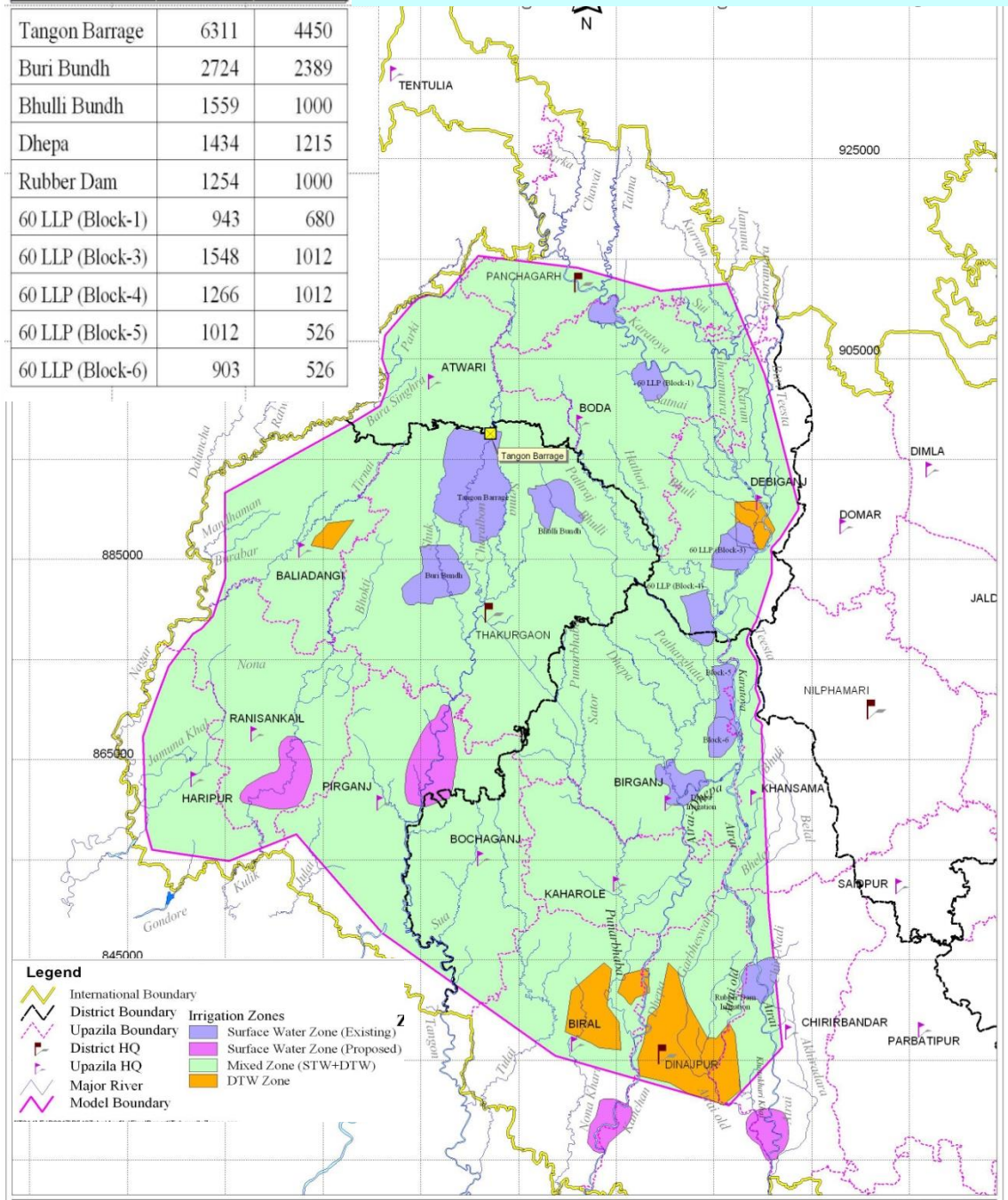


Main Challenges

- Shortage of water in dry season
- Shortage of drinking water
- High presence of Iron
- Shortage of cold storage
- Low profit in vegetable cultivation
- Lowering of GW table
- Lack of knowledge of efficient water irrigation
- River sedimentation
- Sand layer in crop field
- Disconnection of channels from river
- Lower seed quality
- Insufficient Credit facility
- Poor marketing system

Zoning of Areas suitable for SW and GW Development

Project Name	Gross Area (ha)	Net Area (ha)
Tangon Barrage	6311	4450
Buri Bundh	2724	2389
Bhulli Bundh	1559	1000
Dhepa	1434	1215
Rubber Dam	1254	1000
60 LLP (Block-1)	943	680
60 LLP (Block-3)	1548	1012
60 LLP (Block-4)	1266	1012
60 LLP (Block-5)	1012	526
60 LLP (Block-6)	903	526



Recommended Number of Tubewells

Serial	Upazila Name	DTW Type-1		DTW Type-2	STW
		Total	Existing		
1	Panchagarh	133	0	0	1248
2	Atwari	209	54	0	1872
3	Boda	332	77	0	2726
4	Debiganj	264	3	27	2255
5	Baliadangi	277	112	146	1782
6	Thakurgaon	758	485	0	5805
7	Ranisankail	322	130	0	2763
8	Haripur	236	30	0	1711
9	Pirganj	407	125	0	3009
10	Birganj	474	147	0	3633
11	Khanshama	98	3	0	779
12	Bochaganj	247	45	0	2126
13	Kaharole	252	55	0	1851
14	Biral	317	40	85	1671
15	Dinajpur sadar	225	47	119	1084
16	Chirirbandar	106	25	33	580
	Total	4657	1378	410	34895

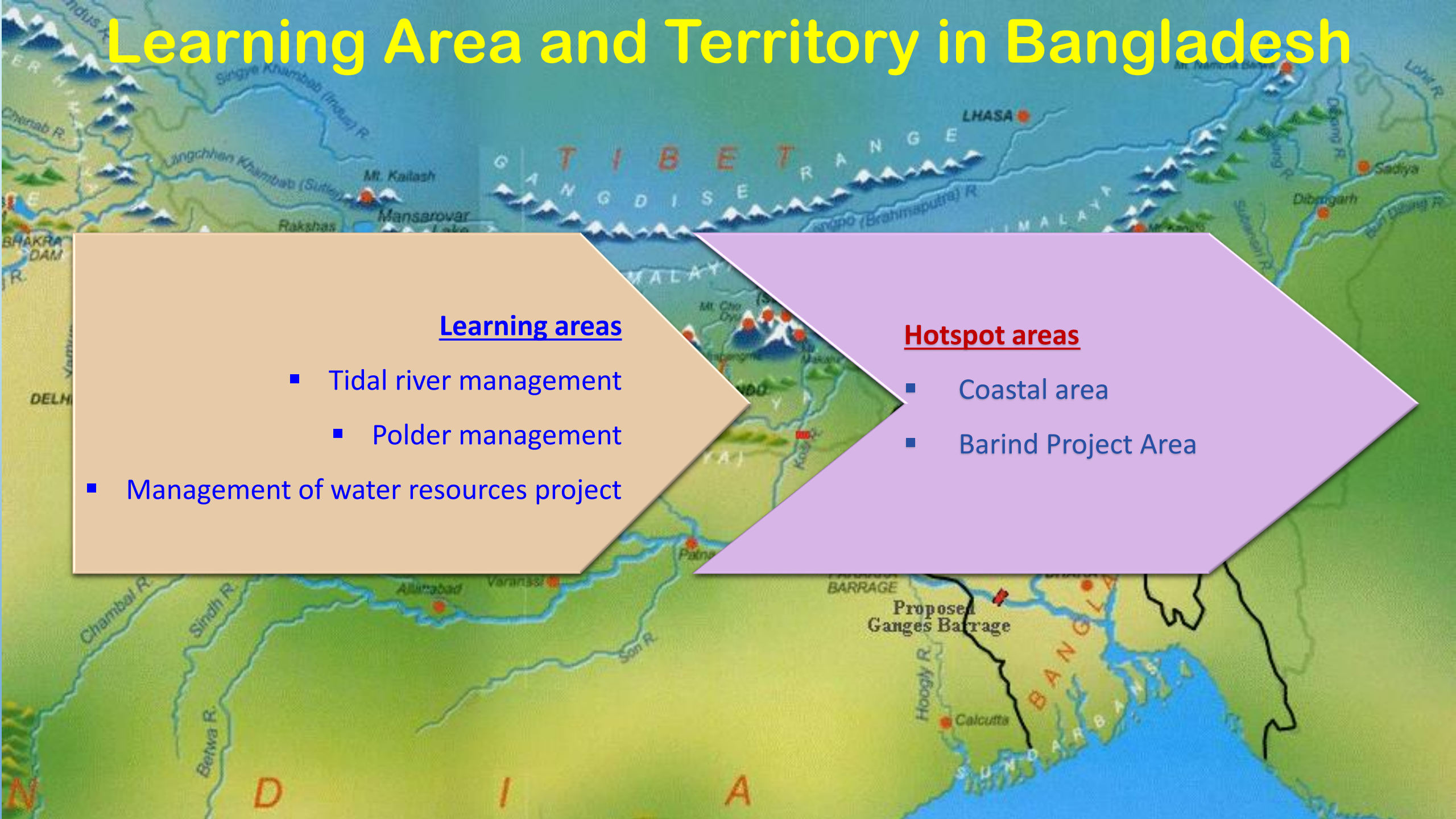
Goss Study Area : 3,95,225 ha
Cultivable area : 3,17,393 ha

Area under HYV Boro & Aus
Pre project : 1,85,756 ha
Recommended : 2,56,896 ha

Way Forward

- Lesson learning from Bangladesh Delta management for capacity enhancement in Myanmar (Phase-II)
- Later other regional delta countries would be involve in knowledge sharing for capacity enhancement of the stakeholders and institutions in policies and politics to cope with impacts of climate change and scaling up the resilience and Adaptation measures.

Learning Area and Territory in Bangladesh



Learning areas

- Tidal river management
- Polder management
- Management of water resources project

Hotspot areas

- Coastal area
- Barind Project Area