



# Bangladesh Delta Plan 2100 Formulation Project

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**Planning Commission**  
**Government of the People's Republic of Bangladesh**

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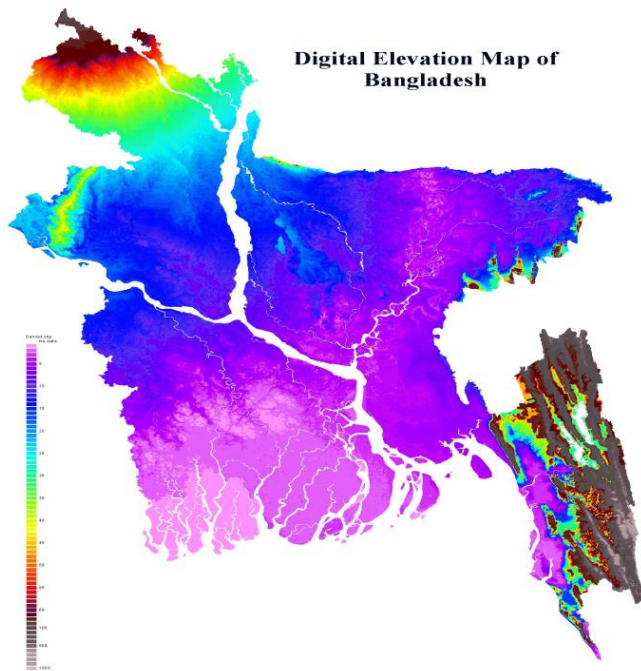
Bangladesh, encompassing the GBM river systems, is one of the most dynamic deltas of the world



Ganges Basin	
Catchment area (sq km)	10,00,000
Av. Annual rainfall (mm)	1,200
Av. Annual discharges (cumec)	11,000
Max. Discharge (cumec)	78,000
Sediment transport (m ton/yr)	550

Brahmaputra/Jamuna Basin	
Catchment area (sq km)	5,73,000
Av. Annual rainfall (mm)	1,900
Av. Annual discharges (cumec)	20,000
Max. Discharge (cumec)	1,00,000
Sediment transport (m ton/yr)	590

Meghna Basin	
Catchment area (sq km)	77,000
Av. Annual rainfall (mm)	4,900
Av. Annual discharges (cumec)	4,600
Max. Discharge (cumec)	20,000
Sediment transport (m ton/yr)	13



## Deltaic Bangladesh

### Land Classification

- Area :147 570 km<sup>2</sup>
- Hills : 12%
- Terraces : 8%
- Floodplains : 80%
- Habitat of about 156 million people
- Just above the sea level

## Context of Bangladesh Delta Plan 2100

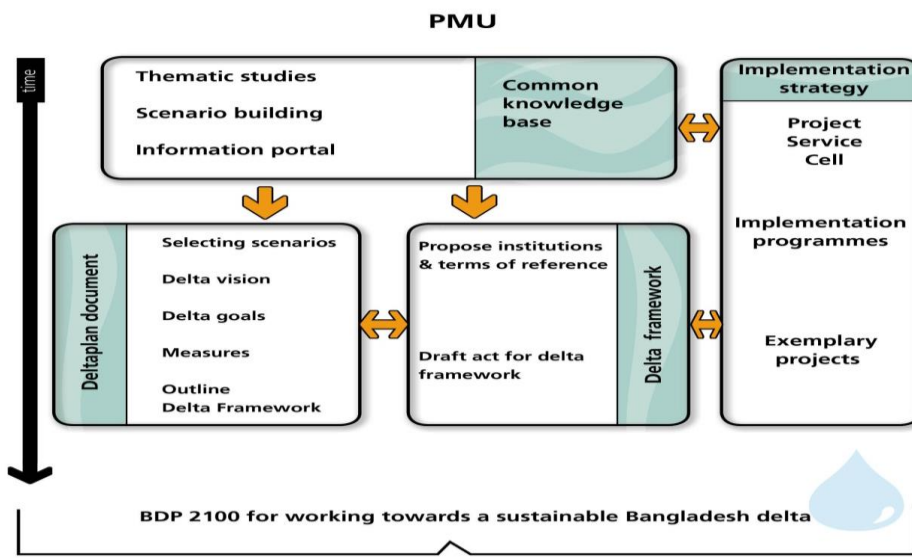
- Bangladesh is confronting the complex problems of **water safety, food security and natural calamities** like floods, cyclones, river bank erosion and drought.
- Population growth, economic development and **climate change** have posed additional challenges.
- There is a high need within the Bangladesh delta to improve the living conditions through better **water management and governance**.
- Bangladesh Delta Plan Formulation Project has been undertaken with assistance from Government of the Netherlands to optimize short term interventions and investment and to prepare for future change.

## Objective of the Project

“The main objective of the project is to formulate a commonly agreed upon **comprehensive, integrated, holistic, long term plan for Bangladesh Delta** with vision and strategy to reach optimum level of **water safety and food security** as well as sustained economic growth and a **framework for its implementation** with elaborated **investment plan** phased out in short, medium and long term interventions”.

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### Overall expected Process



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# Developing Strategies for Adaptive Delta Management in the Face of Climate Change

[www.bandudeltas.org](http://www.bandudeltas.org)

Dr. Jaap de Heer, Team Leader

GoB General Economic Division (GED)  
Planning Commission  
and  
GoN Embassy of Kingdom of The Netherlands (EKN)

Starting Date:  
12 March 2014

Bangladesh Dutch Delta Advisory  
Services (BanDuDeltAS)



**BANDUDELTA**  
BDP 2100

- I. Mission and Organization**
- II. Preparing the Ground**
- III. Interactive Strategic Planning**

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## Importance of Bangladesh Delta Plan 2100



Bangladesh:

- Average economic growth rate of 6%
- Middle-income country by 2021

Threatened by:

- Current water safety situation and climate change: floods, droughts, sea level rise, salinity intrusion, access to fresh water

Challenges:

- Long term holistic approach to water safety, food security and economic growth in relation to future water and land management
- Institutional and governance setting making long term holistic Delta Plan 2100 approach possible and implementable

### I. Mission and Organization

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## BD Delta with Climate Change Challenges

BDP 2100 takes a different point of view: long term and holistic



Considering uncertainties  
risks and impacts

Addressing strategic  
questions and choices:

- Vision & Scenarios
- Pathways & Tipping Points
- Institutional Framework

### I. Mission and Organization

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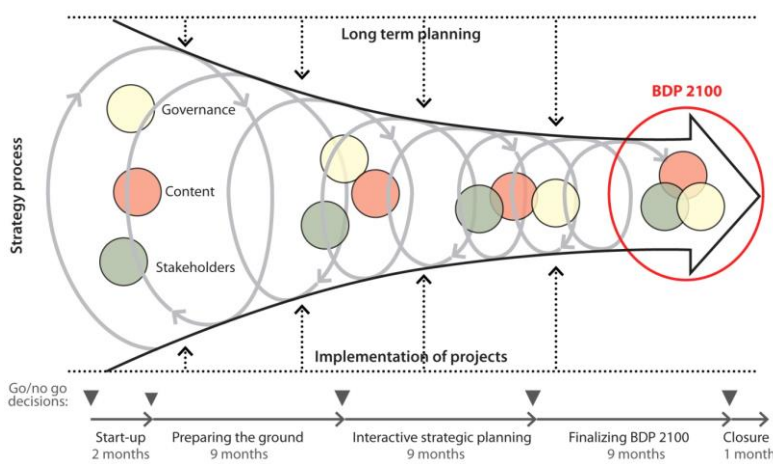
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II. Preparing the Ground

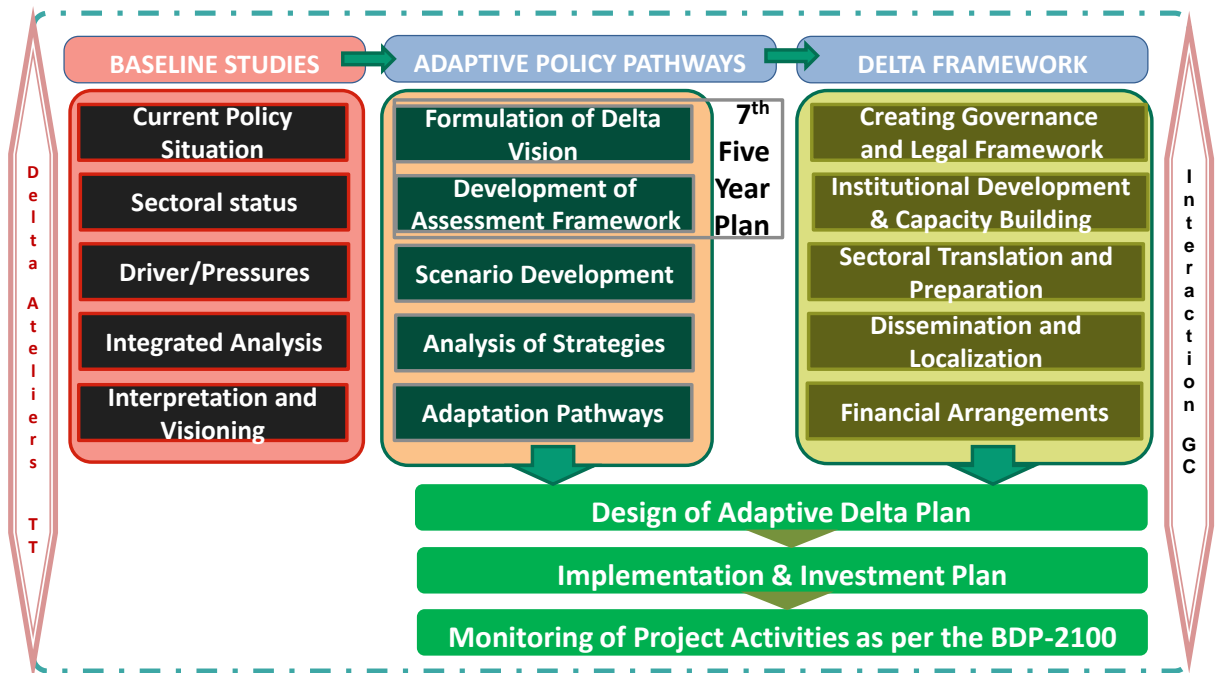
### Interactive Strategic Planning process

Governance, Content, and Stakeholders will come together, via learning cycles



- Concepts:
- Planning as Learning
  - Adaptive Management
  - Strategy Process sense-making - sensegiving

II. Preparing the Ground



## Clustering of Themes and Baseline Studies

### Water Resources

- I. Morphological dynamics of Bangladesh Delta
- II. Water resources
- III. Coastal Polder issues

### Water Supply and Sanitation

- I. Public health, water supply and sanitation

### Disaster Risk Reduction

- I. Climate change issues
- II. Disaster management

### Spatial Planning

- I. Land resources
- II. Urbanization and settlement

### Food Security

- I. Agriculture and food security
- II. Fisheries and livestock

### Environmental Management

- I. Ecological Settings
- II. Forests and biodiversity
- III. Environmental pollution

### Economics and Finance

- I. Growth of Population and Management in the context of resources setting
- II. Socio-economic and demographic condition
- III. Sustainable Transportation Infrastructures

### Governance

- I. Information and creation of knowledge management Institution
- II. Institutional framework/arrangement
- III. Regional cooperation



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BDP 2100

Eight Clusters with 19 themes to be studied

The Baseline Studies include:

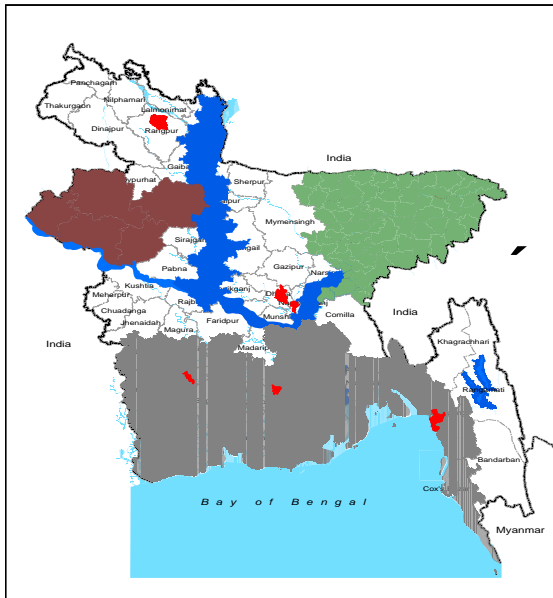
- Study Plans
- Study of Baseline Conditions, current approaches and issues
- Possible solutions
- use of Delta Ateliers & Touch Table for broad consultation

Integrated Analysis

- Hot Spots
- Delta Vision

### II. Preparing the Ground

# Major Hotspots of Delta Plan



- Mighty rivers
- Coastal areas
- Dhaka and other major cities
- Haor-areas in the North-East
- Drought prone areas in the North-West

## III. Interactive Strategic Planning

IIII. Interactive strategic planning

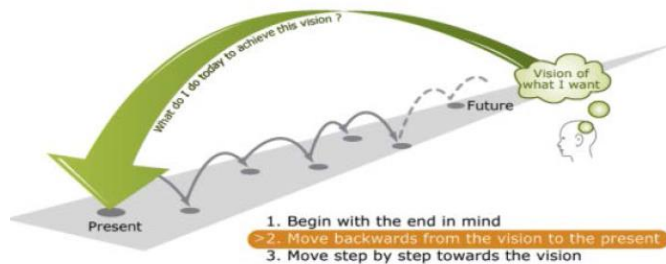


## Developing Delta Vision (Perspective)



*Delta Vision: "Set of vision elements (principles, values, aspirations) of desirable delta development and goals related to its realization."*

- Vision e.g.: climate proof delta, competing delta, sustainable delta
- For a complex adaptive system as a delta, such strategic vision is more a direction than an end-picture.



### III. Interactive Strategic Planning

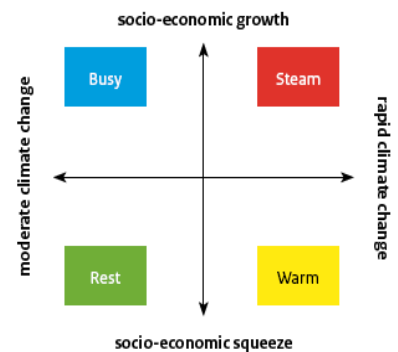
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## Scenarios and strategies with interventions



- Realization of the Delta Vision may take place under different future circumstances
- Scenarios will be used as descriptions (narratives) of 'imaginable' futures
- Related to that a strategy with actionable interventions will be proposed together with an Investment Plan & Roadmap
- Flexibility is on the long term important: using policy pathways and tipping points for adaptation when needed



### III. Interactive strategic planning

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## Input to 7th Five Year Plan



- 7<sup>th</sup> Five Year Plan: a government wide harmonization, and budget allocation
- June 2015: GoB will finalize its 7<sup>th</sup> Five Year Plan
- February 2015: contribute to the 7<sup>th</sup> Five Year Plan, by:
  - Tentative Delta Vision and Assessment Framework
  - Interventions / implementation proposals
  - Investment analysis and funding estimates and opportunities (in relation with donors and IFI's)

### III. Interactive Strategic Planning

## Delta Framework for adequate governance



- Socio-political interaction and support to BDP 2100: GoB officials; cooperation of partners/IFI's; ngo's; private sector
- Embedding Delta Plan 2100 within core governance and institutional setting of Bangladesh, using 5 Delta D's
- Capacity building plays an important role in understanding and using the concepts, in consultation and cooperation
- Working on implementation and the legacy of the project

### The 5 Delta D's:

- Delta Act: statutory basis for a Delta Plan
- Delta Plan: sets out vision, scenarios, strategy, interventions and investments
- Delta Fund: financial provisions even for (future) Delta Programs
- Delta Decisions: strategic choices on Delta Plan and investments
- Delta Commissioner: the government Commissioner or Committee for the Delta Plan

### III. Interactive strategic planning

## Implementation and Investment Strategy



- 'Fast Track of implementation' of BDP 2100 outcomes:
  - input 7<sup>th</sup> Five Year Plan, link with existing projects (e.g.CDSP-4; Haor Master Plan; CEIP), innovations / pilot e.g. Tidal River Management ('Polder 2.0')
- Implementation Guideline
- Project Service Cell: facilitating decision making, use of Guideline
- Investment Plan and Roadmap; funding mechanisms / phasing
  - Short term: no-regret interventions; 'low hanging fruit'
- Results Framework with Monitoring and Evaluation approach

III. Interactive strategic planning

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BDP 2100

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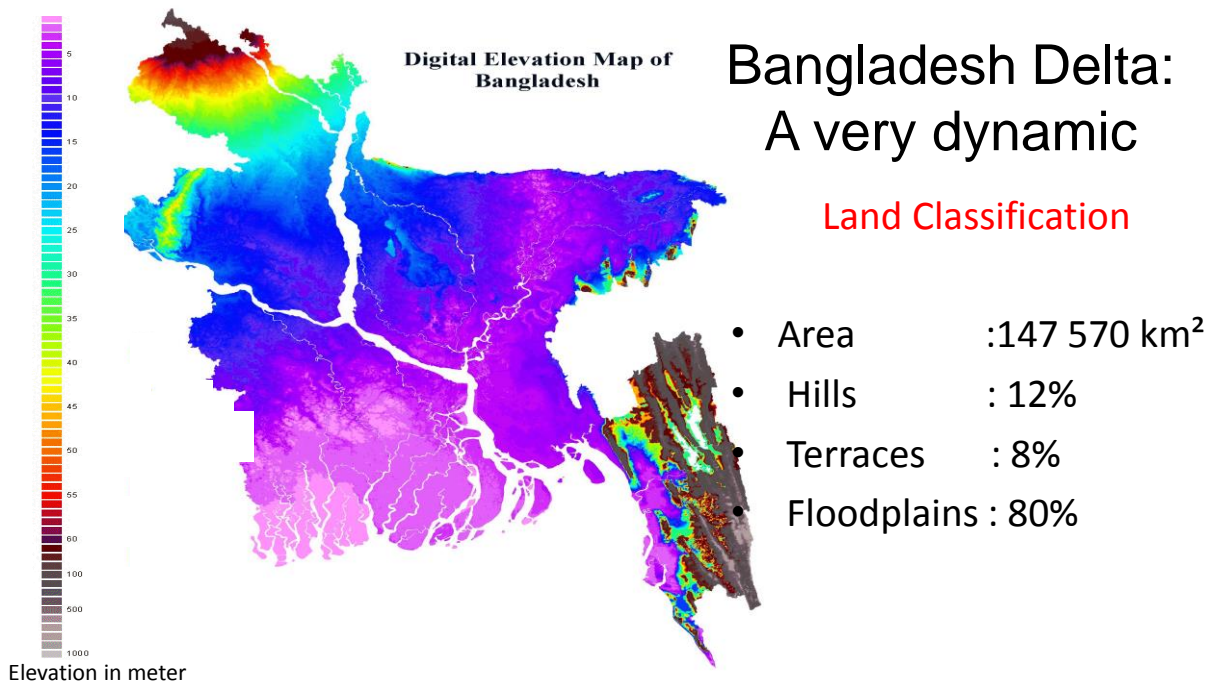


# BANDUDELTA BDP 2100

BANGLADESH DELTA PLAN 2100

## Delta Challenges

Giasuddin Choudhury  
Deputy Team Leader



# Delta Challenges

Bangladesh aspires to be middle income country by 2021

- Present growth : 6% (last 10 years)
- Forecasted growth : 6.7-7.5 (next five years)

However, we face many challenges

Socio-economic snap-shot

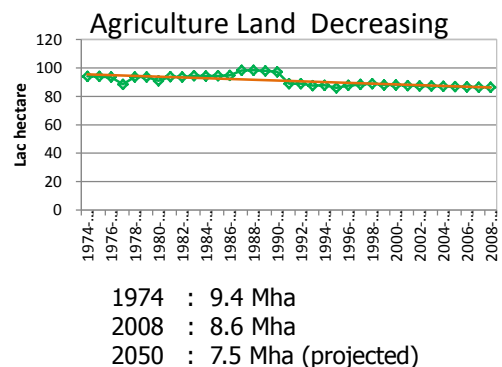
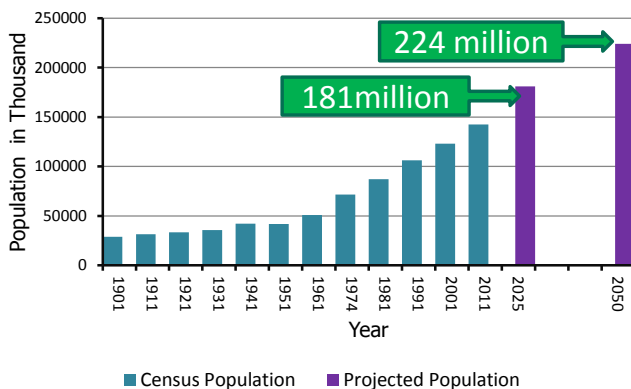
- HDI ranking (2013) : 146<sup>th</sup> out of 186 countries
- GHI ranking (2012) : 68<sup>th</sup> out of 79 countries

Demography

- Population : 156 million

# Delta Challenges

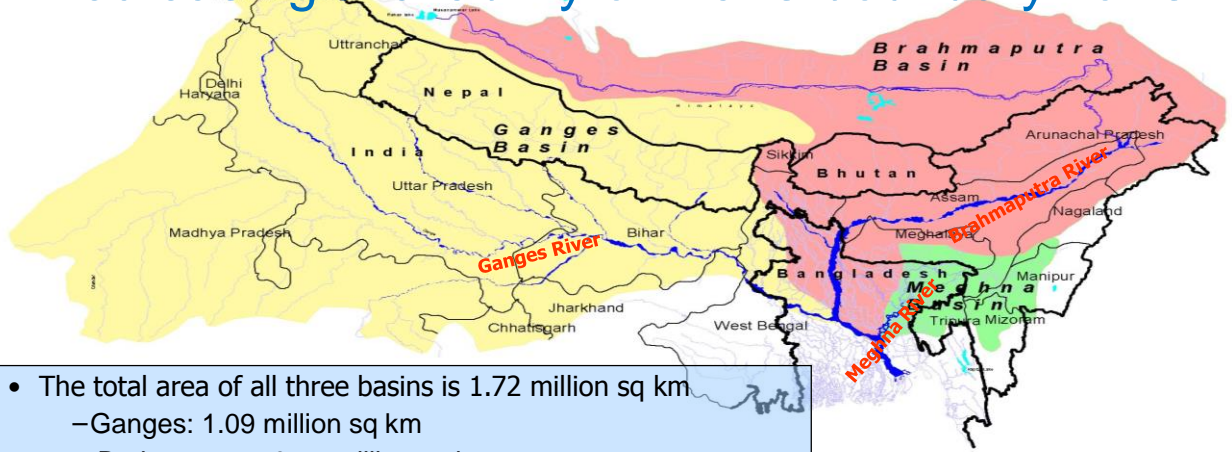
## Population Growth & Land Use Change



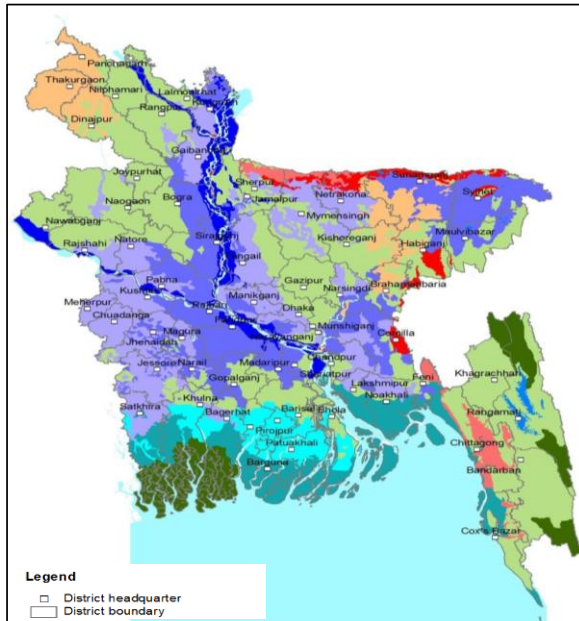
Source: NWMP

# Delta Challenges

## Decreasing availability of trans-boundary flows



- The total area of all three basins is 1.72 million sq km
  - Ganges: 1.09 million sq km
  - Brahmaputra: 0.57 million sq km
- 7% of this area falls within Bangladesh
- 62% of this area falls within India
- 31% Nepal

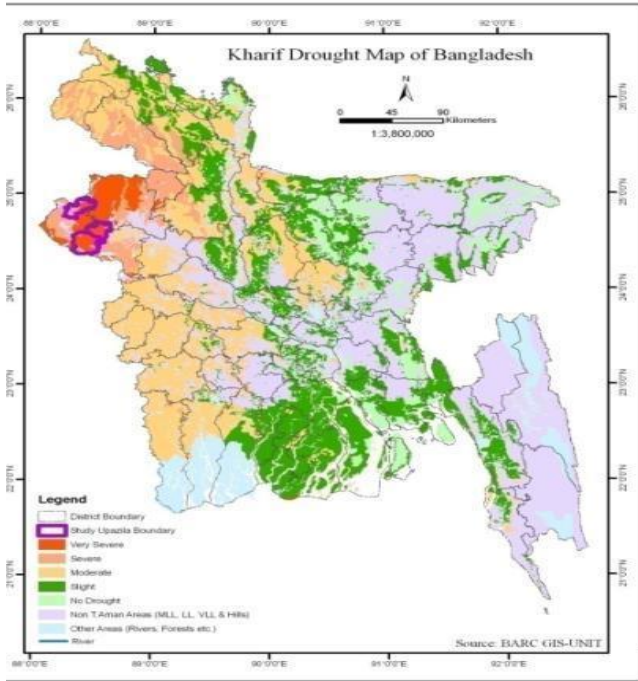


## Delta Challenges: A very flood prone delta

- In normal years 1/5 flooded
- In extreme, events 3/5 flooded

- Flood Prone Area**
- Severe Flash Flooding
  - Moderate Flash Flooding
  - Low Flash Flooding
  - Severe River Flooding
  - Moderate River Flooding
  - Low River Flooding
  - Severe Tidal Surge
  - Moderate Tidal Surge
  - Not Flood Prone
  - Rivers and Bay of Bengal
  - Kaptai Lake
  - Sundarban and Reserved Forest

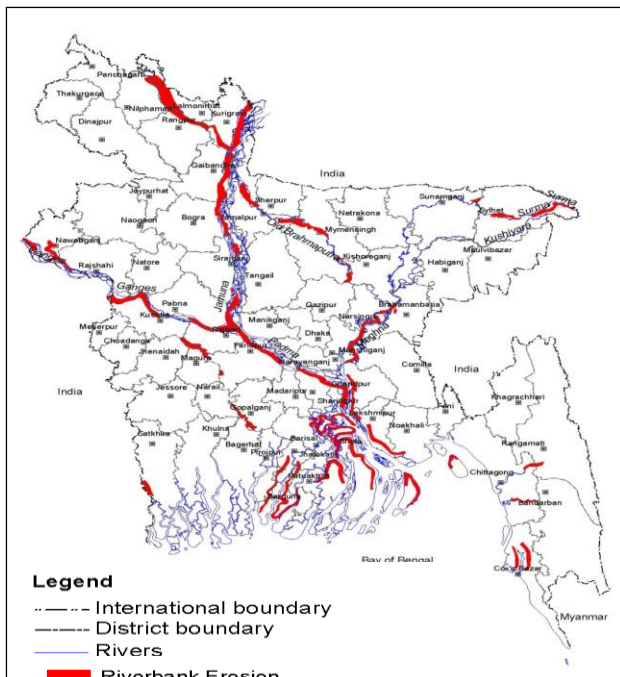
- ❖ **Severe** : Occurs 5 times or more in 10 years
- ❖ **Moderate** : Occurs 3 -4 times or more in 10 years
- ❖ **Slight** : Occurs at least twice in 10 years
- ❖ **Not Affected** : None in 10 years



## Delta Challenges: Prone to agricultural drought



## Delta Challenges: Shifting and eroding rivers

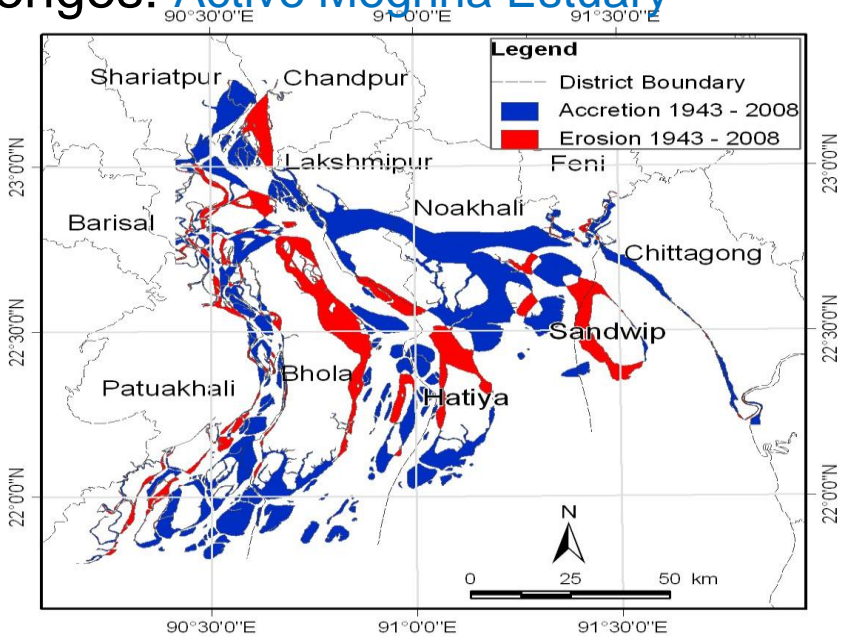


- Annual Rate of River Bank Erosion: 6,000 ha
- Annual Displacement : 50,000 person

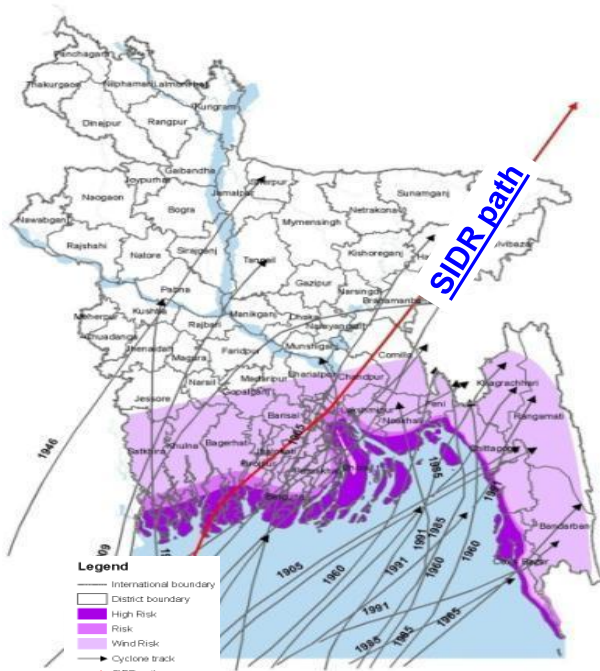
# Delta Challenges: Active Meghna Estuary

Net accretion was 1700 km<sup>2</sup> during the last 60 years

Delta has prograded about 50 km towards the sea



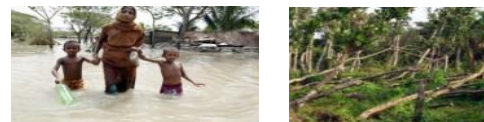
# Delta Challenges: Vulnerable to cyclone and storm surge



Cyclone 1991

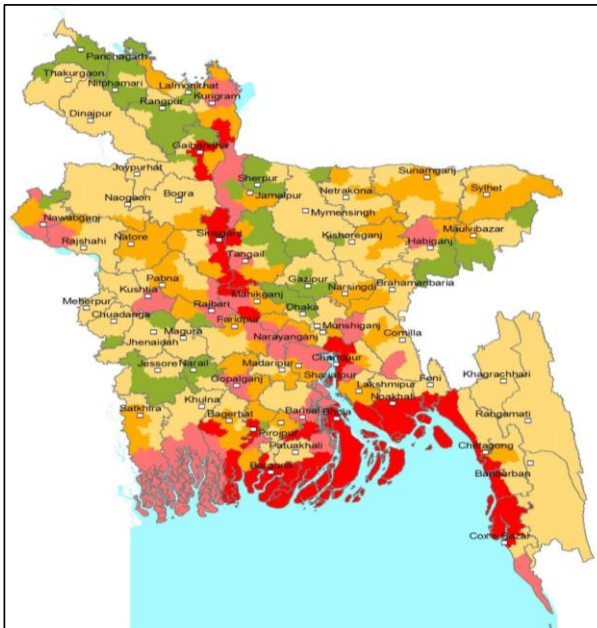


Sidr 2007



Aila 2009

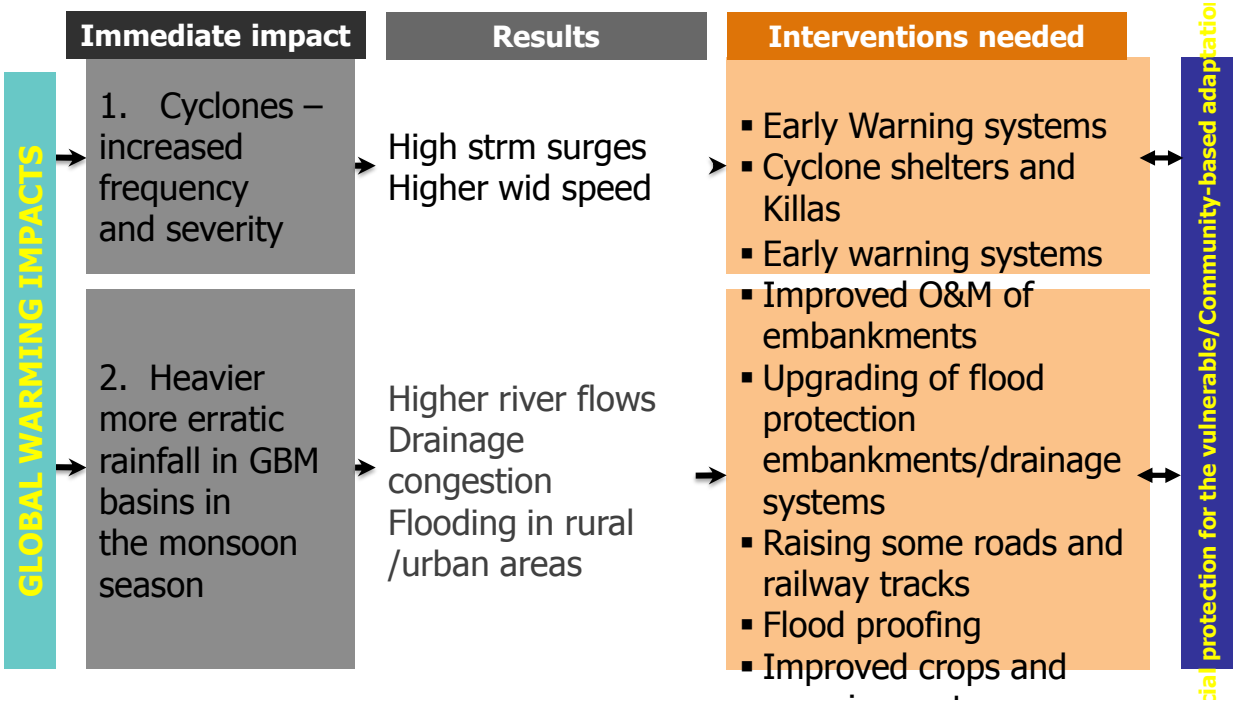


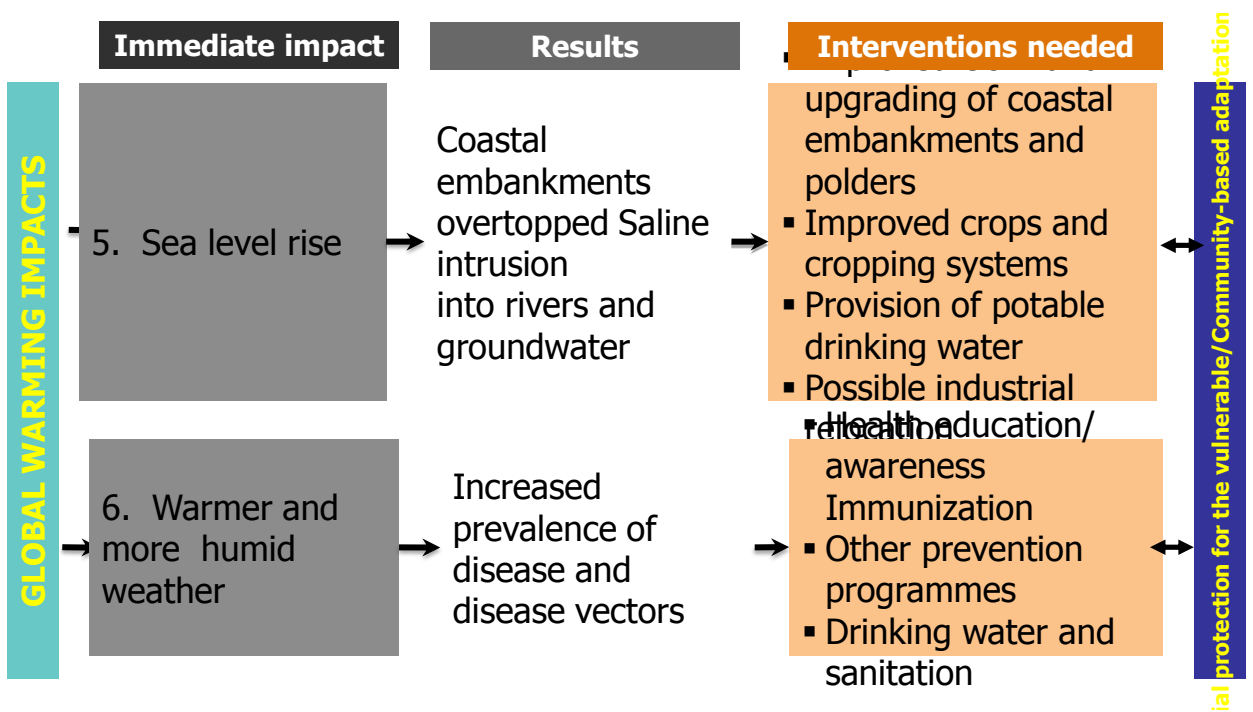
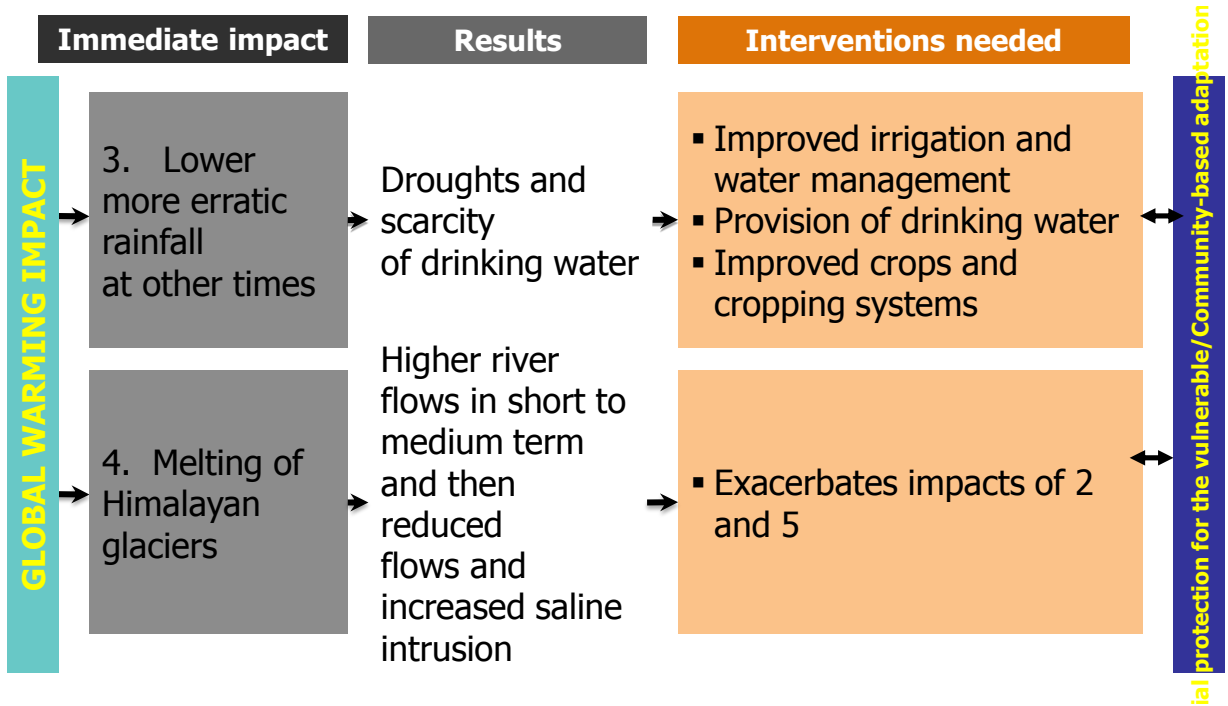


# Hazard Class Map

- Legend**
- District headquarter
  - ▭ District boundary
- Hazard class**
- Very High ( 5.00-above )
  - High ( 4.00 - 4.99 )
  - Moderate ( 3.00 - 3.99 )
  - Low ( 1.00 - 2.99 )
  - Very Low ( below 1.00 )

Ranking of multi-hazard maps used for preparing the risk-index :	
❖ Cyclone	: High risk-5, risk-3, wind risk- 1
❖ Flood	: Severely flooded due to major river floods – 3, flash flood due to major river-2, other flood-1
❖ Riverbank erosion	: Severe erosion-2, erosion -1
❖ Drought	: Very severe drought prone areas – 2, severe drought-1





## Investment Needed

### Immediate impact

Sea level rise

### Results

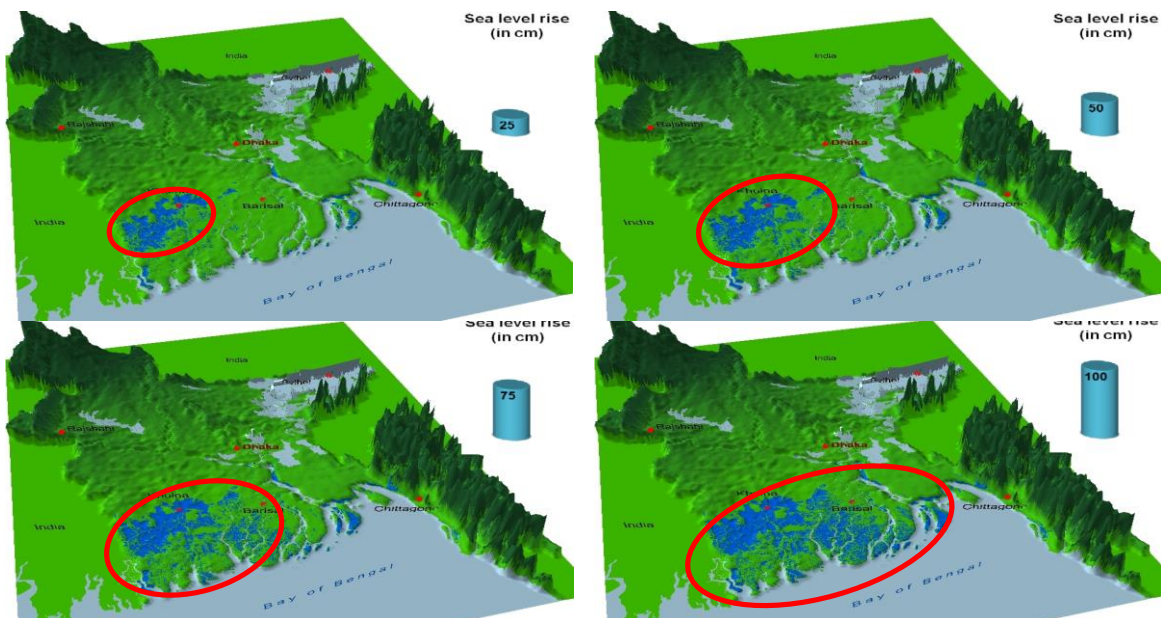
Coastal embankments overtopped Saline intrusion into rivers and groundwater

### Investment needed

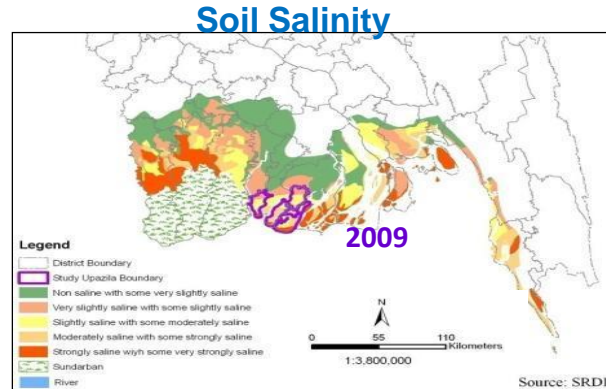
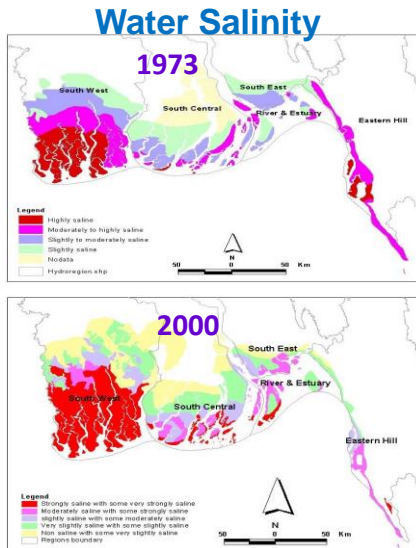
- Improved O&M and upgrading of coastal embankments and polders
- Improved crops and cropping systems
- Provision of potable drinking water
- Possible industrial relocation
- Awareness building

Social protection for the vulnerable/Community-based adaptation

## Sea level rise induced Coastal Flooding



## Vulnerability to Salinity Intrusion



- ❑ Salinity intrusion is increasing
- ❑ Threatening water resources and affecting production in coastal areas

## Climate Change Strategy

**Bangladesh vision** is to eradicate poverty and achieve economic and social well-being for her people

Bangladesh adapted a pro-poor, climate resilient and low carbon development strategy

Strategy based on four building blocks of Bali Action Plan:

- Adaptation to climate change



**On the backdrop of these as well as other challenges, Bangladesh Delta Plan 2100 is being formulated**

Bangladesh Delta Plan 2100 Planning Context