Success of Integrated Water Resources Management to Tackle Water Related Disasters in Bangladesh

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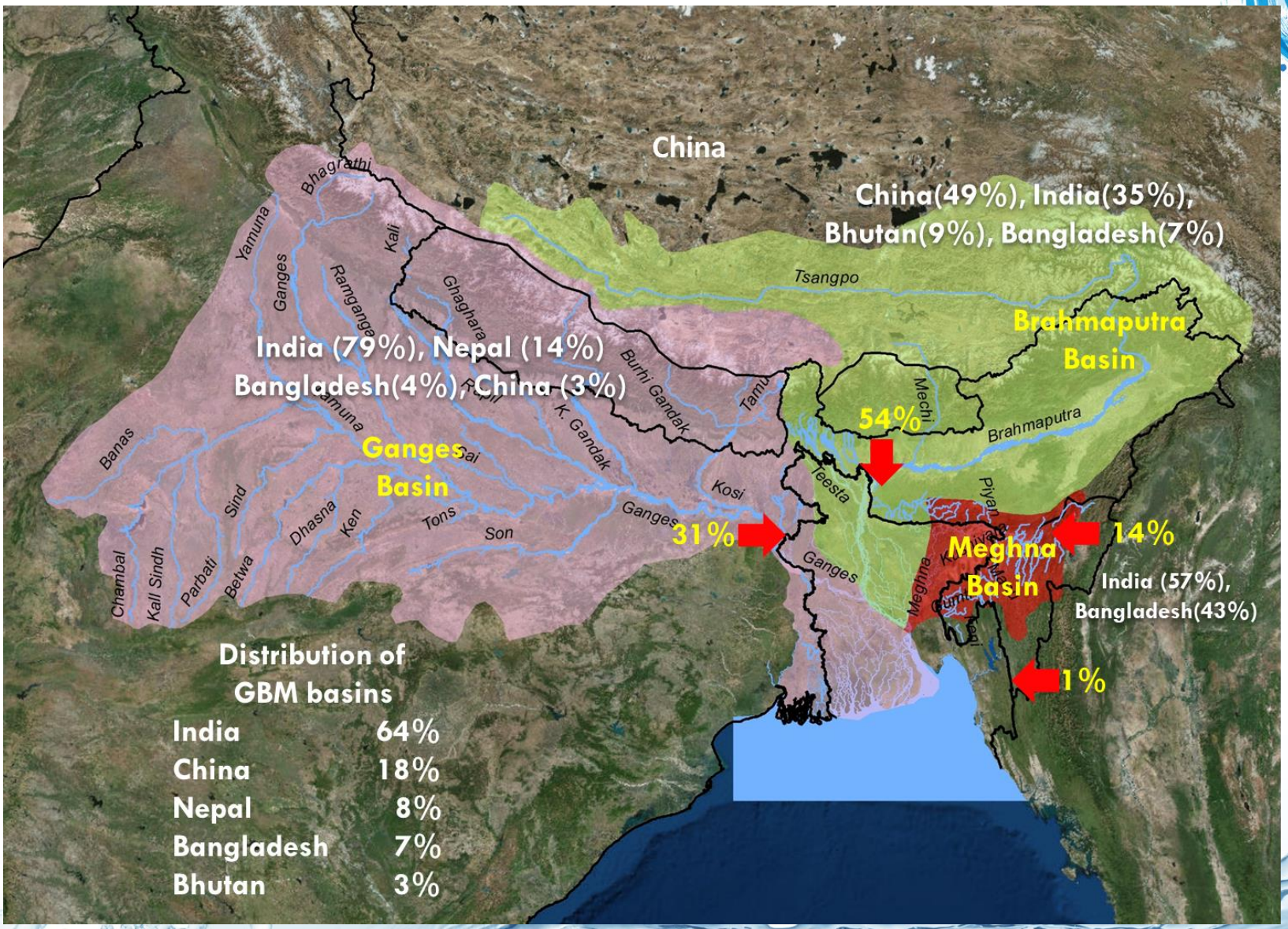
Presentation Outline

- Preamble
- Major Issues & Challenges for WRM
- Water Related Disasters and Climate Change
- Major Achievements of IWRM
- Status of IWRM and Action Plan for SDG
- Concluding Remarks

Preamble

- Bangladesh is having 7% growth rate since last five years tackling all water related disasters through IWRM
- Country houses only 7% area of the total GBM basins which has more than 400 rivers, including 57 trans-boundary rivers
- Water availability between dry and wet seasons highly uneven but aggregate average compares well with many other countries
- Uncertainty of external water flow availability and climate change impact increases the water stress
- IWRM plays a key role for sustainable economic growth to achieve the vision 2021and 2041of present government and SDG

Distribution of GBM Basins

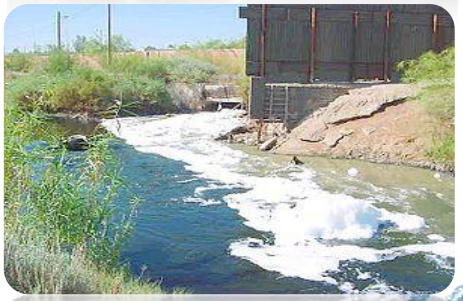


Major Issues & Challenges for IWRM

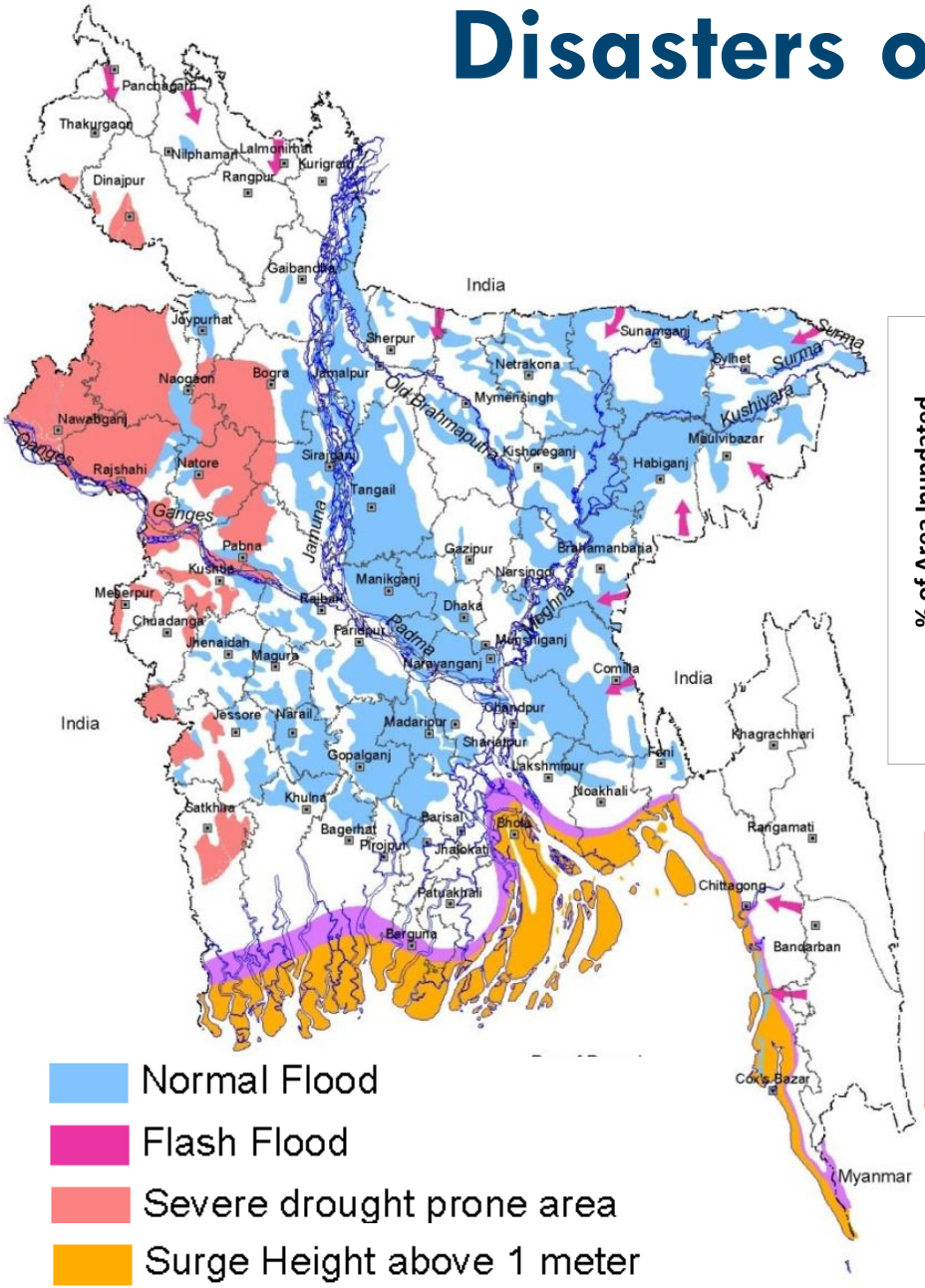
- Due to geographic location & seasonal variability Bangladesh is highly vulnerable to flood, drought, river bank erosion, water logging and salinity intrusion
- 25% area of the country are water stressed due to inadequate water availability in dry season
- Out of 7.6 million ha of irrigable land, 2.6 million ha are still without irrigation coverage
- Every year about 50 thousand people become homeless due to loss of 6000 ha of land by river bank erosion
- Reduction of upstream water flow causing salinity intrusion, siltation and erosion in the coastal area

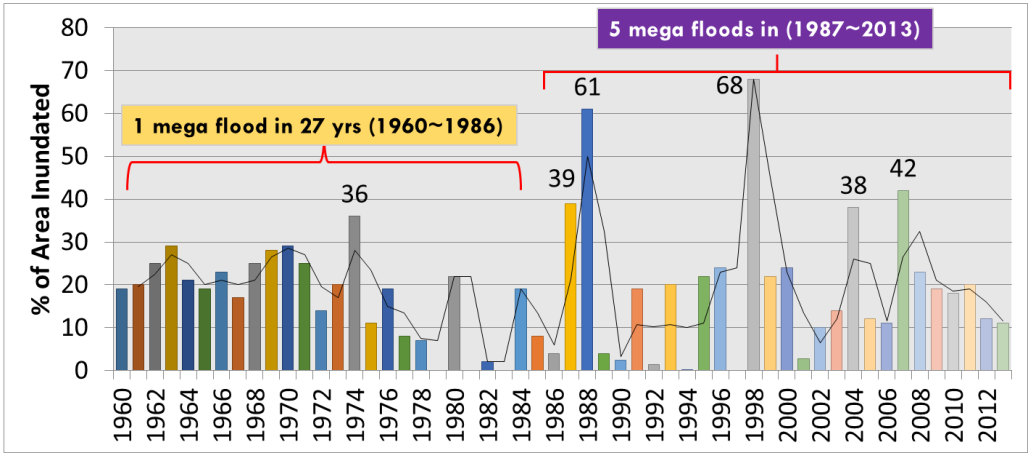
Major Issues and Challenges for IWRM

- Storm surge and sea level rise due to climate change is also affecting the coastal zone of the country
- Dry season flow augmentation is essential for sustainable economic development of the country, protect salinity intrusion and restore ecosystem
- Surface and ground water pollution is a potential risk for conservation and restoration of natural resources and bio-diversity
- Reclamation of land from river and estuary is essential to cope with population pressure and economic development
- Implementation of IWRM in micro - macro scale



Disasters of Bangladesh





Almost once in **every 4~5 years,** severe flood **inundates 60~80% lands** of Bangladesh, causing severe damages to our lives and livelihood

History of Mega Floods

1954

- Inundation 28%

1987

- Inundation 35%
- Estimated damage US$ 1.0 billion
- Death toll 2,055

1988

- Inundation 61%
- Estimated damage US$ 1.2 billion
- Death toll 6,500

1998

- Inundation 69%
- Estimated damage US$ 2.8 billion
- Death toll 1,100

2004

- Inundation 38%
- Estimated damage US$2.0 billion
- Death toll 700

River Bank Erosion & Consequences

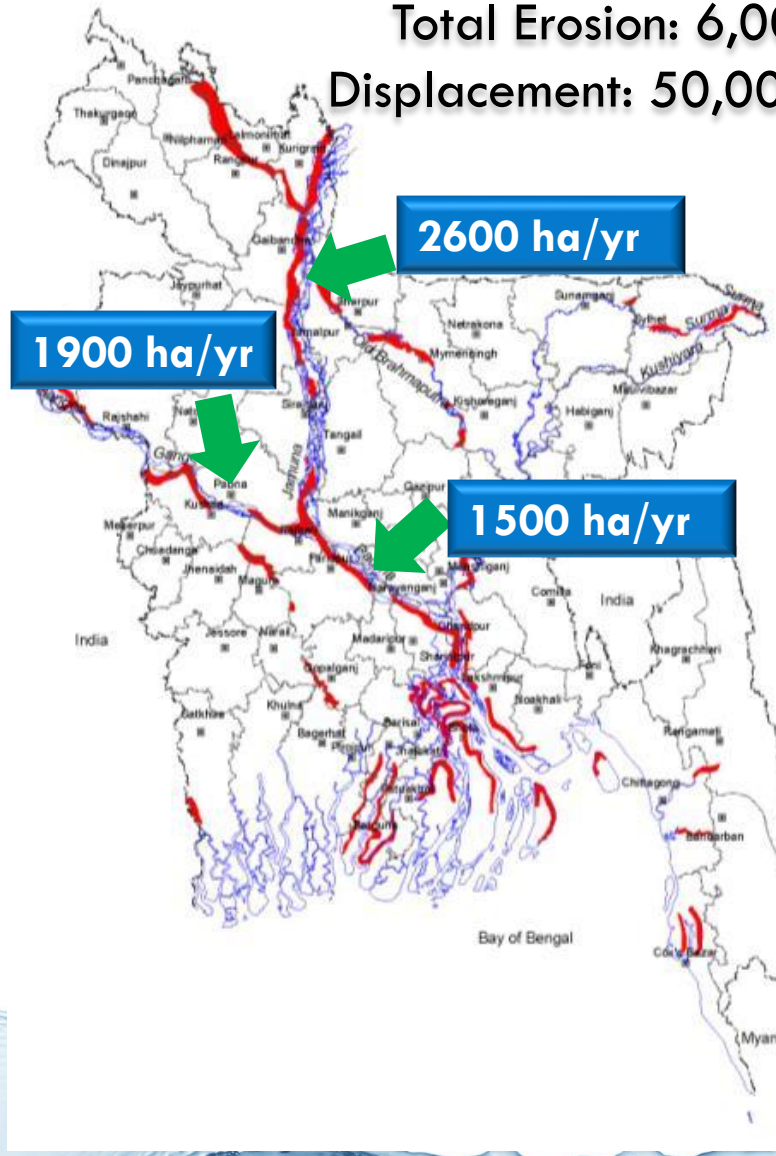
Total Erosion: 6,000 ha/ yr

Displacement: 50,000 person/yr

Land Loss

Infrastructural Damage

Loss of Assets

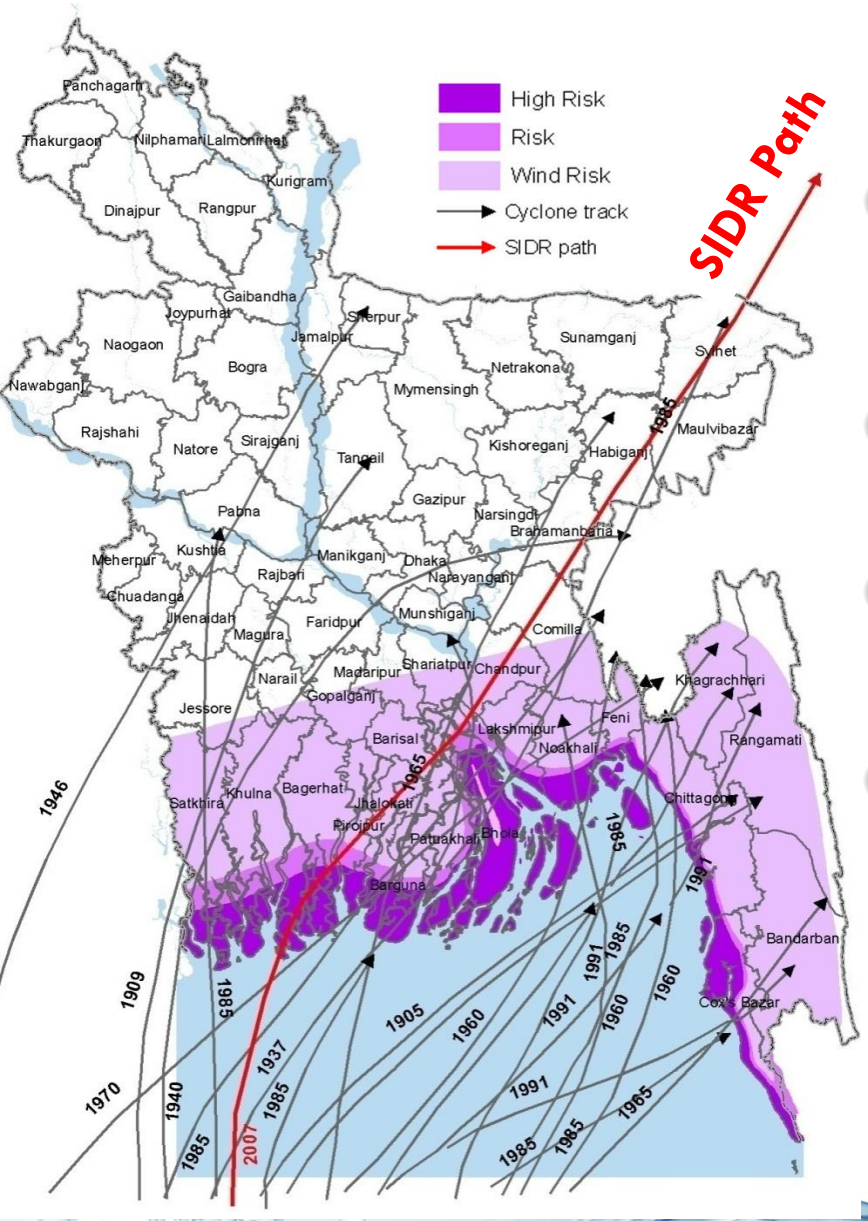


Low Production

Household Loss

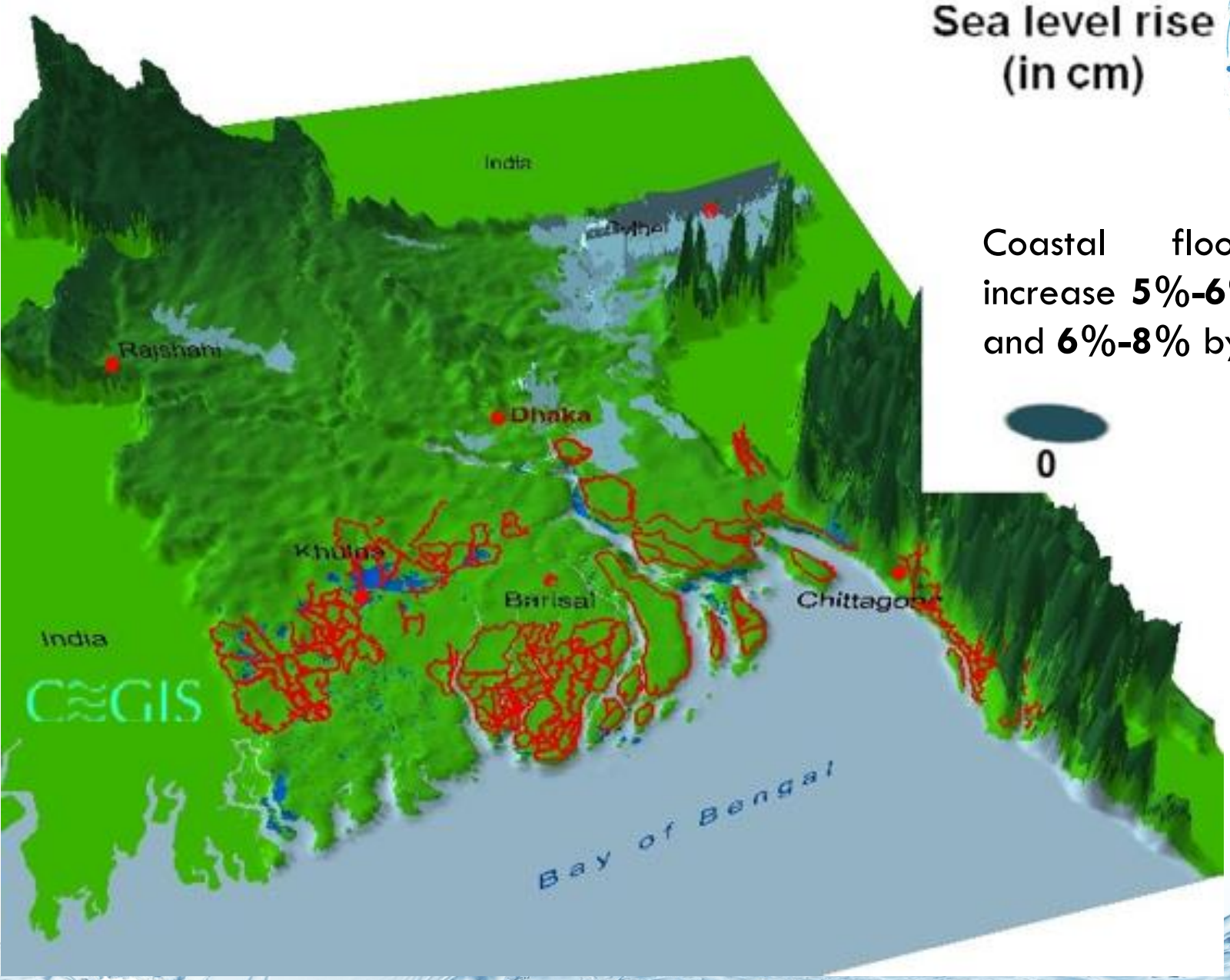
Displacement

CC Impact on Cyclone and Storm Surge



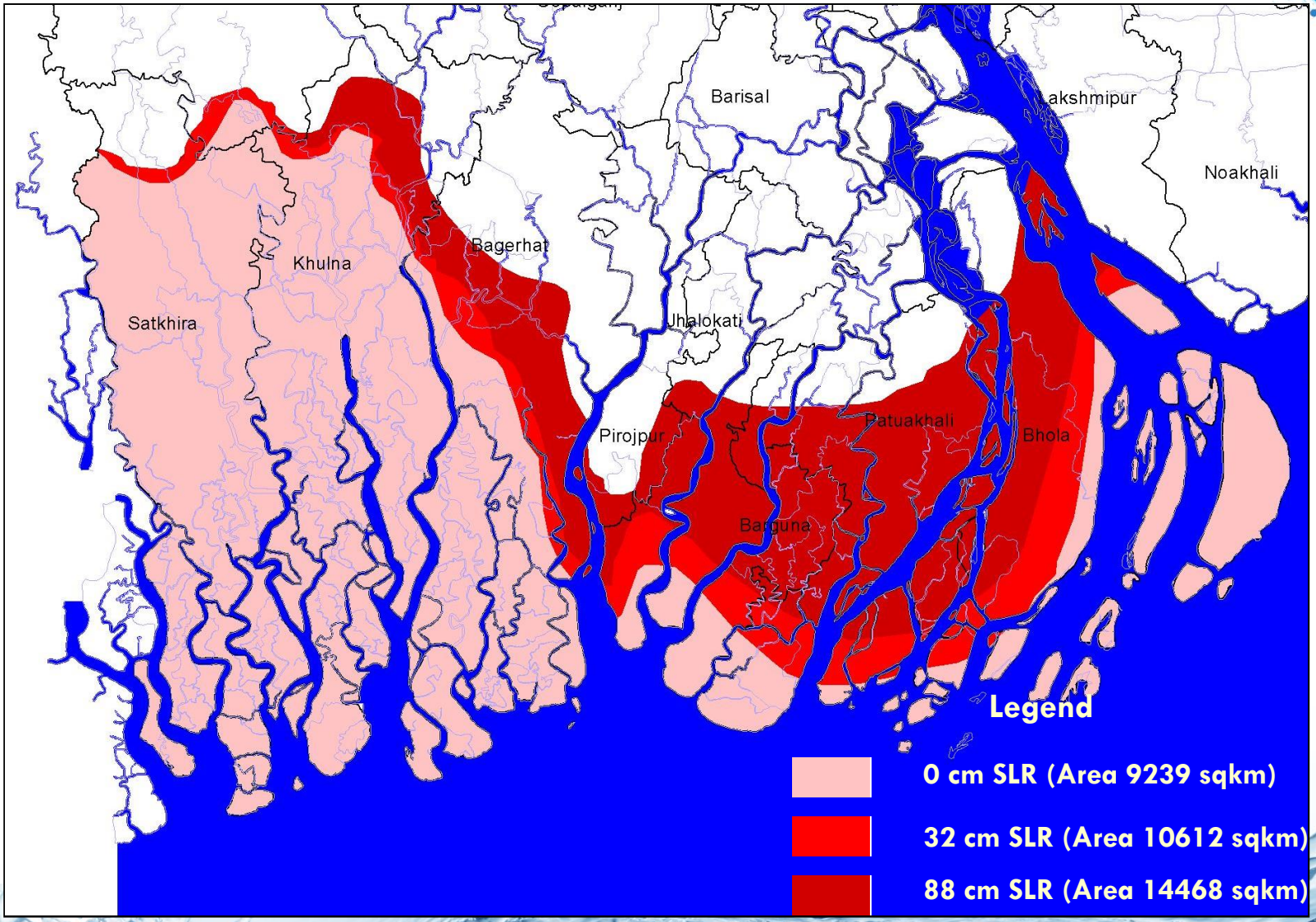
- Increasing intensity of Cyclones due to Climate Change (10 cyclones in last 30 yrs; 11 Cyclones in 100 yrs from 1876-1977)
- Areas vulnerable to inundation more than 1m and 3m, would be 14% and 69%
- 10-year-return period cyclone will be more intense covering 43% of the vulnerable area, 17% more than current coverage
- Coastal embankments, afforestation, evacuation through 10000+ volunteers, warning dissemination etc. are using for cyclone and storm surge management

Coastal Flooding due to Sea Level Rise



Coastal flooding will increase **5%-6%** by 2050 and **6%-8%** by 2100

Increasing Salinity with SLR



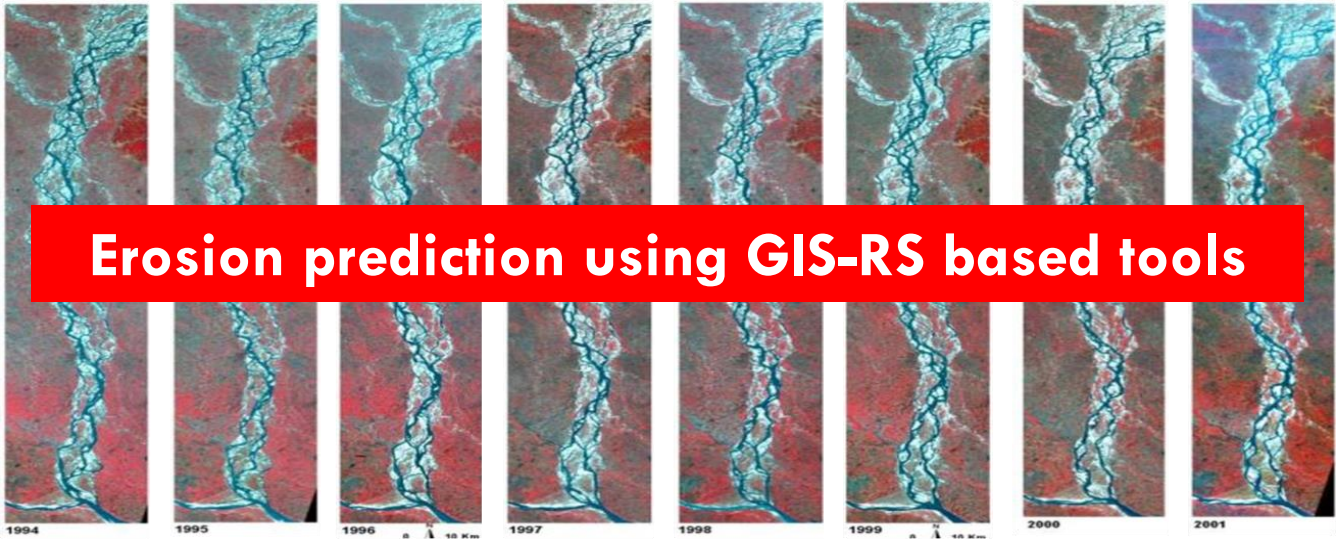
Major Achievements

- Flood control, drainage and irrigation facilities have been introduced for about 6 million ha of land through implementation of over 800 projects
- Every year approximately 10 million tons additional crops out of 37 millions of total production are produced from these projects
- 85 million people are being protected and benefitted from 11,500 km flood protection & coastal embankment
- 23 economically important towns are now protected from river erosion through 265 km river bank protection works

Major Achievements

- 1020 sq. km of land has already been reclaimed from the estuary in coastal zone
- Approximately, 16 sq.km land has been reclaimed in Brahmaputra river through Capital Dredging
- 139 polders have been constructed in the coastal areas for protection of 30 million of people
- Ganges water sharing treaty and framework agreement on cooperation for development with India

Innovation: Erosion Prediction Tool



Erosion prediction using GIS-RS based tools

High risk zones

Red *and* ***Yellow*** *flags for high risk & medium risk zones as warning*

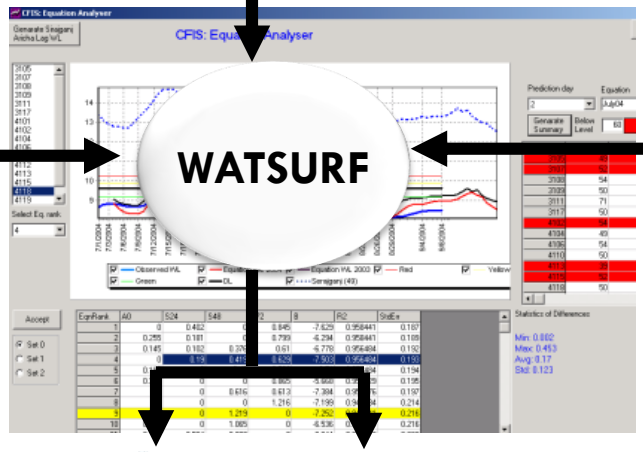
Medium risk zones

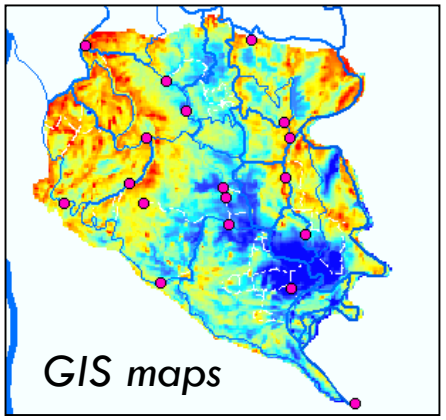
Innovation: Community based Flood Warning System

Early Warning Process

Forecasted WL (FFWC) at u/s and d/s

Observed WLs





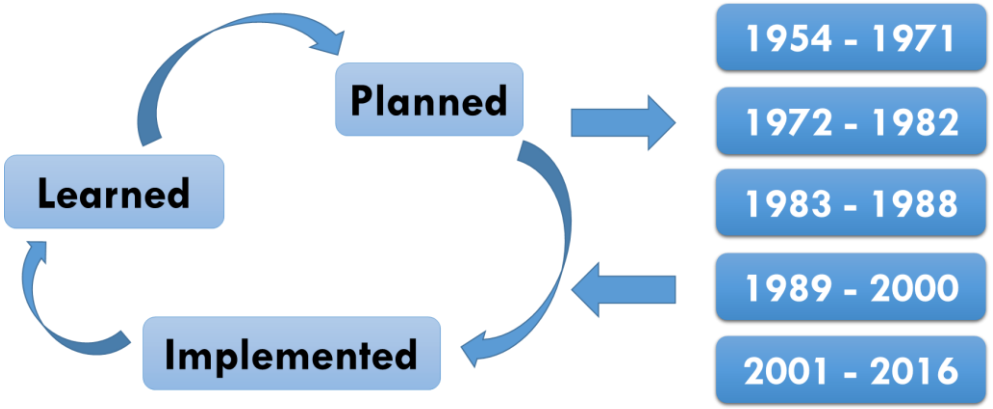
SMS flag Message

Flood map

Policy Initiatives & Governance

1. IECO Master Plan, 1964
2. IBRD Plan, 1972
3. National Water Plan 1, 1986
4. Flood Action Plan, 1989-95
5. BWFMS, 1995
6. National Water Policy, 1999
7. Guidelines for PWM, 2000
8. NWMP, 2004
9. Coastal Zone Policy, 2005
10. Coastal Zone Plan, 2005
11. Climate Change Strategy, 2008
12. Bangladesh Water Act, 2013
13. Bangladesh Delta Plan 2100, 2018

Flood Management Response



There is no shortage of national policies, plans and frameworks - there is shortage of their proper application and integration/implementation

Framework for IWRM Integration

1. Enabling environment	○ Policy ○ Strategy ○ Plan ○ Legislation ○ Trans-Boundary Cooperation
2. Institutional Development	○ National (Community level & institutions) ○ Regional
3. Management Tools	○ Resources availability, demand ○ Communication, Information ○ Allocation ○ Conflict resolution ○ Regulatory instrument ○ Technology

Current Status of IWRM Implementation in line of SDGs

Indicators for IWRM implementation are:

- 6.5.1: Degree of IWRM implementation (0-100)
- 6.5.2: Proportion of transboundary basin area with an operational arrangement for water cooperation
- In respect to degree of IWRM implementation, average score of Bangladesh is 50, whereas global average score is 49.

SL. No.	Criteria	Average Score
1	Enabling Environment	50
2	Institutions and Participations	49
3	Management Instruments	56
4	Financing	45
Final IWRM Score		**50 (medium low)**

Major Action Plan to Achieve SDG6.5 (Improving Enabling Environment)

- Enacting, implementation, monitoring and evaluation of national water resources policies or similar based on IWRM to 95% by 2030
- Preparation, enforcement and revision of national water resources Law(s) based on IWRM to 90% by 2030
- Preparation, implementation, monitoring and revision of National Integrated Water Resources Management Plans (IWRM) including river dredging to 75% by 2030
- Preparation and implementation of Basin/Aquifer Management Plan based on IWRM within the country to 50% by 2030
- Arrangement of Trans-boundary Water Management in most important basins/aquifers to 45% by 2030

Major Action Plan to Achieve SDG6.5 (Strengthening Institutional Framework)

- Strengthen Government authorities' capacity for leading implementation of National IWRM plans or similar to 80% by 2030
- Enhance coordination between government authorities representing different sectors on water resources policy, planning and management at national level to 85% by 2030
- Development of basin level organizations and strengthen capacity for leading implementation of IWRM plans or similar within the country to 50% by 2030
- Develop organizational framework for trans-boundary water management i.e. River Basin Organization (RBO) to 40% by 2030

Major Action Plan to Achieve SDG6.5 (Management Instruments)

- Monitor water availability (includes surface and/or groundwater, as relevant to the country) through modernization of hydrological information services to 90% by 2030
- Sustainable and efficient water use management plan (includes surface and/or groundwater, as relevant to the country) to 70% by 2030
- Management of water-related ecosystems
- Developing IWRM capacity at the national level to 70% by 2030
- Data and Information sharing within country to 98% by 2030
- Data and Information sharing between countries to 65% by 2030

Concluding Remarks

- Effective enforcement of Water Act 2013 and National Water Policies will accelerate the process of IWRM
- Coordination of multi-institutional & multi-stakeholders for integration of sector, resources and spatial aspect in all phases of project implementation
- As Bangladesh and India signed a MoU at Prime Minister level in 2011 to initiate the basin level water management
- Bangladesh Delta Plan, 100 years strategic would be opportunity to ensure integration during implementation of project/program
- National and regional commitment and agreement will help to Implement the Bangladesh Delta Plan 2100 for achievement the goals and targets

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INTEGRATED WATER MANAGEMENT IN THE 21ST CENTURY: ADDRESSING IMMINENT CHALLENGES

Thank you

Overall Water Stress

- Total renewable water resources during January-May is 184 Bm^3 (70% of the water resources is external)
- Water resources availability during dry period 1150 m^3 per-capita, against demand 1700 m^3 per-capita
- Water Stress as per SDG definition 0.55 (101/184) (for critical most dry period January to May)
- Scarcity of resources is mainly due to inefficient and inequitable way the resource being governed, managed and utilized
- Climate Change will intensify the present water stress through food, energy, urban, and environmental systems

Future Needs to Overcome Challenges of IWRM

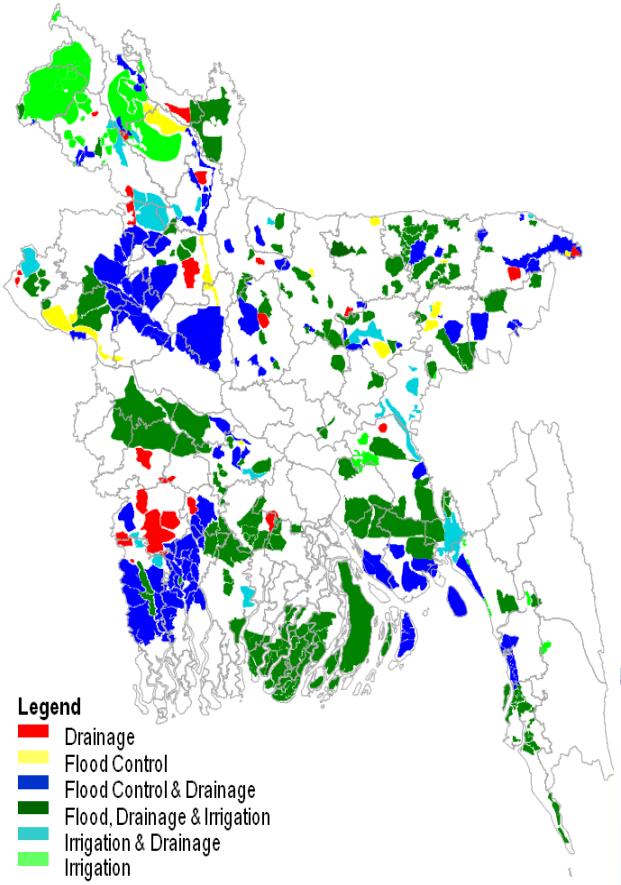
"Development of platform for multi-institutional and multi-stakeholder coordination in all the phases of a project for sustainable development of water, land and related resources"



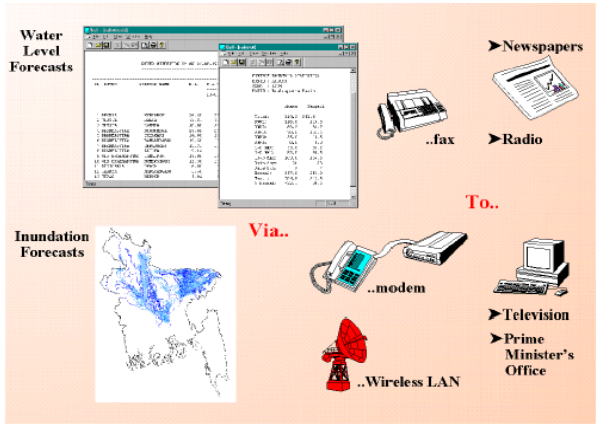


Structural & Non Structural Measures

- More than 10,000 km embankments have been constructed under 800+ flood management schemes
- Around 5.4 Million ha of land are under flood protection
- 139 coastal polders have been constructed to tackle tidal flooding & storm surge due to cyclone and sea level rise
- 3,500 drainage channel improvement has been performed through dredging and river excavation
- 1250 river closures have also been constructed



Structural & Non Structural Measures



- Apart from these, flood warning and dissemination, flood zoning, community based flood information dissemination etc are using as non-structural measures.