

## **A Presentation on**

**Adaptation Measures to Reduce Drought Vulnerability due  
to Climate Change in Barind Area of Bangladesh**

**By**

**Md Elias Hossain**

**Engineer Adviser**

**Ministry of Defence**

**Government of Bangladesh**

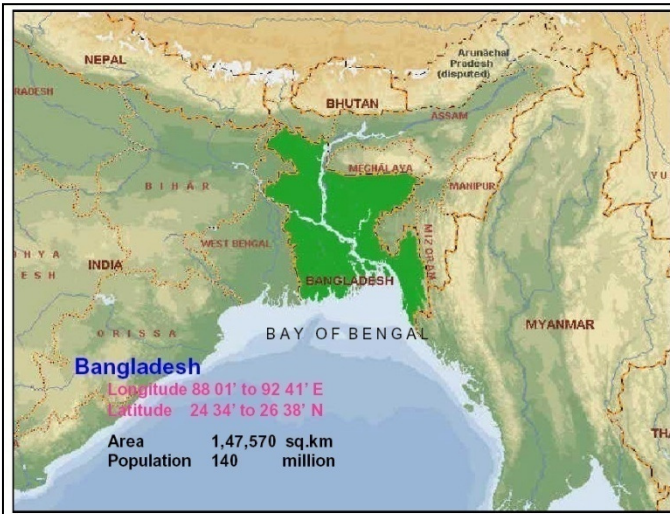
# BANGLADESH AT A GLANCE

## Key Points:

- 160 million population
- 1,47,570 km<sup>2</sup> area of flat topography
- 57 rivers enter Bangladesh either from India or Myanmar
- 92% of the catchment areas are outside Bangladesh
- Bangladesh drains water from an area 12 times larger than its own size

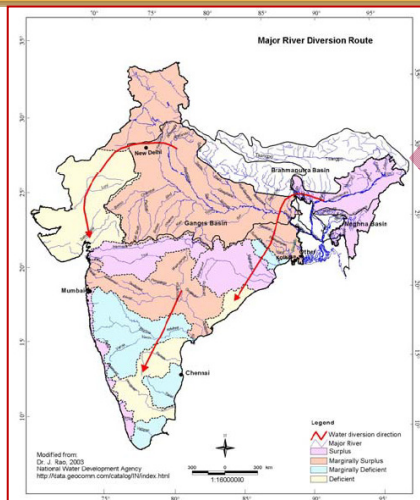


Brahmaputra, Ganges and Meghna Basin: **Constitutes 80% of the floodplain**



Geo-physical setting

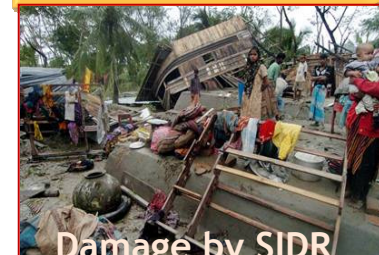
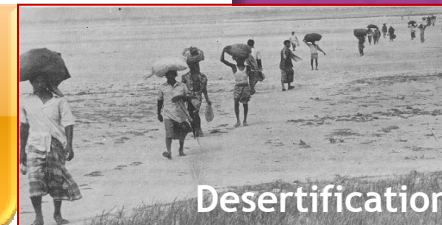
Indian River Linking



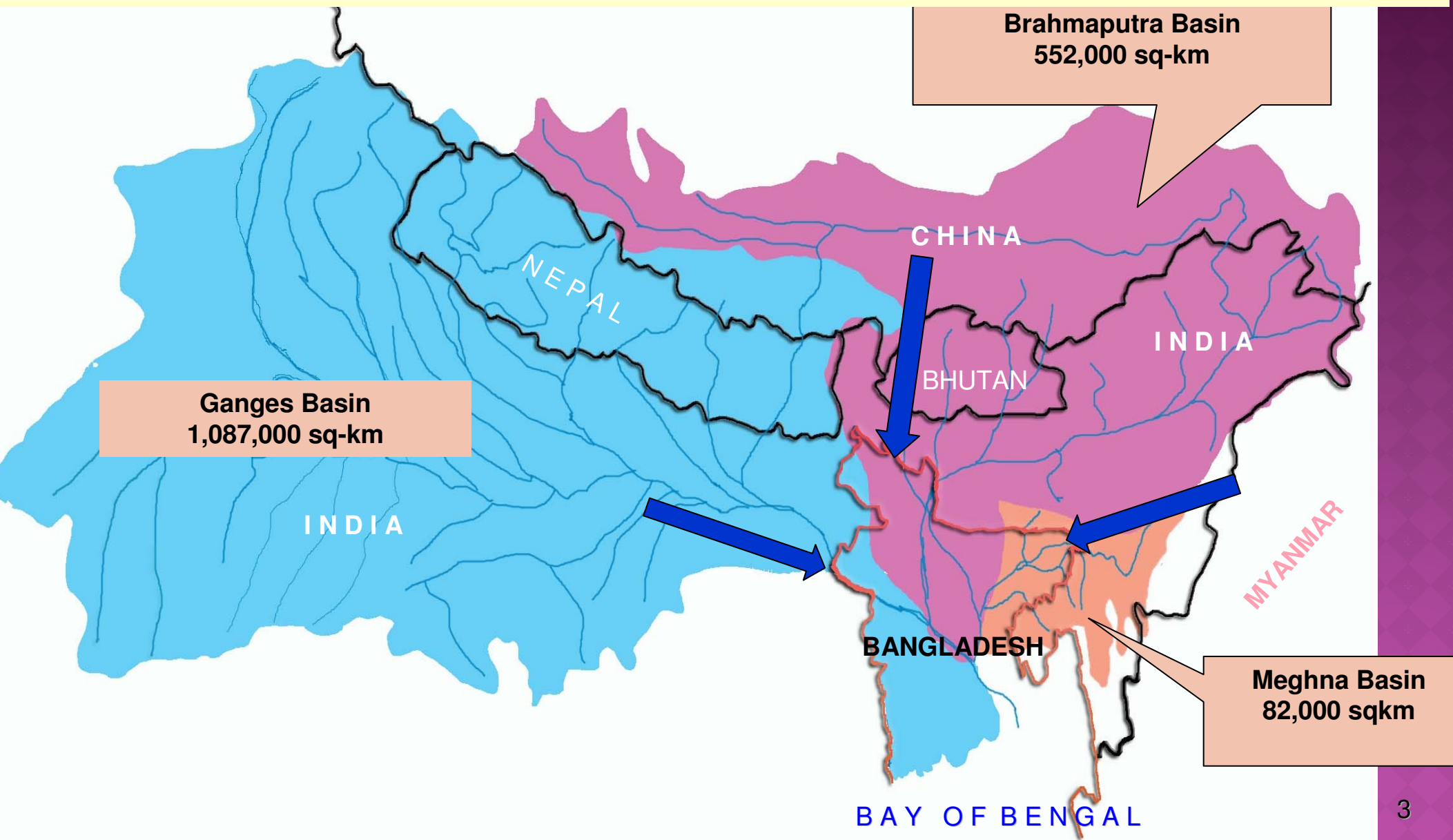
## New threats to country's WR:

- River linking project by India together with the impact of climate change
- Desertification
- Frequent natural calamities
- Salinity intrusion
- Sea-level rise

Impacts of Climate Change



Bangladesh rivers receive runoff from a catchment of 1.72 million sq-km, around 12 times its land area



# Proposed Project Area



BARIND AREA

Project Covers 25 thana of Rajshahi, Nawabganj & Naogaon Districts

Total Area = 750000 ha

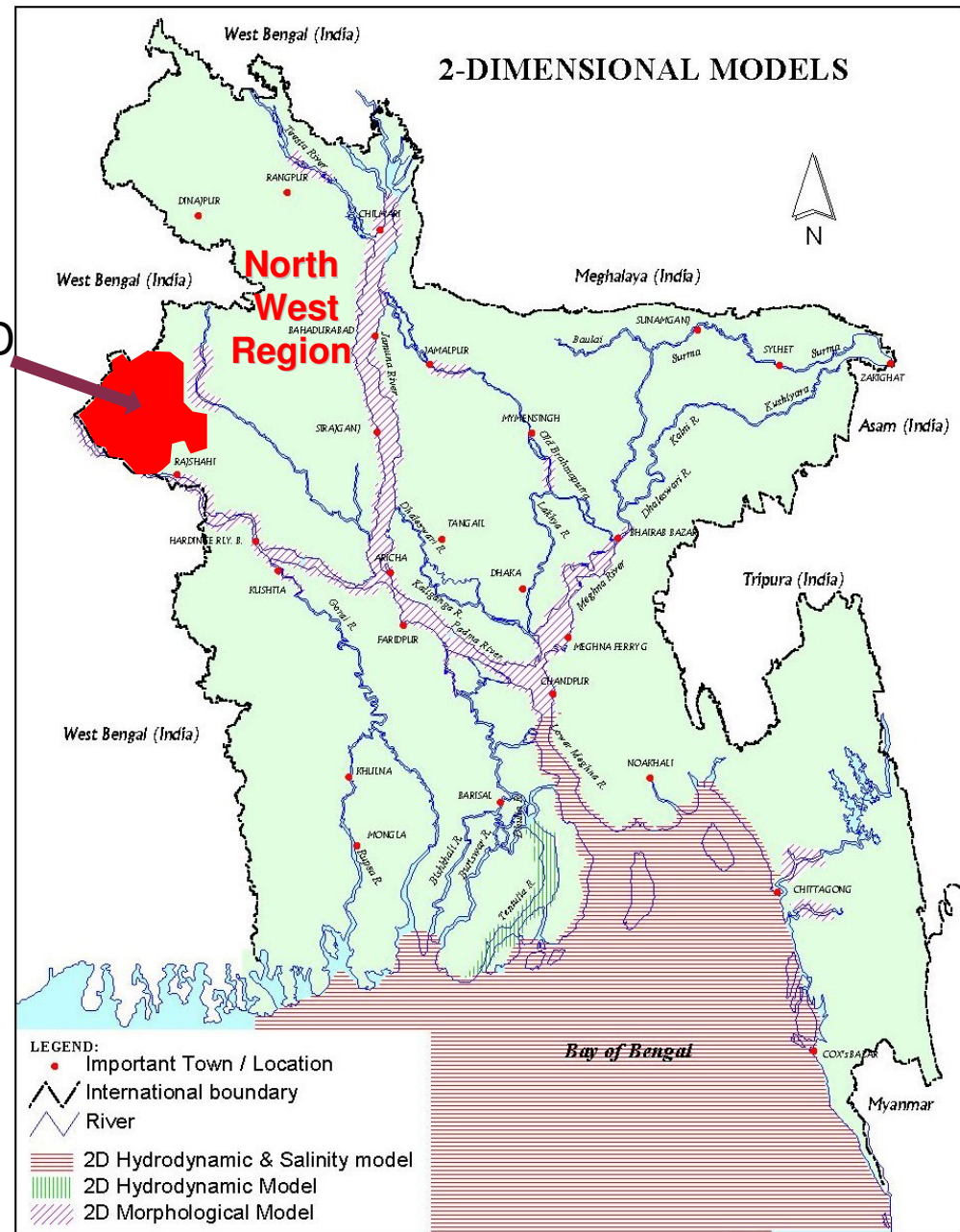
Cultivable Area = 595760 ha

Population = About 2 million

Rainfall ~ 1250 to 1600 mm/Yr

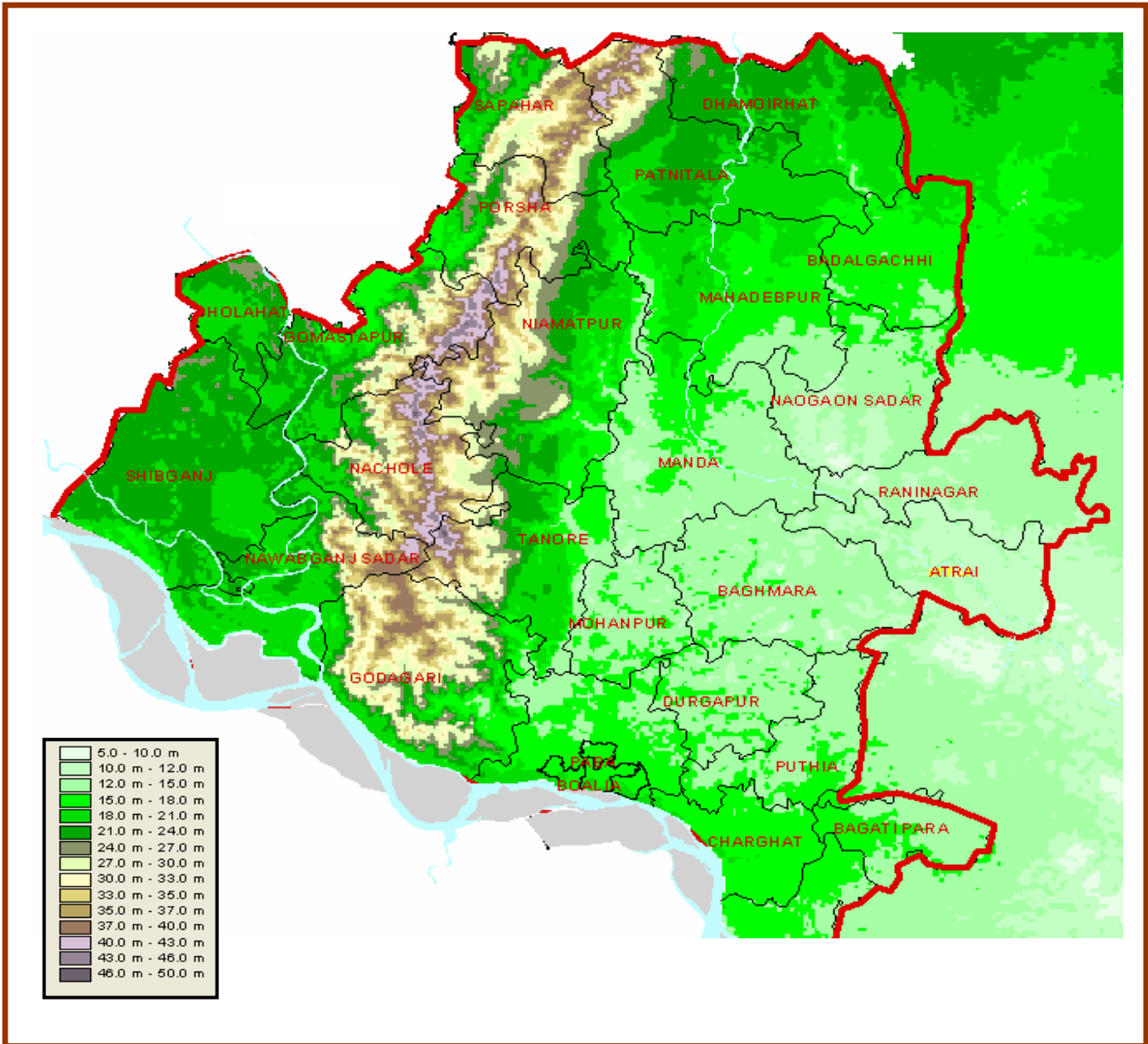
Nos of DTW = 6047

Nos of STW ~ 70,000



# Topography

Elevation  
9.00 mPWD 47.00 mPWD



## **OVER ALL GOAL**

**Assessment of Climate Change Impacts on  
water resources and adaptation measures  
for sustainable water resources  
management in Barind Area of Bangladesh**

# MAJOR ISSUES

- Project GWL goes below suction limit of STW & HTW and becomes inoperable, thereby suffering for domestic as well as irrigation water problems in most of the area during dry season
- Proposed project area suffers frequent agricultural losses due to drought not only in dry season, but also sometimes in monsoon
- Present irrigation is mostly GW based thereby proper assessment of annual recharge to examine the expansion of safe yield, drinking water supply and environmental issues to be addressed.
- Scope of SW development is limited; almost no opportunity in dry season for irrigation but significant potentials exist for supplementing the irrigation system.
- Ganges water remains un-utilized whereas the proposed area suffers scarcity of water due to absence of proper infrastructure.

**All these issues should be adequately addressed in an integrated manner considering both SW and GW including impacts of climate change for sustainable water resources management.**

# OBJECTIVES OF THE PROJECT

## Specific Objectives are:

- **Assessment of the present state of water resources.**
- **Assessment of SW and GW availability under present and future climate change condition.**
- **Assessment of water demand for different sectors.**
- **Formulation of suitable options for sustainable water resources management.**
- **Capacity building of related organization.**



# OUTPUT OF THE PROJECT

The probable outputs of the project are:

- Trend of groundwater level variation.
- Trend of river flow and water level variation.
- Assessment of water quality.
- Assessment of flooding characteristics e.g. flood duration, flood depth, areal extent etc.
- Assessment of SW availability at key location of the perennial rivers.
- Upazila-wise groundwater resources for the project area.

Contd..

# **OUTPUT OF THE PROJECT (Contd..)**

- **Present and future water demand assessment for different sectors e.g. agriculture, domestic, industrial, forestry, fisheries etc..**
- **Impact assessment of different SW development options on GW resources.**
- **Socio-economic and environmental impact assessment of different options.**
- **Automatic monitoring network of GW level in a pilot area.**
- **An Interactive Information System (IIS) to facilitate better resource management.**
- **Performance evaluation of artificial GW recharge in a pilot area.**
- **Trained professionals on mathematical modeling, use of IIS, water demand assessment, water quality modeling, climate change assessment etc.**

# ACTIVITIES

- **Collection of different hydrological and hydro-meteorological data from different organizations e.g. BWDB, BADC, BMDA, BMD, IWM etc.**
- **Quality checking of the collected data.**
- **Trend analysis of GW level, surface generation for pre and post monsoon season.**
- **Statistical analysis of river Water Level and flow.**
- **Collection and analysis of water quality data to assess seasonal and yearly variation.**
- **Development and application of flood model to determine extent and duration of flooding.**
- **Development and application of SW model using MIKE-11.**
- **Statistical analysis of river flow data for different dependability.**
- **Development and application of GW model using MIKE-SHE model.**
- **Analysis of GW model data for GW resource assessment.**

**Contd..**

# ACTIVITIES (Contd..)

- **Collection and analysis of cropped, forest and fishery areas, soil properties, population etc.**
- **Identification of options in consultation with local people, professional communities and review of existing reports**
- **Technical evaluation of different options using mathematical model.**
- **Collection and analysis of socio-economic and environmental data**
- **Need assessment and installation of automatic GW level monitoring stations**
- **Institutionalization of the automatic network.**
- **Need assessment and development of the IIS**
- **Installation of artificial recharge well.**
- **Performance evaluation of the recharge wells using mathematical model.**
- **Assess training needs.**
- **Develop training modules**
- **Design and implement training courses in collaboration with national and international institutions and organizations.**

# KEY LEADERS, CONTRIBUTORS & COLLABORATORS

- **Lead organization:** Ministry of Defence, Government of Bangladesh
- **Collaborators:**
  - NASA, JICA and JAXA.
  - Ministry of Water Resources
  - Ministry of Environment and Forest
  - Bangladesh Water Development Board
  - Bangladesh University of Engineering and Technology (BUET)
  - Institute of Water Modeling (IWM) etc.

# KILLER FACTORS AND MITIGATION MEASURES

<b>Killer Factors</b>	<b>Mitigation Measures</b>
<b>Timely availability of sufficient assistance from the developing partners</b>	<b>Several donors may be explored</b>
<b>Coordination and cooperation amongst different agencies.</b>	<b>A steering committee comprising representatives from concerned agencies may be formed.</b>
<b>Knowledge gap</b>	<b>Highly specialized knowledge required for project implementation may be supported by expert of various organizations.</b>
<b>Discontinuity of related activities.</b>	<b>Suitable organization may be employed to continue it.</b>

**THANKS FOR YOUR PATIENT  
HEARING**

