DEEP SYMPATHY FOR OUR JAPANESE FRIENDS

The 5th Asia-Pacific GEOSS Symposium
GEOSS/Asia Water Cycle Initiative (AWCI) Parallel Session
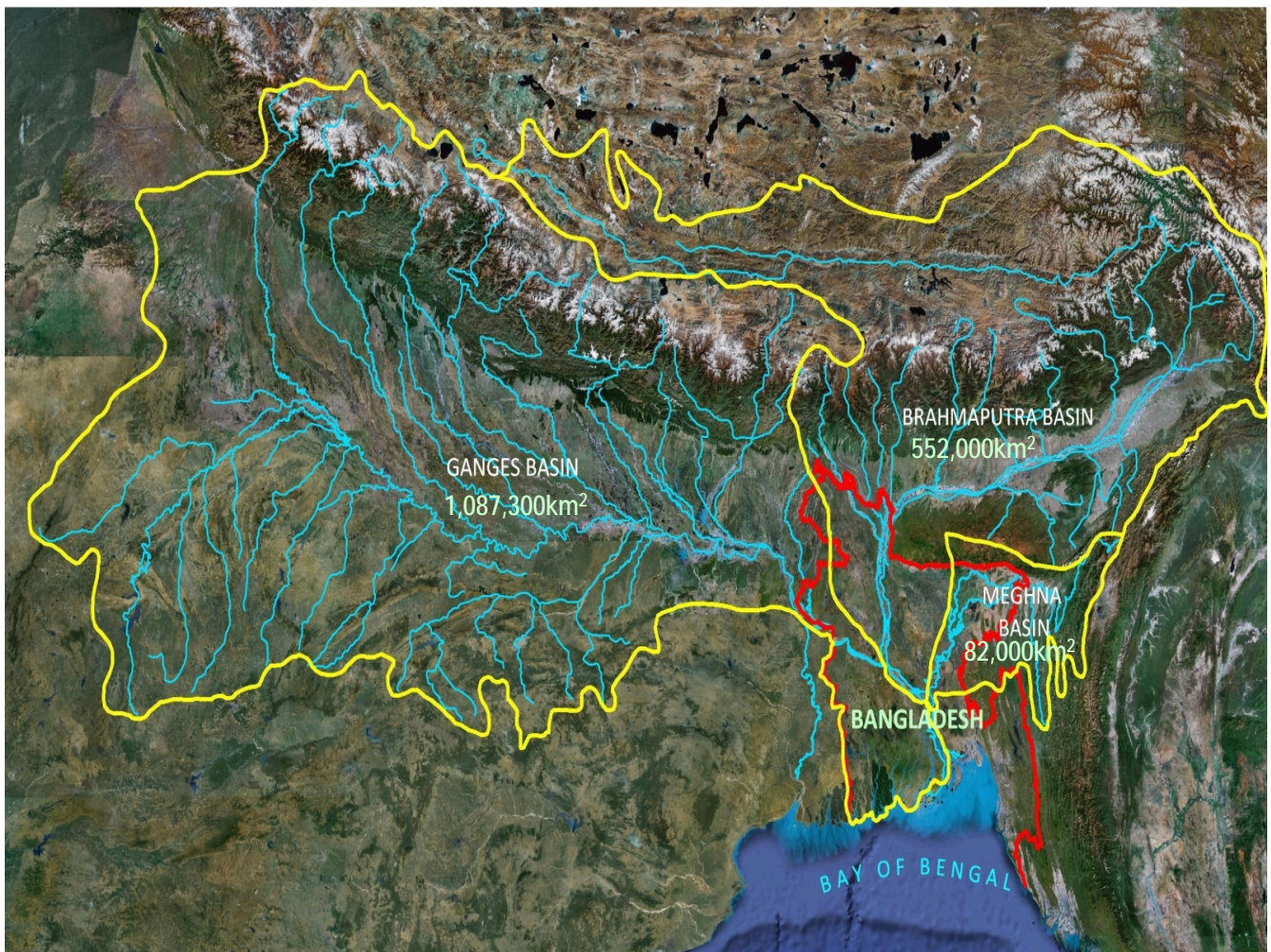
AWCI Activity Report: Bangladesh

Colonel Mohammad Ashfakul Islam
Engineer Adviser
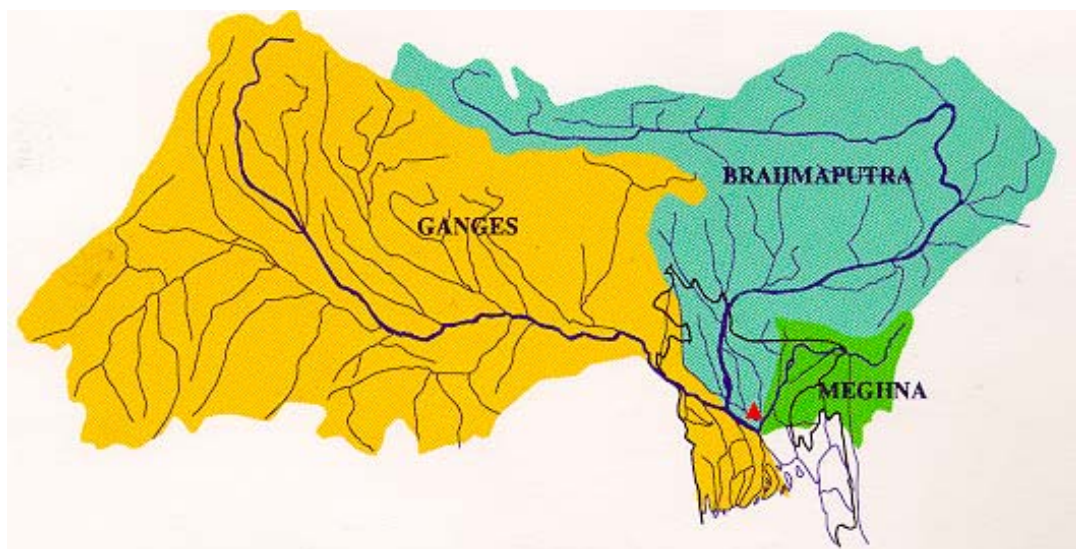**Ministry of Defence**
Government of the People's Republic of Bangladesh

And

Md. Mafizur Rahman
Professor, Department of Civil Engg., BUET

Dhaka, Bangladesh

The Ganges-Brahmaputra-Meghna Basins

➤ **Flow**

❑ The Ganges-Padma: 1,000 ~ 120,000 cumec
❑ The Brahmaputra: 2,400 ~ 102,000 cumec
❑ The Meghna: 500 ~ 30,000 cumec

Stored over Bangladesh Plain would have about 9.0 m of standing water depth

➤ **Annual Sediment Transport**

❑ The Ganges-Padma: 886 Mtons
❑ The Brahmaputra: 600 Mtons
❑ The Meghna: 1 Mtons

Stored over Bangladesh flood plain would have about 1.6 cm thick sedimentation
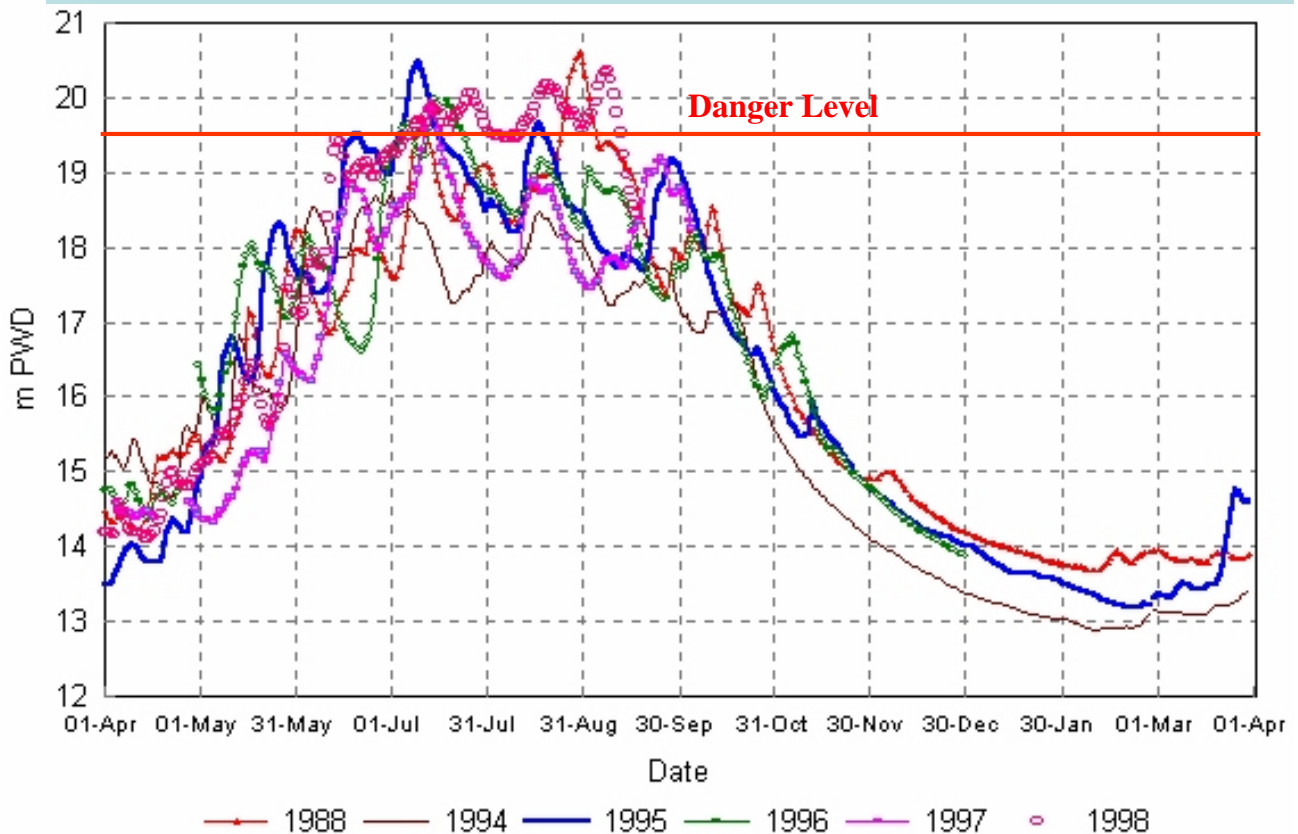
Flooding in Bangladesh

- ❖ **River System**

  24,000 km

- ❖ **Annual Average Rainfall**

  2300 mm

- ❖ **Trans-boundary Flow**

  57 rivers

Due to huge trans-boundary flow, rainfall within county, complex river system Bangladesh experiences flooding every year and severe every 10 years
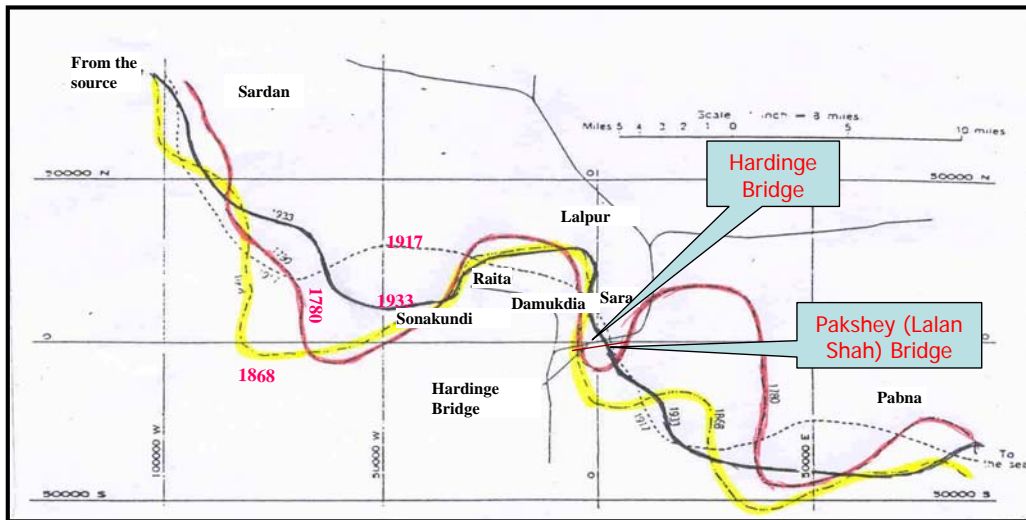

Cherapunji (in INDIA)
Worlds highest rainfall
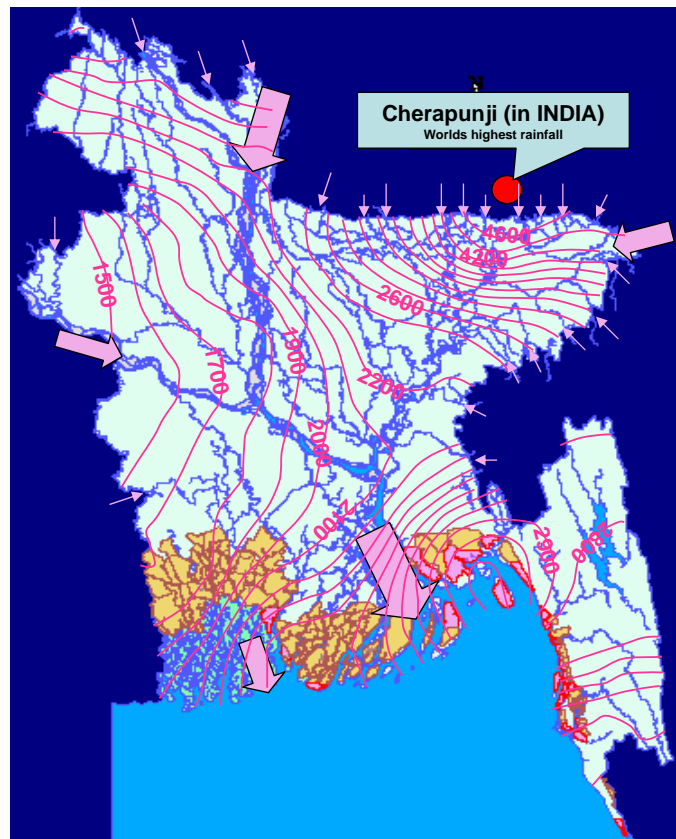
Water Levels often cross the danger level during flood season
Bahadurabad

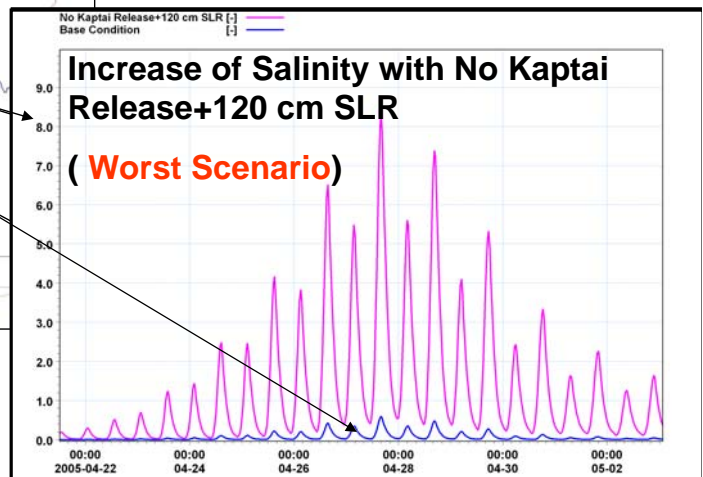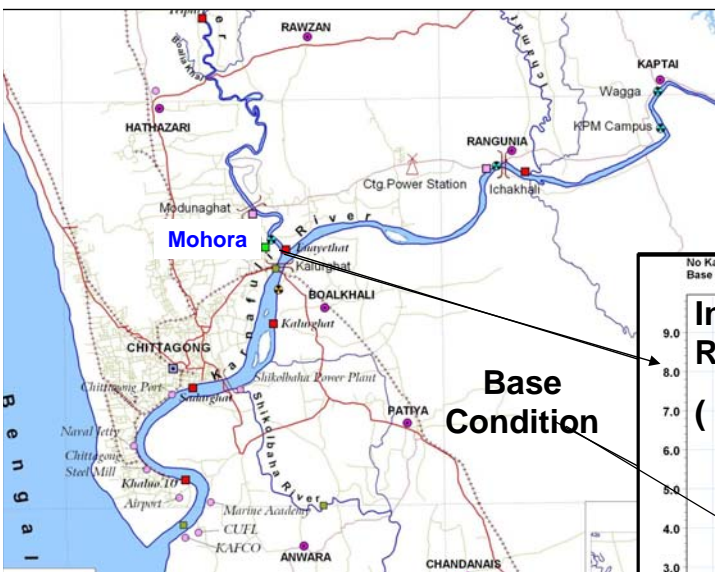
Danger Level

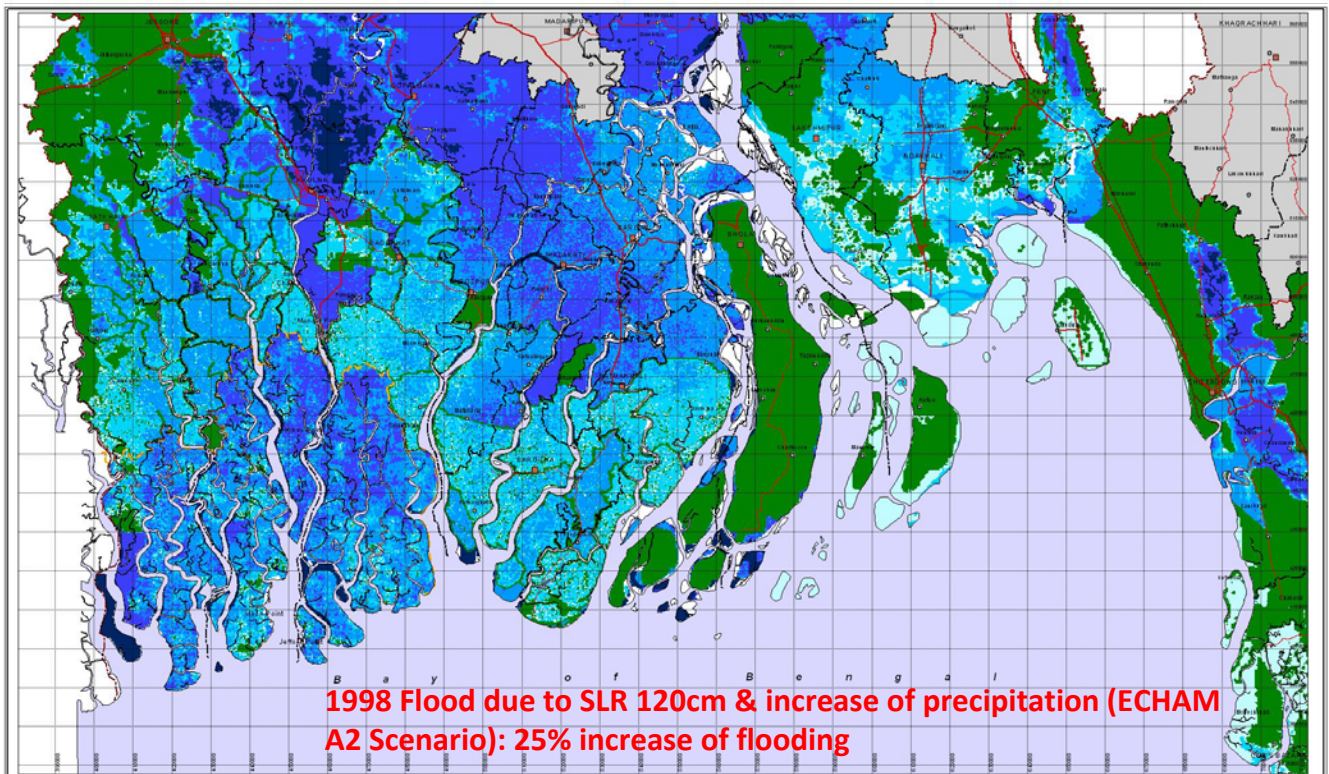Legend: 1988, 1994, 1995, 1996, 1997, 1998

GANGES RIVER-traveling several courses in the last 3 centuries

Impact of SLR(120 cm) on Drinking Water in the Halda River

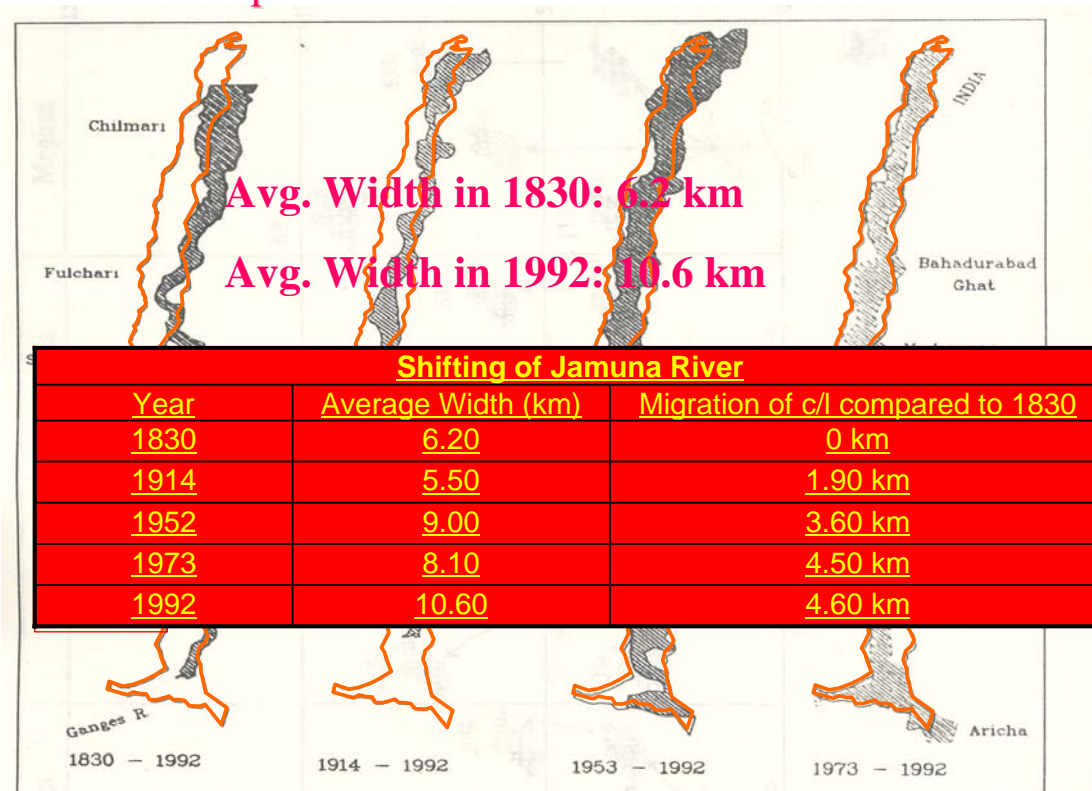# Inundation of the coastal area due combined effect of SLR and increase of precipitation

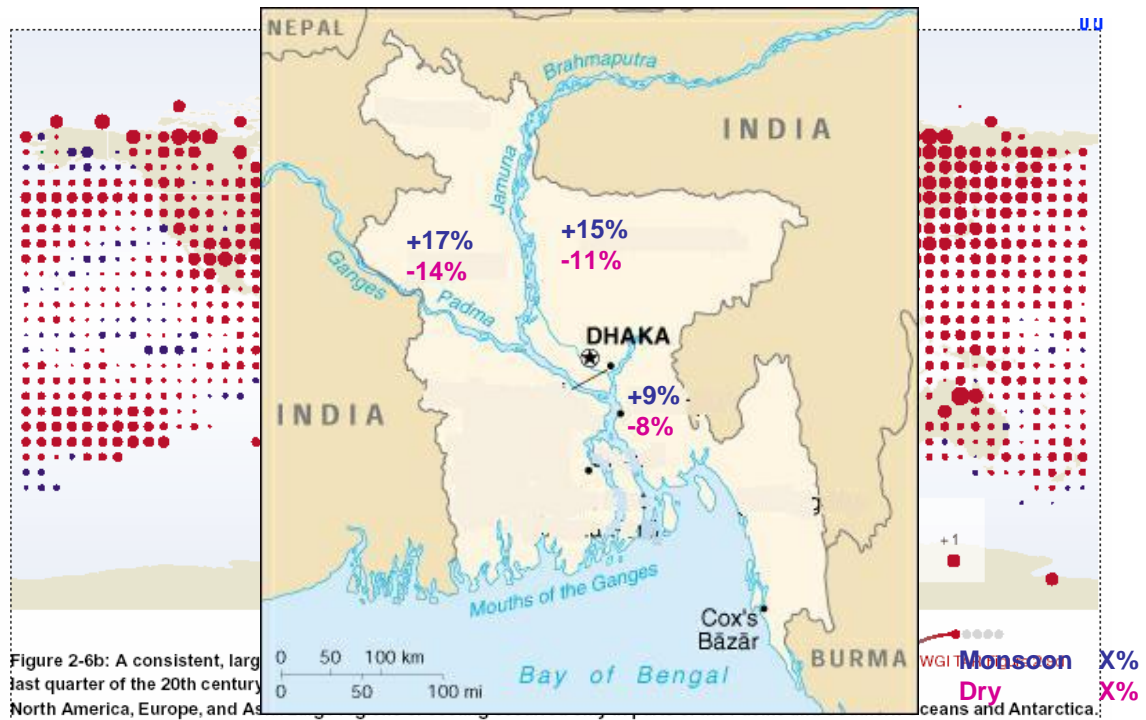**1998 Flood due to SLR 120cm & increase of precipitation (ECHAM A2 Scenario): 25% increase of flooding**

Highly dynamic river system

Frequent Bank shifting

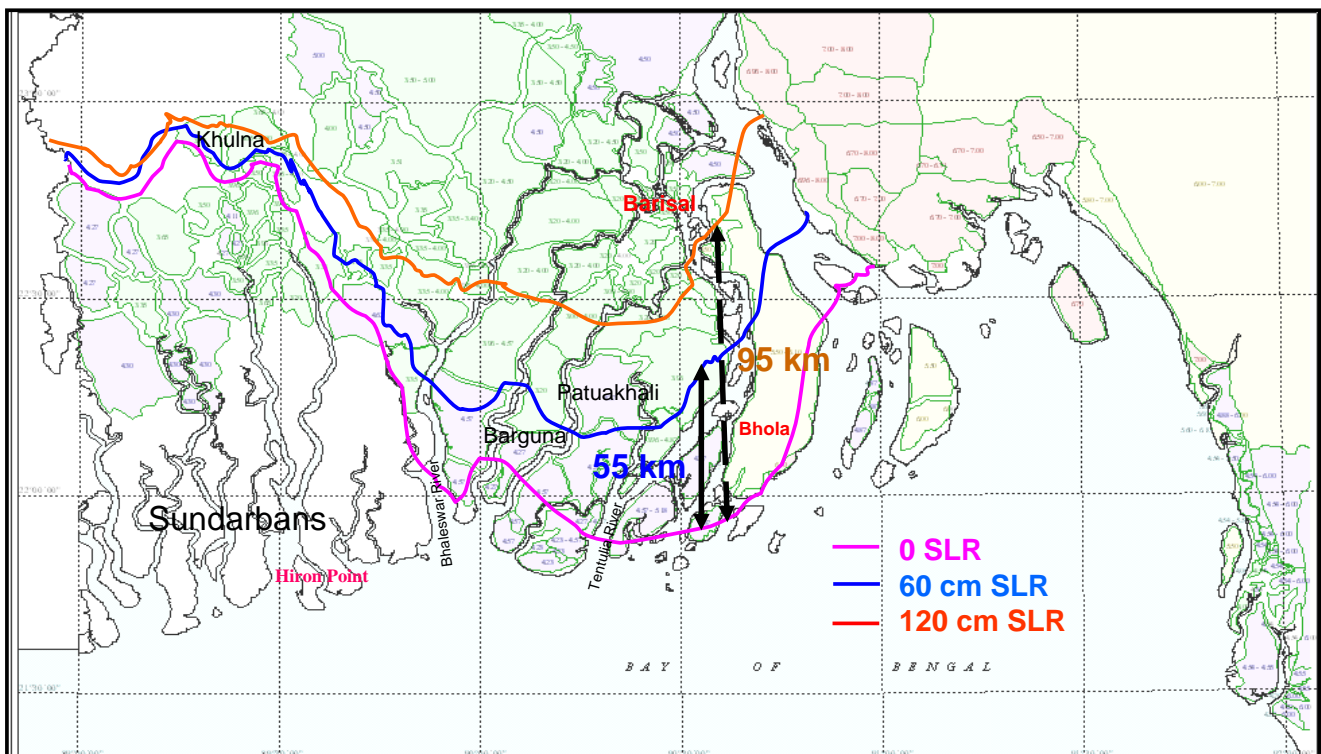Rivers are widening

A picture of the Jamuna: 1830 to 1973

Avg. Width in 1830: 6.2 km

Avg. Width in 1992: 10.6 km

Shifting of Jamuna River		
Year	Average Width (km)	Migration of c/l compared to 1830
1830	6.20	0 km
1914	5.50	1.90 km
1952	9.00	3.60 km
1973	8.10	4.50 km
1992	10.60	4.60 km

Figure 2-6b: A consistent, larg[...]
[...]ast quarter of the 20th century [...]
North America, Europe, and As[...]
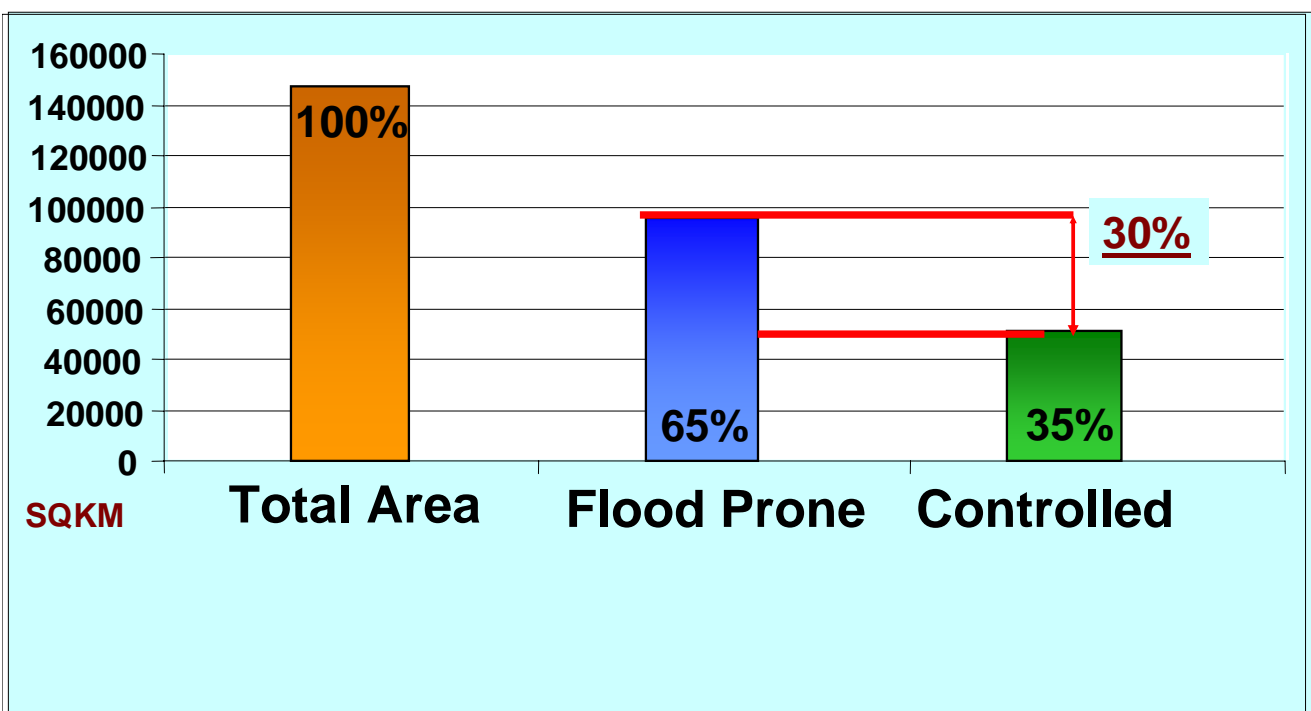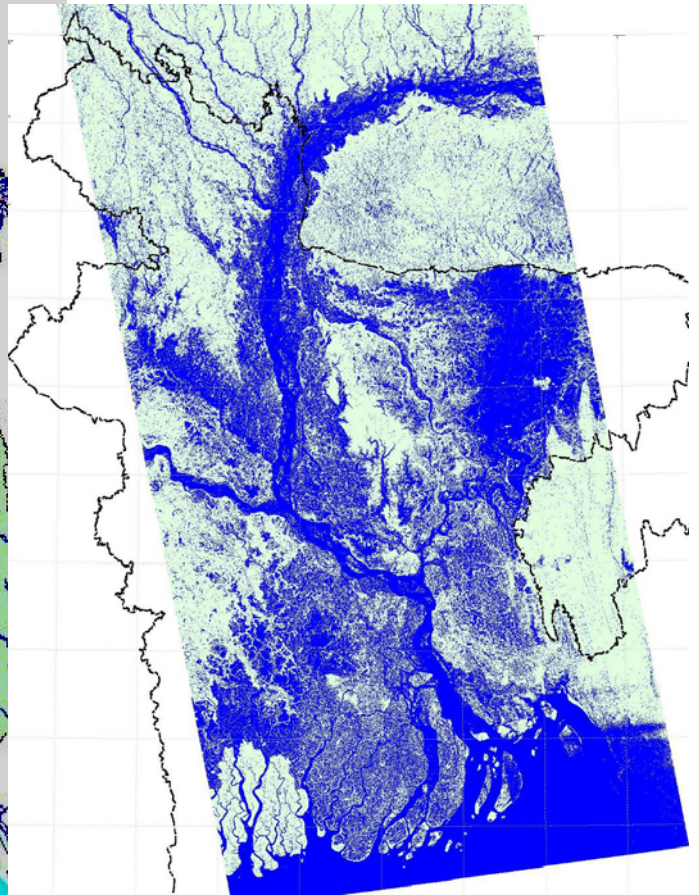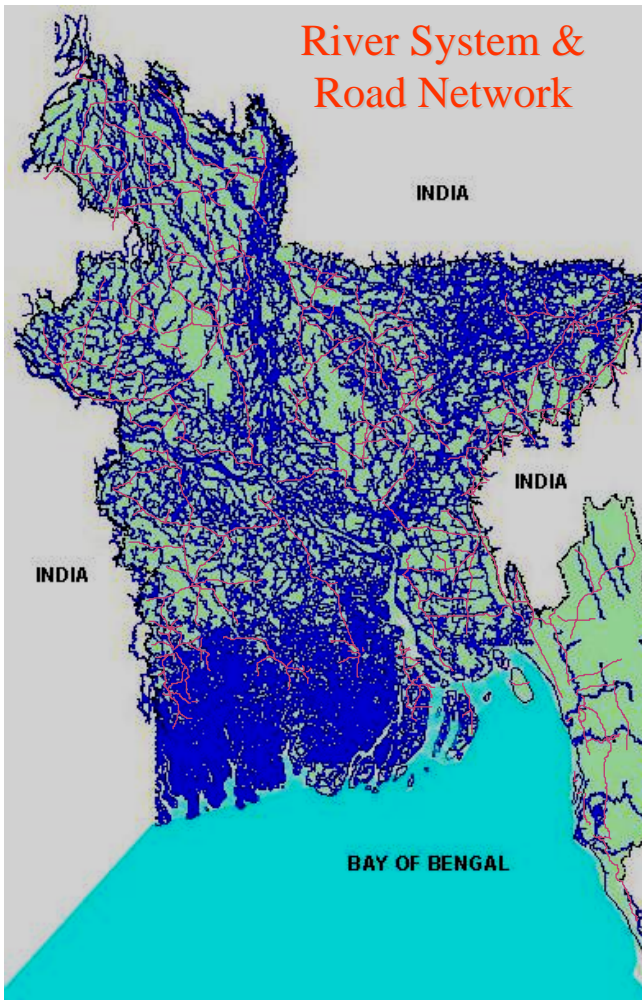
+17%
-14%

+15%
-11%

+9%
-8%

Monsoon   X%
Dry   X%

By the year 2020 (due to increase of 0.5-0.7° C)

Impact of Climate Change on Salinity Intrusion
(5ppt Salinity line)

95 km

55 km

— 0 SLR
— 60 cm SLR
— 120 cm SLR

Khulna
Barisal
Patuakhali
Barguna
Bhola
Sundarbans
Hiron Point
Bhaleswar River
Tentulia River

River System &
Road Network

What has been done to reduce the huge losses of lives and properties?

Flood Mitigation

Structural measures

- Embankments
- Hydraulic Structures

Non-structural measures

- Flood forecasting and dissemination
- Flood preparedness, etc.

The concept of mathematical modeling has been introduced in Bangladesh by IWM for improved flood management through understanding the problems scientifically and to devise appropriate, efficient and cost effective mitigation measures.
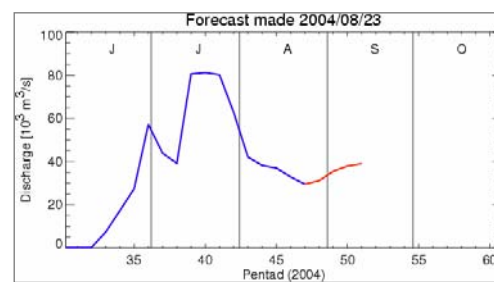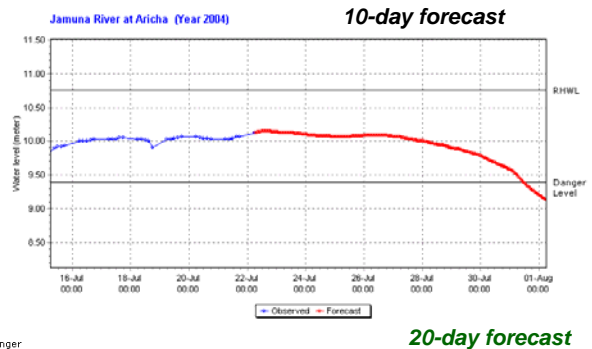

FLOOD FORECASTING AND WARNING SYSTEM IN BANGLADESH
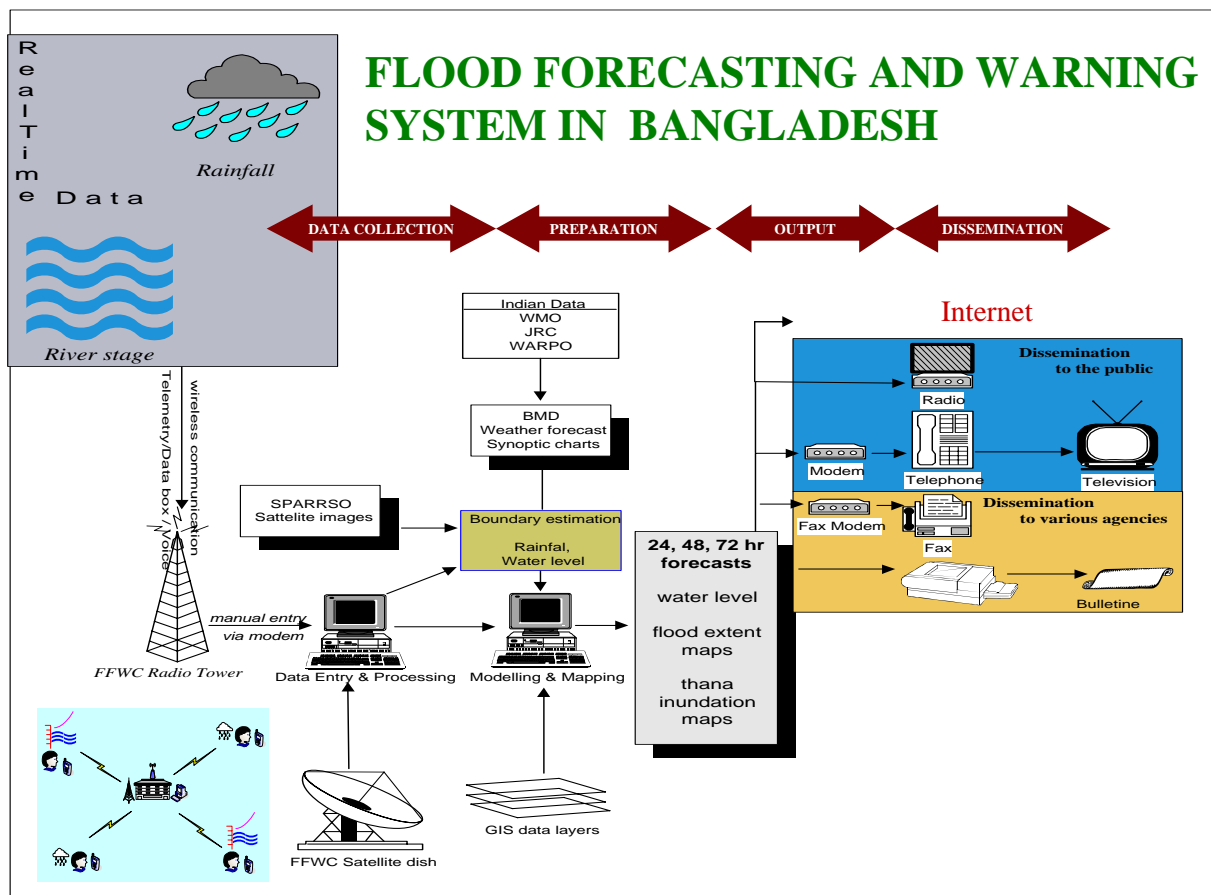
Increase the Lead-time of Forecast
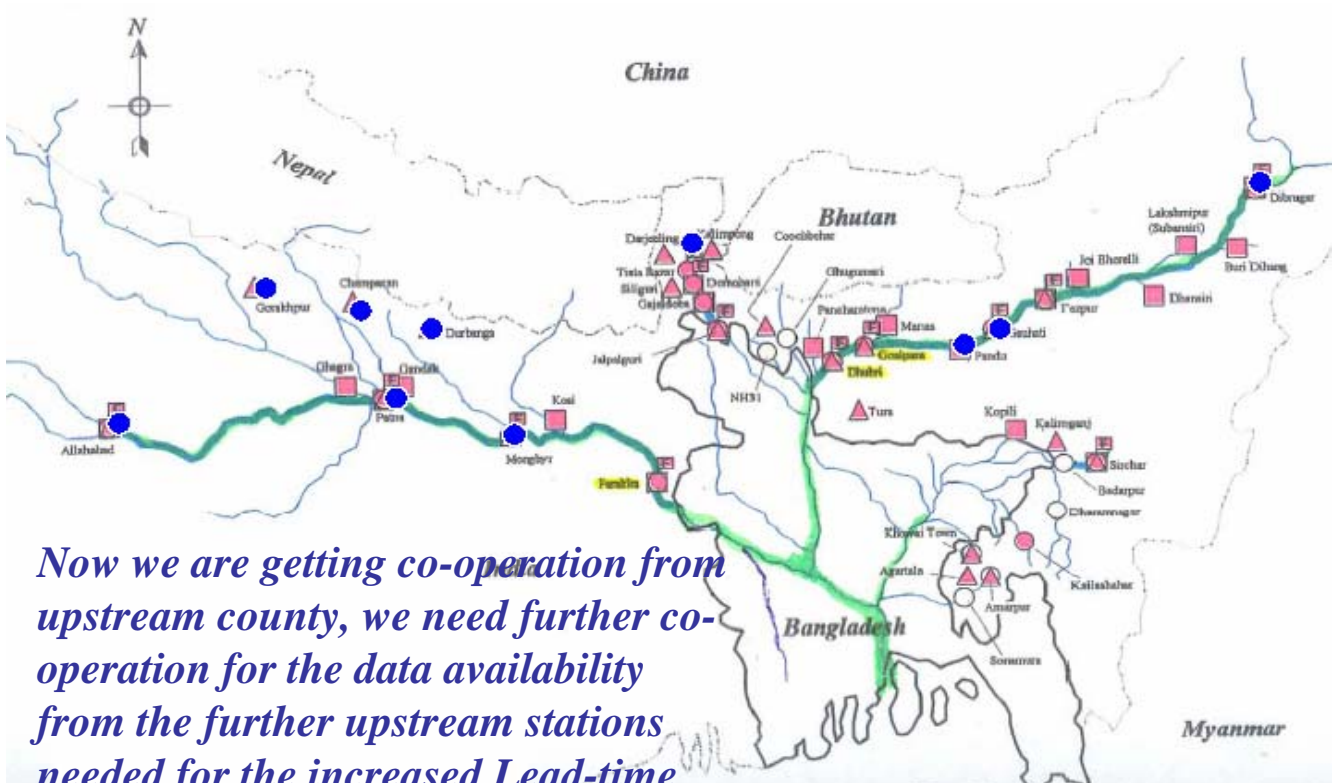
Expected

Present

10-day forecast

20-day forecast
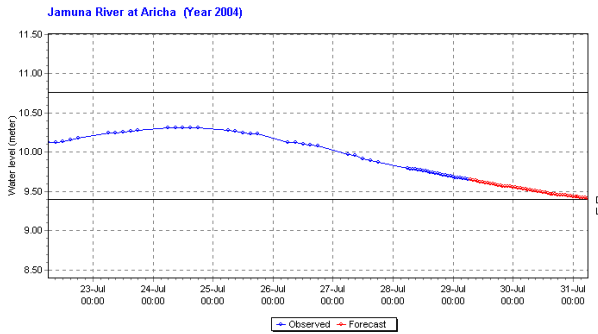
Increase Lead-Time of Flood Forecasting
(Future Data Requirements)

*Now we are getting co-operation from
upstream county, we need further co-
operation for the data availability
from the further upstream stations
needed for the increased Lead-time*

Basin-Wide Water Management
(Scope for Augmentation)

|	Mean five month flows in cusec (cumec)		
	Natural	**Unraised**	**Raised**
Chisapani	15221 (431)	27051 (766)	69817 (1977)
Kaligandaki 1+2	3602 (102)	17022 (482)	17022 (482)
Trisulganga	8829 (250)	16704 (473)	46086 (1305)
Seti	1907 (54)	5333 (151)	8687 (246)
Sapt Kosi	16527 (468)	30583 (866)	85144 (2411)
Pancheswar	4944 (140)	12819 (363)	12819 (363)
Total for Nepal	51029 (1445)	109510 (3101)	239575 (6784)
Net augmentation:			
Raised : 239575 - 51029 = 188,546 cusec (5,339 cumec) ○ Proposed reservoirs			
Unraised : 109510 - 51029 = 58,481 cusec (1,656 cumec)			

❖ **Regional co-operation involving all the countries, India, Nepal, Bangladesh and Bhutan may put all of us in win-win situation.**

What has been achieved so far?

Non-structural measure

- 🔴 Established a Flood Forecasting and Warning Centre
- 🔴 Dissemination of warning through Government and NGO initiatives

# Flood Warning System in Bangladesh (Current)
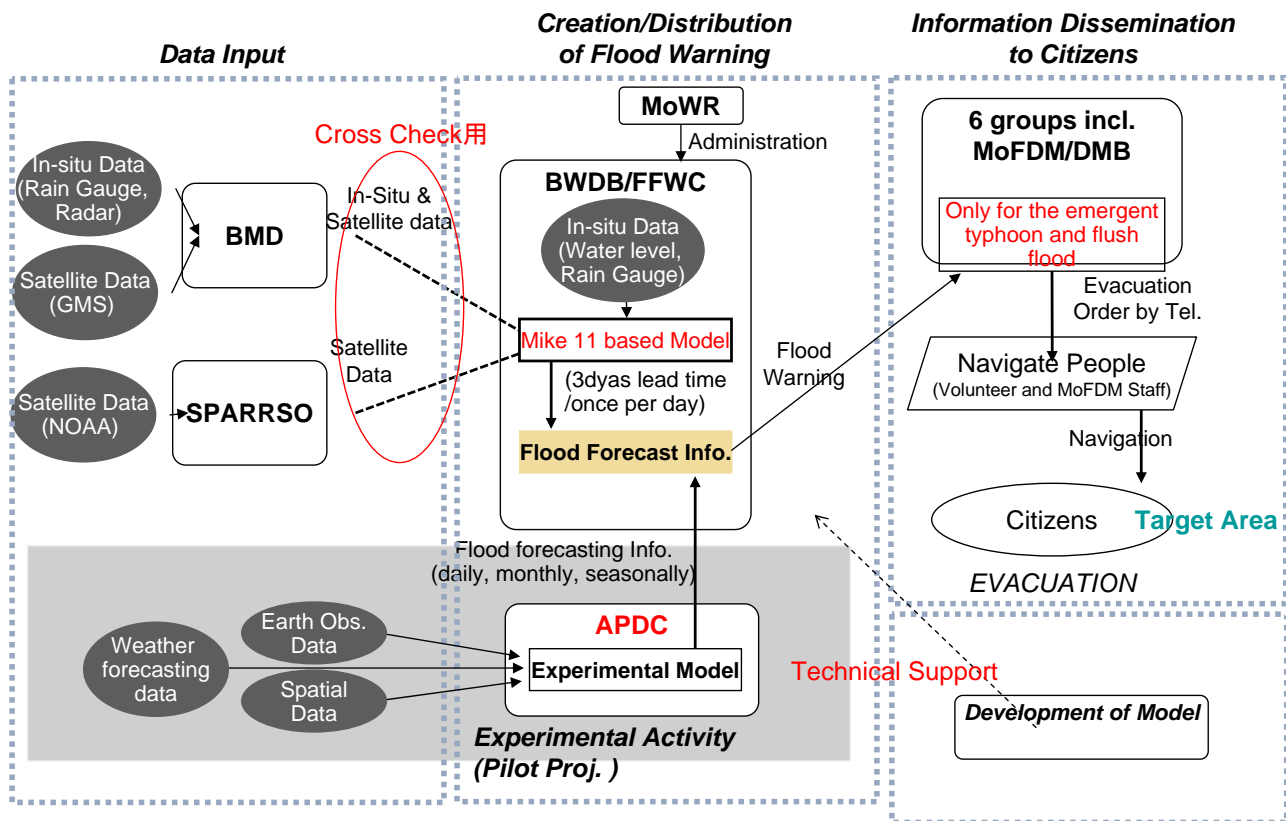
21

Target Area of TA Project

- Criteria for Selecting Target Area for TA Project (JAXA Proposal)
  - 1) The area where lead time of flood forecasting is expected to be improved from 3 days (current) to 5~7 days (i.e. potential inundated area where rainfalls in upstream area incl. India could affect on);
  - 2) where sufficient in-situ observation infrastructure (i.e. water level gauges etc.) are installed so that the accuracy of flood forecasting could be evaluated;
  - 3) and where certain numbers of citizens owning mobile phones lives so that the outcome of information dissemination by SMS could be assessed.
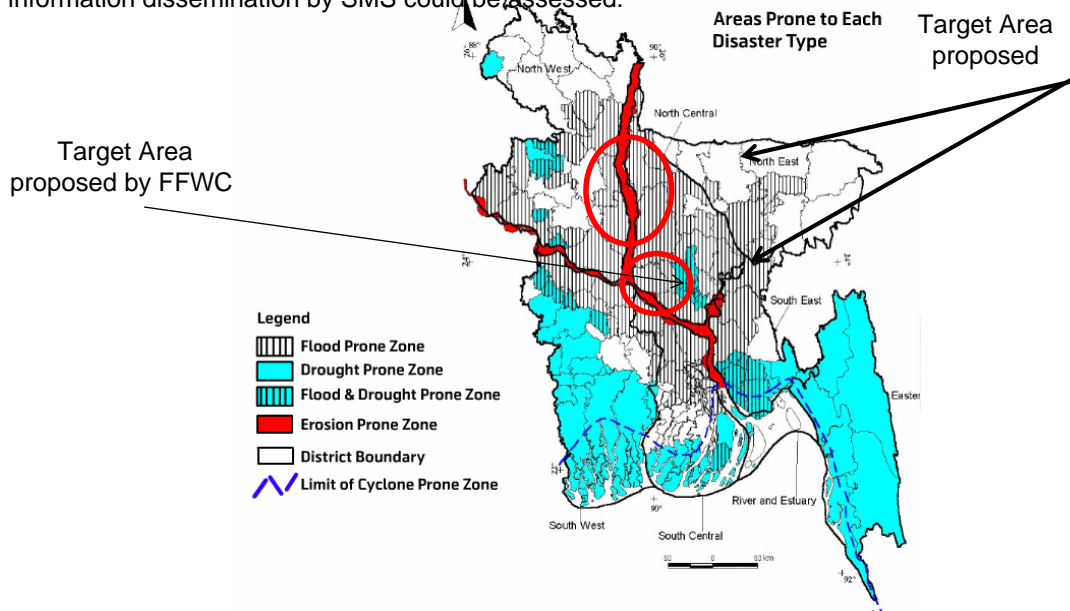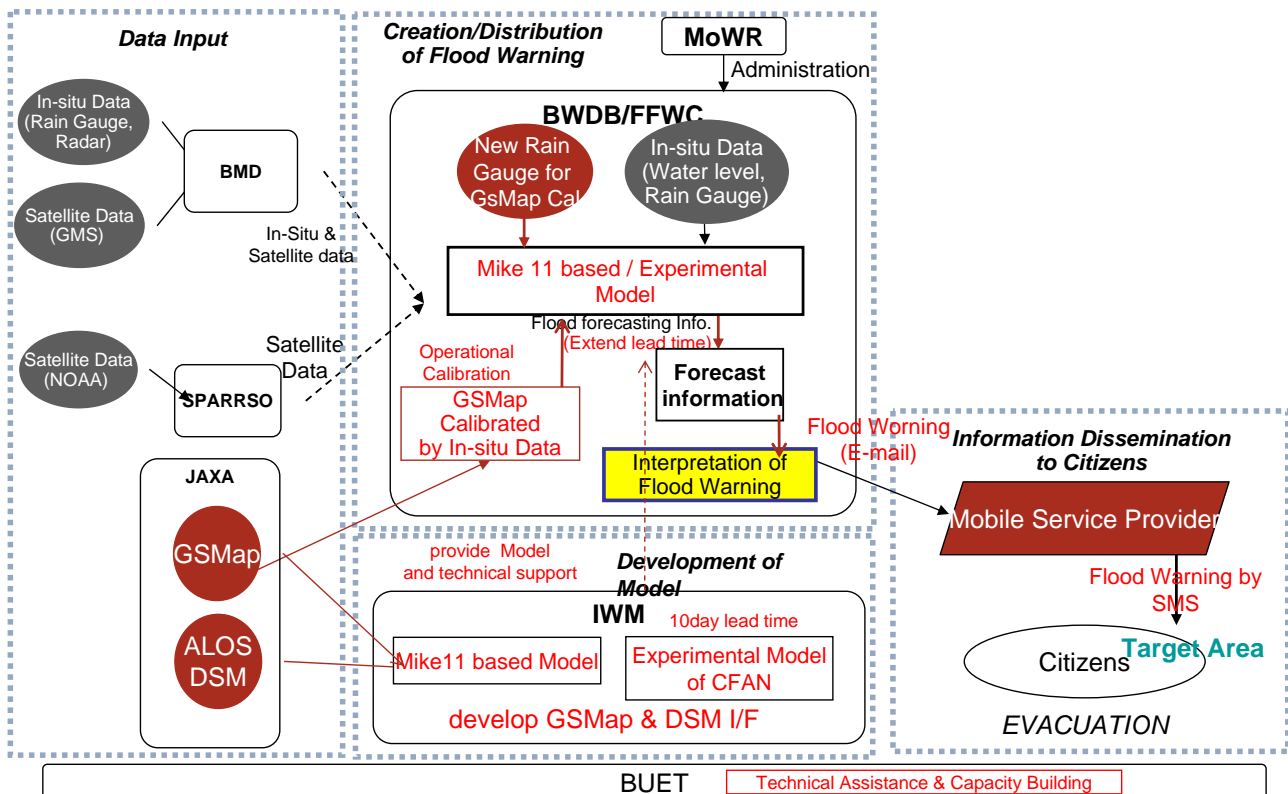
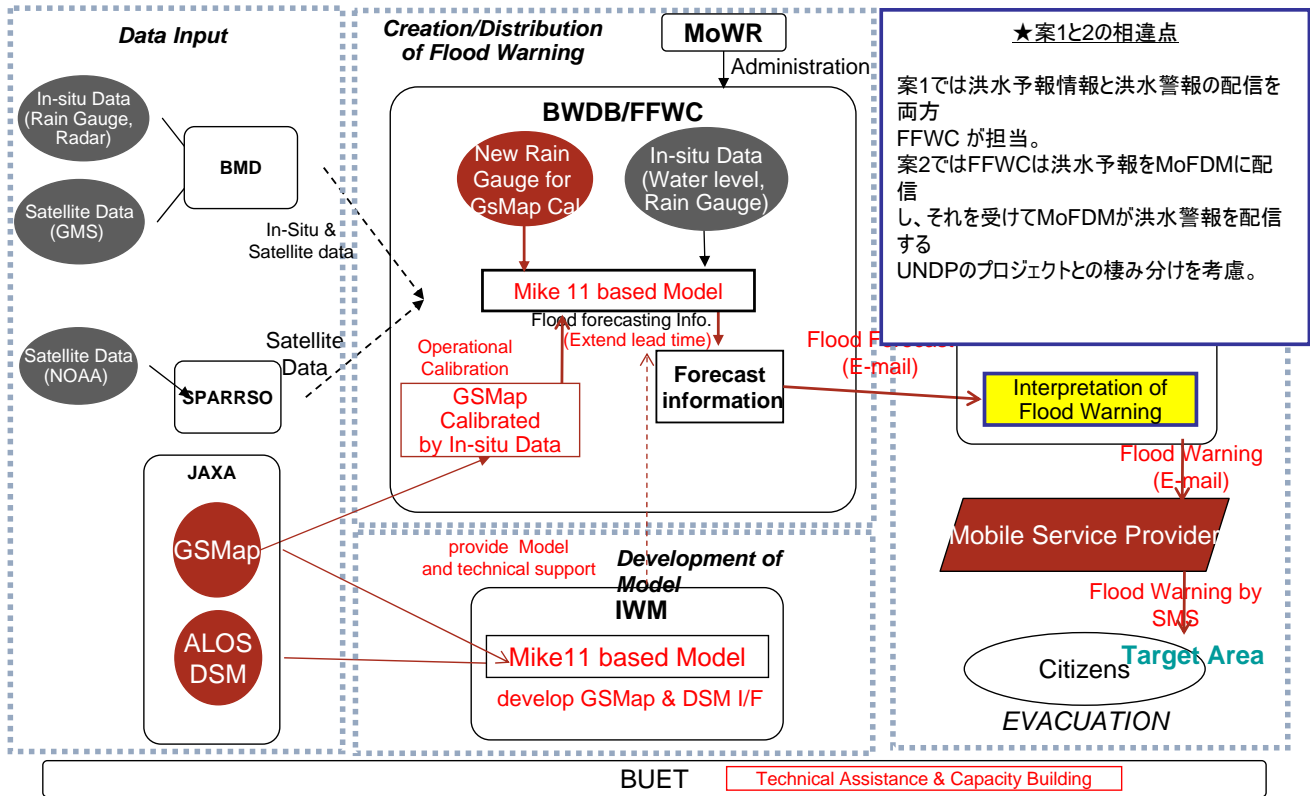# Implementation Framework in Bangladesh (Idea-1-1)
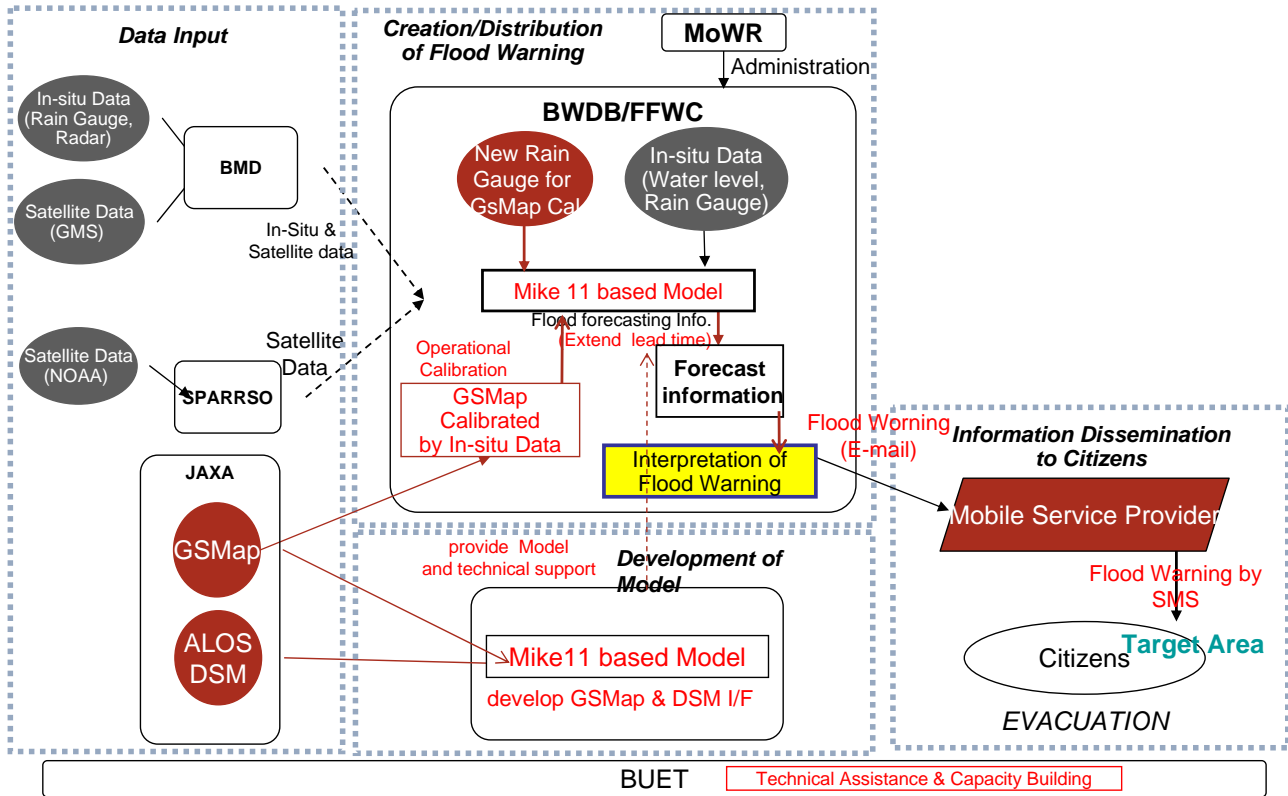
Implementation Framework in Bangladesh (Idea-1-2)

Implementation Framework in Bangladesh (Idea-2)

Thanks for your patient hearing