

People Centered flood management and information tools

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(Bangladesh)

Who are the people ?

What information do they need?

What information can they understand ?

What information can they use?



What Knowledge is required ?

Tools for :

Flood Mitigation

Flood Management: Decision support (what if?)

Flood Forecasting, warning and dissemination



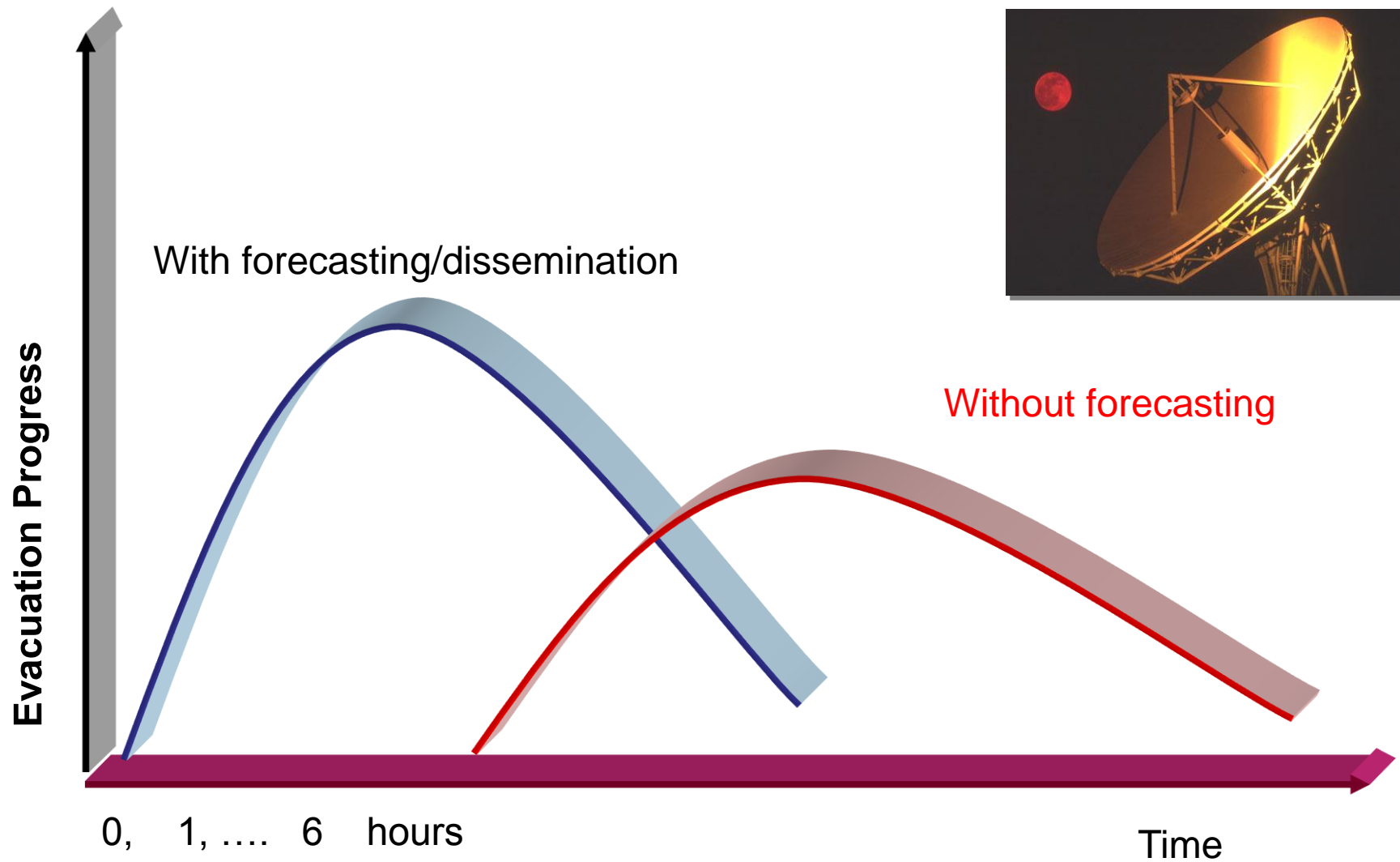
Overall Objective

Risk Reduced

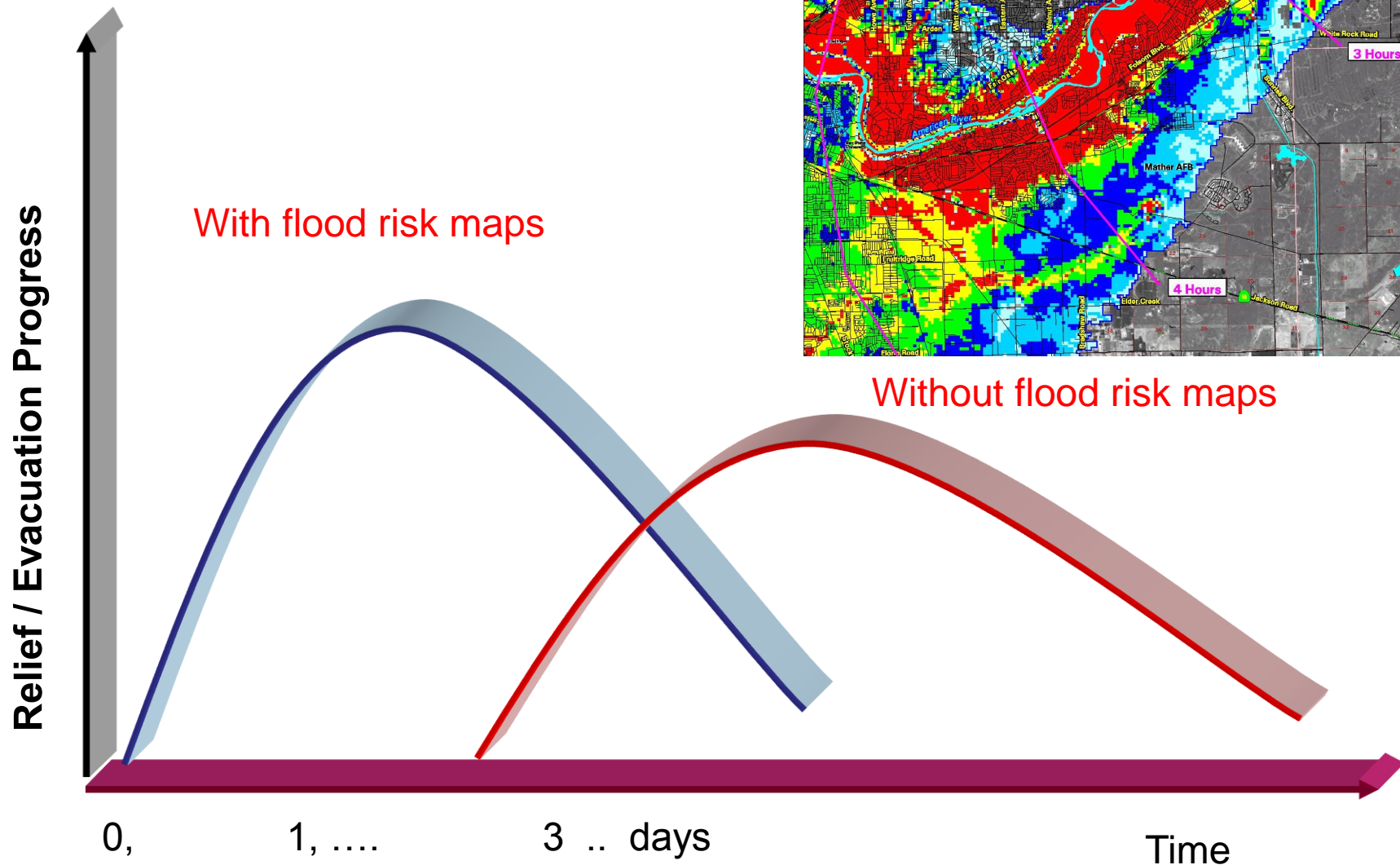
Prepared Society

Flood affected people directly benefited

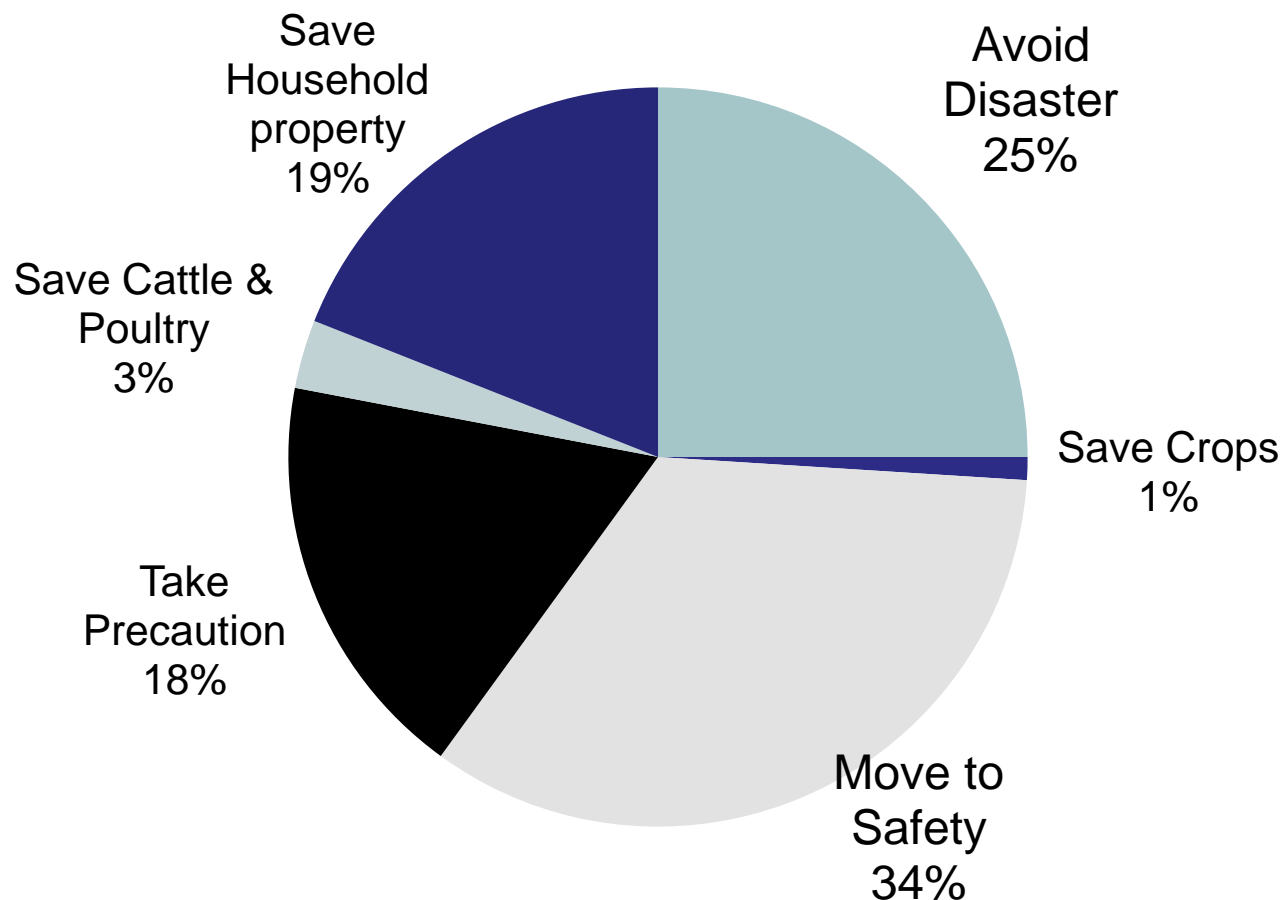
Role of information



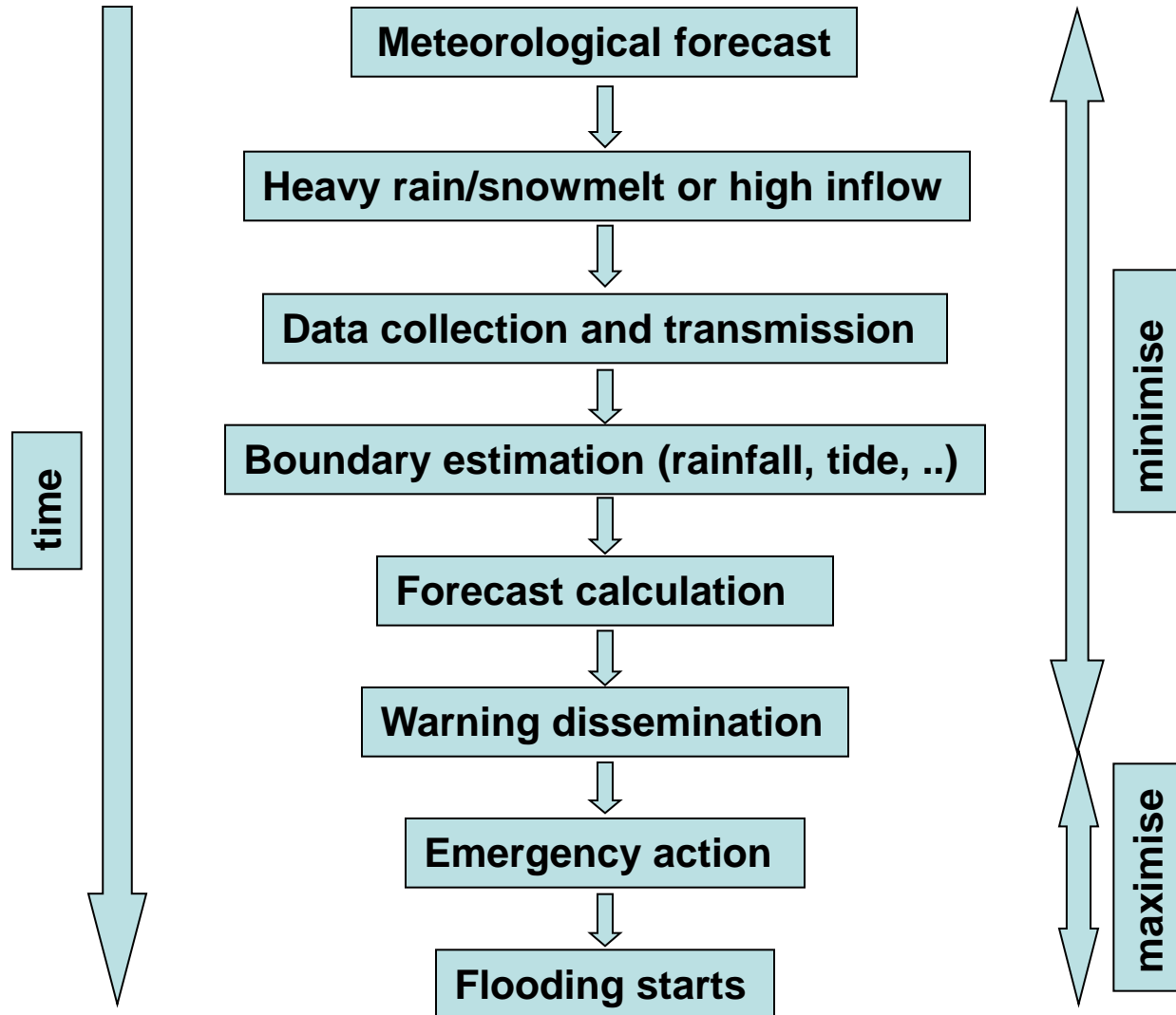
Role of Knowledge Management:



Survey of flood affected people in Rural Bangladesh on use of a 3-day flood forecast



Time is a factor



Making Information Travel Faster than Flood Waters



People have different priorities



- Women, children and poor people suffer the most from floods
- Well coordinated flood forecasting and warning services play important roles in preparing society & reducing risk.



Water Level and I

Bangladesh

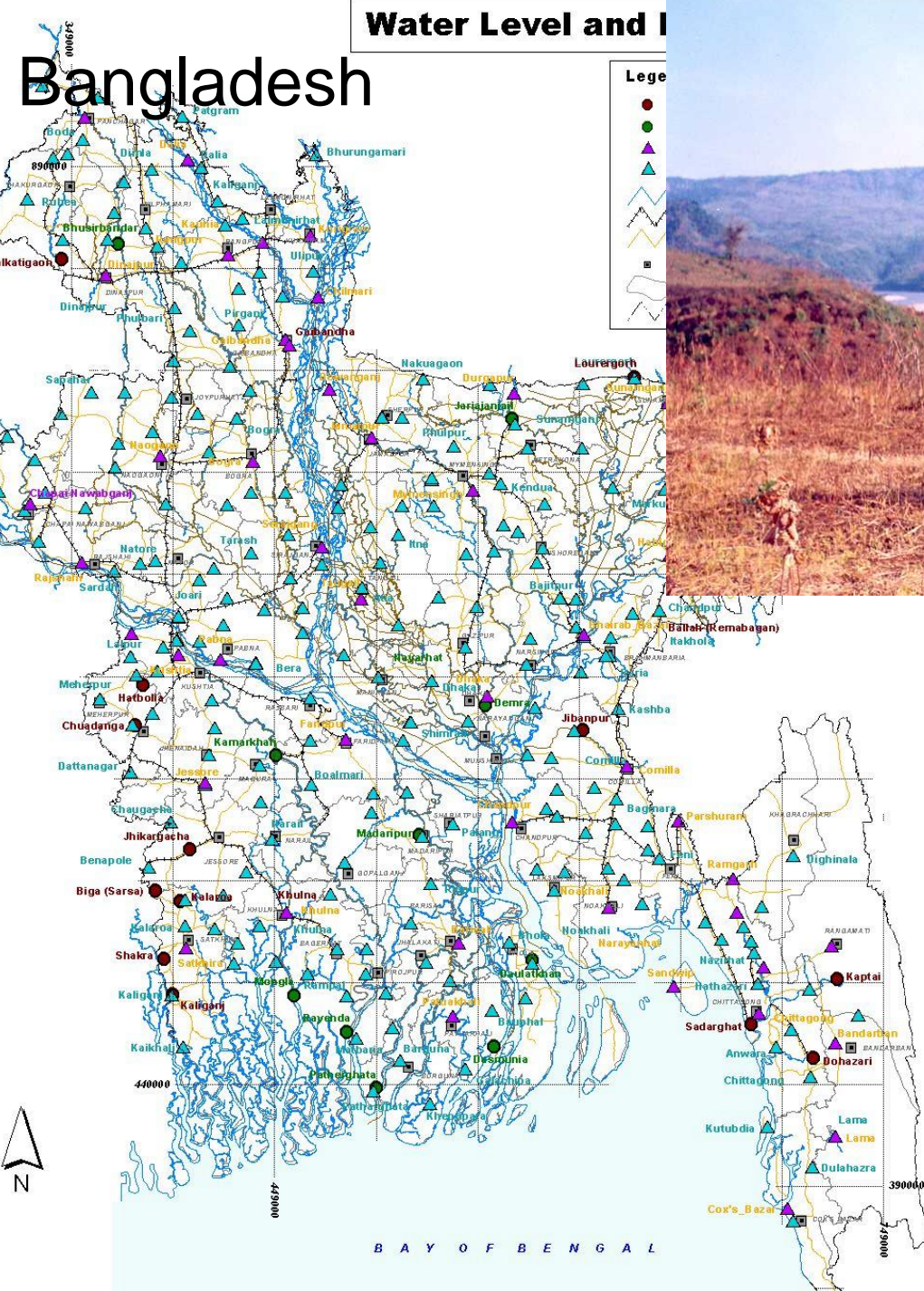




Figure: Water Level Gauge at Seraiganj on Jamuna River

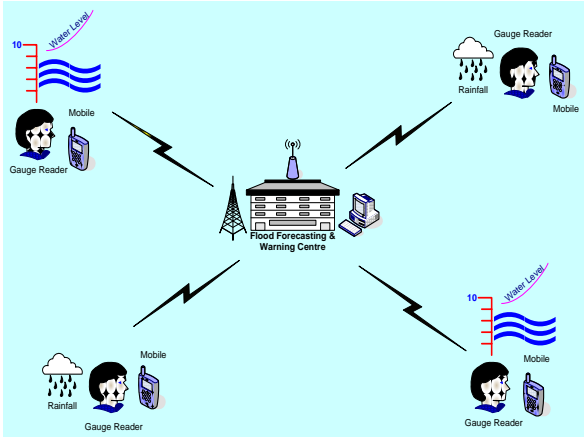


Figure: Schematic diagram of the data transmission network using mobile technology

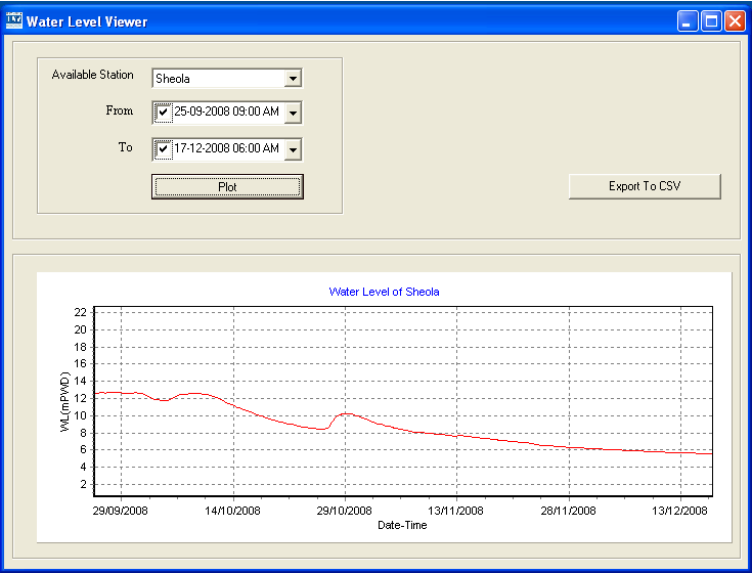
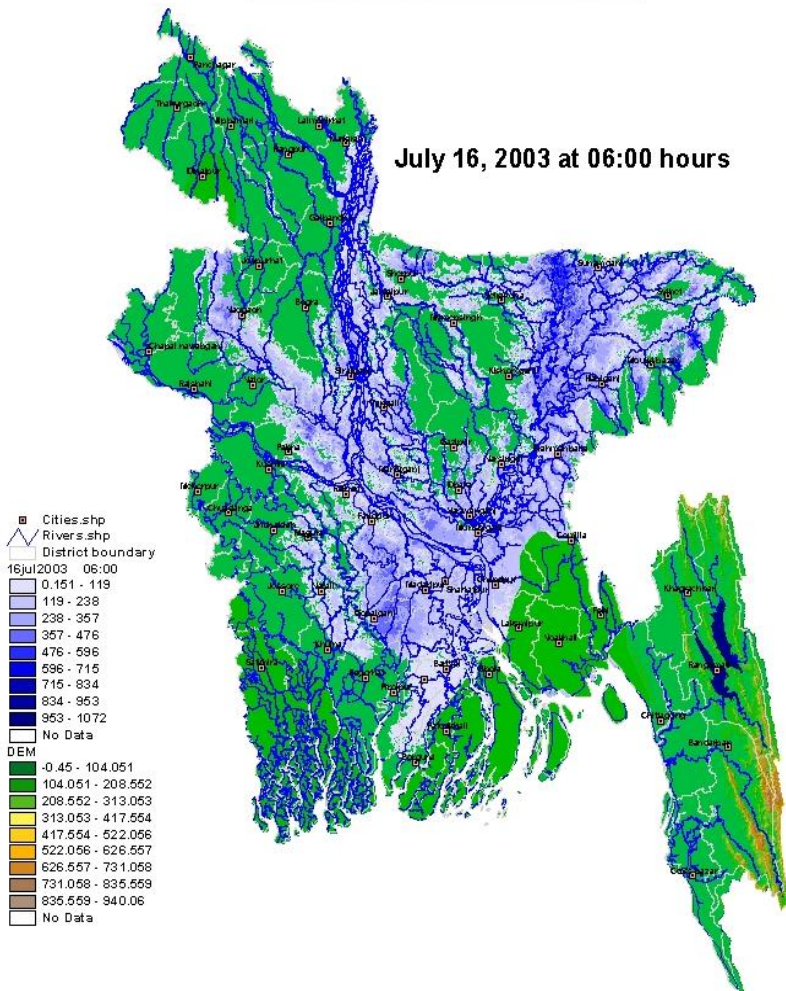


Figure: Visual checking of data collected through Mobile SMS

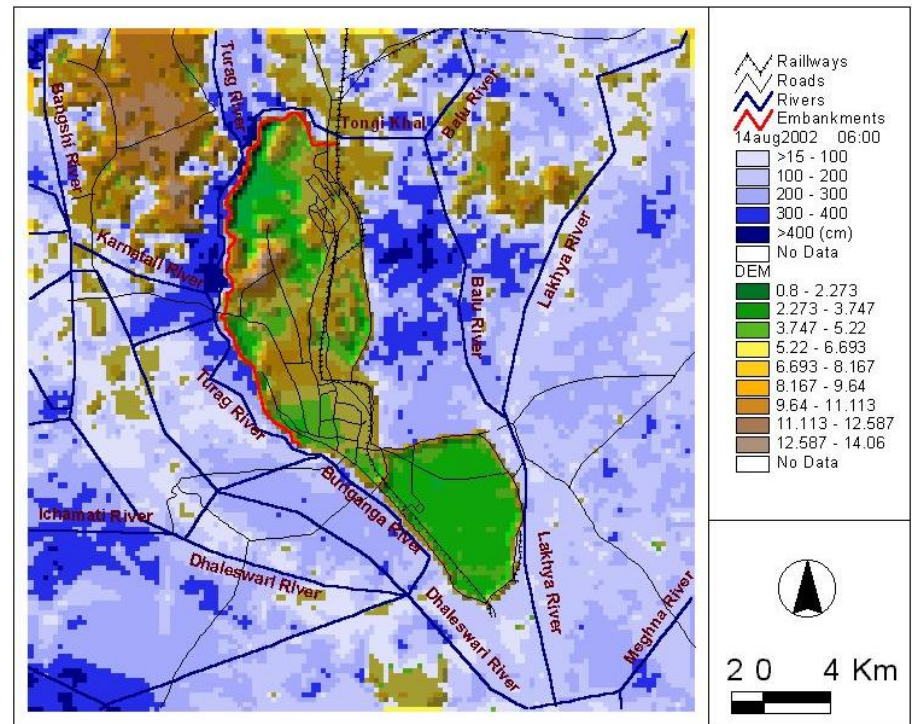
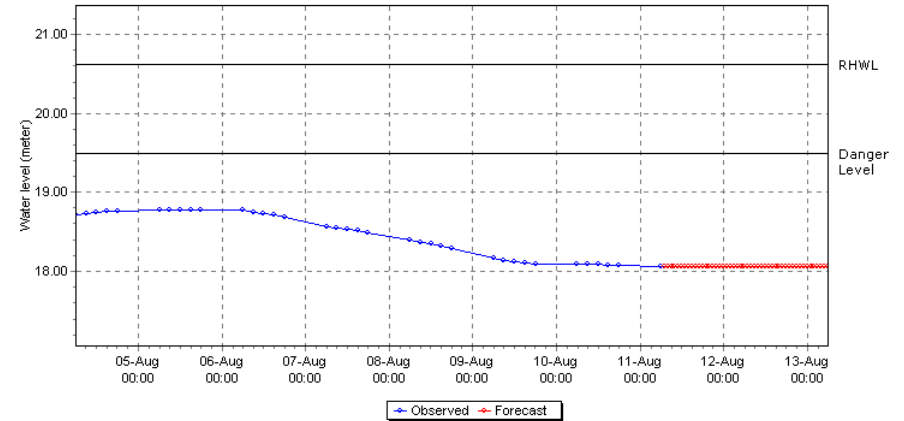
SMS	220908*500*492*485*485*480*30	
Data	Date Time	value
	21 Sep 2008 09: 00	5.00
	12:00	4.95
	15:00	4.85
	18:00	4.85
	22 Sep 2008 06: 00	4.80
	22 Sep 2008 06: 00	30.00 (rainfall of last 24 hours)

Data Storage:
 SMS data are being stored in a database from where it is transferred into the FFWC data base (FloodWatch)

bang160703: 16jul2003 06:00



Jamuna River at Bahadurabad (Year 2003)

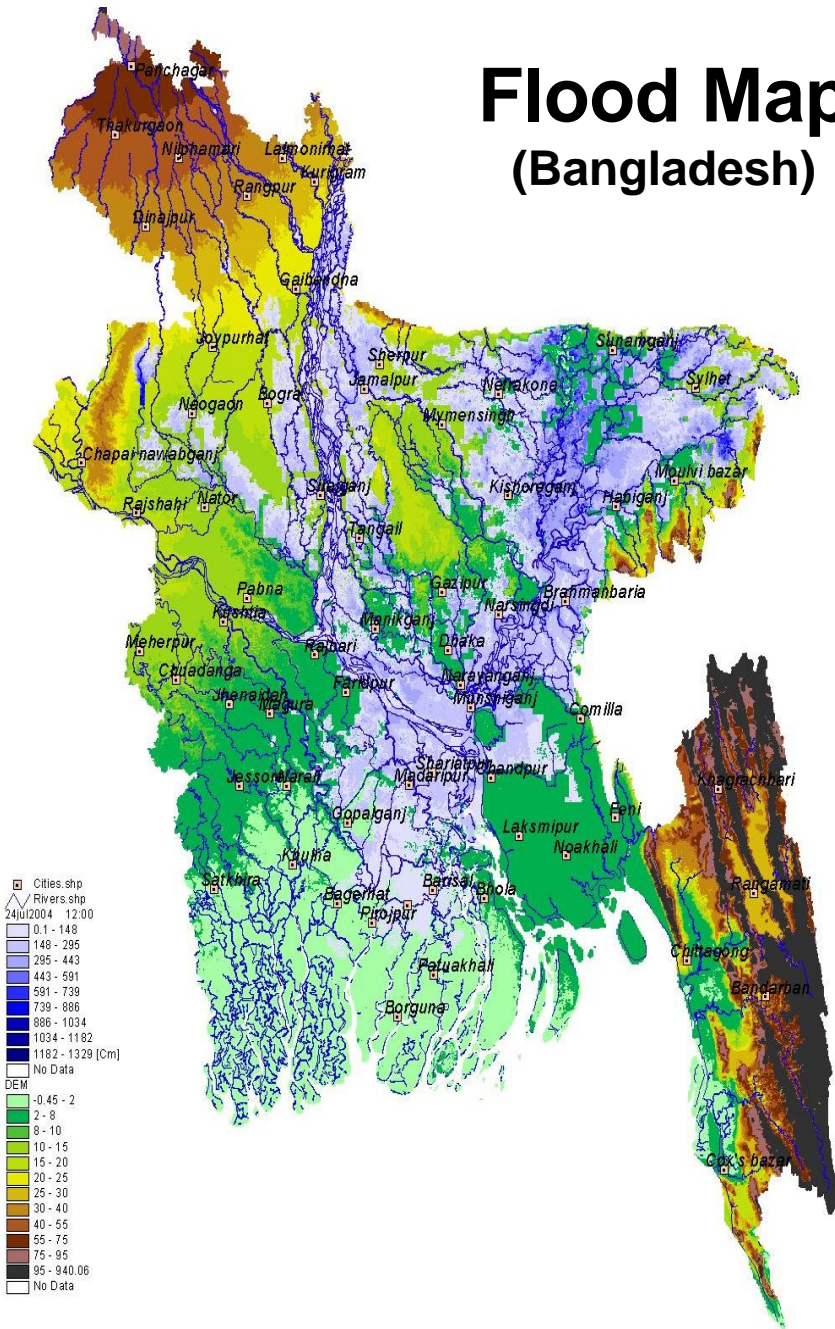


Flood Forecast

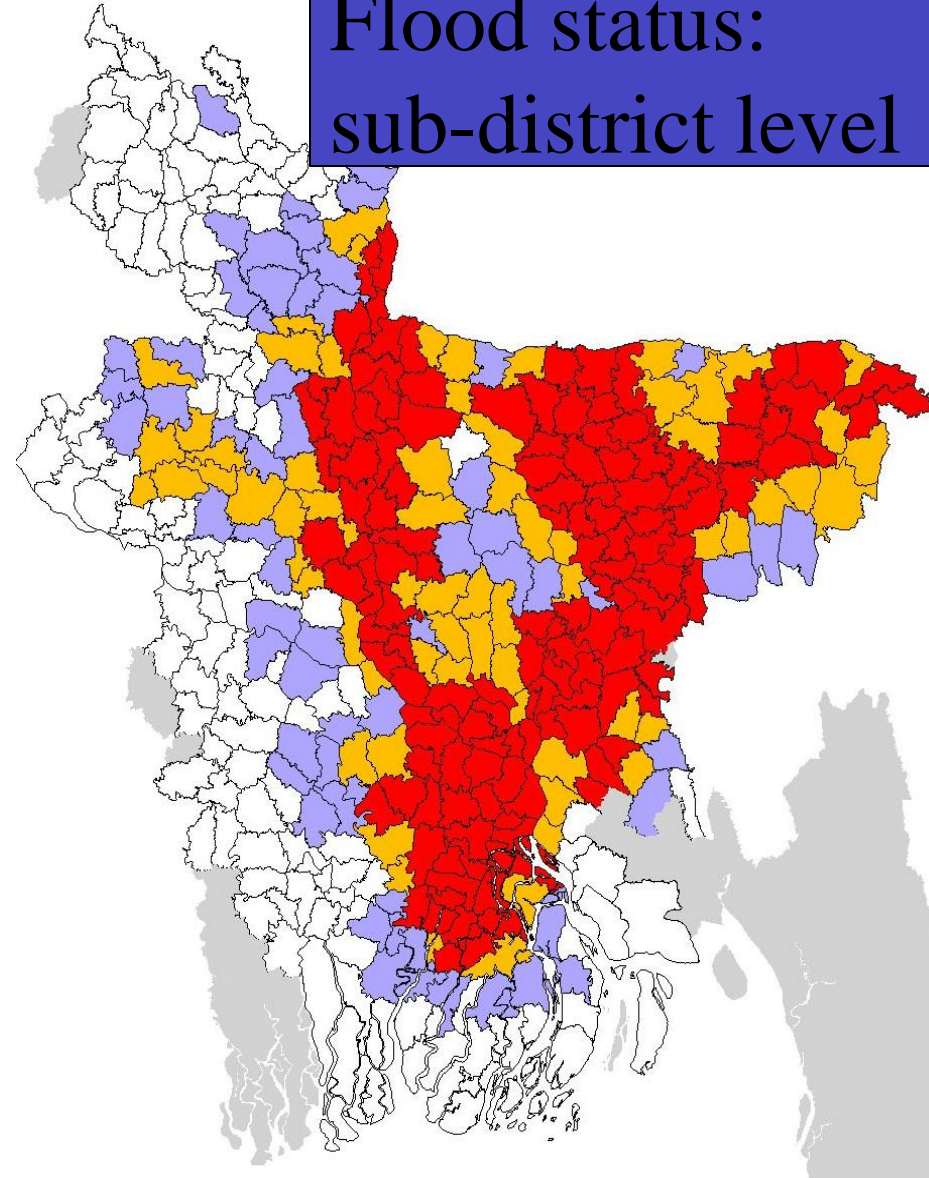
- Water Level
- Flood Inundation Map

Flood map of Dhaka City:14 August,2009 06:00

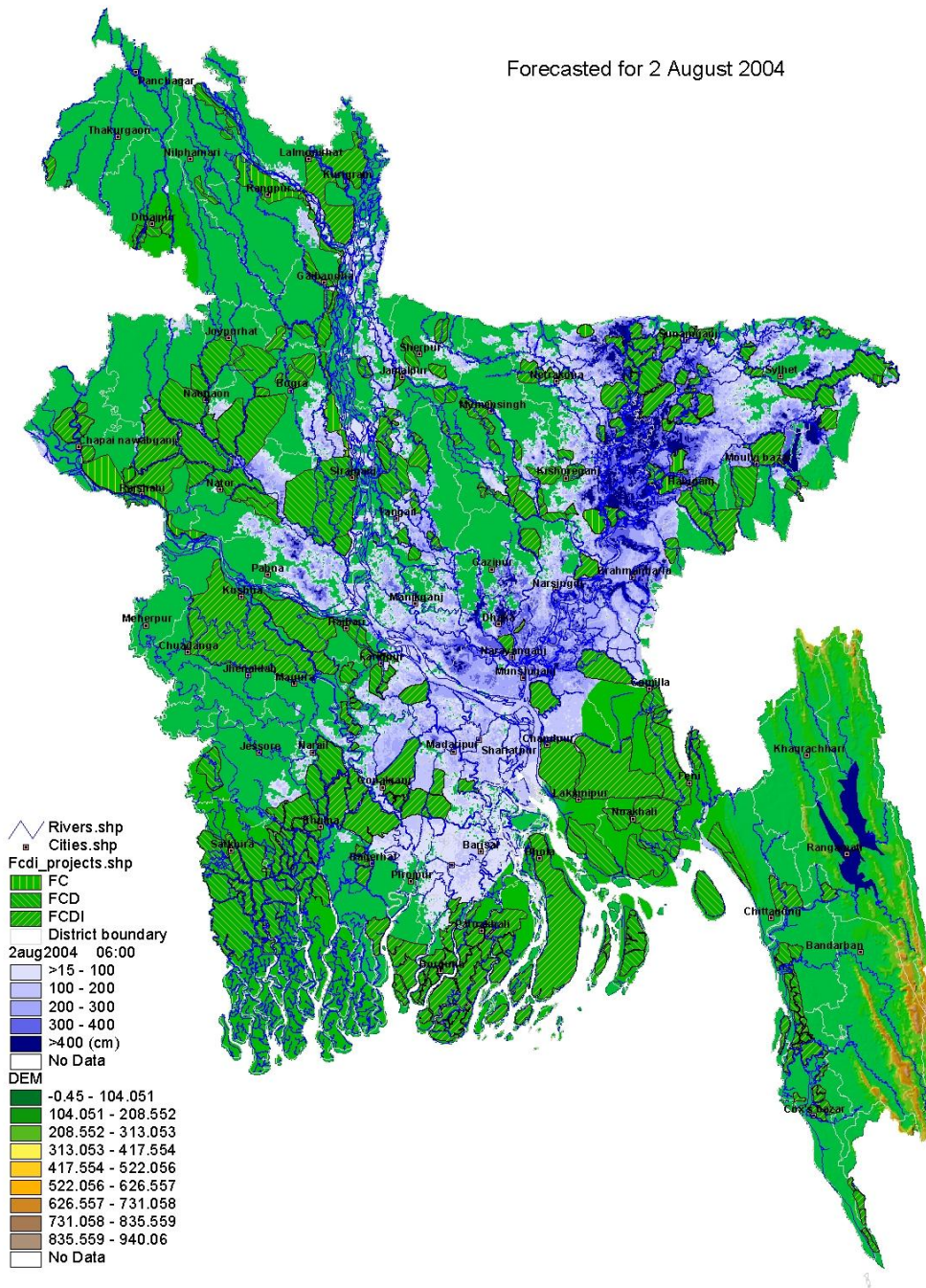
Flood Map (Bangladesh)



Flood status:
sub-district level



Forecasted for 2 August 2004



National level
Flood Map for
overall flood
situation

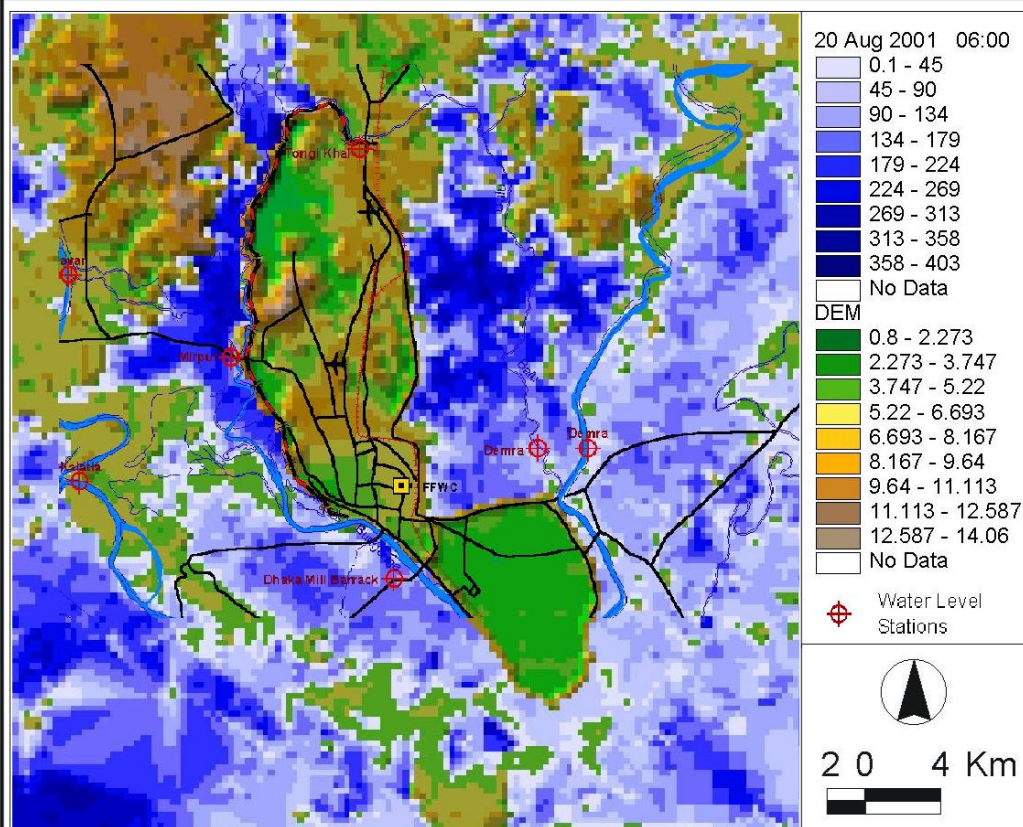
Dhaka City Special Flood bulletin

Sl. No.	River Name	Station Name	RHWL	D.L.	Water Level		+ Rise - Fall	Above D.L.
					19/08/2001	20/08/2001		
			(m)	(m)	(m)	(m)	(cm)	(cm)
1	Buriganga	Dhaka Mill Barrack	7.58	6.00	4.48	4.55	7	—
2	Balu	Demra	7.09	5.03	—	—	—	—
3	Turag	Mirpur	8.35	5.94	4.78	4.78	0	—
4	Turag	Tongi Khal	7.84	6.08	—	—	—	—

Note: River situation an on 20 August 2001 at 6:00 hrs.

RHWL = River Highest Water Level

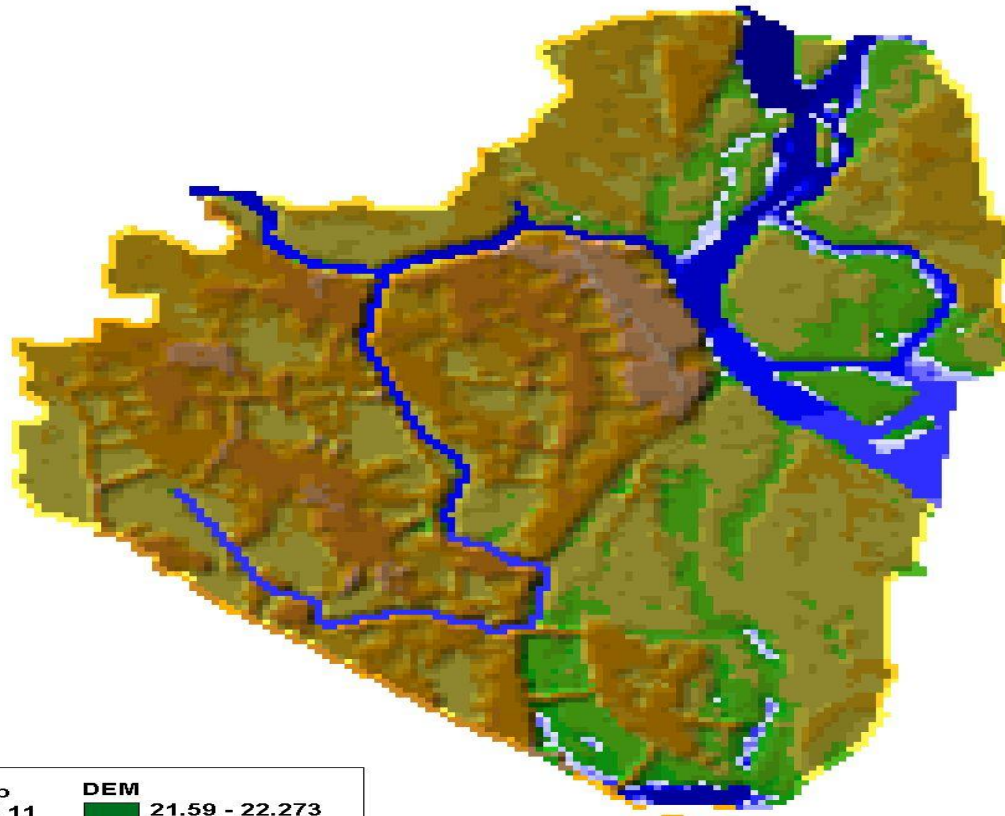
DL = Danger Level



Flood Forecasting and Warning Center
Bangladesh Water Development Board (BWDB)

Detailed Inundation forecast for Dhaka city

Detailed flood map for local area area.

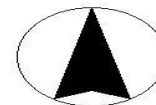


Flood Map

0.1 - 11
11 - 23
23 - 34
34 - 45
45 - 57
57 - 68
68 - 79
79 - 91
91 - 102
No Data

DEM

21.59 - 22.273
22.273 - 22.957
22.957 - 23.64
23.64 - 24.323
24.323 - 25.007
25.007 - 25.69
25.69 - 26.373
26.373 - 27.057
27.057 - 27.74
No Data



2 0 2 Kilometers

Estimates

Events

Scenarios

Simulations

Status

Tasks

Time Series

Chi-Mun at 2006-11-22 09:21:47.561

Properties

Input

Output

Other

Map

Please select an item to plot:

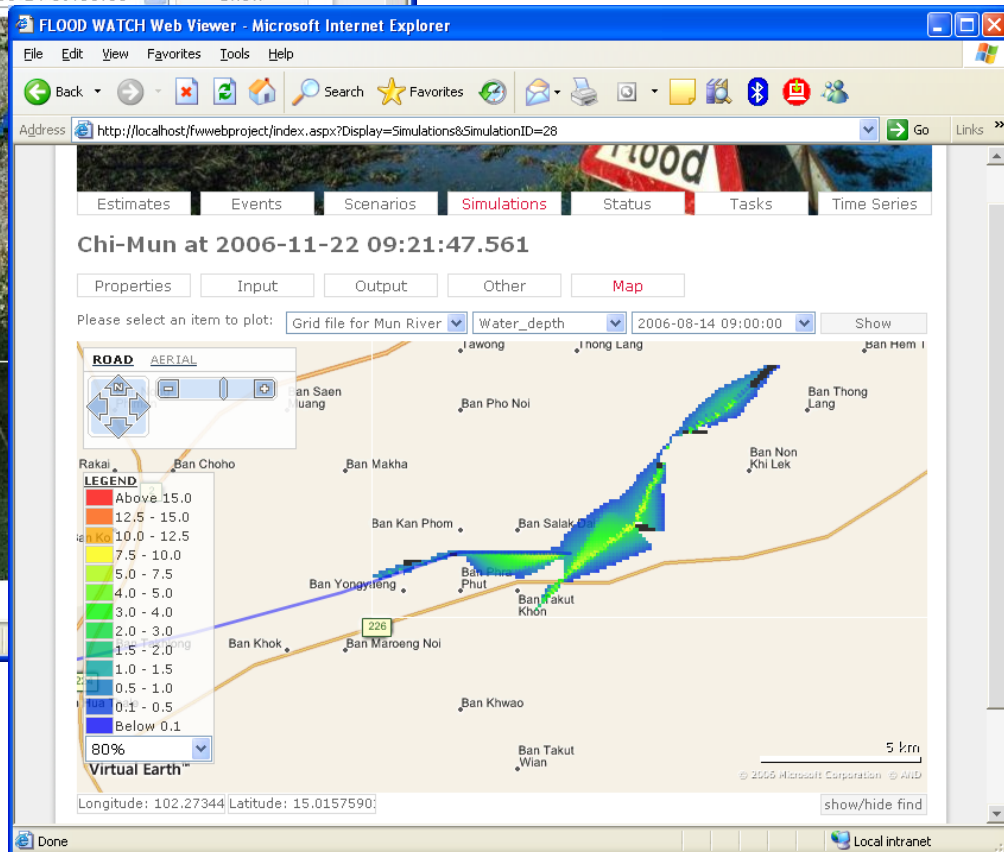
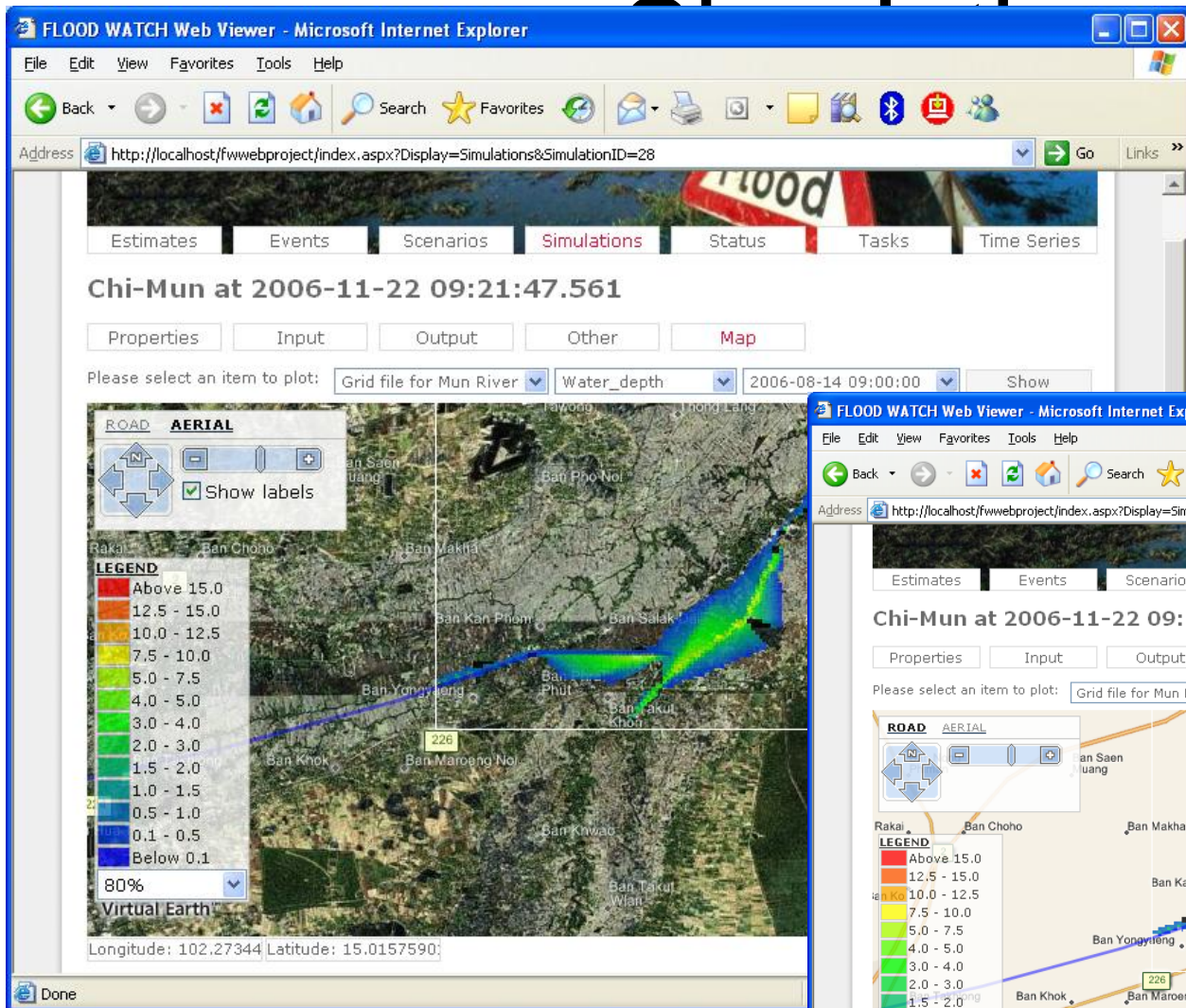
Grid file for Mun River

Water_depth

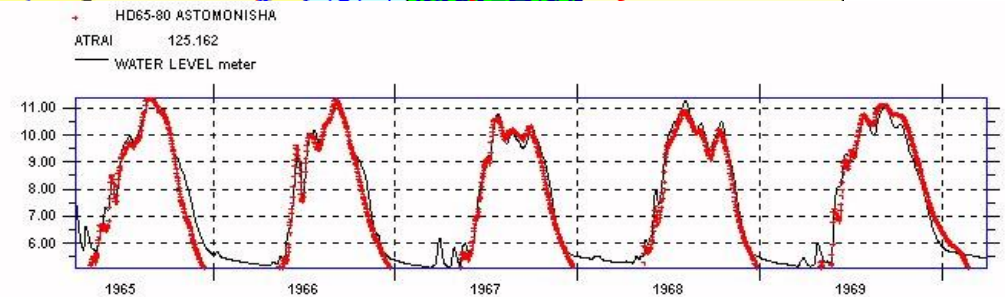
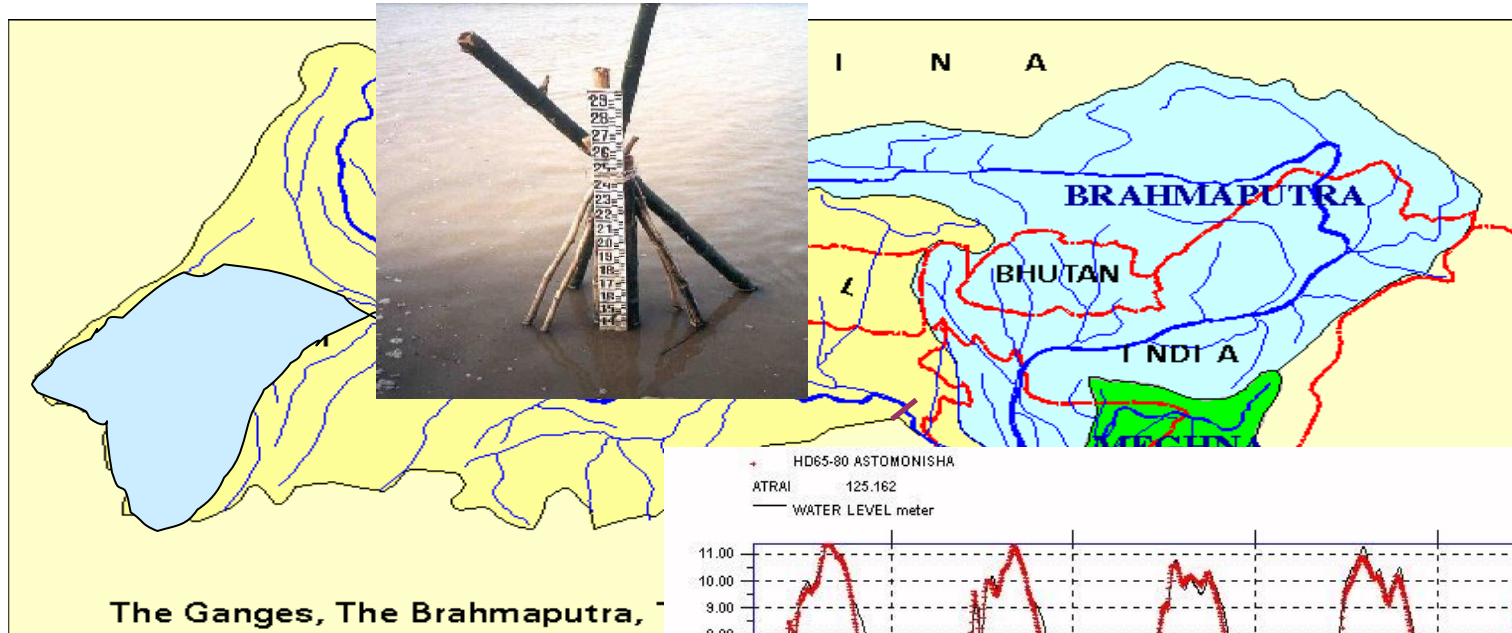
2006-08-14 09:00:00

Show

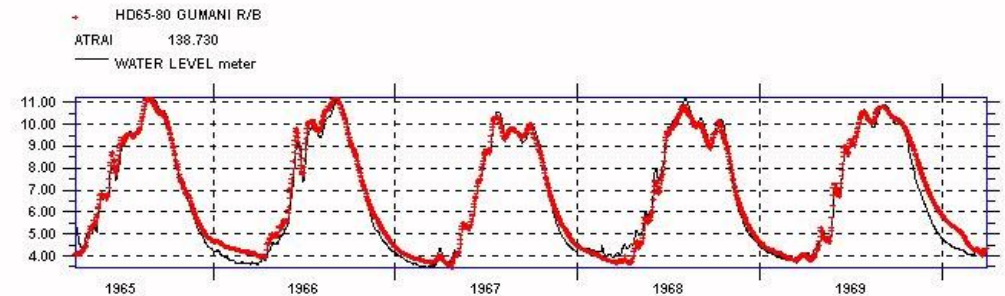




Complexities of trans boundary floods

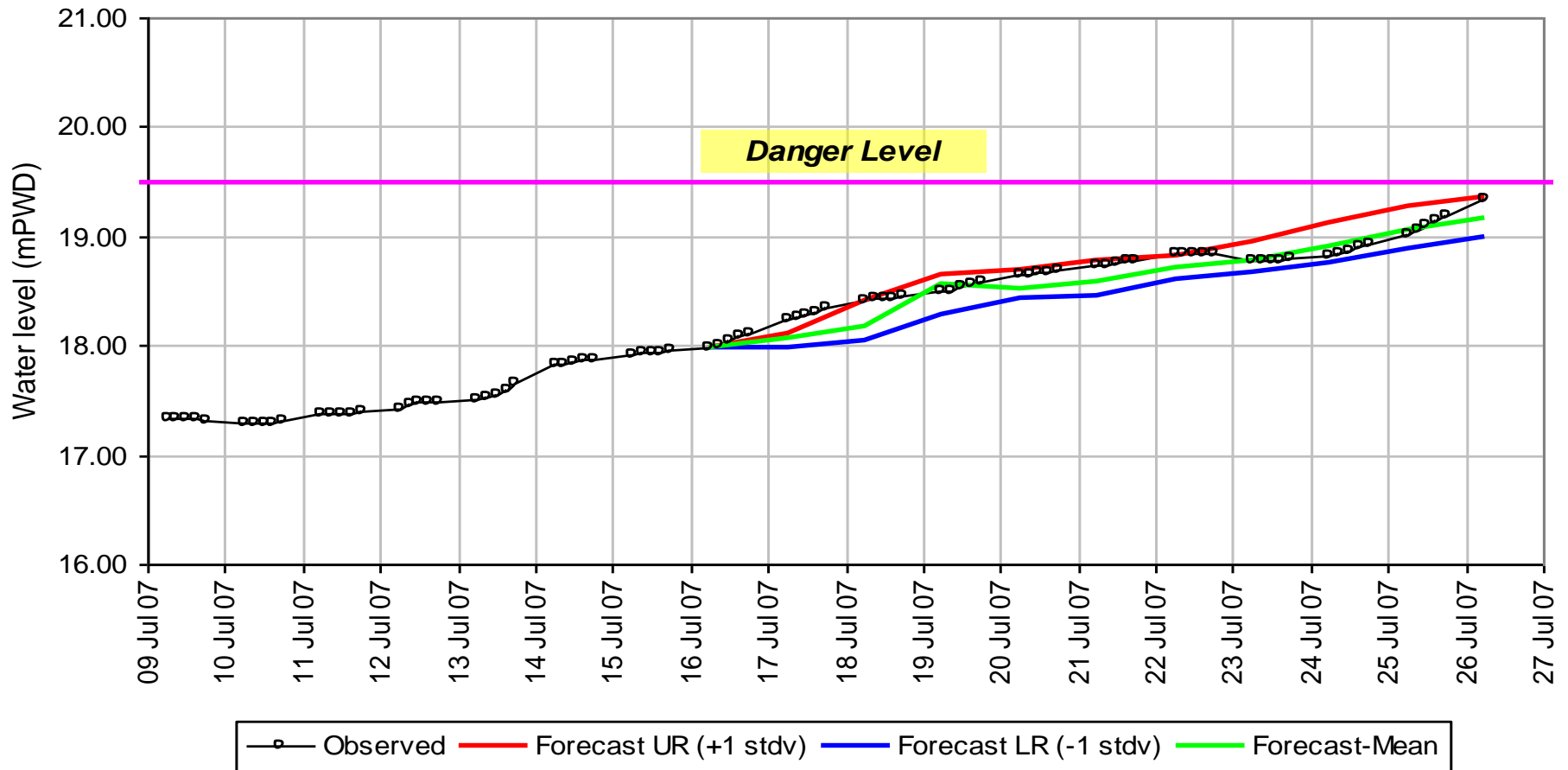


Model Calibration

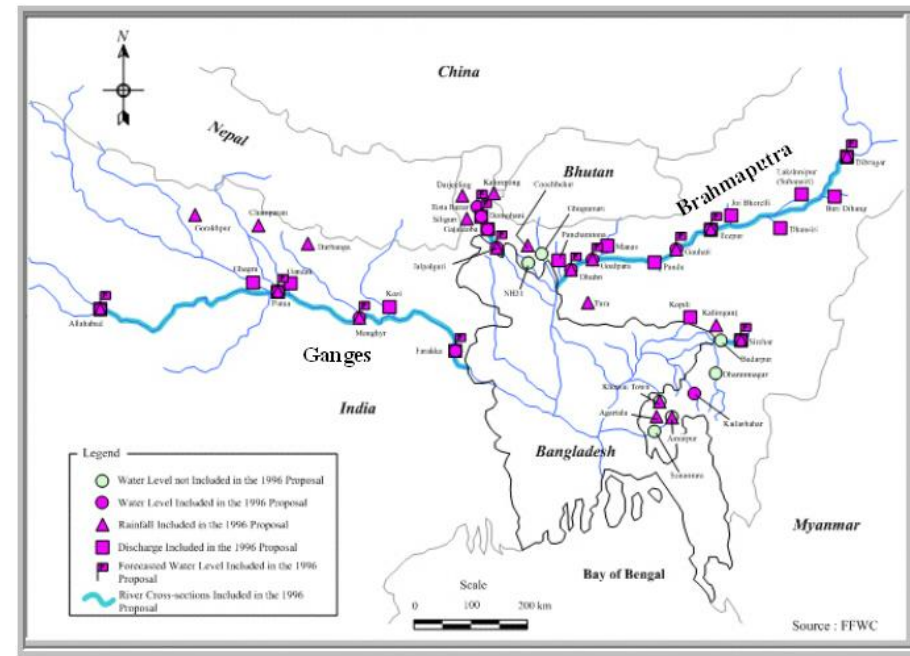
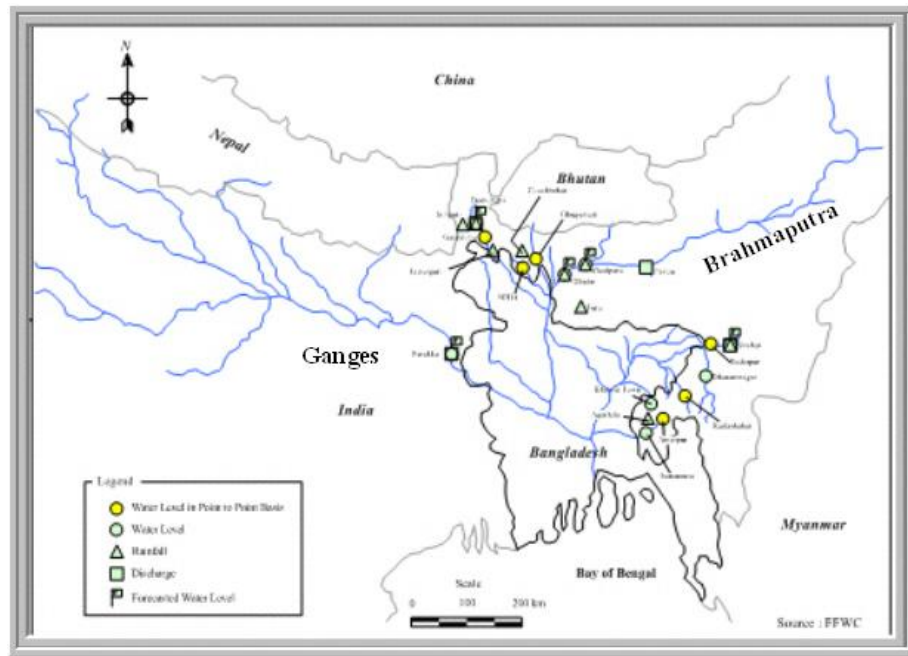


Long-term forecasts using regional climate models

Bahadurabad on the Jamuna River



Regional cooperation on data sharing would enhance the forecast lead time



Existing data sharing Request by Bangladesh

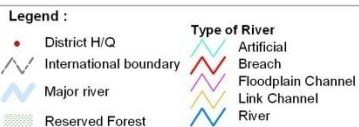
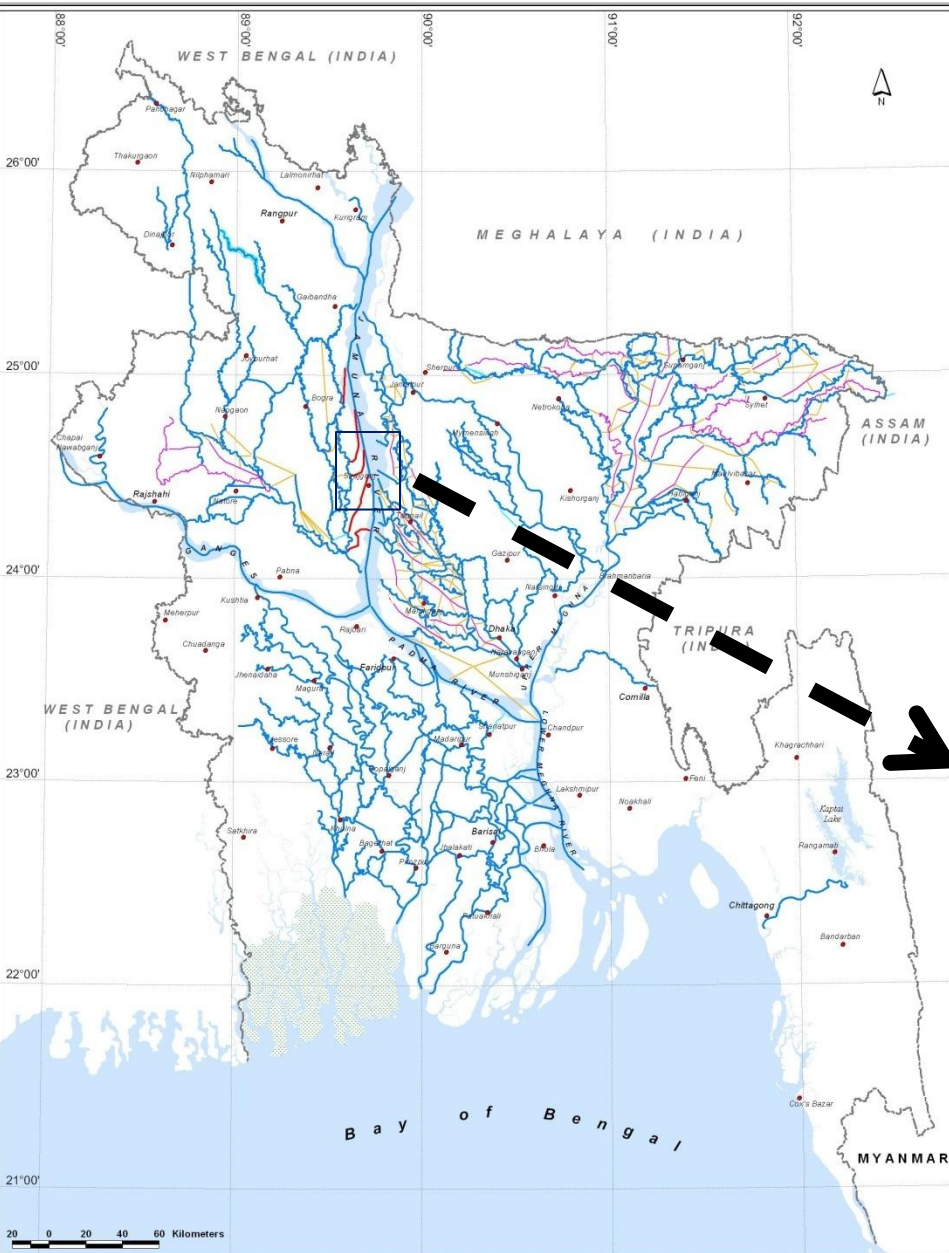
(Lead time = 3 days) **(Lead time = 10 days)**

Community level Flood warning



Flood Warning Dissemination with Marker Posts

IMPROVED FLOOD WARNING to a local area



Updating, Calibration and Validation of
Flood Forecasting Model

**River & Floodplains included in
the FFWC Super Model**

Drawing No. : A.2



FLOOD PRONE AREAS UNDER THE JAMUNA FLOOD PLAIN

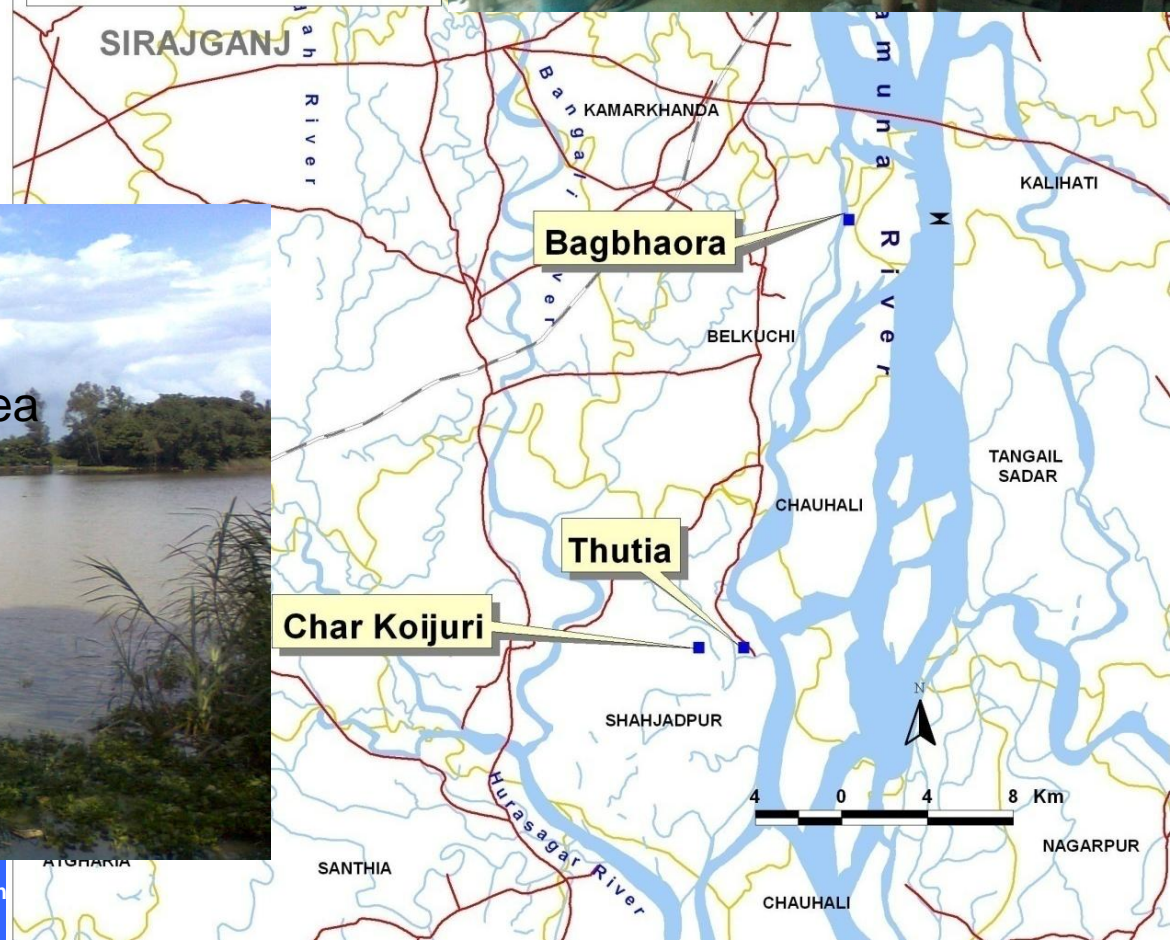
LEGEND

- Forecasting Water Level Station
- ↗ Upazila Boundary
- Road
- Railway
- Minor River
- Major River

Livelihood in the Bag-bhaora area



Flooding in the Char-Koijuri area



FLOOD MARKS

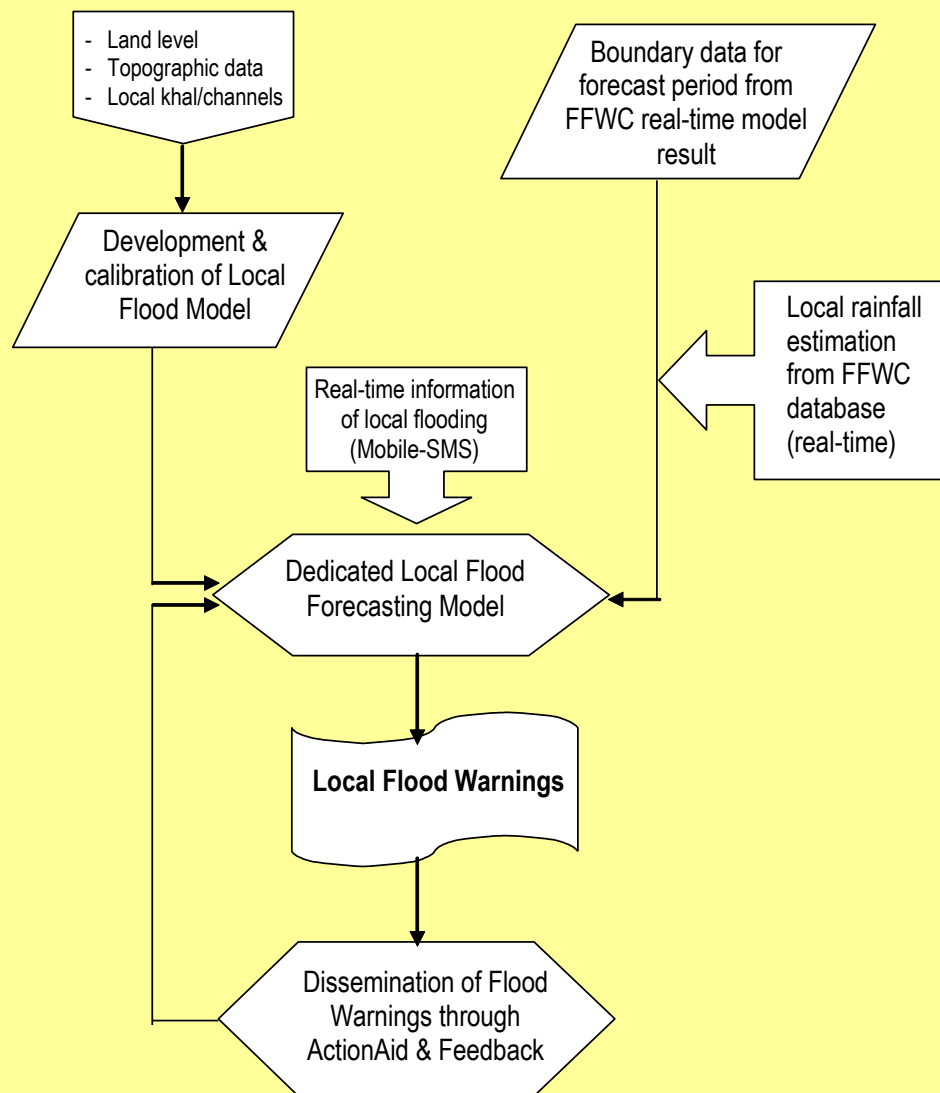
Danger: Red

Medium: yellow

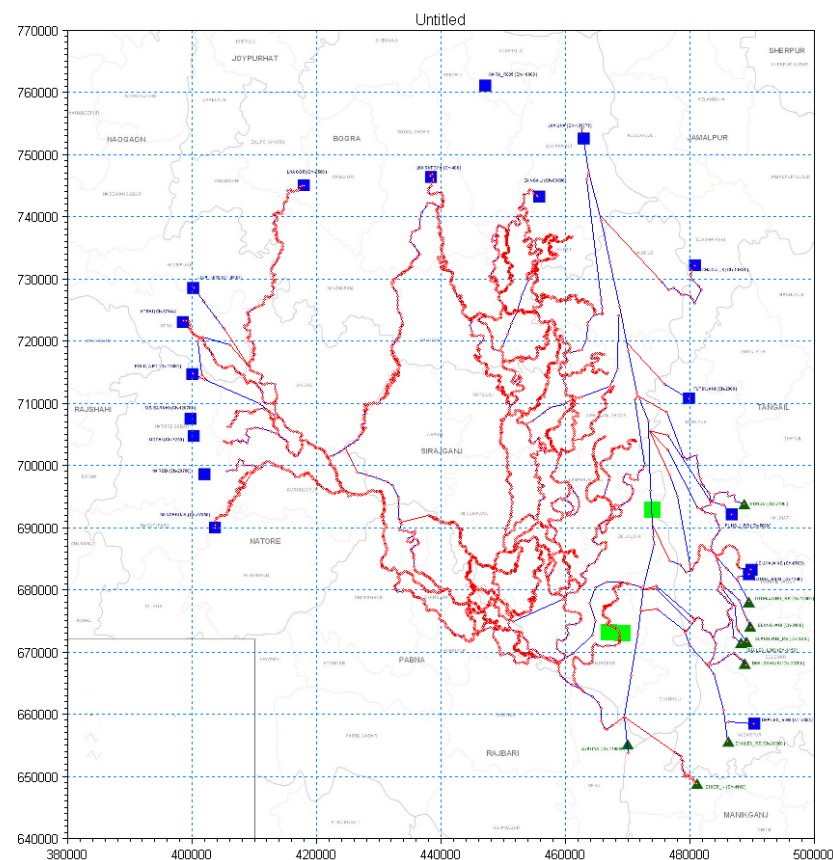
Normal: green

Water level gauge in the Char-Koijuri area
for flood monitoring & forecasting

METHODOLOGY

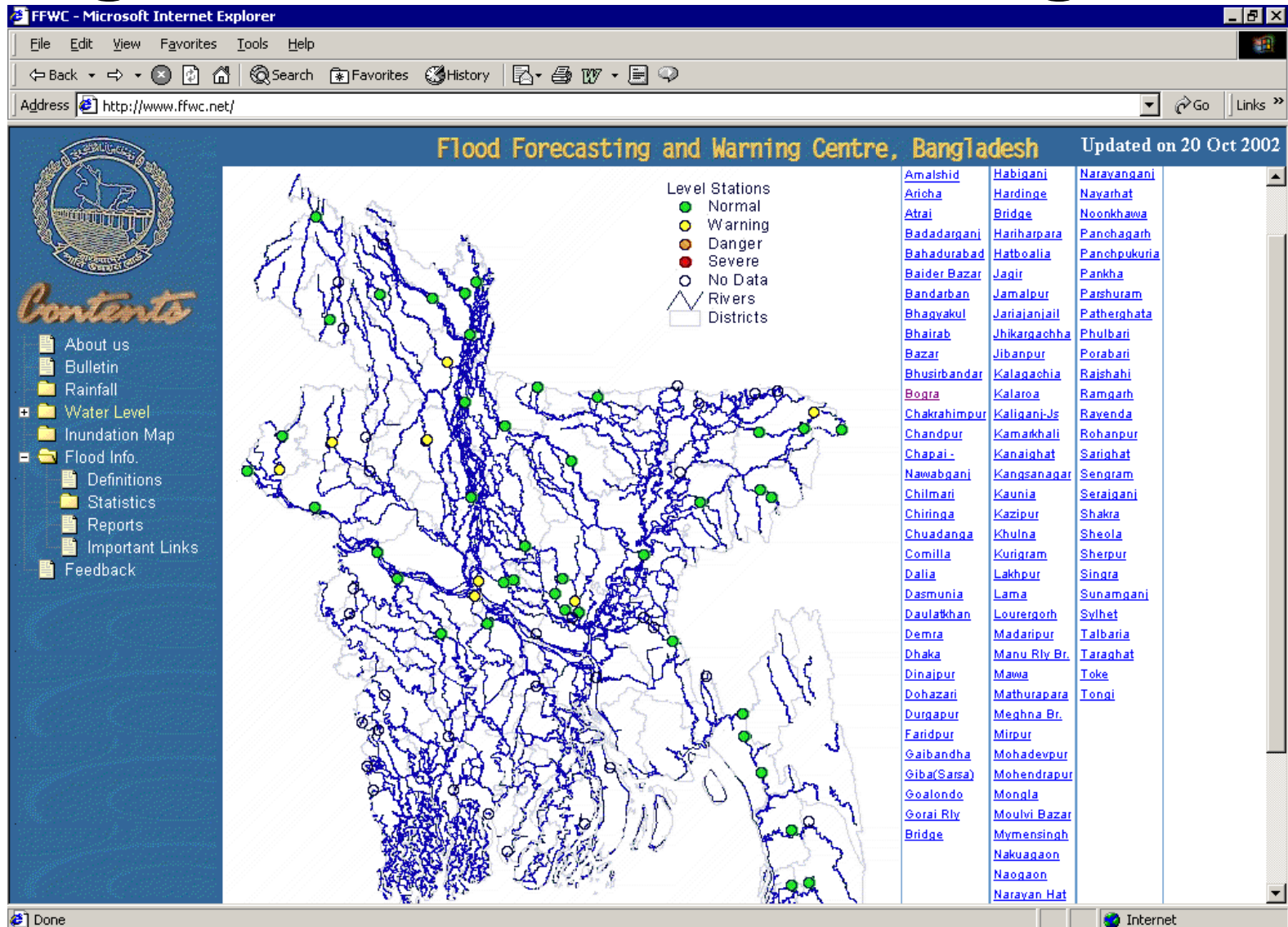


TOOL: Flood Forecasting & warning Centre (FFWC) REAL-TIME SUPER MODEL

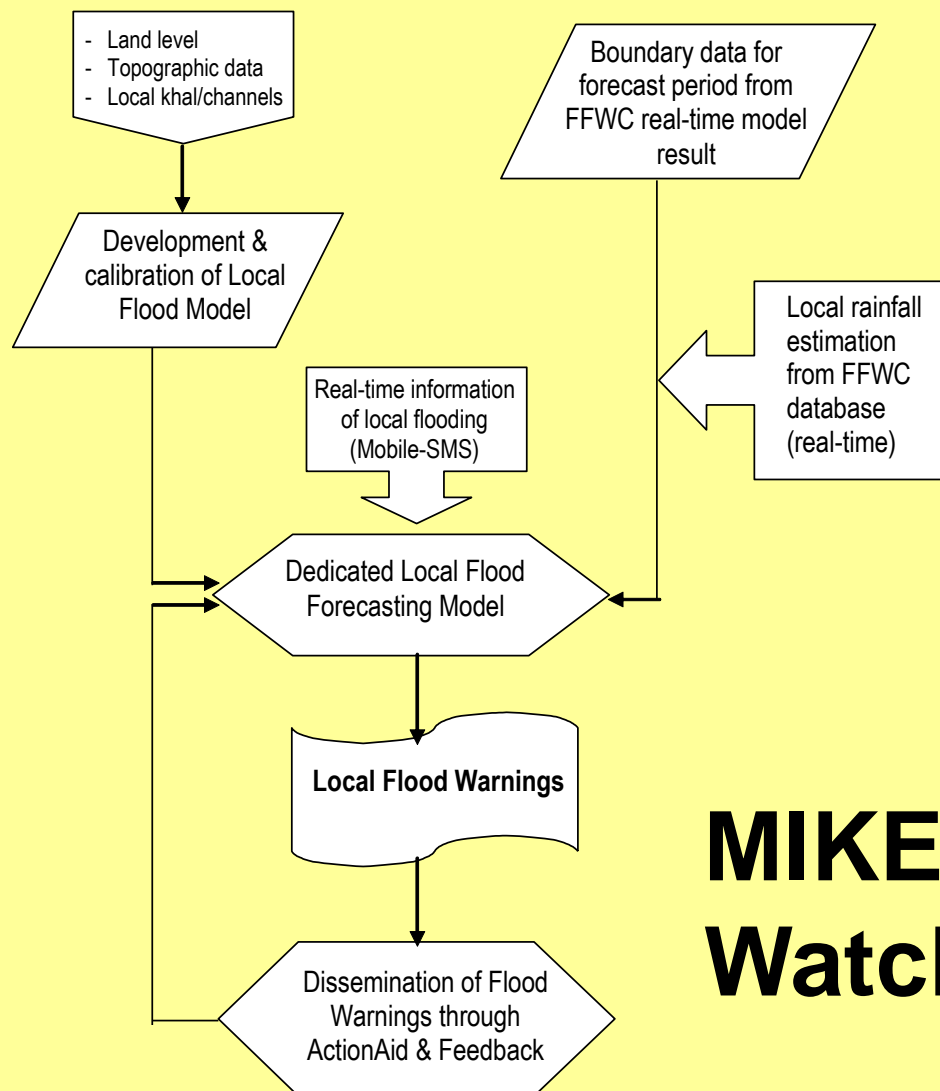


Bangladesh Flood Forecasting Model

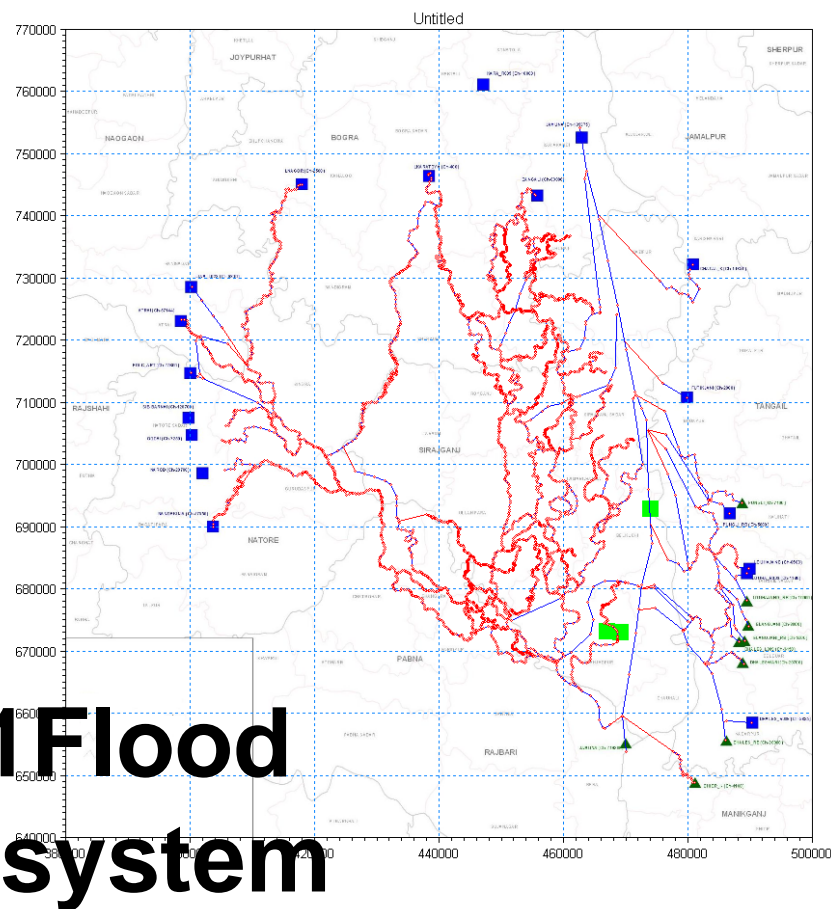
www.ffwc.gov.bd



METHODOLOGY



TOOL: Flood Forecasting & warning Centre (FFWC) REAL-TIME SUPER MODEL



MIKE11 Flood Watch system

Dissemination of Flood Warnings

Forecast Date: 21.09.2010

Station Name	Last 24 Hr Rise / Fall (inch)	Today WL From DL (Below / Above)	WL Rise / Fall for Next 3 Days (inch)		
			24h	48h	72h
Bag Bhaora	-5.4	-58.6	-2.5	-4.4	-5.6
Char Kojuri	-4.2	-36.8	-2.6	-4.7	-6.4
Thutia	-4.2	-48.6	-2.5	-4.4	-5.9

* (-ve) means fall/below

* (+ve) means rise/above

➤ The information contains today's flood situation i.e, how much is the present water level above or below the danger level; changes in water level during last 24 hours and the forecasted flood level changes for 24, 48 and 72 hours.

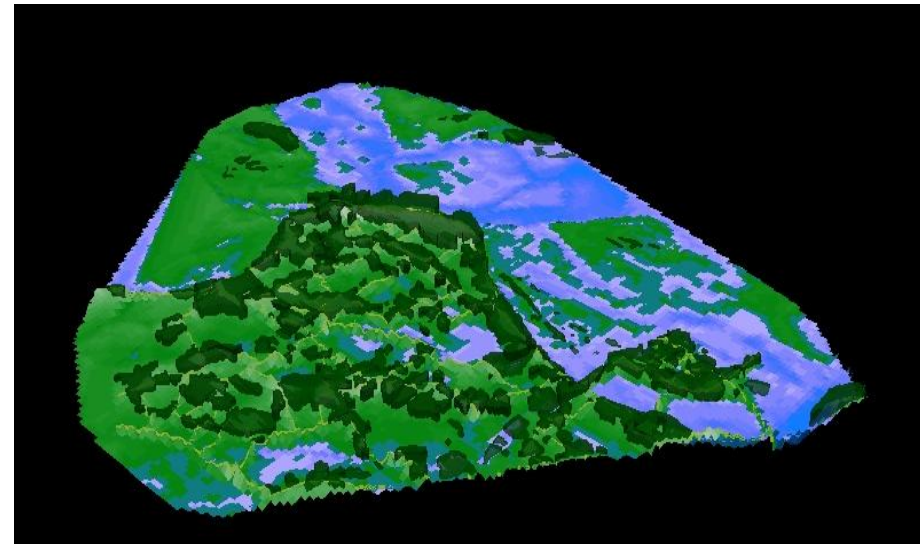
➤ The warnings thus generated have been transferred to local NGO office via e-mail for local level dissemination.

➤ Local NGO disseminates the flood warnings to local community.

Dissemination of Flood Warnings



**People making their own
decision on what next ?**



**Flood maps with details of local area
clearly showing affected villages,
land and infrastructure**



Flood Warning- a challenge
to both flood forecasting
authority and flood prone
communities:

SATO

Sure (no “crying wolf”)

Accurate (in magnitude and time)

Trust (by receivers)

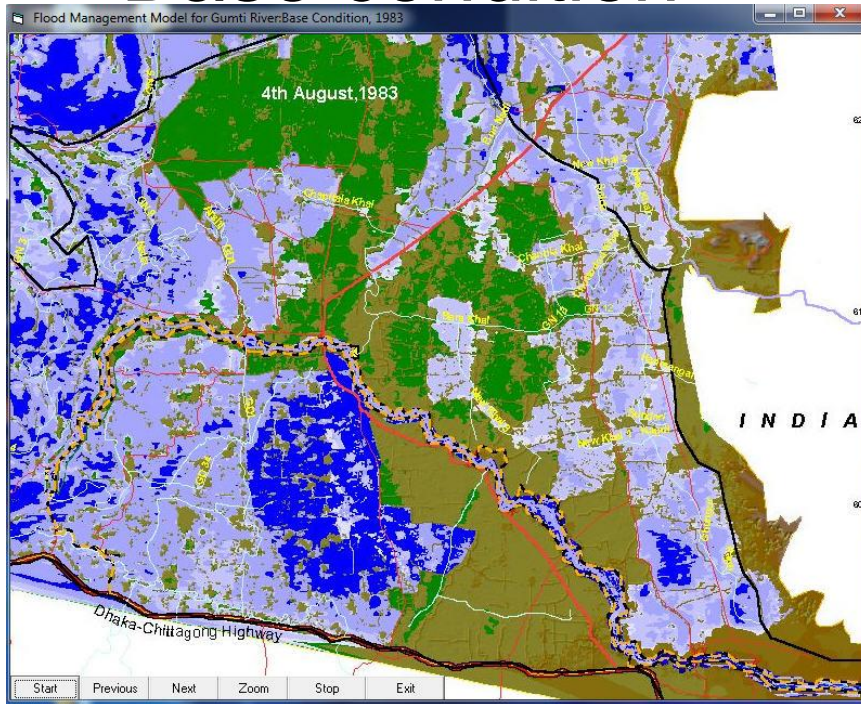
Official (responsibility)

***Flood information and
management decision
making must be based
science (Meteorology,
hydrology, hydraulics)
and reliable ICT tools***

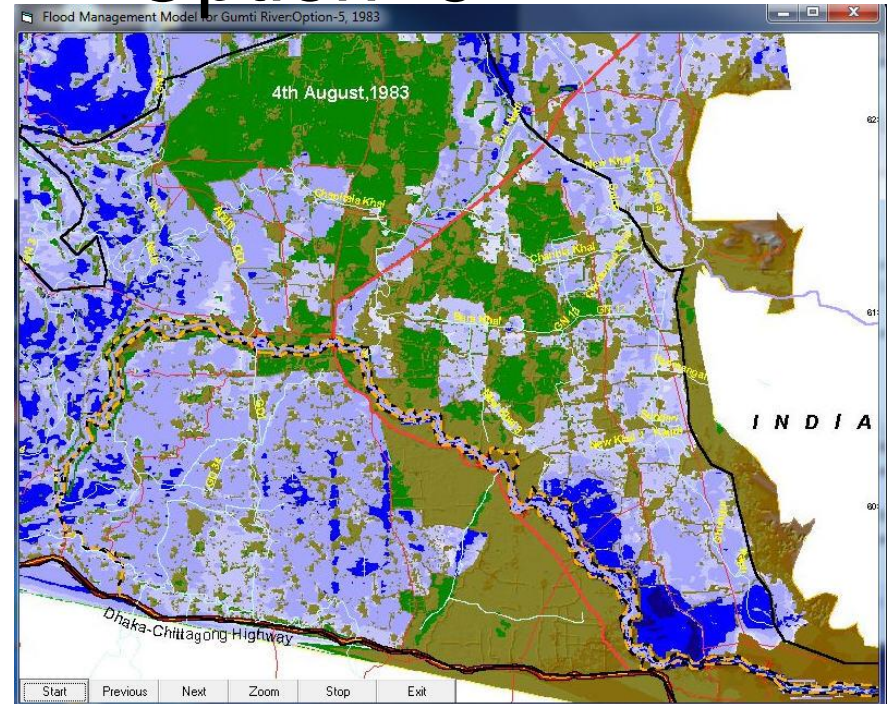
Bring Science to Society

Flood Management decision making

Base condition



Option -5



Assessment of Flood diversion to a designated low lying area to avoid disaster in a urban area

FLOOD-RAVAGED VILLAGE 'IGNORED WARNINGS'

Disaster 'was avoidable'

State of emergency declared in Phrae; floods tipped to hit 15 areas as death toll nears 100

■ *The Nation*

THE TRAGIC LOSS of life resulting from flash-floods and mudslides in Phetchabun could have been prevented if villagers had heeded warnings about a possible natural disaster, a senior interior official said yesterday.

The death toll of victims in the upper central province's Lom Sak district rose to 88 yesterday, with more than 90 reported missing.

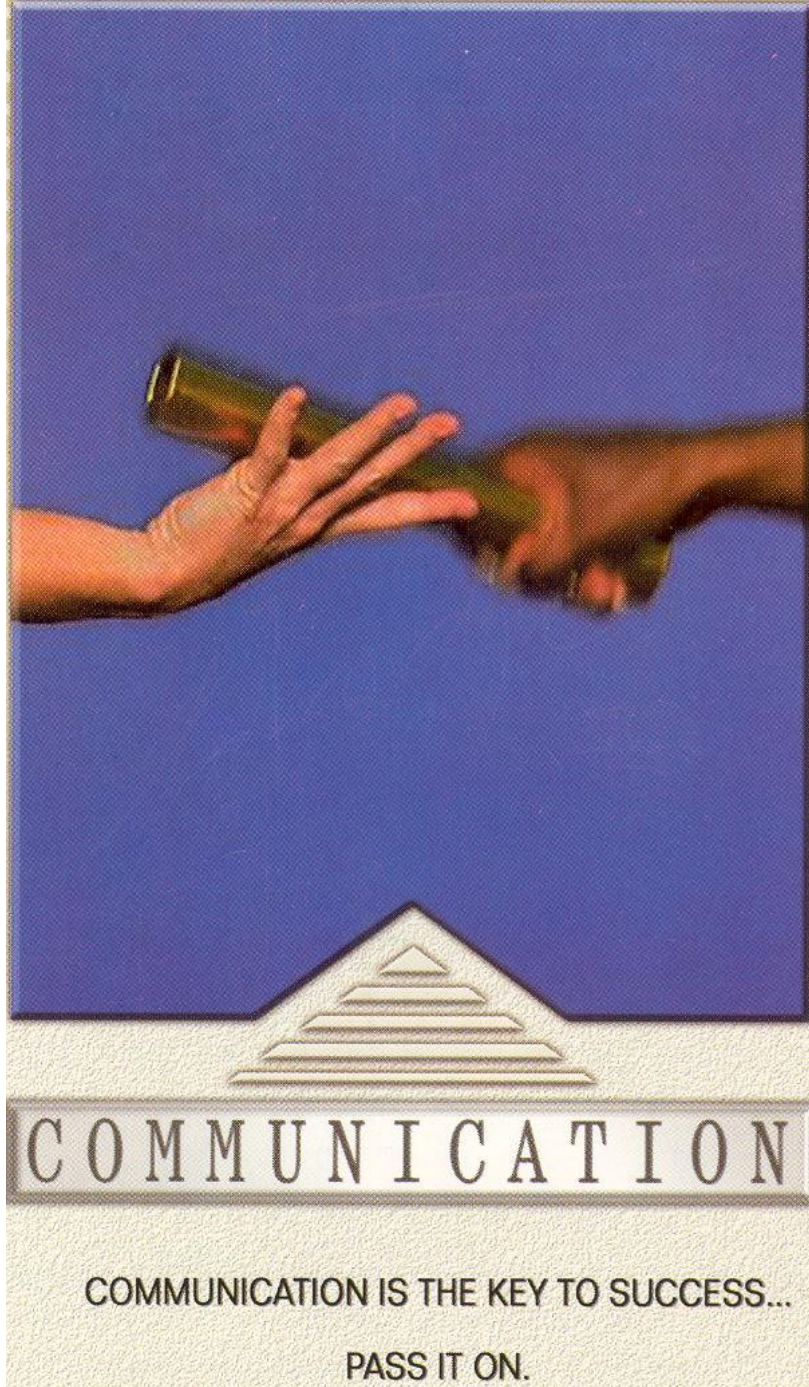
As thousands of Lom Sak residents were reeling under the effects of the flooding, villagers in several northern provinces were still bearing the brunt of heavy rains yesterday, and a state of emergency was declared in at least one province.

Apai Chantanajulaka, director-general of the Local Administration Department, said villagers at Baan Nam Kor, the worst hit area, had been repeatedly warned that they were sitting in the middle of a path which could carry dangerous runoff from forest rain.

"The Baan Nam Kor headman urged villagers to evacuate following the weather forecast that said a depression was heading toward the Lom Sak district," he said. "Villagers refused to listen to the warning because they had lived in the area for more than 100 years and were unconcerned."



A BUDDHIST MONK lights a fire for one of the scores of villagers killed in flash-floods and mudslides in Baan Nam Kor, Lom Sak district, during a mass open cremati



Thank you

