Welcome

To

Presentation of

Preparation of Development Plan for Fourteen Upazilas

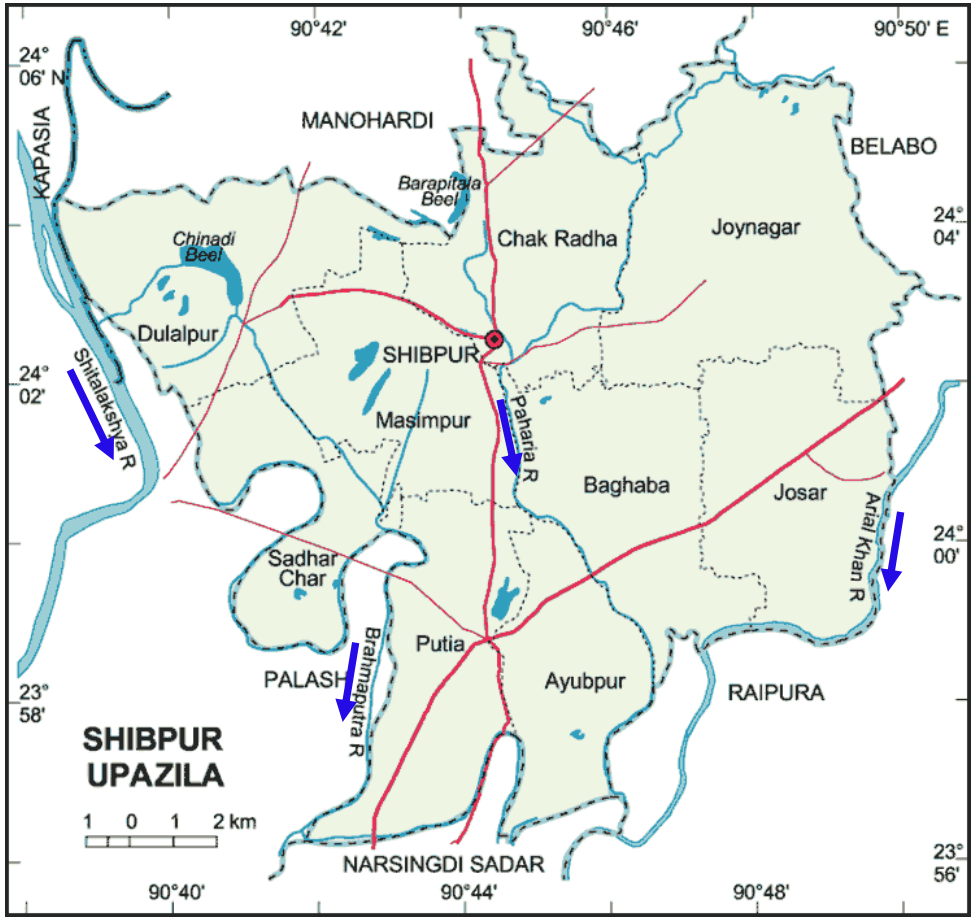
Package 02:

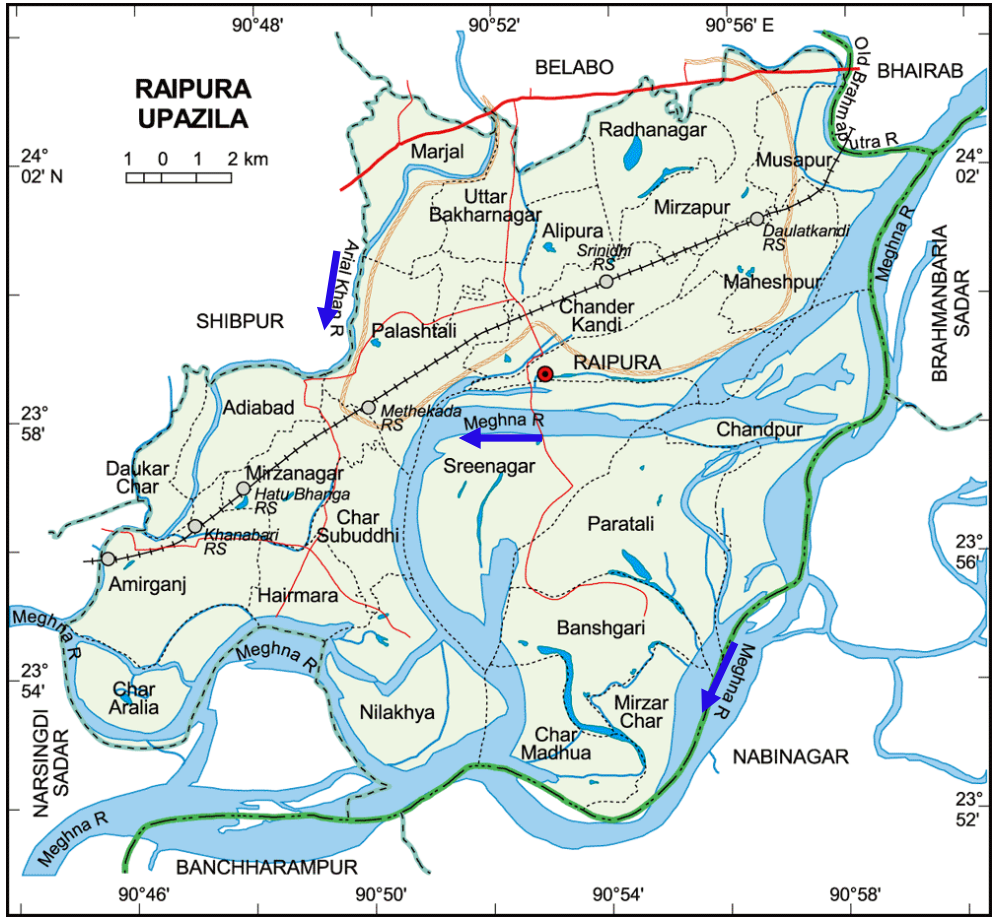
Raipura Upazila, District: Narshingdi
Shibpur Upazila, District: Narshingdi
Ishwarganj Upazila, District: Mymensing

Draft Survey Report

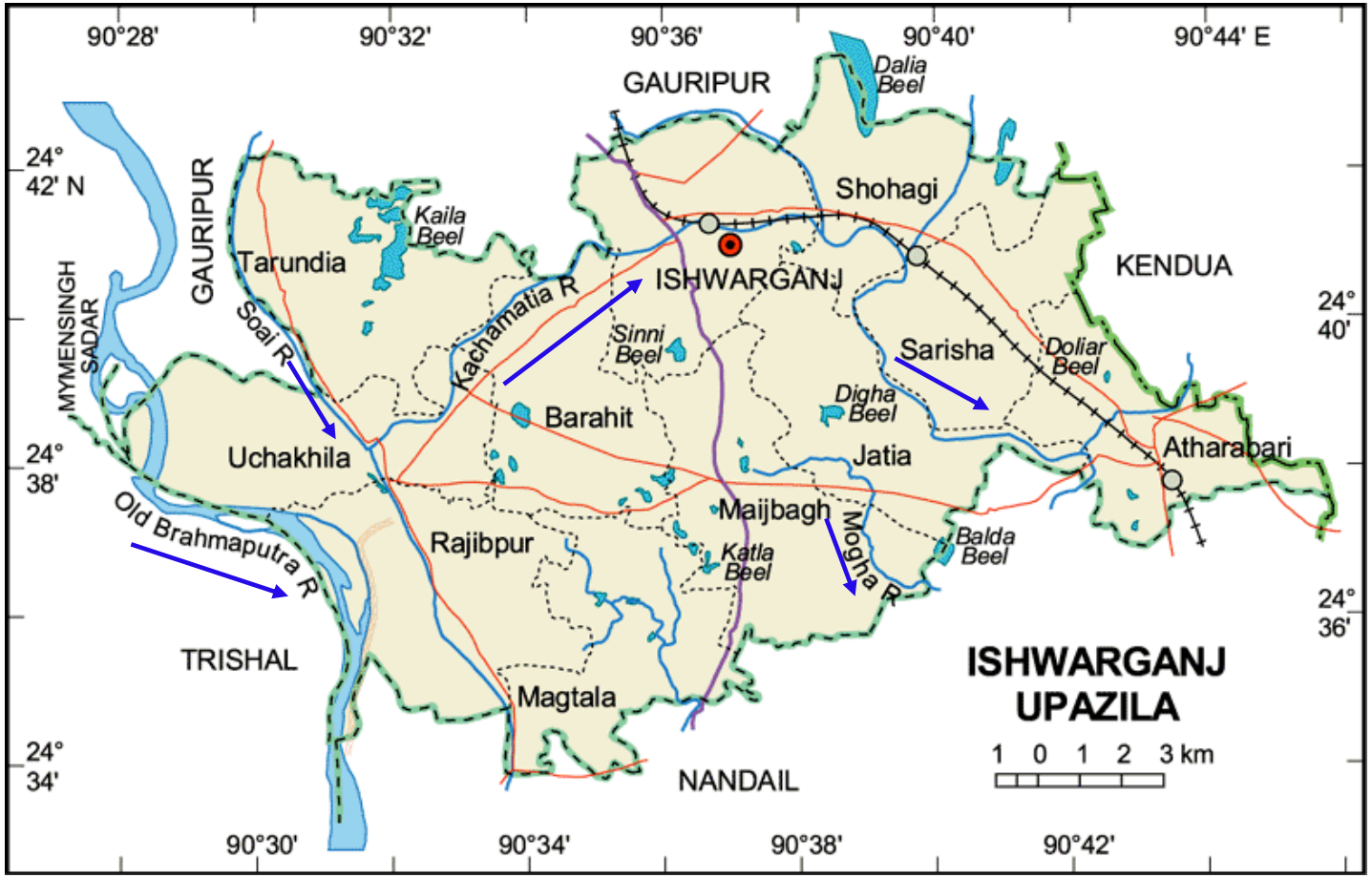
Hydrological Survey Report
of Raipura, Shibpur & Ishwarganj Upazila

Upazila Maps





Upazila Maps

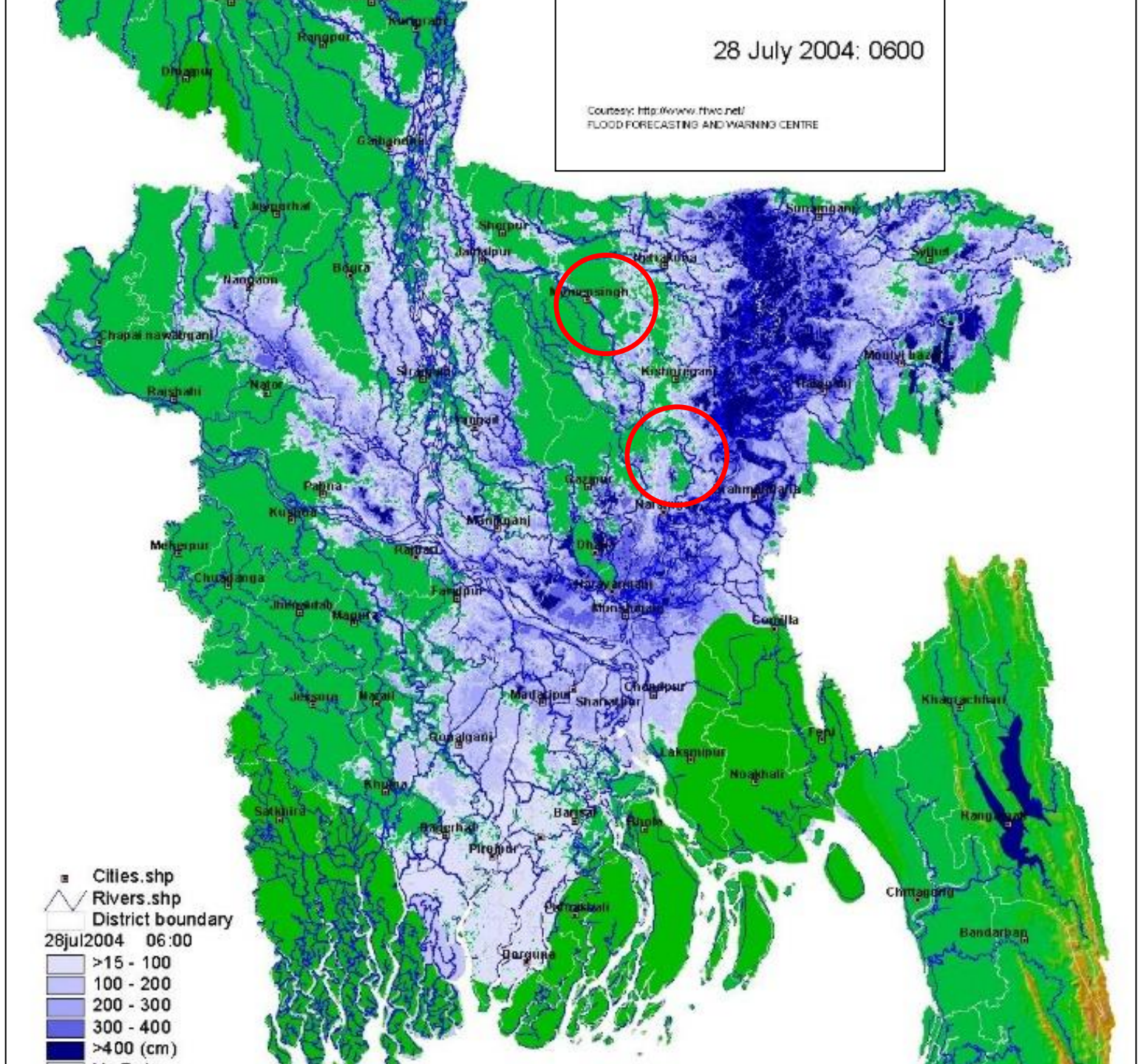


OBJECTIVES OF THE SURVEY WORKS

- Collecting water level data of BWDB stations SW177, SW228.5, SW229, SW274, SW295 & SW 311 and rainfall data of BWDB stations CL64,CL65,CL71, CL76 & CL79.
- Collecting rainfall data of BMD stations.
- Collection of bathymetric data of the major rivers at Raipura, Shibpur and Ishwarganj.
- Identification of hydraulic structures and collection of information about sill levels, openings etc.
- Identification of flood hazard locations.
- Identification of flow direction and tidal effects.
- Collection of observed flood levels in the field.
- Collecting information of any existing drainage system within the town area
- Identification of water logging zones.
- Collecting information regarding encroachments of natural water bodies and drains.

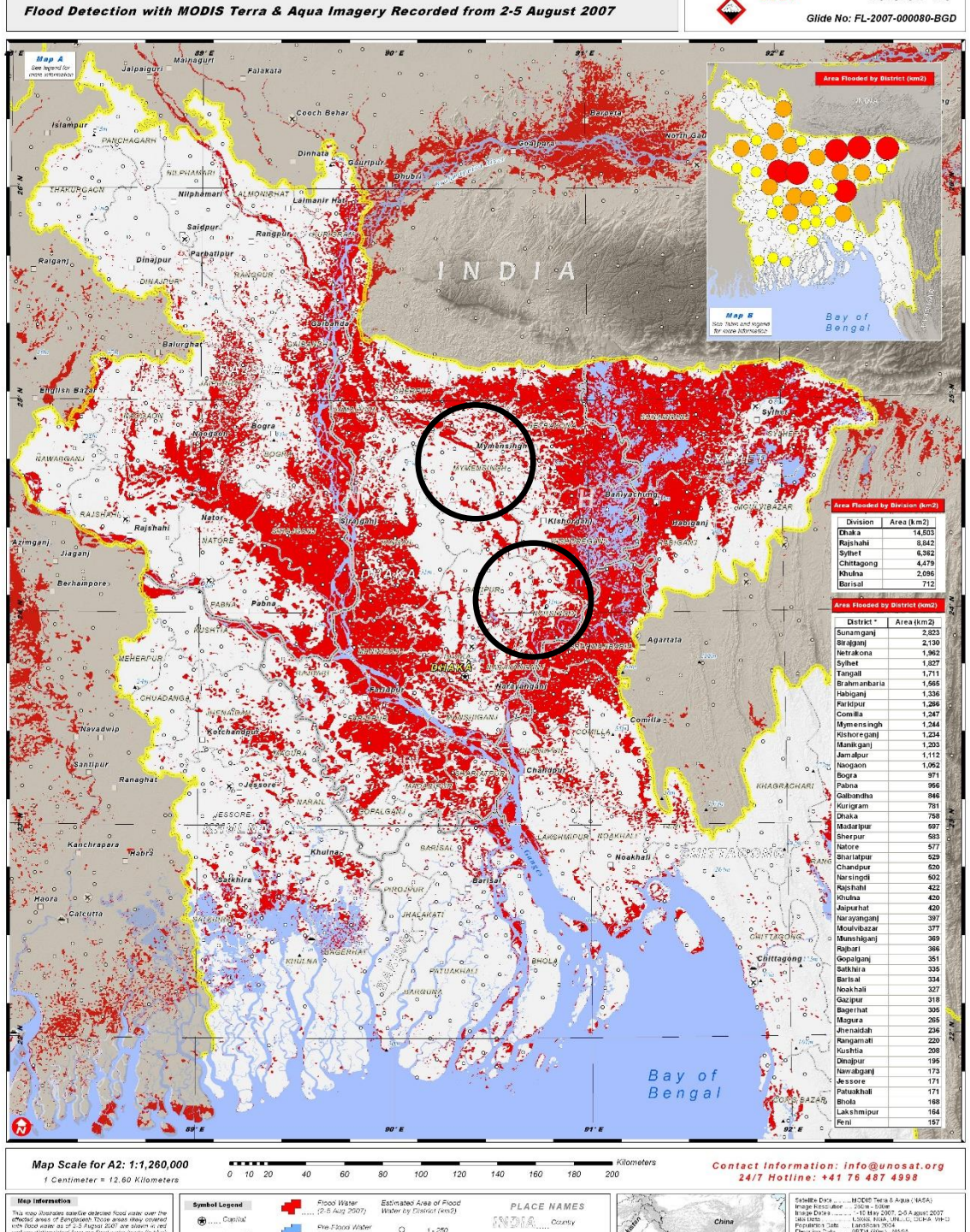
Bangladesh 2004 Flood map

Courtecy: Flood Forecasting and Warning Centre



Bangladesh 2007 Flood map

Courtecy: UNOSAT, satellite imagery for all



Division	Area (km2)
Dhaka	14,503
Rajshahi	8,842
Sylhet	6,382
Chittagong	4,479
Khulna	2,096
Barisal	712

District *	Area (km2)
Sunamganj	2,923
Sirajganj	2,130
Netrakona	1,962
Sylhet	1,827
Tangail	1,711
Brahmanbaria	1,565
Habiganj	1,336
Faridpur	1,296
Comilla	1,247
Mymensingh	1,244
Kishoreganj	1,234
Manikganj	1,203
Jamalpur	1,112
Naogaon	1,052
Bogra	971
Pabna	956
Gaibandha	846
Kurigram	781
Dhaka	758
Madaripur	597
Sherpur	583
Natore	577
Shariatpur	529
Chandpur	520
Narsingdi	502
Rajshahi	422
Khulna	420
Jaipurhat	420
Narayanganj	397
Moulvibazar	377
Munshiganj	369
Rajbari	366
Gopalganj	351
Satkhira	335
Barisal	334
Noakhali	327
Gazipur	318
Bagerhat	305
Magura	265
Jhenaidah	236
Rangamati	220
Kushtia	208
Dinajpur	195
Nawabganj	173
Jessore	171
Patuakhali	171
Bhola	168
Lakshmipur	164
Feni	157

WORKS DONE

- Bathymetric survey of the major rivers and channels Kalagachia channel (Paharia River) at Shibpur, Arial Khan River and Raipura Channel at Raipura, Kachamatia, Soai and Suria Rivers of Ishwarganj are done.
- Collection of BWDB water level and rainfall gauge station data.
- Collection of BMD station data.

- **Sample of Collected Rainfall data of BWDB station CL76 & CL79**

District	StationID	StationName	DateTime	Rainfall
Narsingdi	CL76	Narsindi	01-Jan-81	0
Narsingdi	CL76	Narsindi	02-Jan-81	0
Narsingdi	CL76	Narsindi	03-Jan-81	0
Narsingdi	CL76	Narsindi	04-Jan-81	0
Narsingdi	CL76	Narsindi	05-Jan-81	0
Narsingdi	CL76	Narsindi	06-Jan-81	0
Narsingdi	CL76	Narsindi	07-Jan-81	0
Narsingdi	CL76	Narsindi	08-Jan-81	1.8
Narsingdi	CL76	Narsindi	09-Jan-81	0
Narsingdi	CL76	Narsindi	10-Jan-81	0
Narsingdi	CL76	Narsindi	11-Jan-81	0
Narsingdi	CL76	Narsindi	12-Jan-81	1.3
Narsingdi	CL76	Narsindi	13-Jan-81	0
Narsingdi	CL76	Narsindi	14-Jan-81	0
Narsingdi	CL76	Narsindi	15-Jan-81	0
Narsingdi	CL76	Narsindi	16-Jan-81	0
Narsingdi	CL76	Narsindi	17-Jan-81	0
Narsingdi	CL76	Narsindi	18-Jan-81	0
Narsingdi	CL76	Narsindi	19-Jan-81	0
Narsingdi	CL76	Narsindi	20-Jan-81	0
Narsingdi	CL76	Narsindi	21-Jan-81	0
Narsingdi	CL76	Narsindi	22-Jan-81	0
Narsingdi	CL76	Narsindi	23-Jan-81	0
Narsingdi	CL76	Narsindi	24-Jan-81	0
Narsingdi	CL76	Narsindi	25-Jan-81	0
Narsingdi	CL76	Narsindi	26-Jan-81	0
Narsingdi	CL76	Narsindi	27-Jan-81	0
Narsingdi	CL76	Narsindi	28-Jan-81	0
Narsingdi	CL76	Narsindi	29-Jan-81	0
Narsingdi	CL76	Narsindi	30-Jan-81	0

District	StationID	StationName	DateTime	Rainfall
Narsingdi	CL79	Shibpur	1-Jan-81	0
Narsingdi	CL79	Shibpur	2-Jan-81	0
Narsingdi	CL79	Shibpur	3-Jan-81	0
Narsingdi	CL79	Shibpur	4-Jan-81	0
Narsingdi	CL79	Shibpur	5-Jan-81	0
Narsingdi	CL79	Shibpur	6-Jan-81	0
Narsingdi	CL79	Shibpur	7-Jan-81	0
Narsingdi	CL79	Shibpur	8-Jan-81	0
Narsingdi	CL79	Shibpur	9-Jan-81	0
Narsingdi	CL79	Shibpur	10-Jan-81	0
Narsingdi	CL79	Shibpur	11-Jan-81	0
Narsingdi	CL79	Shibpur	12-Jan-81	0.5
Narsingdi	CL79	Shibpur	13-Jan-81	0
Narsingdi	CL79	Shibpur	14-Jan-81	0
Narsingdi	CL79	Shibpur	15-Jan-81	0
Narsingdi	CL79	Shibpur	16-Jan-81	0
Narsingdi	CL79	Shibpur	17-Jan-81	0
Narsingdi	CL79	Shibpur	18-Jan-81	0
Narsingdi	CL79	Shibpur	19-Jan-81	0
Narsingdi	CL79	Shibpur	20-Jan-81	0
Narsingdi	CL79	Shibpur	21-Jan-81	0
Narsingdi	CL79	Shibpur	22-Jan-81	0
Narsingdi	CL79	Shibpur	23-Jan-81	0
Narsingdi	CL79	Shibpur	24-Jan-81	0
Narsingdi	CL79	Shibpur	25-Jan-81	0
Narsingdi	CL79	Shibpur	26-Jan-81	0
Narsingdi	CL79	Shibpur	27-Jan-81	0
Narsingdi	CL79	Shibpur	28-Jan-81	0
Narsingdi	CL79	Shibpur	29-Jan-81	0
Narsingdi	CL79	Shibpur	30-Jan-81	0

Pagla River at Raipura

WORS DONE

- Sample of Collected Water level Data of BWDB Station SW177 & SW229

RiverName	StationName	StationID	DateTime	HighTide	LowTide
Lakhya	Lakhpur	SW177	01-04-1983	2.18	1.83
Lakhya	Lakhpur	SW177	02-04-1983	2.13	1.78
Lakhya	Lakhpur	SW177	03-04-1983	2.05	1.73
Lakhya	Lakhpur	SW177	04-04-1983	1.93	1.58
Lakhya	Lakhpur	SW177	05-04-1983	1.83	1.48
Lakhya	Lakhpur	SW177	06-04-1983	1.78	1.43
Lakhya	Lakhpur	SW177	07-04-1983	1.73	1.38
Lakhya	Lakhpur	SW177	08-04-1983	1.73	1.38
Lakhya	Lakhpur	SW177	09-04-1983	1.78	1.48
Lakhya	Lakhpur	SW177	10-04-1983	1.91	1.53
Lakhya	Lakhpur	SW177	11-04-1983	1.98	1.58
Lakhya	Lakhpur	SW177	12-04-1983	2.13	1.68
Lakhya	Lakhpur	SW177	13-04-1983	2.18	1.71
Lakhya	Lakhpur	SW177	14-04-1983	2.28	1.78
Lakhya	Lakhpur	SW177	15-04-1983	2.38	1.83
Lakhya	Lakhpur	SW177	16-04-1983	2.13	1.83
Lakhya	Lakhpur	SW177	17-04-1983	1.98	1.73
Lakhya	Lakhpur	SW177	18-04-1983	1.93	1.63
Lakhya	Lakhpur	SW177	19-04-1983	1.83	1.53
Lakhya	Lakhpur	SW177	20-04-1983	1.78	1.48
Lakhya	Lakhpur	SW177	21-04-1983	1.73	1.43
Lakhya	Lakhpur	SW177	22-04-1983	1.78	1.43
Lakhya	Lakhpur	SW177	23-04-1983	1.73	1.63
Lakhya	Lakhpur	SW177	24-04-1983	2.08	1.68
Lakhya	Lakhpur	SW177	25-04-1983	2.28	1.73
Lakhya	Lakhpur	SW177	26-04-1983	2.33	1.83
Lakhya	Lakhpur	SW177	27-04-1983	2.46	1.88
Lakhya	Lakhpur	SW177	28-04-1983	2.48	1.98
Lakhya	Lakhpur	SW177	29-04-1983	2.63	1.98
Lakhya	Lakhpur	SW177	30-04-1983	2.68	2.03
Lakhya	Lakhpur	SW177	01-05-1983	2.76	2.03
Lakhya	Lakhpur	SW177	02-05-1983	2.86	2.08

RiverName	StationName	StationID	DateTime	HighTide	LowTide
Old Brahmaputra	Toke	SW229	01-04-1981	1.36	1.05
Old Brahmaputra	Toke	SW229	02-04-1981	1.48	1.30
Old Brahmaputra	Toke	SW229	03-04-1981	1.66	1.45
Old Brahmaputra	Toke	SW229	04-04-1981	1.91	1.60
Old Brahmaputra	Toke	SW229	05-04-1981	2.12	1.78
Old Brahmaputra	Toke	SW229	06-04-1981	2.33	2.03
Old Brahmaputra	Toke	SW229	07-04-1981	2.36	2.12
Old Brahmaputra	Toke	SW229	08-04-1981	2.24	1.94
Old Brahmaputra	Toke	SW229	09-04-1981	2.12	1.88
Old Brahmaputra	Toke	SW229	10-04-1981	1.97	1.75
Old Brahmaputra	Toke	SW229	11-04-1981	1.97	1.69
Old Brahmaputra	Toke	SW229	12-04-1981	1.91	1.66
Old Brahmaputra	Toke	SW229	13-04-1981	1.94	1.75
Old Brahmaputra	Toke	SW229	14-04-1981	2.09	1.78
Old Brahmaputra	Toke	SW229	15-04-1981	2.12	1.99
Old Brahmaputra	Toke	SW229	16-04-1981	2.24	1.94
Old Brahmaputra	Toke	SW229	17-04-1981	2.48	2.18
Old Brahmaputra	Toke	SW229	18-04-1981	2.67	2.30
Old Brahmaputra	Toke	SW229	19-04-1981	2.76	2.61
Old Brahmaputra	Toke	SW229	20-04-1981	2.76	2.70
Old Brahmaputra	Toke	SW229	21-04-1981	2.79	2.70
Old Brahmaputra	Toke	SW229	22-04-1981	2.76	2.67
Old Brahmaputra	Toke	SW229	23-04-1981	2.70	2.58
Old Brahmaputra	Toke	SW229	24-04-1981	2.61	2.42
Old Brahmaputra	Toke	SW229	25-04-1981	2.45	2.27
Old Brahmaputra	Toke	SW229	26-04-1981	2.36	2.15
Old Brahmaputra	Toke	SW229	27-04-1981	2.27	2.03
Old Brahmaputra	Toke	SW229	28-04-1981	2.15	1.94
Old Brahmaputra	Toke	SW229	29-04-1981	2.15	1.83
Old Brahmaputra	Toke	SW229	30-04-1981	2.04	1.83
Old Brahmaputra	Toke	SW229	01-05-1981	2.01	1.80
Old Brahmaputra	Toke	SW229	02-05-1981	2.29	2.01

WORKS DONE

During Physical Feature survey:

- Hydraulic structures were identified and information regarding the structures were collected.
- Flood prone zones were identified.
- Flow directions of the rivers and khals were observed.
- Information regarding any existing drainage system within the town area were collected.
- Information regarding encroachment of natural water bodies were collected.

Pier of a Bridge over Kalagachia Channel at Shibpur

Road bridge over Arial Khan river near BWDB station SW 274 at Narshingdi

Identification of culverts on the Upazila highway

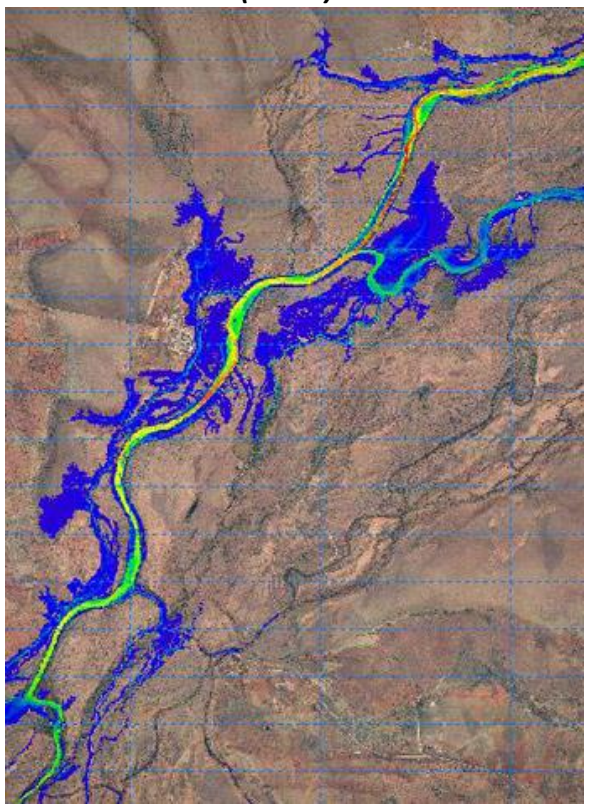
RATIONALES

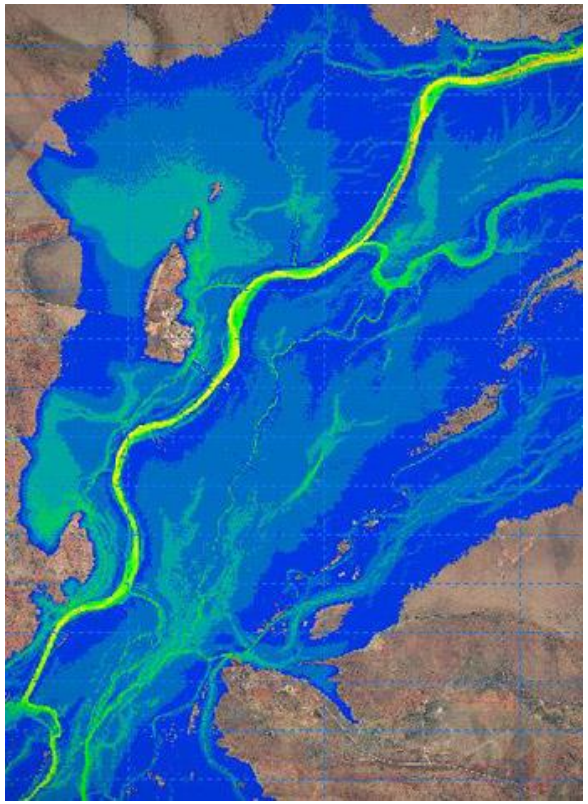
- Frequency analysis is done for collected water level, discharge and rainfall data using extreme value distribution, normal distribution, log normal distribution and log-pearson type III distribution to project these data for different return periods.
- χ^2 test and Kolmogorov-shmirnov test is done to check the goodness of fit of the distribution.
- Bathymetric data will be incorporated to the DEM.
- Contour of the terrain will be generated from the DEM.
- Catchments and the sub-catchments will be identified using ArcGIS.
- Drainage inventory for the existing drainage system is prepared.

RATIONALES

- To run flood models in the flood plains, the water level data and discharge data will be needed.
- It will also require the bathymetric data of the major rivers in the area.
- This analysis will be used to asses the effect of flash floods, frequent in the area.

- *An integrated 1D-2D flood model on a flood plain showing flood conditions at different water level and flow time using MikeFlood (DHI)*

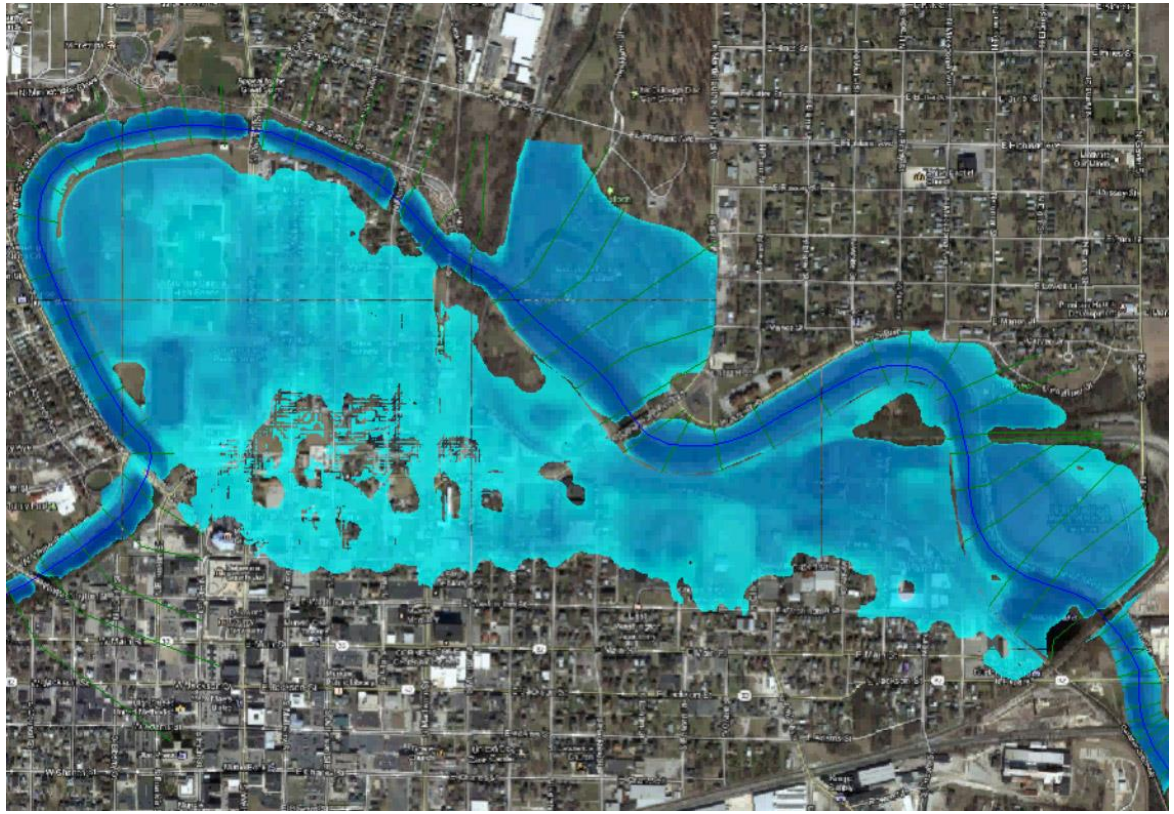




RATIONALES

- The model analysis will also help us identify the areas in the town most susceptible to water logging problems.

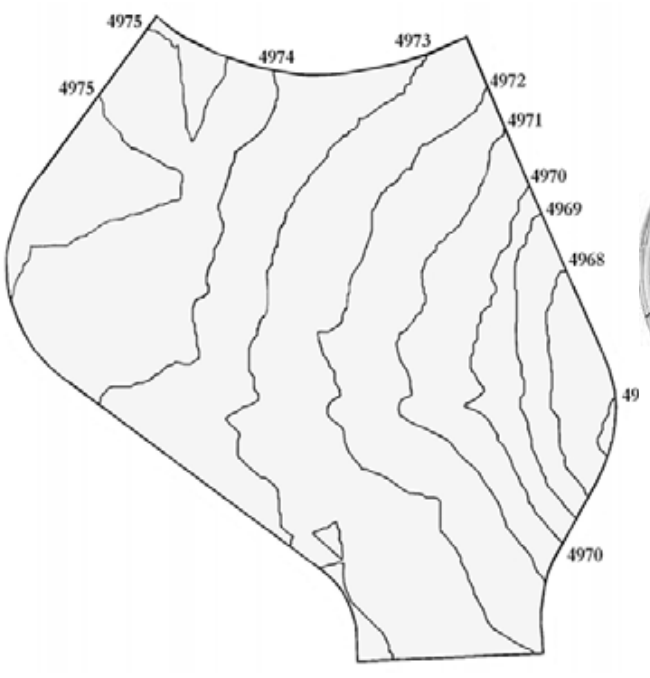
- *An integrated 1D-2D flood model showing flood conditions in a city area using HEC-RAS*

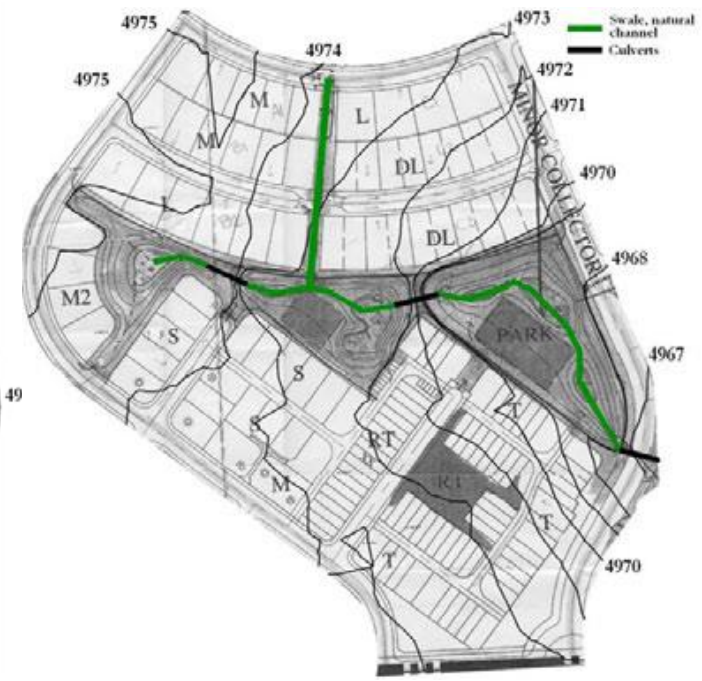


RATIONALES

- Existing & Proposed Drainage system will be assessed using models that will require identification of catchments and sub-catchments
- Rainfall data will be used to calculate runoffs.
- This analysis will be used to asses the efficiency of the existing and proposed drainage systems.

- *Model developed using EPA SWMM simulating undeveloped (left) and developed (right) conditions to calculate and compare the difference of discharge*





ASSESMENT OF SEA LEVEL RISE IN BANGLADESH

STUDIES:

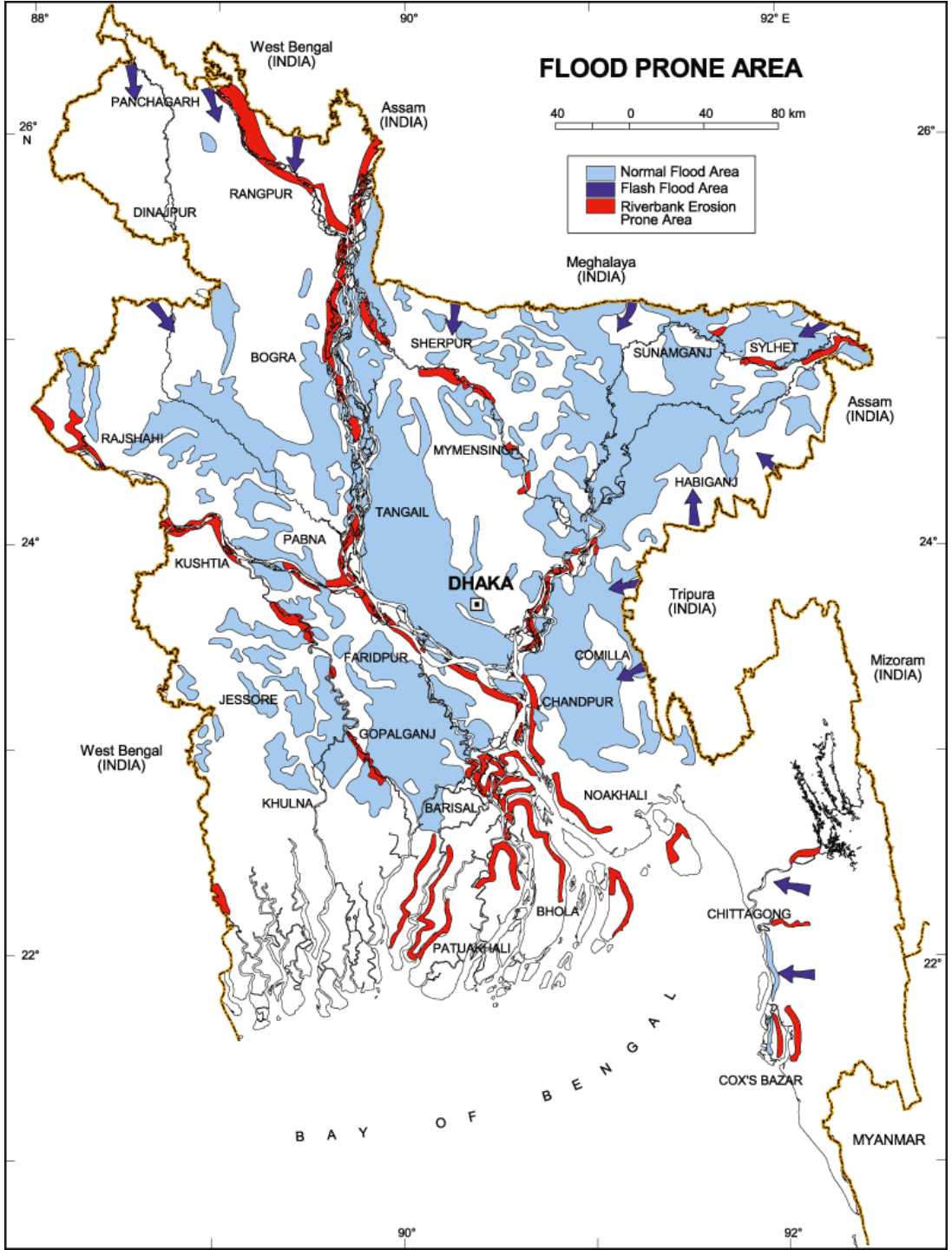
- **Milliman, J.D., Broadus, J.M. and Frank G. (1989). Environmental and Economic Impact of Rising Sea Level and Subsiding Deltas: The Nile and Bengal Examples. In Bangladesh Quest. Vol.: 1, pp 11-12.** - reported 1.0 cm per year sea level rise in Bangladesh.
- **UNEP, 1989** - showed 1.5 m sea level rise in Bangladesh coast by 2030, affecting 22,000 Sq. km (16% of total land mass) area with a population of 17 million (15% of total population).
- **World Bank, 2000. Bangladesh: Climate Change & Sustainable Development. Report No. 21104 BD, Dhaka** - Showed 10 cm, 25cm and 1 meter rise in sea level by 2020, 2050 and 2100.

Adapted from Milliman *et al.* (1989).

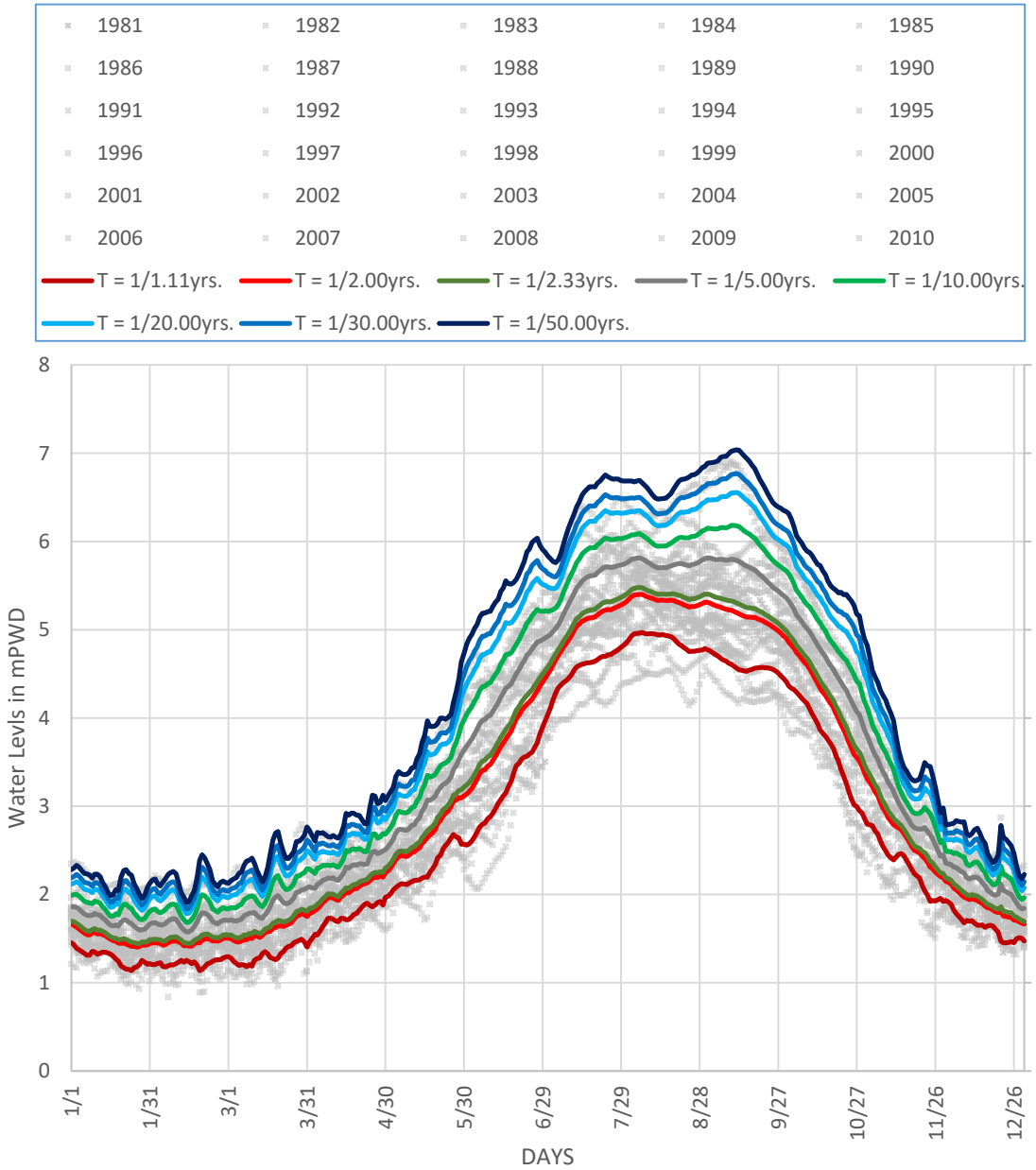
RIVER BANK EROSION

MAP SHOWING THE RIVER BANK EROSION PRONE AREAS IN BANGLADESH (BWDB)

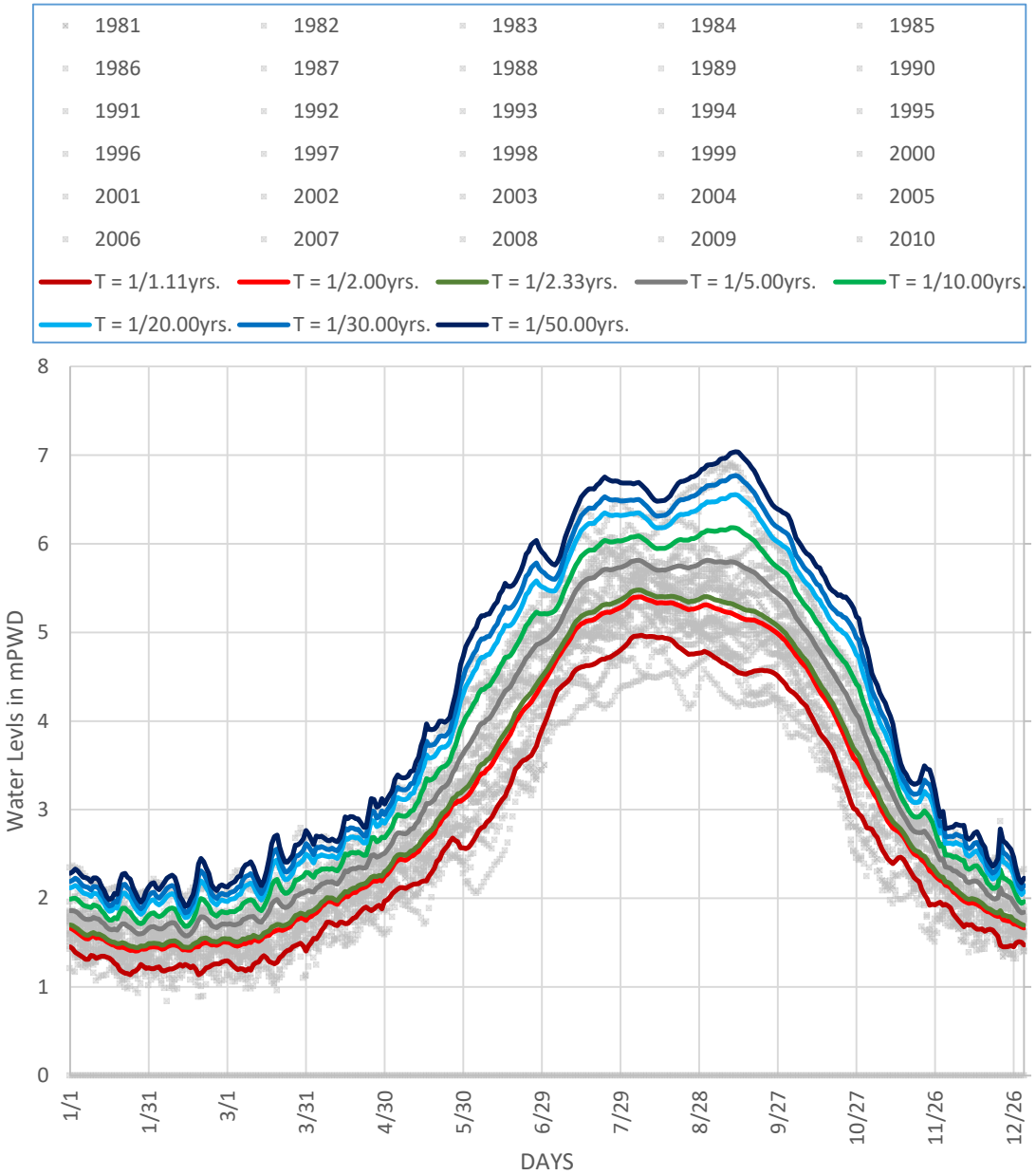
- Raipura experiences river bank erosion at the banks with the mighty Meghna River.
- Ishwarganj and Shibpur do not experience any significant river bank erosion.



DAILY BASIS HIGH TIDE LEVEL ANALYSIS OF BWDB WATER LEVEL STATION SW274 AT NARSHINGDI SADAR, NARSHINGDI (EV I - DISTRIBUTION)



DAILY BASIS LOW TIDE LEVEL ANALYSIS OF BWDB WATER LEVEL STATION SW274 AT NARSHINGDI SADAR, NARSHINGDI (EV I - DISTRIBUTION)



SUSTAINABLE DEVELOPMENT GOALS