



# Use of Space-based Information in DRR and Emergency Response in Bangladesh

**4<sup>th</sup> UN International Conference on  
Space-based Technology for Disaster Management**  
*“A consolidating role in the implementation of the Sendai  
Framework on Disaster Risk Reduction: 2015-2030”*  
**Beijing, China, 14-16 September, 2015**

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Additional Secretary, MoDMR

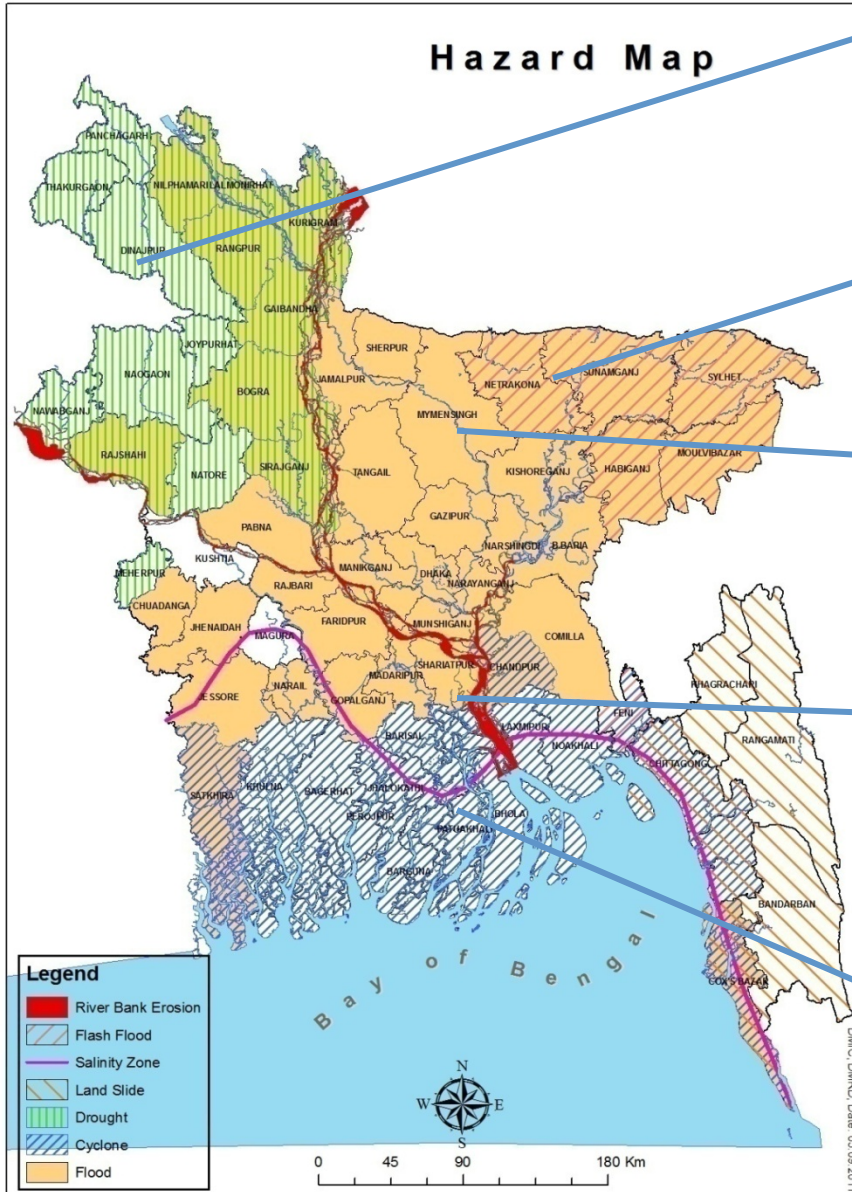
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# BD Hazard Profile

Hazard Map



## DROUGHT

Affects 8.3 million ha land  
In 2006, reduced food grains by 1 million tons  
Loss of grazing fields, dried ponds, water shortage

## FLASH FLOOD

Damages standing crops  
Damages infrastructures and facilities  
Unpredictable, uncertain

## FLOOD

Inundates more areas, increases river erosion  
Breaches embankments, damages infrastructures  
Loss of crops, fisheries, livestock, biodiversity

## SALINITY INTRUSION

Sea level rise, damage to Sundarbans watersheds  
Damages crop lands  
Spreading intrusion from 1.5 to 2.5 Mha (2007)  
Lack drinking water, burden to women & children  
Projected displacement: 6-8 m by 2050

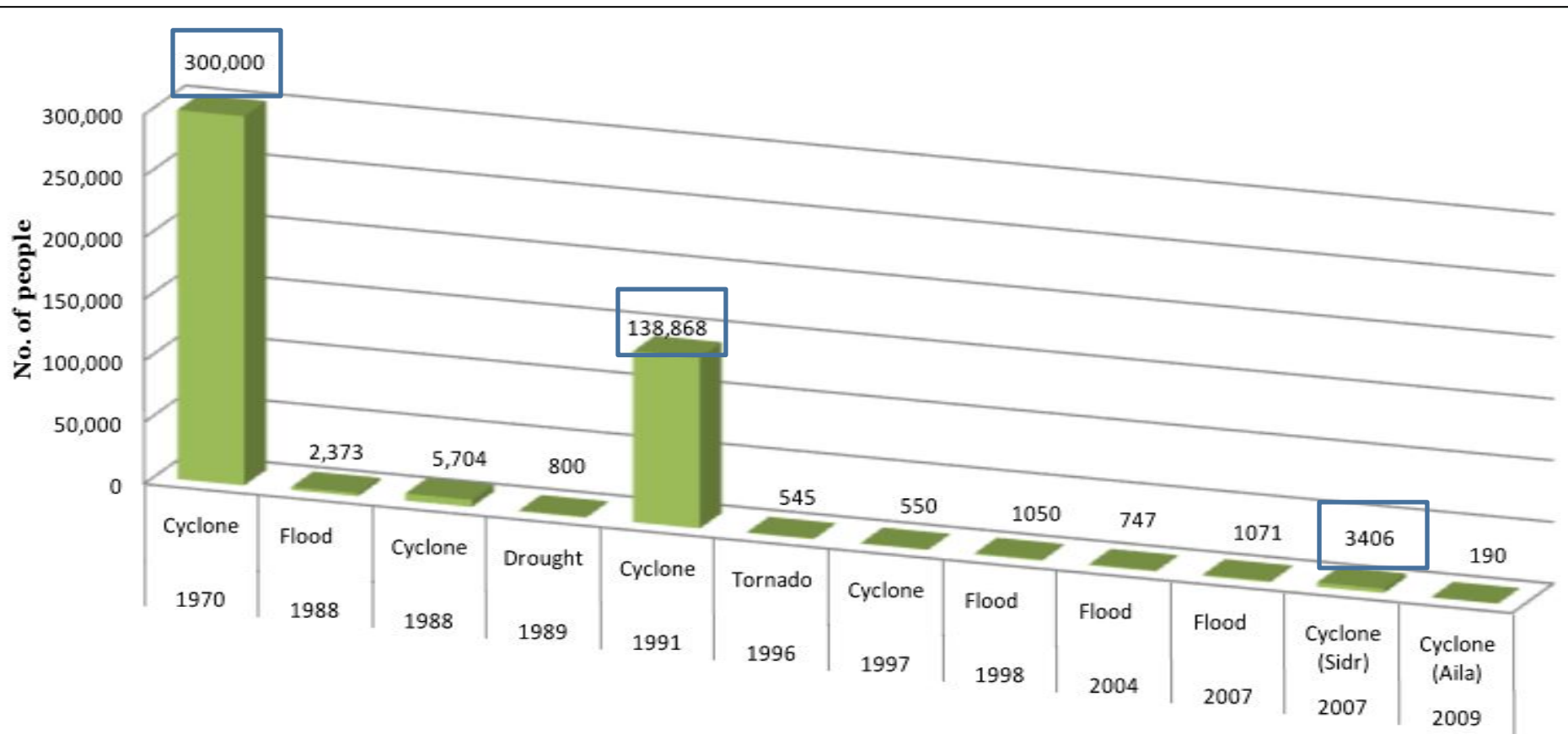
## CYCLONE

Remain to be the deadliest and most destructive hazard  
Recurring event Lingered aftermath, complex recovery  
Improved preparedness (CPP, shelters, embankments)

Legend	
	River Bank Erosion
	Flash Flood
	Salinity Zone
	Land Slide
	Drought
	Cyclone

DMIC, Dhaka, Date: 05.09.2011

# Death Toll Due to Disaster



	1970	1988	1988	1989	1991	1996	1997	1998	2004	2007	2007	2009
	Cyclone	Flood	Cyclone	Drought	Cyclone	Tornado	Cyclone	Flood	Flood	Flood	Cyclone (Sidr)	Cyclone (Aila)
■ Death	300,000	2,373	5,704	800	138,868	545	550	1,050	747	1,071	3,406	190

# Use of Space-based Info: Present Status

Space-based information and products are in incubation stage for DRR

DRR institutional structure is well established

Working level Capacity exists

SPARRSO, BMD, SOB, FFWC, CEGIS and IWM

Cyclone prediction: Proven and effective example of using space based information

Flood Forecasting: Space based information is using for local flood modeling

Spatial databases exist with projects

Capacity assessed for DRR

TAM carried out by UN-SPIDER in 2011

# TAM Objectives

- Assess national capacity for using SBT
- Assist in the definition of risk and disaster management plans and policies
- Provide guidelines to include space technologies into disaster risk reduction and emergency response
- Facilitate access of national institutions to space-based information
- Identify capacity building needs and facilitating
- Identify possible risk reduction and emergency response

# TAM Recommendations

The recommendations focus on the challenges and opportunities in the following specific areas:

- Policy and coordination,
- Capacity building and awareness raising,
- Information management and sharing,
- Data and access
- Emergency communication

# Follow up Action Taken

- SoP has been drafted for the implementation of TAM recommendations
- Multi-hazard Risk Vulnerability Assessment Modeling and Mapping (MRVA) Cell and Damage and Need Assessment (DNA) Cell have been established at DDM in 2013
- A national seminar on “Space Technology Application for Monitoring Earth Resources, Disaster and Climate Change Impacts for Ensuring Human Security and Sustainable Development” has been organized at national level in 2011 at SPARRSO
- Nation wide multi-hazard risk vulnerability assessment is undertaken by engaging an international consulting firm
- 50 academic and sector professionals were trained in space technology for Flood Risk Assessment and DNA supported by UN-SPIDER
- Applying RS in River Basin Management Project has been piloted supported by JAXA/ADB

# Multi-hazard Risk and Vulnerability Assessment (MRVA)



# EQ Vulnerability and Risk Assessment

## RS and GIS-based Building Inventory Database:



Image of a part of Dhaka City after Geo-referencing



Physical Features after digitization



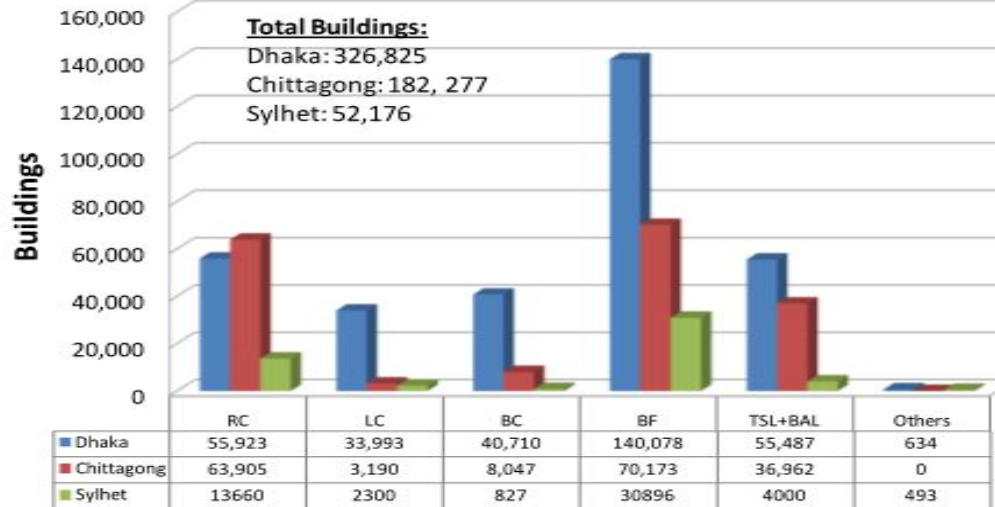
**Chittagong : 183000**



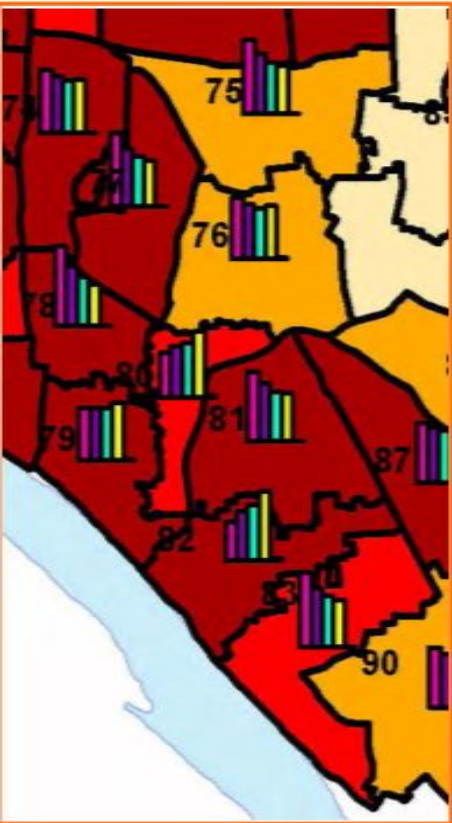
**Sylhet : 52, 000**

**Dhaka : 327000**

Major Structural Types of Buildings in Dhaka, Chittagong and Sylhet



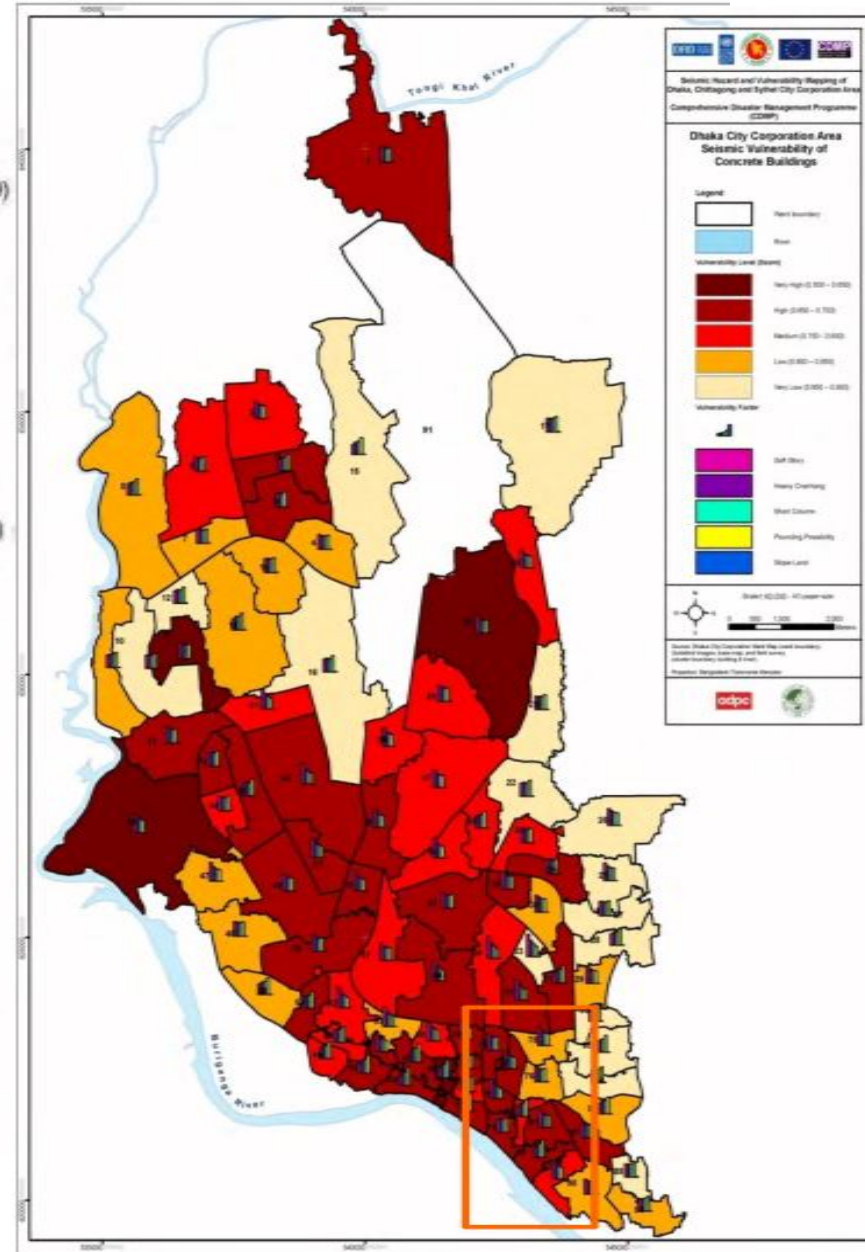
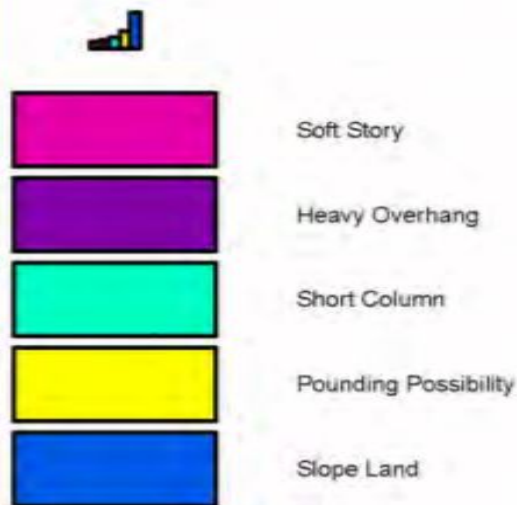
# Building Vulnerability



## Vulnerability Level (Score)

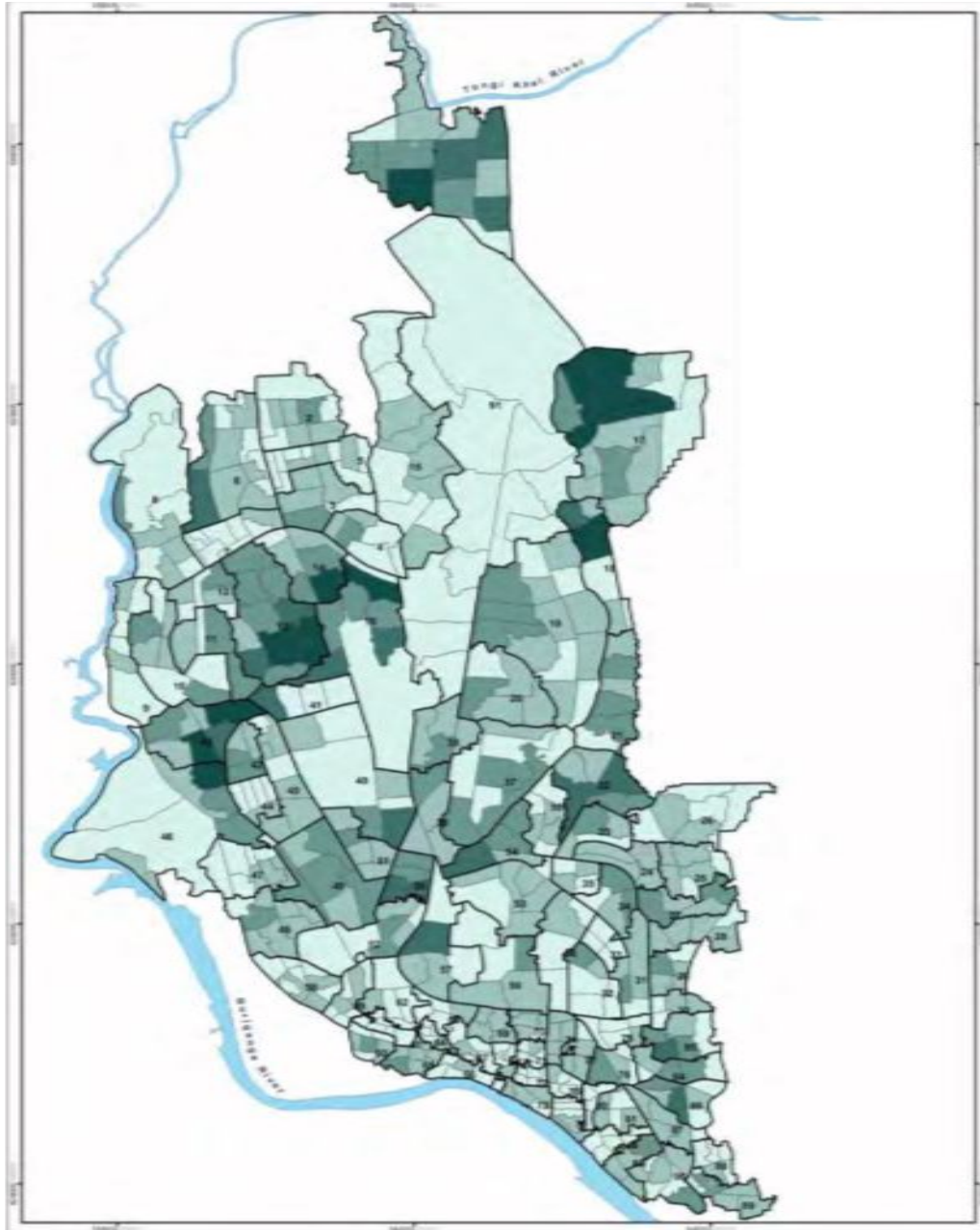


## Vulnerability Factor





# Debris Generation Scenario



## Legend



Ward boundary



Cluster boundary



River

## Debris Expected

(in thousands of tons)



0 - 100



100 - 200



200 - 300

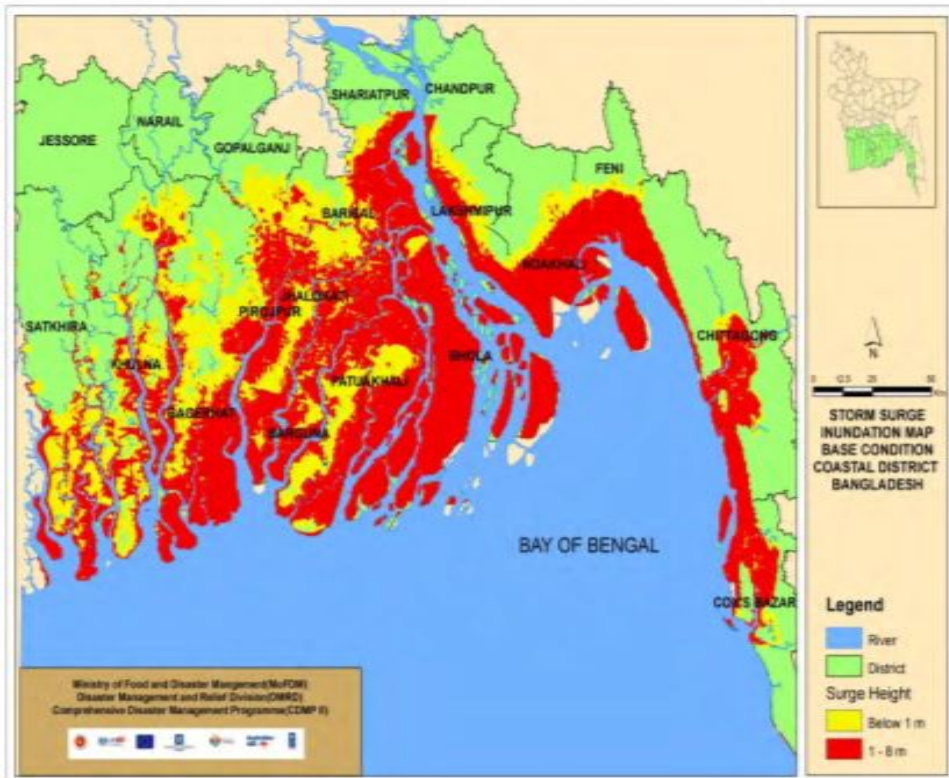


300 - 400

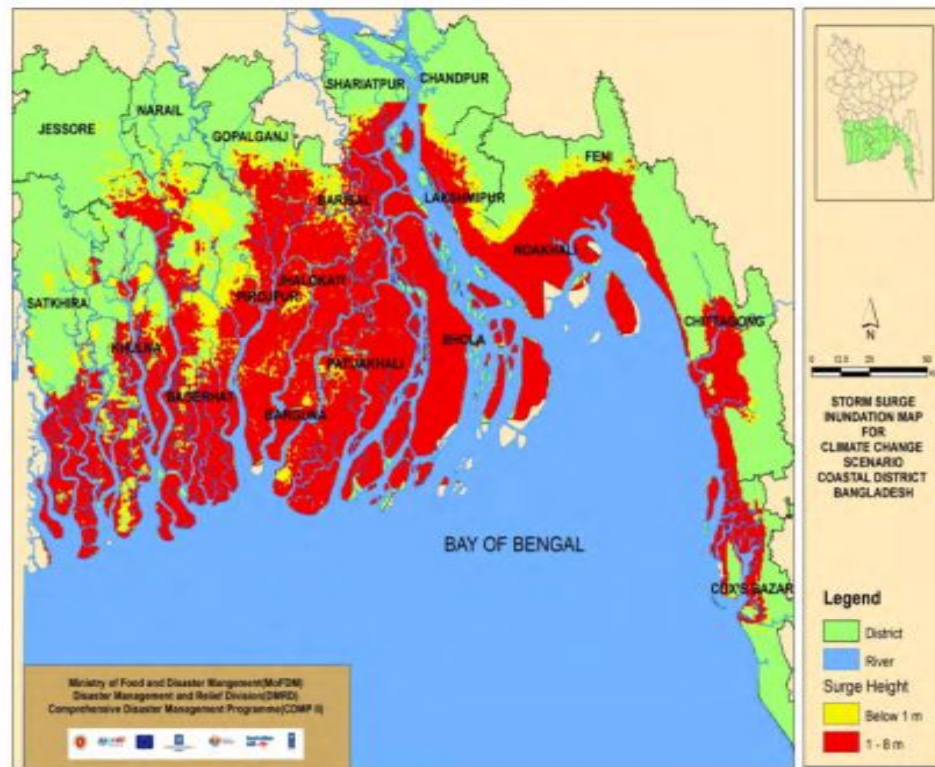


400 - 600

# Storm Surge Risk Assessment



Base Condition



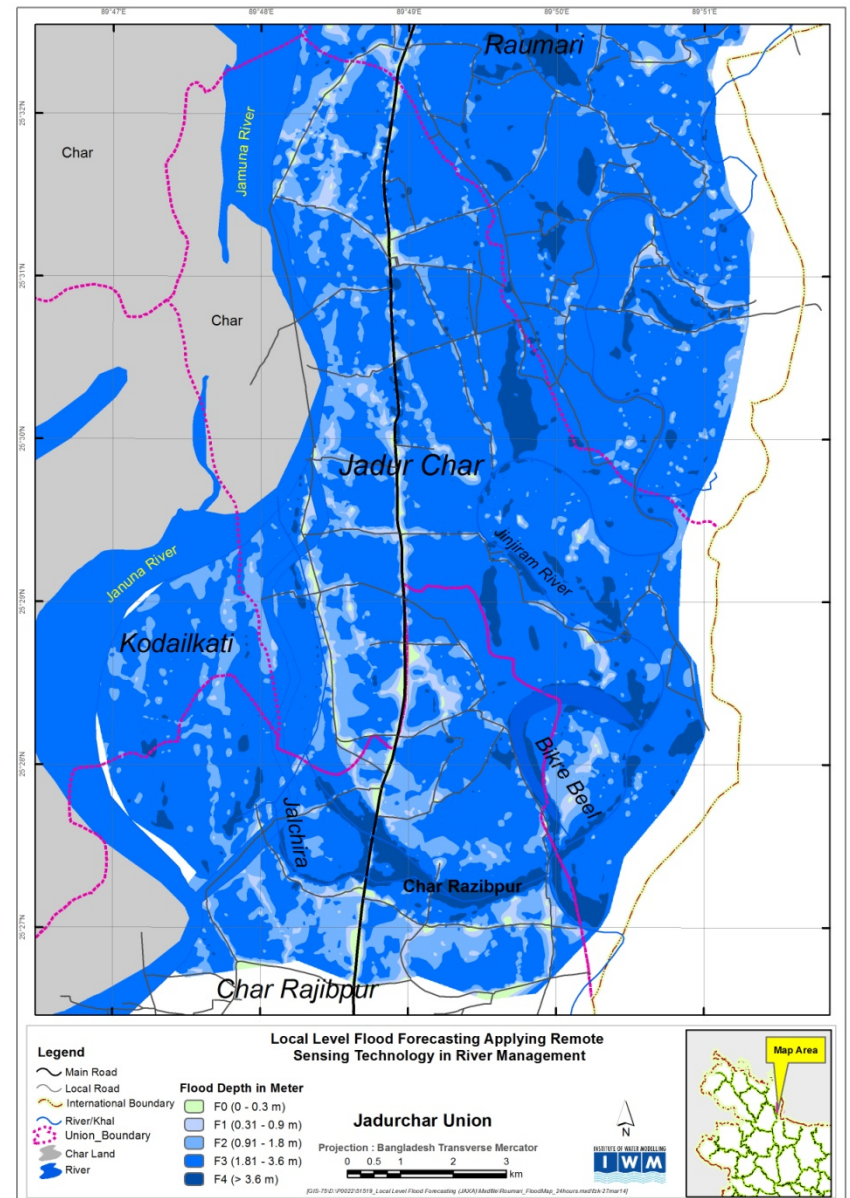
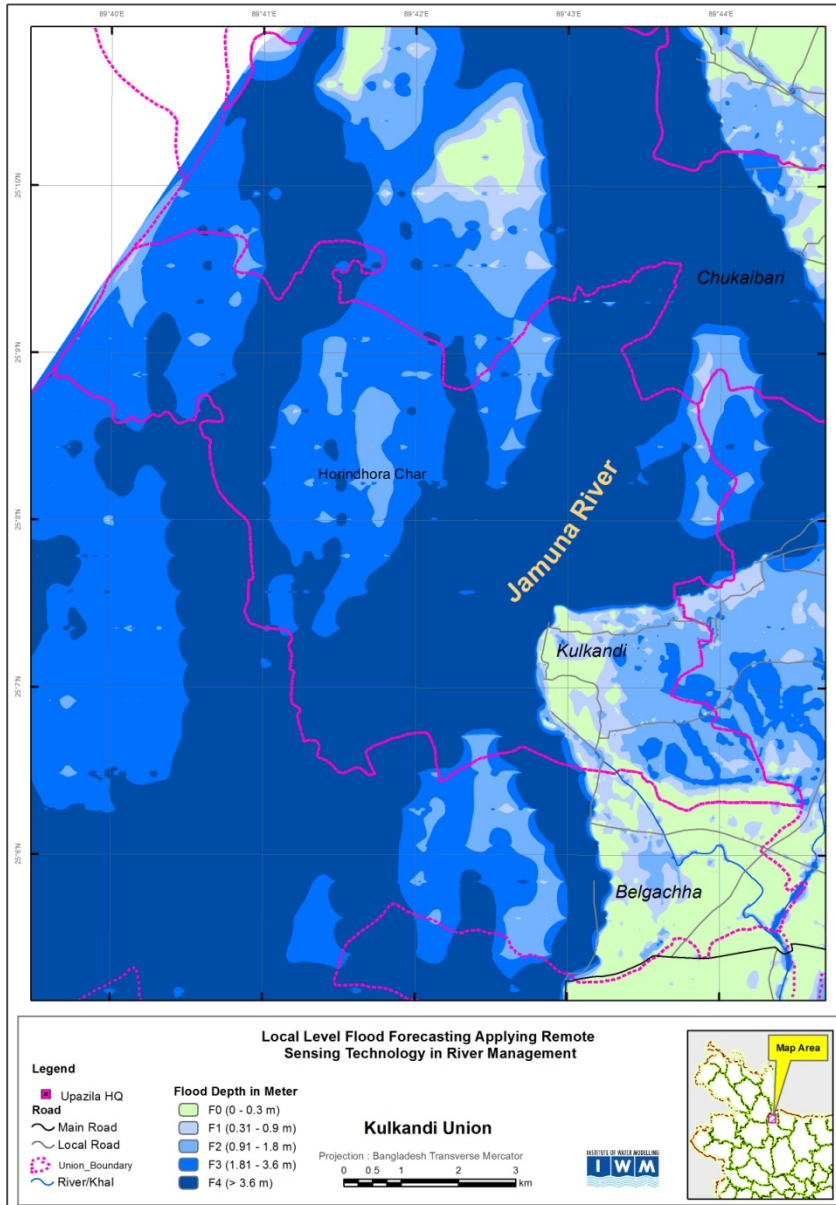
Climate Change Condition

An area of 20,745 km<sup>2</sup> will be inundated by more than 1m water depth in the changing climate

# Improvement of Early Warning and Dissemination Systems

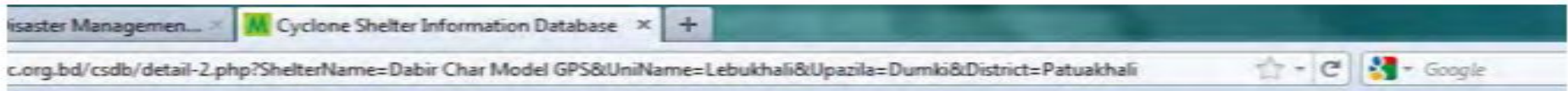


# 5-day Flood Inundation Forecast



# Development of Database

# Online Shelter Database



## Shelter Information

### SHELTER INFORMATION

**SHELTER:** Dabir Char Model GPS  
**UNION:** Lebukhali  
**UPAZILA/P.S.:** Dumki  
**DISTRICT:** Patuakhali



## Details: Dabir Char Model GPS

Name	Desc	Name	Desc	Name	Desc
Shelter ID	100221A	Upazila S.N	2	Shelter Condition	PEDP-II
Shelter Name	Dabir Char Model GPS	GeoCode	1785547356	District	Patuakhali
Upazila	Dumki	Union	Lebukhali	Village	Dumki
Mouza	Dumki	Latitude	22° 28' 37"	Longitude	89° 22' 42"



# Challenges

- Launch own satellite (Bangabandhu-1 Satellite)
- Effective use of space information during emergency response and post-disaster damage and need assessment (PDNA)
- Further Strengthen Early Warning by providing timely access to the space-based information and technologies
- Enhance existing local capacity

# Way Forward

- Building network and platform with international/ regional data and technology providers
- Capacity development for both EO and end users departments
- NSDI to avoid duplication and redundancy
- Incorporation of space technology for DRR-CCA to policy and plan

A serene sunset scene over the ocean. The sun is a bright yellow-orange circle on the horizon, with its reflection shimmering on the water and the wet sand in the foreground. The sky is a gradient of soft colors from light blue to deep orange. In the distance, a small boat is visible on the horizon. In the foreground, dark, silhouetted rocks protrude from the water. The overall mood is peaceful and contemplative.

***Thanks for attention***