

8<sup>th</sup> Joint Project Team Meeting for Sentinel Asia STEP-3 (JPTM2023)

# Remote Sensing Applications on Disaster Management in Bangladesh



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# Major Disasters in Bangladesh



Flood



Cyclone



Tornado



Bank erosion



Salinity



Landslide



Drought

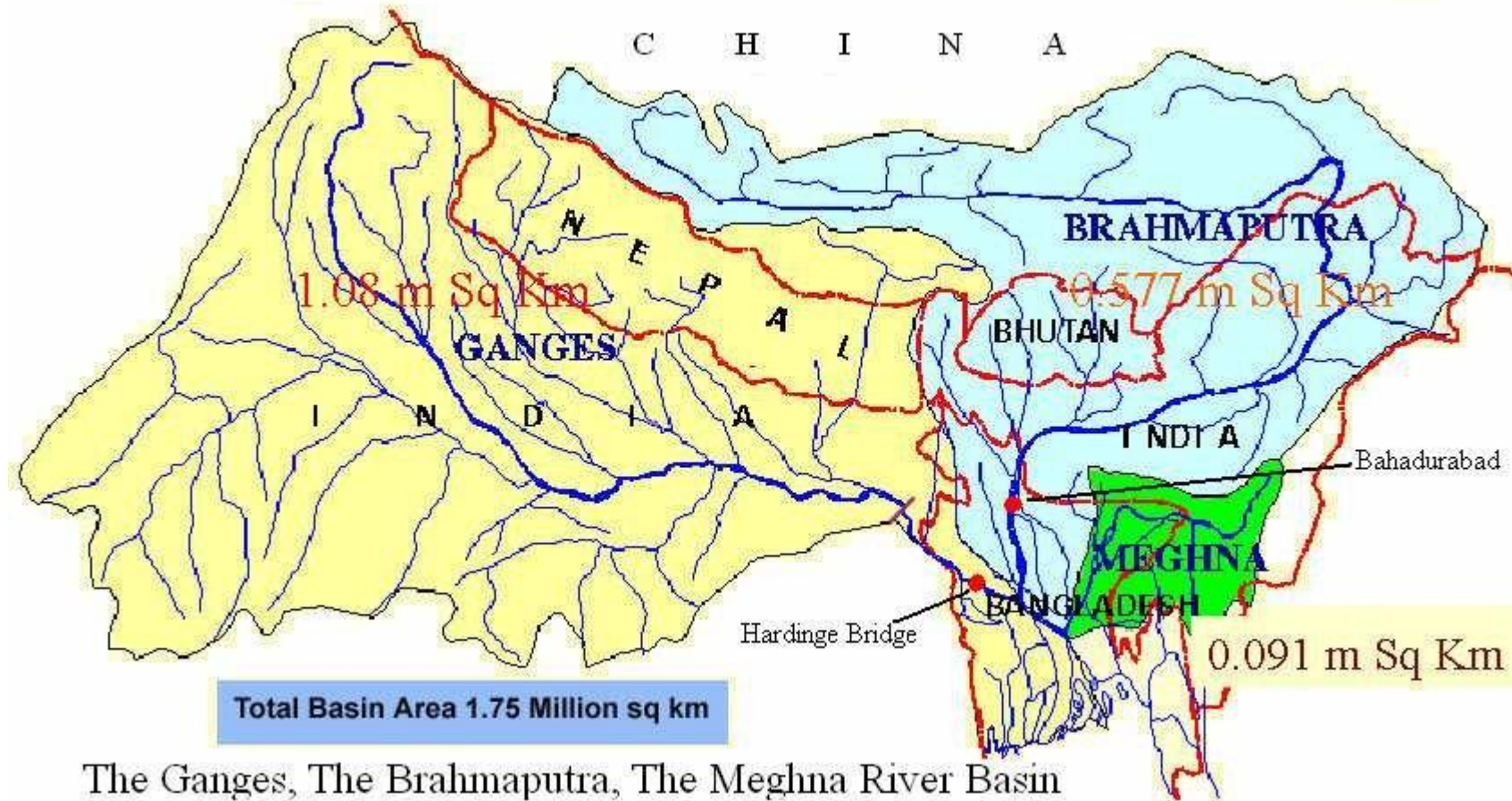


Water logging



Earthquake

# Why Disaster Prone...?

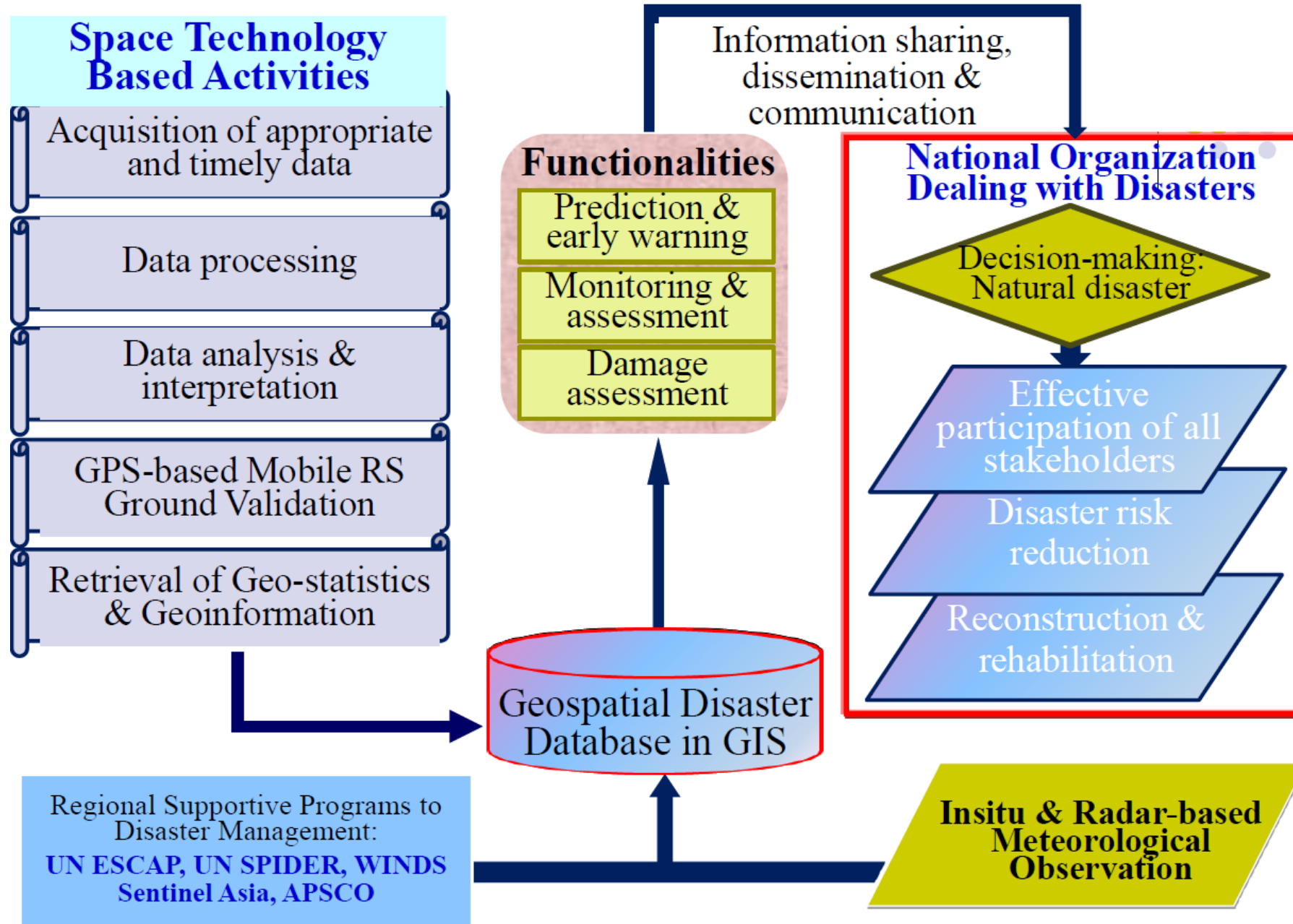


The Ganges, The Brahmaputra, The Meghna River Basin



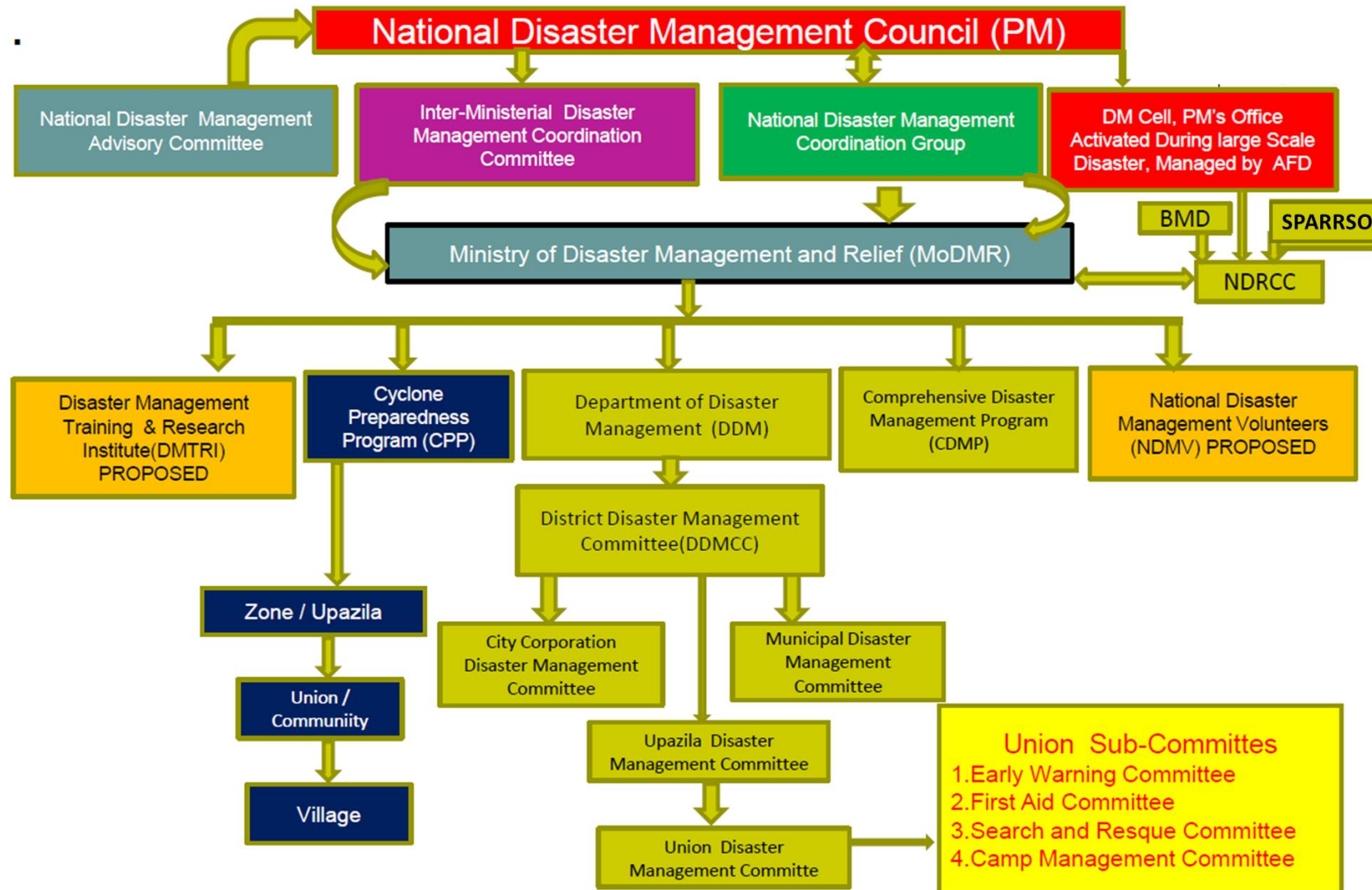
Funnel shaped coastal belt

# Disaster Management Based on Remote Sensing Technology

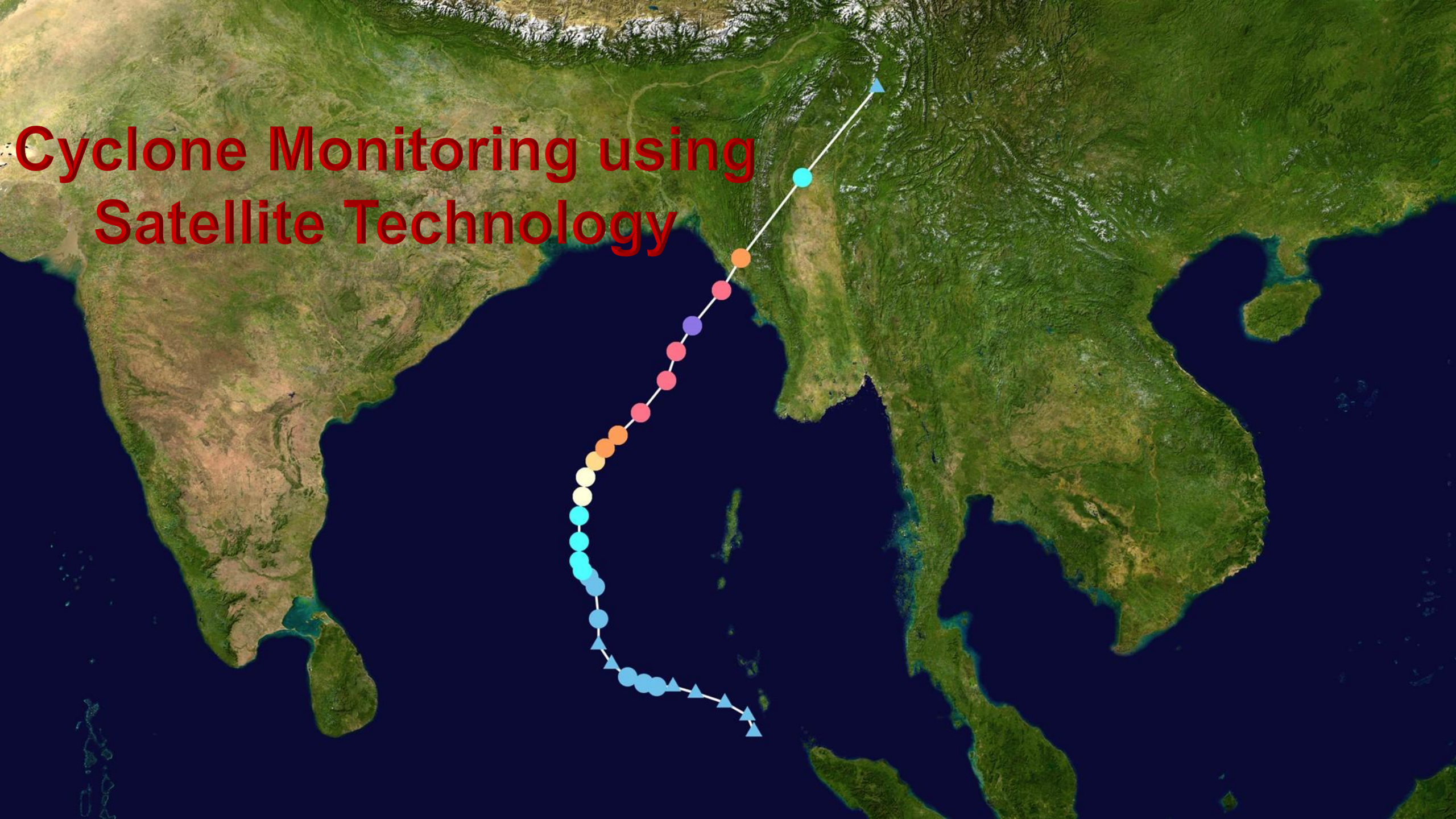


# Institutional Framework of Disaster Management

## D M Institutions in Bangladesh

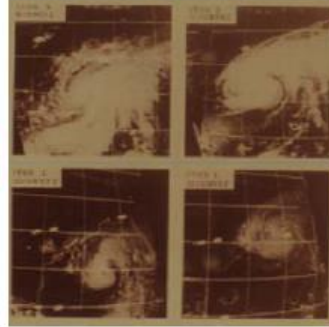


# Cyclone Monitoring using Satellite Technology

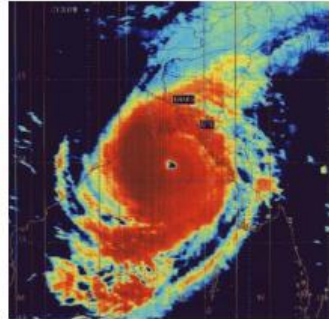


# Cyclone Monitoring

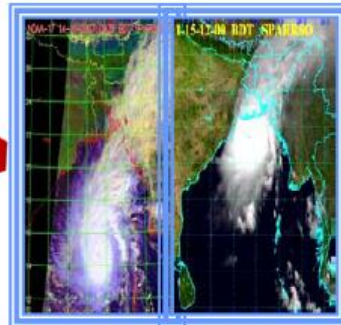
Devastating cyclone of 1970



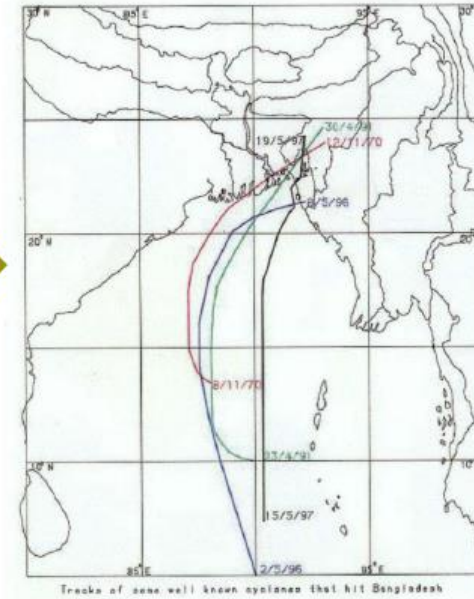
Devastating cyclone of 1991



Devastating cyclone of 2007



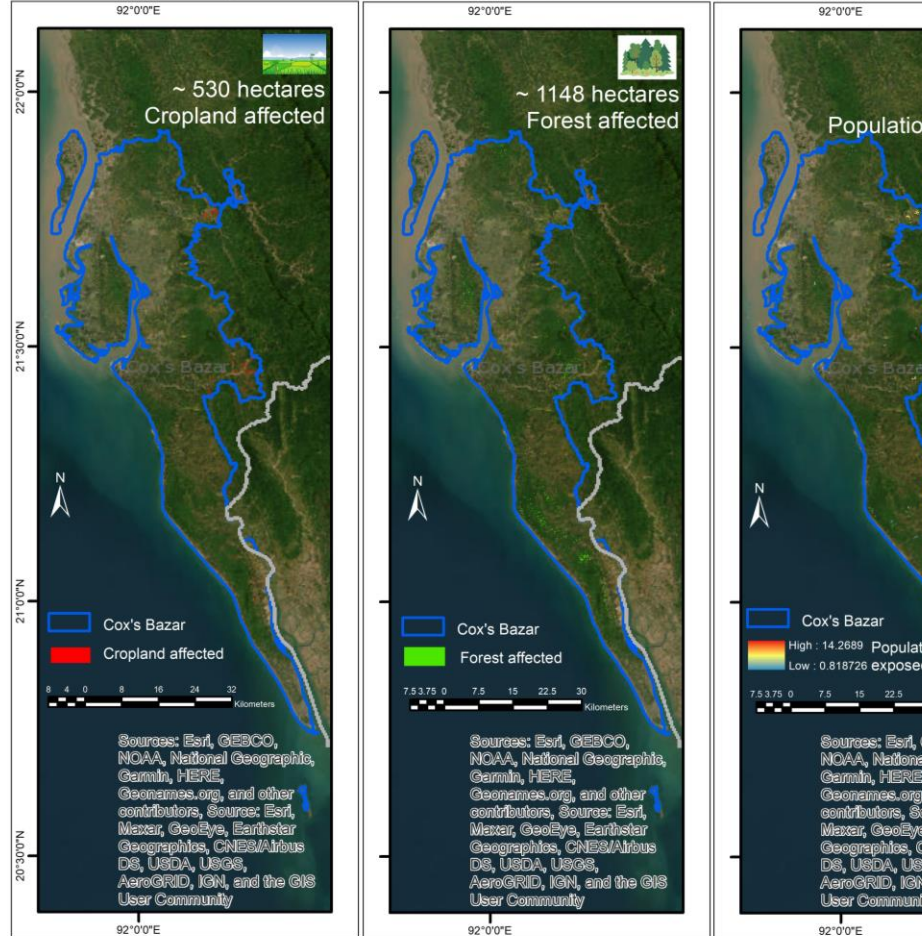
SPARRSO introduced satellite based monitoring in 1985



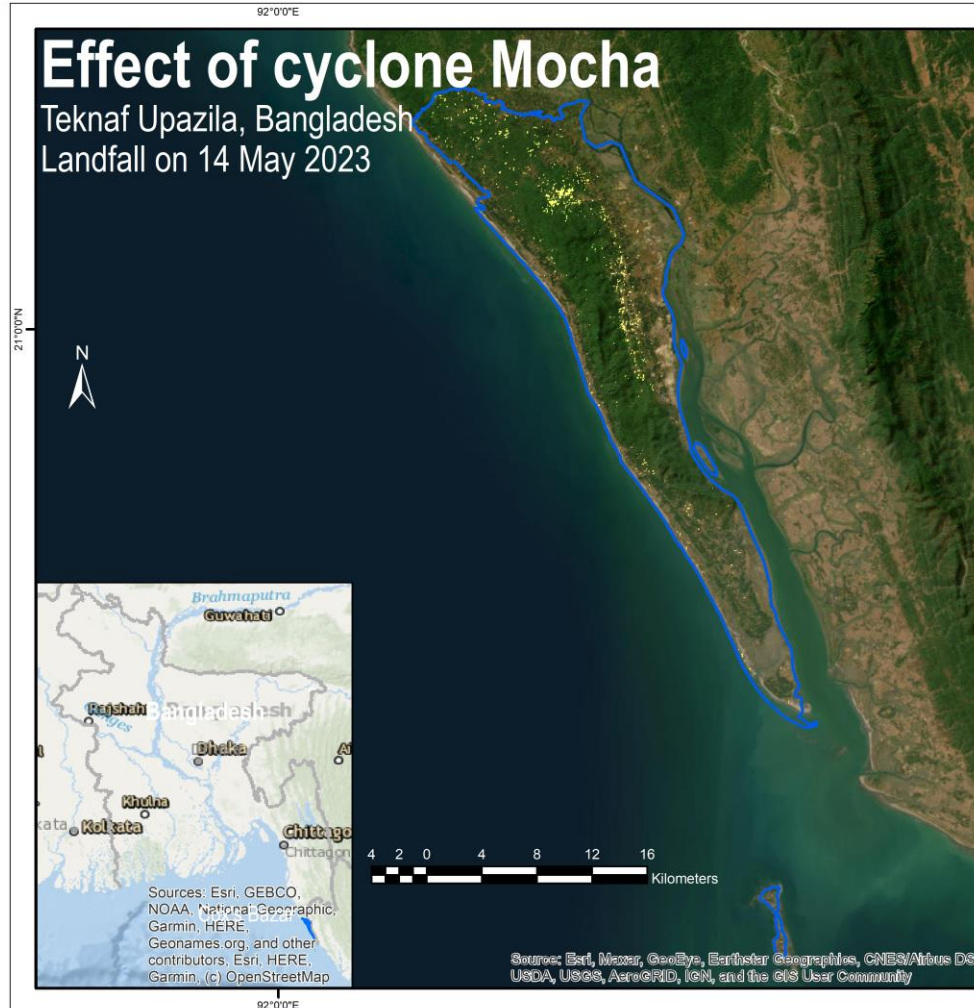
# Effect of Cyclone Mocha using Sentinel Asia Data

## Effect of cyclone Mocha




Cox's Bazar, Bangladesh, Landfall on 14 May 2023





This map shows the effect of cyclone Mocha in Cox's Bazar district of

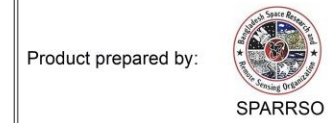


This map shows the effect of cyclone Mocha in Teknaf Upazila of Cox's Bazar District, Bangladesh.

-  ~ 80 hectares Cropland affected
-  ~ 165 hectares Forest affected
-  ~ 1146 Population exposed

- Legend**
-  Teknaf Upazila
  -  Mocha affected areas

Satellite Image:  
Pre-disaster: ALOS-2 PALSAR-2  
01 May 2023  
Post-disaster: ALOS-2 PALSAR-2  
15 May 2023



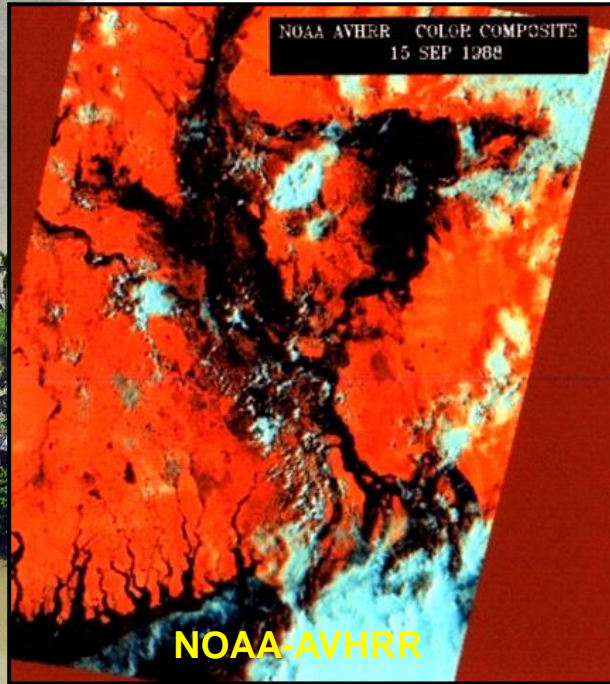
Background image source: ArcGIS, ESRI  
Disclaimer: The accuracy of this product is not validated.



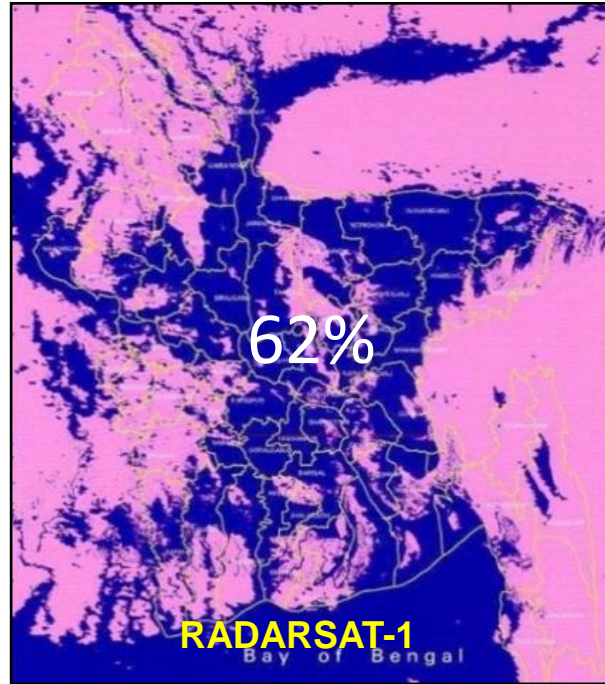
# Flood Monitoring using Satellite Technology



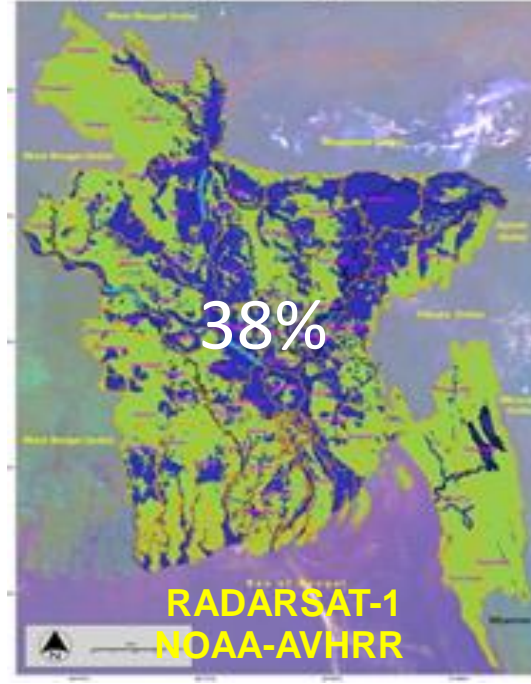
# Flood Monitoring in Bangladesh



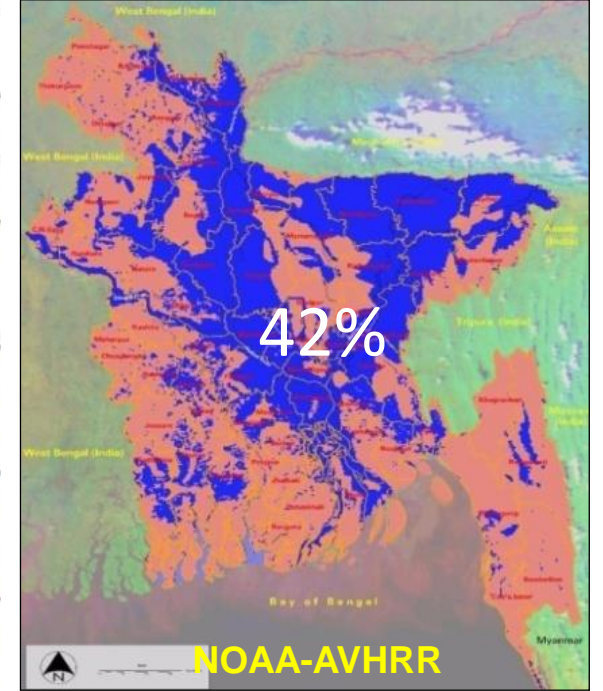
1988



1998



2004



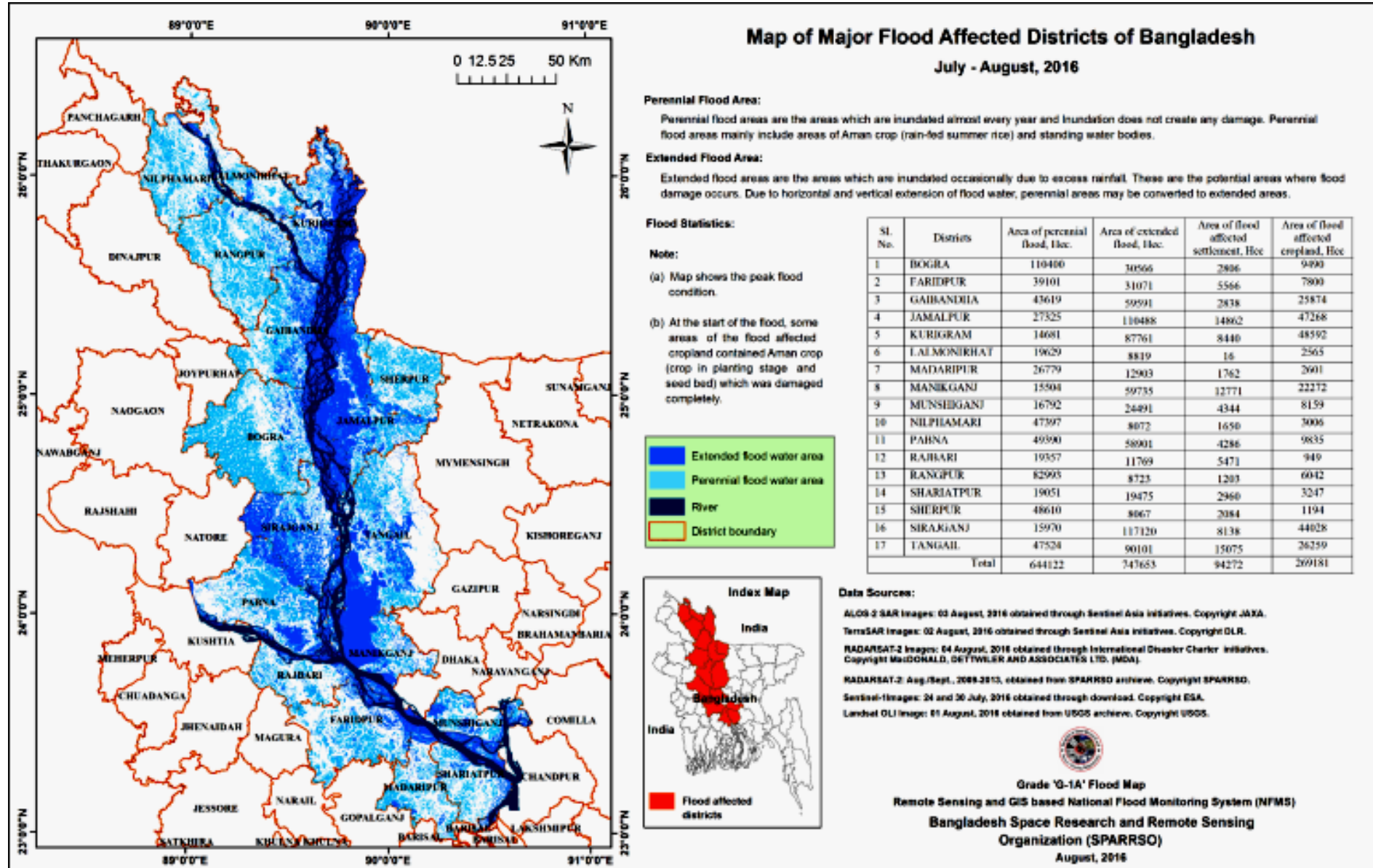
2007



# Flood Extent map generated using Sentinel Asia Data

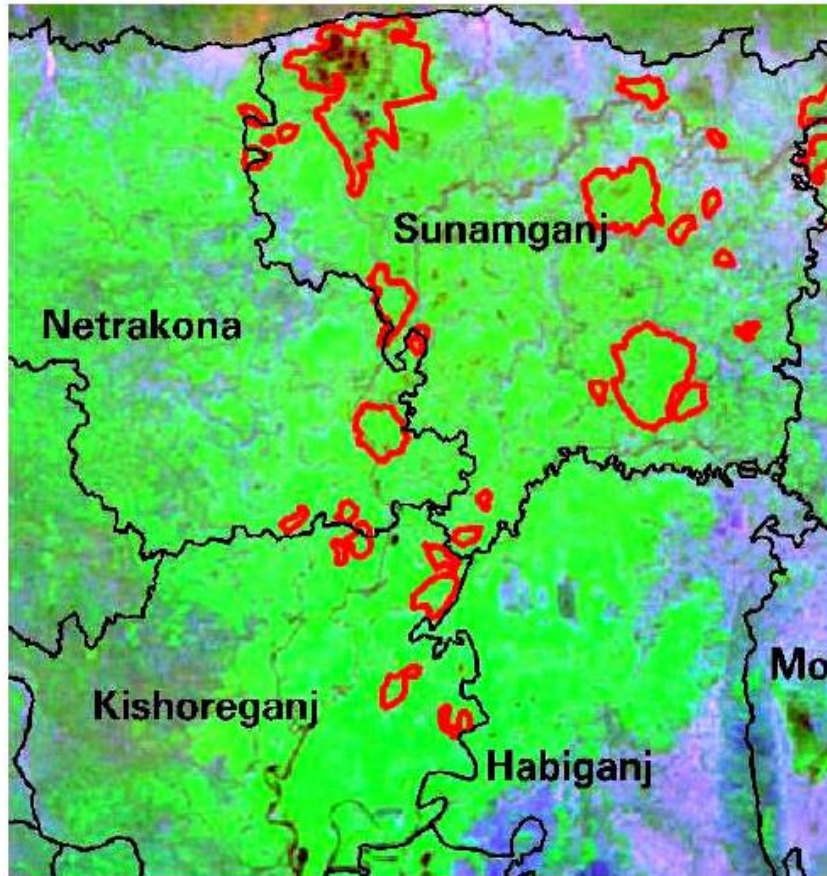


2016

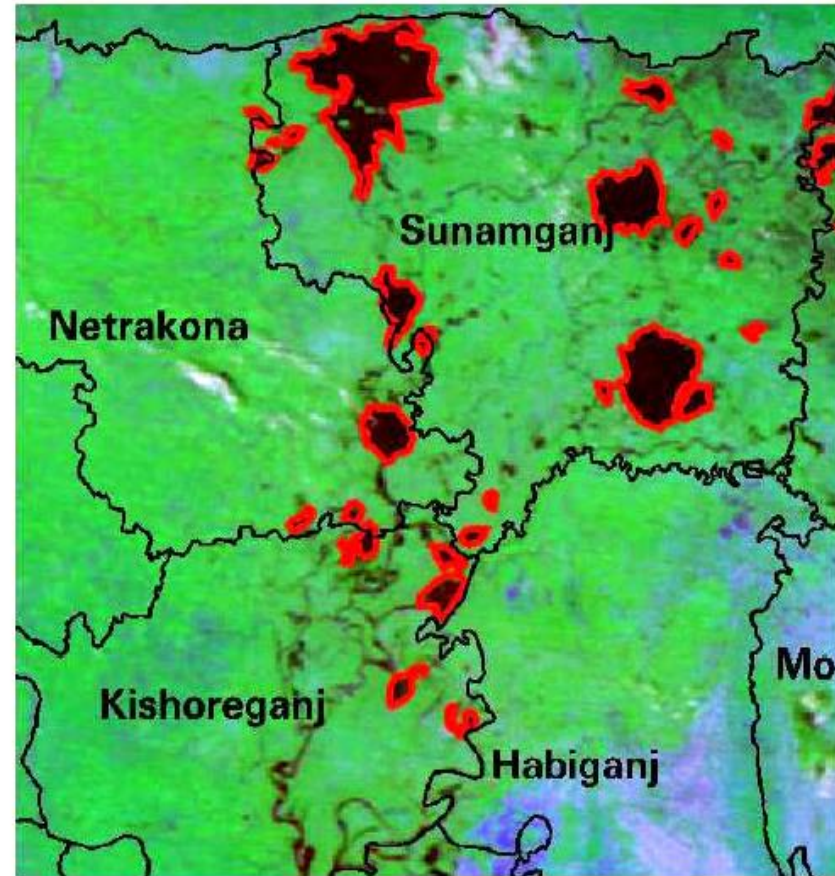


# Assessment of Crop Damage

50,500 hectare Boro rice was damaged by flash flood in April 2010.



MODIS Pre-flood Image

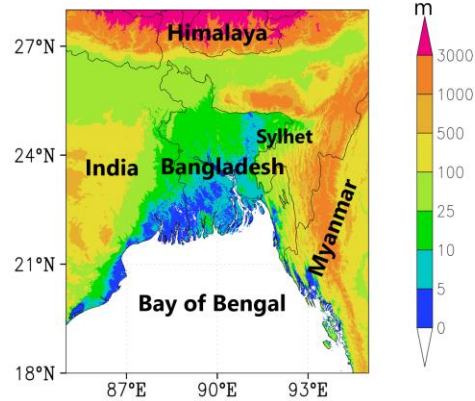


MODIS Post-flood Image



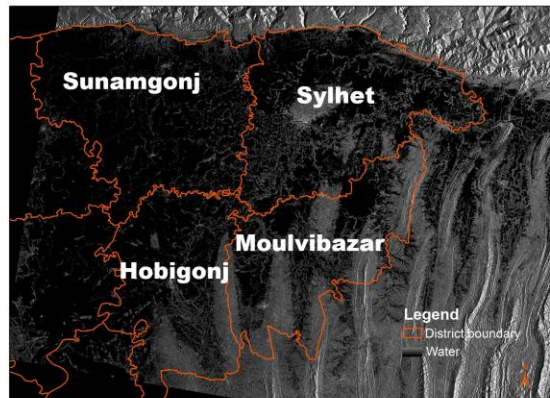
# Affected Area of Sylhet Flood 2022

## Topography in and around Bangladesh



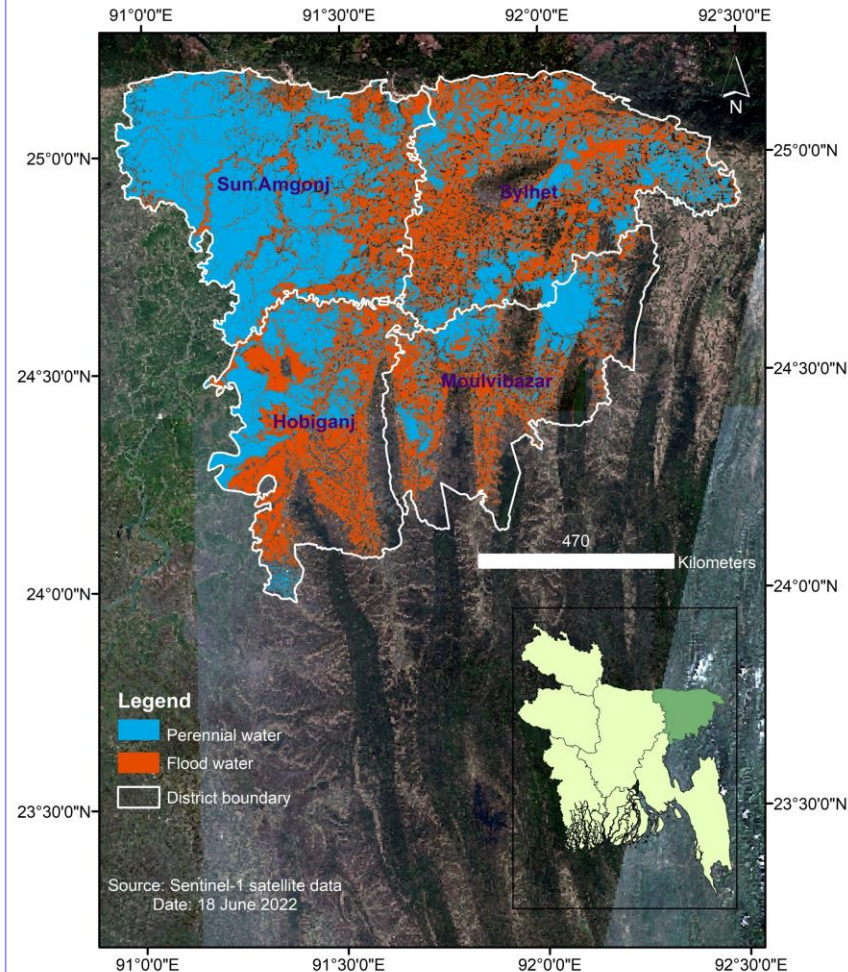
Sylhet division is very prone to flash flood since it is situated to the south of Meghalaya mountain which is renowned for very heavy rainfall.

## Sentinel-1 satellite image of 18 June 2022



100 years of record breaking rainfall and upstream flow from Meghalaya inundated large area of Sylhet division.

## Flood Map of Sylhet Division in June 2022



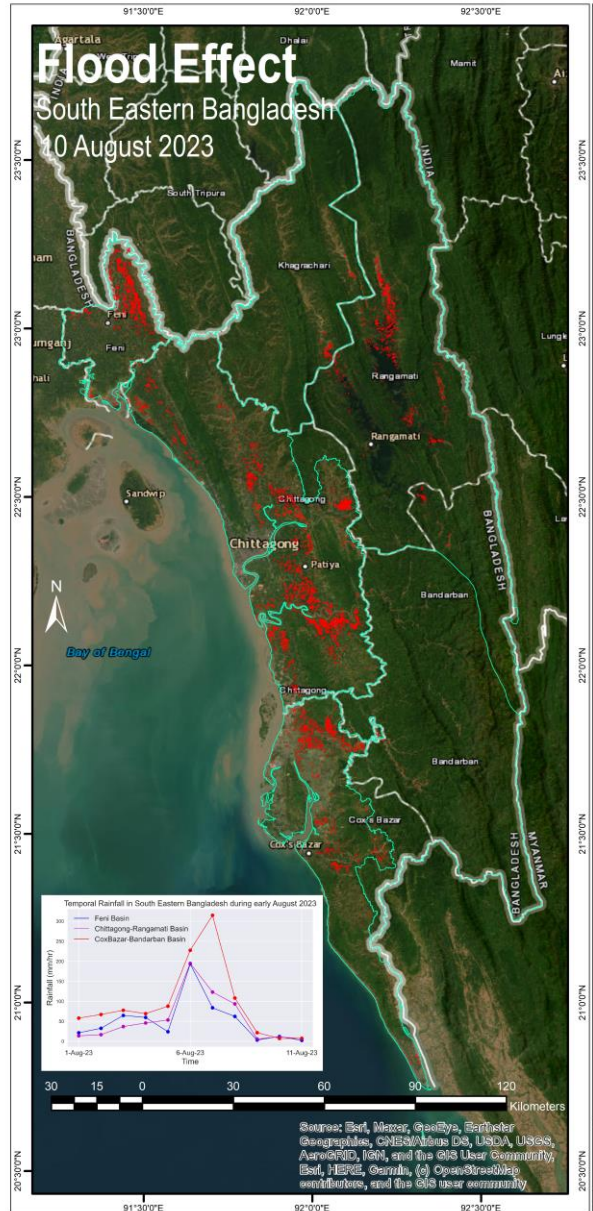
- Perennial water layer for the flood season was prepared from multiple years of microwave satellite image derived surface water extent.

- Actual flood area was calculated by the deduction of the perennial surface water extent from total flood inundated area.

- Among the four districts of Sylhet division, Sylhet and Hobigonj affected badly compare to rest of the two districts.

District	Perennial water area, ha (%)	Flood area, ha (%)	Flood affected population
<b>Sylhet</b>	<b>94,753 (22%)</b>	<b>1,45,529 (35%)</b>	<b>6,92,827</b>
Sunamgonj	2,53,658 (56%)	81,173 (18%)	3,63,698
Moulvibazar	48,032 (15%)	64,557 (20%)	4,56,152
<b>Hobigonj</b>	<b>69,659 (22%)</b>	<b>1,02,158 (33%)</b>	<b>7,48,499</b>

# Remote Sensing Applications on Chittagong Flood 2023



This map shows the effect of flood during early August of 2023 in South Eastern Bangladesh. The map is prepared based on the availability of satellite images of 10 August 2023 whereas the highest rainfall occurred during 06 and 07 August 2023.

**Legend**

- ~87582 hectares Flood affected areas
- South Eastern Bangladesh
- ~67279 hectares Cropland affected
- ~9978 hectares Forest affected
- ~269 hectares Urban area affected
- ~520297 Population exposed

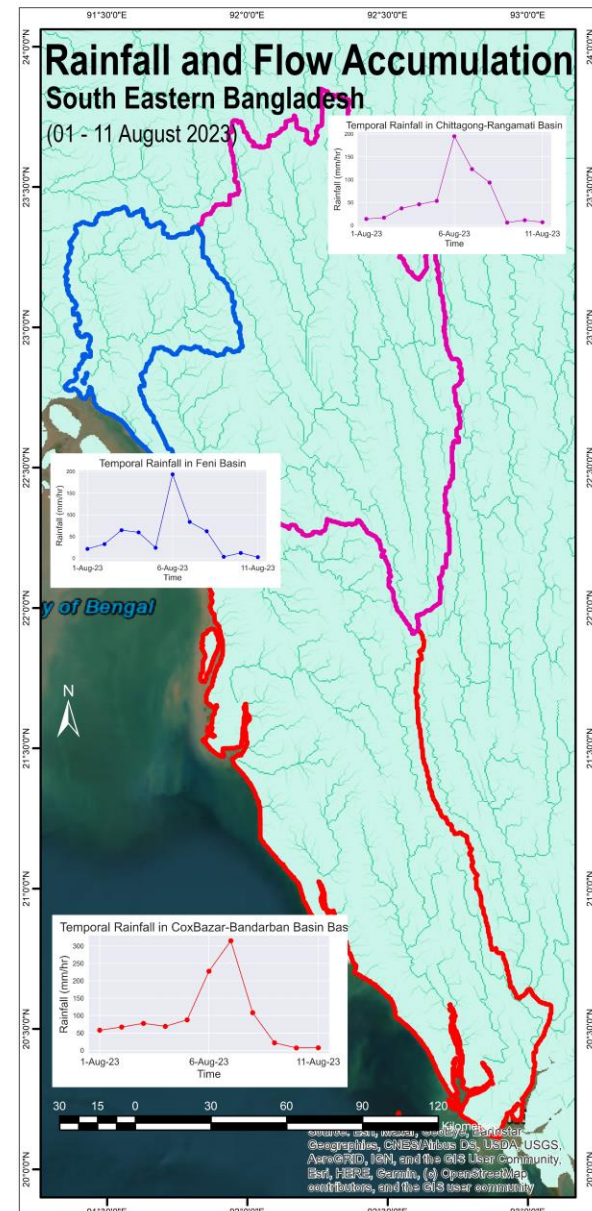
**Satellite Image:**  
Pre-disaster: Sentinel-1  
08 August 2022  
Post-disaster: Sentinel-1  
10 August 2023

Data Source: esa

Product prepared by: SPARRSO

Background image source: ArcGIS, ESRI

Disclaimer: The accuracy of this product is not validated.



This map shows the temporal rainfall during early August of 2023 and flow accumulation in South Eastern Bangladesh.

**Legend**

- Feni Basin
- Chittagong-Rangamati Basin
- Cox's Bazar-Bandarban Basin
- South Eastern Bangladesh

**Flow Accumulation**  
Value  
High  
Low

Data Source: World Wildlife Fund (WWF)

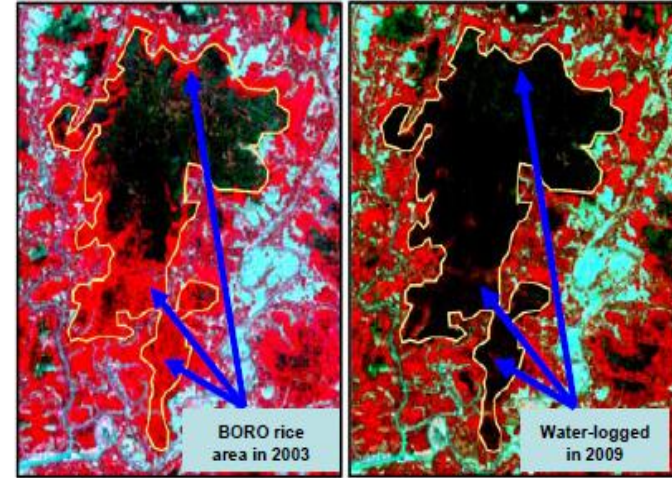
Product prepared by: SPARRSO

Background image source: ArcGIS, ESRI

Disclaimer: The accuracy of this product is not validated.

# Water-Logging Monitoring

Monitoring of Water-Logging in Bhutiar Beel of Khulna District Using Remote Sensing and GIS Technique



Study area: 8000 Hec.

Aman damage: 3540 Hec. (83.37 % of the Aman cultivable area)

Boro damage: 3267 Hec. (81.80 % of the Boro cultivable area)

**Thank you!**

