

# Application of Earth Observation in Disaster Management

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# What is a disaster?

## Any occurrence

that causes damage, ecological disruption, loss of human life, or deterioration of health and health services on a scale, sufficient to warrant an extraordinary response from outside the affected community or area.

## Causes

Natural events, like earthquakes, floods, or cyclones, or human-made events, like accidental fire, nuclear power plant accidents, or terrorist bombings can cause disasters.

## Impacts

Disasters can cause human, material, economic, or environmental losses. They can affect people, jobs, records, vital records, and facilities.



# Types of disaster

## **Geophysical**

Events that originate from the solid earth, like earthquakes, volcanoes, tsunamis, and landslides

## **Meteorological**

Events caused by short-lived atmospheric processes, like cyclones and storms

## **Hydrological**

Events caused by deviations in the normal water cycle, like overflow of bodies of water caused by wind

## **Climatological**

Events caused by long-lived climate variability, like extreme temperatures and droughts

## **Biological**

Events caused by exposure to germs and toxic substances, like epidemics, insect infestations, and animal-related disasters

# Phases of disaster management

## Prevention

Identify potential hazards and develop safeguards to mitigate their impact.

## Mitigation

Reduce the impact of disasters through hazard-resistant construction, improved environmental and social policies, and public awareness.

## Preparedness

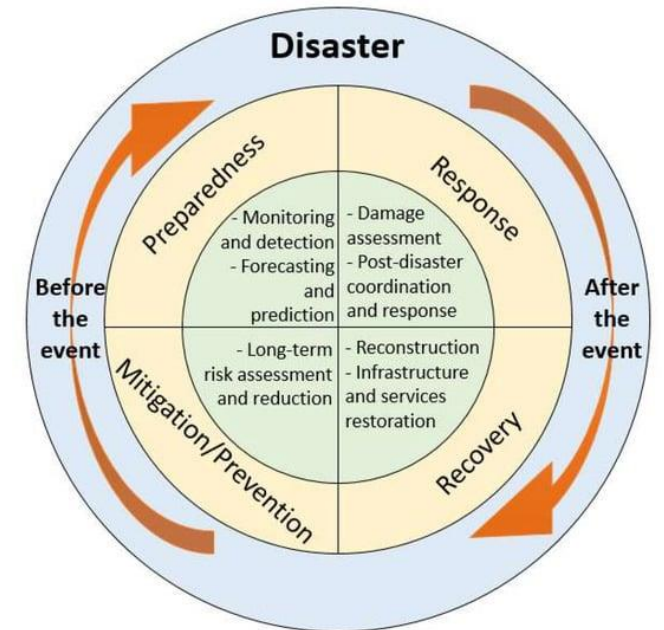
Develop the knowledge and capacities to anticipate, respond to, and recover from disasters.

## Response

Take actions to save lives, reduce health impacts, and ensure public safety.

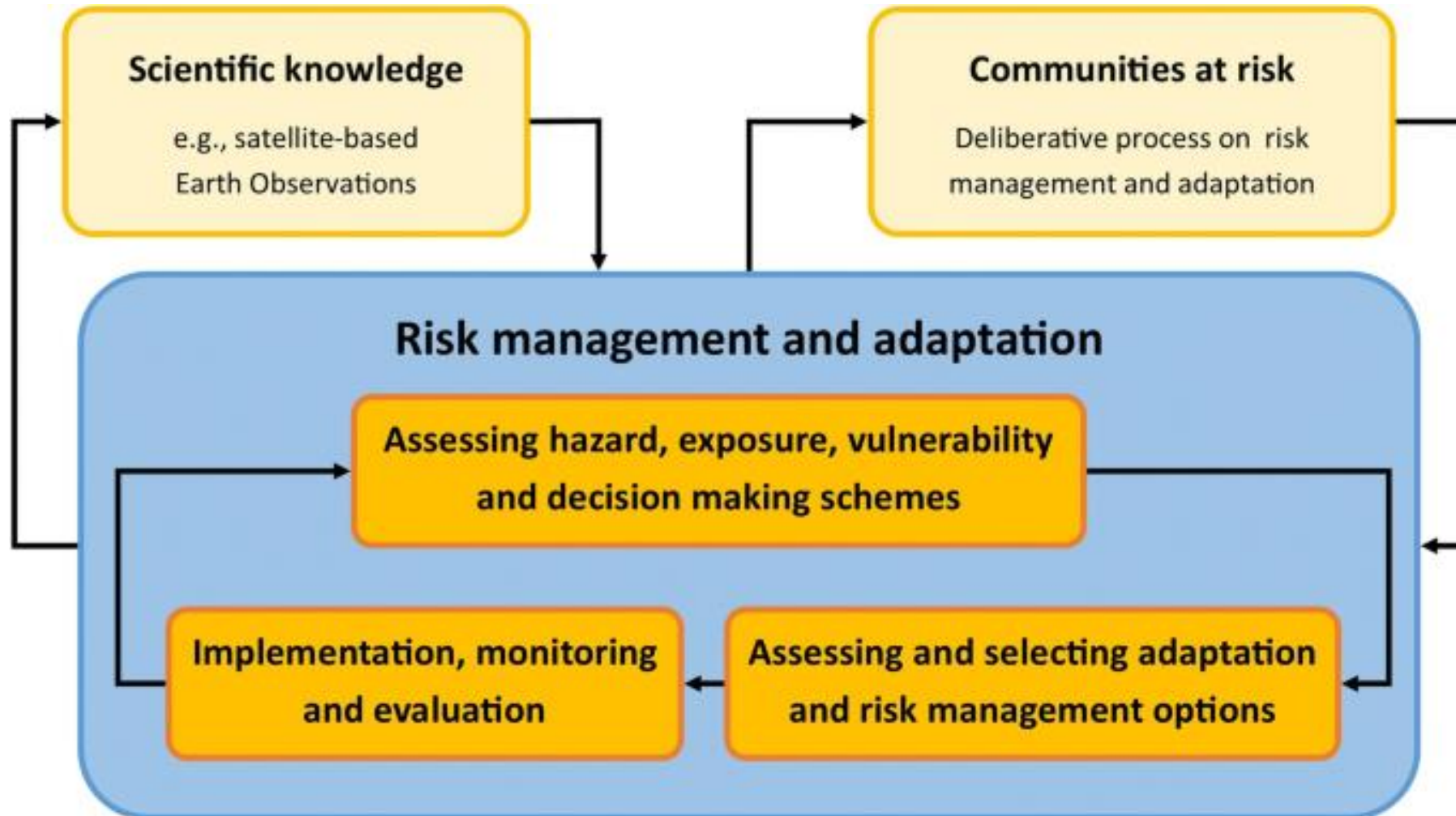
## Recovery

Improve the resiliency of individuals, families, and communities after a disaster

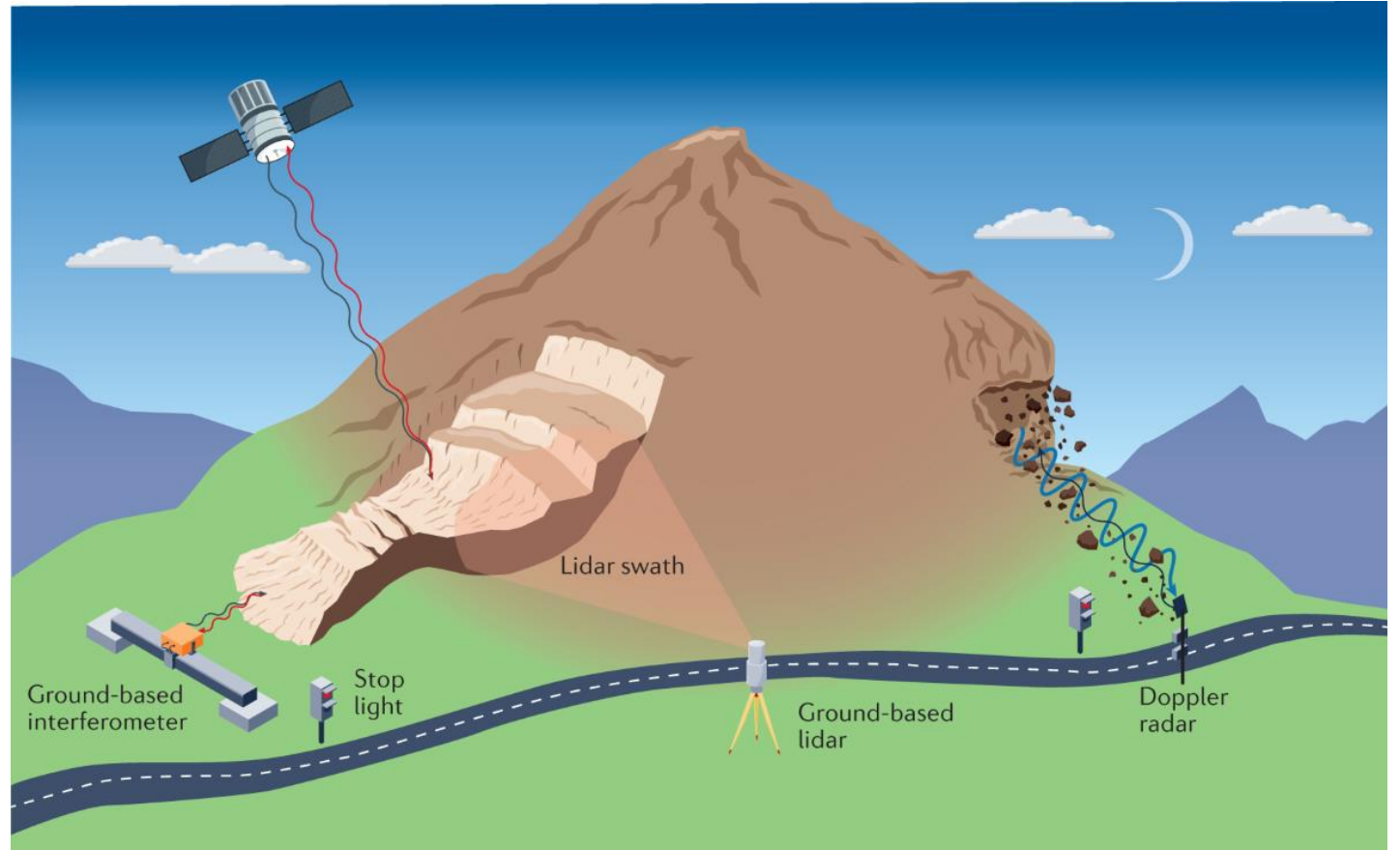




# Application of earth observation in disaster management

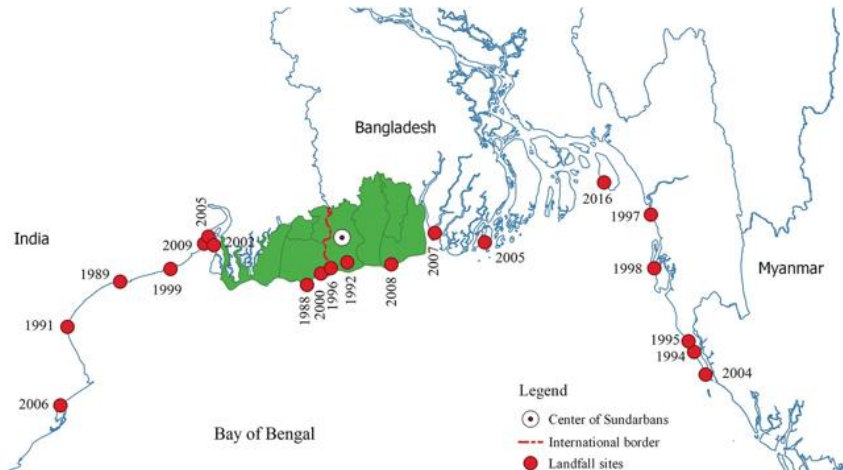


Landslide  
detection,  
monitoring and  
prediction

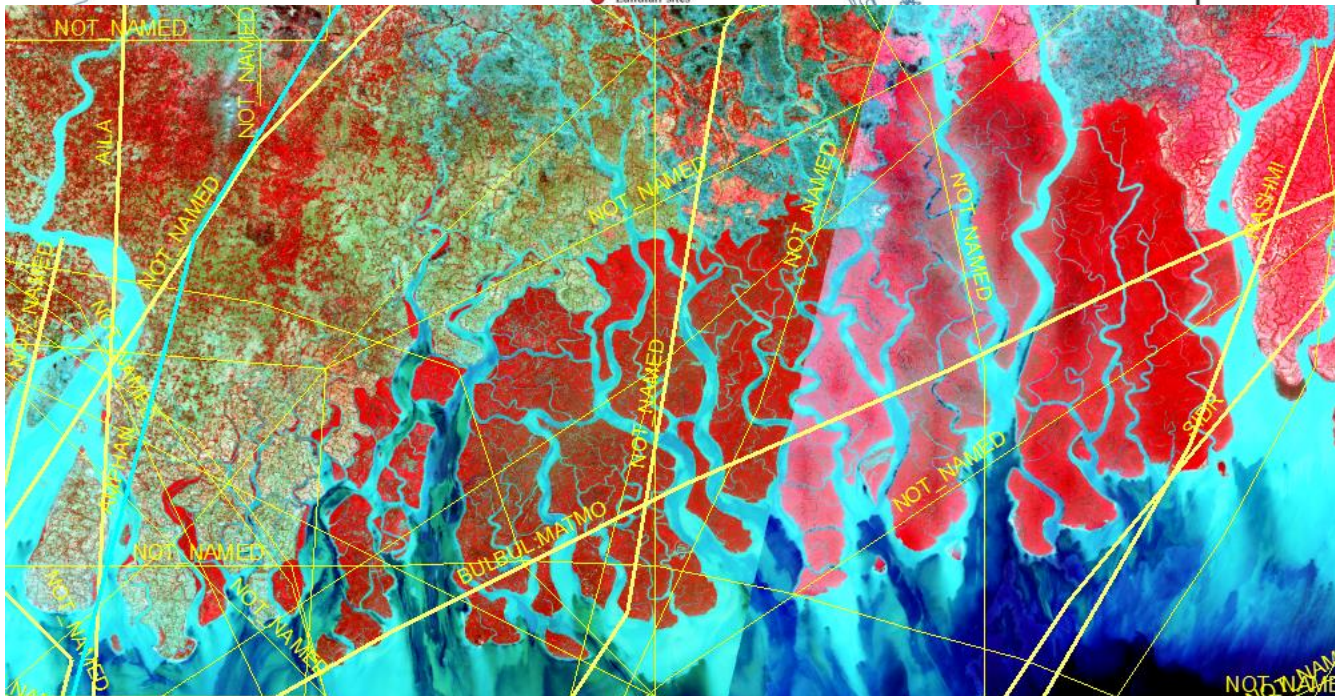
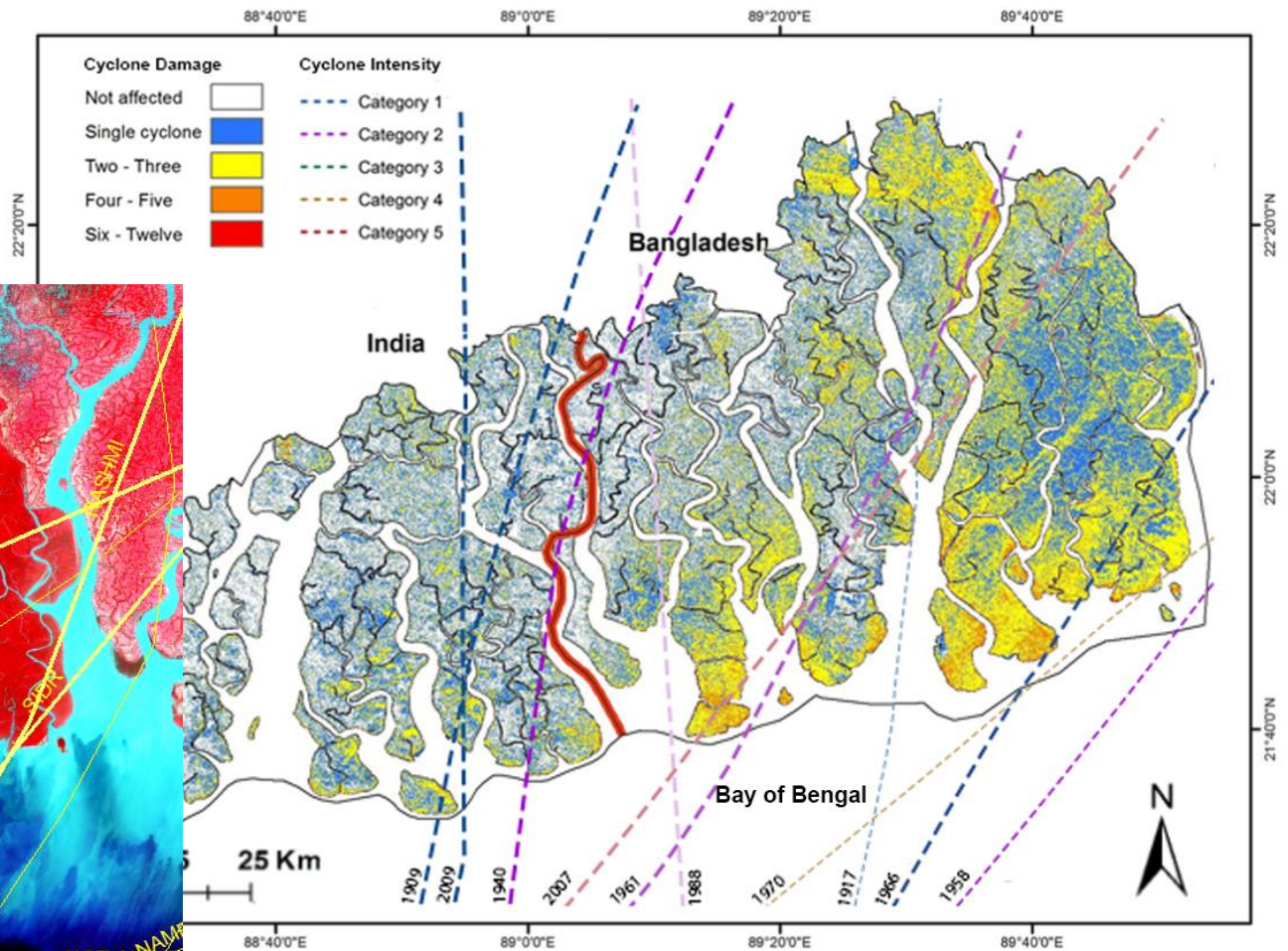




# Cyclones in the Sundarbans

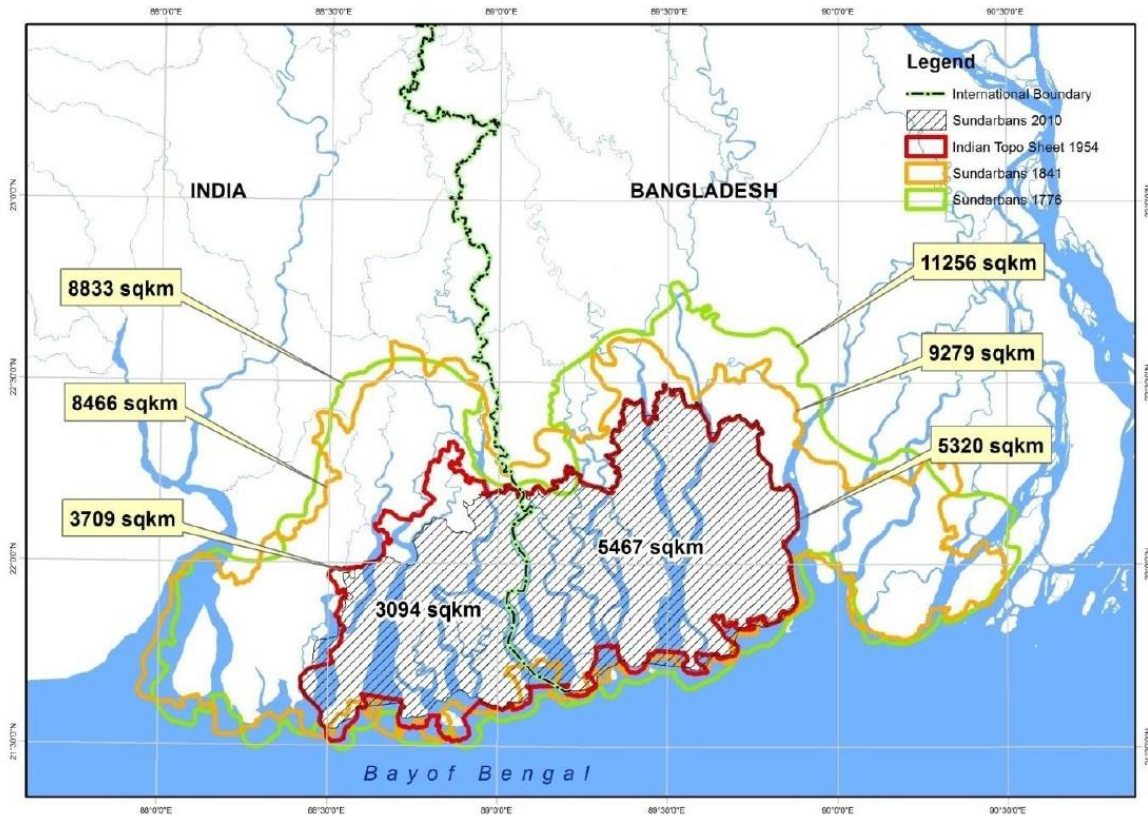


Legend  
 ○ Center of Sundarbans  
 - - - International border  
 ● Landfall sites

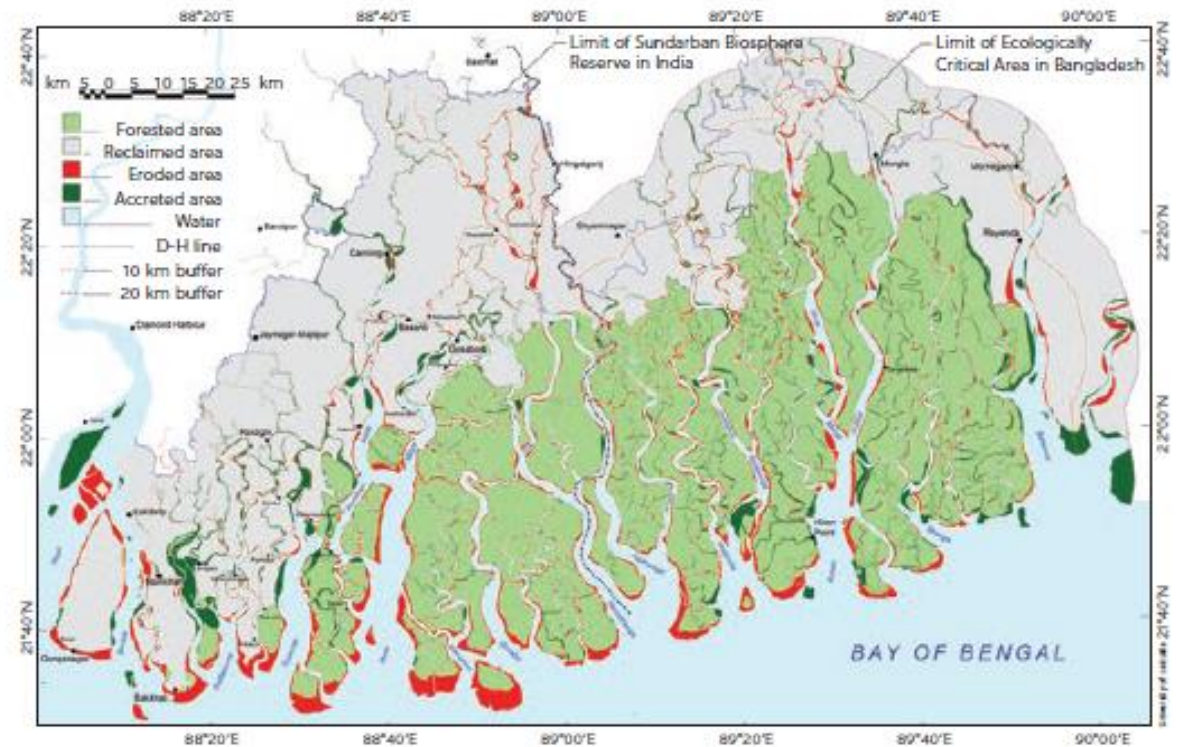




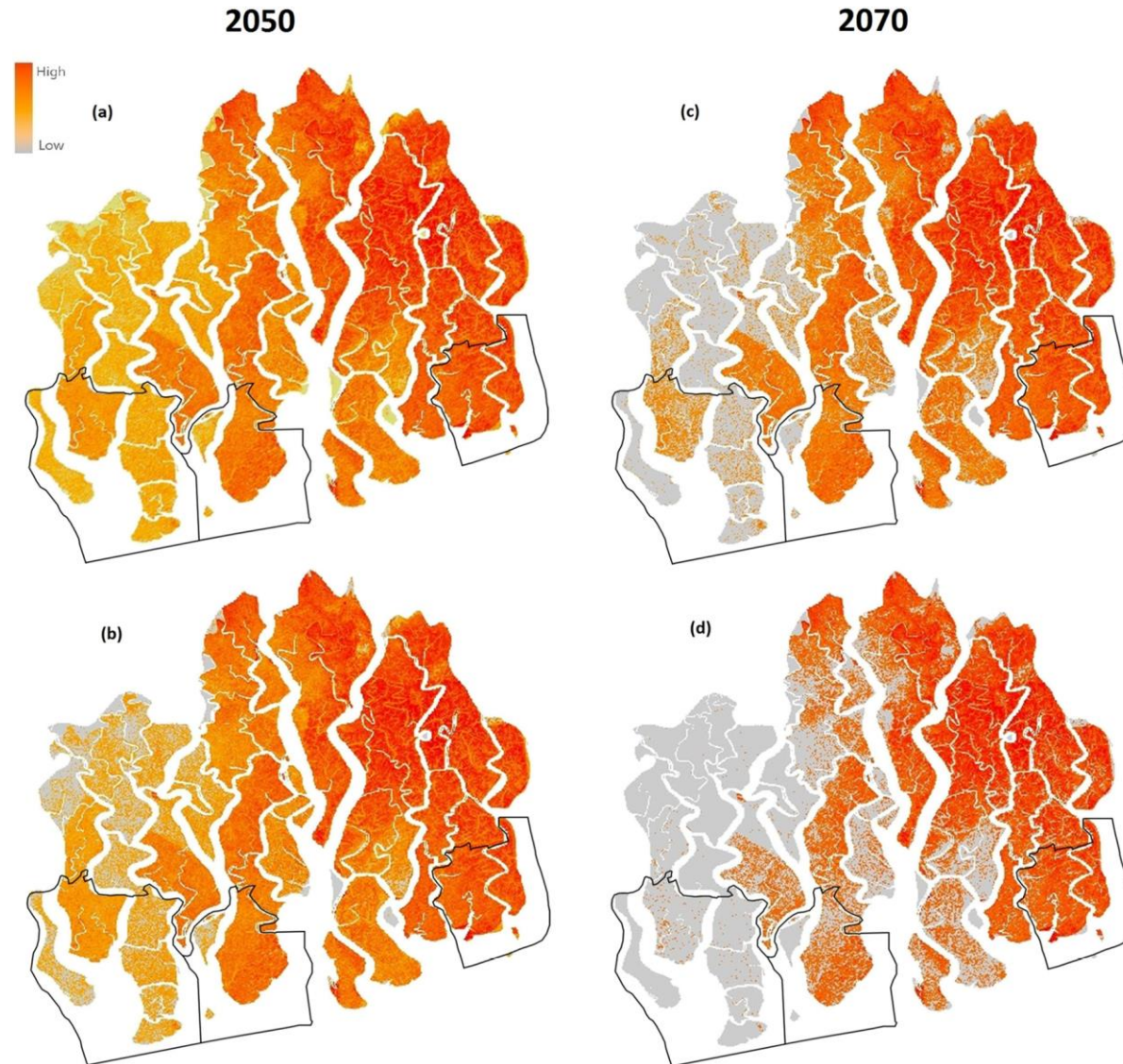
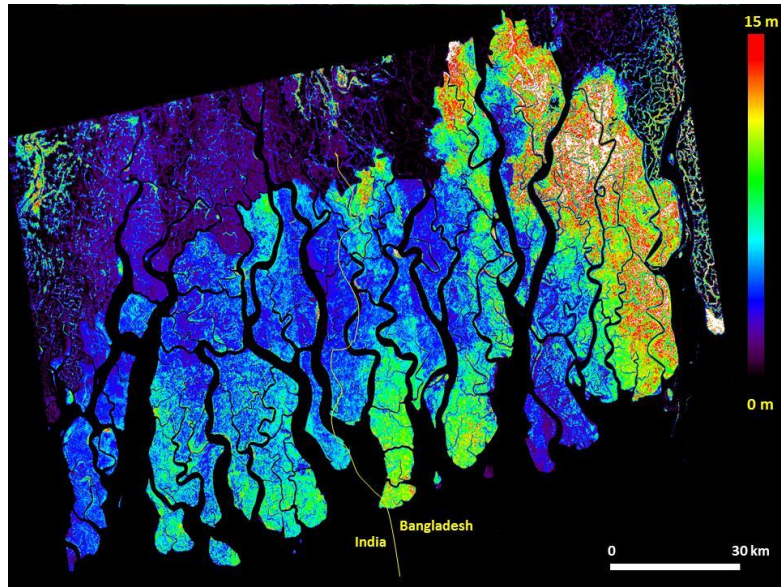
# Historical Changes in the Extent and Erosion-Accretion in Sundarbans



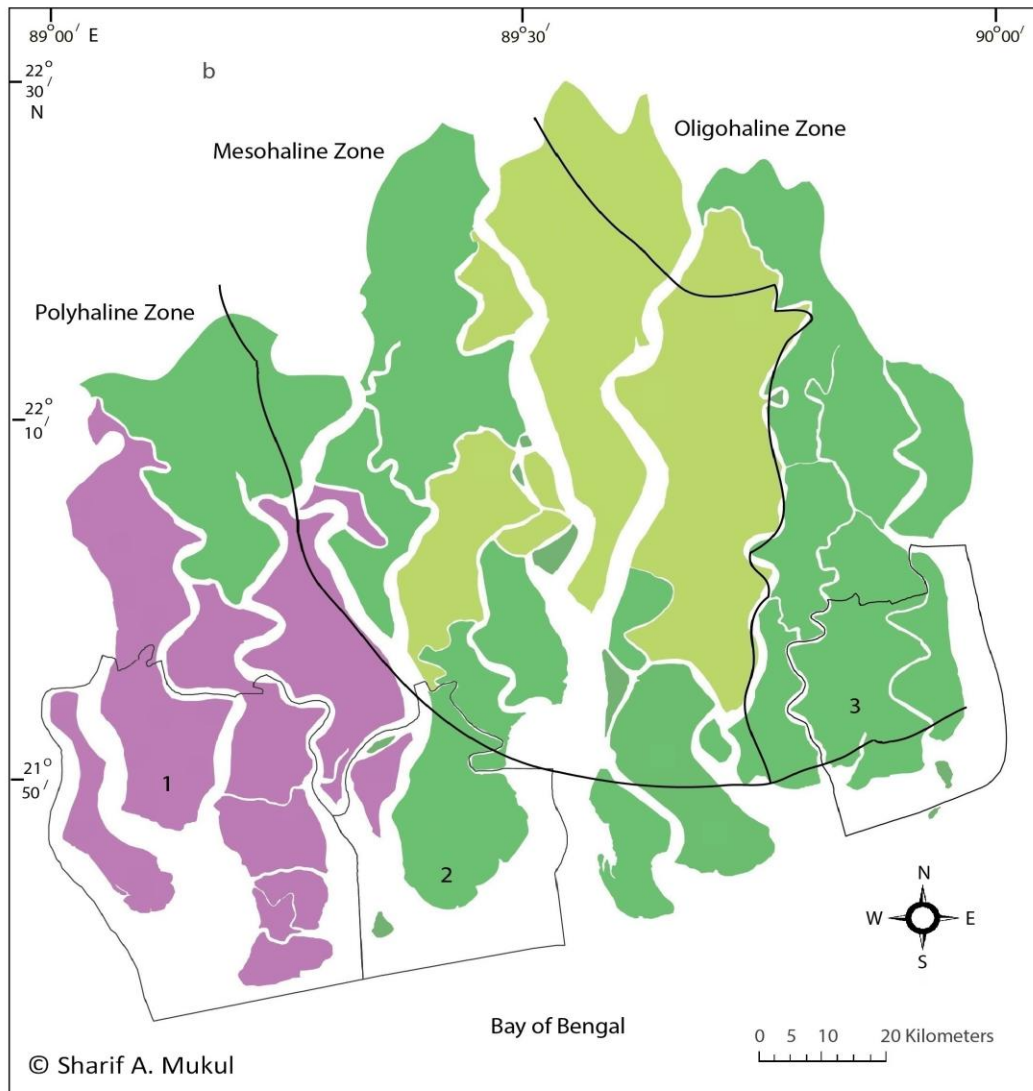
Sundarbans' accretion and erosion, 1904-24 to 2015-16



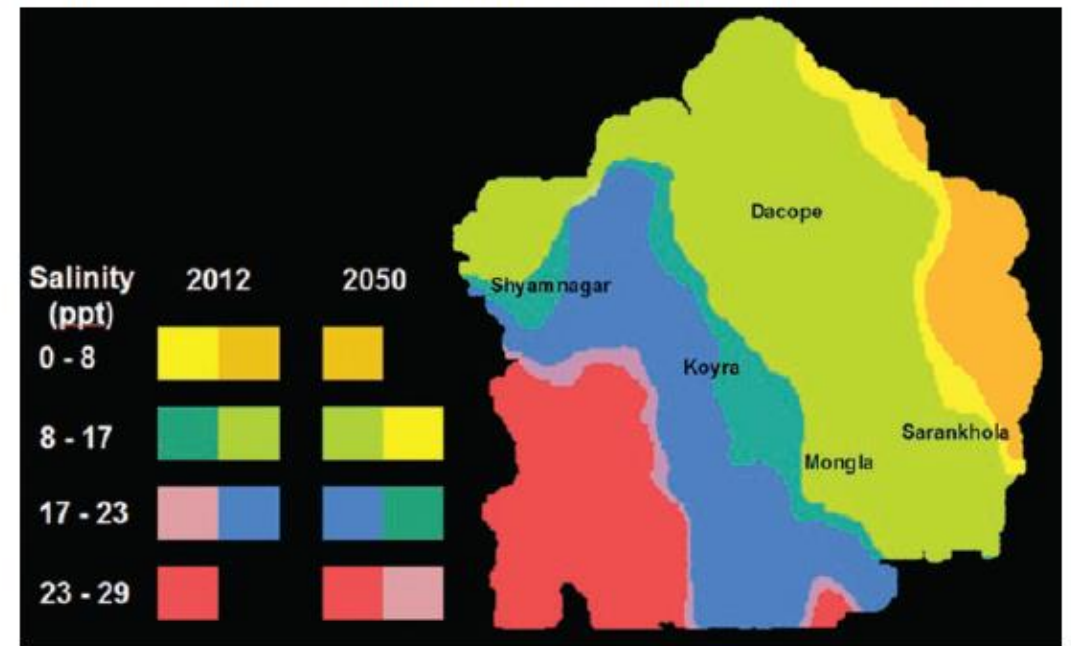




**Projected sea level rise impacts in the Bangladesh Sundarbans – (a) areas after IPCC's RCP6.0 projection for 2050, (b) areas after IPCC's RCP8.5 projection for 2050, (c) areas after IPCC's RCP6.0 projection for 2070, (d) areas after IPCC's RCP8.5 projection for 2070.**



### Predicted rise in water salinization in the Bangladesh Sundarbans



Source: Dasgupta, Sobhan, and Wheeler 2017.  
 Note: ppt = parts per 1,000.



Thanks !

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