



# Ecological solution for Disaster Risk Reduction



Department of Disaster Management and Civil Defence  
**Government of West Bengal**

# State Profile of West Bengal



Area

88,752 sq Km

Lat &  
Long

27°13'15"N to 21°25'24"N and 85°48'20"E to 89°53'04"E

## Geographical Regions

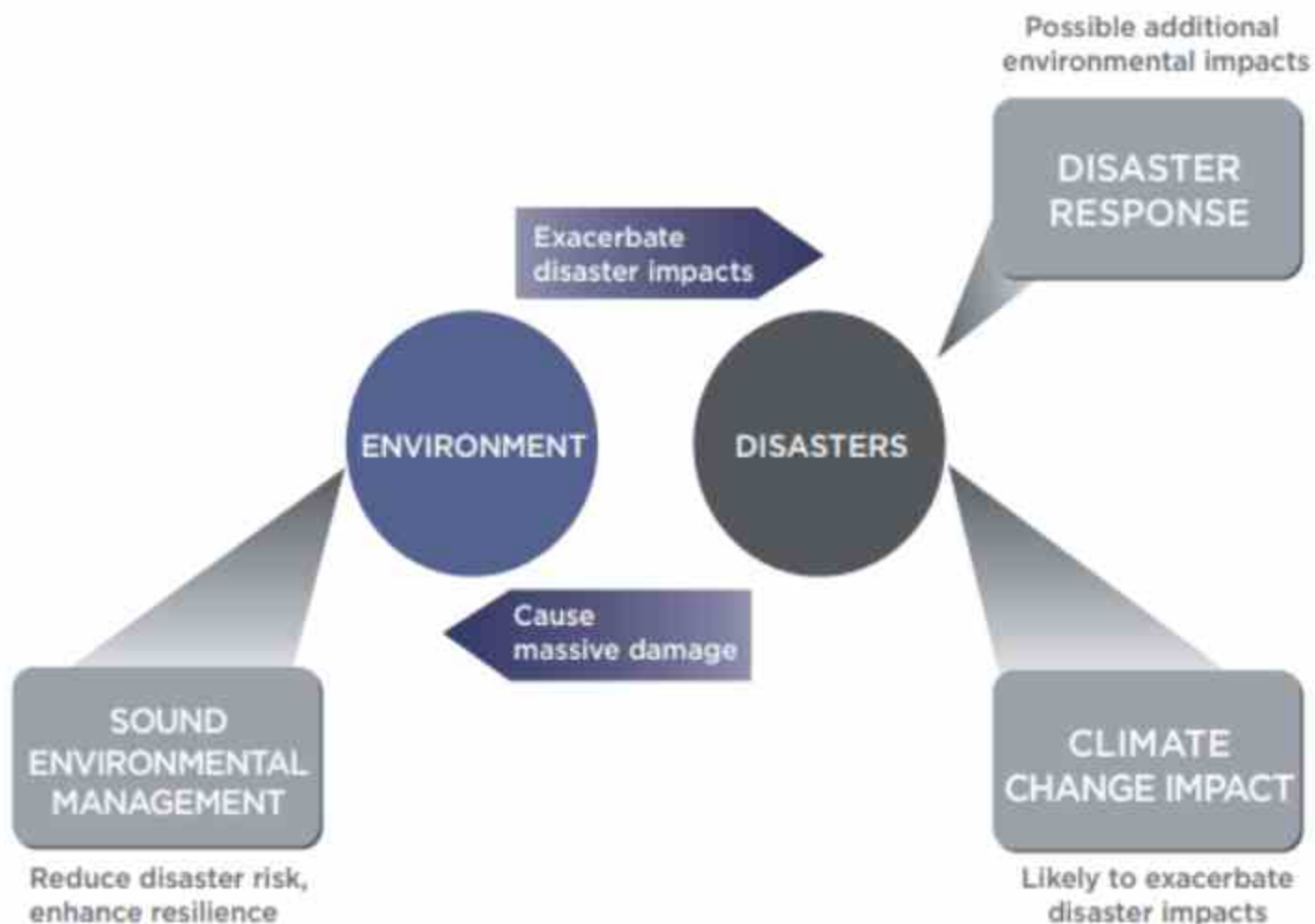
- The hill region in the north of West Bengal is covered by the Himalayan mountain range (Darjeeling & Kalimpong districts);
- The terai and Teesta alluvial region of North Bengal (Jalpaiguri, Alipurduar, Coochbehar districts);
- The North Bengal plains (North Dinajpur, South Dinajpur, Malda districts);
- Rarh Region (Murshidabad, Bankura, Birbhum, Purba Bardhaman, Paschim Bardhaman, Purba Medinipur & Paschim Medinipur districts)
- Western Plateau & high lands ( Purulia, Jhargram & some parts of Bankura, Birbhum & Paschim Medinipur districts);
- Gangetic Delta (Nadia, North 24 Parganas, Kolkata, South 24 Parganas districts and some parts of Howrah, Hooghly district);
- Coastal Plain (State coastal region 220 km in the extreme south of the state).

# Eco-DRR

- Eco-DRR is the sustainable management, conservation and restoration of ecosystems to reduce disaster risk, with the aim to achieve sustainable and resilient development (Estrella & Saalismaa, 2013).
- Well-managed ecosystems act as natural infrastructure, reducing physical exposure to many hazards and increasing socio-economic resilience of people and communities by sustaining local livelihoods and providing essential natural resources (Sudmeier-Rieux & Ash, 2009).



# Inter-linkage between Environment and Disaster



# Why do ecosystems matter in disaster risk reduction?

**Ecosystems contribute to reducing disaster risk in two important ways =>**

**First, by reducing physical exposure to natural hazards by serving as natural barrier or buffer**

**Secondly, by reducing socio-economic vulnerability**

## Five reasons why ecosystems are central to disaster risk reduction

1

- Ecosystems that provide multiple livelihood benefits.

2

- Ecosystems such as wetlands, forests, and coastal systems provide cost-effective natural buffers against impacts of climate change.

3

- Healthy and diverse ecosystems are more resilient to extreme weather events.

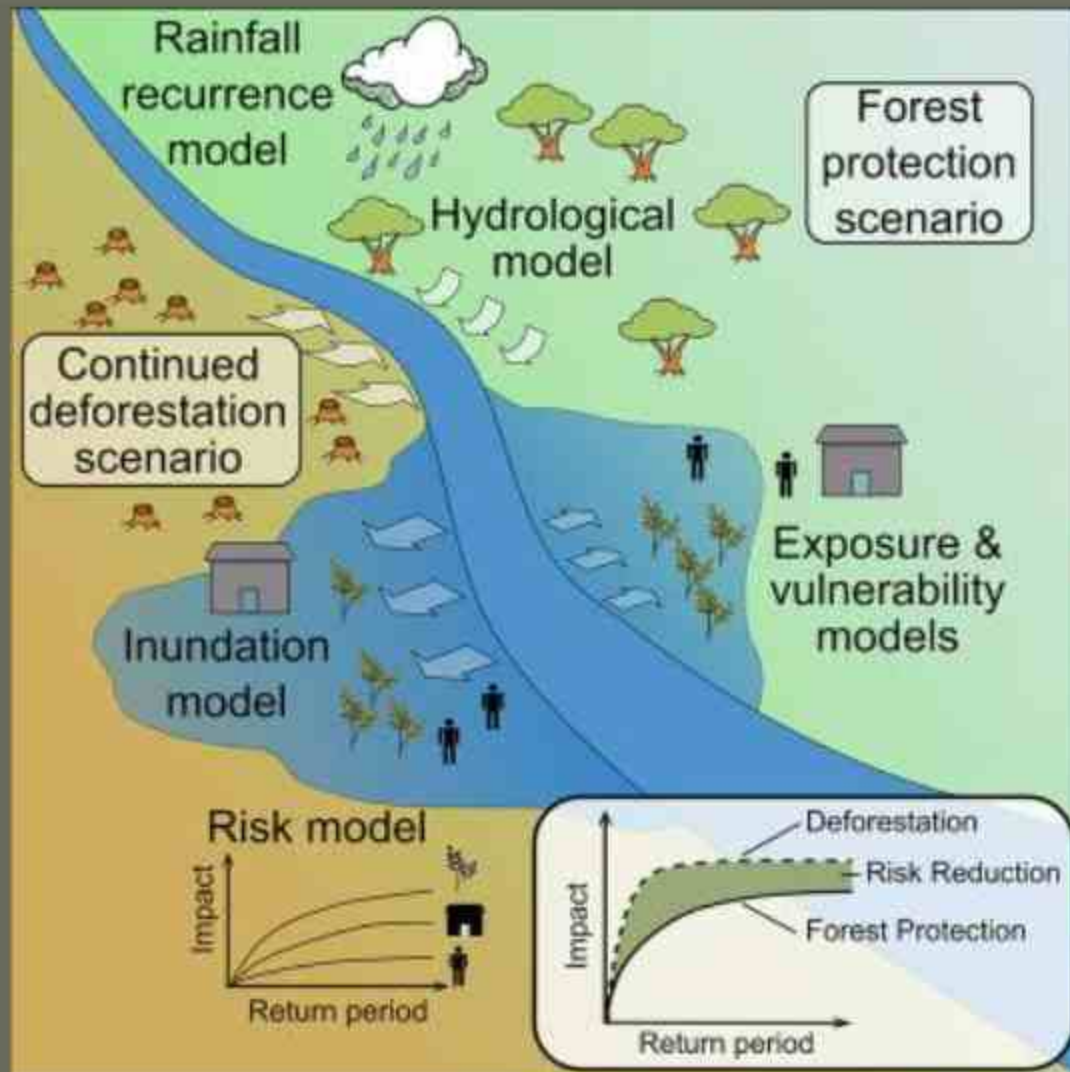
4

- Ecosystem degradation reduces the ability of natural ecosystems and impact of climate change related disasters

5

- Human conflicts can cause devastation to communities similar to the effects of natural hazards

# Eco-models for hydro-meteorological hazards





# Risk reduction benefits from protected ecological area

Hazard	Services provided by protected areas
Flooding	<ul style="list-style-type: none"> <li>• Provide space for floodwaters</li> <li>• Absorb impacts of floods with natural vegetation</li> <li>• Block sudden storm surges and sudden incursions of sea water (for coastal and marine ecosystems)</li> </ul>
Landslides and avalanches	<p><i>In certain circumstances:</i></p> <ul style="list-style-type: none"> <li>• Retain natural vegetation (e.g. forests) that helps to stabilize soil</li> <li>• Tree crowns reduce the uniform build-up of snow that triggers slippage</li> <li>• Slow the movement and extent of damage once slippage is underway</li> </ul>
Drought and desertification	<ul style="list-style-type: none"> <li>• Reduce pressure (especially grazing pressures) on land and thus reduce or slow down desert formation</li> <li>• Maintain populations of drought resistant plants to serve as emergency food during drought</li> </ul>
Fire	<ul style="list-style-type: none"> <li>• Limit human encroachment into the most fire-prone areas</li> <li>• Maintain traditional cultural management systems that apply ecologically sound and safe fire use and wildfire control</li> <li>• Protect intact natural systems with associated natural fire regimes that ensure short- to long-term ecosystem stability</li> </ul>
Hurricanes / typhoons	<ul style="list-style-type: none"> <li>• Mitigate floods and landslides</li> <li>• Buffer communities and assets against the impacts of storms (e.g. coastal and marine ecosystems can reduce the impact of storm surges and sudden incursions of sea water)</li> </ul>
Earthquakes	<ul style="list-style-type: none"> <li>• Prevent or mitigate against associated hazards especially landslides and rock falls</li> <li>• Provide zoning control to prevent settlement in the most earthquake prone areas</li> </ul>
Climate change and unpredictable events	<ul style="list-style-type: none"> <li>• Mitigate climate change-induced hazards and other extreme events, such as more frequent or intense flooding, droughts, wildfires, and worsening storm surges due to sea level rise</li> </ul>



# AMPHAN: Lessons Learnt

- The flooding during the aftermath of the Amphan was considerably lower in the houses along the vicinity of the mangrove plantation cover.
- The mangrove bio-shield checked the breaching of earthen embankments by 60% and led to lesser flooding.



# Damages due to Amphan



# Nona Swarna : Rice variety to adapt in saline soil condition

- Department of Agriculture, Govt of West Bengal took a noble initiative to introduce **NONA SWARNA** group of Paddy Varieties to check its adaptability in the saline water inundated areas of Sundarban blocks during post Amphan reformation period.

## Salient Feature of the Variety

1. It matures within 115-120 days.
2. Being rice variety with good puffing characteristic, it is suitable for puffed rice. Farmers and traders equally prefer this variety.





# Mangrove replantation in Sunderban Area

- ① **5 crore Mangrove** sapling planting in the coastal belts of West Bengal are being done till now for rebuilding the natural barrier of mangroves.



# Steps towards Disaster Risk Reduction : West Bengal scenario

- Vetiver Grass weaving in the slopes of embankments of the coastal belt and slopes of landslides in the hilly region





# Reforestation

- Reforestation measures in the western districts taken up for preventing flash flood situation.
- Dredging of the riverbed and reservoirs for desiltation
- Rain water harvesting is promoted by “ **Jal Dharo Jal Bharo**” programme.





*Towards Safe and Resilient State*

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Thank You

**Department of Disaster  
Management  
& Civil Defence**