

#### **Panel 5.2**

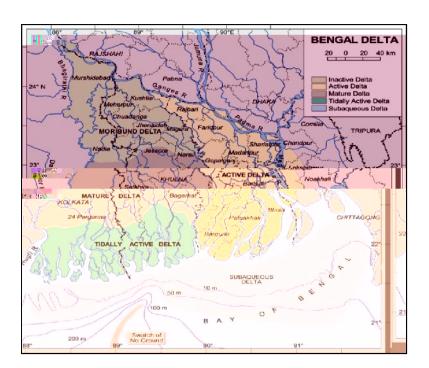
Barriers to Adaptation in socially vulnerable and marginalized groups

Human Vulnerability and barriers of adaptation to climate change in Indian Sunderbans Region: A critical assessment.

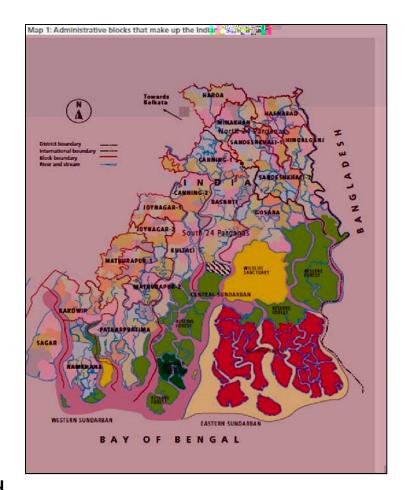
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#### Indian Sunderbans Regions

- Sunderbans Islands situated at the mouth of Bay of Bengal between India and Bangladesh, is a geographically challenged region of the world.
- Large scale weather anomalies has created <u>depletion of mangrove forest</u> and <u>loss of agricultural land</u> to the poor people.
- This depletion of mangroves has caused problems of high salinity, intense sunlight, frequent tidal inundation and storm surges.
- Vanishing of two big islands Bedford and Lohachara has displaced thousand of climate refugees and their inward migration is responsible for mangrove deforestation.



- □ Frequency of the cyclones has decreased but their severity has increased.
- □ Rainfall has considerably increased.
- More erratic within a span of ten years.
- ☐ The span of monsoon season has shifted.
- □ It is now delayed by 15 to 20 days.
- There is an increase in water level during high tide.
- Intrusion of saline water into the agricultural land results in loss of yield and creates risk to the farmers.
- Landless farmers are migrating in search of new lands.



# Land Loss in 10 most vulnerable Island in eight years of the last decade

SI. No.	Islands	2001 (In sq km)	2009 (In sq km)	Loss (In sq km)	% Loss
1	Dakshin Surrendernagar	44.336	42.015	2.324	5.23
2	Sagar	244.434	239.091	5.343	2.18
3	Namkhana	150.155	145.488	4.667	3.1
4	Moushuni	28.283	28.283	0.64	2.28
5	Ghoramara	5.339	4.564	0.774	14.52
6	Dalhousle	36.084	34.28	1.904	5.26
7	DhanchI	67.101	62.201	4.9	7.3
8	Bulchery	26.915	23.287	3.628	13.45
9	Phangaduani	31.316	26.159	5.157	16.44
10	Jambudwip	6.242	4.979	1.263	20.19
Cumula	ative land loss for ten Islands			30.6	

## Changes in the Land use patterns and land cover classes in Sunderbans between 2001 and 2009.

Source: Hazra, S, Samanta K, Mukhopadhyay A & Akhand A., Temporal Change Detection (2001-2008) Study of Sundarban (2010), School of Oceanographic Studies, Jadavpur University

SI.N o	Land use Land cover Classes	Year 2001 (in sq km)	Year 2009 (in sq km)
1.	Dense Forest	1655.878	1651.3275
2.	Saline Banks	38.93	74.7965
3.	<b>Agricultural Land</b>	2149.615	1691.246
4.	Water Body	232.888	<u>250.6531</u>
5.	Sand	8.0835	8.7664
6.	Reclaimed land from forest	14.512	12.644
7.	Swamp	14.847	20.41

### Critical and Neglected Groups:

Two types of environmentally induced migrants

- i) Rural illegal Bangladeshi migrants.
- ii) The village dwellers living near the coast, continuously migrating from one island to another.



## Demarcation of India-Bangladesh Border.





#### Barriers of Adaptation to Climate Change

- Illegal Bangladeshi migrants.
- This is creating burden to Indian Sunderbans Region where the population of the region is already above 4.1 million.
- The Population density of Indian Sunderban Region is above 1100 person/square kilometers.
- Problem of rehabilitation of environmental refugees where these refugees could be accommodated?
- Problem of <u>Land Scarcity</u>
- High level of illiteracy Lack of Knowledge of Climate Change.
- Lack of Community Participation Rate.
- People are migrating in search of jobs in the nearby cities- creating pressure in the urban areas.
- Problem in the <u>construction of embankment</u>.

## Construction of Embankments





## Projects carried out:

- How these environmental refugees could be added in the decision making process.
- What is the people's perception about climate change issues.
- Climate change adaptation so far done and what new things could be done.

#### Indigenous Adaptation Strategies:

- Mass Education- concept of climate change.
- Community Participation.
- Disadvantage of shrimp cultivation near the mangrove plantation.
- Agro-forestry method.
- Salt resistance crops.

- Alternative source of income- weaving, making mats, chairs and fans so that these money could be used in adaptation process.
- To hold back the rural population, is a major challenge for this area.
- Role of panchayat-Implementation of decentralised planning.

#### Saving the Sunderban Mangrove Ecosystem

- Having 2,118 sq km of total mangrove forest cover, the Indian Sunderbans have soaked in 4.15 crore tonnes of carbon dioxide, valued at around \$79 billion in the international market, researchers from the University of Calcutta said.
- The more such biomass is there on earth, the more CO<sub>2</sub> will be pulled from the atmosphere.
- This will ultimately result in controlling the rise of atmospheric temperature and the subsequent climate change.

#### Conclusions:

- Today the resource-base of Sundarbans is not able to sustain the lives and livelihood of people.
- An effective land and rehabilitation policy that will facilitate the process is needed.
- Research on new embankment technology and design.
- The most vulnerable group living in the embankments and along the banks – need to be shifted out urgently.
- Need wider research and network between civil society on impacts and vulnerabilities.
- Global funds are needed to pay for the incremental development cost — but the local and national governments and the civil society must ensure that funds are well directed and used efficiently to address the needs of the Sundarban.

Thank You

Questions.....