

***Integrated Assessment of Coastal
Zones:***

***Case Studies on Sea level rise,
Storms, Coastal Zones &
Livelihoods***

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Study Team***

Work Done So Far...in Natcom 1

- Assessed **vulnerability of the coastal zones to climate related natural hazards:**
 1. **Tropical cyclones,**
 2. **Sea level rise,**
 3. **Temperature and**
 4. **Precipitation**

The **trends and patterns** of these hazards were also analyzed
- The general pattern of **impacts of tropical cyclones on human socio-economic systems** in the coastal zones were studied and **analyzed these patterns for identifying the districts that are most vulnerable to the cyclones**

Work Done So Far...

- **Concept of exposure** and the **components of exposure** – viz. population and housing (classified by material of construction) are discussed in detail
- Survey of **literature on Vulnerability measurement**
- Methods of assessing vulnerability used in literature include:
 - **Historical Narratives**
 - **Statistical Analysis**
 - **GIS and Mapping techniques**
 - **Comparative analysis**

Work Done So Far...

- Discussion on the **socio-economic and geophysical features of the Indian coastline**, and some past assessments of the **key climate related issues** in the Indian coastal zones
- **Socio-economic dimension of vulnerability** was also covered
- The **socio-economic status** of a group is closely **linked to the adaptive capacity** of that particular group

Work Done So Far...

- The **variables considered** in this report for examining the socio-economic context of vulnerability were **infrastructure development** and **agriculture development** in the coastal zones
- We have been till now assessed the **vulnerability of regions (districts)** in the coastal zones of India
- The focus mainly was on the **macro level** and **vulnerability to current natural hazards**

Key Findings

- **Large variation in the extent of vulnerability** over the districts considered in the study
- **Clusters** in terms of **vulnerability indicators**
- The **clusters of districts of low infrastructure and demographic development** are also the regions of **maximum vulnerability**. The **most vulnerable districts** have a **low infrastructural availability and a high population density**. Hence any occurrence of extreme events is likely to be catastrophic in nature for the people
- The **growth in provision of infrastructure is very low** and is highly **outpaced by the growth rate of population**

Key Findings

- Factors contributing to social and economic vulnerability include: **rapid population growth, poverty, poor health, low levels of education, gender inequality, hazardous location and lack of access to infrastructure, resources and services, including knowledge and technological means**
- Vulnerability is derived from:
 - (i) **Exposure** to risks and shocks and
 - (ii) **Inability to manage** these risks and shocks (adaptive capacity) due to inadequate assets, infrastructure and social protection mechanisms (such as social insurance and assistance)

Work proposed:

- A more **comprehensive set of development indicators** are required for **assessing the generic adaptive capacity** in finer detail.
- **Identify event specific adaptation options** that suits the socioeconomic structure of a particular area.
- **Identify ways of merging adaptation policy with local developmental policies.**
- **Need to stress on impacts of climate variability.**

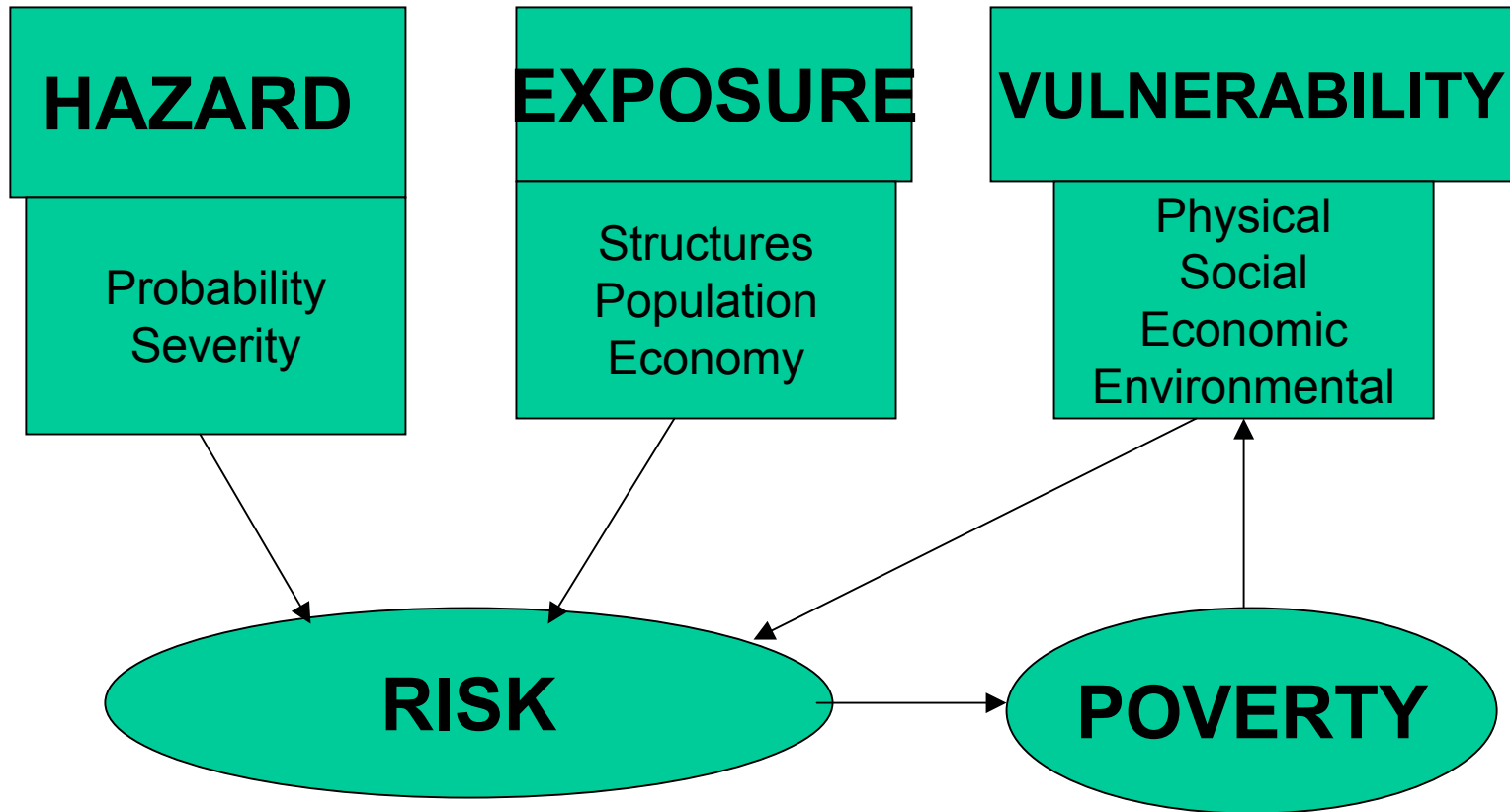
Also,

- **Development of scenarios:** Apart from climate scenarios essentially what is required is a socio-economic scenarios.
- These will be **critical for designing the adaptation options for reducing future vulnerability** to climate change.
- **Role of institutions** to be considered.

Data gaps and difficulties during NATCOM I:

- **Not all districts in the coastal zones considered** due to time and data constraints.
- **Limitations regarding the comparability of the districts** across states due to reallocation of district boundaries over time.
- **Vulnerability assessment confined to single extreme event; cyclones.**

Framework of Analysis



Proposed Work for NATCOM II

Like to **extend the study** by focusing on the following:

- **Impacts and vulnerability of households and the poor to current and future hazards**
- **Options for intervention**
- **Potential for adaptation**
- **Estimating the risk due to impacts of natural disasters and catastrophes on poverty**

Work for NATCOM II

- **Focus on coastal ecosystem**
- **Mapping and resource identification of the coastal zones** (including inland and marine ecosystem)
- **Inventory of livelihood** in the coastal ecosystem including agriculture, fisheries, aquaculture, mangroves, salt pan lands as climate change will have primary impact on livelihood which will in turn determine the vulnerability of the coastal populations.
- **Assessment of trends in poverty** in coastal zones
- **Identification of Institutions** (with a focus on adaptive rather than allocative efficiency).

NATCOM II Work for

- **Study existing risk management framework**
- **This includes risk reduction by mitigation as well as methods to transfer risk**
- **Macro impact of natural disasters and possible options of insurance as a measure to hedge against natural catastrophes.**
- **Shifting the focus to multiple rather than concentrating on one single extreme event.**

Work for NATCOM II

- **Refinement in the methodology of measuring present and future vulnerability and adaptations**
- **Identify various adaptation options**
- **Conduct a primary survey in the select vulnerable districts to enhance our understanding of the adaptation options and provide a comprehensive policy recommendation**

Possible Inputs from Remote Sensing & GIS Techniques

- The macro-level observations can be brought down to **micro-level (village level) study without sacrificing the areal coverage.**
- **Spatio-temporal analysis on the cadastral level for the last 20 years can be achieved.**
- **Hazard zone mapping, vulnerability mapping for single and multi-hazard events and scenario generation for future events can be done.**

... Inputs from Remote Sensing & GIS Techniques

- **Risk mapping** for element at risk like human resources, arable land and other important land use / land cover classes.
- **Resilience of society for hazards can be estimated** by integrating socio-economy data with outputs from hazard and vulnerability analyses.

Thank you