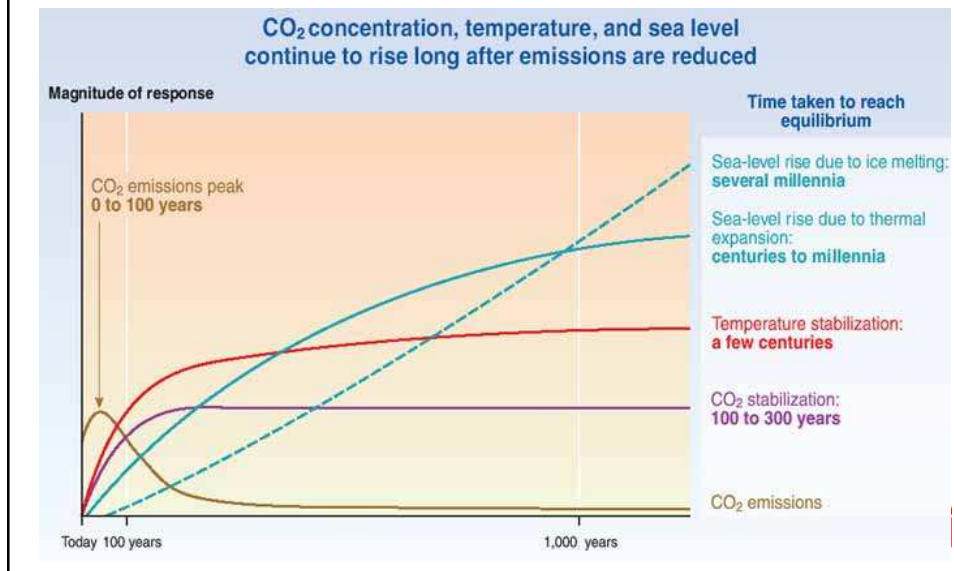


# Session on Climate Change

Suruchi Bhadwal, Associate Fellow TERI  
India Disaster Management Congress 2006



## Climate change: Time scales



## Summarized key observations: IPCC TAR

- Climatic changes not 'linear' but can observe abrupt behavior
- Drier areas to become more drier and wetter more wetter
- Increase in the frequency and intensity of extreme conditions like droughts and floods



## Addressing vulnerability to climate variability and change in India through an assessment of adaptation issues and options

- **Rationale:**
  - agriculture an important sector, sensitive to climate, millions dependent
- **Overall goal:**
  - Identify issues and opportunities that enhance the coping capacities of communities in dealing effectively with climatic extremes including droughts and floods
- **Timeframe:** started May 2005 (still continuing)
- **Funder:** World Bank
- **Partners:** TERI and RMSI Pvt. Ltd

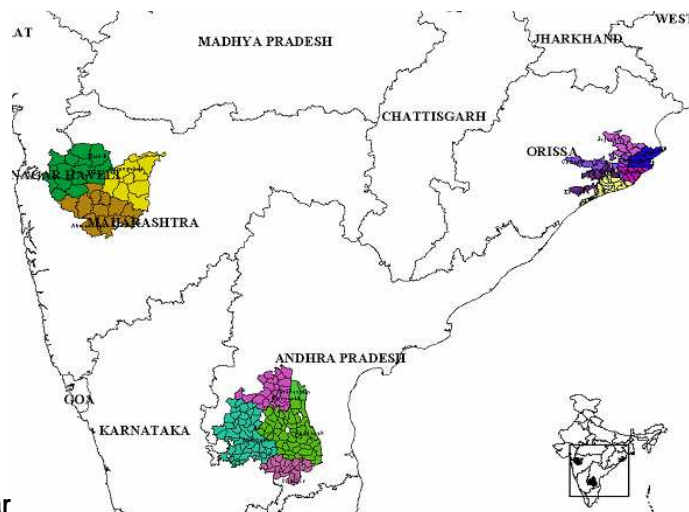


## Broad objectives

- Reviewing coping strategies being employed by communities in India and assessing issues and opportunities for adaptation
  - » study focus on drought and flood affected regions
  - » distinguish between reactive temporary mechanisms and measures for strengthening the adaptive capacities
  - » links with developmental aspects will be explored
- Assessing the effectiveness with which coping measures are being employed and the factors influencing their implementation
- Identifying/ suggesting measures to enhance adaptive capacities
  - » Incremental in nature than those currently being employed to cope during with such circumstances



## Study regions



### Preliminar

Pennar in Andhra Pradesh, Mahanadi in Orissa,  
Godavari in Maharashtra

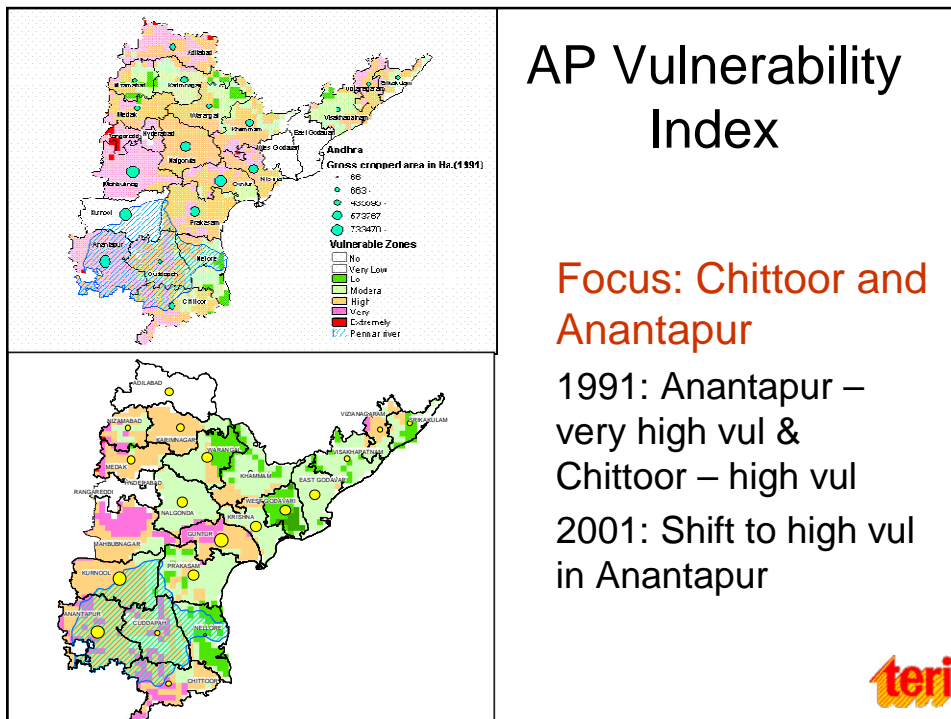


# GIS based quantitative analysis for selection of districts within sites

## Quantitative Indicators

<i>Physical vulnerability</i>	<i>Social vulnerability</i>	<i>Economic &amp; technological vulnerability</i>
1) Soil severity 2) Soil cover 3) Groundwater exploitation	1) Labourer/ Cultivator Ratio 2) Land under cultivation 3) Population density	1) Infrastructure Development 2) Irrigated area 3) Presence of agricultural credit societies

Principles, Criteria and Indicators Approach to quantitatively assess the vulnerability aspects



## Assessment of current coping and adaptation strategies

- Conduct case studies in selected districts
- Carry out case studies using PRA tools through field based surveys and institutional surveys



- Questionnaire-based survey
- Focused group discussions with small and marginal farmers
- One-to-one meetings with village heads and district administrative officers



## Impact indicators

	Jagatsinghpur	Puri
Income decline	Landless – 14 % Small – 22 % Medium – 34 % Large – 25 %	Landless – 25 % Small – 25 % Medium – 33 % Large – 26 %
Food intake decline (< 1 meal a day)	Landless – 4 % Small – 13 % Medium – 1 % Large: nil	Landless – 5 % Small: nil Medium – 3 % Large – 3 %
School drop-out rates	Landless – 23 % Small – 29 % Medium – 22 % Large – 7 %	Landless – 23 % Small – 14 % Medium – 45 % Large – 36 %
Displaced during flood	Landless: 50 % Small: 40 % Medium: 31 % Large: 33 %	Landless: 50 % Small: 70 % Medium: 51 % Large: 50 %
Farm flooded area	Landless – 19 % Small – 53 % Medium – 42 % Large – 30 %	Landless – 6 % Medium – 34 % Large – 47 %
Health expenditure	Increase from 4 - 22 % (across all land holdings)	Increase from 13 - 45 % (across all land holdings)



# Coping Strategies

- **Reactive Coping**
  - Change in cropping intensity
  - Credits/ loans
  - Shifting cattle and household
- **Proactive Coping**
  - Diversification to non-vulnerable income sources, tolerant crop varieties
  - House adaptation - platforms
  - Insurance
  - Access to Government programs



# Opportunities to diversify and well-being



## Differential capacities...anantapur



Sharp decline in water tables registered

Bore well installation is comparatively costly, water resources are unequally distributed in favour of wealthy landowners at the expense of small and marginal farmers. Region mostly rainfed



Normal water level

Normal water level

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## Factors influencing implementation of coping measures (%)

Influencing factors	Jagatsinghpur	Puri
Warning information	54	52
Community organization	40	24
Access to boats/nets	15	30
Government action in FPR	20	5
Government action in repairment	38	41
Land ownership	11	31

- 24 % reported dependence on Relief & Rehabilitation in Jagpur & 42 % in PURI

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## Numerous factors under play that determine adaptive capacity

- Physical factors
  - cropping pattern, crop diversification / shift to resistant varieties or tolerant crops
- Socioeconomic factors
  - asset ownership – land, house, cattle, pumpsets, tractors, tillers, threshers
  - access to public goods & facilities – banking, education and health services
  - infrastructural support – irrigation, markets, proper communication network
  - alternative employment options



## Issues

- Communities coping – but costs and impacts of events continue to be high.
- Vital role of government programs but many opportunities for synergizing and coordination
- How effective are different interventions?
- Can we manage adaptation better and how:
  - Infrastructure priorities
  - Agricultural adaptation
  - Income diversification



Thank you

