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**THE ROLE OF OFFICIAL STATISTICS IN MEASUREMENT
OF THE IMPACTS OF CLIMATE CHANGE: INDIAN
EXPERIENCE**

CLIMATE AND CLIMATE CHANGE...

- ✘ Intergovernmental Panel for Climate Change (IPCC) defines climate change as “a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or more)”

CLIMATE AND CLIMATE CHANGE...

- ✘ Climate change may results from:
 - ❖ Changes in the sun's intensity or slow changes in the Earth's orbit around the sun
 - ❖ Natural processes within the climate system such as changes in ocean circulation
 - ❖ Human activities that change the atmosphere's composition and the land surface

IMPACT ANALYSIS

- ✘ Different models are used to find the impact of climate change on economic development, livelihood and ecosystem
- ✘ Climate models at the global and regional scale are used to study and simulate variations in climate because of the human induced perturbation

FACTS

- ✘ Climate changes have affected a diverse set of physical and biological systems across the world
- ✘ Developing countries, in particular, are more vulnerable to the impacts of climate change
- ✘ Strong correlation between emissions per capita and income per capita
- ✘ India is one of the 'low' GHG per capita country in the world
- ✘ Climate change has multi-sectoral impact

COUNTRY REPORT

CONDITION OF CLIMATE

- ✘ In India, climate change could represent an additional stress on ecological and socioeconomic systems
- ✘ Surface air temperatures in India are going up at the rate of 0.4°C per hundred years
- ✘ Mean winter temperatures will increase by as much as 3.2°C in the 2050s and 4.5°C by 2080s, due to Greenhouse gases
- ✘ Summer temperatures will increase by 2.2°C in the 2050s and 3.2°C in the 2080s

CONDITION OF CLIMATE...

- ✘ Effect on the monsoons
- ✘ India will experience a decline in summer rainfall by the 2050s
- ✘ Can contribute to flood disasters in the Himalayan catchment
- ✘ A trend of sea level rise of 1 cm per decade has been recorded along the Indian coast
- ✘ Climate Change will adversely affect human health in India

DATA SOURCES

Ministry/Organisation/Institution name	Type of data
Indian Metrological Department	Cyclone warning and monitoring
Central Pollution Control Board	Air pollution
Ministry of Home Affairs	Damages due to heavy rain, flood

DATA SOURCES...

Ministry/Organisation/Institution name	Type of data
Geological Survey of India	Landslide
Central Water Commission	Flood forecasting
Central Bureau of Health Intelligence	Health

DATA SOURCES...

Ministry/Organisation/Institution name	Type of data
Ministry of Agriculture	Land use, soil erosion, drought, impact of extreme temperature on production
Central Statistical Organisation	Compendium of Environment Statistics
Ministry of Environment & Forest	Environment and forest related data

A New Initiative in India...

DISASTER STATISTICS DATABASE

REQUIREMENT OF DATABASE

- ✘ While some of the hazards and disasters are manmade but most of them occurs due to change in climate
- ✘ At present no database on hazards and disaster statistics exists in India
- ✘ A database of disaster and hazards can help researchers and policy makers to analyse the impact of climate more fruitfully
- ✘ It will also help in identifying the disaster prone areas

REQUIREMENT OF DATABASE...

- ✘ Realizing the need to develop a National database on hazards and disasters, the Central Statistical Organisation (CSO) of India has taken an initiative for developing a framework for compilation of hazards and disaster statistics on regular basis
- ✘ Central Statistical Organisation (CSO) and National Institute of Disaster Management (NIDM) is currently working on this database

THE DATABASE

- ✘ In India few scientific organizations like IMD, CWC, GSI are collecting hazard/disaster data
- ✘ Different organizations are using different formats and different geographical levels
- ✘ India is currently developing a uniform framework for compilation of Hazard and Disaster Statistics to get an overall picture of hazard/disaster profile of States and Districts on annual basis
- ✘ The District has been selected as primary unit for collection of data.

THE DATABASE...

- × There will be two sets of broad dataset
- × **Hazard Statistics**
- × **Disaster Statistics**
- × **Hazard Statistics** will include:
 - × Rainfall:- District-wise data on heavy and scant rainfall and comparison table with normal rainfall
 - × Tropical Depressions:-District-wise tropical depressions in all coastal districts

THE DATABASE...

- × Seismic Hazards:- Seismic data of all earthquakes with magnitude of 5 and above for districts in India and neighboring countries
- × Landslides:- Data on all reported landslides
- × Floods:- District-wise moderate, high and unprecedented floods, Data on reservoir levels of all major reservoirs in the country
- × Drought, Hailstorms, Pest Attacks :- District-wise data on drought, hailstorm and pest attacks

THE DATABASE...

- × Industrial Hazards:- Industrial/chemical accidents
- × Railway Hazards and Accidents:- Data on railway deaths, injuries and damages to railway infrastructure
- × Aviation Accidents:- Aviation accidents involving deaths, injuries and danger to infrastructure
- × Health Hazards: Important Public health hazards

THE DATABASE...

- ✘ Disaster Statistics will contain three parts:
Damage, Relief and Reconstruction
- ✘ **Damage** data has been classified into eight categories:
 1. Lives (deaths & injuries)
 2. Livestock (deaths)
 3. Agriculture (Sown area affected and production loss)
 4. Housing (full or partial damage)

THE DATABASE...

5. Infrastructure (damage to roads, bridges, water supply, sewerage system, irrigation, electric supply, shops/commercial buildings, other utilities)
6. Environmental Damage
7. Damage at macro-economic level
8. Health (occurrence of epidemic due to water borne and vector borne disease)

THE DATABASE...

- ✘ Data on **Relief** and **Rehabilitation** will cover the cost of relief and detailed mechanism of rehabilitation at district level

THE DATABASE...

Name of indicators/variables	Type
Rainfall, Tropical depression, Aviation accidents, Health hazards	Climate related environmental variables
Seismic hazards, landslides, Floods, Drought, Hailstorms, Pest attacks, Aviation accidents, Health hazards	Outcome of climate changes
Industrial hazards, Railway hazards	Neither climate related environmental variables nor an outcome of climate change

THE DATABASE...

- ✘ Linking these climate related variables and outcomes of climate changes to the data on damages, one can perform a detailed level analysis at the district level
- ✘ The effect on climate change on economic development, ecosystem and human lives can be analysed for different environmental zones using the detailed level data at district level

The challenge before us is not only a large one, it is also one in which every year of delay implies a commitment to greater climate change in the future.....