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Hazard and Disaster in India: Concept and Management

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vulnerability (inadequate access to resources, sick and old people, lack of awareness etc) maybe defined as....
"The extent to which a community, structure, services or geographic area is likely to be damaged or disrupted by the impact of particular hazard, on account of their nature, construction and proximity to hazardous terrains or a disaster prone area."

Risk is a "measure of the expected losses due to a hazard event occurring in a given area over a specific time period. Risk is a function of the probability of particular hazardous event and the losses each would cause."
The level of risk depends upon:

- Nature of the hazard
- Vulnerability of the elements which are affected
- Economic value of those elements

Hazard:

“A natural event that has the potential to cause harm or loss “
Asian Disaster Preparedness Center (ADPC).

"Those elements of the physical environment, harmful to man and caused by forces extraneous to him" (Burton et al 1978)

A Hazard is a threat. A future source of danger. It has the potential to cause harm to

- People - death, injury, disease and stress
- Human activity – economic, educational etc.
- Property - property damage, economic loss of
- Environment - loss fauna and flora, pollution, loss of amenities.

Some examples of hazards are earthquakes, volcanic eruptions, cyclones, floods, landslides, and other such events.

Disaster:

"A serious **disruption** in the functioning of the community or a society causing wide spread material, economic, social or environmental losses which exceed the ability of the affected society to cope using its own resources".

A disaster happens when a hazard impacts on the vulnerable population and causes damage, casualties and disruption. An earthquake is disastrous only when it affects people, their properties and activities.

A disaster is a of the combination of hazard and vulnerability

Thus, disaster occurs only when hazards and vulnerability meet.

The Difference Between Hazard & Disaster?

Well.... Lets put it this way:
All disasters are hazards, but all hazards are not disasters

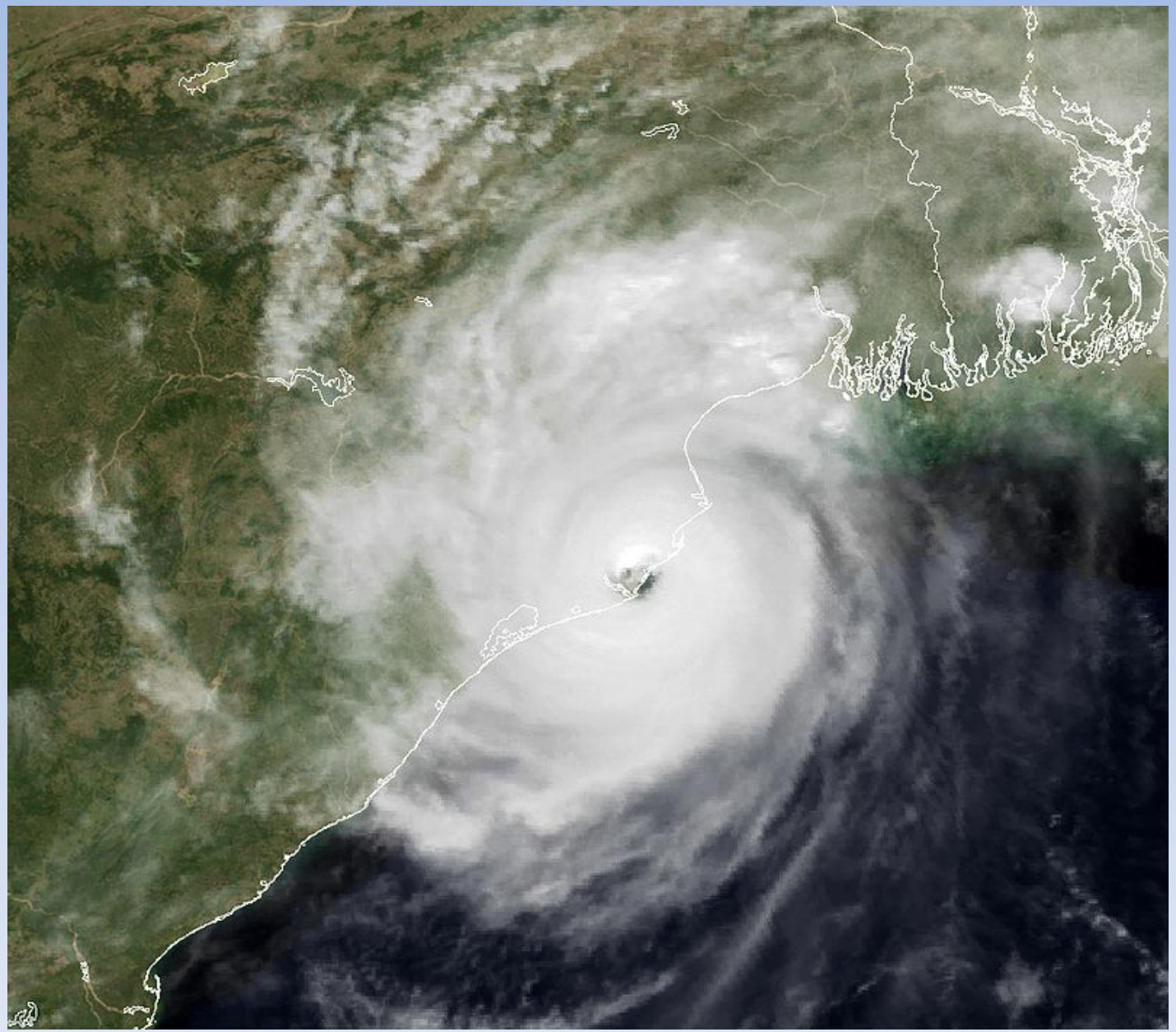
Types of Hazard

Types	Hazards	
Geological Hazards	1. Earthquake 2. Tsunami 3. Volcanic eruption	4. Landslide 5. Dam burst 6. Mine Fire
Water & Climatic Hazards	1. Tropical Cyclone 2. Tornado and Hurricane 3. Floods 4. Drought 5. Hailstorm	6. Cloudburst 7. Landslide 8. Heat & Cold wave 9. Snow Avalanche 10. Sea erosion
Environmental Hazards Biological	1. Environmental pollutions 2. Deforestation 1. Human / Animal Epidemics 2. Pest attacks	3. Desertification 4. Pest Infection 3. Food poisoning 4. Weapons of Mass Destruction
Chemical, Industrial and Nuclear Accidents	1. Chemical disasters 2. Industrial disasters	3. Oil spills/Fires 4. Nuclear
Accident related	1. Boat / Road / Train accidents / air crash Rural / Urban fires Bomb /serial bomb blasts 2. Forest fires	3. Building collapse 4. Electric Accidents 5. Festival related disasters 6. Mine flooding

Cyclone Catarina, USA, 2004

Odisha Super Cyclone, 1999

Winds of 260 km/h. Casualties: 10,



Earthquake at Bhuj, Gujarat, 2001

The earthquake killed between 13,805 and 20,023 people (including 18 in southeastern Pakistan), injured another 167, 000 and destroyed nearly 340,000 buildings

Forest Fire

Italy, Sicily, Lava flow from Stromboli volcano

2004 Tsunami in Thailand

Landslide

Flood in Kerala, India, 2019

Biological Disaster: Covid-19, 2019-ongoing

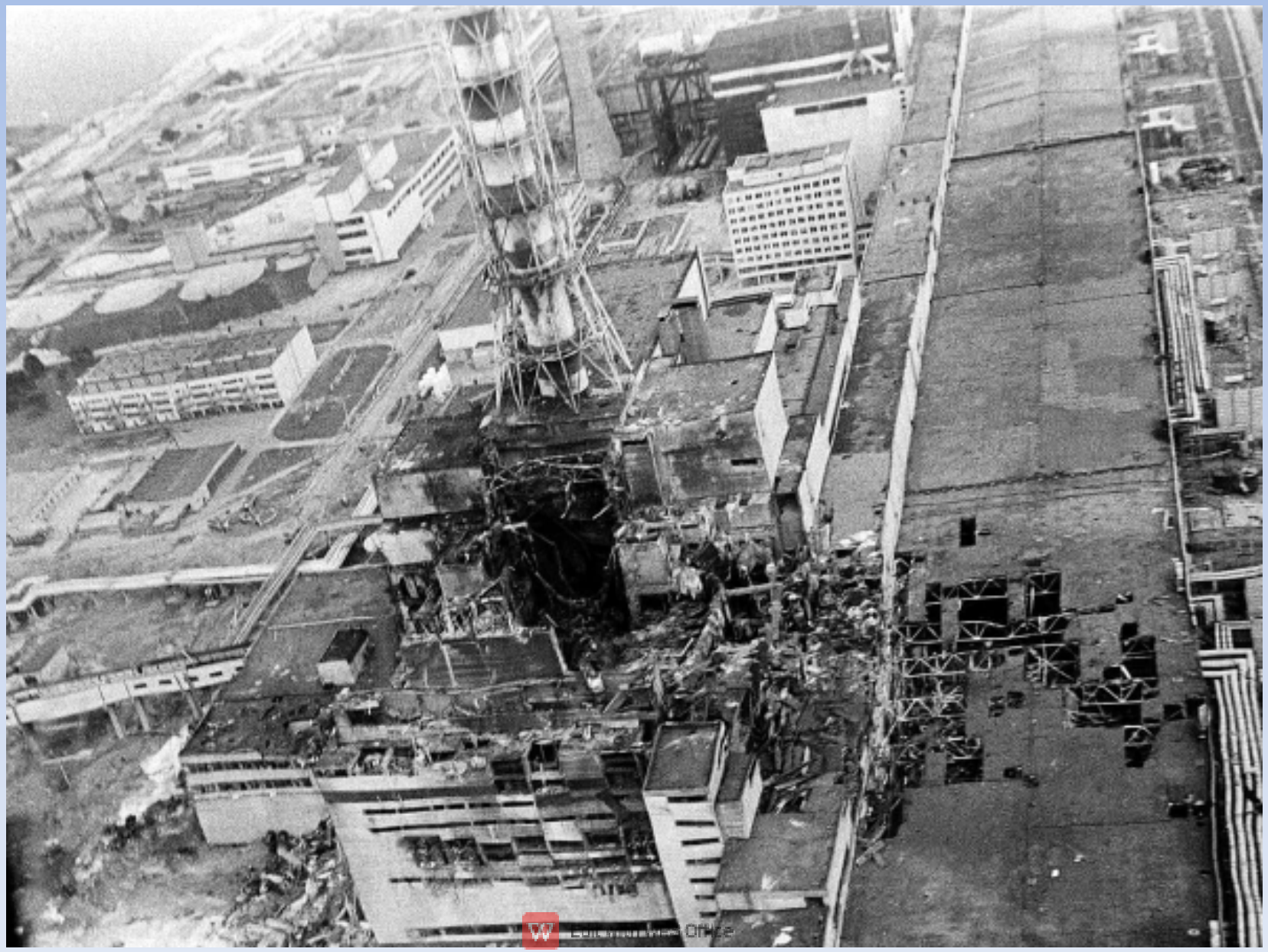
Infected: 20.8 crore, Death: 43.7 Lakh as on 17.08.2021

Worst in history: Black Plague-75-200 million causalty-1346-53

Avian Flu/Chicken Flu

Pest Attack, Jaipur, June, 2020

Chernobyl, Russia, 1986: Biggest Nuclear Disaster ever.



Bhopal Chemical Disaster, 1984

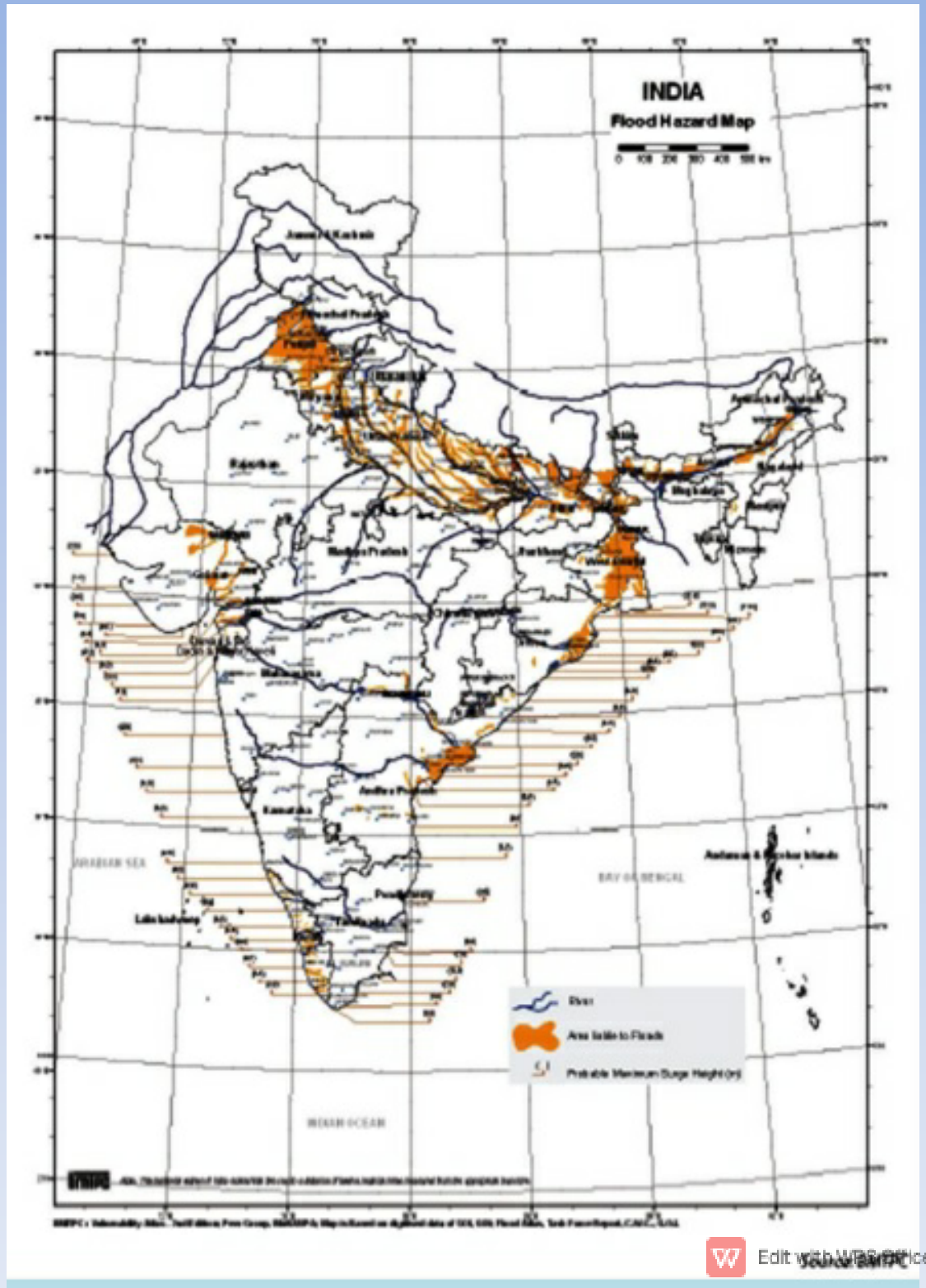
Allahabad Kumbh Mela Stampede, 2013

Before and after photographs of Uttarakhand Flash Floods, 2013

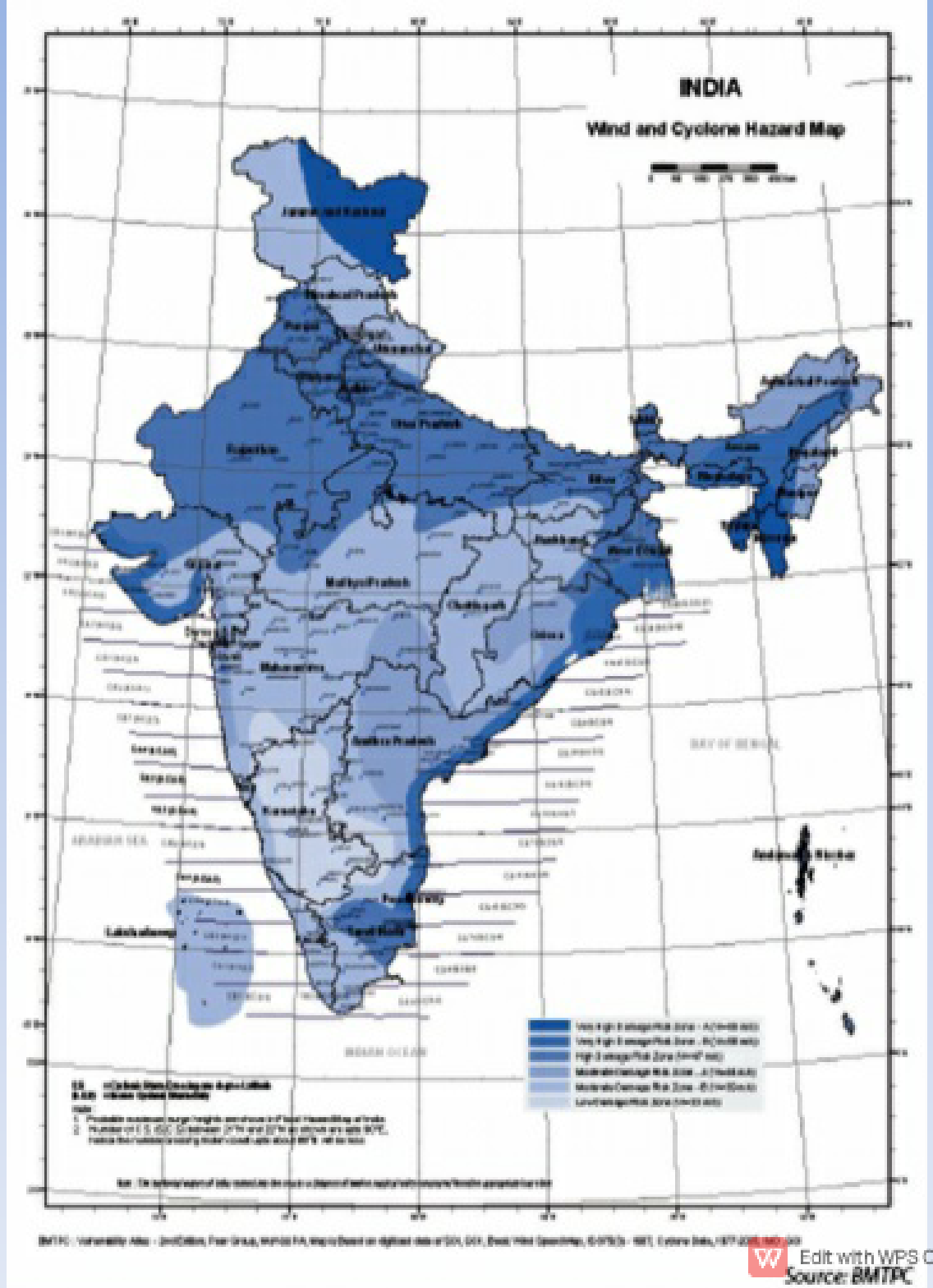
It affected 12 out of 13 districts of the state. Four districts were worst affected namely; Rudraprayag, Uttarkashi, Pithoragarh, and Chamoli. Number of deaths: 5,700+

Hazard and Disasters: Indian Context

India is one of the world’s most vulnerable countries. Infrastructure that mitigates socio-economic damage is needed. India is highly vulnerable to floods, cyclones, avalanches, heat/cold waves, landslides, lightnings, earthquake and droughts.

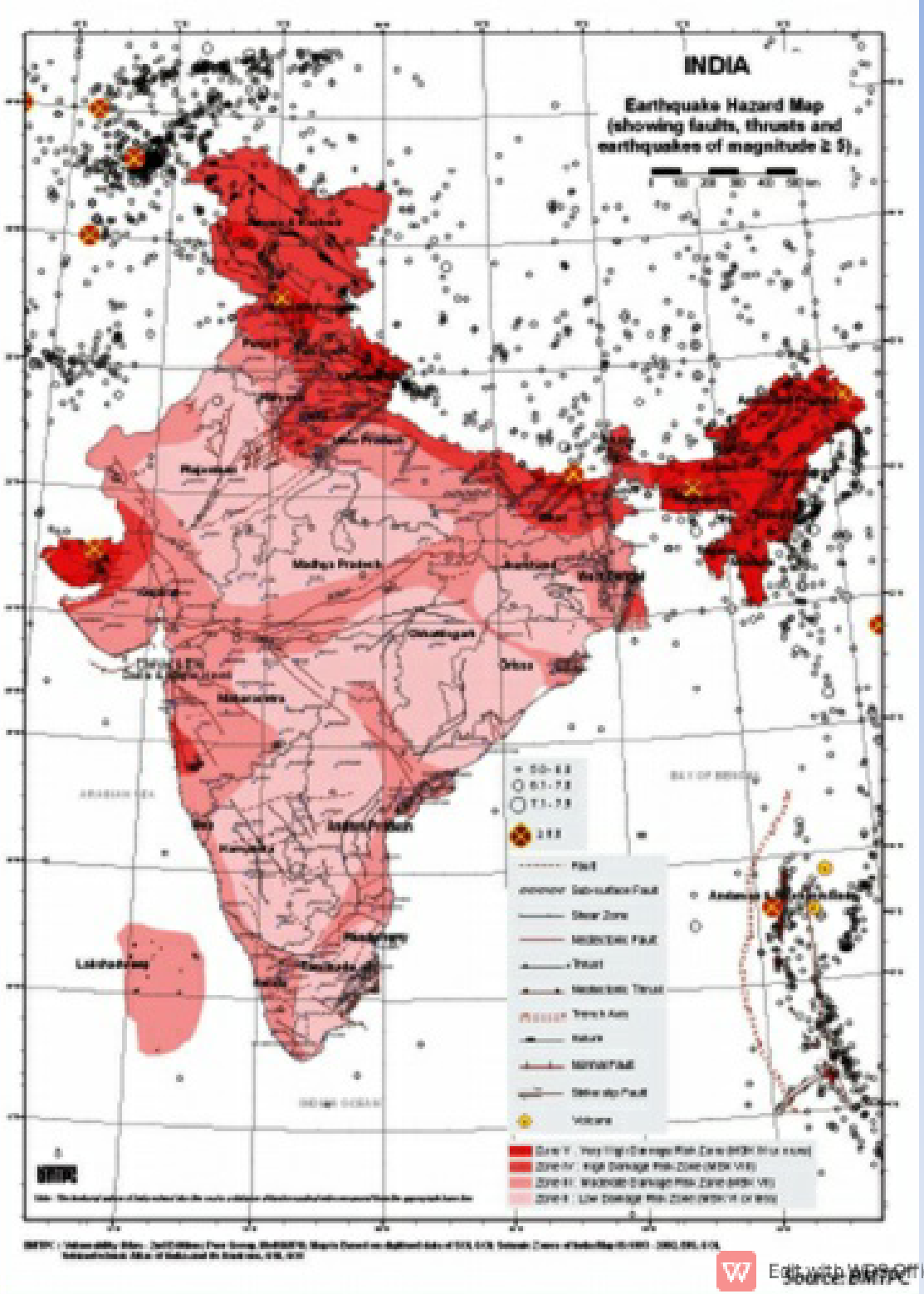


Flood Hazard Map of India

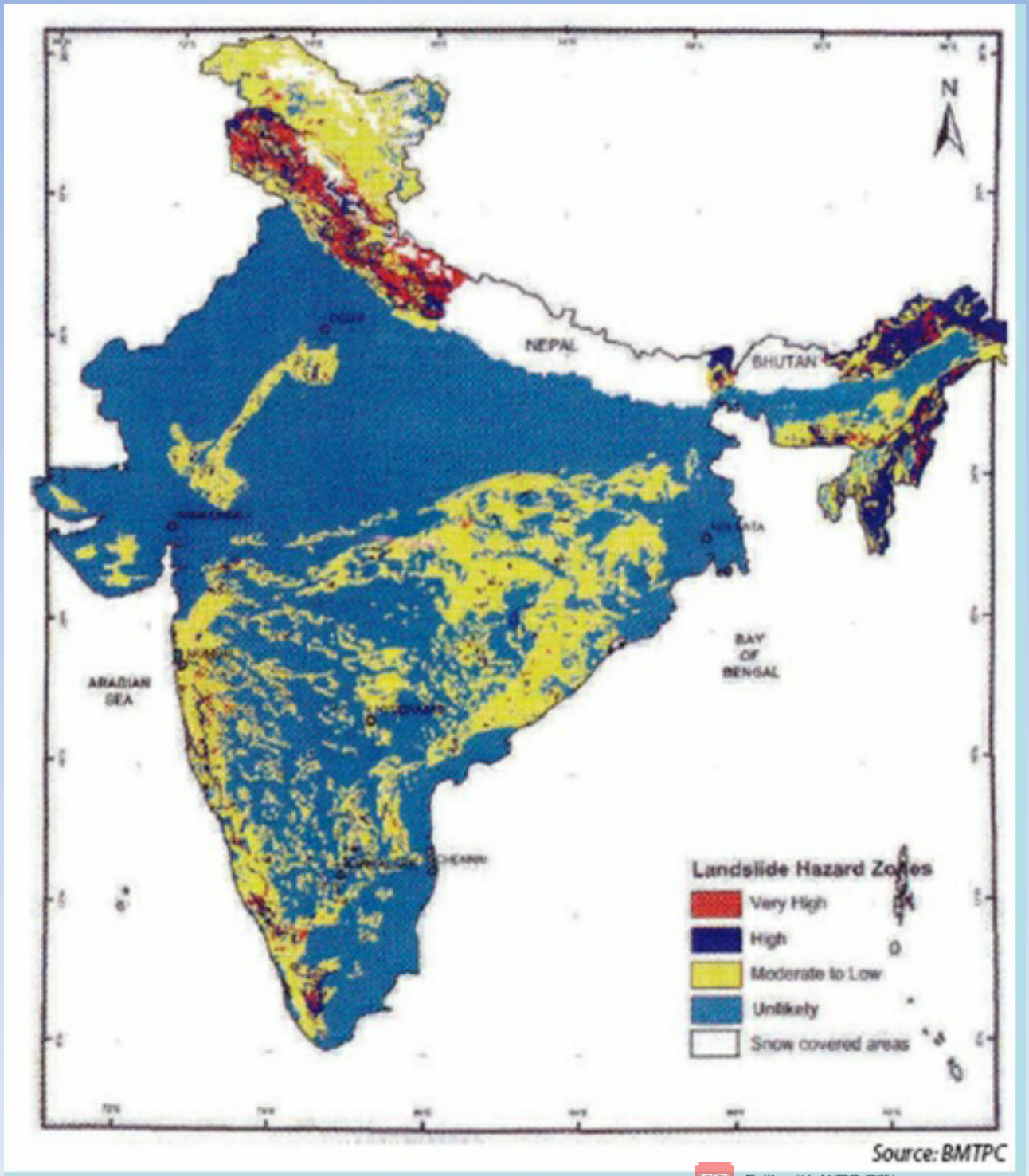


Wind and Cyclonic Hazard Map of India

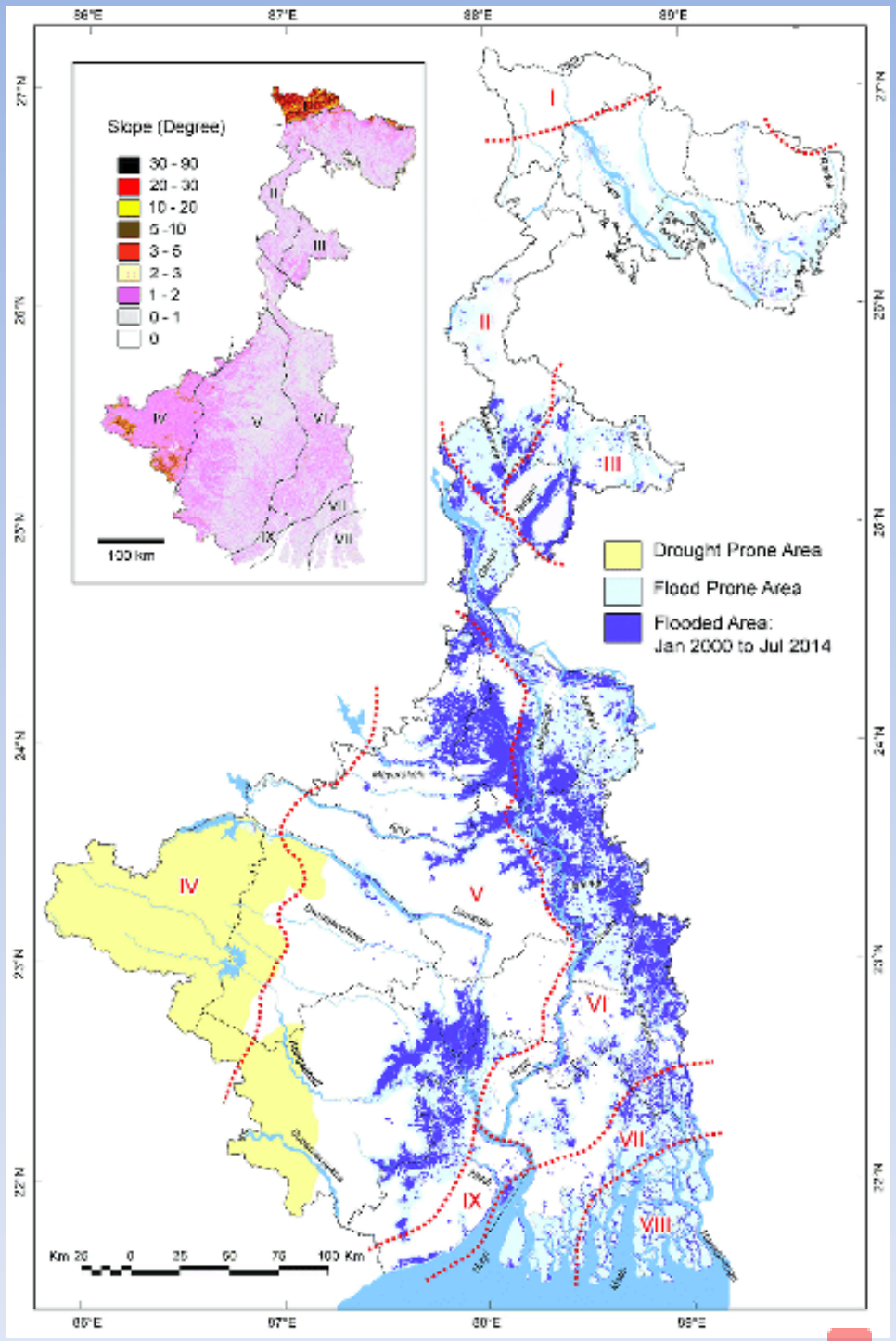
Source: BMTPC



Earthquake Hazard Map of India



Landslide Hazard Map of India



Flood and Drought Prone Area of West Bengal.

Source: Bandyopadhyay, Kar, Das & Sen, 2014

According to the National Disaster Management Authority,

❖around 40 million hectares of land in India is exposed to floods (around 12 per cent of the total land area).

❖68 per cent of land is vulnerable to droughts, landslides and avalanches.

❖58.6 per cent landmass is earthquake-prone, and

❖ tsunamis and cyclones are a regular phenomenon for 5, 700 km of the 7,516-km long coastal line.

Such vulnerable conditions have placed India amongst the top disaster-prone countries

Major disasters in India since 1970

Sl. No	Disaster	Impact
	Cyclone	
1	29th October 1971, Orissa	Cyclone and tidal waves killed 10,000 people
2	19th November, 1977, Andhra Pradesh	Cyclone and tidal waves killed 20,000 people
3	29th and 30th October 1999, Orissa	Cyclone and tidal waves killed 9,000 and 18 million people were affected
	Earthquake	
4	20th October 1991 Uttarkashi	An earthquake of magnitude 6.6 killed 723 people
5	30th September 1993 Latur	Approximately 8000 people died and there was a heavy loss to infrastructure
6	22 May 1997 Jabalpur	39 people dead
7	29th March 1997, Chamoli	100 people dead
8	26th January, 2001, Bhuj, Gujarat	More than 10,000 dead and heavy loss to infrastructure
	Landslide	
9	July 1991, Assam	300 people killed, heavy loss to roads and infrastructure
10	August 1993, Nagaland	500 killed and more than 200 houses destroyed and about 5kms. Road damaged.
11	18th August 1998, Malpa	210 people killed. Villages were washed away
	Flood	
12	1978 Floods in North East India	3,800 people killed and heavy loss to property.

Source: NCERT, 2006

Disaster Management Cycle:

1. Before a disaster (pre-disaster)
2. During a disaster (disaster occurrence).
3. After a disaster (post-disaster).

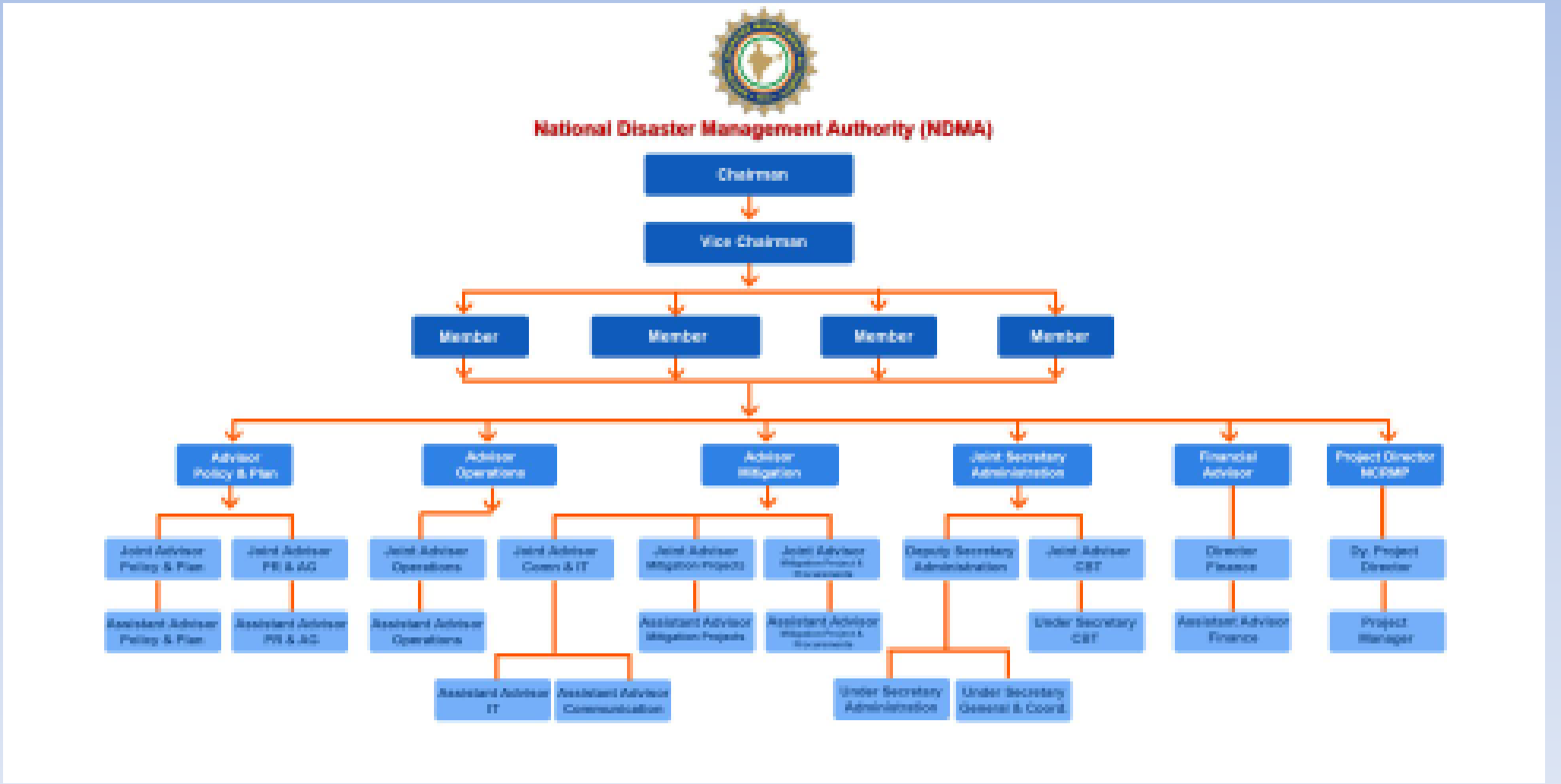
Disaster Risk Reduction can take place in the following ways.

1. **Preparedness**: This protective process embraces measures which enable governments, communities and individuals to respond rapidly to disaster situations to cope with them effectively.
2. **Mitigation**: Mitigation embraces measures taken to reduce both the effect of the hazard and the vulnerable conditions to it in order to reduce the scale of a future disaster. Therefore mitigation activities can be focused on the hazard itself or the elements exposed to the threat.

Basic principle of disaster management?

The basic principle of disaster management is to reduce the risk of a hazard turning into a disaster.

Disaster Management Authority of India



How NDMA Works?

Source: M. Ahmed

Disaster and Climate Change: Facts??

There is a general belief among the media and the public that more natural hazards will be triggered as a result of global warming. However, it is still a scientific question without reaching consensus regarding the linear relationship between natural hazards and climate change. It is believed that (e.g. Webster et al., 2005) the intensity but not the frequency of tropical cyclones might be enhanced in a warmer world. It is known that volcanic eruption can change climate temporarily (Wolfe, 2000) and research arecalled upon studying the effect of climate change on triggering volcanic activities (e.g. McGuire, 2009). On the other hand, there is no correlation at all between the frequency of earthquakes or tsunamis and climate change. It is illogical to link the number of man-induced hazards, e.

g. oil depot explosion, terrorist attack with climate change