18CEO307T – DISASTER MITIGATION AND ITS MANAGEMENT

Syllabus

Unit-1

INTRODUCTION TO DISASTER
(9 hours)

- Meaning, Nature, Importance of Hazard, Risk, Vulnerability and Disaster- Dimensions & Scope of Disaster Management - India’s Key Hazards – Vulnerabilities - National disaster management framework - Disaster Management Cycle.

Unit -2

NATURAL DISASTER (9 hours)

- Natural Disasters- Meaning and nature of natural disaster; their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion.

Unit -3

ANTHROPOGENIC DISASTER (9 hours)

- Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation and industrial waste water pollution.

Unit -4

APPROACHES IN DISASTER MANAGEMENT (9 hours) (9 hours)

- Pre- disaster stage (preparedness) - Preparing hazard zonation maps, Predictability/ forecasting & warning - Preparing disaster preparedness plan - Land use zoning - Preparedness through Information, education. Emergency Stage - Rescue training for search & operation - Immediate relief - Assessment surveys. Post Disaster stage – Rehabilitation - Social Aspect - Economic Aspect and Environmental Aspect.

Unit -5

DISASTER MITIGATION (9 hours)

- Meteorological observatory - Seismological observatory - Hydrology Laboratory and Industrial Safety inspectorate. Technology in Disaster Management - Emergency Management Systems (EMS) in the Disaster Management Cycle - Remote Sensing and Geographic Information Systems(GIS) in Disaster Management.

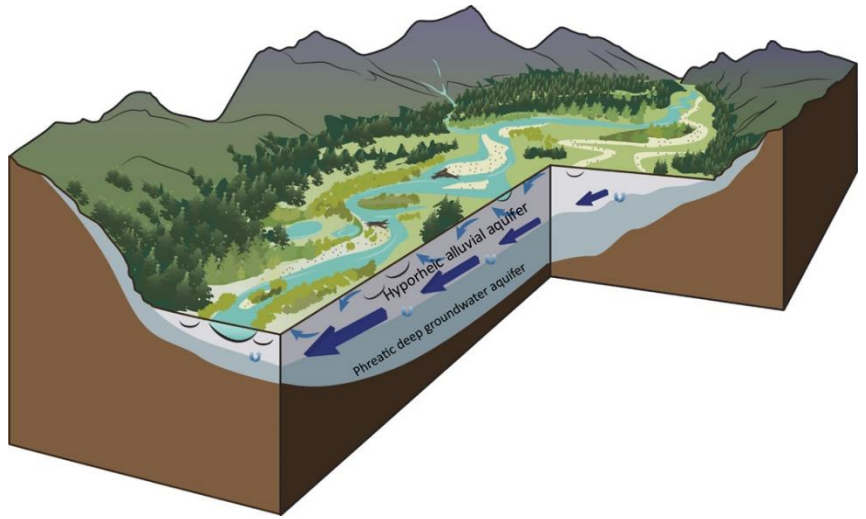
UNIT I - INTRODUCTION TO DISASTER

18CEO307T – DISASTER MITIGATION AND ITS MANAGEMENT

Disaster?

A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources.

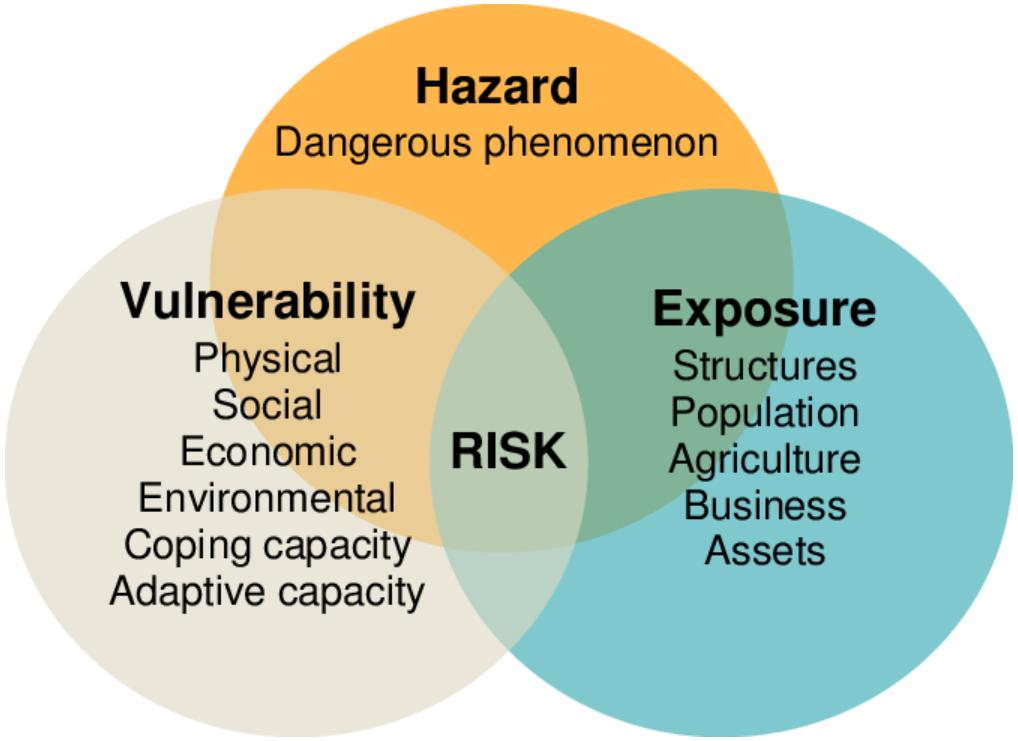
Hazard, Risk, Vulnerability and Disaster



Vulnerability is the inability to resist a hazard or to respond when a **disaster** has occurred

Hazard, Risk, Vulnerability and Disaster

A hazard can be defined as a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.



Hazards may be inevitable, but disasters can be prevented.

Vulnerability refers to the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

Exposure refers to people, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.

Types of Hazards

There could be many type of hazards:

- Water and Climate Hazards
- Geological Hazards
- Environmental Hazards
- Biological Hazards
- Chemical , Industrial and Nuclear Hazards

Water and Climate related disasters

- Floods and Drainage Management
- Cyclones
- Tornadoes and Hurricanes
- Hailstorm
- Cloud Burst
- Heat Wave and Cold Wave
- Snow Avalanches
- Droughts
- Sea Erosion
- Thunder & Lightning

Geologically related disasters

Earthquake

Tsunami

- Landslides and Mudflows
- Dam Failures/ Dam Bursts.
- Mine Fires

Biologically related disasters

- Biological Disasters and Epidemics
- Pest Attacks
- Cattle Epidemics
- Food Poisoning

Chemical, Industrial & Nuclear related disasters

- Chemical and Industrial Disasters
- Nuclear Disasters

Accident related disasters

- Forest Fires
- Urban Fires
- Mine Flooding
- Oil Spill
- Major Building Collapse
- Serial Bomb Blasts
- Festival related disasters
- Electrical Disasters & Fires
- Air, Road and Rail Accidents.
- Boat Capsizing.
- Village Fire

Dimensions of Disaster Management

- Disruption to normal pattern of life, usually severe and may also be sudden, unexpected and widespread
- Human effects like loss of life, injury, hardship and adverse effect on health
- Effect on social infrastructure such as destruction of or damage to government systems, buildings, communications and essential services
- Community needs such shelter, food, clothing, medical assistance and social care.

Disasters occur in varied forms

- Some are predictable in advance
- Some are annual or seasonal
- Some are sudden and unpredictable

Floods	Days and weeks
Earthquakes	Seconds/minutes
Cyclones	Days
Droughts	Months

DISASTER-EFFECTS

Deaths

Disability

Increase in communicable disease

Psychological problems

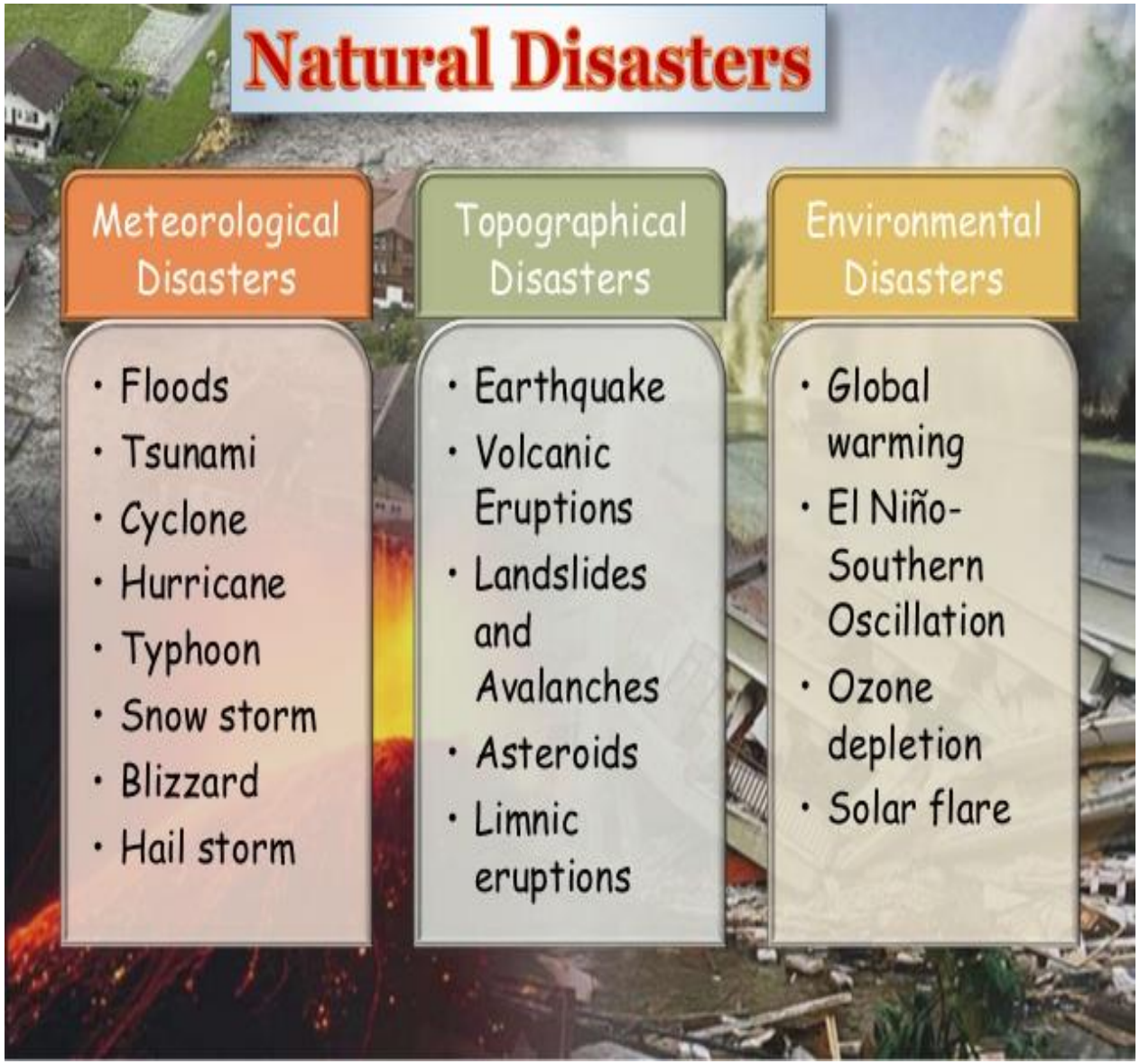
Food shortage

Socioeconomic losses

Shortage of drugs and medical supplies.

Environmental disruption


TYPES OF DISASTER
Natural Disasters
Meteorological
Topographical
Environmental
Man-made Disasters
Technological
Industrial accidents
Security related


Natural Disasters
Meteorological Disasters
• Floods
• Tsunami
• Cyclone
• Hurricane
• Typhoon
• Snow storm
• Blizzard
• Hail storm
Topographical Disasters
• Earthquake
• Volcanic Eruptions
• Landslides and Avalanches
• Asteroids
• Limnic eruptions
Environmental Disasters
• Global warming
• El Niño-Southern Oscillation
• Ozone depletion
• Solar flare


Man made Disasters
Technological
• Transport failure
• Public place failure
• Fire
Industrial
• Chemical spills
• Radioactive spills
Warfare
• War
• Terrorism
• Internal conflicts
• Civil unrest
• CBRNE

VULNERABILITY PROFILE OF INDIA


58 %


16%


12%

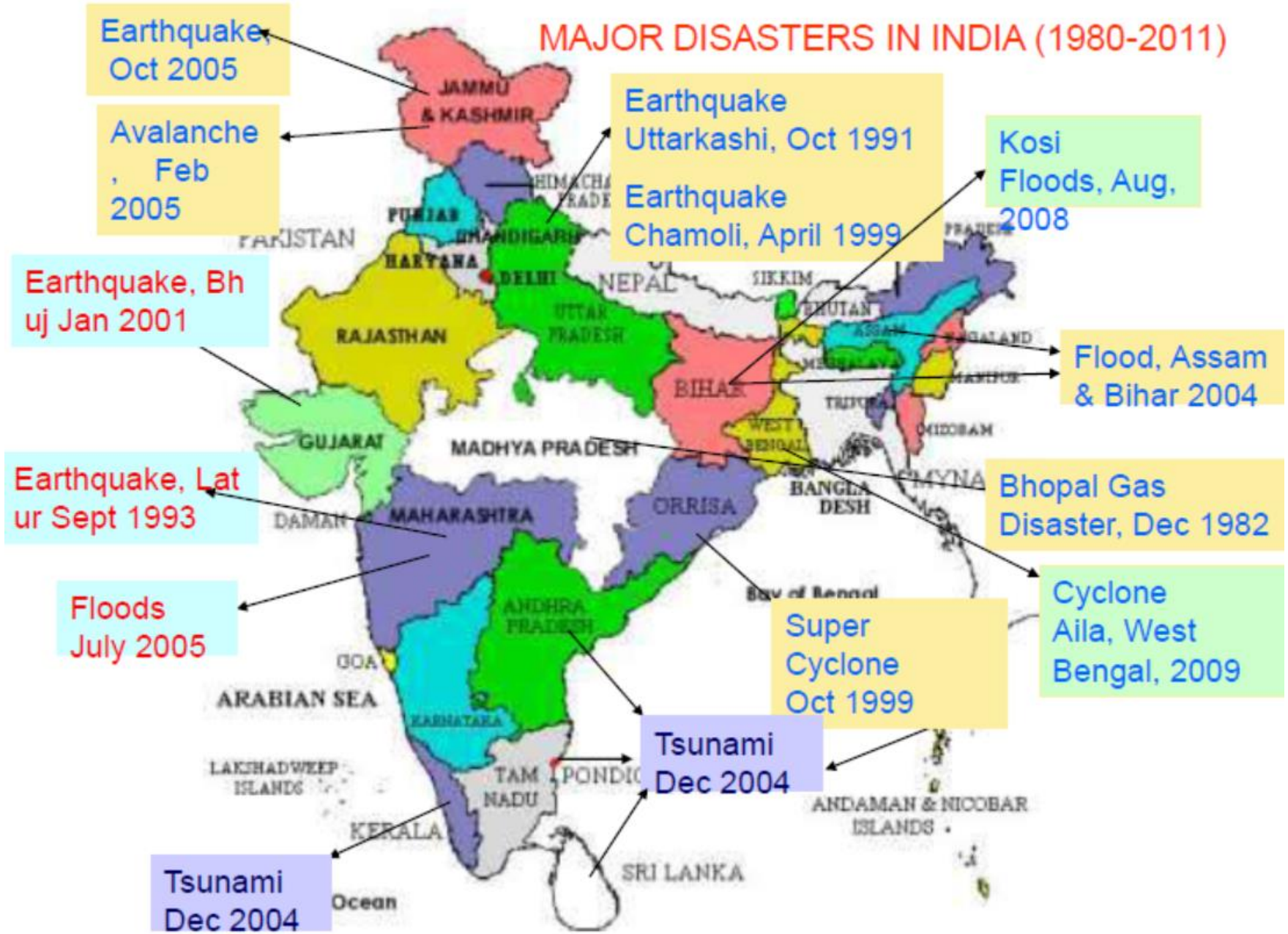

8%


3%

Major Disasters in India

- 1984 Bhopal Gas Tragedy
- 2001 Gujarat earthquake
- 2004 Indian Ocean tsunami
- 2008 Mumbai attacks

MAJOR DISASTERS IN INDIA (1980-2011)

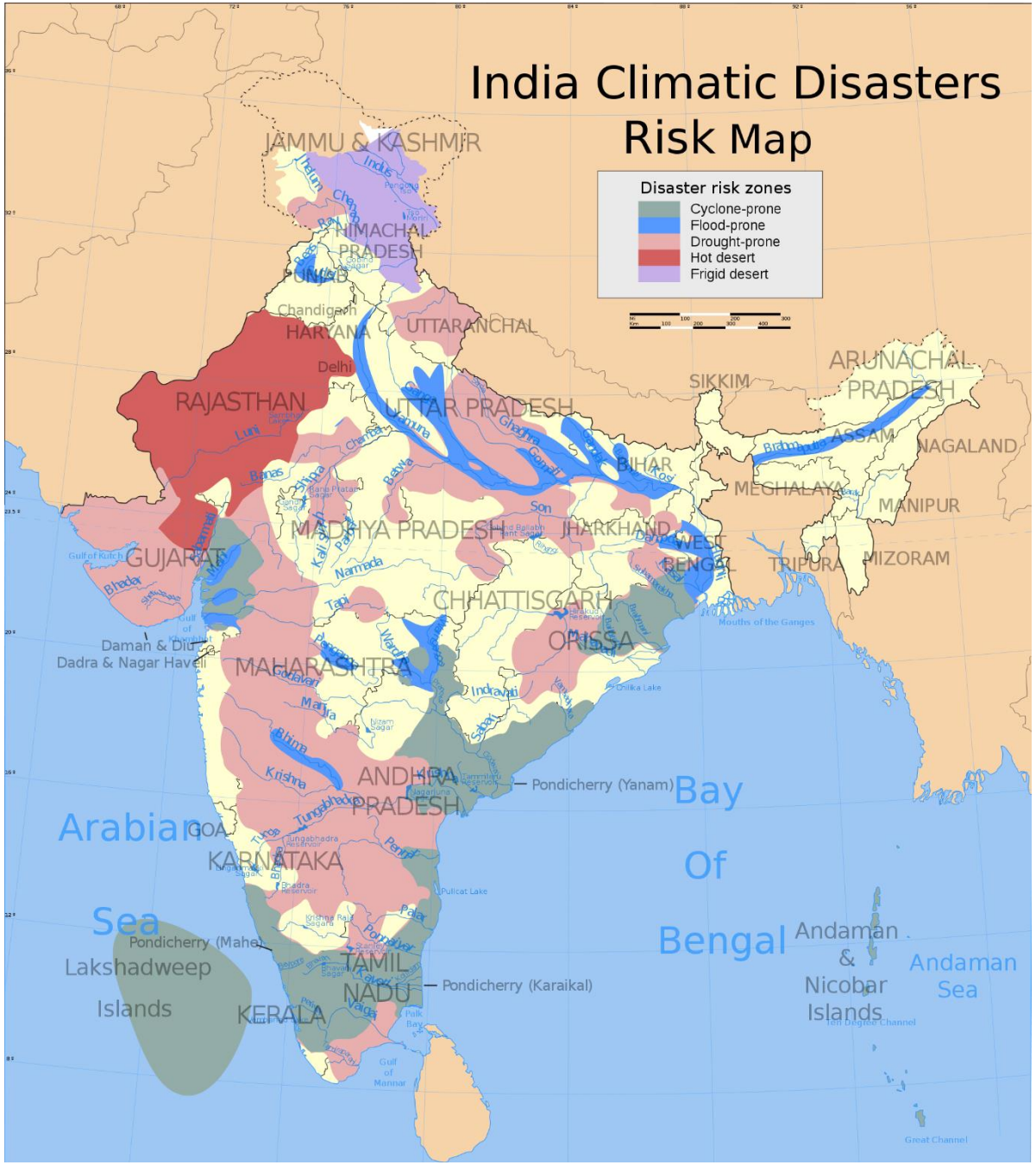


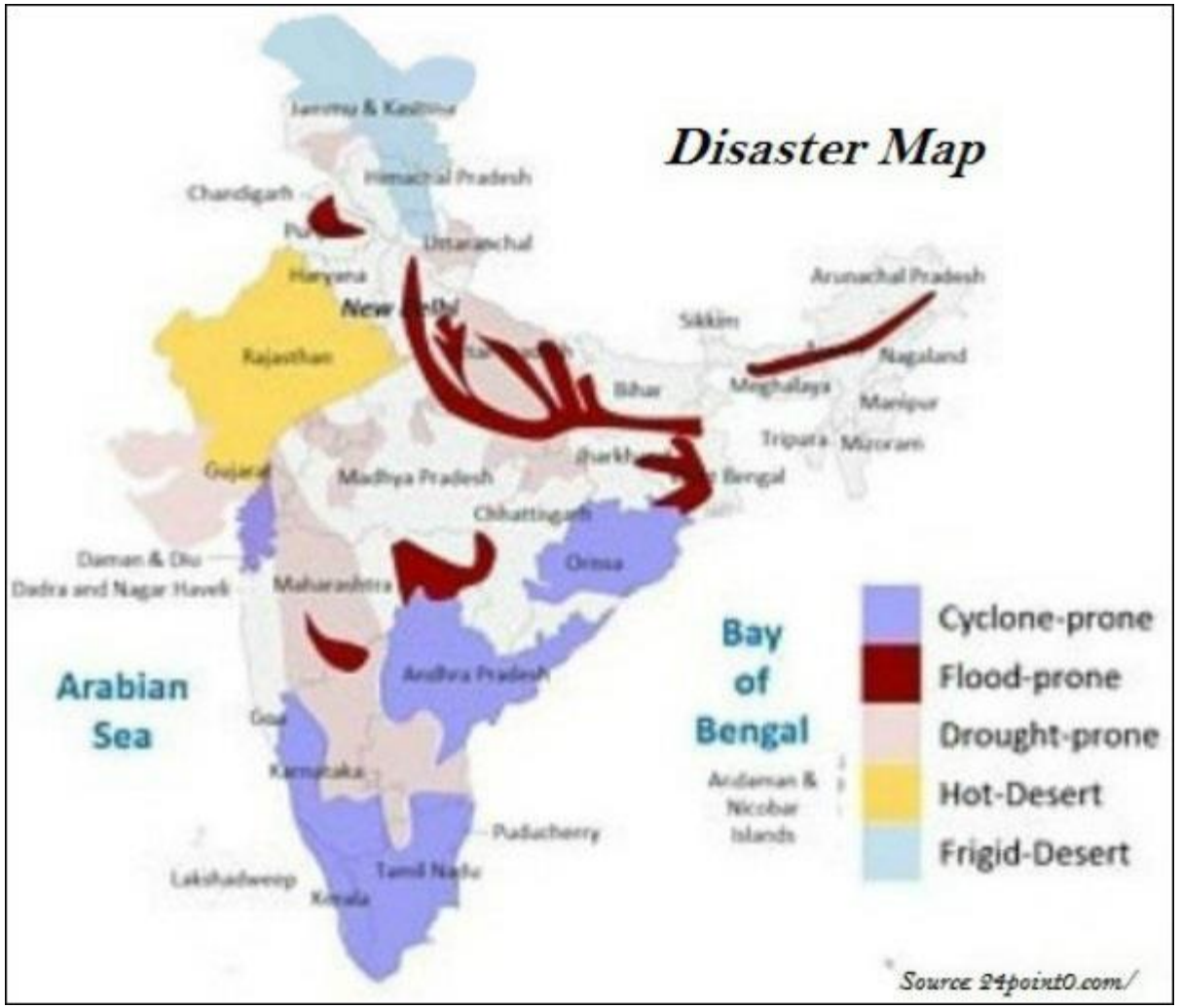
Major Disasters in India (last 40 years)

Sl. No.	Event	Year	State & Area	Effects
1	Drought	1972	Large part of country	200 million affected
2	Cyclone	1977	Andhra Pradesh	10,000 people & 40,000 cattle died
3	Drought	1987	15 states	300 million affected
4	Cyclone	1990	Andhra Pradesh	967 died & 435,000 acres land affected
5	Earthquake	1993	Latur, Maharashtra	7,928 people died & 30,000 injured
6	Cyclone	1996	Andhra Pradesh	1000 people died and 5,80,000 houses destroyed
7	Super cyclone	1999	Orissa	Over 10,000 deaths
8	Earthquake	2001	Bhuj,Gujrat	13,805 deaths, 6.3 millions affected

Major Disasters in India (last 40 years)

Sl.No.	Event	Year	State & Area	Effects
9	Tsunami	2004	Coastline TN, Kerala, AP, A&N islands & Puducherry	10,749 deaths and 5,640 missing, 2.79 Millions
10	Floods	July 2005	Maharashtra	1094 deaths 167 injured, 54 missing
11	Earthquake	2008	Kashmir	1400 deaths
12	Kosi floods	2008	North Bihar	527 deaths,19,323 cattle died
13	Cyclone	2008	Tamilnadu	204 deaths
14	Krishna floods	2009	Andhrapradesh & Karnataka	300 died
15	Flash flood	June 2013	Uttarakhand	5,700 deaths, 70,000 affected
16	Phailin Cyclone	Oct 2013	Coastline of Orissa, Jharkhand	27 died, 10,00,000 evacuations


India Climatic Disasters Risk Map
Disaster risk zones
Cyclone-prone
Flood-prone
Drought-prone
Hot desert
Frigid desert
JAMMU & KASHMIR
HIMACHAL PRADESH
PUNJAB
Chandigarh
HARYANA
Delhi
UTTARANCHAL
RAJASTHAN
UTTAR PRADESH
SIKKIM
ARUNACHAL PRADESH
ASSAM
NAGALAND
BIHAR
MEGHALAYA
MANIPUR
MADHYA PRADESH
JHARKHAND
WEST BENGAL
TRIPURA
MIZORAM
GUJARAT
CHHATTISGARH
ORISSA
Daman & Diu
Dadra & Nagar Haveli
MAHARASHTRA
ANDHRA PRADESH
Pondicherry (Yanam)
Arabian Sea
GOA
KARNATAKA
Bay Of Bengal
Pondicherry (Mahe)
Lakshadweep Islands
TAMIL NADU
Pondicherry (Karaikal)
KERALA
Andaman & Nicobar Islands
Andaman Sea


Disaster Map
Arabian Sea
Bay of Bengal
Cyclone-prone
Flood-prone
Drought-prone
Hot-Desert
Frigid-Desert
Source 24point0.com/

Elements at Risk

- **People**
- **Livestock**
- **Rural Housing Stock**
- **Houses Vulnerable**
- **Crops, Trees,Telephone, Electric poles**
- **Boats, Looms, Working Implements**
- **Personal Property**
- **Electricity, Water and Food Supplies**
- **Infrastructure Support**

Disaster Management

- Disaster management is the discipline that involves preparing, warning, supporting and rebuilding societies when natural or man-made disasters occur.
- It is the continuous process in an effort to avoid or minimize the impact of disasters resulting from hazards.

DISASTER MANAGEMENT

The body of policy and administration decisions and operational activities that pertain to various stages of a disaster at all levels.

An applied science which seek, by systematic observation and analysis of disasters, to improve measures relating to
prevention, mitigation, preparedness, emergency response and recovery.

Encompass all aspects of planning for and responding to disasters, including both pre and post disaster activities.

AIMS/ GOALS OF DISASTER MANAGEMENT

- Reduce (Avoid, if possible) the potential losses (lives & infrastructure) from hazards.
- Reduce the risks by timely measures, short-term and long-term policies
- Assure prompt and appropriate assistance to victims of disaster when necessary.
- Achieve rapid, effective, sustained & durable recovery & rehabilitation.

What is Disaster Management

Preparedness -- activities prior to a disaster.
Examples: preparedness plans; emergency exercises/training; warning systems.

Response -- activities during a disaster.
Examples: public warning systems; emergency operations; search and rescue.

Recovery -- activities following a disaster.
Examples: temporary housing; claims processing and grants; long-term medical care and counseling.

Mitigation - activities that reduce the effects of disasters.
Examples: building codes and zoning; vulnerability analyses; public education.

Disaster Management Cycle

1. **Preparedness:** Measures enabling govt orgs, communities and individuals to respond rapidly and effectively to disaster situations.
2. **Response:** Measures taken immediately prior to and following disaster impact.
3. **Recovery:** Process by which communities and the nation are assisted in returning to their proper level of functioning.
4. **Mitigation:** Measures aimed at reducing the impact of a natural or man-made disaster on a nation or community.

Response

- Includes actions taken to save lives, prevent damage to property, and to preserve the environment during emergencies or disasters.
- It is the implementation of action plans.
- Activities during disaster
- Public warning systems, emergency operations, search and rescue
- The response phase includes the mobilization of the necessary emergency services and first responders in the disaster area.

RECOVERY

Activities following a disaster

- Ex.. Temporary housing, claims processing and grants, long term medical care and counselling
- The aim of the recovery phase is to restore the affected area to its previous state.
- Includes actions that assist a community to return to a sense of normalcy after a disaster.

Mitigation

- Activities that reduces the effects of disaster.
- It reduces either the chance of a hazard taking place or a hazard turning into disaster.
- Mitigation efforts are attempts to prevent hazards from developing into disasters altogether or to reduce the effects of disasters.
- It focuses on long-term measures for reducing or eliminating risk.
- Mitigation measures can be structural or non-structural.
- It includes building codes; zoning and land use management; regulations and safety codes; preventive health care; and public education.

Mitigation

- Risk reduction

Anticipatory measures and actions that seek to avoid future risks as a result of a disaster.

- Prevention

Avoiding a disaster at the eleventh hour.

Includes activities which actually eliminate or reduce the probability of disaster occurrence, or reduce the effects of unavoidable disasters.

DISASTER PREPAREDNESS

Disaster preparedness aims at minimizing the adverse effects of a hazard

1. **Through effective precautionary actions**
2. **Ensure timely, appropriate and efficient organization and delivery of emergency response following the impact of a disaster**.

- Plans made to save lives or property.
- This phase covers implementation/operation, early
- Warning systems and capacity building

Disaster Preparedness Framework

COMPONENTS OF PREPAREDNESS		
Vulnerability Assessment	Planning	Institutional Framework
Information System	Resource Base	Warning Systems
Response Mechanisms	Public Education and Training	Rehearsals

Stages of Disaster Management Cycle

The cycle generally comprises four major stages:

1. **Disaster Prevention, Preparedness and Mitigation**
2. **Disaster Response and Immediate Relief**
3. **Disaster Rehabilitation, Reconstruction and Recovery**
4. **Long-term Development**

Disaster Management Continuum

pre-disaster phase

- Prevention
- Mitigation
- Preparedness

post-disaster phase

- Response
- Rehabilitation
- Reconstruction

Six elements that defines the complete approach to Disaster Management.