

18CEO307T:

DISASTER MITIGATION AND MANAGEMENT

**Dr. N.Pannirselvam,B.Tech, M.Tech, PGDCA, PhD., MS.c(REV),
F.I.E., M.I.C.I, M.IS.R.D, M.I.S.E, M.I.S.T.E, MIAENG.,**

Associate Professor,

Department of Civil Engineering,
SRM Institute of Science and Technology,
Kattankulathur - 603 203.
Mobile : +91-9976379998

E-Mail : pannirsn@srmist.edu.in; selvampannir@yahoo.com; profpannirselvam@gmail.com
<http://www.srmuniv.ac.in/engineering/dept-civil/faculty/dr-n-pannirselvam>

[Orcid.org/0000-0003-0776-0662](https://orcid.org/0000-0003-0776-0662)

[Scopus Author ID: 36069770900](#)

[WhatsApp: 7010168542](#)

Course Learning Rationale (CLR)

- CLR1: Understanding basic concepts of disaster and hazards of India.
- CLR2: Studying the various natural disasters.
- CLR3: Studying the various manmade disasters.
- CLR4: Understanding the disaster management principles.
- CLR5: Studying the modern techniques used in disaster mitigation and management.

Course Learning Outcomes (CLO)

- CLO1: Understanding basic concepts of disaster and hazards of India.
- CLO2: Acquire knowledge on the various natural disasters.
- CLO3: Acquire knowledge the various manmade disasters.
- CLO4: Understand the disaster management principles.
- CLO5: Appreciate the modern techniques used in disaster mitigation and management.

Open Elective Course

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Course Learning Rationale (CLR):					Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Understanding basic concepts of disaster and hazards of India.				1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CLR-2 :	Studying the various natural disasters.																					
CLR-3 :	Studying the various manmade disasters.																					
CLR-4 :	Understanding the disaster management principles.																					
CLR-5 :	Studying the modern techniques used in disaster mitigation and management.																					

Course Learning Outcomes (CLO):					Program Learning Outcomes (PLO)																		
CLO-1 :	Understand basic concepts of disaster and hazards of India.				3	85	80	H	H	-	-	M	-	-	-	-	-	-	-	H	H	-	
					Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
CLO-2 :	Acquire Knowledge on the various natural disasters.				3	90	85	H	H	-	-	H	-	-	-	-	-	-	H	H	-		
CLO-3 :	Acquire Knowledge the various manmade disasters.				2	85	80	H	H	-	-	H	-	-	-	-	-	-	H	H	-		
CLO-4 :	Understand the disaster management principles.				2	85	80	H	H	-	-	M	-	-	-	-	-	-	H	H	-		
CLO-5 :	Appreciate the modern techniques used in disaster mitigation and management.				3	80	70	H	H	-	-	H	-	-	-	-	-	-	H	H	-		

- Introduction – Definition
- Nature, Importance of Hazard
- Risk
- Vulnerability and Disaster
- Dimensions
- Scope of Disaster
- Characters of Disaster
- Phases of disaster management
- Effects
- Dynamics of Disaster
- India's Key Hazards Management
- Vulnerabilities
- National disaster management framework
- Disaster Management Cycle
- NDMA
- Disaster response
- Disaster management policy and plans
- Challenges in disaster response

- Natural Disasters
- Causes and nature of natural disaster
- Disaster types
- Effects of disaster
- Flood Disaster. causes and effect
- Drought-causes and effect
- Cyclone- Origin and effect
- Earthquakes and its impact
- Landslides- Causes and Impact
- Avalanches,
- Volcanic eruptions- Impact- Pollution
- Heat and cold waves
- Climatic change
- global warming
- Causes and Control
- Sea level rise
- ozone depletion
- Impact studies

- Anthropogenic disaster
- Man Made Disasters
- Nuclear disasters
- Radiation Damage
- Chemical disasters and Products
- Reactions and solutions
- Biological disasters-Sources and agents
- Impact of biological disasters
- Building fire–Impact and Mitigation
- Coal fire- Causes and Remedies
- Forest fire- Causes and control measures
- Oil fire
- Air pollution
- Causes and effect
- Water pollution- sources
- Effect of water pollution
- Deforestation
- Industrial waste water pollution

- Disaster management
- Components of DM
- Pre- disaster stage (preparedness)
- Preparing hazard zonation maps
- Predictability/ forecasting
- Warning system
- Preparing disaster preparedness plan
- Land use zoning
- Preparedness through information and education.
- Emergency Stage
- Rescue training for search and operation
- Immediate relief
- Assessment surveys
- Post disaster stage
- Rehabilitation
- Social aspects
- Economic aspects
- Environmental aspects

- Disaster Mitigation
- Mitigation Planning
- Empowerment and community-based mitigation.
- Response plan
- Functional plan
- Public health and Emergency services
- Meteorological observatory
- Seismological observatory
- Hydrology Laboratory
- Industrial Safety inspectorate.
- Technology in Disaster Management -
- Emergency Management Systems (EMS)
- Remote Sensing in Disaster Management
- GIS in Disaster Management
- Hazard specific Mitigation Plan
- Knowledge Dissemination
- Capacity building

Learning Assessment											
	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA - 1 (10%)		CLA - 2 (15%)		CLA - 3 (15%)		CLA - 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	40 %	-	30 %	-	30 %	-	30 %	-	30%	-
	Understand										
Level 2	Apply	40 %	-	40 %	-	40 %	-	40 %	-	40%	-
	Analyze										
Level 3	Evaluate	20 %	-	30 %	-	30 %	-	30 %	-	30%	-
	Create										
Total		100 %		100 %		100 %		100 %		100 %	

#CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	<ul style="list-style-type: none"> • Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why 	<ul style="list-style-type: none"> • Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate 	<ul style="list-style-type: none"> • Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Infer • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize 	<ul style="list-style-type: none"> • Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme 	<ul style="list-style-type: none"> • Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value 	<ul style="list-style-type: none"> • Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

INTRODUCTION



The term disaster means calamity or great misfortune.



WHO in 1990 gave a theme “Should disaster strike-Be prepared”



MIC leak in Bhopal was one greatest man-made disaster in the world.



Disaster causes too great load for normal medical & hlhs. Relief system of the district to cope with.



Multi-dimensional relief efforts & multi institutional approach is needed for its Mgt.

DEFINITION



Sudden and widespread disturbance of the social system of the community by some agent or event, over which, those involved have little or no control.



A sudden adverse or unfortunate extreme event or series of events which seriously disrupts normal activities.



A disaster is an event, located in time & space which produces the conditions whereby the continuity of the structure & processes of social units become problematic.



An overwhelming ecological disruption occurring on a scale sufficient to require outside assistance.

THE UNITED NATIONS DEFINITION

The United Nations defined Disasters as '*A serious disruption of the functioning of a community or a society causing widespread human, material, economic and environmental losses which exceed the ability of the affected community/society to cope using its own resources*' (UNDP)

ELEMENTS OF RISK

Hazard X Vulnerability = Risk

(Mostly Natural)
(Consequence)

Geological
Death/Injury

Hydrological
Loss

Meteorological
Social Loss

(Man and Built Env.)

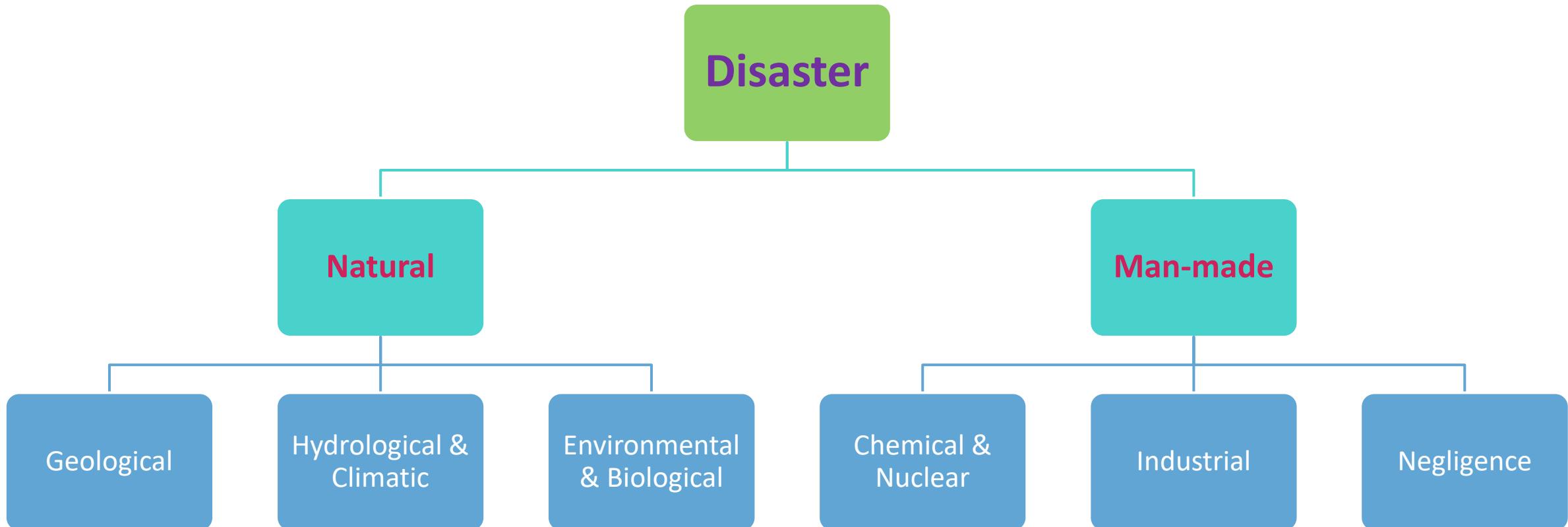
Physical

Social/ Cultural

Economic

Financial

MAIN COMPONENTS OF DISASTER



VULNERABILITY ASSESSMENT

Physical vulnerability

Social Vulnerability

Economic vulnerability

Environmental vulnerability

EFFECT OF DISASTERS



DEATHS



SEVERE INJURIES
REQUIRING
EXTENSIVE CARE.



INCREASED
COMMUNICABLE
DISEASES(POTENTI
AL INCREASE IN
TRANSMISSION OF
DISEASE)



FOOD SCARCITY.



POPULATION
DISPLACEMENT.



INITIAL REACTION
AMONG THE
SURVIVORS IS
SHOCK



EXPOSURE TO
CLIMATE, FOOD/
CROPS MAY GET
DAMAGED,
ANXIETY/NEUROSIS &
DEPRESSION

SCOPE OF DISASTER MANAGEMENT

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

STAGES OF DISASTER MANAGEMENT



Warning stage: When meteorological, seismological and other forecast are made e.g. few Hrs. to 48 Hrs. before cyclone & a week before floods.



Stage of hlhs& medical relief: It is most crucial phase of disaster Mgt.to prevent further disaster of the survivors.



Stage of Impact: Time during which disaster actually strikes.



Rehabilitation stage: In their original settings



Stage of rescue operations: Should be completed efficiently not taking more than 2-3 days.

INDIA'S KEY HAZARDS



About 58.7% of total land mass is prone to earthquake of moderate to very heavy intensity



12% to 15% land mass is prone to flood and 68% land mass is prone to drought



Close to 5700km out of 7600km coastline is threatened by cyclones

DISASTER MANAGEMENT FRAMEWORK

To make Disaster Management an integral part of National Development Agenda.

To promote Human Resource Development in Disaster Management (master plan for training and capacity building).

To establish multi-hazard preparedness, mitigation and prevention plans at all levels.

To promote Awareness and Education in Disaster Management.

To develop Institutional Frameworks at the National and State levels for mainstreaming disaster management.

To enhance capacities at all levels for multi-hazard preparedness and response.

THE WHITE ELEPHANT

THE DISASTER MANAGERS

- Cabinet Committee on Management of Natural Calamities
- Cabinet Committee on Security



MINISTRIES/DEPARTMENTS/ORGANISATIONS THAT ASSIST THE SDMAs

- Ministries & departments of states
- State police
- State disaster response force
- Fire services
- Central forces



संघीय नियमों
CENTRE: NDMA

**STATE-LEVEL:
SDMAs***

**DISTRICT-LEVEL:
DDMAs****

LOCAL AUTHORITIES

MINISTRIES/DEPARTMENTS/ORGANISATIONS THAT ASSIST THE NDMA

- Planning Commission
- National Crisis Management Committee
- Home ministry
- Armed forces
- Central paramilitary forces
- National disaster mitigation resource centres



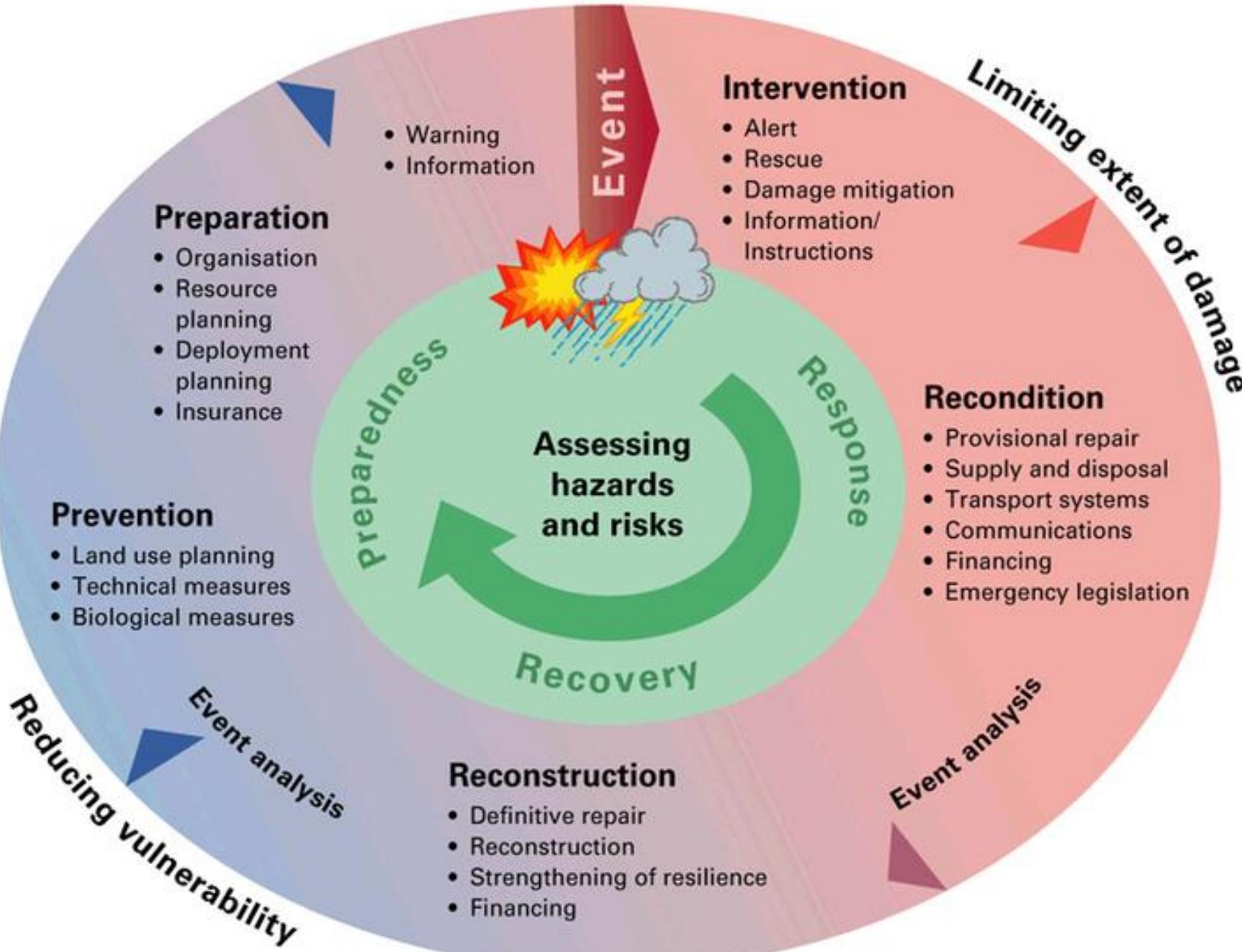
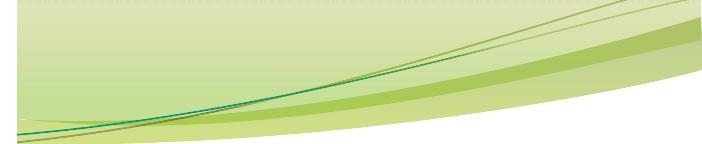
MINISTRIES/DEPARTMENTS/ORGANISATIONS THAT ASSIST DDMAs/LOCAL AUTHORITIES

- Home Guards
- Civil Defence
- NCC/NSS



DISASTER MANAGEMENT FRAMEWORK

- DM Act 2005
- NDMA
- NIDM
- NDRF



DISASTER MANAGEMENT CYCLE

GOVERNMENT OF INDIA – DM PLAN

- Sendai Framework for Disaster Risk Reduction (SFDRR)
- Sustainable Development Goals (SDGs)
- Paris agreement on Climate Change at 21st Conference of Parties (COP21), under the United Nations Framework Convention on Climate Change

MAJOR INSTITUTIONS

NDMA

NIDM

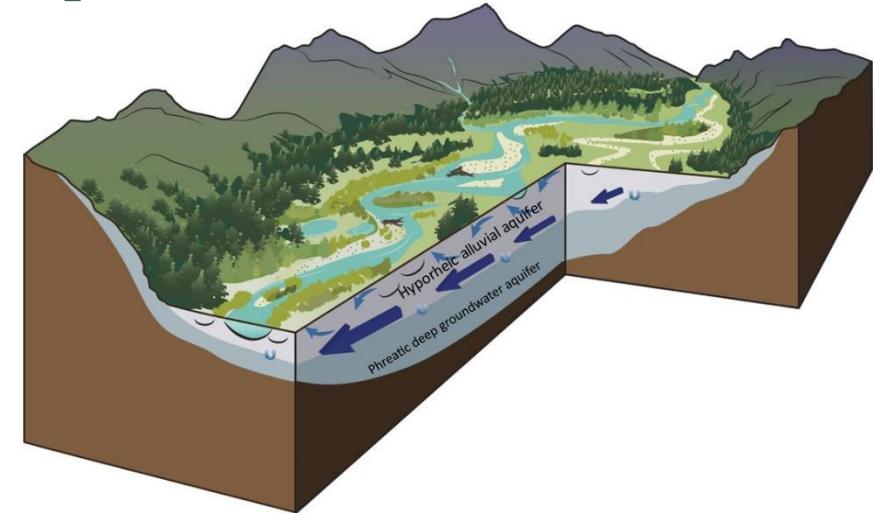
NDRF

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.



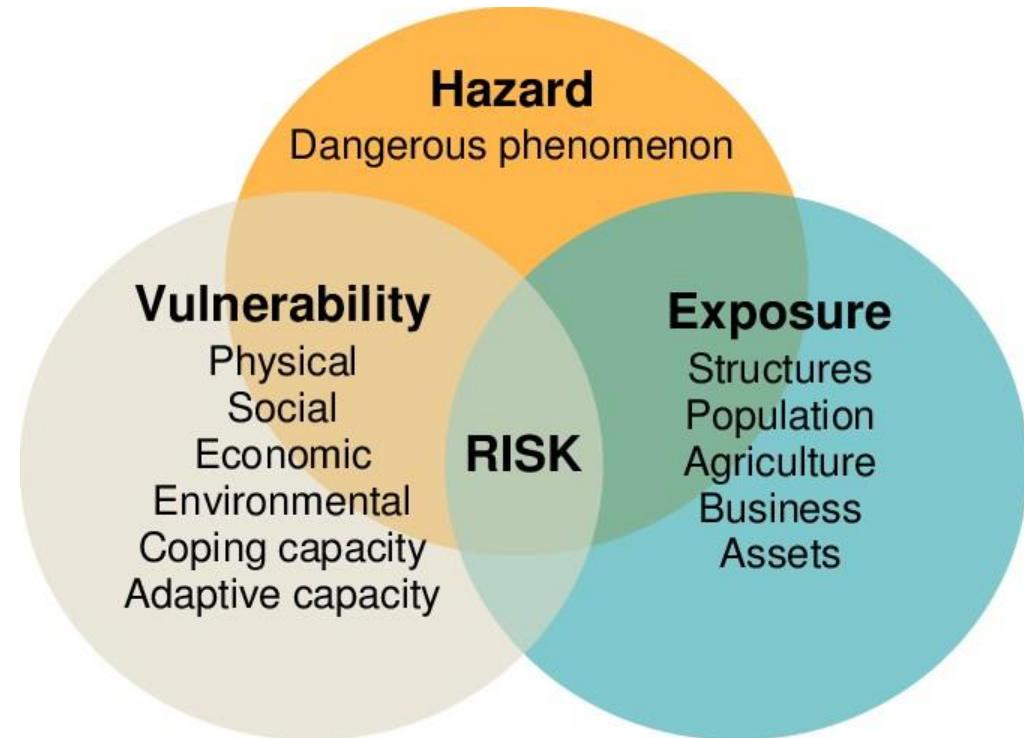
Hazard, Risk, Vulnerability and Disaster



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%



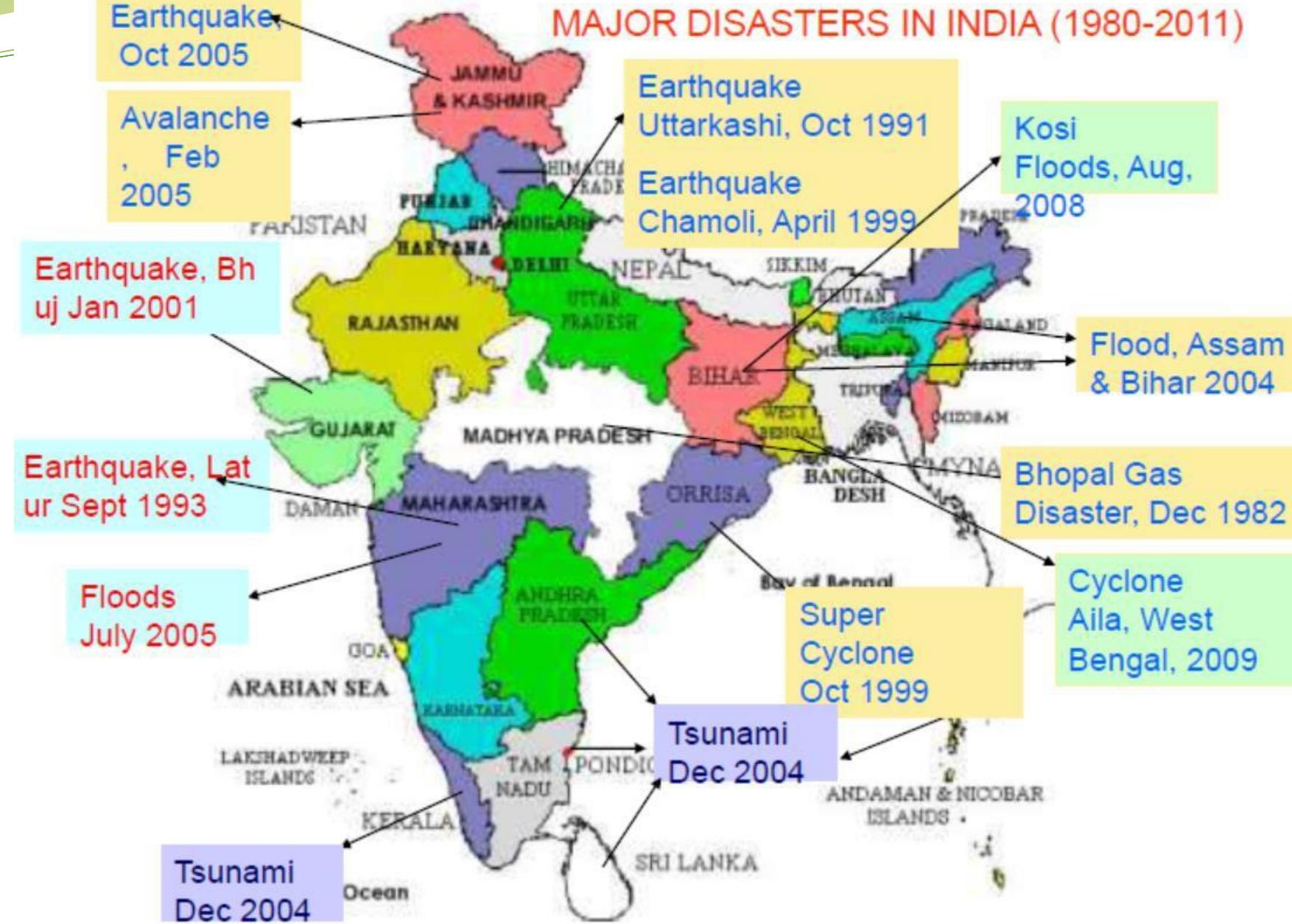
3%

Major Disasters in India

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



MAJOR DISASTERS IN INDIA (1980-2011)

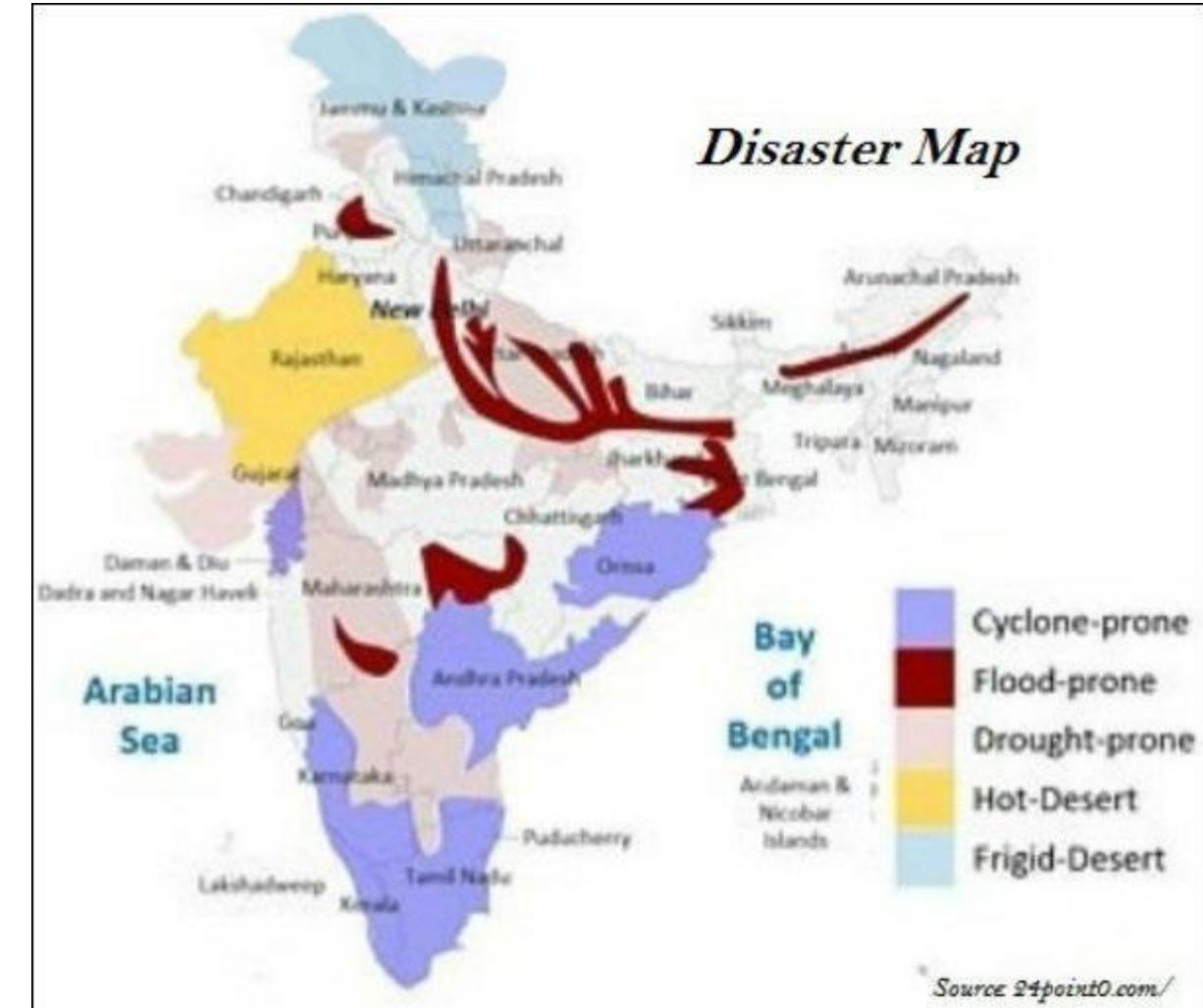
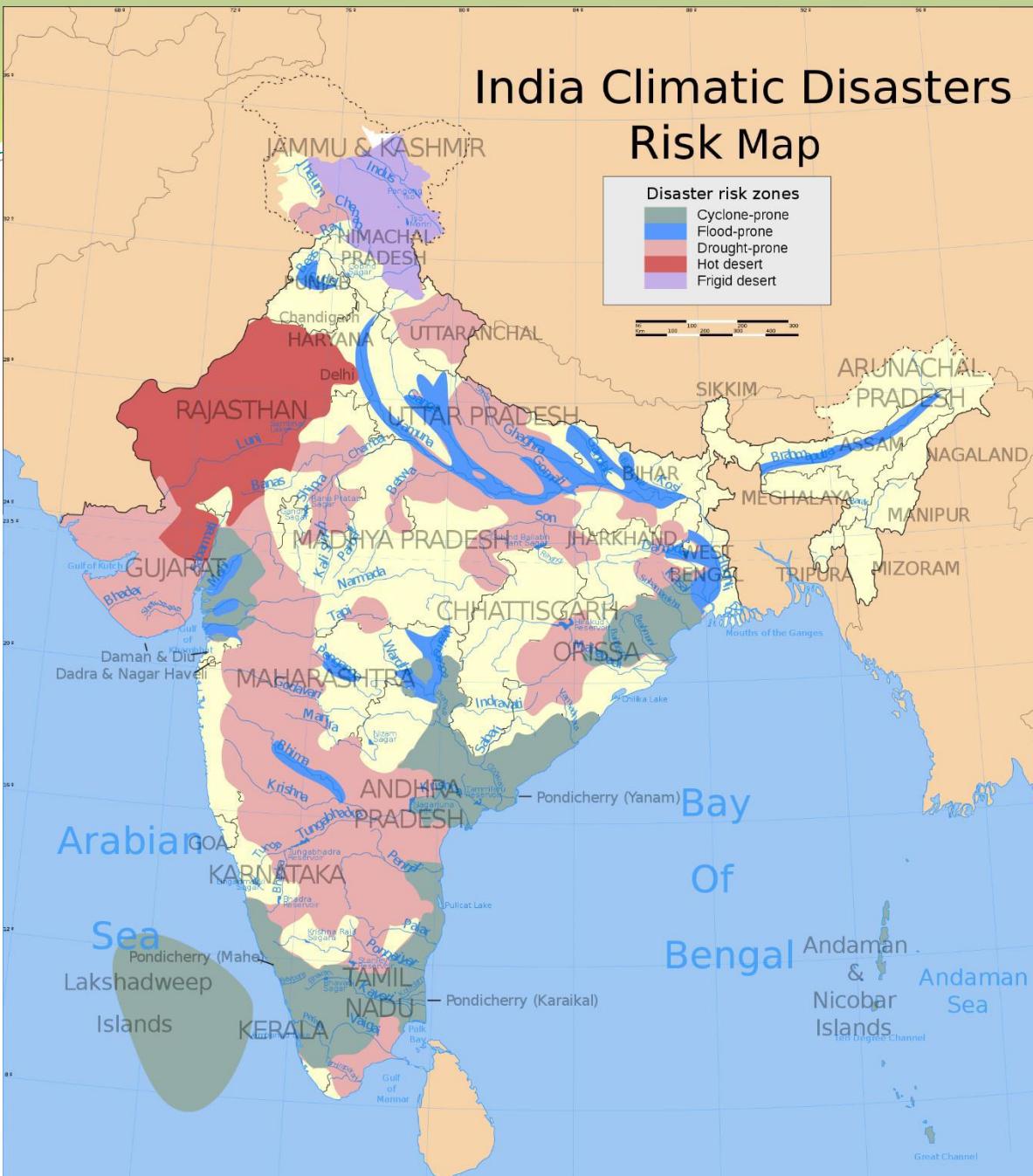


Major Disasters in India (last 40 years)

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, Gujarat	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	Andhra Pradesh & 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



Source 24point0.com/

Risk

- Risk is a “measure of the expected losses due to a hazard event occurring in a given area over a specific period.
- Risk is a function of the probability of particular hazardous event and the losses it would cause.” The level of risk depends upon:
 - Nature of the hazard;
 - Vulnerability of the elements which are affected;
 - Economic value of those elements.

Risk

- A community/locality is said to be at ‘risk’ when it is exposed to hazards and is likely to be adversely affected by its impact.
- Whenever we discuss ‘disaster management’ it is basically ‘disaster risk management’.
- Disaster risk management includes all measures which reduce disaster related losses of life, property, or assets by either reducing the hazard or vulnerability of the elements at risk.

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.

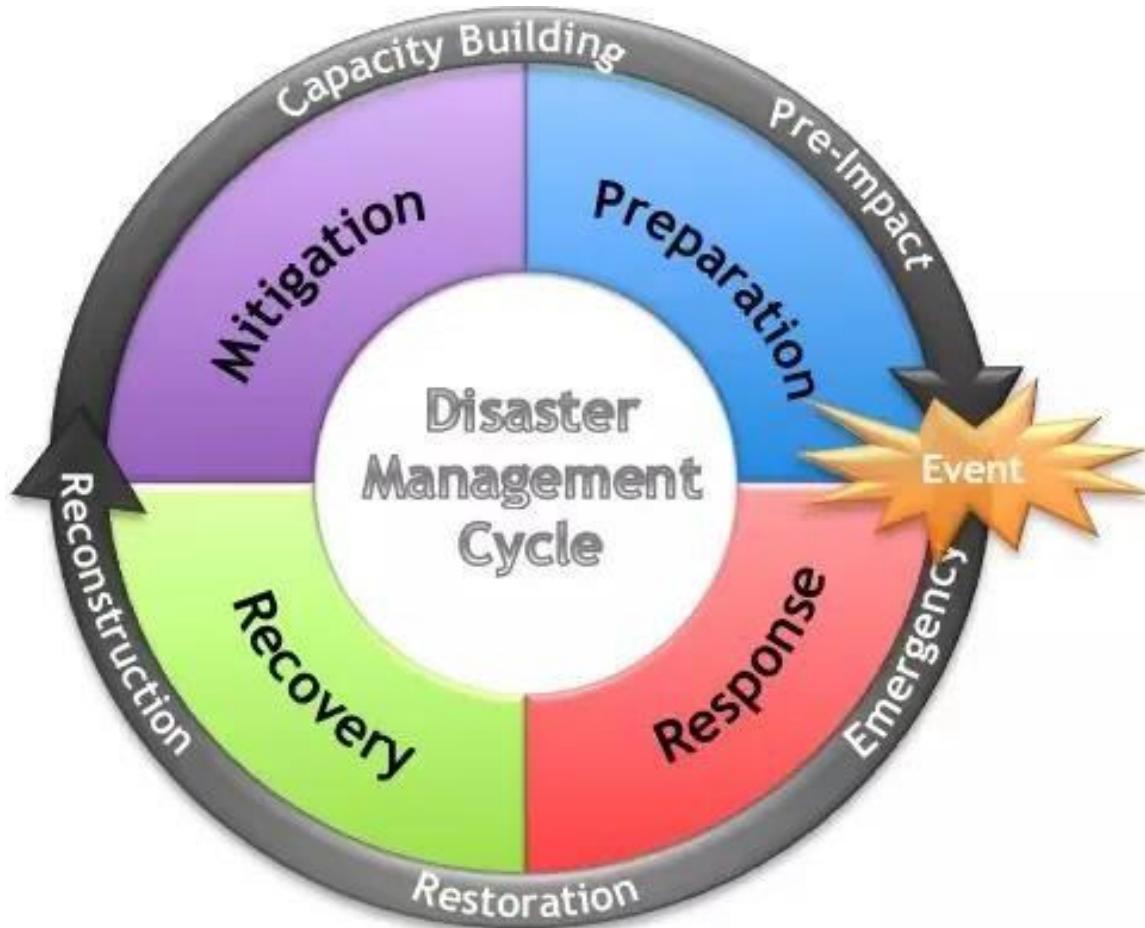
Examples: temporary housing; claims processing and grants; long-term medical care and counseling.

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.

- Disaster is a sudden adverse or unfortunate extreme event which causes great damage to human beings as well as plants and animals.
- *Disasters occur rapidly, instantaneously, and indiscriminately.*
- These extreme events either natural or man-induced exceed the tolerable magnitude within or beyond certain time limits, make adjustment difficult, result in catastrophic losses of property and income and life is paralyzed.
- These events which occur aggravate natural environmental processes to cause disasters to human society such as sudden tectonic movements leading to earthquake and volcanic eruptions, continued dry conditions leading to prolonged droughts, floods, atmospheric disturbances, collision of celestial bodies, etc. (Joshi, 2008).

- Disasters have always co-existed with civilizations.
- With technological advancement, development initiatives resulted in the creation of a lot of infrastructure and permanent assets.
- Gradually material development detached man from nature on one hand, and increased vulnerability of the human population, on the other.
- The progressive increase in loss of life, property and deleterious effect on environment due to disasters moved the international community to look at disaster management in a new perspective, which transcends international barriers, anticipates possible threats and enables tackling of disasters from the pre-stage.
- The last decade (1990-1999) was observed by the International Community as the “International Decade for natural disaster reduction”, a decade dedicated to promoting solutions to reduce risks from natural hazards.
- The international dimension of disasters was realized, and a protocol sought to be established so that when it comes to suffering of humanity, help from the International community flow in right earnest.

- Almost every day, newspapers, radio, and television channels carry reports on disaster striking several parts of the world.

What is a disaster?

- The term disaster owes its origin to the French word “Desastre” which is a combination of two words ‘des’ meaning bad and ‘aster’ meaning star. Thus, the term refers to ‘Bad or Evil star’.
- **The United Nations defined Disasters as ‘A serious disruption of the functioning of a community or a society causing widespread human, material, economic and environmental losses which exceed the ability of the affected community/society to cope using its own resources’ (UNDP).**
- A disaster is a result from the combination of hazard, vulnerability and insufficient capacity or measures to reduce the potential chances of risk.
- A disaster happens when a hazard impacts on the vulnerable population and causes damage, casualties, and disruption.

- Any hazard – flood, earthquake or cyclone which is a triggering event along with greater vulnerability (inadequate access to resources, sick and old people, lack of awareness etc) would lead to disaster causing greater loss to life and property.
- For example, an earthquake in an uninhabited desert cannot be considered a disaster, no matter how strong the intensities produced.
- An earthquake is disastrous only when it affects people, their properties, and activities. Thus, disaster occurs only when hazards and vulnerability meet. But it is also to be noted that with greater capacity of the individual/community and environment to face these disasters, the impact of a hazard reduces. Therefore, we need to understand the three major components namely hazard, vulnerability, and capacity with suitable examples to have a basic understanding of disaster management.

Hazard

- Hazard may be defined as “a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment.”
- Hazards can be grouped into two broad categories namely natural and manmade. Natural hazards are hazards which are caused because of natural phenomena (hazards with meteorological, geological, or even biological origin).
- Examples of natural hazards are cyclones, tsunamis, earthquake, and volcanic eruptions which are exclusively of natural origin.

- Landslides, floods, drought, fires are socio-natural hazards since their causes are both natural and man-made.
- For example, flooding may be caused because of heavy rains, landslide or blocking of drains with human waste.
- Manmade hazards are hazards which are due to human negligence.
- Manmade hazards are associated with industries or energy generation facilities and include explosions, leakage of toxic waste, pollution, dam failure, wars, or civil strife, etc.
- The list of hazards is exceedingly long.
- Many occur frequently while others take place occasionally.
- However, based on their genesis, they can be categorized as follows:

Various types of Hazards

Type	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 pollution 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 disasters blasts 2. Forest fires	3. Building collapse 4. Electric Accidents 5. Festival related 6. Mine flooding

Source: CBSE (2006)

Vulnerability

- 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”
- Vulnerability is a set of prevailing conditions which adversely affect the community’s ability to prevent, mitigate, prepare, or respond to a hazard.
- Absence of coping strategies is also a part of vulnerability and must be considered in vulnerability assessment e.g. living in hazard prone locations like near to a sea or river, etc.

Classification of Vulnerability

Vulnerability are classified as physical, social, economic, and environmental

- **Physical Vulnerability:** The physical vulnerability of an area also depends on its geographic proximity to the source and origin of the disasters e.g. if an area lies near the coast lines, fault lines, unstable hills etc. It makes the area more vulnerable to disasters as compared to an area that is far away from the origin of the disaster. Physical vulnerability includes the *difficulty in access* to water resources, means of communications, hospitals, police stations, fire brigades, roads, bridges and exits of a building or/an area, in case of disasters. Furthermore, the lack of proper planning and implementation in *construction of residential and commercial buildings* results in buildings that are weaker and vulnerable in earthquakes, floods, landslides and other hazards.

- **Social Vulnerability:** As per United Nations office for Disaster Risk Reduction (UNDRR), it refers to the inability of people, organizations and societies to withstand adverse impacts to hazards due to characteristics inherent in social interactions, institutions and systems of cultural values. It is linked to the level of well-being of individuals, communities, and society. It includes aspects related to levels of literacy and education, the existence of peace and security, access to basic human rights, systems of good governance, social equity, positive traditional values, customs and ideological beliefs and overall collective organizational systems. For example, poverty and inequality, marginalisation, social exclusion and discrimination by gender, social status, disability, and age (amongst other factors), etc.

- **Economic Vulnerability:** The level of vulnerability is highly dependent upon the economic status of individuals, communities, and nations. The poor are usually more vulnerable to disasters because they lack the resources to build sturdy structures and put other engineering measures in place to protect themselves from being negatively impacted by disasters. For example, the uninsured informal sector, vulnerable rural livelihoods, dependence on single industries, globalisation of business and supply chains, etc.
- **Environmental Vulnerability:** Natural resource depletion and resource degradation are key aspects of environmental vulnerability. For example, poor environmental management, overconsumption of natural resources, decline of risk regulating ecosystem services, extraction of soil from river bed, etc.

Capacity

- Capacity can be defined as “resources, means and strengths which exist in households and communities and which enable them to cope with, withstand, prepare for, prevent, mitigate or quickly recover from a disaster”. People’s capacity can also be considered.
- Capacities could be classified into physical and socio-economic capacities.

Capacity

- **Physical Capacity:** People whose houses have been destroyed by the cyclone or crops have been destroyed by the flood can salvage things from their homes and from their farms. Some family members have skills, which enable them to find employment if they migrate, either temporarily or permanently.
- **Socio-economic Capacity:** In most of the disasters, people suffer their greatest losses in the physical and material realm. Rich people have the capacity to recover soon because of their wealth. In fact, they are seldom hit by disasters because they live in safe areas and their houses are built with stronger materials. However, even when everything is destroyed, they have the capacity to cope up with it.
- Hazards are always prevalent, but the hazard becomes a disaster only when the frequency or likelihood of a hazard and the vulnerability of the community increases the risk of being severely affected.

Disaster Management Cycle

- Disaster Risk Management includes sum of all activities, programmes and measures which can be taken up before, during and after a disaster with the purpose to avoid a disaster, reduce its impact or recover from its losses. The three key stages of activities that are taken up within disaster risk management are as follows:

1. Before a disaster (pre-disaster)

- Pre-disaster activities those which are taken to reduce human and property losses caused by a potential hazard. For example, carrying out awareness campaigns, strengthening the existing weak structures, preparation of the disaster management plans at household and community level, etc. Such risk reduction measures taken under this stage are termed as mitigation and preparedness activities.

2. During a disaster (disaster occurrence)

- These include initiatives taken to ensure that the needs and provisions of victims are met and suffering is minimized. Activities taken under this stage are called emergency response activities.

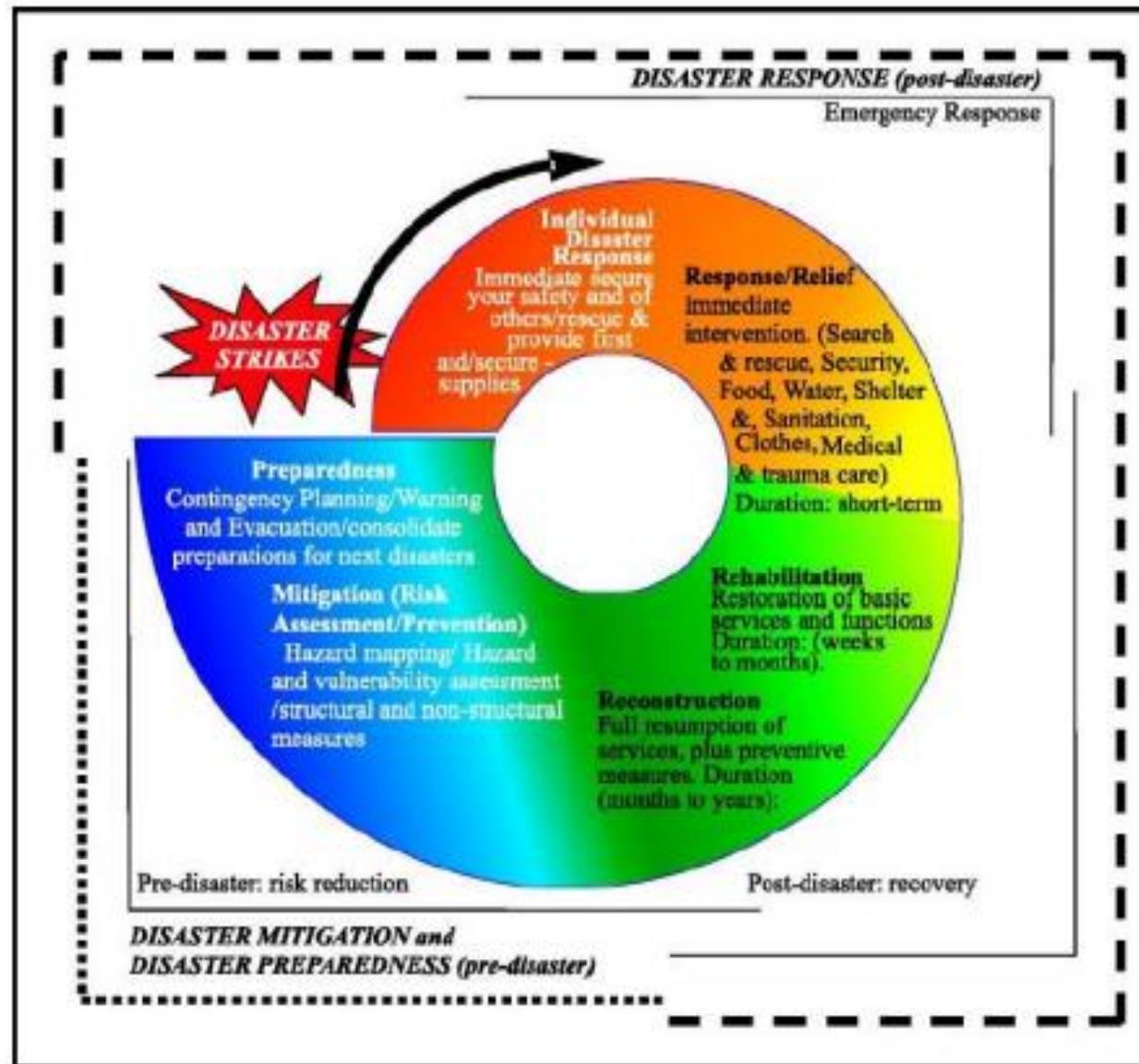
3. After a disaster (post-disaster)

- There are initiatives taken in response to a disaster with a purpose to achieve early recovery and rehabilitation of affected communities, immediately after a disaster strike. These are called as response and recovery activities. The Disaster risk management cycle diagram (DRMC) highlights the range of initiatives which normally occur during both the Emergency response and Recovery stages of a disaster. Some of these cuts across both stages (such things as coordination and the provision of ongoing assistance); whilst other activities are unique to each stage (e.g. Early Warning and Evacuation during Emergency Response; and Reconstruction and Economic and Social Recovery as part of Recovery).

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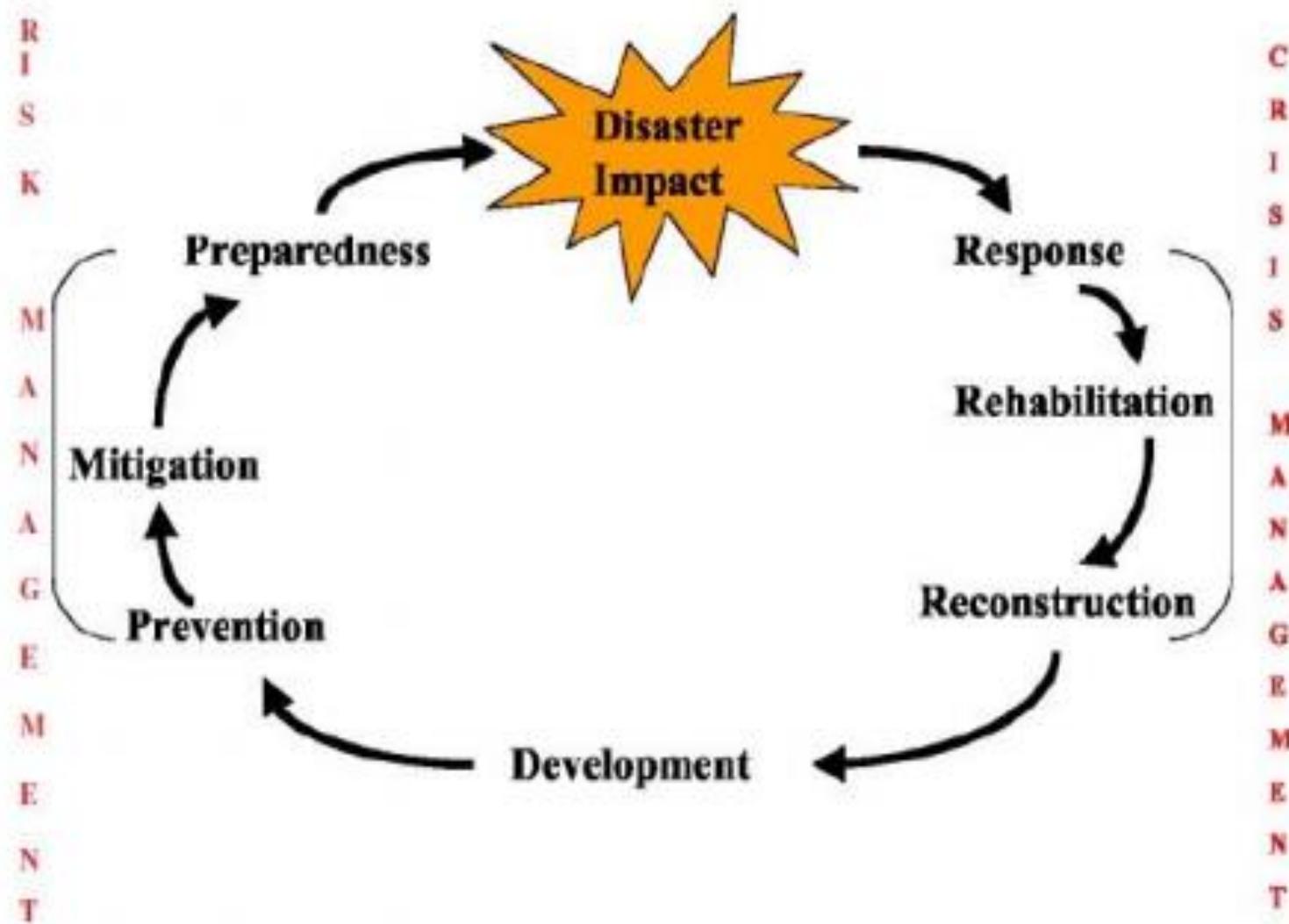
Disaster Management Cycle



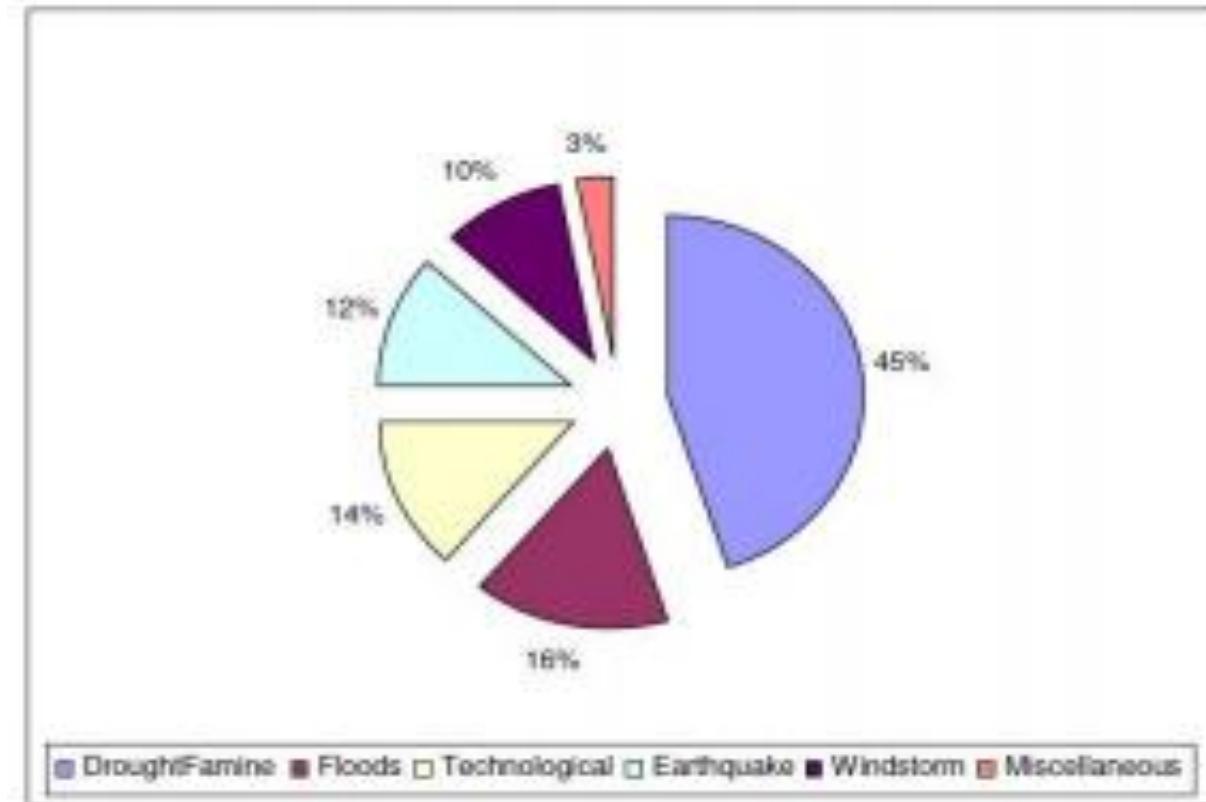
- The DRMC also highlights the role of the media, where there is a strong relationship between this and funding opportunities. This diagram works best for relatively sudden-onset disasters, such as floods, earthquakes, bushfires, tsunamis, cyclones etc, but is less reflective of slow-onset disasters, such as drought, where there is no obviously recognizable single event which triggers the movement into the Emergency Response stage.
- According to Warfield (2008) disaster management aims to reduce, or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery. The disaster management cycle illustrates the ongoing process by which governments, businesses, and civil society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred. Appropriate actions at all points in the cycle lead to greater preparedness, better warnings, reduced vulnerability, or the prevention of disasters during the next iteration of the cycle. The complete disaster management cycle includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure.
- The mitigation and preparedness phases occur as disaster management improvements are made in anticipation of a disaster event. Developmental considerations play a key role in contributing to the mitigation and preparation of a community to effectively confront a disaster. As a disaster occurs, disaster management actors, humanitarian organizations become involved in the immediate response and long-term recovery phases.

- The four disaster management phases illustrated here do not always, or even generally, occur in isolation or in this precise order. Often phases of the cycle overlap and the length of each phase greatly depends on the severity of the disaster.
- • ***Mitigation*** - Minimizing the effects of disaster.
 - Examples: building codes and zoning; vulnerability analyses; public education.
 - ***Preparedness*** - Planning how to respond.
 - Examples: preparedness plans; emergency exercises/training; warning systems.
 - ***Response*** - Efforts to minimize the hazards created by a disaster.
 - Examples: search and rescue; emergency relief.
- • ***Recovery*** - Returning the community to normal.
 - Examples: temporary housing; grants; medical care.

Disaster Management Cycle



- Drought and famine have proved to be the deadliest disasters globally (45%), followed by floods (16%), technological disaster (14%), earthquake (12%), windstorm (10%), extreme temperature and others (3%). Global economic loss related to disaster events average around US \$880 billion per year (CBSE, 2006).



Reported death from all disasters : World Scenario (1992-2001)

The Indian scenario

- The Indian subcontinent is highly vulnerable to cyclones, droughts, earthquakes and floods.
- Avalanches, forest fire and landslides occur frequently in the Himalayan region of northern India.
- Among the 35 total states/ Union Territories in the country, 25 are disaster prone.
- On an average, about 50 million people in the country are affected by one or the other disaster every year, besides loss of property worth several million.

- In the 1970s and the 80s, droughts and famines were the biggest killers in India, the situation stands altered today. It is probably a combination of factors like better resources management and food security measures that has greatly reduced the deaths caused by droughts and famines. Floods, high winds, and earthquakes dominate (98%) the reported injuries, with ever increasing numbers in the last ten years. The period from 1973 to 2001 has been associated with many earthquakes in Asia that have a relatively high injury- to death ratio. Floods, droughts, cyclones, earthquakes, landslides, and avalanches are some of the major natural disasters that repeatedly and increasingly affect India. Table-1 depicts an annual damage due to Natural Disasters (for the year 1985 – 1997).
- The natural disasters directly impact economies, agriculture, food security, water, sanitation, the environment, and health each year. Therefore, it is one of the single largest concerns for most of the developing nations. Different natural hazards cause varying levels of physical damage to infrastructure and agriculture with implications for their indirect and secondary impacts. Drought causes heavy Crop and Livestock losses over wide areas of land but typically leave infrastructure and productive capacity largely unaffected. Floods and Cyclones cause extensive whereas damage to both infrastructure and agriculture, depending on their timing relative to the agricultural cycle. While Earthquakes have little impact on standing crops excluding localized losses but can cause wide spread devastation of infrastructure and other productive capacity over relatively large areas.

- India is hit by one major natural disaster or the other almost every year wherein the loss of life is accompanied by losses of the magnitude that is difficult to comprehend. The decade (1990-99), which was the International Decade for Natural Disaster Reduction (1990-99), it witnessed a spate of large-scale disasters that defied all attempts to stem them. These included the Latur (Maharashtra) Earthquake of 1993 killing about 10,000 persons, the Andhra Pradesh Cyclones of 1990 and 1996, killing about 1000 persons each, the Gujarat Cyclone of 1998 killing over 3,500 persons and the Orissa Super-Cyclone of 1999 killing about 10,000 persons. Besides these major events, there were smaller earthquakes in Uttarkashi, Chamoli and Jabalpur, and frequent floods in the north-east, Uttar Pradesh, Bihar and Kerala. Unfortunately, these disasters were not taken up as learning opportunities, and lessons were not drawn from them to the extent to be prepared in combating future disasters. What happened in Gujarat in 2001 and the way it was handled are grim reminders of the fact that we still need to learn and improve much.
- The precise cost of the disaster in terms of loss of lives, property, loss of development opportunities, etc. cannot be clearly assessed, counted or scaled. The costs of disaster are clearly inequitable, falling heavily only on the few. Disasters result not only in loss of shelter but also create hardships, lack of food availability, temporary loss of livelihood and disrupt socio-economic activities. Some of the losses may be redeemable and compensated for through disaster relief and insurance. However, apart from economic dimension, such disturbances have their psychological and social dimensions as well, which need to be studied, and documented besides developing appropriate mitigation strategies

The Disaster Management Act, 2005

Introductory notes on NDMA, 2005

- India has been traditionally vulnerable to natural disasters on account of its unique geo climatic conditions.
- Floods, droughts, cyclones, earthquakes and landslides have been a recurrent phenomenon.
- Being highly vulnerable to natural disaster, 25 states out of a total of 35 states/UTs in India are considered disaster prone.
- 68% of Indian land is draught prone, 12% to flood and 8% to cyclone.
- The loss in terms of private, community and public assets has been astronomical.
- Therefore, disaster management occupies an important place in this country's policy framework as it is the poor and the under-privileged who are worst affected on account of calamities/disasters.
- At the global level too, there has been considerable concern over natural disasters.

Approach to Disaster Management

- Till recently, the approach to Disaster Management has been reactive and relief centric.
- A paradigm shift has now taken place at the national level from the relief centric syndrome to holistic and integrated approach with emphasis on prevention, mitigation and preparedness.
- These efforts are aimed to conserve developmental gains as also minimize losses to lives, livelihood and property.
- A typical Disaster Management continuum as shown below, comprising of six elements i.e., Prevention, Mitigation and Preparedness in pre-disaster phase, and Response, Rehabilitation and Reconstruction in post-disaster phase, defines the complete approach to Disaster Management.

The Disaster Management Act – 2005

- **The Disaster Management Act – 2005** is aimed at preparedness, prevention and early planning towards disaster.
- By this Act three authorities namely,
 - National Disaster Management Authority,
 - State Disaster Management Authority and
 - District Disaster Management Authority have been established.
- As stated in the act, there shall be no discrimination on the ground of gender, caste and community in providing compensation and relief.
- The act also provides penalties for obstruction, false claims etc and ensures the establishment of Disaster Response fund and Disaster Mitigation fund at central, state and district level.
- The Disaster Management Division of Ministry of Home Affairs is the nodal agency for all issues related to disaster management except the drought which is looked after by the Ministry of Agriculture.
- **The Act comprises of 79 sections and 11 chapters.**
- The President of India gave his assent to the Disaster Management Bill 2005 on January 9, 2006.

Disaster Management Act–2005 (79 sections & 11 chapters)

Chapter I -Definition

- Section 2 of the Act defines '**Disaster**' as a catastrophe, mishap, calamity or grave occurrence in any area, arising from either natural or man made causes, or by accident or negligence which results in substantial loss of life or human suffering, or damage to and destruction of property or damage to or degradation of environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.
- '**Disaster Management**' is defined as a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient to prevent danger or threat of any disaster, mitigation or reduce the risk or severity or consequences of any disaster, capacity-building and preparedness to deal with any disaster, prompt response to any threatening disaster situation or disaster, assessing the severity or magnitude of effects of any disaster, evacuation, rescue and relief, rehabilitation and reconstruction.

Disaster Management Act–2005(79 sections & 11 chapters

Chapter II- National disaster management authority

- The Act empowers the Central Government to appoint the National Disaster Management Authority with the Prime Minister of India as the Chairperson and such number of other members, not exceeding nine. The Central Government is to provide the National Authority with such officers, consultants and employees, as it considers necessary for carrying out the functions of the National Authority. The National Authority has the responsibility to lay down, approve the policies, plans and guidelines for disaster management prepared by various departments of Government of India to ensure timely and effective response to disaster. Further the chapter also details about the meetings, executive committee and plans.

Chapter III - State Disaster Management Authorities

- Like National Authority at the Centre, the State Government is to establish a State Disaster Management Authority for the State. The State Authority is to be headed by the Chief Minister of the State as the Chairperson and such number of other members, not exceeding nine. The State Authority is empowered as and when it considers necessary to constitute an advisory committee, consisting of experts in the field of disaster management. The State Authority is supposed to lay down the State disaster management policy, approve the State Plan in accordance with the guidelines laid down by the National Authority. Chapter III also specifies on meetings, state executive committee and plans.

Chapter IV - District Disaster Management Authorities

- Every State Government, in turn is to establish a District Disaster Management Authority for every district in the State with the Collector or District Collector or Deputy Commissioner as the Chairperson and such number of other members, not exceeding seven. The District Authority is to act as the district planning, coordinating and implementing body for disaster management and take all measures for the purposes of disaster management in the district in accordance with the guidelines laid down by the National Authority and the State Authority.

Chapter V - Measures by the Government & International Agencies for Disaster Management

- The Central Government is empowered to take measures as it deems necessary or expedient for the purpose of disaster management like deployment of naval, military and air forces, other armed forces of the Union or any other civilian personnel as may be required for the purposes of this Act, coordination with the United Nations agencies, international organizations and governments of foreign countries for the purposes of this Act and establish institutions for research, training and developmental programmes in the field of disaster management. It is also empowered to deal with all such other matters as it deems necessary or expedient for securing effective implementation of the provisions of the Act.

Chapter VI - Local Authorities

- Subject to the directions of the District Authority, the local authorities shall ensure that the officers and employees are trained, resources are so maintained as to be readily available, carry out relief rehabilitation and reconstruction activities in the affected areas and may take such other measures as may be necessary for the disaster management.

Chapter VII - National Institute of Disaster Management

- The Central Government is empowered to constitute an institute to be called the National Institute of Disaster Management. The institute functions within the broad policies and guidelines laid down by the National Authority and is responsible for planning and promoting training and research in the area of disaster management, documentation and development of national level information base relating to disaster management policies, prevention mechanisms and mitigation measures.

Chapter VIII - National Disaster Response Force

- A National Disaster Response Force for the purpose of specialist response to a threatening disaster situation or disaster is to be constituted. The general superintendence, direction and control of the Force shall be vested and exercised by the National Authority and the command and supervision of the Force shall vest in an officer to be appointed by the Central Government as the Director General of the National Disaster Response Force.

Chapter IX - Finance, Accounts and Audits

- The Central Government is empowered to constitute a fund to be called as the National Disaster Response fund for meeting any threatening disaster situation or disaster and there shall be credited thereto an amount which Central Government may, after due appropriation made by parliament by law in this behalf provide any grants that may be made by any person or institution for the purpose of disaster management.

Chapter X -Offences and Penalties

- The Act imposes punishments to persons/companies for contravening the provisions of this Act, 2005 such as obstructing or abandoning, refusing to comply with any of the provisions of this Act, making false claims, misappropriation of money or materials or false warning, etc. The punishment in such cases could be imprisonment or fine or both.

Chapter XI-Miscellaneous

- The National Authority, the State Authority, or a District Authority is empowered to recommend the Government to give direction to any authority or person in control of any audio or audiovisual media or such other means of communication as may be available to carry any warning or advisories regarding any threatening disaster situation or disaster, and the said means of communication and media as designated shall comply with such direction.

Recent Initiatives

- Coordinated mock drills under simulated situations like terror attack, earthquake, bomb blast, fire breakouts, flyover collapse etc., are being organized by the National, State & District Management Authorities from time to time.
- The most calamitous situations had been planned out to test Delhi's disaster preparedness and the venues included Metro stations, schools, colleges, markets, temples, government buildings and five-star hotels.
- Mock drills will build the awareness of the general population and increase their coping capacity during disaster.
- This will help all the stakeholders especially the community to know what needs to be done to prevent and safeguard and avoid casualty.

NDMA Act Remarks

- Disaster results not only in the loss of life & shelter but also creates lack of food, increase in diseases and disturb socio-economic activities.
- Therefore, it is one of the major area of concern for a developing country like India.
- Disaster Management must be a multi disciplinary and pro-active approach.
- Besides various measures for putting in place institutional and policy framework, disaster prevention, mitigation and preparedness initiatives taken by the Central and State Governments the INGOs and NGOs, the community, civil society organizations and the media also have a key role to play in achieving the goal of moving together, towards a safer India.



Disaster Management in INDIA

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2. Definition.
3. Objectives
4. Approach
5. Disaster Management act-2005.
6. National Disaster Management Authority (NDMA).
7. Institutional Framework.
8. National Policy on Disaster Management.
9. National Plan on Disaster Management.
10. *Role of Government.*
11. *Role of Non-Government.*
12. *Various Types of Disaster*
13. *Some Signification Earthquake in India.*
14. *Case Study: Flood*

1. Introduction

- ✓ India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions.
- ✓ Floods, droughts, cyclones, earthquakes and landslides have been a recurrent phenomena.
- ✓ The super cyclone in Orissa in October, 1999 & the Bhuj earthquake in Gujarat in January, 2001 was done.
- ✓ Over the past couple of years, the Government of India have brought about a paradigm shift in the approach to disaster management.
- ✓ Disaster management occupies an important place in this country's policy framework as it is the poor and the underprivileged who are worst affected on account of calamities/disasters.

2. Definition

The Disaster Management Act, 2005 defines disaster as “*A catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area*”.

The United Nations defines disaster as “*The occurrence of sudden or major misfortune which disrupts the basic fabric and normal functioning of the society or community*”.

3. Objectives

- ✓ Mitigation or reduction of risk of any disaster or its severity or consequences.
- ✓ Capacity building including research & knowledge management.
- ✓ Prompt response to any threatening disaster situation or disaster.
- ✓ Assessing the severity or magnitude of effects of any disaster.

4. Approach

- ✓ Community based DM, including last mile integration of policy.
- ✓ Plans & execution.
- ✓ Capacity development in all spheres.
- ✓ Consolidation of past initiatives & best practice.
- ✓ Co-operation with agencies at national & international levels.
- ✓ Multi-sectoral synergy

5. Disaster Management Act, 2005

- ✓ This Act provides for the effective management of disaster and for matters connected there with or incidental thereto.
- ✓ It provides institutional mechanisms for drawing up and monitoring the implementation of the disaster management.
- ✓ The Act also ensures measures by the various wings of the Govt. for prevention and mitigation of disasters and prompt response to any disaster situation.
- ✓ The Act further provides for the constitution of different Executive Committee at national and state levels.
- ✓ The Act also provides specific roles to local bodies in disaster management.

There are two National Level Institution,

- National Disaster Management Authority (NDMA).
- National Executive committee (NEC).

There are two State Level Institution,

- State Disaster Management Authority (SDMA).
- State Executive Committee (SEC).

There are one District Level Institution,

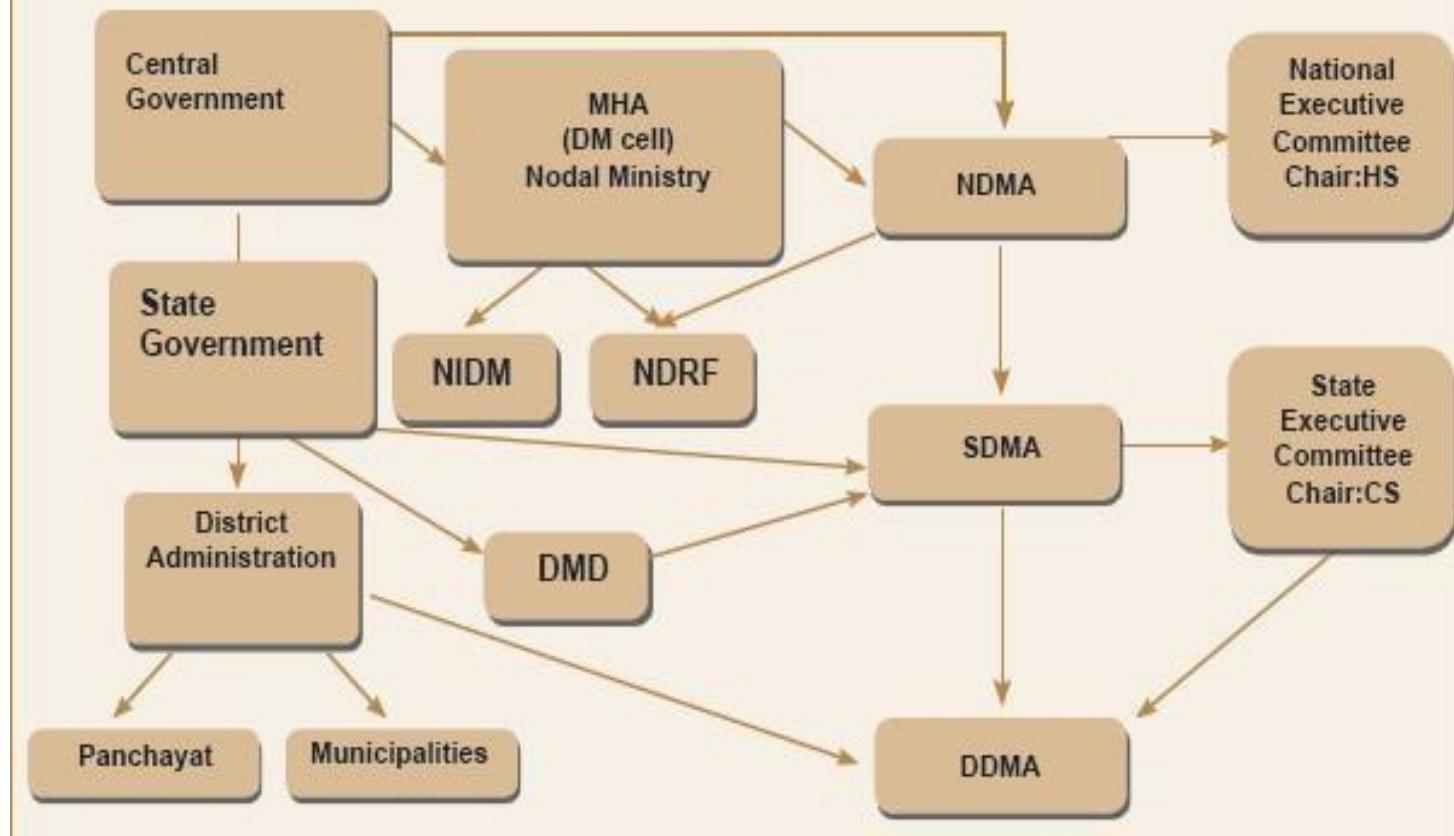
- District Disaster Management Authority (DDMA).

6. National Disaster Management Authority

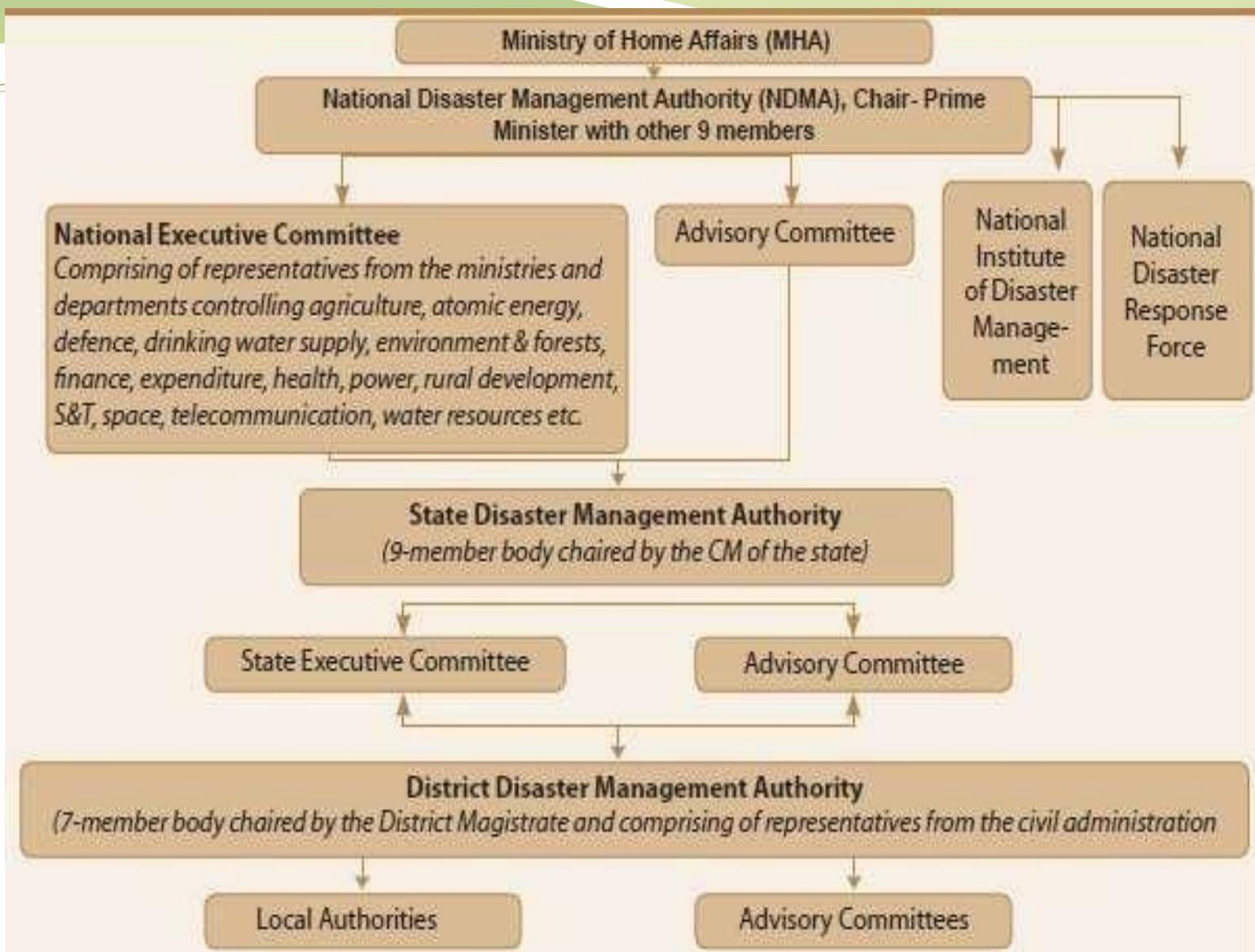
- ✓ Approve the National Plan.
- ✓ Approve plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan.
- ✓ Lay down guidelines to be followed by the State Authorities in drawing up the State Plan.
- ✓ Co-ordinate the enforcement and implementation of the policy and plan for disaster management.
- ✓ Recommend provision of funds for the purpose of mitigation.
- ✓ Provide such support to other countries affected by major disasters as may be determined by the Central Government.

LEGAL-INSTITUTIONAL FRAMEWORK

Disaster Management Act 2005



□ Legal Institutional Framework



□ Structure of National Disaster Management

7. Institutional Framework

- ✓ Shifting from relief and response mode, disaster management in India started to address the issues of early warning systems, forecasting and monitoring setup for various weather related hazards.
- ✓ A structure for flow of information, in the form of warnings, alert sand updates about the oncoming hazard, also emerged within this framework.
- ✓ A multi-stakeholder High powered group was setup by involving representatives from different ministries and departments.
- ✓ Some of these ministries were also designated as the nodal authorities for specific disasters.

8. National Policy on Disaster Management

- ✓ The National Policy on Disaster Management (NPDM) has been approved by the central govt. on October 22, 2009 and circulated to all concerned.
- ✓ The policy covers all aspects of disaster management including institutional and legal arrangements, financial arrangements, techno-legal disaster prevention, mitigation and preparedness, regime, response, relief and rehabilitation, reconstruction and recovery, capacity development, knowledge management, research and development.
- ✓ It focuses on the areas where action is needed and the institutional mechanism through which such action can be channelized.
- ✓ It aims to bring in transparency and accountability in all aspects community, of disaster management through involvement of community based organisations.

9. National Plan on Disaster Management

- ✓ An institutional mechanism for preparation of the National Plan has been put in place, which is under preparation in three parts namely:-
 - National Response Plan,
 - National Mitigation Plan &
 - National Capacity Building Plan.
- ✓ The National Mitigation Plans are under preparation by the concerned nodal ministries for disasters in respect of which the Nodal Ministries have been identified and designated.
- ✓ The Nodal Officers of the ministries concerned with the disasters are the conveners of the National Mitigation Plan Committees and are required to complete the Mitigation Plan in consultation with the members concerned with the respective disasters in NDMA.

10. Role of Government

a). *State Govt.:-*

- ✓ In the context of federal set-up of India, the responsibility to formulate the Government's response to a natural calamity is essentially that of the concerned State Government.
- ✓ Most of the States have Relief Commissioners under the Department of Disaster Management, who are in charge of the relief measures in the wake of natural disasters.
- ✓ At the state level, the State Relief Commissioner supervises and controls relief operations through Collectors or Deputy Commissioners, who are the main functionaries to coordinate the relief operation at district level.

b). District Govt.:-

- ✓ A District is subdivided into subdivisions and Tehsils or Talukas.
- ✓ The head of a sub-division is called the Sub-Divisional Officer while the head of a Tehsil is generally known as the Tehsildar.
- ✓ Contact with the individual villages is through the village Officer or Patwari who has one or more villages in his charge.
- ✓ The entire hierarchy right from the Central Government to the District level is connected by means of a telecommunication system.

c). National Govt.:-

- ✓ The National in the Ministry of Home Affairs functions 24×7 to monitor the disaster or disaster like situation.
- ✓ During the south west monsoon, daily situation reports are prepared based on the feedback received from the affected States and concerned Central Ministries and organizations, and are sent to all concerned.
- ✓ During the calamities of severe nature, special situation reports are also prepared and issued to all concerned.
- ✓ It also developed a branch called National Disaster Response Force (NDRF).
- ✓ The main task of NDRF is to provide specialist response in case of disasters.

11. Role of Non-Government

- ✓ For large relief agencies & NGOs, the main response is to provide material relief & rescue operation during times of disaster including medical relief.
- ✓ This is followed by a longer period of reconstruction activities of the physical infrastructure like roads, houses, community buildings, drinking water facilities etc. & continuation of medical aid.
- ✓ For small & localized NGOs, initial response is in the form of rescue & material relief.
- ✓ Most of larger India agencies stay back in disaster prone areas for disaster mitigation, long-term development of the people of area & especially for disaster preparedness before next disaster strikes.
- ✓ Local NGOs, who also participate in relief & reconstruction activities during times of disaster, revert back to their usual pre-disaster activities after initial phase.

12. Various Types of Disaster

- | | | |
|------|--|--|
| i. | Water and climate related disasters | a) Floods and drainage management
b) Cyclones
c) Tornadoes and hurricanes
d) Hailstorm
e) Cloud burst
f) Heat wave and cold wave
g) Snow avalanches
h) Droughts
i) Sea erosion
j) Thunder and lightening
k) Tsunami |
| ii. | Geological related disasters | a) Landslides and mudflows
b) Earthquakes
c) Dam failures/ Dam bursts
d) Minor fires |
| iii. | Chemical, industrial and nuclear related disasters | a) Chemical and industrial disasters
b) Nuclear disasters |
| iv. | Accident related disasters | a) Forest fires
b) Urban fires
c) Mine flooding
d) Oil spills
e) Major building collapse
f) Serial bomb blasts
g) Festival related disasters
h) Electrical disasters and fires
i) Air, road and rail accidents
j) Boat capsizing
k) Village fire |
| v. | Biological related disasters | a) Biological disasters and epidemics
b) Pest attacks
c) Cattle epidemics
d) Food poisoning |

13. Some Significant Earthquakes in India

Date	Epicenter		Location	Magnitude
	Lat (Deg. N)	Lat (Deg. E)		
16 June 1819	23.6	68.6	Kutch, Gujarat	8.0
10 June 1869	25	93	Near Cachar, Assam	7.5
30 May 1885	34.1	74.6	Sopor, J&K	7.0
12 June 1897	26	91	Shilong Plateau	8.7
04 April 1905	32.3	76.3	Kangra, HP	8.0
08 July 1918	24.5	91.0	Srimangal, Assam	7.6
02 July 1930	25.8	90.2	Dhubri, Assam	7.1
15 Jan 1934	26.6	86.8	Bihar- Nepal Border	8.3
26 June 1941	12.4	92.5	Andaman Island	8.1
23 Oct 1943	26.8	94.0	Assam	7.2
15 Aug 1950	28.5	96.7	Arunachal Pradesh- China Border	8.5
21 July 1956	23.3	70.0	Anjar, Gujarat	7.0
10 Dec 1967	17.37	73.75	Koyna, Maharastra	6.5
19 June 1975	32.38	78.49	Kinnuar, HP	6.2
06 Aug 1988	25.13	95.15	Manipur-Myanmar Border	6.6
21 Aug 1988	26.72	86.63	Bihar- Nepal Border	6.4
20 Oct 1991	30.75	78.86	Uttarkhashi, Uttarakhand	6.6
30 Sept 1993	18.07	76.62	Latur- Osmanabad, Maharshtra	6.3
22 May 1997	23.08	80.06	Jabalpur, MP	6.0
29 Mar 1999	30.41	79.42	Chamoli Dist, UK	6.8
26 Jan 2001	23.40	70.28	Bhuj, Gujarat	7.7
08 Oct 2005	34.49	73.15	Kashmir	7.6

14. Case Study: Floods

- ✓ Flood destructions have always brought miseries to numerous people, especially in rural areas.
- ✓ Flood results in the outbreak of serious epidemics, specially malaria and cholera.
- ✓ India is one of the most flood prone countries in the world.
- ✓ The average rainfall in India is 1150 mm with significant variation across the country.
- ✓ Most of the floods occur during the monsoon period.
- ✓ Floods occur in almost all rivers basins in India.
- ✓ The main causes of floods are heavy rainfall, discharge of water from Reservoir, inadequate drainage to carry away the rainwater quickly to rivers.



□ Floods in Uttarakhand in September 2010