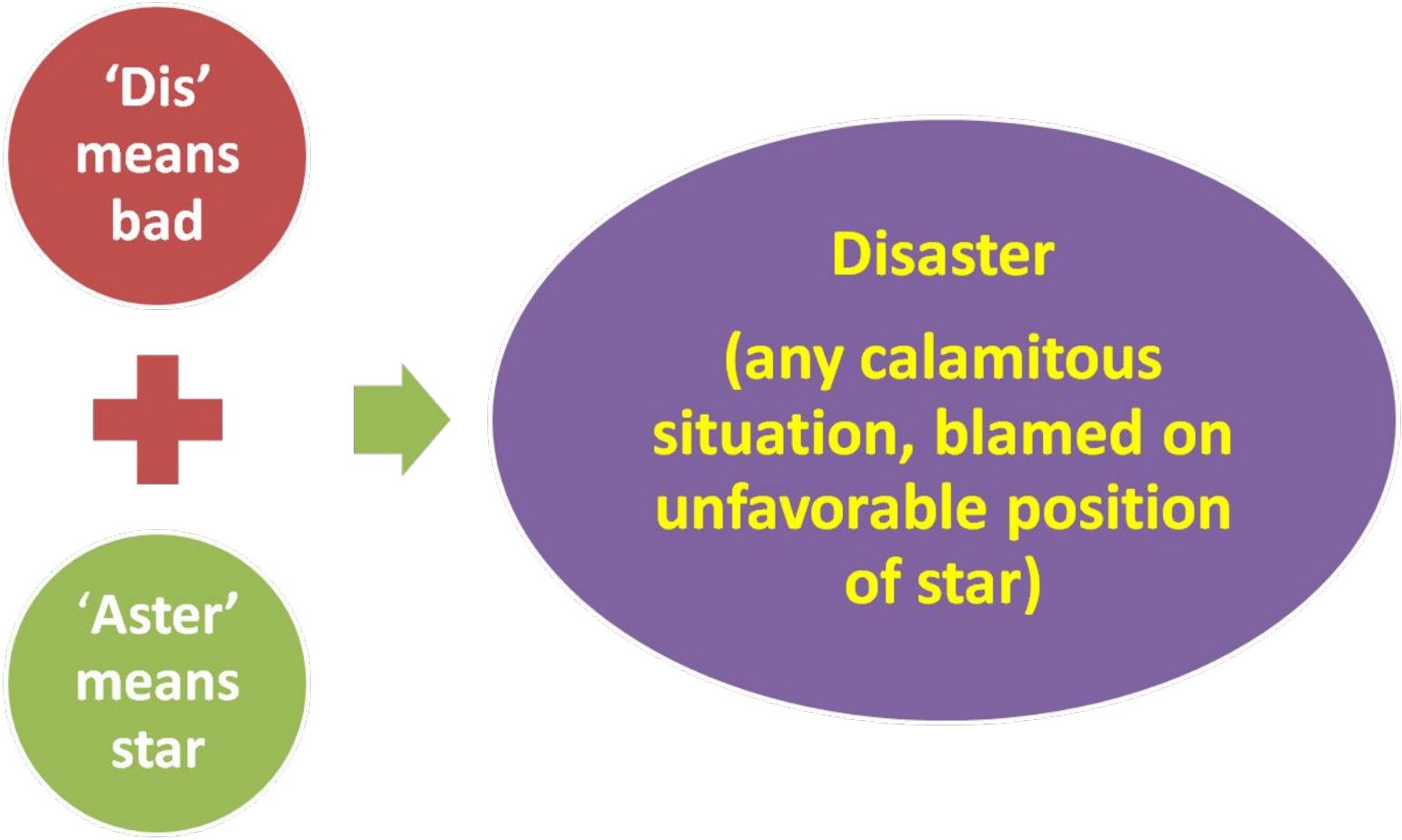
Disaster

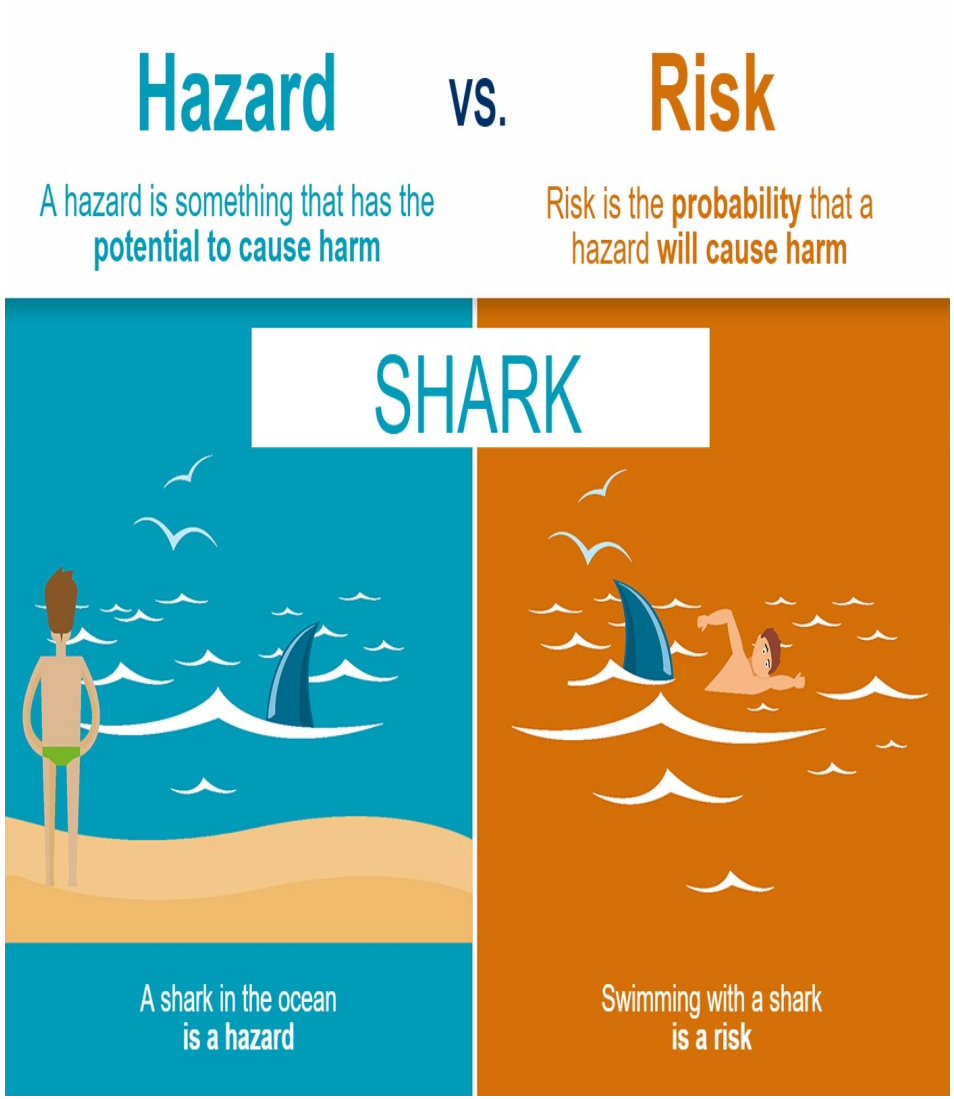
(Italian word *disastro*)



Disaster?

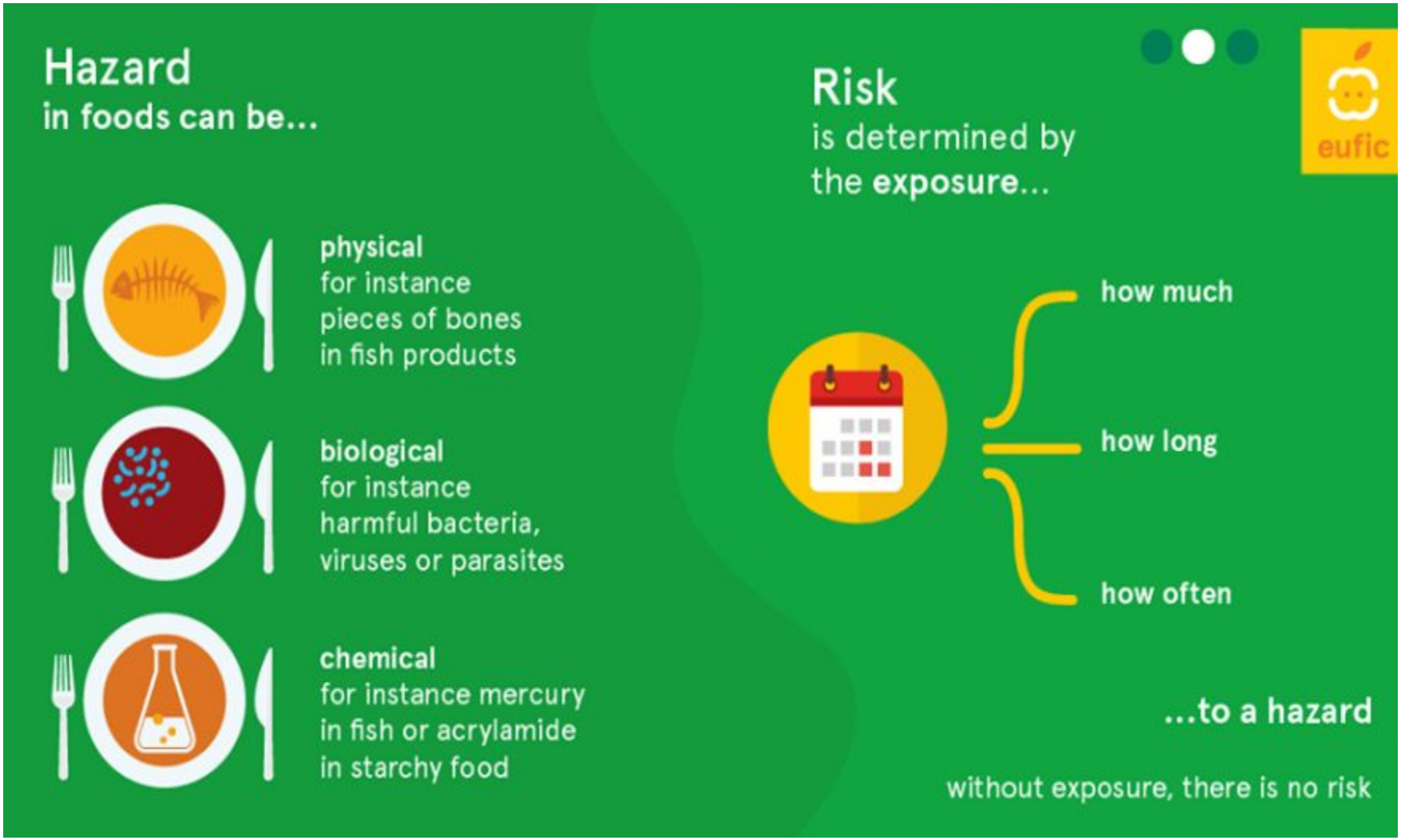
- A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources.
- Disaster is an occurrence that causes widespread damage and destruction or a sudden catastrophe leading to loss of life or property.

Hazard and Risk



- Hazard - Source of potential loss or circumstances that have the potential to cause harm
- Primary source of risk which results in disaster
- Hazard become emergency when eminent situation requires immediate attention
- Risk – chance of something happening that has a negative impact in terms of consequences and likelihood.
- Emergency – any event which endangers to life and environment and which calls for a momentous and coordinated response

Hazard and Risk

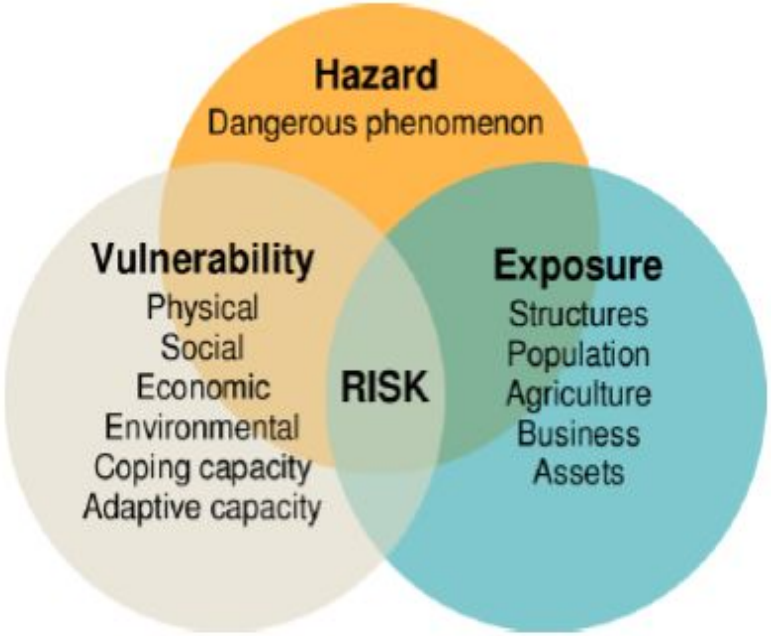


Hazard and Risk

Hazard		Risk	
	Water		Jumping in without knowing how to swim
	Gasoline		Lighting a match
	Driving		Texting while driving

Risk

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.

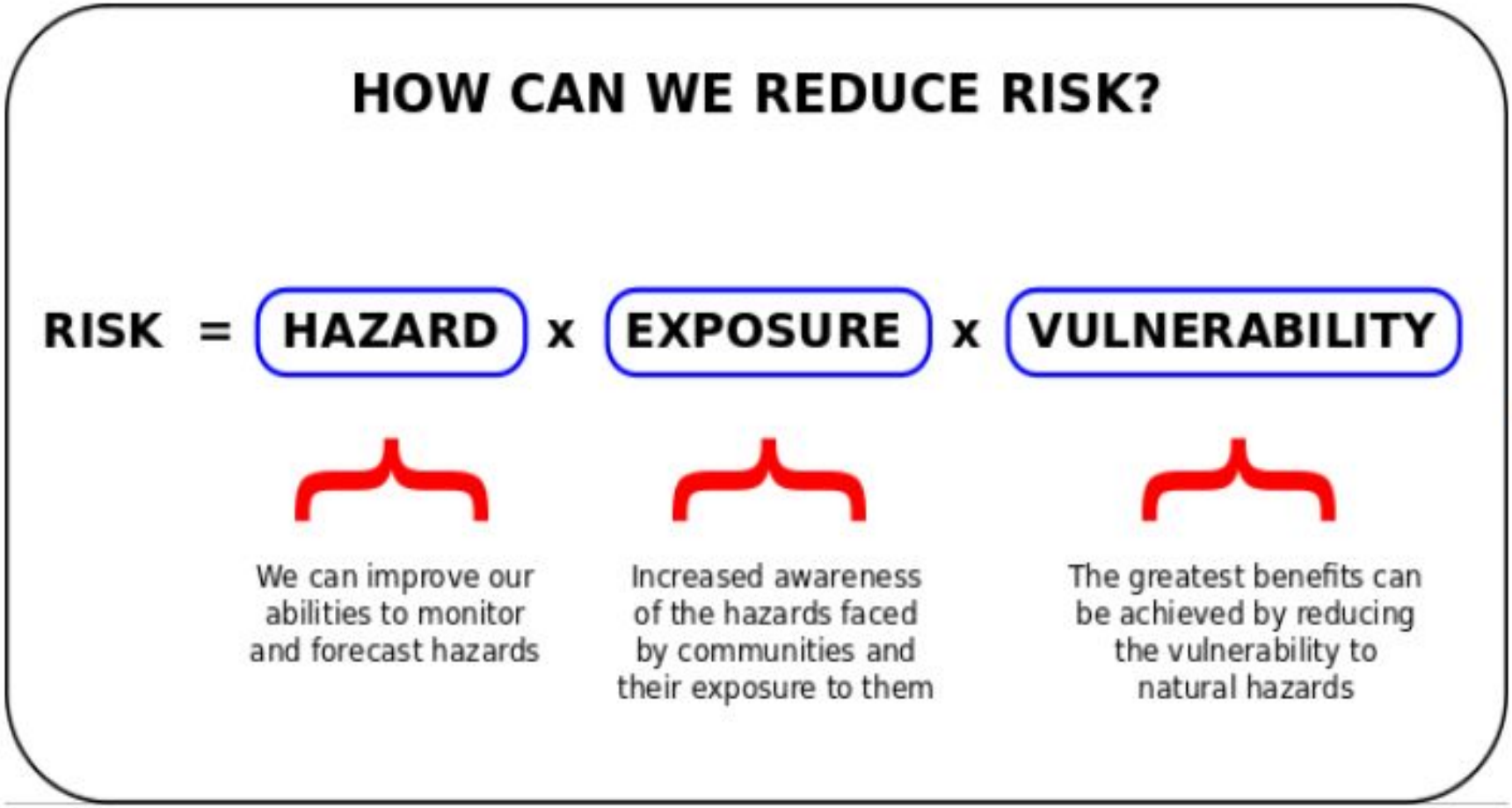


Hazards may be inevitable, but disasters can be prevented.

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

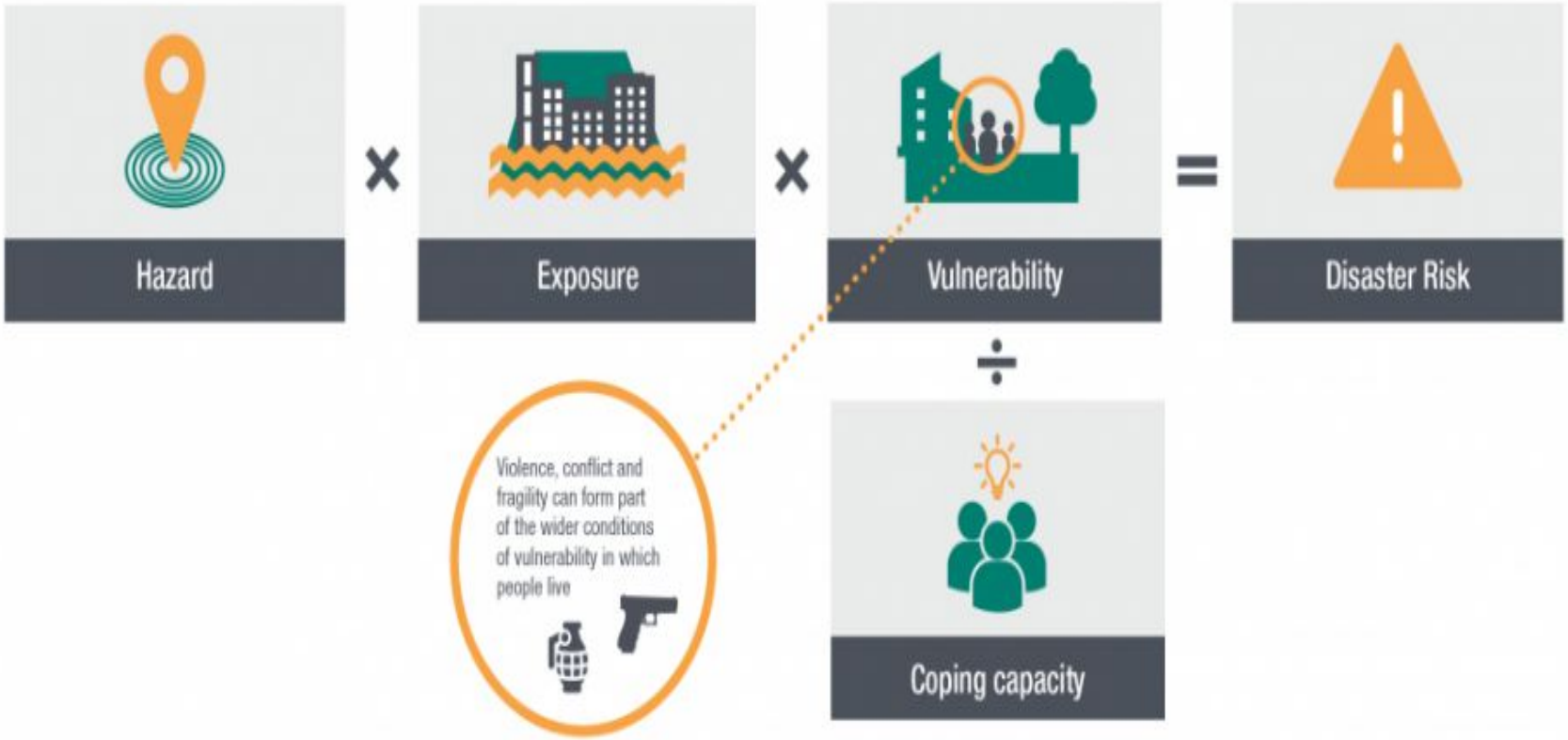
Exposure refers to people, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.

Risk


HOW CAN WE REDUCE RISK?
RISK = HAZARD x EXPOSURE x VULNERABILITY
We can improve our abilities to monitor and forecast hazards
Increased awareness of the hazards faced by communities and their exposure to them
The greatest benefits can be achieved by reducing the vulnerability to natural hazards

Disaster risk: where conflict fits in

Violence, conflict and fragility are part of the disaster risk equation – affecting how, where and when disasters happen – and need to be factored into strategies to reduce disaster impacts.



Vulnerability

(Basis of effect of hazard)

Physical	• Buildings/Infrastructure • Means of Communication
Social	• Social Interaction • Community Organisation
Economic	• Entrepreneurship • Savings/Earnings/Employable Skills
Attitudinal	• Ready to accept change • Collectivism Approach

Vulnerability

(Basis of effect of hazard)

1. ***Physical Vulnerability*** - influence of events on infrastructure, agriculture, etc. (site of settlement, and the design and materials used for housing)

2. ***Social Vulnerability*** – inability of the affected population (levels of literacy, good governance, social justice, conventional values, customs and ideological beliefs)

3. ***Economic Vulnerability*** – impact on assets and business process (economic status of individuals, communities and nations)

4. ***Environmental Vulnerability*** – natural resource depletion and resource degradation (pollution and soil erosion)

India's Vulnerability to Disaster

- **57%** land is vulnerable to **earthquakes.** Of these, **12%** is vulnerable to **severe earthquakes.**
- **68%** land is vulnerable to **drought.**
- **12%** land is vulnerable to **floods.**
- **8%** land is vulnerable to **cyclones.**
- Apart from natural disasters, **some cities** in India are also vulnerable to **chemical and industrial disasters** and **man-made disasters.**

- Northern mountain region prone to land slides, snow–storms , earthquakes
- Eastern coastal area prone to severe floods ,cyclones
- Western desert prone to draughts

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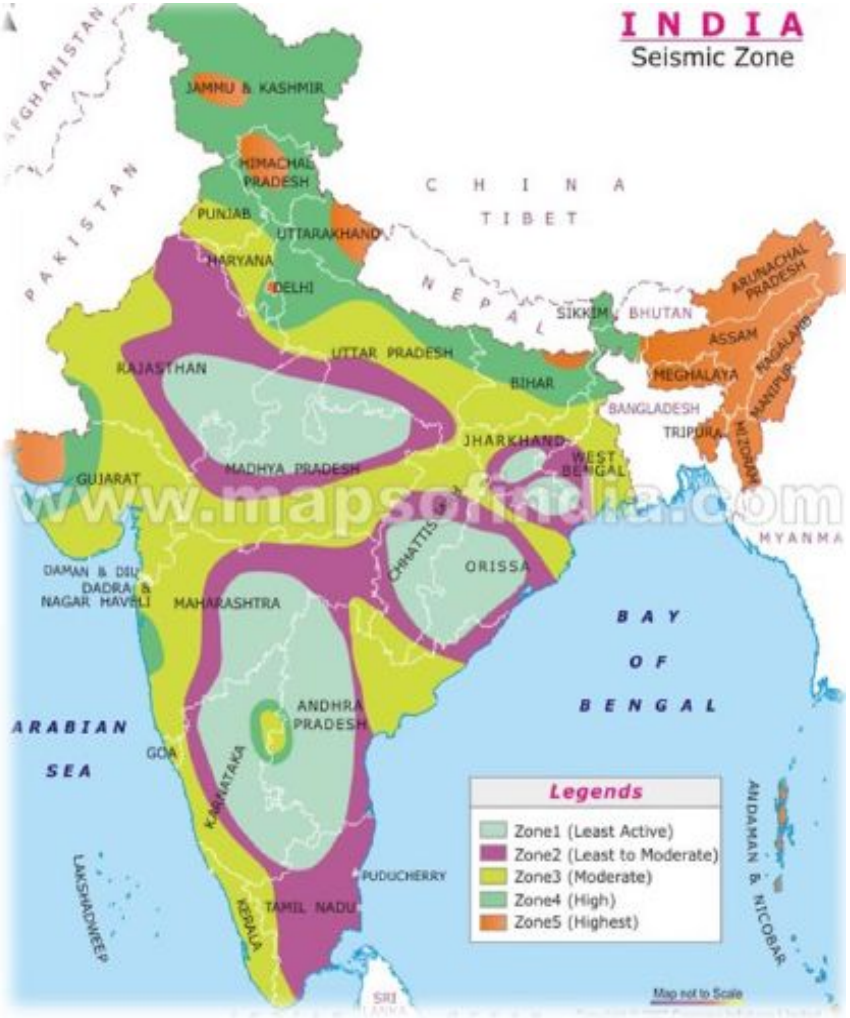
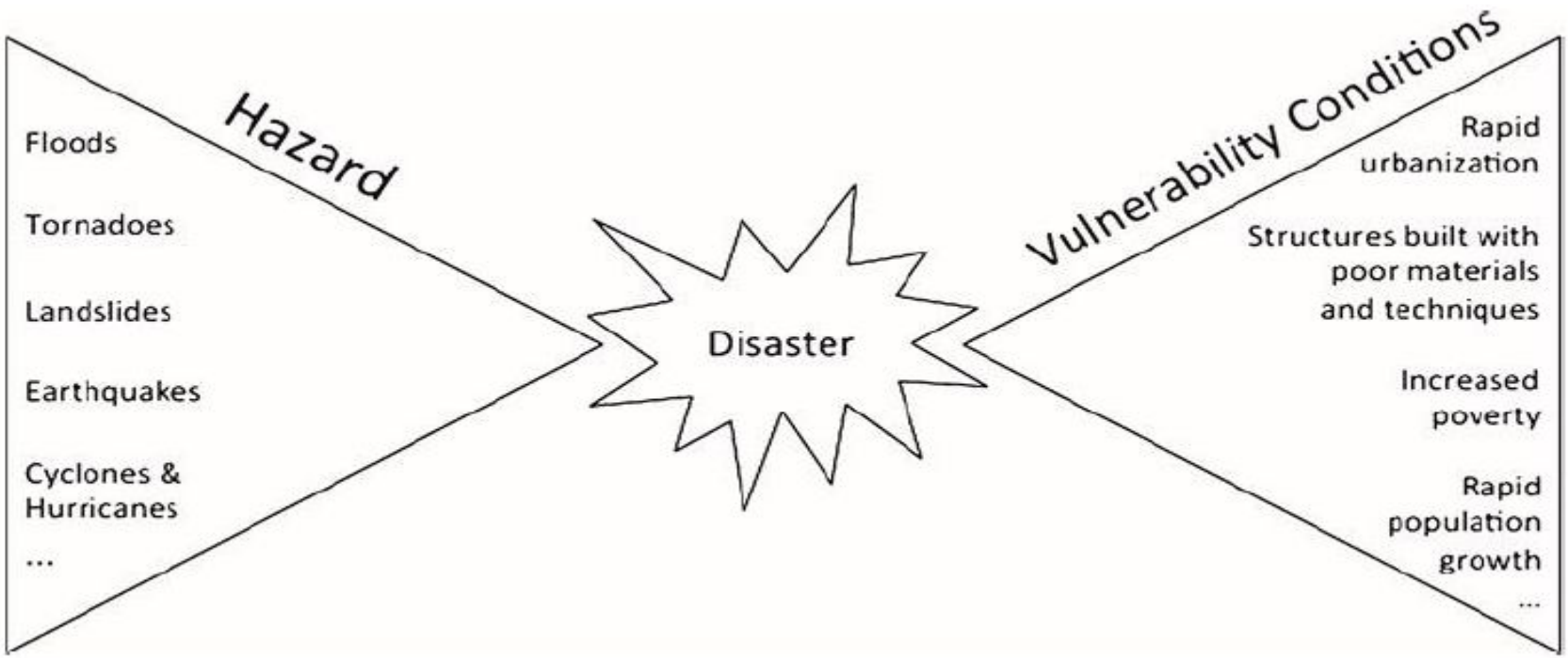
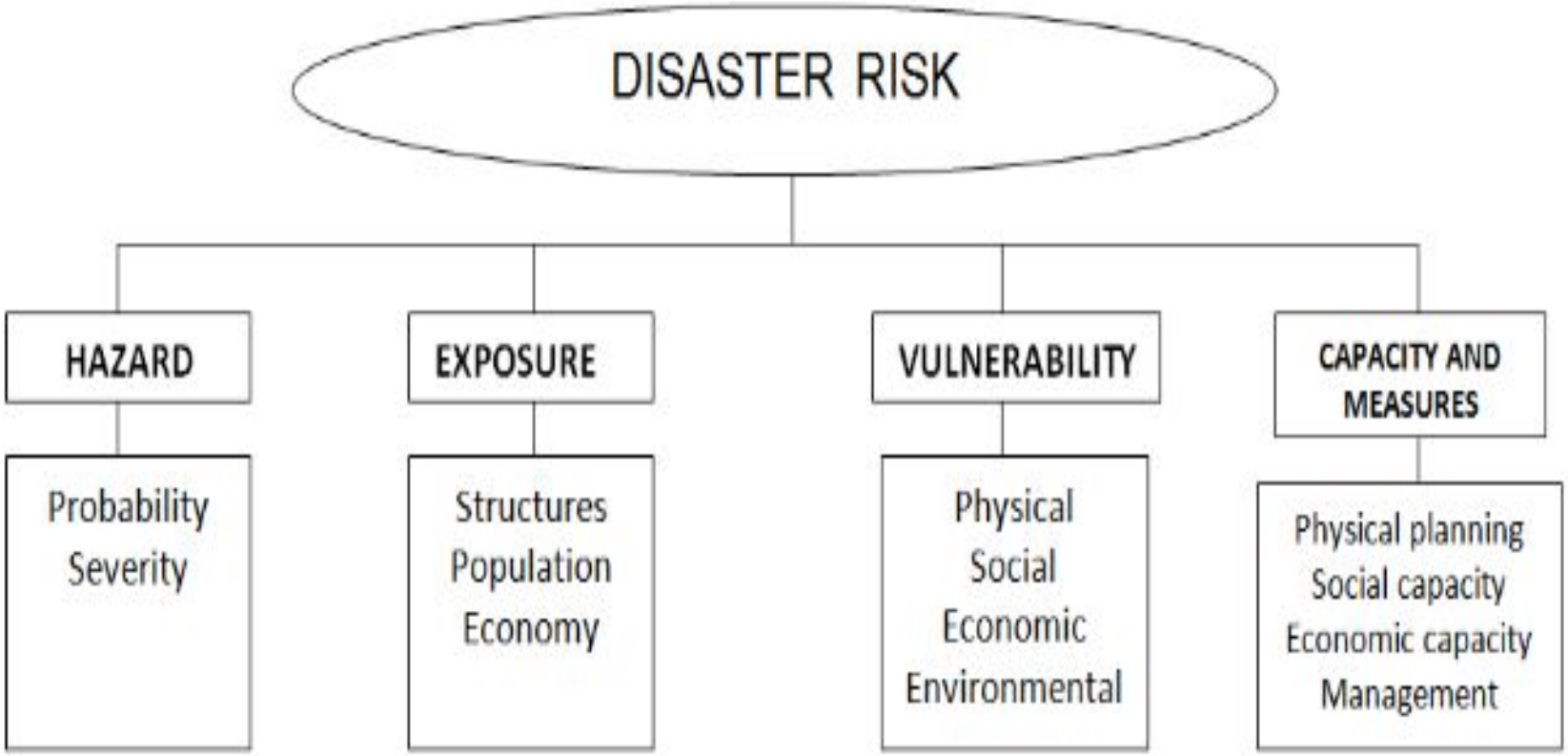
India's Vulnerability to Disaster



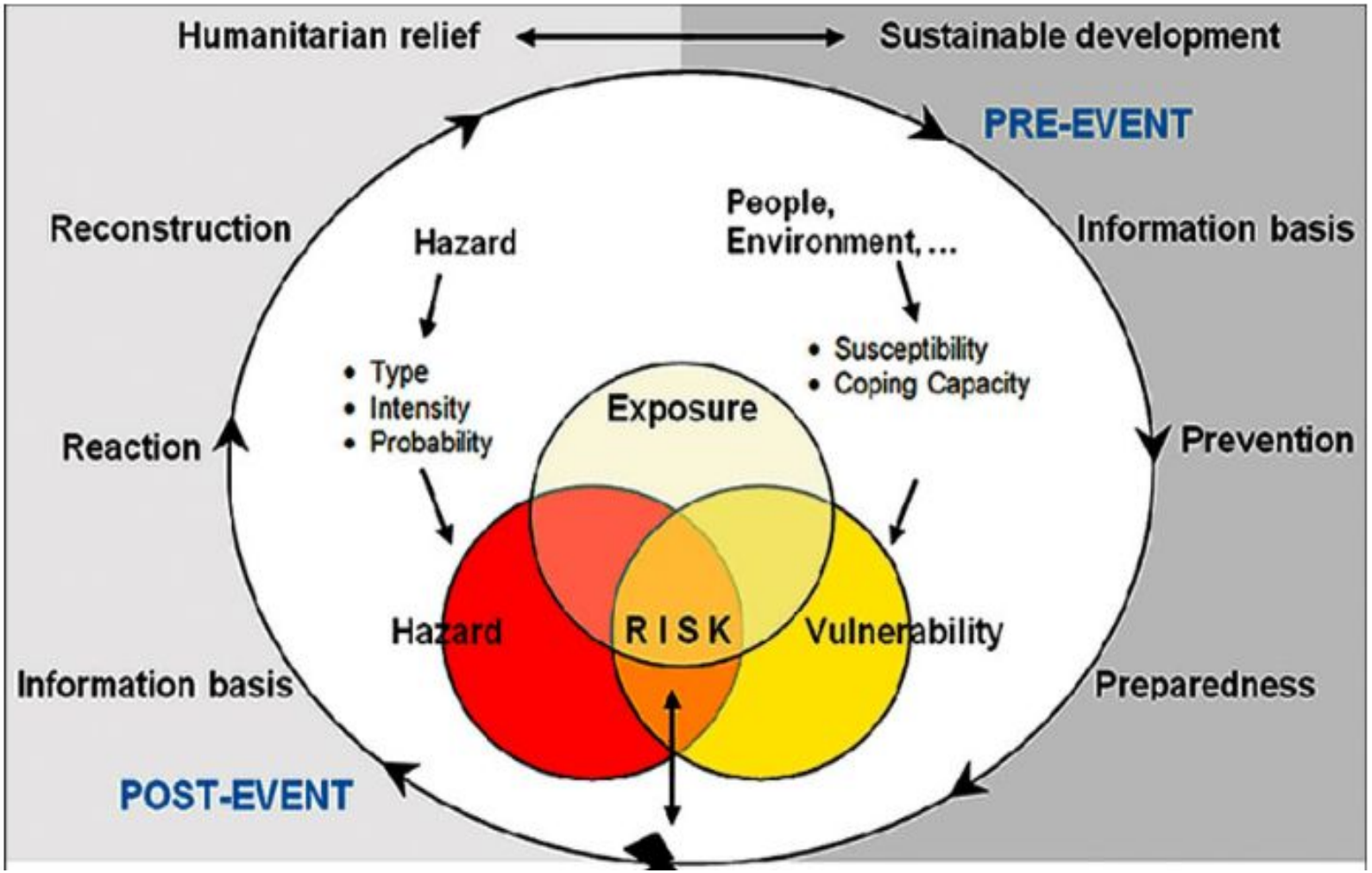
Hazard and Vulnerability



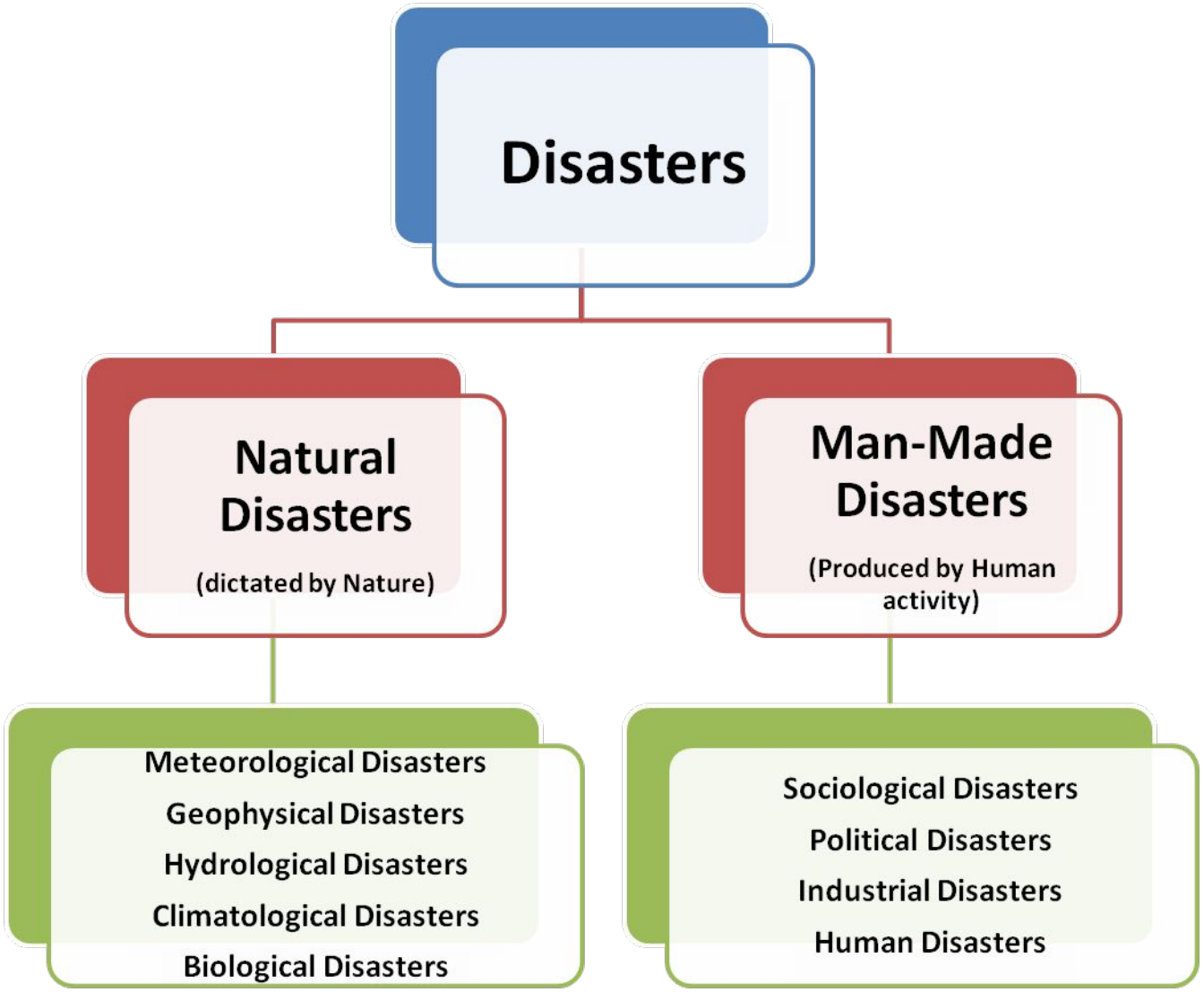
Conceptual Framework



Disaster Event



Disasters


Disasters
Natural Disasters
(dictated by Nature)
Man-Made Disasters
(Produced by Human activity)
Meteorological Disasters
Geophysical Disasters
Hydrological Disasters
Climatological Disasters
Biological Disasters
Sociological Disasters
Political Disasters
Industrial Disasters
Human Disasters

Types of Disasters

- ***Natural Disasters***

  This type of disasters often caused as a result of the natural forces and have to be accepted as unfortunate by the people. It includes droughts, hurricanes, floods, snow storms, volcanoes, sea surges, tsunamis, famines, and earthquake. Every year, there are natural disasters experienced in many different parts of the world. An earthquake in heavily populated areas often results in the loss of hundreds of lives.

- ***Man Made Disasters***

  The disasters that result from the human activities can be defined as the man made disasters and it causes harm to the animals, plants, and people. The man made disasters consists of fires, explosions, dam failures, nuclear reactor accidents, the release of toxic chemicals, wars and other similar types of activities.

When and Where it occurs ?

- ***Anytime*** and ***anywhere***, not confined to any part of the world.
- Some disasters can be ***predicted*** and whereas some ***cannot be predicted***.
- ***Warfare*** is a ***special category***, because it is well planned and damage is the intended goal of action.

Natural Disaster

Disaster Generic Group	Disaster Group	Disaster Main Type	Sub-type Disaster	Sub-subtype Disaster
Natural Disasters	Meteorological	Storm	Tropical Storm Extra-tropical Cyclone Local/Convective Storm	Thunderstorm/ Lightning Snow storm/ Sand storm/ Dust storm/ Tornado

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Natural Disaster

Disaster Generic Group	Disaster Group	Disaster Main Type	Sub-type Disaster	Sub-subtype Disaster
Natural Disasters	Geophysical	Earthquake Volcano Mass Movement (Dry)	Ground Shaking Tsunami Volcanic Eruption Rock fall Avalanche Landslide Subsidence	Snow avalanche Debris avalanche Mudslide Debris flow Sudden subsidence Long lasting subsidence

Natural Disaster

Disaster Generic Group	Disaster Group	Disaster Main Type	Sub-type Disaster	Sub-subtype Disaster
Natural Disasters	Hydrological	Flood	River Flood Coastal flood	-

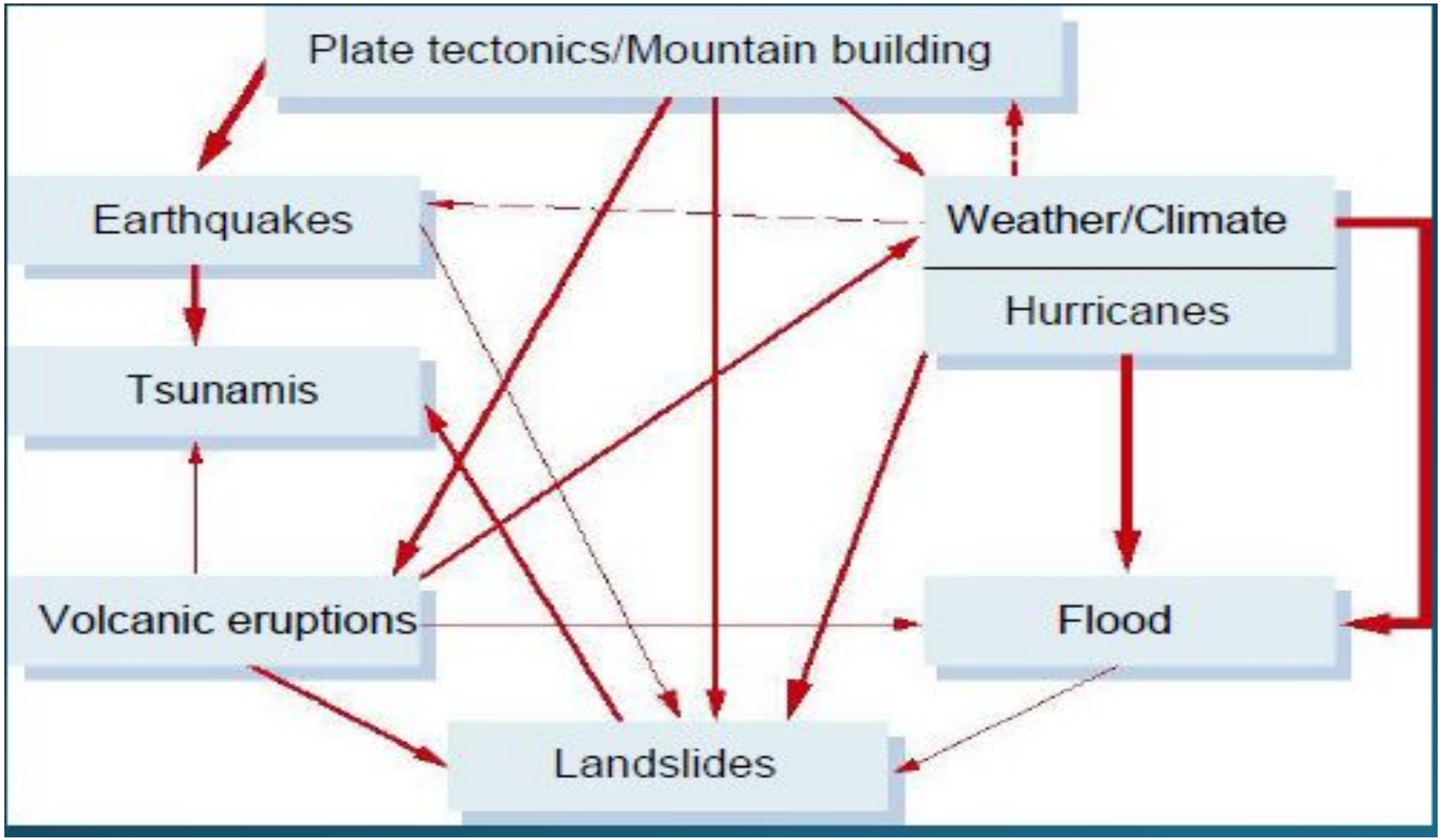
Natural Disaster

Disaster Generic Group	Disaster Group	Disaster Main Type	Sub-type Disaster	Sub-subtype Disaster
Natural Disasters	Climatological	Extreme temperature Drought Wild fire	Heat wave Cold wave Extreme Winter conditions Drought Forest Fire Land fire	Frost Snow pressure Icing Freezing rain

Natural Disaster

Disaster Generic Group	Disaster Group	Disaster Main Type	Sub-type Disaster	Sub-subtype Disaster
Natural Disasters	Biological	Epidemic Insect infestation	Viral, bacterial, fungal, parasitic infectious diseases Grasshopper/ Locust/Worm	-

Interactions among Natural Hazards



Man-Made Disaster

Disaster Generic Group	Disaster Group	Disaster Main Type	Sub-type Disaster	Sub-subtype Disaster
Man-Made Disasters	Sociological	Arson Civil Disorder Terrorism	-	-

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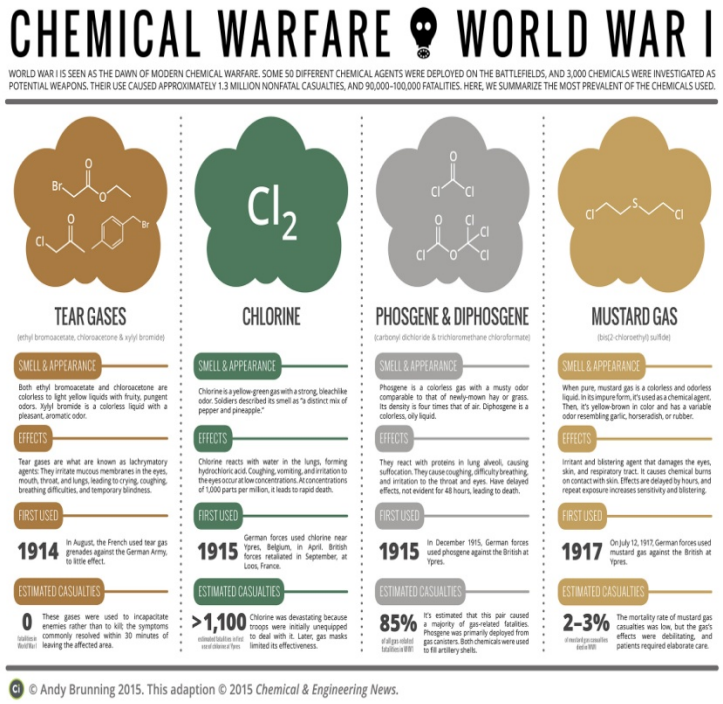
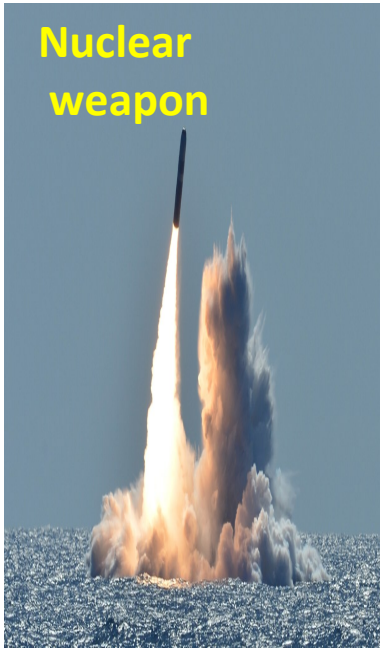
Man-Made Disaster

Disaster Generic Group	Disaster Group	Disaster Main Type	Sub-type Disaster	Sub-subtype Disaster
Man-Made Disasters	Political	War	Chemical weapons, Biological weapons, Nuclear weapons, Armed Conflict	-





Man-Made Disaster

Disaster Generic Group	Disaster Group	Disaster Main Type	Sub-type Disaster	Sub-subtype Disaster
Man-Made Disasters	Industrial	Chemical Spill Explosion Transport Accident Engineering failure	Nuclear Plants Airways, waterways, railways, roadways Structural Collapse	-


Chemical Spill


Explosion

Man-Made Disaster

Disaster Generic Group	Disaster Group	Disaster Main Type	Sub-type Disaster	Sub-subtype Disaster
Man-Made Disasters	Human	Human error of judgment Poisoning	Stampede, Road accidents, railway accidents, Airplane crash Food poisoning, Carbon monoxide poisoning	-


Land Slide


Volcanic Eruption


Cyclone


Earthquake


Iraq War


Terrorism


Oil Spillage


Floods

Major Disasters in India

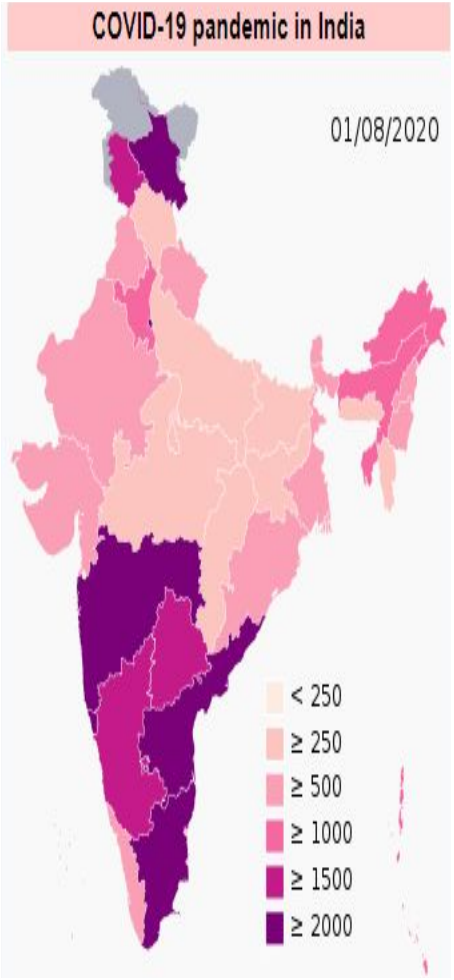
1984 – Bhopal Gas Tragedy

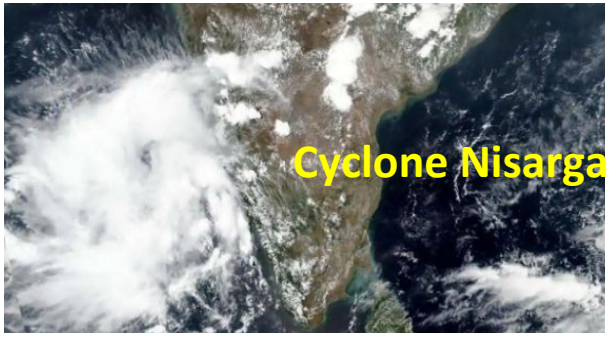
2001 – Gujarat Earthquake

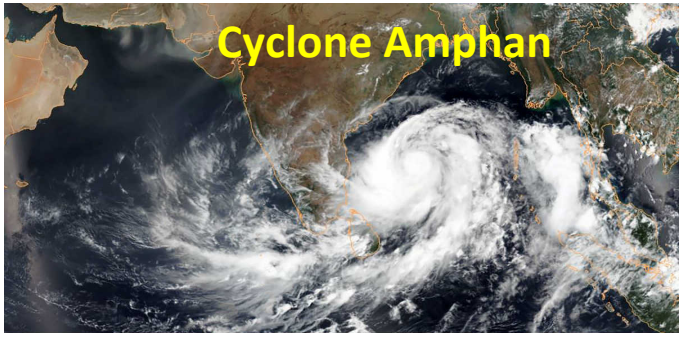
2004 – Tsunami Indian Ocean

2008 – Mumbai Attacks

Major Disasters in India 2020







Severity of the Impact

The severity of the impact depends upon many factors

- Predictability – Some of the disasters like cyclones, floods can be predicted and the degree of preparedness will be high
- Type of Disaster – In earthquakes, the mortality is high because the people get crushed below the falling objects and collapsed buildings
- Density and Population distribution
- Opportunity of warning
- Condition of the environment

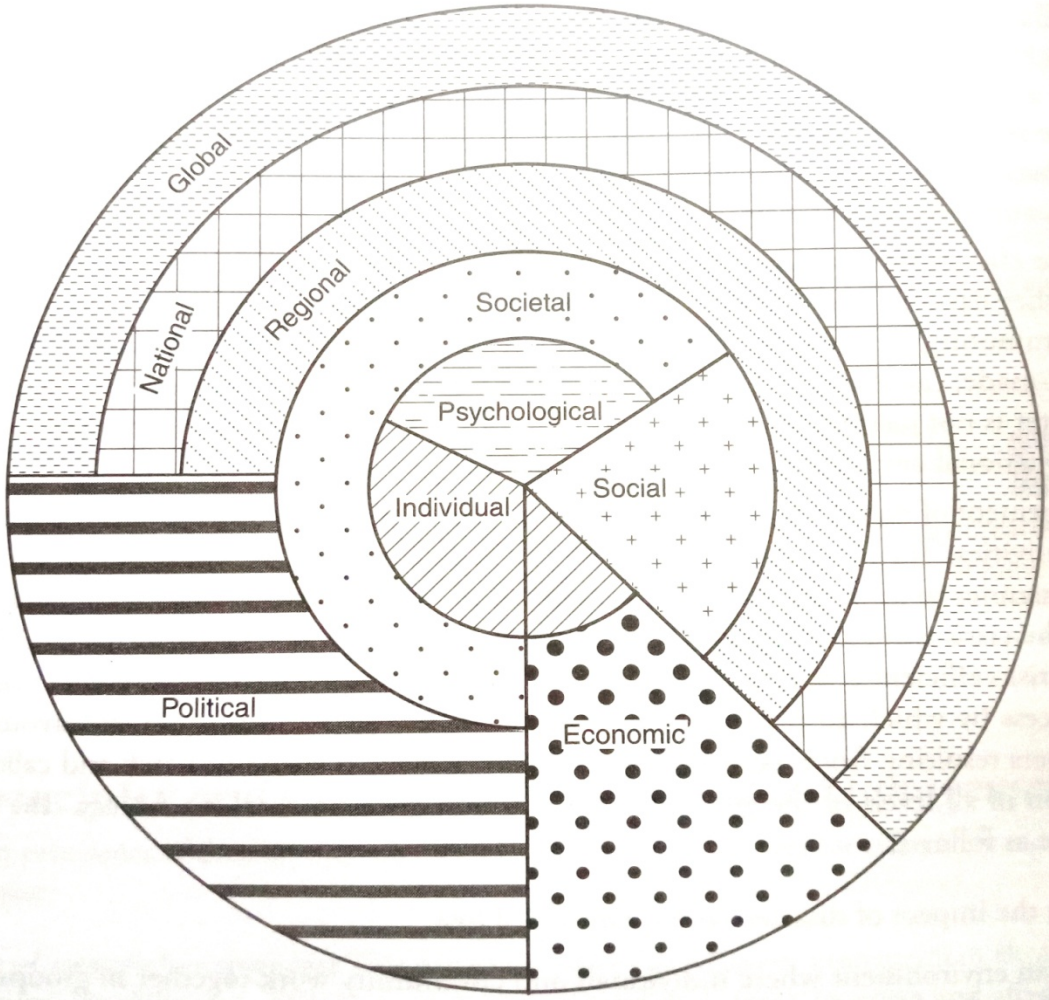
Elements at Risk

- 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

Effects of Disaster

- Deaths
- Disability
- Increase in communicable disease
- Psychological problems
- Food shortage
- Socioeconomic losses
- Shortage of drugs and medical supplies.
- Environmental disruption

Dimensions of Disaster



- Psychological – Individual
- Social – Individual and Societal
- Economic – Societal, Regional, National and Global
- Political – Regional, National and Global

Disaster Management

- Disaster management aims to reduce the occurrence of disasters and to reduce the impact of those that cannot be prevented
- Disaster Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters.
- In order for mitigation to be effective we need to take action now before the next disaster to reduce human and financial consequences later (analyzing risk, reducing risk, and insuring against risk).
- It is important to know that disasters can happen at any time and any place and if we are not prepared, consequences can be fatal.

Disaster Management

- The Disaster Management is a type of management and organization having resources and duties to deal with the entire human characteristics of the emergencies in a particular response, recovery, and preparedness to reducing the effect of the disasters. These organizations undertake the necessary steps for minimizing the impact of the disasters.

Objectives of Disaster Management

- 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.

Scope of Disaster Management

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

Principles of disaster management

- ***Comprehensive*** – disaster managers consider and take into account all hazards, all phases, and all impacts relevant to disasters.
- ***Progressive*** – anticipate future disasters and take preventive and preparatory measures
- ***Risk-driven*** – use sound risk management principles (hazard identification, risk analysis, and impact analysis) in assigning priorities and resources.
- ***Integrated*** – ensure unity of effort among all levels of government and all elements of a community.

Principles of disaster management

- ***Collaborative*** – create and sustain broad and sincere relationships among individuals and organizations .
- ***Coordinated*** – synchronize the activities to achieve a common purpose.
- ***Flexible*** – use creative and innovative approaches in solving disaster challenges.
- ***Professional*** – value a science and knowledge-based approach for continuous improvement.

International Organizations

International Organizations :

Organizations in INDIA :

FOR INFORMATION ON DISASTERS **DIAL TOLL FREE No. 1070**

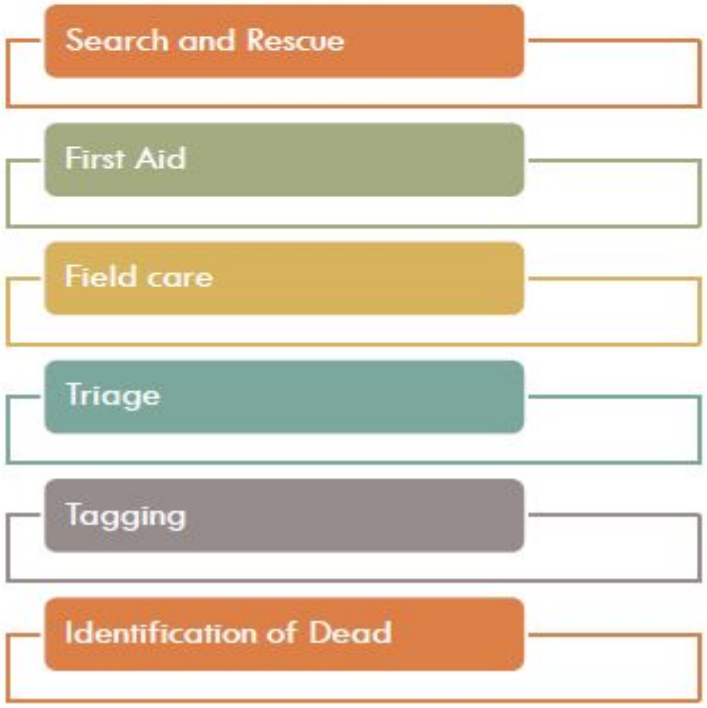
Log on to **http://www.ndmindia.nic.in**

Volunteers :

They form an important non-professional supporting team in disaster management.

Impact & Response :

- Greatest need for emergency care is in **1st few hours** after the impact.
- The management of mass casualties are divided into :



Search and Rescue & First-Aid :

- For search and rescue the team should be organised and work as one. Even with a good team the search may be a small fraction in major disasters.
- The immediate help is usually obtained from the uninjured

Field care :

- The injured people are brought to nearest health care immediately by available means of transport and people converge into health facilities.
- The hospitals must get ready to deal with mass input of injured with new priorities for bed availability and surgical services.
- Provision for food, shelter should be done.
- A centre to respond for the enquiries from patient's relatives and friends.
- Priority is given to :

  a. victims identification and

  b. adequate mortuary space.

Triage :

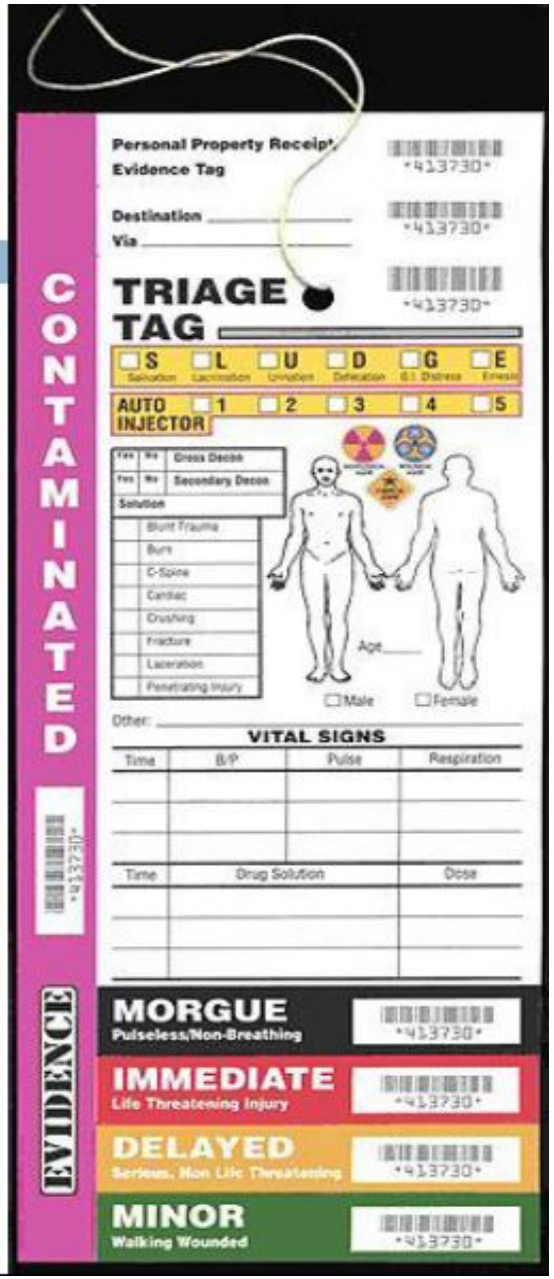
- It consists of **rapidly classifying** the injured on the basis of the severity of their injuries and their likelyhood of their survival with prompt medical intervention.
- The principle of **"First come, first serve" is NOT FOLLOWED**.
- High priority is given to those whose immediate or long term prognosis can be changed dramatically with simple intensive care.
- It is the only approach that can provide maximum benefit to large population in a major disaster.

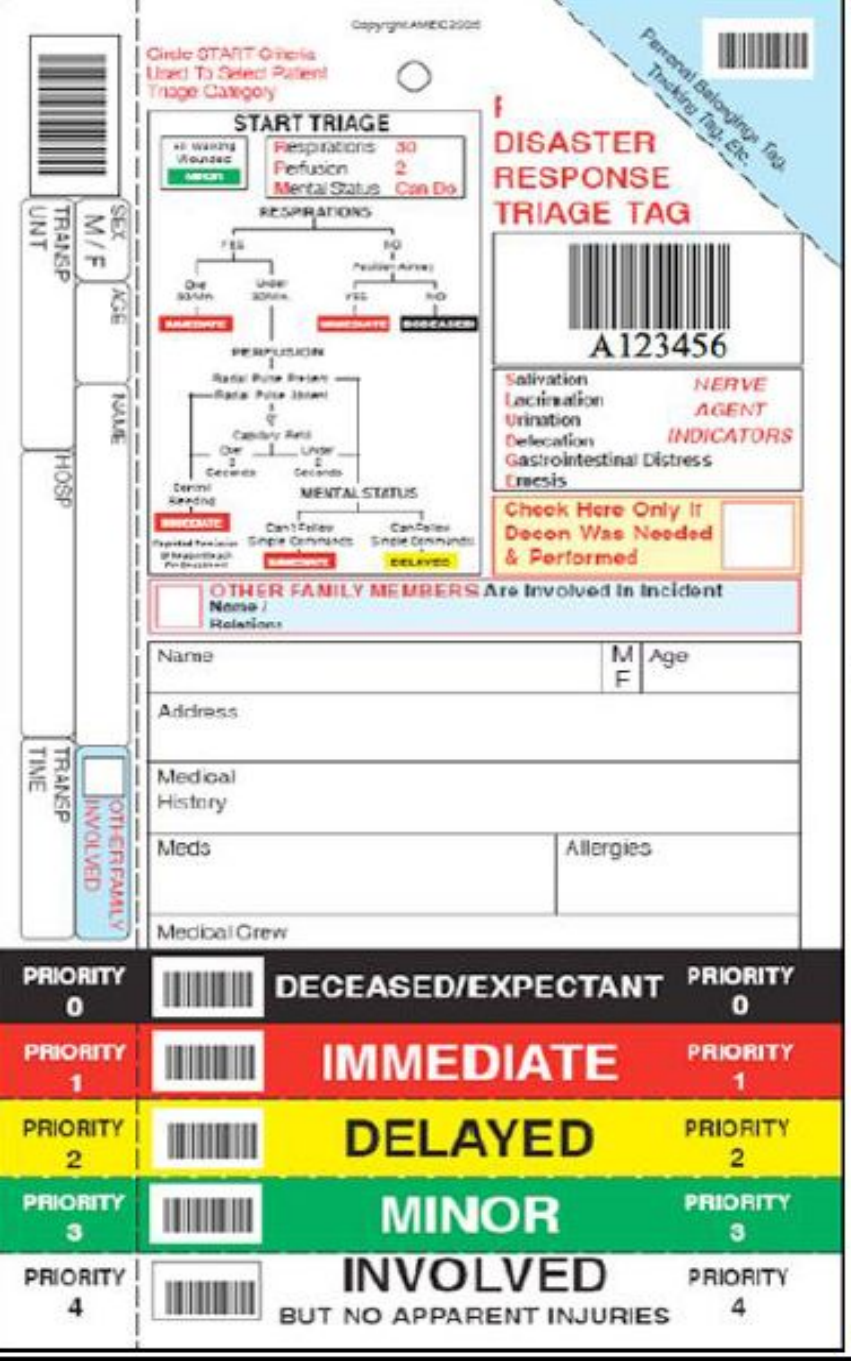
Colour coding in a Triage

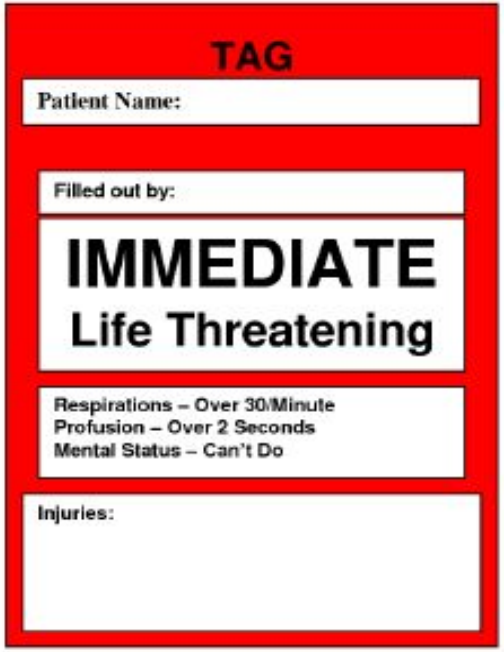
Internationally accepted four colour coding system :

- **Red** – High priority treatment or transfer.
- **Yellow** – Medium priority.
- **Green** – Ambulatory patients.
- **Black** – Dead or Moribound patients.

- ❑Triage should be carried out at the site of the disaster.
- ❑Local health workers should be taught the principles of triage as a part of disaster training.
- ❑People with minor injuries should be treated in their homes to avoid social dislocation and drain the resources which are needed by severely injured person.
- ❑All persons should be tagged with details – name, age, place of origin, triage, initial diagnosis and treatment.




Circle START Criteria Used To Select Patient Triage Category
START TRIAGE
Respirations 30
Perfusion 2
Mental Status Can Do
RESPIRATIONS
PERFUSION
MENTAL STATUS
DISASTER RESPONSE TRIAGE TAG
A123456
Salivation
Lacrimation
Urination
Defecation
Gastrointestinal Distress
Emesis
NERVE AGENT INDICATORS
Check Here Only If Decon Was Needed & Performed
OTHER FAMILY MEMBERS Are Involved In Incident
Name
M F
Age
Address
Medical History
Meds
Allergies
Medical Crew
SEX M / F
AGE
NAME
HOSP
TRANSP UNT
TRANSP TIME
OTHER FAMILY INVOLVED
PRIORITY 0
DECEASED/EXPECTANT
PRIORITY 1
IMMEDIATE
PRIORITY 2
DELAYED
PRIORITY 3
MINOR
PRIORITY 4
INVOLVED
BUT NO APPARENT INJURIES


TAG
Patient Name:
Filled out by:
IMMEDIATE
Life Threatening
Respirations – Over 30/Minute
Profusion – Over 2 Seconds
Mental Status – Can't Do
Injuries:


TRIAGE TAG
Patient Name:
Filled out by:
MINOR
Walking
All Walking Wounded are Classified as Minor.
Injuries:


TRIAGE TAG
Patient Name:
Filled out by:
DELAYED
Serious, Not Life Threatening
Respirations – Under 30/Minute
Profusion – Under 2 Seconds
Mental Status – Can Do
Injuries:


TRIAGE TAG
Patient Name:
Filled out by:
DEAD
No Respirations

Identification of Dead :

- Dead people care is most important in disaster management because they impede the efficiency of rescue activities.
- **Care of dead includes** :

1. Proper Respect.
2. Removal of dead from the scene.
3. Shifting to mortuary.
4. Identification.
5. Reception of bereaved relatives.

#Cadavers must be removed from water sources as they may cause outbreaks of gastroenteritis or food poisoning.

#The health hazards from the cadavers are outbreaks of cholera, typhoid, leptospirosis, anthrax, plague etc.

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.

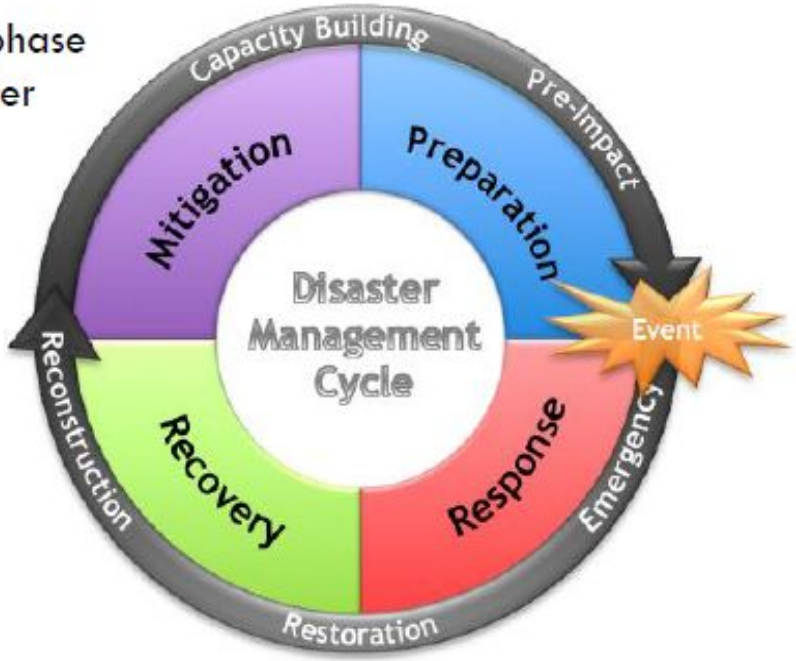
Phases of Management

- Disaster Response
- Disaster Rehabilitation
- Disaster Reconstruction

} Recovery phase after disaster

- Disaster Mitigation
- Disaster Preparedness

} Risk reduction phase before a disaster



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.

Mitigation

- Mitigation is the measures of reducing the effects of disasters before the disaster occurs. It is the initiative disaster management approach before the occurrence of disaster.

- It includes 3 phases:

a) ***DRR (Disaster Risk Reduction)***

Disaster Risk Reduction is the process of identifying, analysing, assessing the hazard, its risk, vulnerability and reducing the risk, vulnerability. With several assessment and approaches it is performed. It increases capacity and decreases vulnerability by reducing risk.

Mitigation

b) Capacity Building

In this step, government, NGO and several national, international organization work to build up capacity of people who are at risk and decrease their vulnerability. This capacity is build up by creating awareness, social events, news and information dissemination etc.

c) Adaptation

It is the process of coping with the environment. It is the way by which people are being used to survive in reverse environment. Such as: Climate change adaptation.

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.

Preparedness

- Preparedness is the emergency precautions and planning which is taken before the occurrence of disaster thus it cannot effect so much.

a) Planning

In the planning phase organization and government make a proper emergency plan that how they respond when the disaster occurs. The manage available transport, relief to fight against disaster.

Preparedness

b) Early Warning

It is the warning phase to aware people about upcoming disaster by using the communication and technology. This warning information is given after forecasting and analysing weather, climate, location data etc.

c) Coordination

It is the integration of national, international, community and society based all kind of organizations to work for disaster management. It helps to integrate several organizations and makes among different organizations. During Disaster

Preparedness

Disaster Preparedness Framework

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

Response

- In this phase government and several organizations respond to disaster affected people with all kinds of facilities thus they can survive. The main responsibility in that time is to rescue the affected people and give them relief.

a) Collaboration

It is the systematic process of working several organizations with each other. They cooperate each other to achieve the goal and help the vulnerable people.

b) Communication, Networking & Transportation

Communication is a vital part of response system in disaster management. Transportation and networking are integrated part of it. With the help of science and technology communication is getting much easier day by day. Quick and effective communication system can reduce the disaster effect so much. There are several tools make a great impact in networking system like GPS, GIS, other remote sensing tools etc.

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

- After the dangerous effect of disaster people don't have enough capacity to recover their condition like before. Then it is important to help them for reconstructing their lives and livings.

a) Rehabilitation

Rehabilitation is very important after disaster period to return their normal life. This time the vulnerable people need physical and mental support. Rehabilitation can be structural and non-structural. This phase main thing is to ensure people both economic and mental (advise, counselling etc.) support.

b) Reconstruction

Reconstruction is the final step of disaster management. Restoration and recreation of the settlements, infrastructures, houses etc. like before thus the community, society and individual can regain their settlements are the main process of this phase.

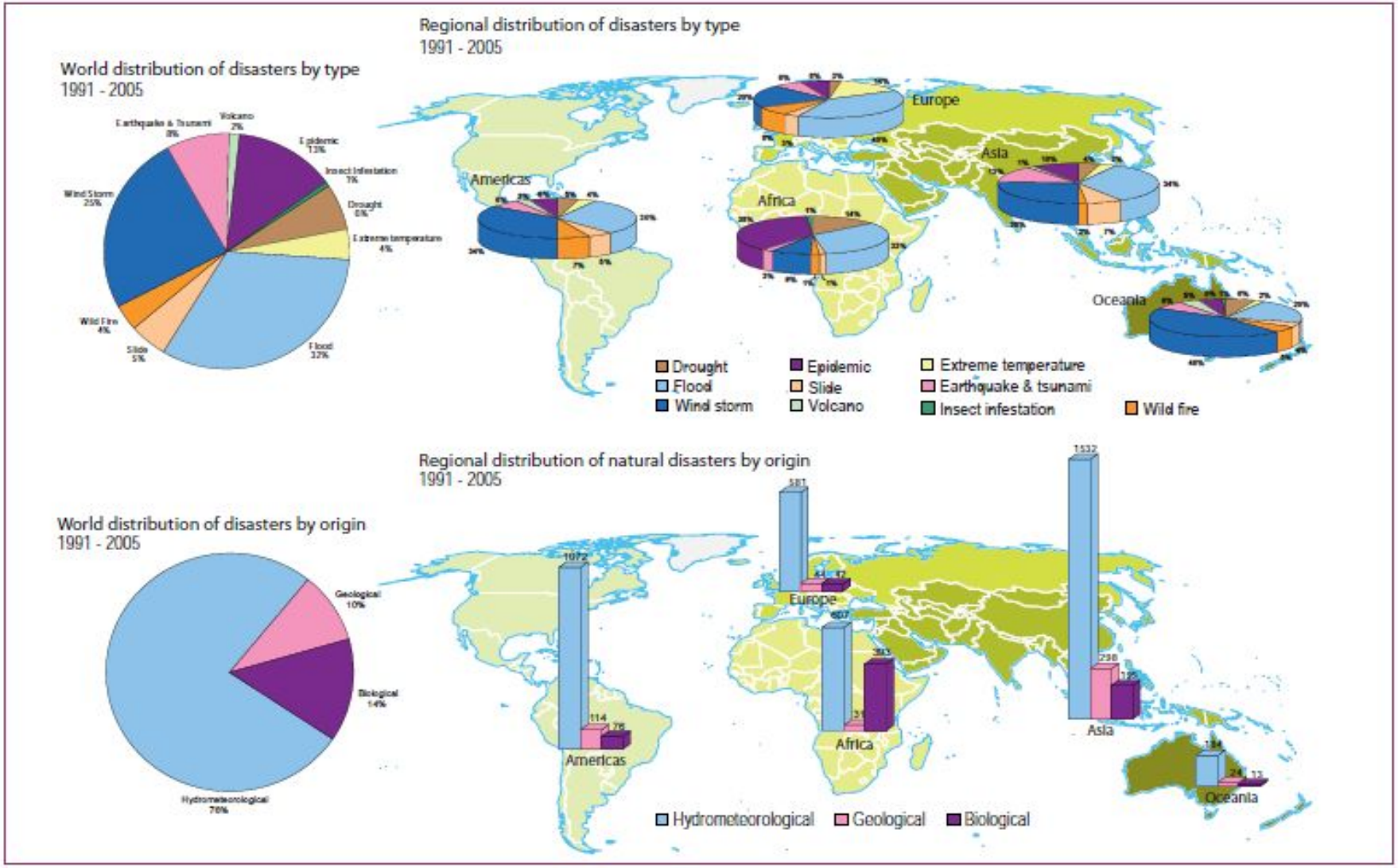
Recovery

Activities following a disaster

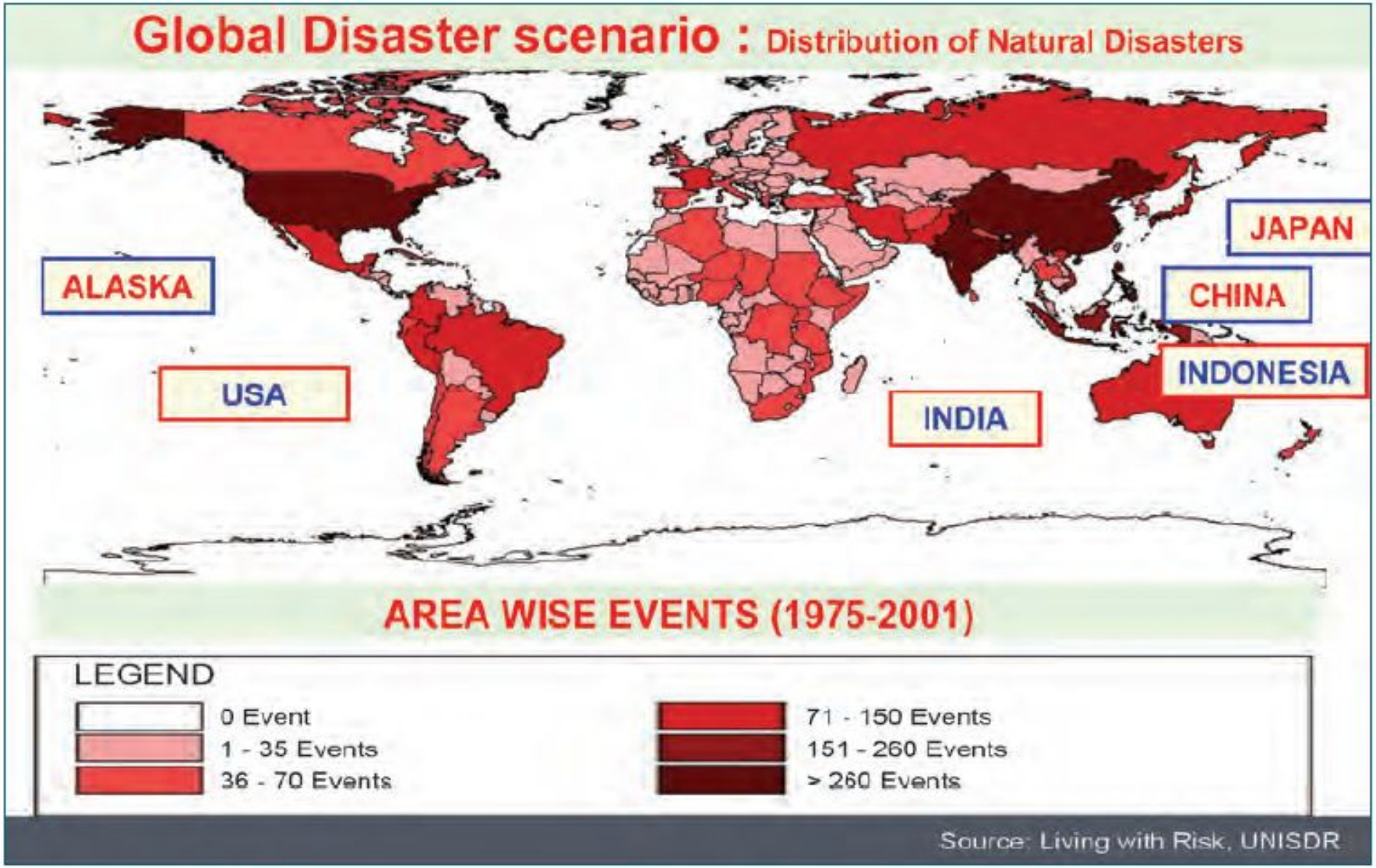
- Ex.. Temporary housing, claims processing and grants, long term medical care and counselling
- The aim of the recovery phase is to restore the affected area to its previous state.
- Includes actions that assist a community to return to a sense of normalcy after a disaster.

What is Multi-Hazard?

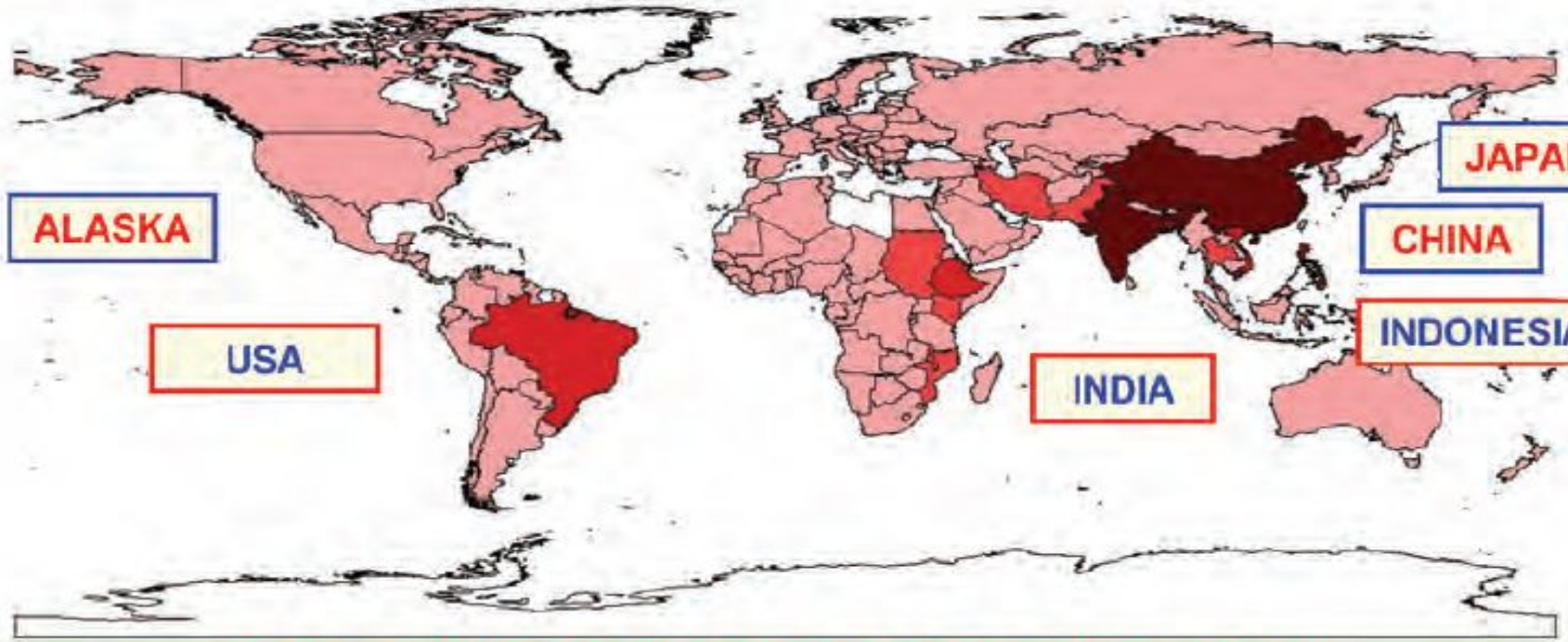
'Multi-hazard' to describe the independent analysis of multiple different hazards (e.g., landslides, earthquakes, volcanic eruptions, flooding) relevant to a given area



Source: Centre for Research on Epidemiology of Disaster


Global Disaster scenario : Distribution of Natural Disasters
ALASKA
USA
INDIA
JAPAN
CHINA
INDONESIA
AREA WISE EVENTS (1975-2001)
LEGEND
0 Event
1 - 35 Events
36 - 70 Events
71 - 150 Events
151 - 260 Events
> 260 Events
Source: Living with Risk, UNISDR

Distribution of People Affected

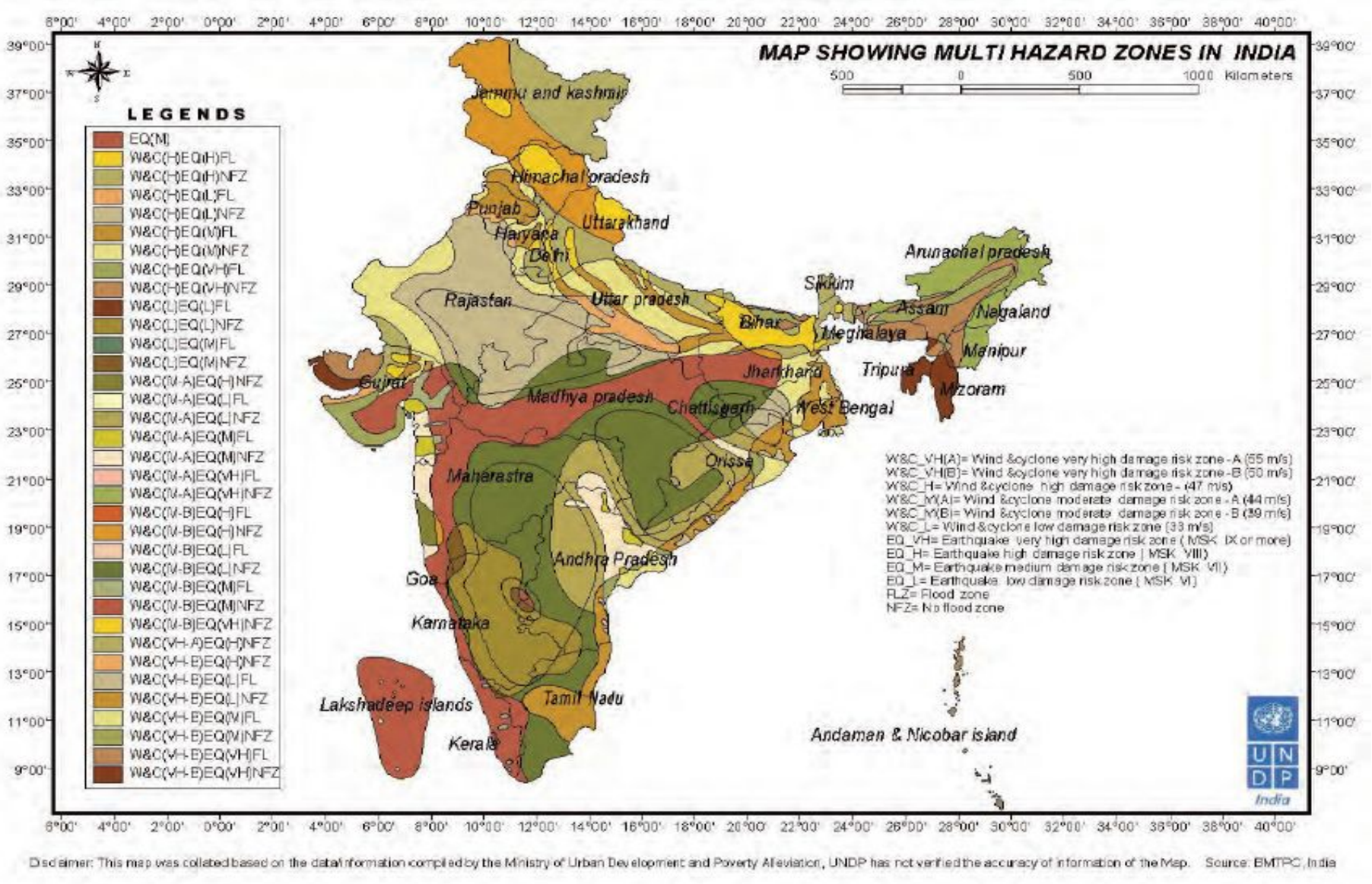


AFFECTED BY NATURAL DISASTERS (1975-2001)

LEGEND

- Zero
- One to 18 Million
- 18 to 48 Million
- 48 Million to One Billion
- One Billion to 3.5 Billion
- More than 3.5 Million

Source: Living with Risk, UNISDR



Disclaimer: This map was collated based on the data/information compiled by the Ministry of Urban Development and Poverty Alleviation, UNDP has not verified the accuracy of information of the Map. Source: BMTPC, India

India's Deadliest Disasters

Sl. No.	Name of Event	Year	State & Area	Fatalities
In the Known History				
1.	Earthquake	1618	Mumbai, Maharashtra	2,000 deaths
2.	Bengal Earthquake	1737	Bengal	300, 000 deaths
3.	Cyclone	1864	Kolkata, West Bengal	60,000 deaths
4.	The Great Famine	1876-1878	Southern India	58.5 million people affected 5.5 million deaths due to starvation
5.	Cyclone	1882	Bombay, Maharashtra	100,000 deaths
6.	The Indian famine	1896-1897	Whole India	1.25 million to 10 million deaths
7	Earthquake	1934	Bihar	6,000 deaths
8	Bhola Cyclone	1970	West Bengal	500,000 deaths (including Hindu Kush Himalayas and surrounding areas)
9	Drought	1972	Large part of the country	200 million people affected
10	Drought	1987	Haryana	300 million people affected
In the Last Century				
1	Earthquake	1905	Kangra, Himachal Pradesh	20,000 deaths
2	Cyclone	1977	Andhra Pradesh	10,000 deaths hundreds of thousands homeless 40,000 cattle deaths. Destroyed 40% of India's food grains.
3	Latur Earthquake	1993	Latur, Marthawada, region of the Maharashtra	7,928 people died and another 30,000 were injured.
4	Orissa Super Cyclone	1999	Orissa	10,000 deaths
5	Gujarat Earthquake	2001	Bhuj, Bachau, Anjar, Ahmedabad, and Surat in Gujarat State	25,000 deaths 6.3 million people affected

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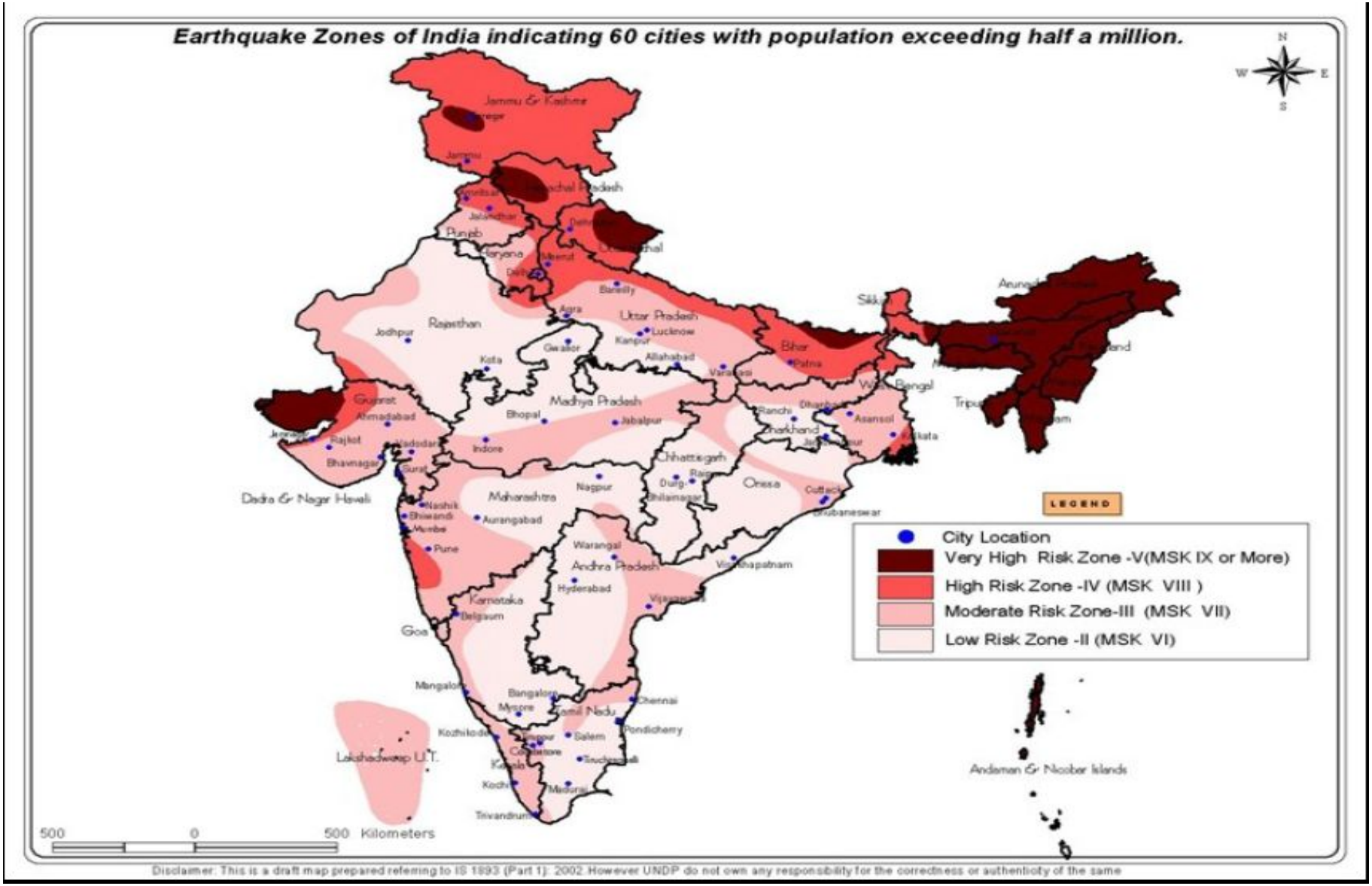
6	Tsunami	2004	coastline of Tamil Nadu, Kerala, Andhra Pradesh and Pondicherry, as well as the Andaman and Nicobar Islands of India	10,749 deaths 5,640 persons missing 2.79 million people affected 11,827 hectares of crops damaged 300,000 fisher folk lost their livelihoods
7	Maharashtra floods	July 2005	Maharashtra State	1094 deaths 167 Injured 54 Missing
8	Kashmir Earthquake	2005	Kashmir State	86000 deaths (includes Kashmir & surrounding Himalayan region)
9	Kosi Floods	2008	North Bihar	527 Deaths 19323 Livestock perished 222754 Houses damaged 3329423 persons affected
10	Cyclone Nisha	2008	Tamil Nadu	204 deaths $800 million worth damages

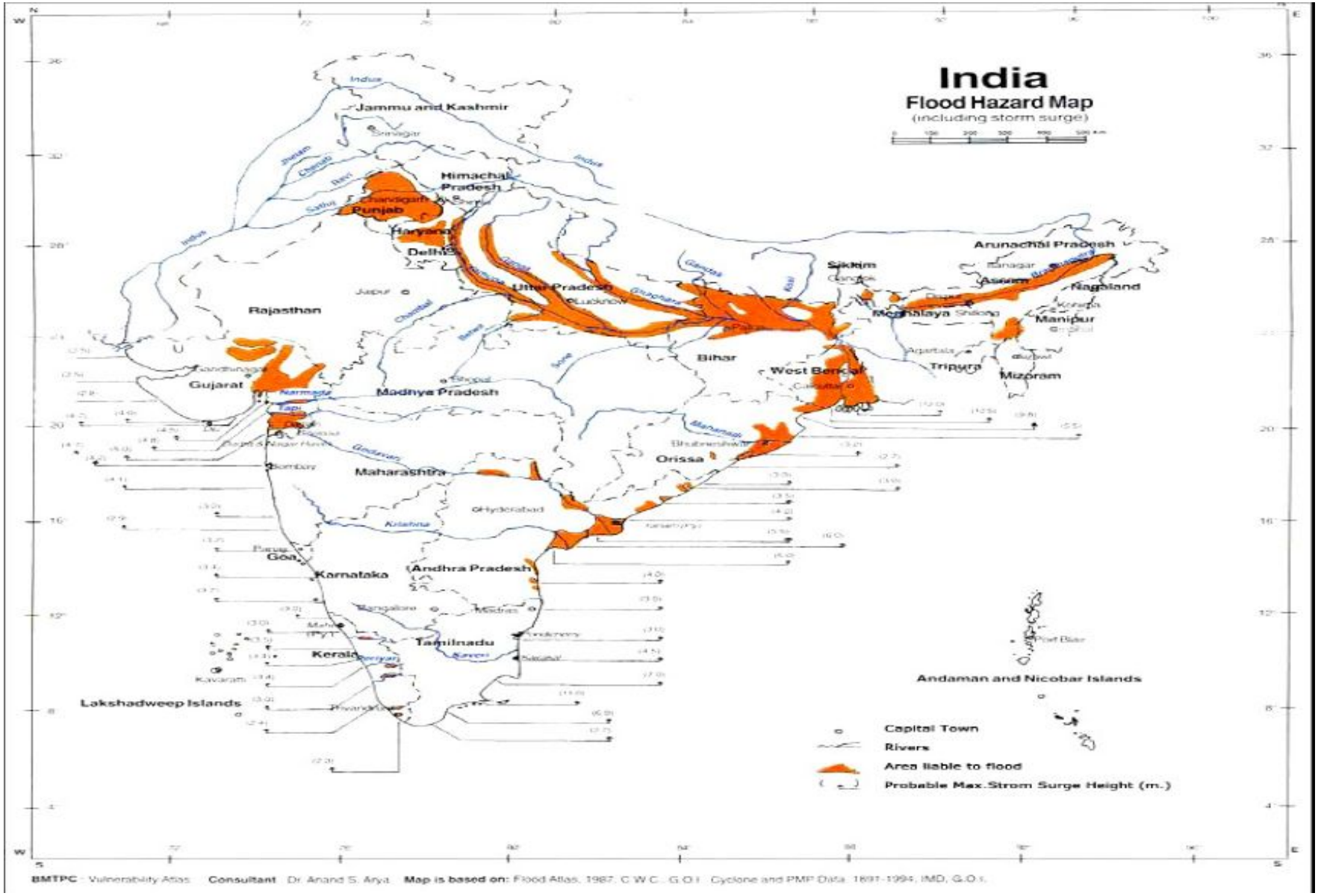
Earthquakes

- Of the earthquake prone areas, 12% is prone to very severe earthquakes,18% to severe earthquakes and 25% to damageable earthquakes.
- The biggest quakes occur in the Andaman and Nicobar Islands, Kutch, Himachal and the NorthEast. The Himalayan regions are particularly prone to earthquakes.
- The last two major earthquakes shook Gujarat and Jammu and Kashmir.
- Many smaller scale quakes occurred in other parts of India in 2006.
- All 7 North East states of India – Assam, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura and Megalaya; Andaman & Nicobar Islands; and parts of 6 other states in the North/NorthWest (Jammu and Kashmir, Uttaranchal, Bihar) and West (Gujarat), are in Seismic Zone V.


Earthquake Zones of India indicating 60 cities with population exceeding half a million.
N
W
E
S
Jammu & Kashmir
Punjab
Haryana
Rajasthan
Uttar Pradesh
Bihar
Gujarat
Madhya Pradesh
Maharashtra
Chhattisgarh
Orissa
Andhra Pradesh
Karnataka
Goa
Tamil Nadu
Lakshadweep U.T.
Andaman & Nicobar Islands
Dadra & Nagar Haveli
Delhi
Jodhpur
Kota
Gwalior
Agra
Bareilly
Lucknow
Kanpur
Allahabad
Patna
Bhopal
Jabalpur
Indore
Ahmadabad
Rajkot
Bhavnagar
Surat
Nagpur
Nashik
Aurangabad
Pune
Warangal
Hyderabad
Belgaum
Mangalore
Bangalore
Mysore
Chennai
Pondicherry
Salem
Coimbatore
Kochi
Madurai
Trivandrum
Ranchi
Asansol
Kolkata
Cuttack
Bhubaneswar
Vishakhapatnam
LEGEND
City Location
Very High Risk Zone -V(MSK IX or More)
High Risk Zone -IV (MSK VIII)
Moderate Risk Zone-III (MSK VII)
Low Risk Zone -II (MSK VI)
500 0 500 Kilometers
Disclaimer: This is a draft map prepared referring to IS 1893 (Part 1): 2002. However UNDP do not own any responsibility for the correctness or authenticity of the same

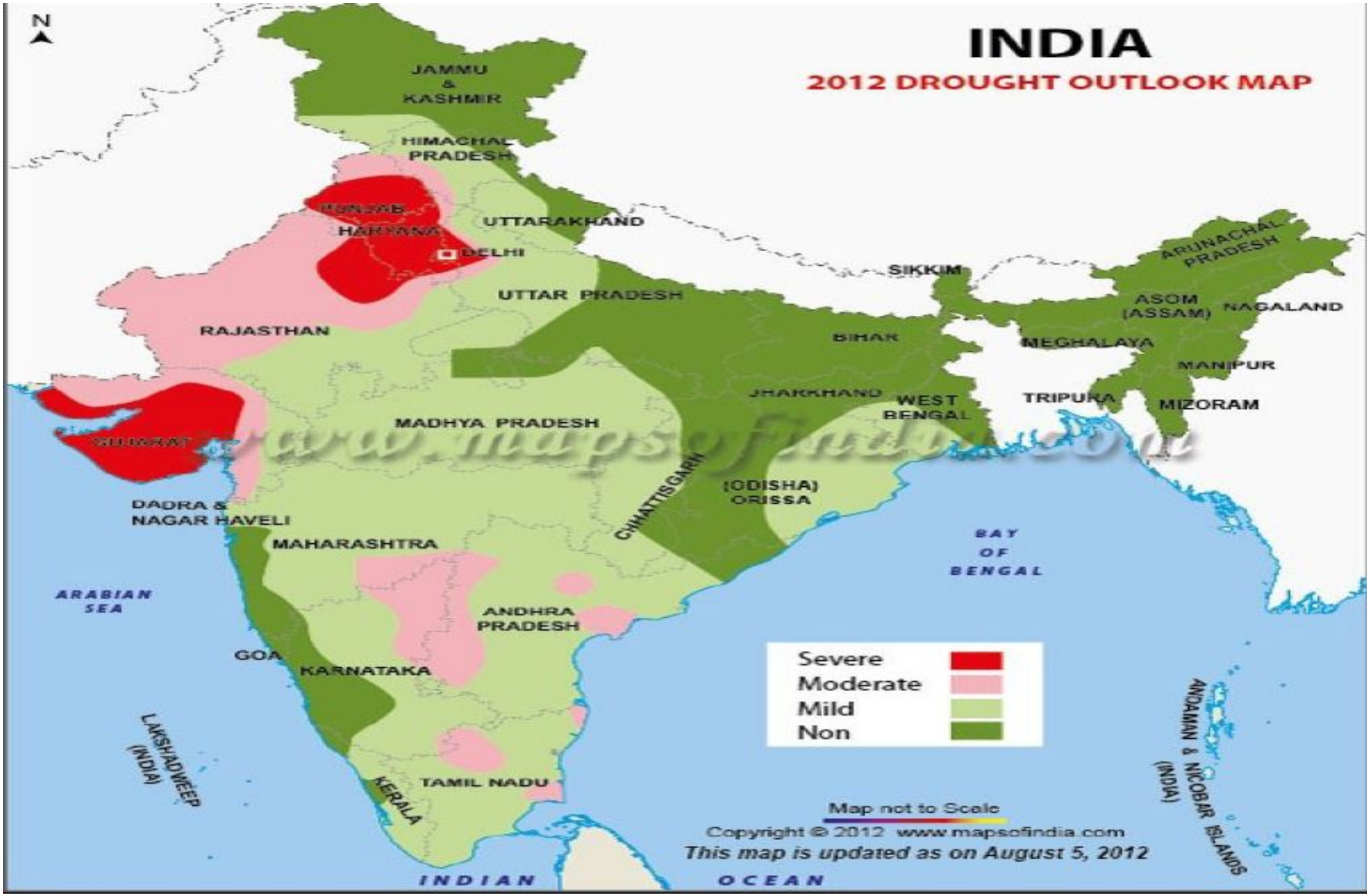
Floods

- About 30 million people are affected annually. Floods in the Indo–Gangetic–Brahmaputra plains are an annual feature. On an average, a few hundred lives are lost, millions are rendered homeless and several hectares of crops are damaged every year.
- Nearly 75% of the total rainfall occurs over a short monsoon season (June – September). 40 million hectares, or 12% of Indian land, is considered prone to floods.
- Floods are a perennial phenomenon in at least 5 states – Assam, Bihar, Orissa , Uttar Pradesh and West Bengal. On account of climate change, floods have also occurred in recent years in areas that are normal not flood prone. In 2006, drought prone parts of Rajasthan experienced floods.


India
Flood Hazard Map
(including storm surge)
Jammu and Kashmir
Himachal Pradesh
Punjab
Haryana
Delhi
Rajasthan
Uttar Pradesh
Bihar
Sikkim
Arunachal Pradesh
Assam
Nagaland
Meghalaya
Manipur
Tripura
Mizoram
West Bengal
Gujarat
Madhya Pradesh
Orissa
Maharashtra
Andhra Pradesh
Goa
Karnataka
Tamilnadu
Kerala
Lakshadweep Islands
Andaman and Nicobar Islands
Capital Town
Rivers
Area liable to flood
Probable Max.Strom Surge Height (m.)
BMTPC : Vulnerability Atlas Consultant Dr. Anand S. Arya Map is based on: Flood Atlas, 1987, C.W.C., G.O.I. Cyclone and PMP Data 1891-1994, IMD, G.O.I.

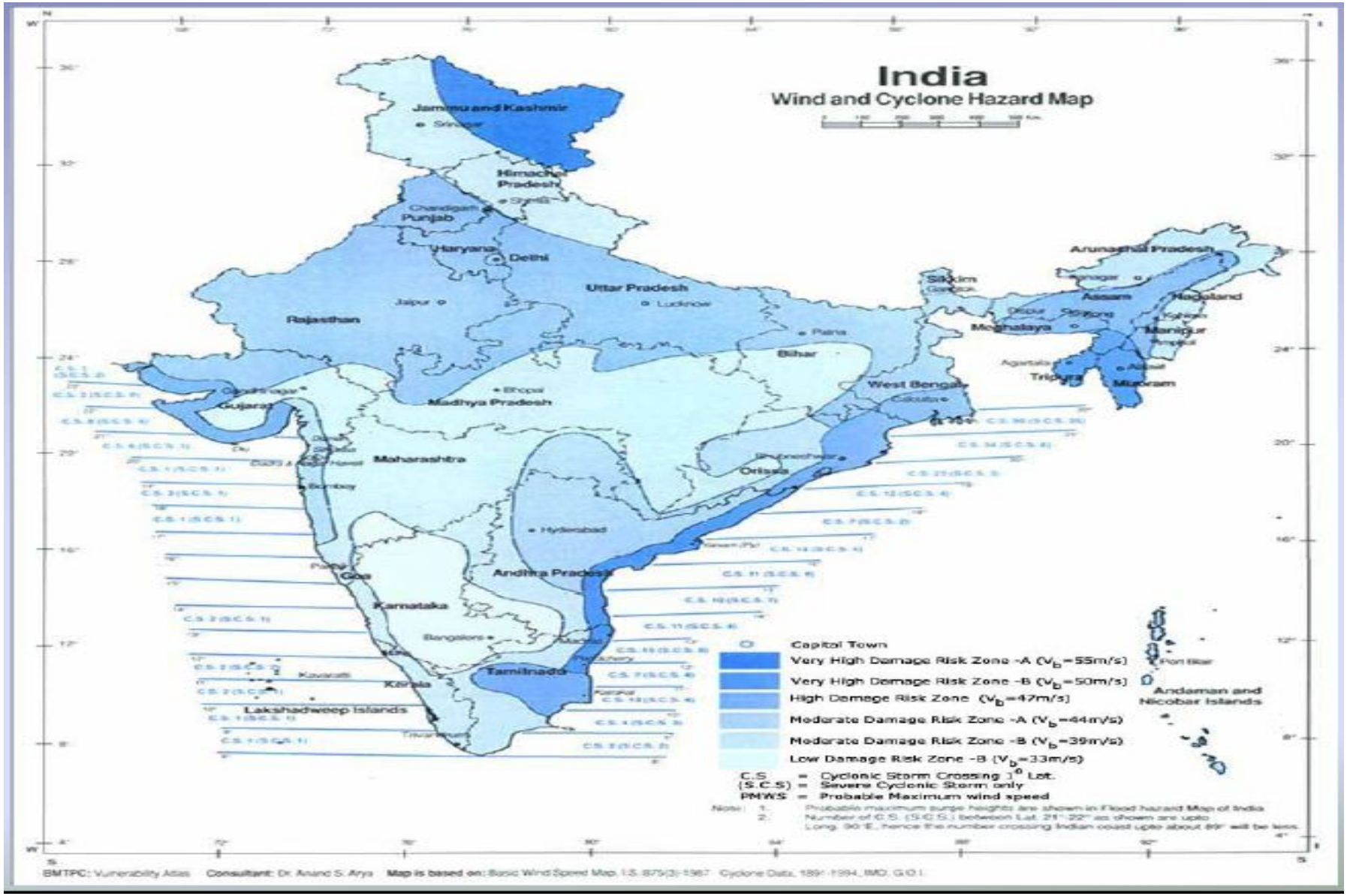
Droughts

- About 50 million people are affected annually by drought. Of approximately 90 million hectares of rain-fed areas, about 40 million hectares are prone to scanty or no rain.
- Rainfall is poor in nine meteorological subdivisions out of 36 subdivision (each meteorological sub division covers a geographic area of more than ten revenue districts in India)
- In India annually 33% area receive rainfall less than 750 mm (low rainfall area) and 35 % area receive between 750 to 1125 mm rainfall Medium rainfall) and only 32percent falls in the high rainfall (>1126 mm) zone.


INDIA
2012 DROUGHT OUTLOOK MAP
N
JAMMU & KASHMIR
HIMACHAL PRADESH
PUNJAB
HARYANA
DELHI
UTTARAKHAND
UTTAR PRADESH
RAJASTHAN
BIHAR
SIKKIM
ARUNACHAL PRADESH
ASOM (ASSAM)
NAGALAND
MEGHALAYA
MANIPUR
TRIPURA
MIZORAM
JHARKHAND
WEST BENGAL
MADHYA PRADESH
GUJARAT
CHHATTISGARH
(ODISHA) ORISSA
DADRA & NAGAR HAVELI
MAHARASHTRA
BAY OF BENGAL
ARABIAN SEA
ANDHRA PRADESH
GOA
KARNATAKA
LAKSHADWEEP (INDIA)
TAMIL NADU
KERALA
ANDAMAN & NICOBAR ISLANDS (INDIA)
Severe
Moderate
Mild
Non
Map not to Scale
Copyright © 2012 www.mapsofindia.com
This map is updated as on August 5, 2012
INDIAN OCEAN

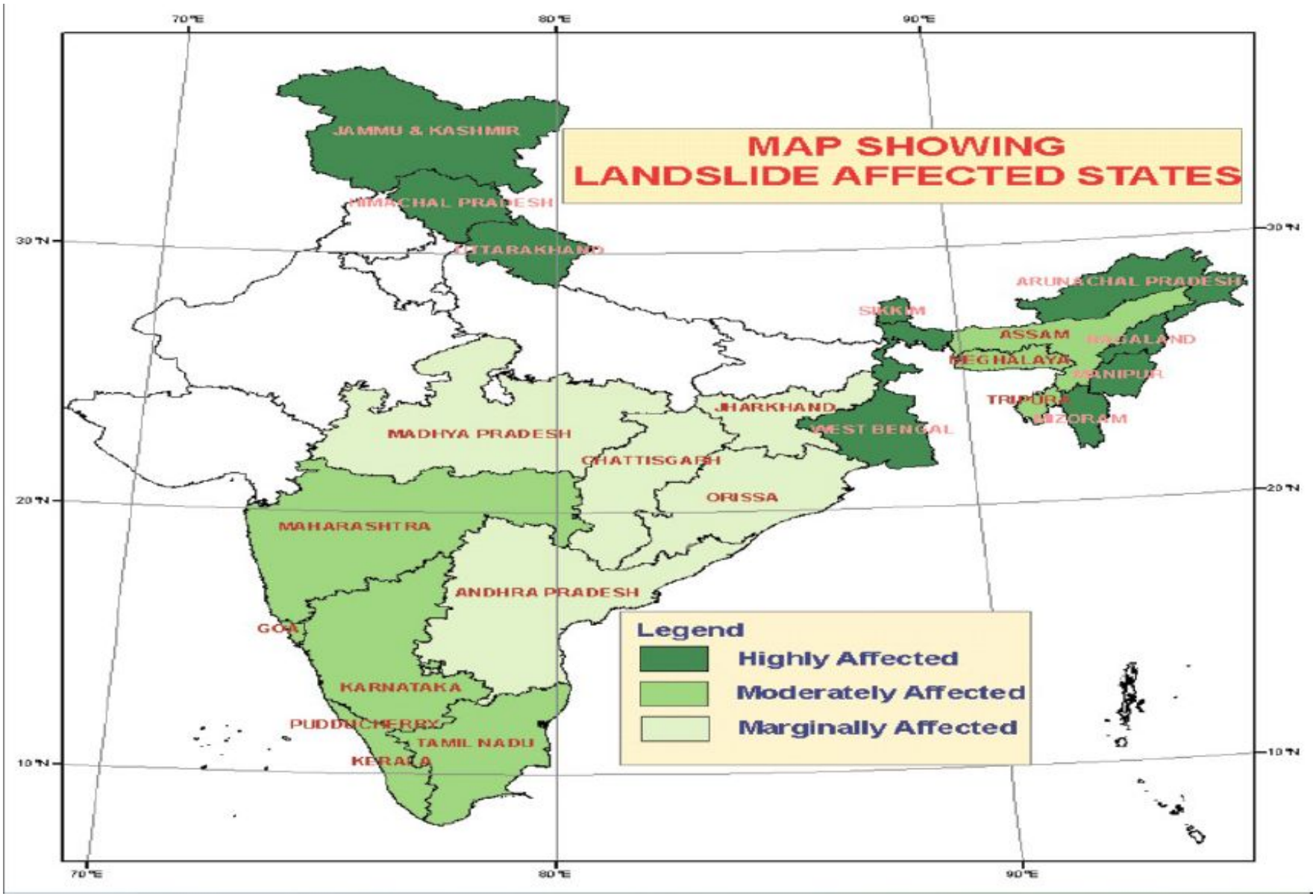
Cyclone

- About 8% of the land is vulnerable to cyclones of which coastal areas experience two or three tropical cyclones of varying intensity each year. Cyclonic activities on the east coast are more severe than on the west coast.
- The Indian continent is considered to be the worst cyclone affected part of the world, as a result of low depth ocean bed topography and coastal configuration. The principal threat from a cyclone are in the form of gales and strong winds; torrential rain and high tidal waves/storm surges. Most casualties are caused due to coastal inundation by tidal waves and storm surges.
- Cyclones typically strike the East Coast of India, along the Bay of Bengal, ie. the states of West Bengal, Orissa, Andhra Pradesh and Tamil Nadu, but also parts of Maharashtra and Gujarat at the Arabian Sea West Coast.


India
Wind and Cyclone Hazard Map
Jammu and Kashmir
Himachal Pradesh
Punjab
Chandigarh
Haryana
Delhi
Rajasthan
Uttar Pradesh
Jaipur
Lucknow
Patna
Bihar
Sikkim
Arunachal Pradesh
Assam
Nagaland
Meghalaya
Manipur
Tripura
Mizoram
West Bengal
Bhopal
Madhya Pradesh
Gujarat
Maharashtra
Orissa
Hyderabad
Andhra Pradesh
Goa
Karnataka
Kerala
Tamilnadu
Lakshadweep Islands
Andaman and Nicobar Islands
Capital Town
Very High Damage Risk Zone -A (V_b=55m/s)
Very High Damage Risk Zone -B (V_b=50m/s)
High Damage Risk Zone (V_b=47m/s)
Moderate Damage Risk Zone -A (V_b=44m/s)
Moderate Damage Risk Zone -B (V_b=39m/s)
Low Damage Risk Zone -B (V_b=33m/s)
C.S = Cyclonic Storm Crossing
(S.C.S) = Severe Cyclonic Storm only
PMWS = Probable Maximum wind speed
BMTPC: Vulnerability Atlas Consultant: Dr. Anand S. Arya Map is based on: Basic Wind Speed Map, I.S. 875(3)-1987 Cyclone Data, 1891-1994, IMD, G.O.I.

Landslides

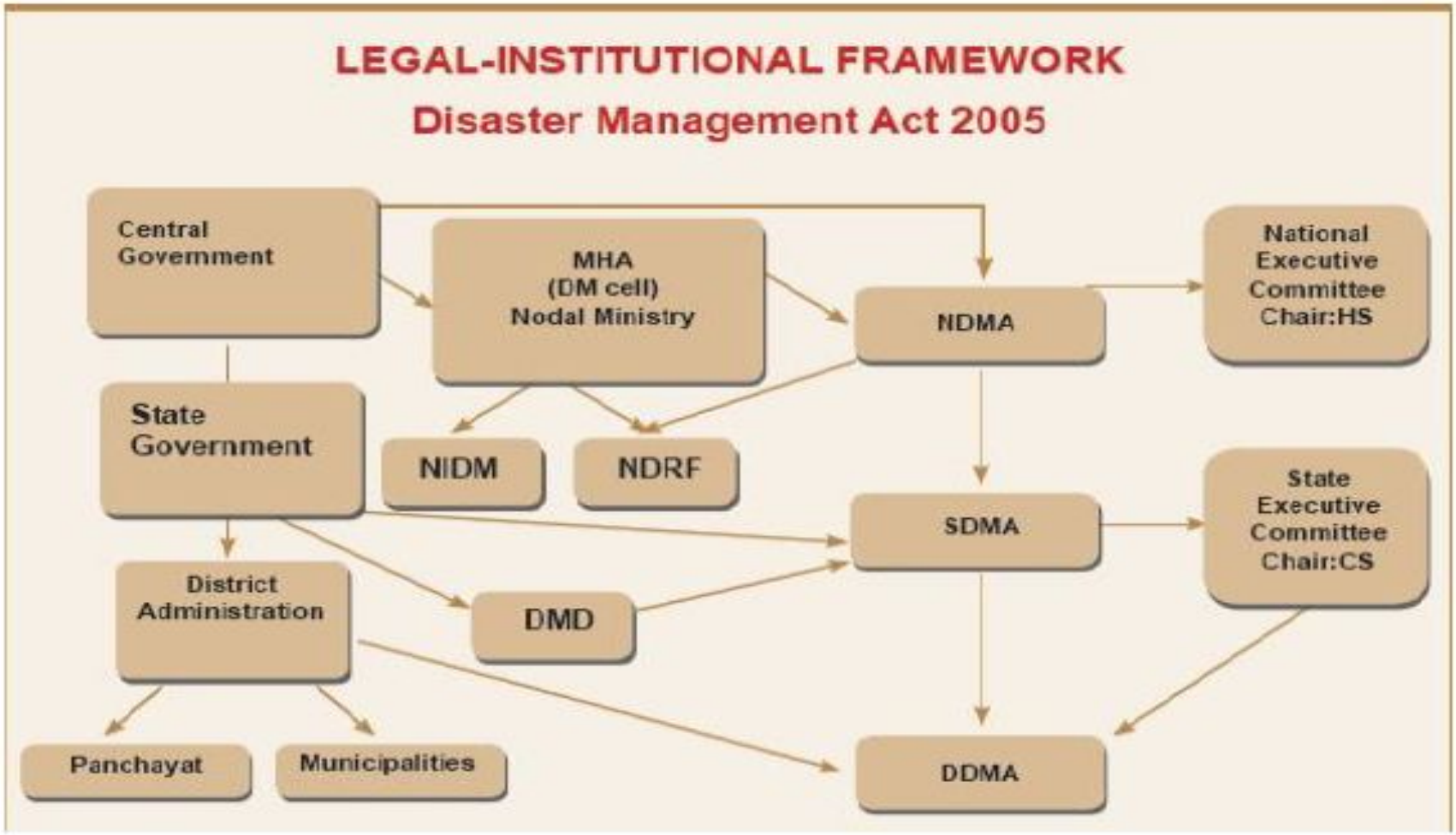
- Landslides occur in the hilly regions such as the Himalayas, NorthEast India, the Nilgiris, and Eastern and Western Ghats.
- Landslides in India are another recurrent phenomenon. Landslide prone areas largely correspond to earthquake prone areas, i.e. Northwest and NorthEast, where the incidence of landslides is the highest.


MAP SHOWING
LANDSLIDE AFFECTED STATES
JAMMU & KASHMIR
HIMACHAL PRADESH
UTTARAKHAND
SIKKIM
ARUNACHAL PRADESH
ASSAM
NAGALAND
MEGHALAYA
MANIPUR
TRIPURA
MIZORAM
JHARKHAND
WEST BENGAL
MADHYA PRADESH
CHATTISGARH
ORISSA
MAHARASHTRA
ANDHRA PRADESH
GOA
KARNATAKA
PUDUCHERRY
TAMIL NADU
KERALA
Legend
Highly Affected
Moderately Affected
Marginally Affected
70°E
80°E
90°E
30°N
20°N
10°N

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.
- 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.

Legal Institutional Framework



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, alerts and updates about the on coming hazard, also emerged within this framework.
- A multi-stake holder 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

National Policy on Disaster Management

- The National Policy on Disaster Management (NPDM) has been approved by the central govt. on October22, 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 institutional mechanism through which such action channelized.
- It aims to bring in transparency and accountability in all aspects of disaster management through involvement of community based organisations.

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

NDMA Guidelines

- ✔ Management of Landslide and Snow Avalanches
- ✔ Management of Cyclones
- ✔ Management of Earthquake
- ✔ Management of Floods
- ✔ Chemical Disasters (Industrial)
- ✔ Management of Chemical (Terrorism) Disasters
- ✔ Preparation of State Disaster Management Plans
- ✔ Psycho-Social Support and Mental Health Services in Disasters
- ✔ Medical Preparedness and Mass Casualty Management
- ✔ Management of Nuclear and Radiological Emergencies
- ✔ Incident Response System
- ✔ Strengthening of Safety and Security for Transportation of POL tankers
- ✔ Management of Biological Disaster
- ✔ Management of Tsunami
- ✔ Role of NGOs in Disaster Management
- ✔ Urban Flooding
- ✔ Management of Dead in the Aftermath of Disaster
- ✔ Plan to counter threats to Municipal Water Supply and Water Reservoirs

National Action Plan on Climate Change

1) National Solar Mission
2) National Mission on Sustainable Habitat
3) National Mission for Enhanced Energy Efficiency
4) National Mission for Sustaining The Himalayan Ecosystem
5) National Water Mission
6) National Mission for Green India
7) National Mission for Sustainable Agriculture
8) National Mission for Strategic Knowledge on Climate Change

Disaster Management Institutions

- There are ***six National Level Institution***,
  - *National Disaster Management Authority(NDMA).*
  - *National Executive committee(NEC).*
  - *National Institute of Disaster Management (NIDM)*
  - *National Disaster Response Force (NDRF)*
  - *National Civil Defence College (NCDC), Nagpur*
  - *National Fire Service College (NFSC), Nagpur*
- 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).*

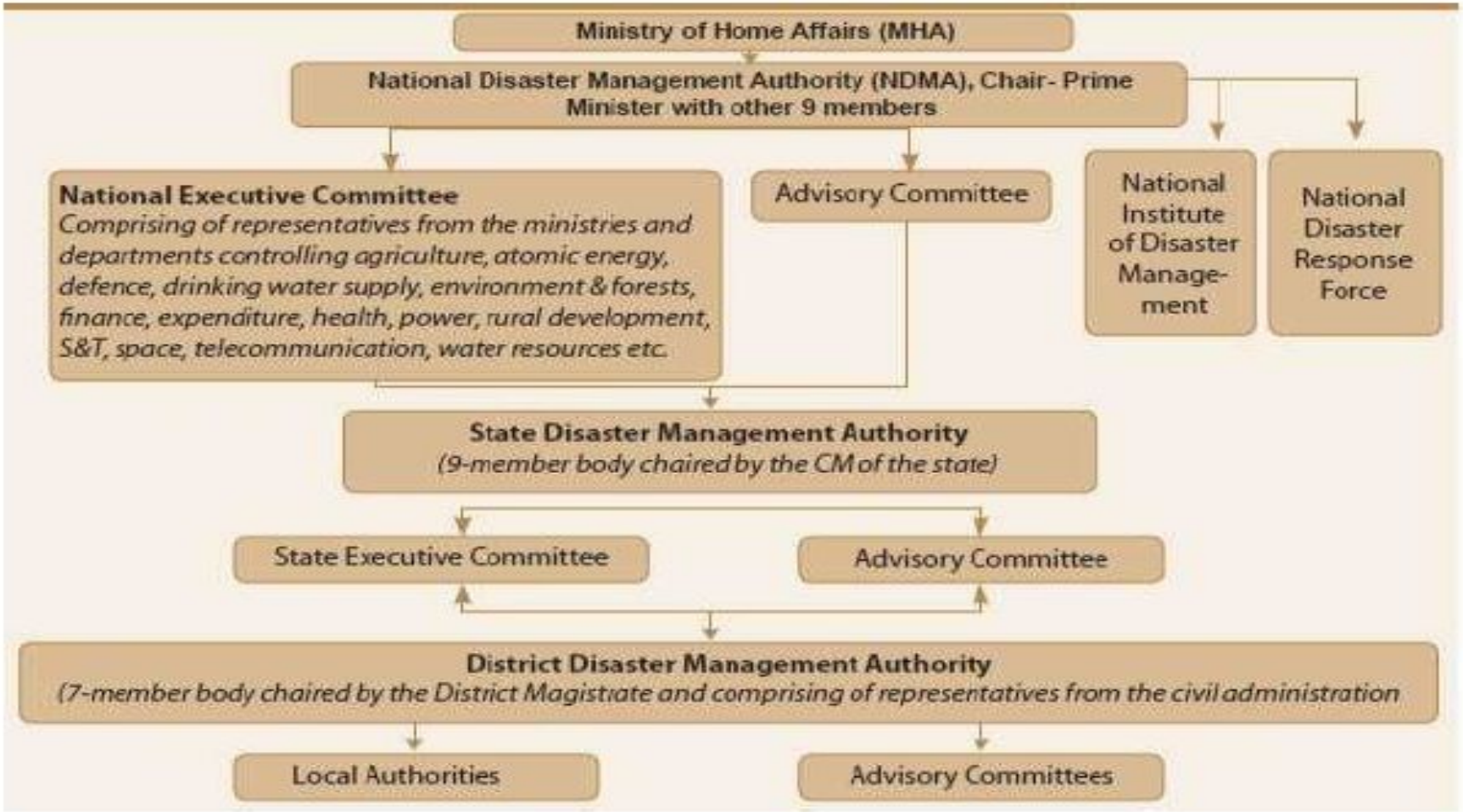
National Disaster Management Authority

- Lay down policies on disaster management;
- 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;
- Lay down guidelines to be followed by the different Ministries or Departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects in their development plans and projects;

National Disaster Management Authority

- Coordinate 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;
- Take such other measures for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with the threatening disaster situation or disaster as it may consider necessary;
- Lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

Structure of National Disaster Management



National Executive Committee

- A National Executive Committee is constituted under Section 8 of DM Act, 2005 to assist the National Authority in the performance of its functions.
- NEC may as and when it considers necessary constitute one or more sub-committees for the efficient discharge of its functions.
- NEC has been given the responsibility to act as the coordinating and monitoring body for disaster management, to prepare a National Plan, monitor the implementation of National Policy etc. vide section 10 of the DM Act.

National Institute of Disaster Management

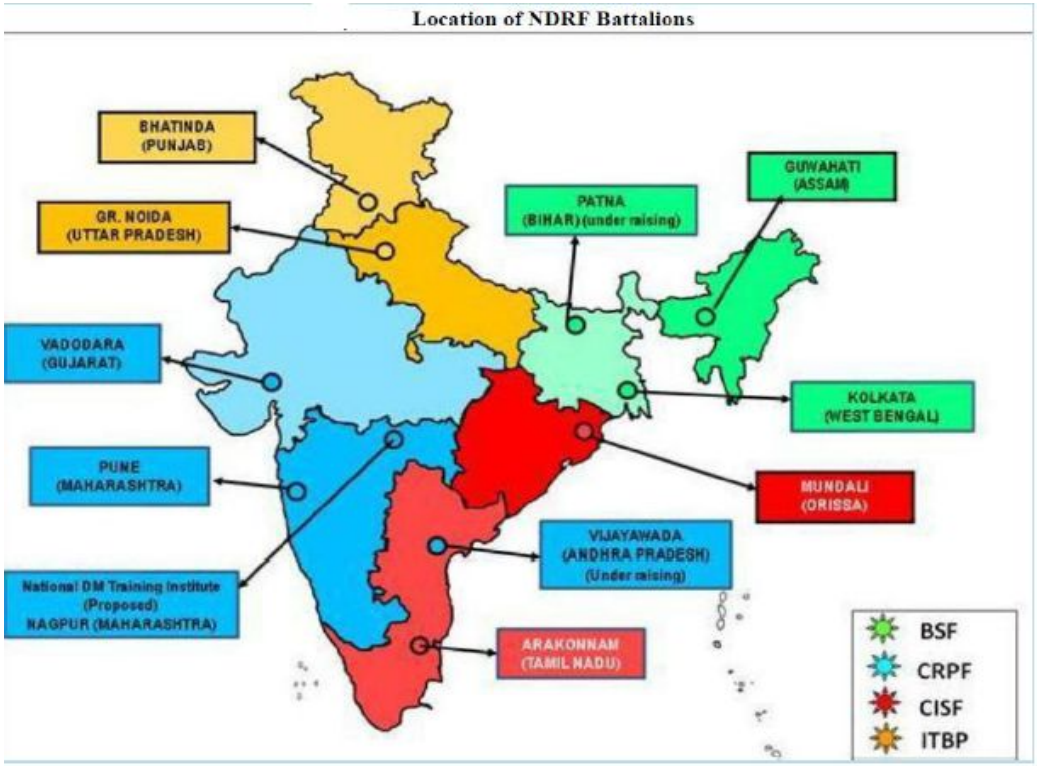
Governing Body of National Institute of Disaster Management

In terms of Section 42(4) of the Disaster Management Act, 2005 read with Rule 6 of the Disaster Management (National Institute of Disaster Management) Rules, 2006, Governing Body of the NIDM has been constituted vide Order No. 45/1/2007-NDM-IV dated 3rd May, 2007 with following members:-

i.	The Vice-Chairperson, National Disaster Management Authority (NDMA)	Chairperson
ii	Union Home Secretary	Vice-Chairperson
iii	Secretary (BM)	Member
iv	Secretary, Ministry of Finance, Department. of Expenditure	Member
v	Secretary/ Additional Secretary, NDMA	Member
vi	Additional Secretary and Financial Advisor, Ministry of Home Affairs	Member
vii	Secretary(Disaster Management), Government of Gujarat	Member
viii	Vice-Chancellor, Guru Gobind Singh Indraprastha University, Delhi	Member
ix	Director, Indian Institute of Technology, Roorkee	Member
x	Director, Indian Institute of Management, Kolkatta	Member
xi	Director, National Eco-physical Research Institute, Hyderabad	Member
xii	Secretary, Department of Space	Member
xiii	Secretary, Department of Science and Technology	Member
xiv	Executive Director, NIDM	Member Secretary

National Disaster Response Force

- The National Disaster Response Force (NDRF) has been constituted under Section 44 of the DM Act, 2005 by up-gradation/conversion of eight standard battalions of Central Para Military Forces i.e. two battalions each from Border Security Force (BSF), Indo-Tibetan Border Police (ITBP), Central Industrial Security Force (CISF) and Central Reserve Police Force (CRPF) to build them up as a specialist force to respond to disaster or disaster like situations.



National Civil Defence College

- The first Disaster Management Training Institution of the country was founded on 29th April 1957 at Nagpur as the Central Emergency Relief Training Institute (CERTI) to support the Emergency Relief Organization of the Government of India.
- This Institute organized advanced and specialist training for revenue officials responsible for Disaster Relief Operations against any natural or manmade disaster.
- CERTI was renamed as National Civil Defence College on 1st April 1968. NCDC is mandated for conducting training courses for various groups of stakeholders.

National Fire Service College

- The National Fire Service College was established in 1956 as a sub- ordinate establishment of Ministry of Home Affairs with the aim of providing training to the Fire Officers of the country in advanced techniques of fire fighting and rescue, and creating uniformity in the Fire Service organizations and their management across the country.

National Projects

1) National Earthquake Risk Mitigation Project (NERMP)
2) National Building Code (NBC)
3) National Cyclone Risk Mitigation Project
4) Integrated Coastal Zone Management Project (ICZMP)
5) National Flood Risk Mitigation Project (NFRMP)
6) National Landslide Risk Mitigation Project (NLRMP)
7) Drought Mitigation Measures
8) Forest Fire Management
9) Chemical Disasters Mitigation
10) Prevention of Disasters in Mines
11) Epidemic Control Measures
12) Measures taken for Rail Safety
13) Road Safety Measure
14) Early Warning and Response

Role of Government

a) State Govt.:-

- In the context of federal set-up of India, the responsibility to formulate the Governments 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 incharge 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.

Role of Government

b) District Govt.:-

- A District is sub-divided into sub-divisions 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.

Role of Government

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 feed back 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.

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.