# INTRODUCTION
# TO


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- Causes and types of disaster in detail
- Dimensions of natural and anthropogenic disasters
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# INTRODUCTION

The word ‘disaster’ has its roots in Italian word ***‘disatro’*** meaning ‘**bad star’**

**Disaster** is an occurrence that causes widespread damage and destruction or a sudden catastrophe leading to loss of life and property.

**Hazard** is defined as a source of potential loss that can have the potential to cause harm. It can be natural, technological, chemical, biological and radiological.

Hazards can be classified as

Those that are detected by nature and

Those that are produced by human activities.

A hazard becomes an **emergency** when an imminent situation requires immediate attention which calls for a momentous and coordinated response. When emergency moves beyond the purview of the population, it becomes a disaster.

**Vulnerability** means susceptibility to harm those at risk. Vulnerability can be classified into four parts on the basis of effect of a hazard.

1. **Physical Vulnerability**
2. **Social Vulnerability**
3. **Economic Vulnerability**
4. **Environmental Vulnerability**

| | Human - social | Physical | Economic | Cultural Environmental |
|---|---|---|---|---|
| **Direct losses** | • Fatalities<br>• Injuries<br>• Loss of income or employment<br>• Homelessness | • Structural damage or collapse to buildings<br>• Non-structural damage and damage to contents<br>• Structural damage infrastructure | • Interruption of business due to damage to buildings and infrastructure<br>• Loss of productive workforce through fatalities, injuries and relief efforts<br>• Capital costs of response and relief | • Sedimentation<br>• Pollution<br>• Endangered species<br>• Destruction of ecological zones<br>• Destruction of cultural heritage |
| **Indirect losses** | • Diseases<br>• Permanent disability<br>• Psychological impact<br>• Loss of social cohesion due to disruption of community<br>• Political unrest | • Progressive deterioration of damaged buildings and infrastructure which are not repaired | • Economic losses due to short term disruption of activities<br>• Long term economic losses<br>• insurance losses weaken-ing the insurance market<br>• Less investments<br>• Capital costs of repair<br>• Reduction in tourism | • Loss of biodiversity<br>• Loss of cultural diversity |

- **Risk:** In the context of DM, Risk is viewed "as the product of the interaction of a potentially damaging event and the vulnerable conditions of a society or element exposed". The first step of risk analysis is hazard identification, which is a process of defining and describing a hazard including its physical characteristics, magnitude and severity, probability and frequency, causative factors and areas affected.
- However, if there is no Vulnerability, there is no risk, for example, a cyclone hitting an uninhabited coastal area. The occurrence of disaster can be attributed to the union of hazards and Vulnerability. But the quantum of damage due to disaster depends on the greater capacity of the respondents. The greater the capacity to cope, the lesser is the impact of the disaster.

**Capacity:** is defined as the "resources means and strengths which exist in households and communities enabling them to cope with, withstand, prepare for, prevent, mitigate or quickly recover from a disaster". Capacity can be of two types;

1. **Physical Capacity**
2. **Socio-economic Capacity**

For successful management of emergency situations, it is imperative to have proper planning and response and well-coordinated efforts from all stakeholders.

# CHARACTERISTICS OF DISASTER ARE :-

- **Size and Scope:** It is difficult to determine what has happened and how to respond, when disasters are beyond the capacity of the affected population to cope with available resources.
- **Unpredictable:** Events which cannot be predicted with certainty.
- **Unfamiliar:** Disasters such as floods that occur time and again are not also familiar since the effect varies according to location, density of population and time.
- **Speed and Urgency:** Any disaster triggers an urgent response from the agencies to control the damages, for ex.- an earthquake. In such situations an extreme sense of urgency among the affected population.
- **Threat:** Ill-effects of disasters are limited not only to loss of property and lives but also to the overall economic and psychological state of individuals.

According to **CRED** (Centre for Research on the Epidemiology of Disasters) which maintains emergency event database for a disaster to be pronounced as a disaster, there are certain criteria that must be met.

Certain disruptive factors of disasters are:

1. **Death and destruction:** Death and injury of near and dear ones cause emotional and psychological upheaval in individuals.

2. **Loss of basic amenities:** Life comes to a standstill causing a threat to lives without water supply and food supply.

3**. Disruption of emergency services**: Hospitals are in a state of chaos following a disaster.

4. **Destruction of roads and modes of communication:** Difficult to carry the injured to the hospital. First aid and other necessary amenities cannot reach the affected population.

5. **Disorganization in response services:** The more sudden the disaster, the more is the disorganization.

# CAUSES AND TYPES OF DISASTERS

According to report of CRED, the top five countries that have been most frequently hit by natural disasters over the last decade are China, the United States, the Philippines, India and Indonesia.

Disasters can be classified into two broad categories, namely **natural and man-made or technological**

**A. Natural Disaster:** category can be divided into six disasters groups: Biological, Geophysical, Meteorological, Hydrological, Climatological and Extra-terrestrial.

# METEOROLOGICAL

1. **Tropical Strom:** for the development of a tropical cyclone, there are four distinct stages depending on storm's wind speed:

- Tropical Disturbance
- Tropical Depression
- Tropical Strom and hurricane

2. **Extra-tropical Storm:** When cold and warm air masses interact in an unstable environment, potential energy is released, which forms the source of extra –tropical storms. The "Wahine Storm" was an extra-tropical storm that struck Wellington, New Zealand, on 10th April 1968, which caused 53 deaths. Another violent extra-tropical storm hit Uruguay on 23-24 August 2005, killing 10 people.

3. **Local/ Convective Storms:** These are formed by the heating of the earth and with deep moisture.

# GEOPHYSICAL DISASTERS

Geophysical disasters are events originating from the solid earth. They are classified as:

1. **Earthquake**

2. **Volcano**

3. **Mass movement:** can be subdivided into various categories:

- Rockfall – Rockfall refers to quantities of rock or stone falling freely from a cliff face. It is caused by undercutting or weathering. It annihilated part of the town of Frank, Northwest Territories, Canada, in 1903. It occurred early morning in April when over 90 million tons of limestone rock slid down Turtle Mountain within 100 s, the largest landslides in the Canadian history.
- Subsidence: is the downward motion of the earth's surface.
- Avalanche is any kind of rapid snow/ ice movement of a quantity of snow or ice that slides down a mountainside under the force of gravity.

# HYDROLOGIAL DISASTERS

Hydrological Disasters are disastrous events caused by deviations in the normal water cycle and overflow of bodies of water caused by the wind set-up. It can further be categorized into:

1. **General Floods**
2. **Storm Surge/ Coastal Flood**

# CLIMATOLOGICAL DISASTERS

Climatological disasters can be subdivided into the following categories;

**1. Disasters caused by extreme temperatures:** can be categorized as follows:

- Heat wave
- Cold wave
- Winter storm

2. **Drought**
3. **Wildfire**

# B. MAN –MADE DISASTERS

Technological or man-made hazards are events that are caused due to certain human conduct.

**SOCIOLOGICAL DISASTERS**

These can be classified as follows:

- Arson
- Civil Disorder
- Terrorism

**POLITICAL DISASTERS**

Political Disasters can be classified into the following types.

**1. War**

- Chemical Weapons
- Biological Weapons
- Nuclear Weapons
- Armed Conflict

**2. Massacre**

# INDUSTRIAL DISASTERS



1. **Chemical Spill:** The most significant chemical accident in recorded history was the 1984 Bhopal Gas Tragedy in India, in which more than 3,000 people were killed after a highly toxic vapour (methyl isocyanate) was released at a Union Carbide pesticides factory.

2. **Explosion at other industrial plants:** Explosions can be divided into the following categories:

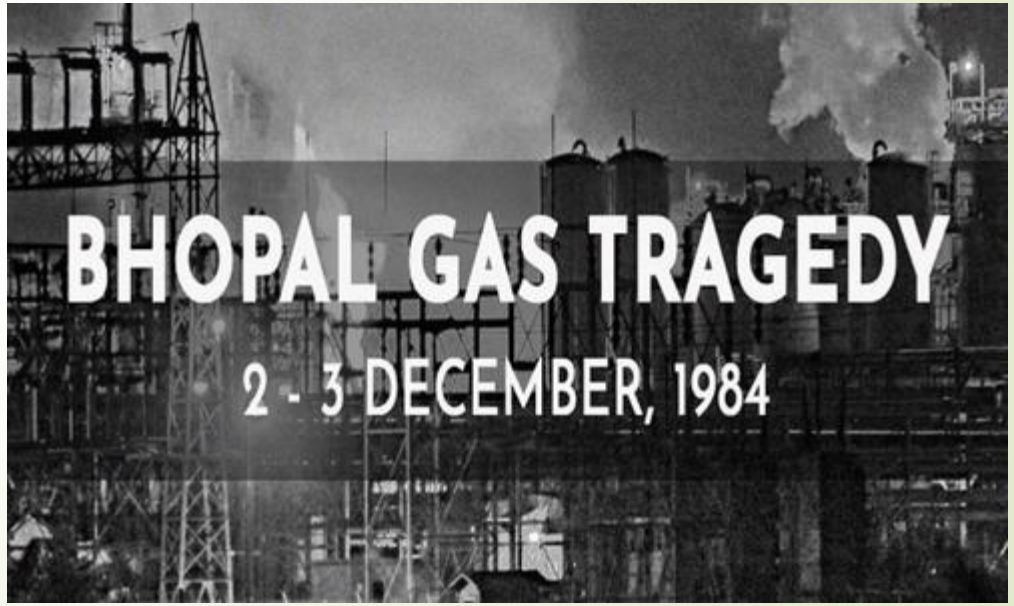
- Nuclear plant explosion and radiation
- Explosion at other industrial plants

3. **Transport Accident:** Transport accidents comprise of four disaster subsets

- Air
- Water
- Raliways
- Roadways

4. **Engineering Failure**

- Structural Collapses



# HUMAN DISASTERS

Human Disasters are disasters that take place due to intentional or unintentional human behavior.

1. **Human error of Judgement**

- Stampede
- Airplane Crashes
- Railway Accidents
- Road Accidents

2. **Poisoning:** These can be classified into the following categories:

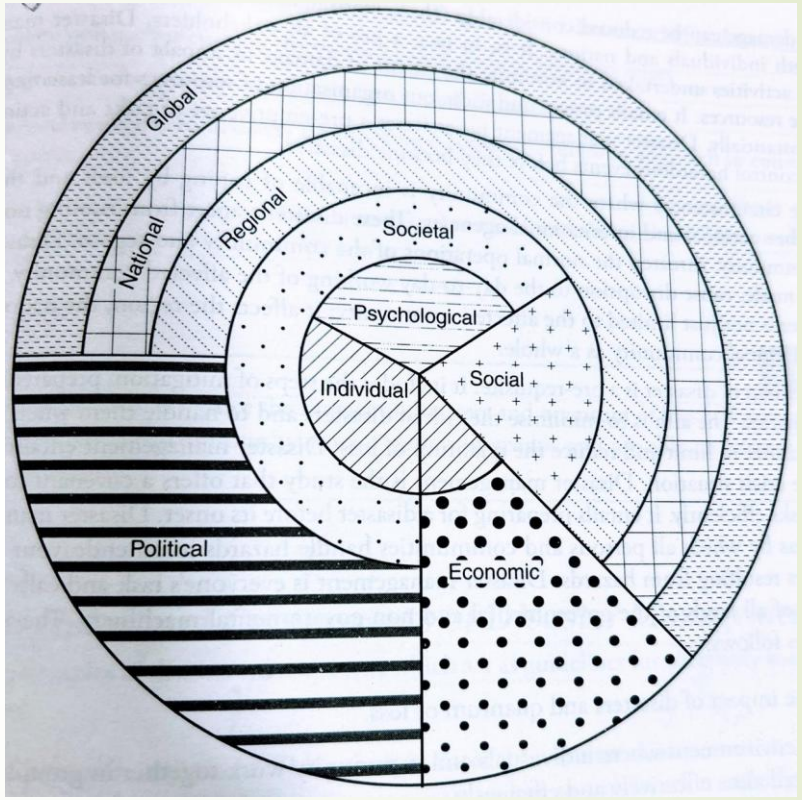
- Food Poisoning
- Carbon Monoxide (CO) poisoning

# DIMENSIONS OF NATURAL AND ANTHROPOGENIC DISASTERS

- A Disaster causes a large number of fatalities and damages.
- The increasing trend towards losses of both lives and property can be attributed to two broad reasons.
- The increase population density worldwide heavily populated large cities are growing in highly hazardous areas.
- The standards of living have augmented that has resulted in a huge increase in property values.

The various dimensions of disaster are as follows:

- **Economic**
- **Political**
- **Psychological**
- **Social**




Dimensions of Disaster

# AIMS OF DISASTER MANAGEMENT

- Disasters disrupt the normal lives by causing havoc and destruction from individuals to nations, all face the ill-effects.
- Destruction that is caused in a few seconds take years and decades to recompense.
- Disasters cannot be done away with, surely the extent of damage can be reduced considerably.
- Thus, management of disasters becomes an important agenda for both individuals and nations, all stakeholders.
- **Disaster Management** is defined as the activities undertaken to minimize the extent of damage or impact of disasters by intelligent use of available resources, proper and judicious organization of resources for lessening of disasters substantially.
- DM necessitates a set of tasks and actions designed to reduce and control hazardous events before they become disasters.

Management of disasters is a pre-requisite. It includes the steps of mitigation, preparedness response and recovery activities. The aim of disaster management are as follows:

- To reduce the impact of disaster and quantum of loss
- To create an environment where individuals and community work together in groups and are able to achieve selected aims effectively and efficiently
- To develop important strategies to reduce and control the occurrence of disasters
- To train individuals and community to remain prepared for sudden disasters
- To organize recovery and rescue mechanism
- To trigger the affected regions and community's emergency resources for quick response

- To coordinate and communicate for proper management of resources, namely man, material and economic resources available for the purpose of disaster response and recovery
- To foster team spirit, where persons rise above their self to help the victims of disasters in whatever way they can
- To generate resources necessary for rescue, recovery and post-recovery work
- To elicit action for management of disaster in a time-bound manner
- To facilitate the non-governmental and governmental machinery to work in tandem for disaster management
- To commit resources for disaster mitigation, preparedness, rescue and recovery
- To draw the attention of national and international agencies for disaster relief and rescue
- To formulate policies for curbing the menace called disaster before its onset

- To develop a systematic approach to management of disasters
- To foster local resilience to disasters by adopting a consensus-building approach in consultation with the local community

**All of these goals have a unified mission and that is to reduce the quantum of loss to life and property.**

# PRINCIPLES AND COMPONENTS OF DISASTER MANAGEMENT

- There are certain principles of DM, which act as guidelines for effectively managing disasters.

**1. Principle of Comprehensiveness:** DM should consider and take into account all hazards and all stages irrespective of the nature, location and affected community.

**2. Principle of Prevention and Protection:** This states that in anticipating future disasters, a preventive approach should be followed as far as practicable. The focus should be to build disaster-resistant and disaster-resilient communities.

**3. Principle of shared Responsibility:** DM is everyone's responsibility. Therefore, individuals, communities and nations should play an active and responsible role in disaster management.

4. Principle of Judicious use of available resources: Judicious use of available resources and minimum budget allocation, coupled with effective management strategies, the menace of disasters can be managed well.

5. **Principle of Collaboration and Coordination:** The various agencies working for response and rescue should be well co-ordinated and collaborate in their efforts for disaster management.

6. **Principle of Flexibility:** There should be space for deviation of plans, if required, to manage disasters.

7. **Principle of practice of ethical standards:** The highest ethical and moral standards should be practiced by all who are aiding in management of disasters.

8. **Principle of Prioritization:** Relief and rescue operations should be carried out as per the priorities.

9. **Principle of risk-driven hazard identification:** All hazards are different and so are the impacts, therefore a differentiated approach to hazard identification is required.

10. **Principle of Initiative:** For ensuring unity of effort among all levels of government and community, everyone should try and take initiative.

11. **Principle of Accountability:** It is essential to ensure effective response mechanism and that there is no passing the buck in crises situations.

12. **Principle of Equity:** Victims should be treated as equally as possible, equal treatment is a must.

13. **Principle of subordination of individual interest to common interest:** All should rise above their self and help the community in coping with disasters.

14. **Principle of Order and Discipline:** The right things should be made available at the right time and right place.

15. **Principle of Unity:** A feeling of harmony and unity serving the affected population is a pre-requisite. Caste, creed, culture and region should not hinder the management of disaster. The people should unite and work together in a dedicated manner.

**The Principles of disaster form the foundation for effective and efficient management of disasters by providing guidelines for the decisions and actions.**