

NATURAL DISASTER

The term 'Disaster' is a French word 'Desastre' which is combination of two terms 'des' meaning bad or evil and 'astre' meaning 'star' so when combined the expression is bad or evil star

Disaster has been defined with following features:

- 1- Disruption to normal pattern of life. Such disruption is usually severe and may also be sudden, unexpected and widespread.
- 2-Human effect such as loss of life, livelihood and property, injury, hardship and adverse effect on health.

Types of Disaster

Natural Disaster

Basically are related to three factors:

- a) **Wind related:** storm, cyclones, hurricane, storm, surge and tidal waves.
- b) **Water related:** flood, cloud burst, flash flood, excessive rain and drought.
- c) **Earth related:** earthquake, tsunamis, avalanches, landslides and volcanic eruptions.

Man Made Disaster

1-Release of toxic chemicals (Bhopal Gas tragedy)

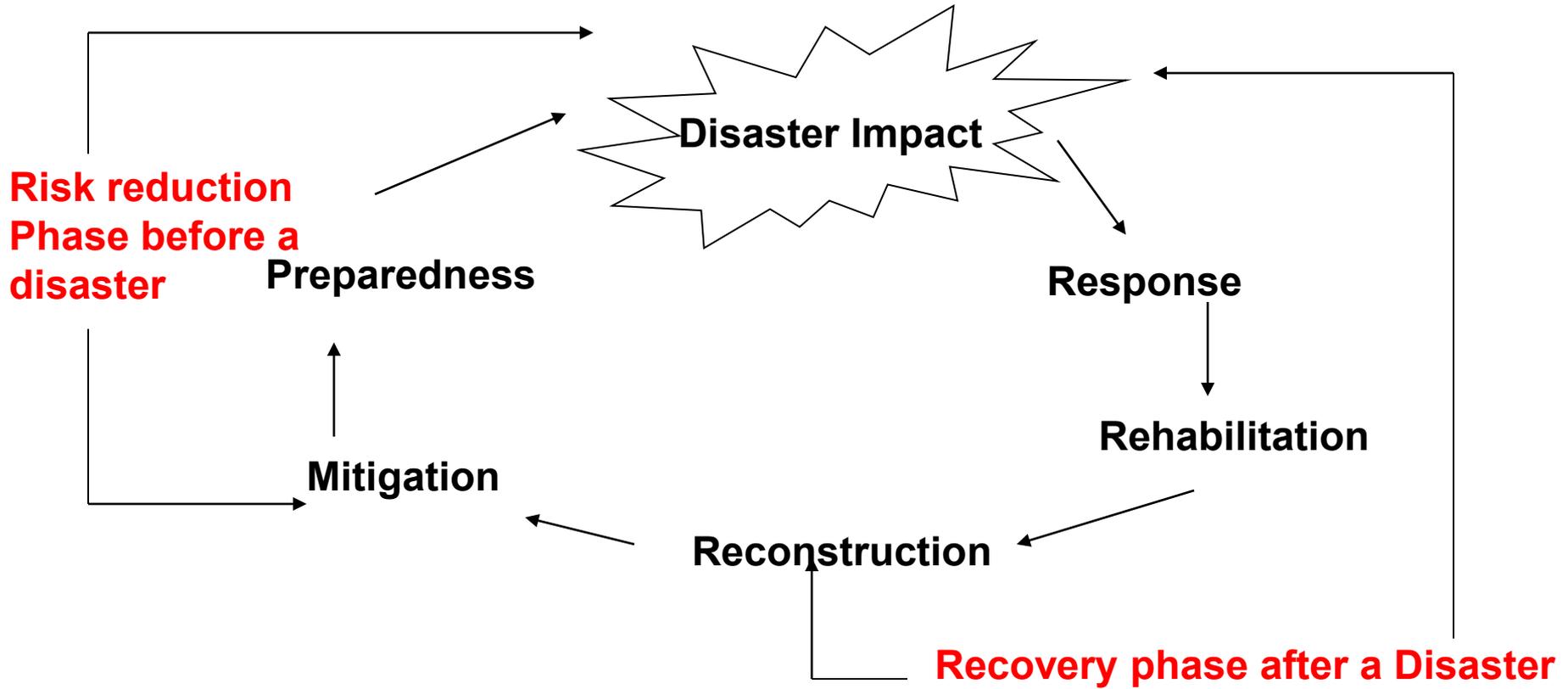
2- War

3- Nuclear explosion

Disaster Management

Effective disaster management depends on four factors:

- (i) **Preparedness:** knowing where and when disaster will hit
- (i) **Mitigation:** through measures like costal zone regulation, building earthquake – resistant buildings, before the event
- (iii) **Relief:** effective action, like moving supplies quickly



Flood

A flood is a high flow of water overtops the natural or artificial banks Of river

General Features

- 1- Flash Flood:** Occur due to heavy rain, accelerated runoff, dam failure etc.
- 2- River Flood:** River get charged due to heavy rainfall over a large catchment area or by melting of ice
- 3- Coastal Flood:** Flood associated with tropical cyclones.

Predictability:

Flood forecasting depends upon the seasonal pattern.

Flood plane Mapping

Aerial and Terrestrial survey

Preparedness (Risk reduction)

- Flood detection and warning system
- Community participation and education
- Master Plan for development of flood plain
- Vegetation cover, dams by making channels erosion control.

Post Disaster needs:

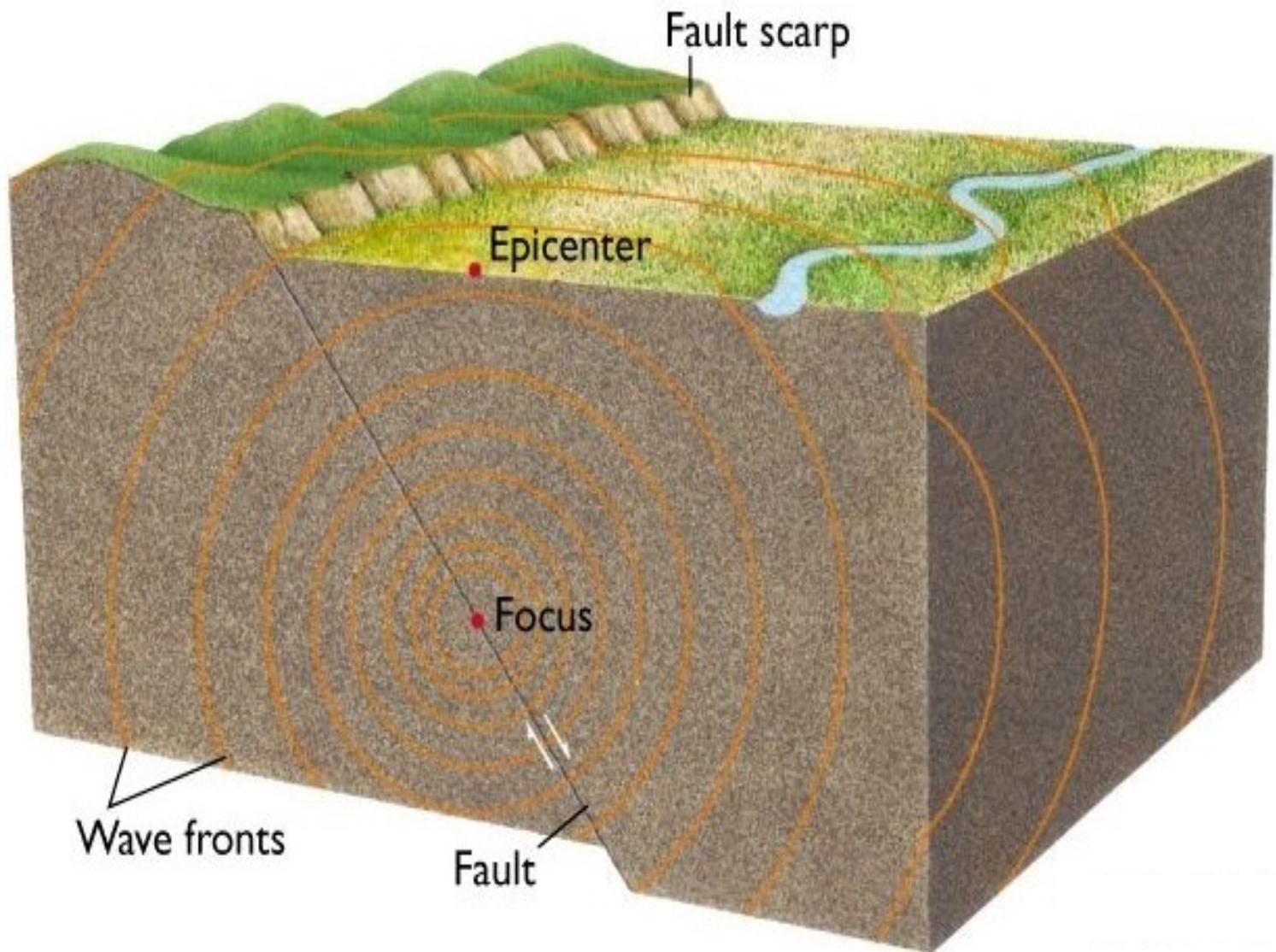
- Search and rescue operations
- Medical assistance
- Food and water for victims
- Epidemiological survey

Earthquake

An earthquake is the shaking of the earth

EARTHQUAKE BASICS

- Earthquakes are an energy release in the **form of seismic waves caused by the sudden rupture of strained rocks.** Strain is deformation of rocks resulting from stress (e.g., tectonic forces).
- Earthquakes occur along faults (fracture where rocks have been displaced). **Focus = Epicenter**



Seismic waves:

Basic Types:

1) **Body waves: travel within the Earth.**

- Two Types:

a) PRIMARY WAVES (P-WAVES):

- **Pressure waves** caused when rock is **push or pull forward or backward.**
- Travel down the earth
- **Fastest wave (~5.5 km/s)**
- Can travel through solids, liquids, and gases.

b) SECONDARY WAVES (SHEAR OR SECONDARY):

- **Shear wave** caused when rock is shaken or whipped from **side to side like wavy motion**
- **Second fastest wave (~3 km/s).**
- Can travel though **solids only.**

2) Surface waves:

- Travel on or near the Earth's surface (~ 2 km/s);
- very destructive

Two Types:

- a) **Love waves:** complex horizontal (side-to-side) motion.
- b) **Rayleigh waves:** rolling or elliptical motion in the vertical plane, like a waves on the ocean surface, a little slower than Love waves.

Earthquake Magnitude

Mercalli Intensity Scale: (I to XII)

Subjective based on damage and human perception.

Richter Magnitude Scale:

- (from -2 to infinity; values of >9 are essentially impossible).
- Based on the largest amplitude seismic wave measured on a **seismograph**.

Earthquake mitigation Programme:

1- Preventive Phase

- Analysis of risk and seismic zone
- Earthquake insurance for buildings and individuals
- Time to time analyzing seismic zones

2- Emergency Phase

- Evacuation of peoples
- Medical care for injured
- Recovery of dead bodies and their disposal
- Restoration of lines of communication and information
- Food and water supply

3- Consolidation and Reconstruction Phase:

- Detail survey of buildings for assessment of damage and decision regarding repair, reconstruction and strengthening or demolition.
- Selected sites for new construction
- Training of personals, engineers, architectures, buildings etc
- Stastical studies regarding the earthquake.

Land slides

- Slope transport of soil and rock due to the natural occurring vibration or change in construction removal of lateral support.
- Loading with weight or human manipulation of water source and slope component.

Predictability:

- Frequency of occurrence
- Geomorphological, Climatological and geological survey.

Possible Risk Reduction:

- Hazard mapping
- Land use regulation
- Community Education
- Monitoring and warning and education system.

Cyclones

- Cyclones are center of low pressure
- Tropical cyclone: are intense low pressure areas in the atmosphere around which fierce with blows.

Horizontally it extends from 500 to 1000 Km.

Vertically from surface to about 12 to 14 Km.

Wind speed ----- 85 to 100 Km.

Center ===== Eye

Typhoons----- in pacific ocean

Cyclones ----- In Indian ocean

Hurricane----- In North Atlantic ocean

Destruction:

- Near coastal areas, collapse of buildings, falling trees, Flying debris, rain aircraft accidents.
- Destroy life and Property.

Predictability:

- Indian Meteorological Department (IMD)
- Area of Cyclone warning centers (ACWCs) located at Kolkata, Chennai, Mumbai
- Cyclone warning Center (CWCs) at Bhubneshwar, Visakhapatnam and Ahmedabad.

Mitigation:

- Mass awareness
- Cyclone warning bulletins on Radio/T.V
- Forecast satellite technique