



## DISASTER MANAGEMENT



“Preparedness is the only way we can combat a natural disaster.”

John Quinlan



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## Learning Objectives

At the end of this lesson you shall be able to

- Explain disaster and its types.
- Explain the causes, effects and precautions to be taken on various disasters.

### 8.1 Introduction

Disaster is a sudden extreme, calamitous event bringing great damage, loss to life and property. The damage caused by disasters is immeasurable and varies with the geographical location, climate and type of the earth surface. This influences the mental, socio-economic, political and cultural state of the affected area. Generally disaster has the following effects in the concerned areas,

- It completely disrupts the normal day to day life

- It negatively influences the emergency systems
- Normal needs and processes like food, shelter, health, etc., are affected and deteriorate depending on the intensity and severity of the disaster.

### 8.2 Types of disaster

Generally, disasters are of two types –

- Natural disaster
- Man-made disaster

### 8.2.1 Natural Disaster

A Natural Disaster is a major adverse event that is caused by the natural forces of the earth where great damage and some times loss of life occurs.

The following are the examples of natural disaster.

- Cyclone
- Earthquake
- Flood
- Tsunami
- Landslide
- Volcanic eruption

Among these cyclone, earthquake and flood are frequently happening disasters in India.

### 8.2.2 Man-Made Disaster

The developmental activities of the human being through improper intervention with nature have also increased the degree of occurrence of natural disasters in many folds. This mainly involves situations in which civilian populations suffer casualties, losses of property, basic services and means of livelihood as a result of war, civil strife or other conflicts.

The following few types of disasters are explained in detail in this chapter:

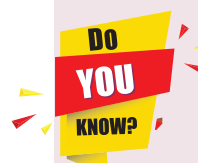
## 8.3 Earthquake

An earthquake is a trembling or shaking movement of the earth's surface, resulting from plate movements along a fault-plane or as a result of volcanic activity.

The location at which the seismic waves started propagating from the deep subsurface is known as Focus. The spot on the earth surface just above the Focus

is known as Epicentre. Earthquakes can strike suddenly, violently and without warning at any time of the day or night.

Earthquake magnitude is a measure of the "size" or amplitude, of the seismic waves generated by an earthquake source and recorded by seismographs. Richter scale is commonly used today to measure the magnitude of earthquake.



In 2001 Gujarat earthquake also known as the Bhuj earthquake is one of the vulnerable earthquake occurred in India. It occurred on 26<sup>th</sup> January India's 52<sup>nd</sup> Republic Day at 8.46 AM IST and lasted for over two minutes at a magnitude of 7.7 Richter. The epicentre was about 9km south – west of the village of Chobari in Bhachau taluk of Kutch district.



### 8.3.1 Causes of Earth quake

- Seismic Waves
- Compression in the earth's crust
- Groundwater extraction
- Geothermal drilling
- Tectonic movements of the earth
- Volcanic eruptions



- Disturbance on the earth's surface
- Powerful bomb blast

### 8.3.2 Effects of Earth quake

- Ground shaking
- Differential ground settlement
- Soil liquefaction
- Immediate landslides, avalanches, etc.
- Permanent ground displacement along faults
- Floods from tidal waves, sea surges and Tsunami
- Dam failures
- Pollution from damage industrial plants
- Delayed landslides

### 8.3.3 Precautions to be taken

- Educate yourself and family members.
- Minimize your movements to a few steps that reach a nearby safe place.
- Stay indoors until the shaking has stopped and you are sure exiting is safe.
- DROP to the ground; take COVER by getting under a sturdy table or any other of furniture; and HOLD ON until the shaking stops.



- If you are outside, move away from buildings, trees, streetlights, and utility wires.

## 8.4 Cyclone

Cyclone is one among the major climatic disaster caused due to the low pressure development over the Ocean surface naturally.

It is a derivative of the Greek word “Cyclos” that means ‘coils of a snake’.

### 8.4.1 Causes of Cyclone

The low pressure is formed over the ocean surface due to warming up of ocean water. Subsequently hot moisture air formed near will start moving up due to its light density. As a result, low pressure surface is formed in that surface area. In order to equalize the pressure, little high dense air from the surrounding will move towards the low pressure area. Again they get warmed up and raises above. During their raise, the hot moisture air gets cooled and condensed to form cloud. Then at certain heights it moves laterally either anti-clockwise or clockwise direction because of the Coriolis effect (Earth's self-rotation). This movement forms an eye at the center. Whenever it gains a rapid circulation, it is known as Cyclone.

### 8.4.2 Effects of Cyclone

The main effects of cyclones includes

- Heavy rain
- Strong wind
- Large storm surges near land fall
- Tornadoes

### 8.4.3 Precautions to be taken

#### Before cyclone:

- Check the house, secure loose tiles and carry out repairs of doors and windows.
- Remove dead branches or dying trees close to the house, anchor removable objects which can fly in strong winds.
- Keep some wooden boards ready so that glass windows can be boarded if needed.
- Keep candles, hurricane lantern filled with kerosene, battery operated torches with enough dry cells.



#### World's biggest Tsunami

The largest recorded Tsunami with a wave height of 1720 feet in Lituya Bay, Alaska on the night of 9<sup>th</sup> July, 1958. In India, the biggest Tsunami occurred on 26<sup>th</sup> Dec 2004.



#### After cyclone :

- Don't go outside until officially advised it is safe.
- Check for gas leaks.
- Listen to the local radio for official warning and advice.
- If you have to evacuate, or if did so, do not return until advised.
- Beware of damaged power lines, bridges, buildings and trees.
- Don't enter into flood waters.

## 8.5 Floods

The natural rainstorm, heavy rain and cyclonic cloud burst brings huge quantum of surface water as flood and destroys the low-lying area by washing out all the resources and properties all along its flow path and by inundation.

Different types of floods classified based on the type of occurrence are:

- Flashflood
- dam failure flood
- overland flood
- coastal zone flood
- cloud burst flood
- snow melt flood
- seasonal flood.





### 8.5.1 Causes of Flood

Following are some of the most common causes of flood.

- Heavy rains
- Overflow rivers
- Broken dams
- Storm surges and Tsunami
- Melting snow and ice

### 8.5.2 Effects of Flood

- Economic loss to farmers as agricultural lands, crops being submerged in water.



#### Malpa Landslide

The Malpa Landslide was one of the worst landslide in India. On 18<sup>th</sup> Aug 1998 at 3.00AM. the massive landslide wiped away the entire village of Malpa Landslide in the Pithoragarh District of Uttarakhand.



- They wreck houses, particularly kuccha houses in villages.
- They causes disruption of all types of transport and communication.
- There is a shortage of drinking water.
- They harm human, animal and plant life.
- They cause a rise in epidemics because of water logging (like Malaria, Diarrhoea, etc.)

### 8.5.3 Precaution to be taken

#### During flood

- Seek higher ground.
- Be aware of flash flood areas such as canals, streams, drainage channels.
- Be ready to evacuate.
- Don't touch electrical equipment if wet.
- If you must leave your home, do not walk through moving water.
- Do not drive over a flooded road.

#### After flood

- Stay away from flood water.
- Do not attempt to swim, walk or drive through the area.
- Be aware of areas where water has reduced. Road ways may have weakened and could collapse.
- Avoid downed power lines and muddy waters where power lines may have fallen.
- Do not drink tap water until advised by the health unit.
- Flood contaminated rooms have to be thoroughly cleaned and disinfected.
- Floor drains and sumps have to be cleaned and disinfected.



## Activity 1

Collect the details and images of recent Cyclones and prepare an album.

## 8.6 Oil Spills

Oil spill is an accidental or intentional release of liquid petroleum hydrocarbon into the ocean or coastal waters mainly due to human activity.

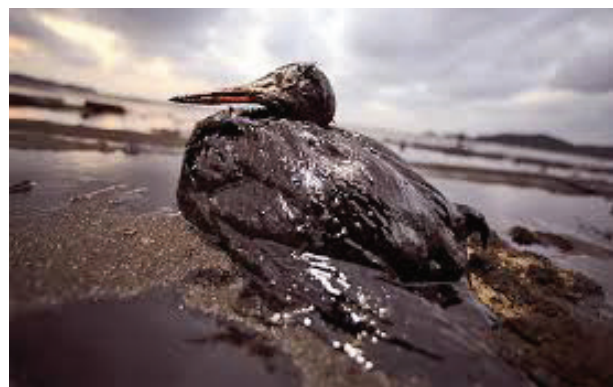


### 8.6.2 Effects of Oil Spill:

1. Oil spills can have terrible consequences for society (economically, environmentally and socially).
  - Affects entire marine life.
  - Blocks entrance of oxygen into water.

### 8.6.1 Causes of Oil Spills

- Sinking or leakage of oil carrying vessels or oil pipelines.
- Illegal dumping by industries.
- Countries at war.
- Terrorist activity.
- Due to Natural disasters.





- Affects the food bed when oil reaches sea bed.
- Natural recovery process may require more than 10 years.

### 8.6.3 Precautions to be taken

- Build double hull.
- Installing Blowout preventers.
- Better training of ship and oil rig personnel.
- Prediction of weather and ocean conditions.



## 8.7 Human Stampede:

A stampede is an act of mass impulse among herd animals or a crowd of people in which the herd or crowd collectively begins running with no clear direction or purpose often in an attempt to escape a perceived threat.

### 8.7.1 Causes of Human Stampede

- **Force** of the crowd or crowd pressure.
- **Information** upon which the crowd acts or reacts.
- **Space** involved in the crowd incident, and standing area, physical facilities like stairs, corridors, escalators.
- **Time** or duration of incident.



### 8.7.2 Effects of Human Stampede

- Loss of life.
- Damage to public property.
- Tangible costs (repair costs, medical costs, etc.)
- Intangible costs (pain, sufferings, etc.)
- Hospitalization.
- Handicap.

### 8.7.3 Precautions to be taken

- Study the event and its location thoroughly.

- Do not take kids or the elderly in any such area or event.
- Keep minimum things to carry with you.
- Do not panic.

## 8.8 Nuclear Disaster

According to International Atomic Energy Agency, a nuclear and radiation accident is defined as “an event that has led to significant consequences to people, the environment or the facility”.

- Nuclear weapons are more destructive and harmful to the society than any other weapon.



### 8.8.1 Causes Nuclear Disaster

- The main causes is due to meltdowns that occur in a reactor.



Meltdown



### 8.8.2 Effects of Nuclear Disaster

- Emitting radiations, can be caused health disorders.
- Disease like Thyroid cancer, mental illness, rise in abortion and various physical disability occurs.
- Fatality rate is more.
- Adverse effects on vegetation, animals, aquatic life and human beings.
- Has both **immediate** effects (Significant destruction within seconds or minutes) and **delayed** effects (effects are extended to a period from hours to centuries).

### 8.8.3 Precautions to be taken

- We should keep ourselves informed about the governments plants.
- We should act in accordance with official communication.
- Medical aid should be made available as the effect on human beings are seen through nausea, giddiness, etc.



### Activity 2

Collect the images of recent manmade disaster occurred.