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12

# DISASTERS AND THEIR MANAGEMENT

In nature catastrophes such as floods, drought, earth quake, tsunami, happen from time to time causing immense damage to life and property. It is important to devise means and methods to manage and minimise from natural disasters as far as possible.

Disasters caused by human activities such as fires, accidents, epidemics are no less sudden than natural disasters and may be equally devastating. In this lesson you shall learn about causes, effects, prevention and management of natural as well as human made disaster.

## OBJECTIVES

After completing this lesson, you will be able to:

- *explain how ecological balance is maintained in nature;*
- *classify disasters into natural and man-made;*
- *explain the causes, effects and management of flood, cyclone, drought (water and climate related disasters);*
- *explain the causes, effects and management of earthquake (geologically related disasters);*
- *explain the causes, effects and management of forest fire, oil spill accident related disaster to industrial accidents;*
- *explain the causes, effects and management of biologically related disasters (epidemics namely dengue, HIV and cattle epidemics);*
- *explain the role of community and government in disaster management.*

## 12.1 ECOLOGICAL BALANCE IN NATURE

Nature is bountiful full of resources used by the living organisms use for their survival and well being. But nature has its own control systems. Resources used up are replenished



excesses are checked, all naturally through the biogeochemical cycles, the food chains and webs and other natural phenomena. Thus equilibrium is maintained in nature. This is called ecological balance and has in recent times been disturbed by human activities.

## 12.2 NATURAL DISASTERS

The Indian sub continent is highly prone to natural disasters. Floods, droughts, cyclones and earthquakes are recurrent phenomena in India. Susceptibility to disasters is compounded by frequent occurrences of man-made disasters such as fire. The changing topography (topo = land) due to environmental degradation also increasing vulnerability to natural disasters. In 1988, 11.2%of total land area was flood prone, but in 1998 floods inundated 37% geographical area. Four major disasters that India has experienced in the recent past are the earthquake in Latur (Maharashtra in 1993), super cyclone in Orissa (1999), the earthquake in Gujarat (2001) and Tsunami in Tamilnadu and Andhra Pradesh in December 2004. Frequent disasters lead to enormous loss of life and property. Physical safety-especially that of the vulnerable groups is routinely threatened by hazards. Natural disasters can not be prevented but their damaging impact can be reduced through better forecast, and preparedness to take up effective rescue measures. The four major disasters mentioned above have very clearly illustrated that we need multi-hazard prevention, response and recovery plans for natural hazards so that threat to human life and property is minimized. Disaster risk management is essentially a development problem. Preparedness and planning for disaster management have to be taken up along with environmental concerns that the country is facing today.

### 12.2.1 Type of disasters

There are two types of disasters namely natural disasters and man made disasters. For example: fire, accidents (road, rail or air), industrial accidents or epidemics are some of the examples of man-made disasters, both natural and man-made disasters which have devastating input resulting loss of human life, loss of livelihoods, property and environmental degradation. Disasters disrupts normal functioning of society and leave long lasting impact. Earth quake, cyclone, flood and drought are examples of natural disasters.

**A. Natural disasters**

Certain disasters occur in nature, without human provocation. They are described below.

(a) **Floods**

Floods are sudden and temporary inundation of a large area as an overflowing of rivers or reservoirs.

*Fig. 12.1: Flood*

(i) **Causes**

Floods are caused by rains, high winds, cyclones, tsunami, melting snow or dam burst. Flood can happen gradually or can happen suddenly due to heavy rains, breach of the water storage and control structures, spillover. Siltation of the rivers and reservoirs, and this can enhance the incidence and magnitude of floods.

(ii) **Effects**

- **Casualties**

Human and livestock death due to drowning, serious injuries and outbreak of epidemics like diarrhea, cholera, jaundice or viral infections are common problems faced in flood affected areas. Even wells, other source of drinking water get submerged resulting in acute shortage of safe drinking water during floods. Consequently often people are forced to drink the contaminated floodwater, which may cause serious diseases.

- **Structural damage**

During floods mud huts and buildings built on weak foundations collapse endangering human lives and property. Damage may also be cause to roads, rail, dams, monuments, crops and cattle. Floods may uproot trees and may cause landslides and soil erosion.

- **Material loss**

Household articles including eatables, electronic goods, beds, clothes, furniture get submerged in water and get spoilt all materials mounted on ground e.g. food stock, equipment, vehicles, livestock, machinery, salt pan and fishing boats can be submerged and spoilt.

- **Utilities damage**

Utilities such as water supply, sewerage, communication lines, power-lines, transportation network and railways are put at risk.

- **Crop loss**

Apart from the loss of human and cattle life, floods cause severe devastation of standing agricultural crops. Floods water spoils the stored food-grains or harvested crop. Floods



may affect soil characteristics and may turn them infertile due to the erosion of the top soil or in coastal areas agricultural lands may turn saline due to flooding by sea water.

**• Flood control**

Flood control can be achieved through various means. The floodwater can be reduced by reducing the run-off water through afforestation. Forests promote rainwater percolation in the ground, thus recharging the groundwater and reducing the run-off water. Construction of dams also reduces flood water through storage. Dams can store water, which can not be accommodated in the river downstream may cause floods. Water can be released in a controlled manner from the dam. Desilting, deepening and increasing embankment increase the capacity of a river/channel/drain.

(iii) **Management**

The flood damage can be considerable reduced and loss of human lives can prevented through proper planning of flood control and management measures.

**• Identification of flood prone areas**

A rational planning for flood management involves identification the flood prone areas and frequency and magnitude of flooding in these areas.

**• Flood forecasting**

Normally there is a reasonable timely warning by alerting people and moving them to safer area well in time. Measurement of intensity of rainfall in the catchment area provide sufficient clue to hydrology engineers to calculate the possible submergence area along a river well before the flooding occurs. Accordingly expected run-off volume people can be warned to evacuate the likely areas to be flooded and advise to go to safer places along with their belongings including livestock. In India has a large network of rain measuring stations, flood warnings are issued by the Central Water Commission (CWC), Irrigation and Flood Control Department and Water Resources Department.

**• Land use planning**

Land use planning is very important for all the developmental activities. No major development should be permitted in flood prone areas. If construction is unavoidable it should be able to withstand the flood forces. Buildings should be constructed on elevated areas.

Afforestation should be encouraged. Deforestation in the catchments areas should be discouraged because deforestation results in excessive run off water and causes soil erosion, which is the main cause of river siltation resulting in floods. Any construction, which causes obstruction in drainage flow, should not be permitted. Encroachment of the storm water drains should not be allowed.

This reduces the risk of floods. Some precautionary measures are as follows -

- Build houses away from flood prone area.
- Keep yourself alert and updated to weather and flood forecasting information.
- In case evacuation warnings are issued, immediately go to the shelters provided.
- When you are moving to a shelter, move your valuable articles to safer elevated places so that they are not destroyed by flood water.
- Store extra food, such as rice, pulses etc. for emergency.
- Do not touch any loose electric wire to avoid electrocution.
- Do not spread rumours or listen to them.
- Make provision for adults and children who need special diet.
- After the flood is over, get yourself and your family members inoculated against diseases and seek medical care for injured and sick.
- Clear the house and dwellings of debris.
- Report any loss to the revenue authorities.

(b) **Drought**

Drought is an event that results from lower than normal expected rainfall over a season or period. The low rainfall is insufficient to meet the needs of human beings, plants, animals and agriculture. Short fall in rain results in drying of rivers, lakes, reservoirs and drying of wells due to excessive withdrawal and poor recharge of ground water and loss of crop yield due to shortage of water are some of the main indicators of drought.

**(i) Causes**

Drought occurs due to shortage of rainfall. As per Meteorological Department if rainfall is deficient by more than 10% of the annual average rainfall, the condition is said to be that of drought. The severity of drought is determined by the extent of deviation of rainfall from the average. In the recent past frequency of periods of drought have increasing due to deforestation and environmental degradation.

**(ii) Effects**

Drought has severe effects on agriculture. To start with drought affects mostly rainfed crops and subsequently the irrigated crops. The herdsman, landless labours, subsistence farmers, women, children and farm animals are most affected.

- Crop failure or food shortage leading to large scale starvation and death.
- Affects dairy activities, timber and fisheries.
- Increases unemployment.

- Depletion of ground water.
- Increases energy consumption for pumping water from deep aquifers.
- Reduces energy production in hydro-electric power plants.
- Loss of biodiversity; and reduced landscape quality.
- Causes health problems, increased poverty, reduced quality of life and social unrest leading to migration.

**(iii) Management**

The adverse effects of drought can be minimised if some measures are taken. A regular monitoring of rainfall, water availability in reservoirs, lakes and rivers as well as in comparison it with the demand. When water availability decreases than demand, water consumption need to be reduced by adopting various water conservation measures. These include economizing water consumption, by increasing water use efficiency, reducing wastage, reusing the wastewater for inferior uses. Use of efficient methods of irrigation and sowing low water-consuming crops are some important measures to overcome drought. Rain water harvesting increases water availability. Water harvesting is done by either allowing the run-off water from all the catchment areas to a common point and storing it in a reservoir or allowing it to percolate into the ground so far recharging groundwater.

**(c) Earthquake**

Earthquake is a sudden release of energy accumulated in deformed rocks of earth crust causing the ground to tremble or shake. Earthquake can occur suddenly any time of the year without any warning causing severe loss of life and property (Fig. 12.2). We are aware of the severe damage caused by earthquakes of Latur (1993) and Bhuj (2002).

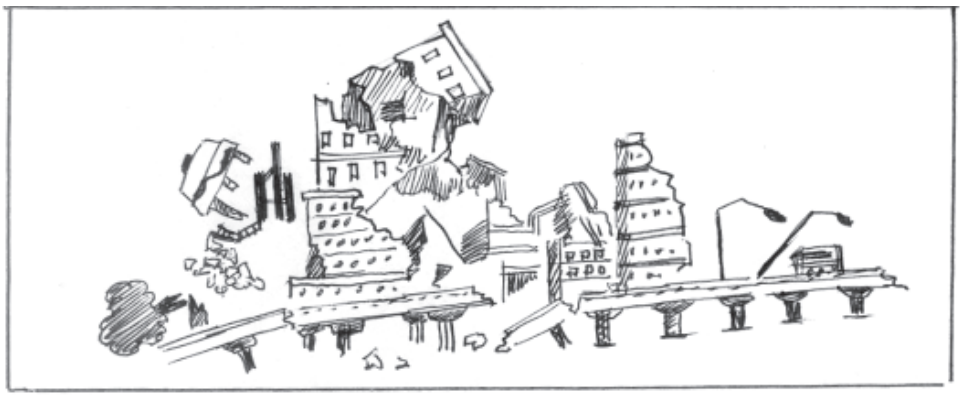

***Fig. 12.2:*** *Earthquake*

The intensity of an earthquake is related to the amount of energy released when rocks give way to the forces within the earth. It is measured with the help of an instrument known as

**seismograph**. (Fig. 12.3) The intensity is measured on Richter scale (after inventor C.F. Richter). Following values indicate degree of damage.

| Intensity on Richter Scale | Extent of damage |
|---|---|
| upto 3 | No damage |
| 3-5 | Cracks in old building |
| 5-7 | Cracks in roads |
| Above 8 | Collapsing of Buildings |

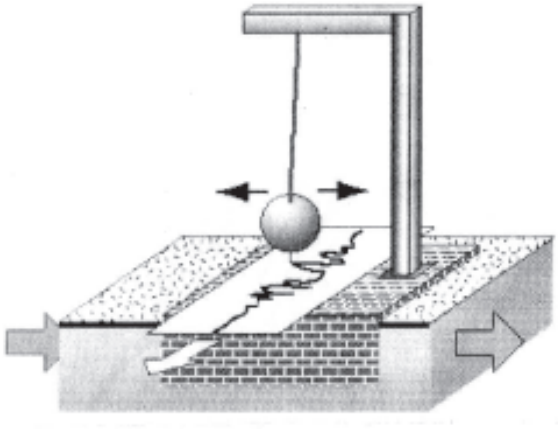

***Fig. 12.3:*** *Seisomograph*

(i) **Causes**

Earthquakes are natural ways of releasing energy by earth. An earthquake occurs in certain pockets of the earth which has geological faults. Such areas have already been identified.

(ii) **Effects**

**• Structural damage**

Earthquakes may cause physical damage to the buildings, roads, dams and monuments. High rise buildings or building built on weak foundations are especially susceptible to earthquake damage. Household articles including electronic goods and furniture get damaged. Human and livestock deaths or serious injuries from collapsing of building are common followed by outbreak of epidemics like cholera, diarrhoea, and infectious diseases. Utilities such as water supply, sewerage, communication lines, power-lines, transportation network, and railways get damaged.

**• Management**

The effects can be minimized if some of the following measures are taken:-



**Design of buildings**

The buildings should be designed especially in earthquake prone areas in such a manner that they can withstand the stress of earthquake. Physical characteristics of soil should be analysed in order to ensure the strength to withstand the earthquake. Bureau of Indian Standards has formulated building designs and guidelines for constructions that withstand against earthquakes. Generally building design is approved by the concerned municipal authorities according to build by laws and safety requirements. Training of the builders, architects, contractors, designers, house owners and government officials is important.

Some of the precautionary measures in the event of an earthquake are as follows:

- Move out in the open;
- Keep calm, do not rush and panic, never use lift, keep away from windows, mirrors and furniture;
- Stand under strong beams that may not fall or creep under the dining table or a strong bed;
- If you are under a building and unable to move, cover your head and body with your arms, pillows, blankets to protect yourself from falling objects;
- If in a multi storey building stay on the same floor. Do not use elevators or run towards the staircase;
- If travelling stop the vehicle away from building, walls, bridge, trees, electricity poles and wires;
- Check for structural damage and clear the blockage;
- Check for injuries. Apply first aid. Help others;
- If your home is badly damaged by earthquake, come out immediately. Collect all emergency supplies like food, water, first aid kit, medicines, flash light or torch, candles, matchbox, clothes etc; if possible;
- Keep away from buildings especially old and tall ones, electricity poles, wires and walls.

(d) **Cyclone**

Cyclones are violent storms, often of vast extent, characterised by strong and high winds rotating about a calm center of low atmospheric pressure. This center moves onwards, often with velocity of around 50 km/h. Cyclones strike suddenly though it takes time for them to build up. Cyclone is generally followed by heavy rains causing floods. Satellite tracking can predict on possible affected areas and inhabitants fore-warned can be made for warning. Warning and evacuation is done along the projected path.

(i) **Effects**

Light weight structures built of mud, wood, old buildings with weak walls and structure without proper anchorage to the foundation are at risk. The settlements located in low

lying areas of coastal regions are directly vulnerable. Settlements in adjacent areas are vulnerable to floods, mudslide or landslide due to heavy rain. Telephone and electricity poles and wires, fences, light building structures such as thatched, tin sheds roofs, signboards, hoardings, fishing boats and trees are most vulnerable to cyclone damages. Due to heavy rains people and their property might be washed away in floods or blown away by cyclone itself. The cyclone along in the coastal areas may cause sea waves to enter on land and flood it. This may cause saline water contamination of soil and water in the affected area, affecting water supply and severely affecting agricultural crops.

(ii) **Management**

It is important to identify the cyclone prone areas. No development should be permitted in cyclone – prone areas. The building should be designed to withstand forces of wind and floods. All the elements holding the structures need to be properly anchored to resist the uplift. Coastal green belt has been found very effective in minimizing the effects of cyclones. Such green belts (trees growing along the coast) need to be developed along the coasts.

(e) **Tsunami**

Tsunami is also called seismic sea wave, or tidal wave, catastrophic ocean wave, usually caused by a submarine earthquake occurring less than 50 km (30 miles) beneath the seafloor, with a magnitude greater than 6.5 on the Richter scale. Underwater or coastal landslides or volcanic eruptions also may cause a tsunami. The term tidal wave is more frequently used for such a wave, but it is a misnomer, for the wave has no connection with the tides.

In a tsunami a train of simple, progressive oscillatory waves is propagated to great distances at the ocean surface in ever-widening circles, much like the waves produced by a pebble falling into a shallow pool. The observation has enormous practical value, enabling seismologists to issue warnings to endangered coasts immediately after an earthquake and several hours before the arrival of the tsunami.

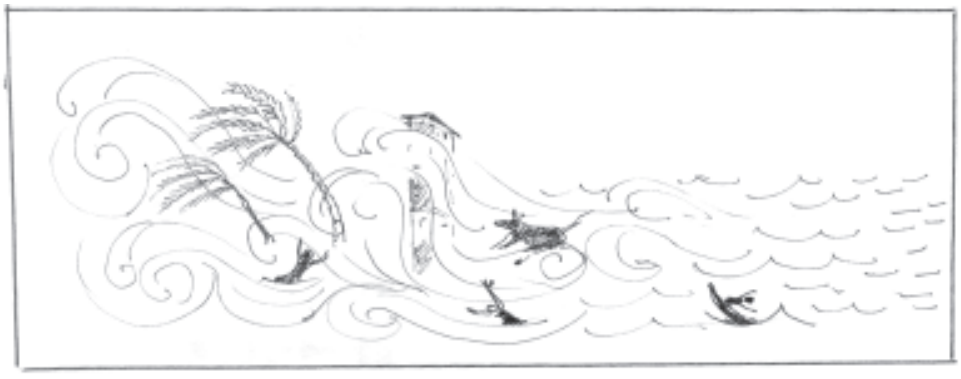

***Fig. 12.4:*** *Tsunami*

As the waves approach the continental coasts, friction with the increasingly shallow bottom reduces the velocity of the waves. This results in increased wave height up to 50 meter and



above. Three to five major oscillations generate most of the damage. The effects of tsunami however, vary widely from place to place.

(i) **Effects**

The effects of tsunami are quite similar to those of cyclones or floods. Huge waves of sea water enters with great force and floods the land and washes away human settlements, agricultural crops and other properties. The famous tsunami of December 2004 has had devastating effects in many countries particularly in Indonesia, Malaysia, Srilanka, India etc. One large area of coastal districts of Andhra Pradesh and Tamilnadu. More than 2 lacs people died in 8 Asian countries including India.

(ii) **Management**

The mitigation measures are quite similar to those for cyclone or flood.

## INTEXT QUESTIONS 12.1

1. Define: (i) Floods (ii) Earthquake (iii) Cyclone (iv) Tsunami

   _____

2. Mention two ways by which floods may be controlled.

   _____

3. State any one effect of tsunami.

   _____

4. Why is a cyclone, generally, followed by floods?

   _____

5. State the change in the ocean with predicts the advent of tsunami.

   _____

### B. Manmade or Anthropogenic Disasters

Certains disasters occur in nature by humans activities. They are described below:

(a) **Fires**

Fires are events of burning something. They are often destructive taking up toll of life and property. It is observed that more people die in a fire than in a cyclone, earthquake, floods and other natural disasters combined. Fires are a great threat to forests and wild life because they spread speedily and cause tremendous damage in a short time. In cities fires break out in home, jhuggis, buildings specially godowns and factories. Fire can spread to a large area. Many people may die of burns and asphyxiation. It may also cause

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contamination of air, water and soil, which may affect the crops, plants and animals, and soil fertility.

(i) **Causes**

During summer months such fires results in casualties and enormous economic losses.

There are numerous causes of fires. Some important ones are given here-

- Throwing burning matchsticks or cigarettes irresponsibility.
- Heating sources can cause fire in houses e.g. clothes may catch fire while cooking on kerosene stove or gas stove.
- Cooking accidents are a major cause of fire at home. Fire can result due to unattended cooking.
- A short circuit in an electric wiring can cause fire. Overheating of electric appliances, poor wiring connections, use of sub-standard quality appliances can also result in a fire.
- Rubbish and waste materials often lying on roadsides or near houses may catch fire when people throw burning matchstick or cigarette butt.
- Storage and transportation of inflammable material or explosive chemicals without proper precautions may cause fires.
- Forest fires may result from human negligence or carelessness.

(ii) **Effects**

• **Casualities**

Death of humans and livestock may occur due to burning or serious injuries from fire. In rural areas often the entire harvested crop stored in securely may catch fire and burn to ashes resulting in heavy loss to the owner.

(iii) **Management**

- Obey fire safety rules and remember the evacuation route in case of fire.
- Keep and handle inflammable materials with utmost care.
- Keep a fire extinguisher in the house and learn how to use it.
- When you leave home, make sure to shut off all electrical and gas appliances.
- Do not plug several devices into one socket.
- Keep matches away from children.



- Do not block access routes by cupboards or any furniture.
- In the event of a fire call the fire department immediately.
- In the smoke filled corridor, crawl on all floors or on your belly as the smoke is less on the floor.
- Find at least two ways to escape from your home.
- Make sure that you remove all the waste material from work place and home on regular basis.
- Hazardous materials such as paints, solvents, adhesives, chemicals or gas cylinders should be kept in separate storage, well away from fire.
- Fire crackers on Diwali is a major cause of fire in our country. Use them carefully under supervision of elders.

(b) **Road, rail and air traffic accidents**

(i) **Road accidents**

Road networks are developed for better connectivity and service. Increased number of vehicles, violation of traffic rules, speeding, drunken driving and poor maintenance of vehicles as well as of roads are some of the main causes of road accidents. In order to avoid accidents following safety measures can be adopted:

- Look on either side of the road before crossing.
- Use zebra crossing while crossing the road by foot.
- Wear helmet while riding a two-wheeler.
- Use seat belt provided in your car.
- Drive only if you possess a proper driving license.
- Be familiar with road markings and honour them.
- Maintain a safety distance from the vehicle in front.
- Do not jump lanes. It becomes difficult for other vehicles, on the road to anticipate your move.
- Do not be rash and do not try to overtake unnecessarily.
- The best way to be safe on roads is to follow "lane driving"
- While driving avoid sudden acceleration and deceleration.
- Replace the worn tyres and faulty headlamps.
- Check the tyre pressure, radiator water, brake oil and fuel frequently.
- Dip your beam whenever you spot an oncoming vehicle.
- Follow the maintenance schedule prescribed by the manufacturer.
- Overcome impatience, anger and intoxication during driving. Road rage is dangerous.
- In case a mishap occurs stay calm.
- In case of fire, try to get out as early as possible and do not worry about the baggage.

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(ii) **Rail accident**

The most common type of rail accident is derailment due to human error, sabotage or natural landslide in a hilly track, or fire. Rail accidents lead to large number of casualties and material damage. Indian Railways incur heavy loss due to such accidents every year. Some of the common safety measures are:-

- At railway crossings pay attention to the signal and the swing barrier. Do not get underneath and try to get across.
- In case of a unmanned crossing, get down from the vehicle and look at either sides of the track before crossing.
- Do not stop the train on a bridge or tunnel where evacuation is not possible.
- Do not carry inflammable material in a train.
- Do not lean out of a moving train.
- Do not smoke in train.
- Do not pull the emergency cord unnecessarily.

(iii) **Air accidents**

Air accidents may occur due to technical problems, fire, poor landing and take-off, weather conditions, hijacking, bombing etc. Some of the common safety measures are:

- Pay attention to the flight crew safety demonstration.
- Carefully read the safety card in the pocket.
- Know where is the nearest emergency exit and learn how to open it.
- Always keep your seatbelt fastened when seated.
- Stay calm, listen to the crew members and follow their instructions.
- Before you try to open any emergency door yourself, look outside the window. If you see a fire outside the door, do not open it or the flame may spread into the cabin. Try to use an alternate route for escape.
- Remember, smoke rises. So try to stay down if there is smoke in the cabin.
- If you have a cloth, put it over your nose and mouth.

(d) **Industrial accidents**

Industrial accidents can be due to explosion, fire and leakage of toxic or hazardous chemicals and lead to heavy loss of life and material. Leakage of chemicals and explosion may be due to human error, technological failure or geological hazards like earthquakes, flood etc. Fire in an industry may result from human error or electrical faults (short circuit).

(i) **Effects**

The industrial premises and immediate surroundings are at high risk in the event of an industrial accident. Employees and residents of nearby localities and their live-stock and crops in nearby areas are severely affected. The environment over a large area gets polluted. Hazardous chemicals released into the atmosphere or into a water body may travel long distances and may even damage the entire ecosystem around the industrial area. This is what has happened in Bhopal in the year 1984, when about 45 tonnes of methyl isocyanide (MIC) gas leaked into the atmosphere killing more than 2500 people.

Explosion or fire or leakage of corrosive chemicals severely damage structures. If the chemical is in gaseous form the geographical spread is fast and wide . Many people may die either due to mechanical damage from explosion or fire or due to toxicity of the poisonous chemicals. The routes of exposure to chemical released from an accidents are from inhalation, eye exposure, skin contact and ingestion. The polluting agents can have both immediate or long term effects. The immediate effects include death or other symptoms like dizziness, headache, irritation etc. The long term effects may include cancer, heart failure, brain damage, disfunction of immune system, deformation, genetic disorders or congenital(by birth) disorders in children.

(ii) **Management**

**• Inventory of hazardous chemicals**

It is important to have an inventory of hazardous chemicals along with their quality, storage locations, characteristics along with possible hazard associated with hazardous chemicals and this informed all employees and people living in the neighbourhood should informed about the potential risk. The inventory as far as possible high risk areas demarcated and displayed along with indicating affected zone and safe routes for evacuation in the event of emergency.

**• Location of industries**

Industries should not be sited in residential areas. A large buffer zone, in form of a green belt, for separating an industrial area from residential areas.

**• Community preparedness**

The community should be aware of the hazardous installations and know how to combat the situation. Some members of the community should monitor the potential risk and participate in safety training organised by industries.

**• Other measures**

Limit storage capacity of the toxic chemicals. Improve firefighting capability, warning systems and measures for preventing pollution dispersion. Develop emergency relief and evacuation planning for employees and nearby settlements. Adopt insurance for employees and surrounding population which is mandatory under the law.

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## 12.3 BIOLOGICAL DISASTERS

### 12.3.1 Epidemics

**Epidemic** is defined as occurrence of an illness or other health related event that is unusually affecting a large population. An epidemic can be anticipated by a sudden increase in the number of people suffering from a particular disease, increase in the population disease carrier. In order to control the spread of epidemics urgent measures are essential. Outbreaks of communicable disease to ready epidemic level are potentially high after a disaster.

(i) **Cause**

The outbreak of diseases is mainly due to poor sanitary condition leading to contamination of water or spread of disease form breeding of the disease vectors. Other factors include seasonal changes that favour breeding of insects. Vectors, exposure of a non-immune population (eg tourists or migrants), poverty and overcrowding.

(ii) **Effects**

Epidemic may cause mass illness or death. There are secondary effects such as disruption in the society and economic losses. Vulnerability is high among those who are poorly nourished, people living in unhygienic in sanitary conditions, poor quality of water supply, lack of access to health services.

(iii) **Management Measures**

Preventive public health measures needs to be strengthened. Personal protection through vaccination is an effective mitigation measure. Improvement of sanitary conditions, fumigation of vector breeding sites and proper disposal of domestic and municipal wastes greatly reduce chances of epidemic spread of diseases. Contingency plan for dealing with the epidemics that are likely to occur in the region. Early warning system and regular surveillance are primary requirements so as to mount an effective control response in early stages to prevent any outbreaks.

Some common diseases that may reach epidemic proportions are described below:-

(a) **Dengue**

Dengue is also called **Breakbone Fever**, or **Dandy Fever**. It is an acute, infectious, mosquito- borne hemorrhagic fever. Besides fever, the disease is characterized by an extreme pain and stiffness of the joints (hence the name "breakbone fever"). Dengue is caused by a virus transmitted through a mosquito called *Aedes aegypti* or Asian tiger mosquito.

A mosquito becomes infected only if it bites an infected individual (humans) during the first three days of the victim's illness. It then requires 8 to 11 days to incubate the virus before the disease can be transmitted to another individual. Thereafter, the mosquito remains



infected for life. The virus is injected into the skin of the victim. There is no specific therapy; therefore attention is focused on preventive measures involving mosquito control is only effective way to prevent spread of dengue.

(b) **HIV and AIDS**

The year 2001 was the 20th anniversary of the initial reports of a mysterious deadly immune-system disorder that came to be known as AIDS (or Acquired Immuno Deficiency Syndrome). The disease epidemic that had killed more than 21 million people in the World. In 2001 an estimated 36 million people were living with HIV infection. This disease is caused by virus, called HIV (Human Immune Virus) which is mostly transmitted through sexual union and blood transmission

(c) **Mad Cow Disease (Bovine spongiform encephalopathy)**

Bovine spongiform encephalopathy (BSE or mad cow disease) in cattle is caused by an infectious agent that has a long incubation period, between two and five years. Death usually follows within a year of the onset of symptoms. No treatment or palliative measures are known.

First recognized in cattle in the United Kingdom in 1986, Mad cow disease (BSE) became epidemic there, particularly in southern England. After the emergence of mad cow disease, concern grew over a possible relationship between the animal disease and the occurrence of brain fever disease in man (Creutzfeldt-Jacob disease). Possibly due to consumption of infected beef.

## INTEXT QUESTIONS 12.2

1. Name three disasters caused by human carelessness.

   _____

2. How can road accidents be prevented?

   _____

3. Why should chemicals be stored away from human settlements?

   _____

4. State two causes of disasters fire?

   _____

5. Why are diseases such as HIV/AIDS considered as a disaster?

   _____

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## 12.4 COMMUNITY LEVEL DISASTER MANAGEMENT

At the time of disaster, various agencies such as government, NGOs and community plays an important role for disaster management.

These are preparedness, response, recovery and prevention details are on follows:

Disaster management has four basic components:

**Preparedness**: Measure to ensure that communities and services are capable of coping with the effect of disaster. It has the following main elements:

- Community awareness and education;
- Preparation of disaster management plans for community, school, individual;
- Mock drill, training and practice;
- Inventory of resources both material resources and human skill resources;
- Proper warning systems;
- Mutual aid arrangement;
- Identifying the vulnerable groups;

**Response**: Measures taken in anticipation of, during and immediately after a disaster for minimizing its adverse impact. It has following main elements:

- Activate the emergency operation centres (control room);
- Deployment of search and rescue teams.
- Issuing updated warning;
- Setting up community kitchens using local groups;
- Set up temporary living accomodation and toilet faciliites;
- Set up medical camps;
- Mobilising resources;

**Recovery:** Measures are initiated to undertake reconstruction of the physical infrastructure and restoration of economic and emotional well being. The main elements are as follows:

- Community awareness on health and safety measures;
- Counselling programme for those who have lost the near and dear ones;
- Restoring the essential services -roads, communication links, electricity etc.;
- Providing shelters;
- Collecting usable materials for construction from rubble;
- Providing financial support;



- Finding employment opportunities;
- Reconstructing new buildings.

**Prevention:** Measures to eliminate or reduce the incidence of severity.

- Land use planning;
- Preventing habitation in risk zones;
- Disaster resistant buildings;
- Finding ways to reduce risk even before the disaster strikes;
- Community awareness and education.

The first few hours before and after a disaster are critical and precious for saving lives and reducing further injury. Often external help may take time to reach the disaster site. In any disaster, often the neighbours are first to respond. The first responders are people who act first in a disaster situation, usually lack basic response skills to deal medical or other emergencies. The aim of community level management is to train the individuals and the members of local community to deal with emergency situation effectively. Trained community members are life saving assets in such situations. Thus community level management involves people's participation.

## 12.5 GOVERNMENT INITIATIVES ON DISASTER MANAGEMENT

The Government of India has set up a National Committee on Disaster Management (NCDM) under the Chairmanship of the Prime Minister. The recommendations of this National Committee would form the basis of national disaster risk management programme and strengthening the natural disaster management and response mechanisms. United Nations Development Programmes (UNDP) has also been supporting various initiatives of the government to strengthen disaster management capacities.

The programme components would include the following:

- Development of state and district disaster management plans.
- Development of disaster risk management and response plans at Village/ Ward, Gram Panchayat, Block/Urban Local Body levels.
- Constitutions of Disaster Management Teams and Committees at all levels with adequate representation of women in all committees and team. (Village/ Ward, Gram Panchayat, Block/Urban local body, District and State.)
- Capacity Building of Disaster Management Teams at all levels. Special training for women in first aid, shelter management, water and sanitation, rescue and evacuation, etc.

- Capacity Building in cyclone and earthquake resistant features for houses in disaster-prone districts, training in retrofitting, and construction *of* technology demonstration units.
- Integration of disaster management plans with development plans *of* local self governments.

## INTEXT QUESTIONS 12.3

1. Name the form components of disaster management.

   _____

2. Why is community level disaster management important?

   _____

3. Define NCDM?

   _____

## WHAT YOU HAVE LEARNT

- The Indian sub continent is highly prone to natural disasters. Floods, droughts, cyclones and earthquakes are a recurrent phenomenon in India.
- Susceptibility to disasters is compounded by frequent occurrences of human made or anthropogenic disasters such as fire, epidemics etc.
- Four major disasters that India has experienced in the recent past are the Earthquake in Latur (Maharashtra in 1993), Super cyclone in Orissa (1999), the Earthquake in Gujarat (2001) and Tsunami in Tamilnadu and Andhra Pradesh in December, 2004.
- Floods are temporary inundation of large region as a result of increase in level of river or reservoir due to heavy rains, high winds, cyclones, tsunami, melting snow or dam burst. Floods cause heavy toll on life of people, livestock and materials. Deforestation resulting in soil erosion causing siltation of the rivers and reservoirs can enhance the incidence of floods.
- Drought is an event which results from lower rainfall than expected over a season or period. The rainfall is insufficient to meet the need of human beings, plants, animals and agriculture.
- The most important effect of drought is on agriculture. It affects dairy activities, fisheries, increases unemployment. Causes loss of biodiversity, groundwater depletion and food

shortage causing starvation deaths, health reduction, increased poverty, reduced quality of life and social unrest leading to migration.

- Earthquake is a sudden release of energy accumulated in deformed rocks of earth crust causing the ground to tremble or shake.
- The most important effect of earthquake is collapse of buildings especially high rise buildings or building built on weak foundations endangering human lives and properties.
- Fires are events of something burning and is often destructive taking up toll of life and property. It is observed that more people die in fire than in cyclone, earthquake, floods and other natural disasters combined.
- Accident on road, rail and air also take a major toll on life and property.
- Following regulations can prevent majority of such accidents. Epidemics of various diseases occur mostly due to ignorance.
- If proper mass awareness programmes are conducted for the people. A majority of them can be avoided.
- Community level participation in disaster management is very useful as they are the first responders.
- Government of India is conducting several initiatives in order to involve public at various level in order to implement the disaster management plan effectively.

## TERMINAL EXERCISE

1. Why do floods occur?
2. How can you mitigate the effects of floods?
3. Why is drought common in our country?
4. How can the ill effects of drought overcome?
5. What is tsunami?
6. Why do epidemics occur in our country?
7. Write a note on fire mitigation measures
8. Give a brief account of damage caused by industrial accident
9. What arc the advantages of involving the community in disaster management?
10. What is the contribution of the government in disaster management?

Notes

## ANSWER TO INTEXT QUESTIONS

**12.1**

1. (i) Are temporary inundation of a large region as a result of increase in level of river or reservoir.

   (ii) Is a sudden release of energy accumulated in defamed rocks of earth crust causing the ground to tremble or shake.

   (iii) Are wild storms often of vast extent, characterised by strong and high winds rotating about a calm centre of low atmospheric pressure.

   (iv) Is a catastrophic ocean wave, caused by a submarine earthquake.

2. Through afforesting, construction of dams, Desalting, deepening and increasing embankment increase the capacity of a river/channel/drain./channel. (any two)

4. Sea water floods the land and wash away human settlement, agriculture and other properties

5. Due to heavy rain causes flood and vulnerable form of flood is followed by cyclone.

**12.2**

1. Fires, Accidents (rail, road, air), industrial accidents

2. Drive safely, lane driving by following traffic rules, any other

3. To prevent industrial accidents

4. To throw burning match sticks or cigarettes, heating sources, short circuit of electric wires, storage and transportation of inflammable material or explosive chemical (any two)

5. Because it affects a large number of population.

**12.3**

1. Prepareness, response, recovery, prevention

2. Because community or neighbours respond first to disaster situation

3. National Committee on Disaster Management (NCDM) has set up by Government of India under the chairmanship of the prime minister.