9. Disaster Management

Try this.

Read about the following disasters which have occurred across the world and answer the following questions.

Major Disasters			
Year	**Disaster**	**Location**	**No. of deaths/loss incurred (approx.)**
1920	Earthquake	China	2,35,000
1923	Earthquake	Japan	1,42,000
1970	Bhola Cyclone	India and Bangladesh	5,00,000
1984	Release of gas Methyl Isocyanate	Bhopal, India	10,000; 5.5lakh affected
1985	Ruiz Volcanic Eruption	Colombia	25,000
1994	Land slide	Varandha Ghat, Maharashtra, India	20; Breaching of ghat road, Konkan Coast damaged to the extent of 1 km at several places
1995	Rail accident	Firozabad, India	400
1999	Cyclone	Odisha, India	10,000
2004	Tsunami	India, Indonesia, Sri Lanka	2,50,000
2005	Earthquake	India and Pakistan	80,000
2005	Flash Floods	Mumbai, India	1100
2014	Hailstorm	Maharashtra, India	Affected many standing crops, 2700 farm animals dead
2019	Cyclone Fani	Odisha, India	89

1) Classify these disasters into natural and man-made disasters.
2) Which of these disasters occurred due to climatic conditions?
3) Which of these disasters occurred due to geological causes?
4) Can you relate the location of a disaster with its cause?
5) Besides the number of deaths, what other losses might be occurring after the disasters?
6) Comparing the cyclones of 1999 and 2019, can you think of the reasons behind the reduction in the number of deaths?
7) Which of these disasters can be predicted in advance?
8) Of those disasters for which prediction can be made, can the people be evacuated from the area?
9) Why do some people get affected by the disaster in specific regions?

Geographical explanation

Natural disaster have caused widespread loss of life and property. Human beings are now becoming more aware and various steps have been taken at different levels to reduce the effect of disasters. Identification and classification of disaster is considered the first step to deal with disasters.

Types Of Disasters :

Disasters can be classified into various types depending on their origin. They can be of the following types:

1) Tectonic Disasters : Earthquakes, volcanic eruptions, Tsunamis, etc. e.g. The great Tsunami and earthquake of Indonesia occurred on 26th December, 2004
2) Geological : Landslides, mudslides, avalanches. e.g. The Malin mudslide of 2014 in Maharashtra.
3) Meteorological : Flood, cyclone, storm, heat wave, etc. e.g. The floods of Kerala, 2018
4) Biological : locust attacks, pest attacks, epidemics such as flu, dengue, cholera, etc. e.g. The Surat plague of 1992.
5) Anthropogenic or man-made : Industrial accidents, Transportation accidents, Nuclear accidents, etc. e.g. Bhopal gas tragedy 1984

Thus, we see that disasters can be natural or man-made. Some disasters can be prevented. Generally, man-made disasters can be prevented as they happen due to mistakes or carelessness by humans. Thus, disasters affect human population while some ever may occur only in nature. For example, volcanic eruption is a natural process which cannot be prevented. Such natural events are called hazards. When they occur in areas inhabited by humans and cause damage, they are termed disasters.

Hazards :

Hazards are phenomena that pose a threat to people, structural or economic assets and which may cause a disaster. They could be either naturally occurring in the environment or man-made. Thus, high rainfall is a hazard as it may cause floods which may be disastrous. A hazard becomes a disaster when it affects human population, settlements and their activities.

Always remember

Difference between a hazard and a disaster

Disaster and hazard are often used interchangeably. But they are two different terms. A disaster is the result of the impact of a hazard on society. Disaster is more of an anthropocentric concept, while hazard is a result of natural process. An earthquake or a storm occurring anywhere in the world is a hazard but the same event occurring in inhabited areas is called a disaster. A disaster occurs when the people are unable to cope with the impact of the hazard, causing death, injury, loss of property as well as economic losses.

Vulnerability :

In the examples given in the table, we find that population living in certain areas are exposed to particular disasters. In the above example, in case of cyclone, people in the coastal areas of India are more likely to be affected than those in the interior. People living in seismically active areas are prone to earthquakes. At times, the social economic and political conditions may make people or more likely to be affected by disasters in the same region. For example, the poor are more likely to be affected by disasters. Similarly, old people and children can easily become victims of disasters. Densely populated areas are more likely to be affected than sparsely populated areas. The geographical conditions and circumstances of people or region that make them susceptible to a disaster is known as

vulnerability. Thus, if you are more vulnerable, you have to be better prepared. And, if we are better prepared, we can reduce the risk of getting affected by the disaster.

Capacity to cope :

The ability of people, organisations and systems, using available skills and resources, to face and manage disasters is known as their capacity to cope. Thus, vulnerability is reduced if the capacity to cope with the disaster is high. For example, in 1999 the cyclone had caused 10,000 deaths but in 2019, only 89 deaths occurred due to a cyclone. This shows that capacity to cope has improved.

Can you tell ?

If an earthquake occurs with a magnitude of more than 6 in Sahara desert area which is totally uninhabited by humans and a similar one occurs in Assam, which one would you call a disaster ?

Effects of Disasters :

The disasters can bring lot of immediate and long-term effects on various sectors of a society. Primary effects occur as a result of the disaster itself. For example, damage during a flood or collapse of buildings during earthquake. Secondary effects occur because a primary effect has caused them. For example: fires ignited, disruption of electrical power and water service as a result of earthquakes.

Tertiary effects are long-term effects that are a result of a primary and secondary effect. These include things like loss of homes, permanent changes in the position of river channel and adverse effect on tourism in an affected area due to an earthquake etc.

Find out !

With the help of internet or library, collect old newspaper cuttings of disasters. Bring them in the class and discuss how people faced them. Find out how governments and various institutions tackled the situations together.

Disaster management :

In all the examples of disasters, given in the table, disasters like gas leakage and rail accident could have been prevented. Disasters like volcanic eruption, tsunamis, earthquakes etc. cannot be prevented but their effect can be reduced. Events like cyclones and floods can now be forecast and people can be evacuated from vulnerable areas. This process of creating awareness about disasters, taking steps to reduce its effects, evaluating the damage caused by the disasters, providing relief, food and medical aid in affected areas involves many people, organizations and processes.

Disaster management is a multi-disciplinary task which in the following tasks. :

- Preparedness
- Monitoring, Early warning and mitigation
- Evacuation, search and rescue
- Providing relief in terms of medical help, basic needs such as food clothes and shelter
- Reconstruction and rehabilitation

Disaster management seeks to reduce risk to damages or losses. It focuses on the hazard that causes the disaster and attempts to minimize the adverse impact of the same on communities. It involves coordination from governments, local self governments, police, military and paramilitary forces, NGOs, doctors, scientists, planners, volunteers and groups or communities.

Can you do it!

Classify the above components of disaster management into pre-disaster and post-disaster.

Geographical explanation

Disaster management cycle :

In disaster management, disaster prevention, disaster mitigation and disaster preparedness constitute the pre–disaster planning phase. Pre–disaster planning is the process of preparing in advance, to face disasters in future.

Disaster preparedness :

It involves measures taken to prepare for and reduce effect of disasters. This include carrying out awareness campaigns, strengthening the weak structures, preparing plans for households and community level etc. For example, if a building catches fire, its residents should know how to escape. For this to occur they should be trained before hand. People living in the flood prone areas should be prepared with items such as medicine, food, water etc.

It is the action taken to reduce or avoid disasters and their effects. It should be included in development policy and planning at regional, national and international levels. It is a continuous process.

Use your brain power!

In 1988, an earthquake of magnitude 6.9 struck Armenia and took 25,000 lives. On the other hand, an earthquake in 1989 in California of magnitude 7 took only 63 lives. Can you think of the reason behind this difference?

Mitigation :

Mitigation mean any measure taken to minimize the impact of a disaster before it occurs. Mostly, it refers to action taken against potential disasters. It is mainly carried out for those disasters which cannot be prevented. Mitigation efforts help the people by creating safer communities and reducing loss of life and property.

Some mitigation measures can be • community level disaster planning, • public awareness and information campaigns, • preparedness of hospitals • construction of houses away from hazardous areas, etc. Mitigation efforts can be categorized as structural and non-structural. Structural efforts include construction of river embankments strengthening existing buildings, etc. whereas non-structural effort include areas training in disaster management, regulating land-use, public education etc.

These measures involve all possible steps to reduce the losses. For example, use of satellites in forecasting floods or cyclones can help in knowing the timing of their landfall. People can be evacuated from vulnerable areas. In the case of Cyclone Fani, effective mitigation efforts have helped to bring down the number of deaths. Mitigation lessens the financial impact of disasters on government agencies.

Disaster response :

'Disaster response' is the way the community responds to the disaster. Though, this is a post disaster process, it reflects the preparedness of the community. It includes the immediate period after the disaster strikes. It is concerned with providing food and shelter to the disaster victims, restoring normal condition and providing financial supports. Thus, those initiatives taken to ensure that the needs and provisions of victims are met and suffering is minimised are taken under this stage. The main focus in this phase is making people safe till further measures are taken.

Recovery :

These steps involve measure taken to bring life back to normal in affected areas. This involves restoration of basics services and repair of physical, social and economic damages. Cleaning of debris, giving finical assistance to victims, rebuilding roads and bridges and providing sustained medical care for displaced human and animals population is included in this stage.

Rehabilitation :

Though, this is the last phase of disaster management, the process of disaster management does not end here. This phase involves efforts taken to restore normalcy in the long term. This phase may take many years efforts. This may include providing to housing to the affected, taking important decisions regarding economy, agriculture etc. which have been affected by disasters.

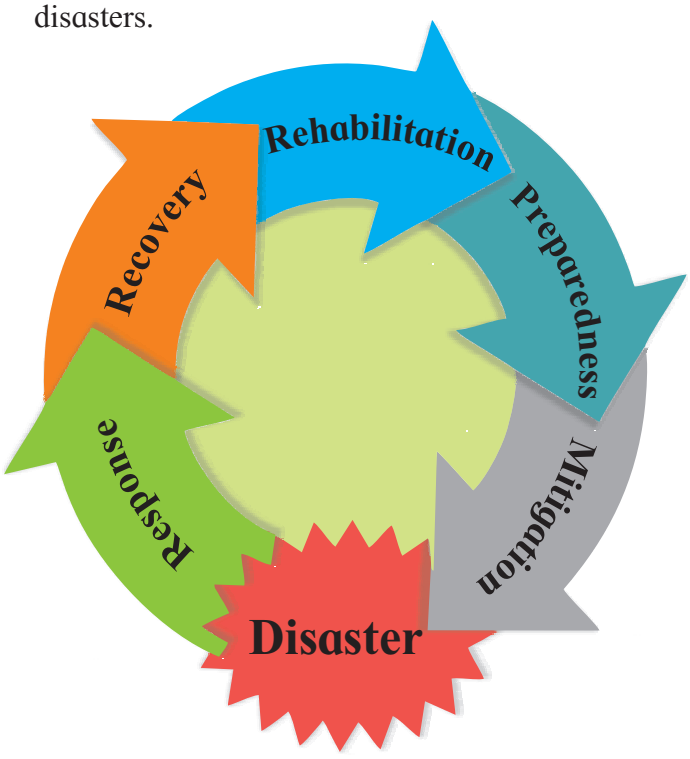

Fig. 9.1 : Disaster management cycle

Use your brain power !

Why is disaster management called a cycle? (See fig. 9.1)

Always remember

Structural and non-structural measures :

Structural measures include any physical construction to reduce or avoid possible impacts of hazards. It is achieved by or the application of engineering or technology. Nonstructural measures do not involving physical construction. It includes mainly the use of knowledge, practice or agreement to reduce disaster risks and impacts. In particular it is achieved through policies and laws, public awareness, training and education.

Give it a try.

Given below are a list of measures taken for disaster. Write whether they are pre-disaster or post-disaster and structural or non-structural. Also write the name of the disaster for which they are used. One has been done for you an as example.

Sr. No.	Measures	Pre-disaster / Post-disaster	Structural / Non structural	Disaster/ (s) to which they are applicable
1	Conducting mock drills.	Pre- disaster	Non structural	Earthquake, landslides, fire
2	Discussions about disaster risks and community problems and solutions.			
3	Using art, documentaries, music and drama to portray the impact of disasters on communities.			
4	Inviting emergency services personnel to provide lectures/demonstrations.			
5	Making booklets on disaster related information.			
6	Retrofit old buildings.			
7	Constructing shelters and evacuation chambers .			

Sr. No.	Measures	Pre-disaster / Post-disaster	Structural / Non structural	Disaster/ (s) to which they are applicable
8	Making change in land use policy regarding construction of houses in low-lying areas.			
9	Constructing buildings and houses using disaster resistant material, design to comply with relevant BIS (Bureau of Indian Standards) codes.			
10	Constructing proper drains.			
11	Carrying out plantation activities.			
12	Regular disaster related activities through radio, TV newspaper, etc.			
13	Using satellites for early warning.			
14	Evacuation routes in disaster management plans should be delineated.			

Find out !

Who is responsible for looking after disaster management in our country?

Role of Remote sensing, GIS and GPS in disaster management :

Today, Information Technology (IT) is used in this field for increasing the efficiency and effectiveness in coping with disaster. Map and spatial information are important components of all information in case of any disaster. Hence, mapping and spatial information acquisition becomes vital for any disaster management.

Remote sensing is very effective in mapping disaster prone areas particularly flood- affected areas. Microwave data can provide information on flood-inundated areas. Remote sensing satellites monitor the path of cyclone and it can provide ample time with warning for evacuation and preparedness in advance. The data obtained from meteorological satellites is used for cyclone tracking, intensity and landfall predictions and forecasting of extreme weather events. The data from earth observation satellites is used for monitoring disaster events and assessing the damages. The communication satellites help to establish communication in remote and inaccessible areas. Navigation satellites are used for providing location based services.

The GPS (Global Positioning System) is also important tool. GIS has emerged as a very important methodological tool for effective planning, communication and training in the various stages of the disaster management cycle. It also has a vital role to play in determining the extent of hazards and disasters. These techniques are very helpful to make planning and policy very easy for implementation.

In pre – and post disaster activity management role of GIS, GPS and remote sensing assume greater importance.

Disaster Management In India :

India's geo-climatic conditions as well as its high degree of socio-economic vulnerability, makes it one of the most disaster prone country in the world.

After the tsunami in 2004, approach towards

disaster management has drastically changed. Various state governments were requested to set up a disaster management office. At the Government of India level, two institutes were set up in New Delhi - the National Institute of Disaster Management (NIDM) and the National Disaster Management Authority (NDMA). The aim was to mitigate the damage potential of natural disasters in future.

The National Disaster Management Authority has been established at the centre, and the SDMA at state and district authorities at district level are gradually being formalized. In addition to this, the National Crisis Management Committee, part of the earlier setup, also functions at the Centre.

The nodal ministries, are identified for different disaster types of function under the overall guidance of the Ministry of Home Affairs (nodal ministry for disaster management). This makes the stakeholders interact at different levels within the disaster management framework.

For disasters such as drought, the Ministry for Agriculture is the nodal agency. Military forces and para military forces such as Home Guard, etc. play an important role. Various agencies such as ISRO, NRSC (National Remote Sensing Centre), etc. also play an important role in disaster management.

Find out !

Find out about the role of military and paramilitary forces in disaster management of India.

Do you know ?

The Union Ministry of Earth Science has launched India Quake application. The mobile App has been developed by the National Centre for Seismology (NCS). Through this App, location, time and magnitude of earthquakes can be known after their occurrence. It also will help in reducing panic amongst people during an earthquake.

Project :

Make a list of satellites which are used in disaster management. Collect their pictures and paste on the class notice board.

Exercise

Q. 1) Choose the correct alternative :

1) Which of the following groups shows the correct type of disasters?

a) Tectonic, Geological, Human, Climatic

b) Floods, Geological, Human, Climatic

c) Tectonic, Geological, Volcanic, Climatic

d) Tectonic, Human, Biological, Volcanic

2) The Meteorological Department has given information that a cyclone is likely to make a landfall at Odisha in 2 days. Which of the following group shows the correct sequence of management processes?

a) Recovery, Rehabilitation, Preparedness, Mitigation, Response

b) Rehabilitation, Preparedness, Mitigation, Response, Recovery

c) Preparedness, Mitigation, Response, Recovery, Rehabilitation

d) Response, Recovery, Rehabilitation, Preparedness, Mitigation

3) Statement A - The cyclonic depression originating in the Bay of Bengal is marching towards Tamil Nadu at a velocity of 350 km/hr.

Statement B - The loss of life was not much but property loss occurred on a large scale.

i) A indicates a disaster and B indicates a hazard.

ii) A indicates a hazard while B indicates a disaster.

iii) A indicates a disaster but B does not indicate a hazard.

iv) A does not indicate a disaster but B indicates a hazard.

4) India has been successful in mitigating the effects of the following disaster:

a) earthquake

b) volcanic eruptions

c) floods

d) cyclones

Q. 2) Write notes on :

1) Vulnerability
2) Disaster
3) Hazard
4) Man-made disasters

Q. 3) Write in short :

1) Mitigation for cyclones
2) Preparedness for floods
3) Rehabilitation after earthquake

Q. 4) Answer in detail :

1) Explain the types of disaster according to origin
2) Explain the effects of disasters with the help of examples
3) Write about the preparedness in Disaster Management in India.
4) Explain, with example, how will you carry out disaster management in your region/ premises.

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