

Internal security also includes aspects like natural and man-made disasters. It brings together the Police, Paramilitary and the Armed Forces along with immigration and customs, firefighters and the civil society on a single platform to tackle these disasters. This chapter focuses on various hazards and disasters that we see happening around us.

Hazards and Disasters

Hazards : A Hazard is a phenomenon that has the potential to cause threats to life, property, environment and normal processes. Hazards are natural and human induced. Earthquakes, Floods, Tsunami Landslides and Droughts are some of the natural hazards. Industrial accidents, road accidents and most of the fires are typical examples of Human Induced Hazards.

Natural hazards exist in some specific geographical areas, while human induced hazards are due to human errors or failure of some processes and could happen everywhere. Hazards may become active suddenly or build up slowly.

Disasters : Disasters are the occurrences caused due to some hazards that become active and go out of control. Thus, they are events that cause substantial damage to property and environment and loss or injury to life, creating imbalance in society and disturbing its normalcy. It takes tremendous efforts by the entire nation state and the populace to restore normalcy.

Disasters could be sudden or slow in their build-up and occurrence. Ill-effects of disasters depend upon the intensity and speed of the occurring hazard that causes disaster. It also depends upon the vulnerability of the population and infrastructure.

Types of Disasters

Natural Disasters

(Earthquake, floods, Landslides, Tsunami, Cyclone Droughts Precipitation and cloud burst)

Manmade Disasters

(Road accidents, Fire, Industrial accidents and Biological hazards)

Natural Disasters

Natural disasters are mostly the ones that cannot be prevented. They cause great losses and damages. Earthquakes, Floods, Landslides, Tsunamis, Droughts, Lightning Strikes, Cloud Bursts, Heavy Rainfall (precipitation) and Cyclones are some of the most commonly experienced natural disasters in India. Every disaster has complex ill-effects. They are generally in the form of deaths and injuries to living beings, damage to property and infrastructure resulting in economic losses, loss of crops and vegetation, industrial losses and even degradation of environment. All these effects lead to disturbance of life and exert great social, administrative and economic burdens on the society. Let us study these disasters.

Earthquakes :

When an earthquake takes place, it causes building structures to collapse. The collapsed buildings cause loss of lives and injuries. There are many secondary effects like landslides, dam bursting, snapping of high tension overhead wires, electrocution and even fires. Large scale epidemics spread because of decaying of the dead and contamination of water. Sometimes, the earth's surface cracks. Water streams change their courses. There is tremendous economic loss and social ill-effects.

Earthquakes are a common phenomenon all over the world. Construction technology is now evolving to construct earthquake resistant structures. Earthquakes measure from intensity 0.1 to 9.9 (10 being hypothetical) on a Richter Scale.



Earthquake Damage

Richter Scale	Effects
1.0	Not felt by humans
3.0	Felt by a few people on the upper stories of tall buildings
3.5	Felt by people lying down on hard surfaces
4.0	Felt indoors by many and by very few outside the buildings
4.5	Generally felt by everyone.
5.0	Trees sway, chandeliers swing, loose objects shift and fall causing damage
6.0	Cracking of walls and plaster falls
6 to 7	Chimneys fall, weak structures collapse
7.0	Some structures collapse, pipes break
7.5	Ground cracks, many buildings collapse, landslides occur
8.0	Most buildings and bridges collapse
Greater than 8	Total destruction, triggers tsunami (if under oceanic surface)

Floods :

Floods occur in many countries of the world. Almost 65% of India's main land is prone to floods. Floods cause havoc in states like Bihar, UP, Maharashtra, West Bengal, North East states and Orissa quite frequently. Floods are of two types – the flowing ones and sedentary ones. Flowing ones are because of overflowing rivers and sedentary ones are

because the heavy rains cause submergence of low laying areas in urban centres. The rain data and monitoring of water levels allows a fair warning period today. This ensures that people can be shifted to safer areas and help save their lives.

Effects of floods are in the form of submergence of areas causing damage to houses and properties, spoilage of crops and vegetation and drowning of people and cattle. Further, the secondary effects are in the form of displacement of population, Dam Bursts (due to water pressure) damage to infrastructure (Bridges, Railway Lines, Power Grids, Mobile Towers and many more). Epidemics also get triggered after floods.



Flood Situation

Landslides :

Landslide is a phenomenon where mud and rocks that form hills and mountains come sliding down with great force. This is due to natural causes like heavy rain or human intervention done through building of railway lines, digging canals, digging tunnels, mining for gravel etc.

In 2005, several people lost their lives in Jui village in Raigad District of Maharashtra. In 2014, there was a massive landslide in Malin village in Pune district. Careful observation allows a fair judgment of a possible landslide so as to plan for precautionary measures.



Landslide in Raigad District - 2005



Landslide at Malin Village in Pune District - 2014

Tsunami :

Tsunami is a Japanese word that means “Giant Wave”. This is caused by a strong earthquake or a volcanic eruption that occurs below the ocean waters (crust below the ocean waters). In India, Tsunami struck the coastal regions in December 2004. In March 2011, Japan suffered great losses due to Tsunami that had followed a massive Earthquake. Tsunami waves are known to be as high as 30 mtr (height of a 10 storey building approximately!). Tsunami warning systems are now available in the world. Tsunami waves travel nearly upto 1 km inland. It can submerge the coastal belt, destroy houses and infrastructure and kill people because of drowning and collapsing of infrastructure. The secondary effects are disruption of communications, spread of epidemics and loss of coastal crops.



A Picture Showing Tsunami Wave

Cyclones :

Cyclones are climatic hazards. Cyclones originate on land masses as well as oceanic water surfaces. The latter ones are more frequent and violent. Cyclones damage houses, infrastructure, uproot trees and electric poles, break overhead cables cutting lines of communication. Cyclones are accompanied by rain in the coastal areas.

India's East Coast experiences cyclones quite often. Cyclonic winds are known to travel at speeds greater than 200 km per hour. The nucleus may be of high pressure or low pressure around which the surrounding air spins. The cyclones may spin clockwise or anti-clockwise and may be termed as cyclones and anti-cyclones. Weather satellites do give us warnings of building up of a cyclone and its movement pattern.



Cyclone



Destruction During Orissa's Super Cyclone in 1999

Droughts, Heavy Precipitation and Cloud Bursts :

While Heavy Precipitation and Cloud Bursts are sudden and more local in their geographical expanse, the droughts are slow in becoming effective and cover vast tracts of land mass. Warning of Cloud Bursts and precipitation is now available through weather radars. Drought conditions depend upon rainfall and ground water levels. These can be predicted on the basis rainfall data and measurement of water tables.

Man-made Disasters

Road Accidents :

Road accidents are a common phenomenon in India. Most of the road accidents are attributed to the lack of road discipline. Reasons of road accidents are – rash driving, not following the traffic rules (like jumping the 'Red Signal', drunken driving and not maintaining driving norm.) Many accidents occur because of bad road and weather conditions. Pedestrians crossing the roads without due precaution is also a major reason. Unauthorized encroachments of the roads by hawkers and faulty parking of vehicles reduces space available to the traffic and increases road densities. Vehicle maintenance is also a major cause. After an accident, deaths and injuries occur because of non-usage of helmets by two wheeled riders or non-use of the seat belts by the occupants of the four-wheeled vehicles.

Fires :

The number of deaths due to fire is very high in India. Nearly 8% of all deaths in India occur due to fires. We hear of fires during festive seasons, as people use fire crackers. We also see domestic fires occurring while using cooking gas. Fires also occur in Industries due to failure of machines and industrial processes.

Industrial Accidents

With greater industrialization and automation, the threats of industrial accidents have enhanced. In India, Bhopal gas tragedy of 1984 had been the worst known industrial accident. Industrial accidents occur in the form of fires, chemical spillages and gas leakages. Most industrial accidents occur due to negligence, human errors and non-standard operations. When safety rules are flouted, accidents take place. However, industrial accidents are known to occur also as a result of some natural calamities. (like Earthquakes and Tsunamis).

Biological Hazards

Biological hazards occur due to natural disasters as well as human behavior. Creation of garbage, contamination of river water, open drains and gutters and unclean habits are the human induced causes that result into wide spread diseases and epidemics. Allowing water accumulation that enhances the chances of mosquito breeding, contamination of food and drinking water are the major reasons of biological disasters. Cholera, Typhoid, Malaria, Dengue, Chikun Gunya are the most common diseases that spread through water and food contamination and mosquito breeding.

Prevention and Preparedness

Prevention and preparedness are two key components of disaster management. We will see what we can do to prevent and prepare ourselves to face these problems.

Prevention

It has become possible to prevent man-made disasters due to research in new technologies. Preventive actions have helped to control disasters. Government has an important role to play in preventing disasters. Similarly, every citizen is an important player in preventing a disaster. Although natural phenomenon like precipitation, movement of Earth's crust and lightning cannot be prevented, precautions to protect lives and infrastructure could be taken to avoid losses and destruction. Such actions are called Mitigation.

Preparedness

Much as we may wish to be free of dangers, many dangers – Natural and Human induced lurk around all of us. Thus it is important for us to be well prepared to face the dangers. We may take all efforts to prevent hazards from getting converted into disasters. We may attempt to reduce the adverse impacts which are called mitigation measures. Preparations are of many types – creating warning systems, having adequate resources, having reactive forces in readiness and increasing awareness of the population and most importantly, have Disaster Management plans ready.

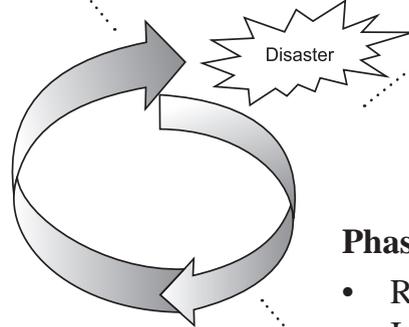
Disaster Management Cycle

Phase 1 : Pre Disaster phase

- Identify Hazards and Threats
- Take Preventive and Mitigation Measures
- Prepare for Responding

Phase 2 : During Disaster phase

Immediate rescue and relief



Further development
and resilience

Phase 3 : Post Disaster phase

- Relief
- Immediate recovery to semi-normalcy
- Rehabilitation of life and restoration of infrastructure

Disaster Management Cyclic Process

- Step 1 :** Identification and Analyses of possible Hazards, Vulnerability and Risks in a given area. This is called 'Threat Assessment Stage'.
- Step 2 :** Taking actions to prevent the hazards from getting activated. These are called 'Preventive Measures'.
- Step 3 :** When a hazard (like a natural hazard) cannot be controlled or prevented, the next best action is to minimize the damage/ loss/ destruction (or in short, the risk). This is called 'Mitigation Stage'.
- Step 4 :** Preparing to face a hazard when it turns into a disaster. It ranges from personal level to the level of own family, a community, a village, a city or the entire nation. This is part of 'Preparatory Stage'.
The First Four steps are part of 'Pre-Disaster Activity Phase'.
- Step 5 :** Actual response of saving lives, property and infrastructure by evacuating these from hazardous area and also rescuing people, animals or important material from the ill-effects of a hazard is called "Response". This step forms part of 'During-Disaster Activity Phase'
- Step 6 :** Relief and Rehabilitation of affected population, Restoration of normalcy and reconstruction of damaged infrastructure falls under the purview of 'Post Disaster Recovery Phase'.

