

# Introduction to Disaster Management

**H**ow strange it (the earthquake) must all have seemed to them, here where they lived so safely always! They thought such a dreadful thing could happen to others, but not to them. That is the way!

—William Dean Howells

## Learning Objectives

After reading this chapter, you should be able to:

- Elucidate the importance of disaster management.
- Explain in detail the causes and types of disasters.
- Describe the dimensions of natural and anthropogenic disasters.
- Explain the principles and components of disaster management.
- List the contents of an emergency operational plan.

## OPENING CASE

**I**t was a bright morning and the sun peeped in through the window panes. Sunaina, a 10-year-old girl, woke up with a lump in her throat, a feeling which we all feel at times when we do not get sound sleep. The fear of the unknown haunted her. She had seen weird dreams and was badly missing her mother. She wiped her tears and tried to open her eyes wide to get a clear view of the morning. The tears had done the job of water and had cleared her sleep. She walked towards the kitchen. After her mother's death 2 years ago, she was responsible for doing all domestic chores and was supposed to look after her brother Somu, who was now 8 years old. After getting ready for school herself, she would dress her brother and serve him breakfast. She would then leave for school. These were hard times, but she did this almost daily ever since her mother left for the heavenly abode.

As usual, after completing the morning errands, the brother-sister duo started for school. It was a 54-year-old school run by one Pulavar Palanichamy. About 900 students studied in the school complex housing three schools, namely, Lord Krishna High School, Lord Krishna Middle School and Saraswati Nursery School. The school had received recognition in 1950. It had classes from LKG to Standard 10 and was aided by the government up to Standard 8. Both Sunaina and Somu were students of Saraswati Nursery School.

It was a Friday, and on their way to school, Sunaina and Somu discussed about how they would spend their weekend. Upon reaching the school, they made their way to the third floor through the dark, dingy and congested staircase. Sunaina was very particular about her brother's well-being and, therefore, made it a rule to see to it that he sat on the front bench. Her mother used to tell her that the students who sat in the first row would always come first in the class. Sunaina wanted her brother to become a police officer, one whom she had seen often in police vans. That day she made him sit in the first bench in his class and gave her special instruction of not leaving the classroom until she arrived after the school was over.

At the school, the classes were running at the usual pace. All of a sudden, a fire broke out at around 11 am. When Sunaina saw the fire had caught the thatched roof, she, like other students, tried to run out, but the exit passage was narrow. Somehow, she managed to make her way to Somu's classroom. She was caught in the trap. She could not breathe and her nylon dress had caught fire. She succumbed to her fate, much like her brother.

The next day, the newspapers reported about the black Friday. The headline of a daily read 'Fire devours 83 school kids in Kumbakonam' (TNN Jul 17, 2004, 02.12 am IST)<sup>[1]</sup>. It reported: 'Eighty-three children were today burnt alive, 17 of them charred beyond recognition, while over 27 others received serious burns when a major fire ripped through the Krishna Saraswati School in Kumbakonam town of Tamil Nadu's Thanjavur district.'

Among the dead are 28 boys and 38 girls. District Magistrate J Radhakrishnan said that of the 27 injured admitted to hospitals, 15 are critical. Shops and other business establishments downed their shutters immediately after the news spread and the entire town went into mourning.

Most of the children died on the spot and were in the age group of eight to ten, the official, who was on the spot supervising the rescue operation, said. Fire service personnel who rushed to the scene immediately fought for nearly two hours and put out the fire.

The Tamil Nadu government has, meanwhile, placed four education department officials in the district, including the chief education officer, under suspension. They had inspected the school three years ago and given a no objection certificate. According to norms, such thatched roofs are not permissible, especially when there is a kitchen at such close quarters where food under the noon meal scheme is cooked. This is an act of criminal negligence, and it is clear that the management of the school has not adhered to the norms.

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The licence of the school is cancelled, and the chief minister has also announced *ex-gratia* relief of Rs 1 lakh each to the families of all the children who died in the fire, Rs 25,000 each to the relatives of students who suffered over 50% burns and Rs 10,000 each to the kin of the children who suffered simple burns.<sup>[2]</sup>

An enquiry commission under Justice K Sampath (the Sampath Commission) was set up, and it said in its 500-page report: 'School's greed led to Kumbakonam fire tragedy. It was management greed abetted by education authorities, which failed to enforce the laws and safety standards, and carelessness of midday meal staff caused the fire that led to the death of nearly 100 primary school students in Tamil Nadu in 2004. The "avarice and shady dealings" of management at the primary school in Kumbakonam, Tamil Nadu, which "violated all safety norms", was responsible for the school fire tragedy in July 2004 that resulted in the death of children'.

The report stated that children from the nursery and high schools were often 'herded' into the primary school to boost its attendance when school inspectors came visiting. This helped the management get government subsidies for children partaking of the free noon meal and teaching grants for more teachers. The ill-fated school was run like the 'personal fiefdom' of Palanichamy, said the Commission. Three schools functioned within the same building, which was a blatant violation of the norms and rules of the Tamil Nadu State School Education Department. The management flouted educational as well as safety norms in a bid to make financial gains.

The report indicted 24 individuals and recommended that the government enquire into the roles of the other 12. The owner and his relatives who ran the school were identified as the prime culprits, along with the midday meal programme staff. 'The carelessness of the noon meal staff, the callous indifference and criminal insensitivity on the part of the management running the three schools, compounded and abetted by the (state government) departments concerned, which failed to implement and enforce the laws and safety standards, were responsible for the tragedy,' the Commission concluded.

As for allegations that many of the school's teachers fled the scene soon after the fire began, instead of staying behind to help save their students, the Commission noted that, in fact, credit for the 700 other children who escaped must go to the teachers who had no training in disaster management: 'There was only lack of judgement on the part of the teachers, and not culpable negligence,' it said. Having visited 2,661 schools across Tamil Nadu, the Commission set out a number of guidelines on location, construction and safety measures for school buildings in the state. It suggested regulation of the noon meal scheme, drinking water supplies, toilet facilities, playgrounds and transport arrangements. On 2 September 2006, the Tamil Nadu government accepted the findings and recommendations of the Commission.

Six years after this incident, the Press Trust of India on 21 April 2010, ran the headline 'Fire officer demanded bribe, gets 9 years in jail'. The news report said: 'A fire service officer was today sentenced to 9 years imprisonment by a court here for demanding and accepting bribe from a school for issuing a no objection certificate in the aftermath of the 2004 Kumbakonam school fire tragedy that left 94 children dead. Chief Judicial Magistrate ordered the officer, Karunanidhi, also to pay a fine of Rs. 5,000, who was found guilty of demanding a bribe of Rs. 2,000 for issuing the NOC to the primary school'.

Hope Sunaina and Somu now rest in peace in their mother's lap.

### Case Questions

1. Is training in disaster management required? If yes, why?
2. Man-made disasters such as fire are mostly a result of greed and callous attitude. Agree/Disagree, giving reasons.

### 1.1 Concept of Disaster

The word 'disaster' has its roots in the Italian word *disastro*. Disaster has a Greek pejorative prefix 'dis', which means 'bad', and the word 'aster' has its origin in the word 'astro', which means 'star'. Evidently, disaster means 'bad', and any calamitous situation blamed on an unfavourable position of a star. Disaster is an occurrence that causes widespread damage and destruction or a sudden catastrophe leading to loss of life and property.

There are numerous definitions of disaster, and many of them focus on the event in terms of loss of life or damage caused. According to Quarantelli (1985)<sup>[2]</sup>, disaster is a crisis situation that far exceeds our capabilities to cope. Another definition of disaster is any tragic event that can cause damage to life and property and destroy the economic, social and cultural life of people. An early definition of 'disaster' was 'an event that caused more than 10,000 deaths'. In all the definitions of disaster, there are certain common elements. Disasters affect people adversely, are beyond the normal capacity of the individuals to cope using their own resources, and cause a serious disruption to the functioning of society. Initially, the focus of concern of disasters was on the discussion of the aftermath of a disastrous event. But now, the focus has shifted towards deliberation on the circumstances that lead to disasters. This change of focus is the result of two important aspects: one is the recognition of the capability for negating, to a great extent, the potential damage from such situations; and the other is the realisation that the consequences of all disasters are similar in nature. More importantly insights into disasters pave way for finding ways to prevent disasters from occurring and for reducing their impact. It is thus imperative that we gain a thorough understanding of how we can manage impending disastrous situations that cannot be prevented or condensed. This, in turn, requires a detailed deliberation on the factors that lead to such situations and, accordingly, making plans for managing them.

Before further deliberations on disasters, it is essential to understand the concept of hazard and risk. The word 'hazard' traces its origin to the word 'hasard' in old French and 'az-zah' in Arabic, meaning 'chance' or 'luck'. It is defined as a source of potential loss or circumstances that have the potential to cause harm. Hazards can be natural, technological, chemical, biological and radiological. Hazards mean a potential source of danger and are impending exogenous events whose possible characteristics and frequency of occurrence can be approximated. They are said to be the primary sources of risk which result in disasters due to interactions among the elements at risk in the community and its environment. Hazards can be classified into two main classes: (a) those that are dictated by nature and (b) those that are produced by human activities. One important point that is essential to state here is that there can be a substantial dissimilarity in the probability of the same type of hazard evolving into a disastrous event in different parts of the world. Hazards of the same scale may become disasters in some areas, whereas their incidence at other areas may not be very damaging.

A hazard becomes an **emergency** when an imminent situation requires immediate attention. Emergency is defined as any event which endangers or intimidates to jeopardise life and the environment and which calls for a momentous and coordinated response. It is a situation which the community is capable of coping with. When emergency moves beyond the purview of the population, it becomes a disaster.

In the context of disaster, another word that is of utmost importance is '**vulnerability**'. Vulnerability means susceptibility to harm those at risk. It is the intrinsic characteristic of the elements at risk that determines the extent of damage arising out of a hazard. Vulnerability is a multidimensional factor, embodying the pooled effects of hazardous conditions. It can be classified into four parts on the basis of the effect of a hazard:

- Physical vulnerability:** It seeks to analyse the influence of events on infrastructure, agriculture, etc. It is determined by characteristics of the site of settlement, and the design and materials used for housing.

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- Social vulnerability:** It refers to the inability of the affected population to endure unfavourable impacts of hazards. Social vulnerability is linked to the safety of individuals, communities and society. It includes social aspects such as levels of literacy, good governance, social justice, conventional values, customs and ideological beliefs. Social vulnerability can be attributed to the very social fabric of society. It seeks to estimate the effect of events on vulnerable groups of society to respond to hazards.
- Economic vulnerability:** It refers to potential impacts of hazards on assets and business processes. The level of economic vulnerability is dependent to a great extent on the economic status of individuals, communities and nations. The poor are generally considered to be economically more vulnerable since they are deficient in the resources to build strong housing structures which can protect them from many ensuing disasters such as floods and earthquakes.
- Environmental vulnerability:** It is the aftermath of natural resource depletion and resource degradation. Degradation in the quality of the environment due to pollution and soil erosion adversely hinders our resilience to hazardous consequences.

Risk, according to the Oxford Dictionary, is a situation involving exposure to danger or the possibility that something unpleasant or unwelcome will happen. It is, in other words, the chance of something happening that has a negative impact in terms of consequences and likelihood. In the context of disaster management, risk is viewed 'as the product of the interaction of a potentially damaging event and the vulnerable conditions of a society or element exposed'. There are two prospects linked with the incidence of a hazard: first, the risk that a hazard will become an event; and second, the risk that the hazard will cause damage. If both these prospects lead to damage beyond the coping capacity of the population impacted, it becomes a disaster. The hazardous event may or may not produce enough damage to create a disaster. In fact, it is dependent on the extent to which a society is vulnerable to the incidence of a particular event. Moreover, the extent of damage from disaster depends largely on the capacity of individuals or community to foresee, handle, defend and recover from the impact of hazards. A physical risk assessment, which is the process of identifying and evaluating the hazards in terms of their potential to do harm, is necessary. Because risk is a product of the interface of a potentially destructive occurrence and the vulnerable circumstances of the population that can be affected, this analysis can provide significant information about the extent of proneness to risk. The first step of risk analysis is hazard identification, which is a process of 'defining and describing a hazard, including its physical characteristics, magnitude and severity, probability and frequency, causative factors, and locations/areas affected'.<sup>[3]</sup> However, if there is no vulnerability, there will be no risk, for example, a cyclone hitting an uninhabited coastal area. A disaster is a result from the blend of hazard, vulnerability and inadequate capacity or method to reduce the probability of risk. The occurrence of disaster can be attributed to the union of hazards and vulnerability. But the quantum of damage due to disaster depends on the greater capacity of the respondents. The greater the capacity to cope, the lesser is the impact of the disaster.

**Capacity** is defined as the 'resources, means and strengths which exist in households and communities which enable them to cope with, withstand, prepare for, prevent, mitigate or quickly recover from a disaster'. Capacity in terms of facing disasters can be said to be of two types:

- Physical capacity** is the capacity of individuals to withstand the damage caused by disasters.
- Socio-economic capacity** which can be defined in terms of social and economic capability of the affected population. The lesser the capacity to cope up with a hazardous situation, the more is the quantum of loss.

**Disaster** is an aftermath of exposure to a hazardous event under the conditions of vulnerability and deficient capacity to reduce the negative effect of the risk. The impact of disasters and the extent of damage depend on a community's physical exposure to a particular hazard and its vulnerability. An increasing death toll and a rise in the frequency of disasters stand testimony to the fact that human beings are getting increasingly vulnerable to disasters. They are being continuously threatened with numerous forms of man-made and natural emergency situations. These emergencies cannot be prevented altogether from occurring, but they can be better managed. For successful management of emergency situations, it is imperative to have proper planning and response and well-coordinated efforts from all stakeholders. The various characteristics of a disaster are as follows:

1. **Size and scope:** Disasters are situations or events which are beyond the capacity of the affected population to cope with available resources. The size or quantum of loss to life and property is enormous, and it is beyond the scope of one single agency to respond to such lethal events. It is difficult to determine what has happened and how to respond.
2. **Unpredictable:** Disasters are events which cannot be predicted with certainty. Also, the situations keep on changing, thus making it difficult to respond to such situations. Generally, people are taken aback at occurrence of such events, and the losses can be attributed to the unprepared state that people are caught in. The abruptness in occurrence of the situation and the scene of death and devastation make it difficult to cope with and respond to such disastrous situations.
3. **Unfamiliar:** Disaster situations are generally unfamiliar and the affected people do not have experience in facing such situations. Moreover, disasters such as floods that occur time and again are also not familiar since the effect varies according to location, density of population and time.
4. **Speed and urgency:** The devastation caused due to disasters is because of the speed with which it strikes. It allows no time and leaves no space to respond to the events and thus the population is affected seriously. The suddenness with which disasters occur causes crises. Because of the large number of affected groups, it becomes complicated to clearly ascertain the needs of the population and to respond. Any disaster triggers an urgent response from the agencies to control the damage. An example can be an earthquake. In such situations, there is an extreme sense of urgency among the affected population. The normal response of survivors is to look for family members and loved ones.
5. **Threat:** All the disasters are threats as they affect the population negatively. All that took years to build comes down within seconds. The ill-effects are limited not only to loss of property and lives but also to the overall economic and psychological state of individuals. Moreover, when individuals perceive threat, they try to save their own lives and that of their near and dear ones. There is a visible reluctance to do something for the overall situation.

According to the Centre for Research on the Epidemiology of Disasters (CRED), which maintains an Emergency Events Database (EM-DAT) for a disaster to be pronounced as a disaster, there are certain criteria that must be met. At least one of the following criteria must be satisfied: 10 or more people reported killed, 100 or more people reported affected, declaration of a state of emergency and call for outside assistance. All disasters disrupt the normal lives of people. They upset the capability of individuals, hence making it difficult to cope with such situations. Certain disruptive factors of disasters are:

1. **Death and destruction:** Death and injury of near and dear ones cause emotional and psychological upheaval in individuals. The individuals are confused, and a feeling of helplessness creeps in. They

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hard to fight the situation, but widespread destruction and devastation is upsetting. Moreover, as emergency services fail, it becomes all the more difficult for survivors. Rubbles of homes and property make for a frightening sight, and people get busy in saving whatever they can. They search the debris for important things and get into a protective mode.

2. **Loss of basic amenities:** Disaster causes widespread damage and all the basic needs such as food, clothing and shelter are lost. Life comes to a standstill. Water facilities and food supply languish, causing a threat to lives.
3. **Disruption of emergency services:** The emergency services are completely disrupted. The hospitals are also in a state of chaos following a disaster.
4. **Destruction of roads and modes of communication:** The destruction of roads and vehicles makes it difficult to carry the injured to the hospital. The communications systems are either rendered useless because of collapse of mobile towers or are jammed because of excessive loads. As a result of this, vehicular movement is stalled and first aid and other necessary amenities cannot reach the affected population, thus making their situation worse. In hilly areas, due to difficult terrain, it is a herculean task to reach the affected areas even by helicopters because helipads are either destroyed or are not available.
5. **Disorganisation in response services:** As it is difficult to know the exact nature of damage and the area which is most affected, it becomes difficult to respond effectively to situations. The lack of clarity renders the response services ineffective. Moreover, there is bound to be confusion and chaos among the response services. There is no time to plan effectively; hence, resources cannot be organised properly. The more sudden the disaster, the more is the disorganisation. Also, this is true for the severity of situations. As the severity of the situation increases, the demand for emergency services also increases. Since disasters come as a shock and people are not prepared to face such situations, there are bound to be confusion and disorganization. The extent and nature of damage is unclear which renders the emergency response teams in a fix because they are not clear as to where they should start from.

Disasters are the convergence of hazards with vulnerabilities. As such, an increase in physical, social, economic or environmental vulnerability can mean an increase in the frequency of disasters.

## KEY IDEAS

- The word 'disaster' has its roots in the Italian word *disastro* which means 'bad star'.
- Hazards mean a potential source of danger and are impending exogenous events whose possible characteristics and frequency of occurrence can be approximated.
- A hazard becomes an emergency when an imminent situation requires immediate attention.
- Vulnerability means susceptibility to harm those at risk. These are Physical vulnerability, social vulnerability, economic vulnerability and environmental vulnerability.
- Risk is the chance of something happening that has a negative impact in terms of consequences and likelihood.
- Capacity is the 'resources, means and strengths which exist in households and communities which enable them to cope with, withstand, prepare for, prevent, mitigate or quickly recover from a disaster. These are of two type: physical capacity and socio economic capacity.'

## 1.2 Causes and Types of Disasters

Disasters are a source of annihilation and devastation. These are large-scale traumatic events that negatively affect a considerable number of people. According to reports of CRED, the top five countries that have been most frequently hit by natural disasters over the last decade are China, the United States, the Philippines, India and Indonesia. The estimated economic loss from natural disasters from 2001 to 2010 was around US\$ 143 billion. Based on the source or origin, disasters can be classified into two broad categories, namely natural and man-made or technological. We will study both in the following subsections:

### **1.2.1 Natural Disasters**

Natural disasters are primarily natural events. These are naturally occurring physical phenomena caused by either rapid- or slow-onset events which can cause great harm to lives and property. The natural disaster category can be divided into six disaster groups: biological, geophysical, meteorological, hydrological, climatological and extra-terrestrial. Further, each group covers different disaster main types, each having different disaster subtypes, as discussed next.

#### **1.2.1.1 Meteorological Disasters**

Meteorological disasters are events triggered by short-lived or small- to meso-scale atmospheric processes. These are generally storms. The storms can be subdivided into:

1. **Tropical storm:** For the development of a tropical cyclone, there are four distinct stages: tropical disturbance, tropical depression, tropical storm and hurricane depending on the storm's wind speed.
  - **Tropical disturbance:** It is a discrete tropical weather system of apparently organized convection – generally 200 to 600 km (100 to 300 nmi) in diameter – originating in the tropics or subtropics, having a non-frontal migratory character, and maintaining its identity for 24 hours or more. It may or may not be associated with a detectable perturbation of the wind field. Disturbances associated with perturbations in the wind field and progressing through the tropics from east to west are also known as easterly waves.<sup>[4]</sup>
  - **Tropical depression:** It is a tropical cyclone in which the maximum sustained wind speed (using the U.S. 1 minute average standard) is up to 33 kt (38 mph, 17 m/s). Depressions have a closed circulation.<sup>[4]</sup>
  - **Tropical storm and hurricane:** A tropical storm is characterised by maximum unrelenting winds of 63 kmph. Beyond this limit, it is called a hurricane, typhoon or cyclone based on the region where it strikes. A tropical cyclone is characterised by a distinct cyclonic rotation and harsh thunderstorms around a central low-pressure zone. A tropical cyclone is one step above a tropical depression, but (2001), which is known as one of the deadliest and costliest US tropical storm on record. This \$5 billion in damage. The worst affected area was Houston. Bonnie was a mild storm that killed 3 persons in South Carolina and North Carolina and caused moderate damage.
  - 2. **Extra-tropical storm:** When cold and warm air masses interact in an unstable environment, potential energy is released, which forms the source of extra-tropical storms. These storm systems are

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characterised by frontal features and multiple areas of relatively low and high pressure, the locations of which can change rapidly and regularly. These storms can occur over land or ocean and can have winds as weak as a tropical depression or as strong as a hurricane. The difference between tropical storms and extra-tropical storms is that the former has the potential to quickly grow into hurricanes and can generate more rain as compared with the latter. The 'Wahine storm' was an extra-tropical storm that struck Wellington, New Zealand, on 10 April 1968. It forced the inter-island ferry TEV Wahine to strike a reef and founder at the entrance to Wellington Harbour, which caused 53 deaths. Another violent extra-tropical storm hit Uruguay on 23–24 August 2005, killing 10 people.

3. **Local/Convective storms:** These are formed by the heating of the Earth and with little moisture. The three key features of a convective storm are lift, moisture and instability. Convective storms produce high winds, heavy rainfall, and thunder and lightning. A convective storm that hit North Ireland on 21 July 2010 produced heavy rain, flooding and deafening thunder.

#### **1.2.1.2 Geophysical Disasters**

Geophysical disasters are events originating from the solid Earth. They are classified as follows:

1. **Earthquake:** Earthquakes refer to tremors of the Earth. There is incessant activity going on below the surface of the earth, which causes movement of large plates below the surface of the earth. As a part of this movement, occasionally, the plates collide against each other. And, after the collision, they might still continue to push each other. As they continually keep pushing each other, a pressure builds up across these plates below the surface. Shaking and displacement of the ground due to seismic waves causes an earthquake. In other words, an earthquake is the result of a sudden release of stored energy in the earth's crust that creates seismic waves. They can be of tectonic or volcanic origin. (Tectonic origin earthquake is a result of a sudden release of energy in the Earth's crust or upper mantle, usually caused by movement along a fault plane. It is a result of changes in the structure of the Earth's surface. Volcanic origin earthquake is a result of or by volcanic activity; it results in the creation of seismic waves which can be destructive.) The impact of an earthquake is categorised by two primary features. The first is the intensity, which measures the magnitude of the event. The higher the value, the bigger is the enormity (an earthquake is measured by a logarithmic scale called the Richter scale). The second is the epicentre, which denotes the point on the earth's surface directly above the place of origin of an earthquake. The deeper the origin, the lower is the impact on the surface. The Great Tangshan Earthquake of China was one of the deadliest earthquakes of the world. The magnitude of this massive earthquake was measured as 7.8, which caused large-scale devastation, leading to a significant loss of lives, estimated between 2,50,000 and 7,00,000.
2. **Volcano:** According to CRED, volcanic activity describes both the transport of magma and/or gases to the earth's surface, which can be accompanied by tremors and eruptions, and the interaction of magma and water (e.g. groundwater, crater lakes) underneath the earth's surface, which can result in phreatic eruptions. Depending on the composition of the magma, eruptions can be explosive and effusive, and result in variations of rockfall, ash fall, lava streams, pyroclastic flows, emission of gases, etc. The volcanic eruption of Mt. Tambora, Indonesia, in April 1816 is considered to be the deadliest volcanic eruption, which took 92,000 lives. The explosion was felt as far as a thousand miles away. Mt. Tambora, which was 13,000 feet tall before the explosion, was condensed to 9,000 feet after the emission of more than 93 cubic miles of debris. The year in which this catastrophe took place became

known as the 'year without a summer' because of the volcanic ash in the atmosphere that lowered worldwide temperatures. It caused around 1,00,000 additional deaths from starvation in the surrounding areas as crops failed.

- Mass movement:** Mass movement refers to the movement of a quantity of debris/land/snow or ice that slides down a mountainside under the force of gravity. It often gathers material that is underneath the snow pack such as soil, rock, etc. It can be subdivided into various categories:

- **Rockfall** refers to quantities of rock or stone falling freely from a cliff face. It is caused by undercutting or weathering. The worst known rockfall that occurred due to coal mining was the Frank Slide. It annihilated part of the town of Frank, Northwest Territories, Canada, in 1903. It occurred one early morning in April when over 90 million tons of limestone rock slid down Turtle Mountain within 100 s. It is still considered to be the one of the largest landslides in the Canadian history.
- **Subsidence** is the downward motion of the earth's surface. Subsidence can be caused by geological faulting or isostatic rebound. Little or no warning may be available if the cause is an earthquake.
- **Avalanche** is any kind of rapid snow/ice movement and refers to the movement of a quantity of snow or ice that slides down a mountainside under the force of gravity. It occurs if the load on the upper snow layers exceeds the holding or bonding forces of the entire mass of snow. It often gathers material that is underneath the snow pack such as soil, rock, etc. (debris avalanche). The 1910 Wellington avalanche is the most horrible avalanche in the US history, in which 96 people died.

### 1.2.1.3 Hydrological Disasters

Hydrological disasters are disastrous events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by the wind set-up. An example is flood, which refers to a significant rise of the water level in a stream, lake, reservoir or coastal region. Hydrological disasters can further be categorised into the following:

- General floods:** Gradually rising water levels of rivers, lakes and groundwater due to high rainfall or snowmelt is the prime cause of floods. When a body of water overspills its normal boundaries due to rising water levels, the surrounding area is flooded. Heavy rain and floods in parts of Uttar Pradesh and Uttarakhand have left as many as 115 dead according to official reports. Nature's fury in the form of floods took 77 lives in Uttar Pradesh and 38 in Uttarakhand in August 2011. **Flash floods** are rapid inland floods due to excessive rainfall. A flash flood describes unexpected flooding for a short duration. In sloped terrains, the water flows rapidly with a high destruction potential. In flat terrains, it falls. Usually, flash floods are linked with thunderstorms and can occur at any place. Kedarnath in Uttarakhand suffered severe destruction during June 2013 from flash floods caused by torrential rains.
- Storm surge/Coastal flood:** Coastal flood on coasts and lake shores are caused by wind. The water level in the sea rises as a result of storm and the strong wind drives the seawater towards the coast. This by five and more metres. Generally, coastal lowlands are threatened by mean high water level can exceed. Brazil was affected by extensive flooding in the second half of June 2010, when complete villages were washed away. Dozens of persons were killed and hundreds vanished.

### 1.2.1.4 Climatological Disasters

**Climatological disasters**, according to CRED, are 'events caused by long-lived/meso to macroscale processes (in the spectrum from intraseasonal to multidecadal climate variability)'. These can be subdivided into the following categories:

- Disasters caused by extreme temperatures:** These can be categorised as follows:
  - **Heat wave:** A heat wave is a delayed period of exceptionally hot and sometimes sultry weather relative to normal climate patterns of a certain region. The heat wave in Europe in 2003 was the hottest summer on record in Europe since 1540, recording a death toll of 70,000.
  - **Cold wave:** A cold wave can be both a lengthened period of terribly cold weather and the sudden assault of very cold air over a large area. The cold wave of January 2013 that took North India under its grip caused 233 deaths, apart from affecting crops.
  - **Winter storm:** Damage caused by snow and ice is known as winter storm. Winter storm causes extensive damage to buildings, infrastructure and traffic. A severe winter storm hit Chicago in 1932. The mixture of ice, snow, wind and hail shut down transportation and communications in the northern half of the state for 2 days following the storm, which produced hail up to 3.5 inches in diameter that accumulated up to a depth of 3 inches.
- Drought:** Drought is a long-enduring event caused by lack of rainfall. It results in deficiency in a region's water supply and can lead to losses in agriculture, distress inland navigation and hydropower plants and cause a scarcity of drinking water and famine. In India, agriculture makes up 15% of the gross domestic product (GDP). Agriculture is dependent on rain. Due to erratic weather conditions, it is prone to drought. According to the World Bank reports, South Asia is one of the world's most water-stressed areas. The region's per capita water availability has dropped by 70% since 1950. The state of Maharashtra in India faced the worst-ever drought in the year 2012 when eight districts received 50% less rainfall than normal.
- Wildfire:** Wildfire refers to an unrestrained burning fire, usually in wild lands, which causes damage to forests, agriculture, infrastructure and buildings. Each year, such fires impact extensive areas of Australia, causing severe damage to property and human life.

### 1.2.1.5 Biological Disasters

**Biological disasters** are disasters caused by the exposure of living organisms to germs and toxic substances. These are as follows:

- Epidemic:** Either an unusual increase in the number of cases of an infectious disease which already exists in the region or population concerned or the appearance of an infection previously absent from a region is termed as an epidemic. Dengue outbreak in Pakistan in 2011 caused more than 350 deaths and more than 21,204 people were reportedly infected.
- Insect infestation:** Invasive incursion and development of insects or parasites affect humans, animals, crops and materials adversely. Siafu, a colony of African ants, can ravage the African countryside, eliminating everything in their path. When food shortages present themselves, a colony of 20 million ants march to acquire rations. About 20–50 people die each year and thousands of dollars of foodstuff are damaged yearly.

3. **Animal stampede:** A stampede is an act of mass impulse among herd animals in which the herd together starts running with no clear direction or purpose. This can cause extensive damage to life and property.

According to reports, in 2012, there were 905 natural catastrophes worldwide, out of which 93% were natural disasters. If we divide it further, 5% were meteorological, 36% were hydrological, 12% were climatological and 70% were geophysical disasters.

## 1.2.2 Man-Made Disasters

Technological or man-made hazards are events that are caused by humans and occur in or close to human settlements. These are mostly caused due to certain human conduct. The disasters themselves could be unintentional, but are caused due to some intentional or unintentional activity. Most of these could have been prevented if sufficient precautionary measures were put in place. Hazardous materials resulting in workplace fires are more common emergencies include chemical spills and groundwater contamination. Workplace fires are more common and can cause significant property damage and loss of life. Communities are also vulnerable to threats posed by extremist groups, who use violence against both people and property. High-risk targets include military and civilian government facilities, international airports, large cities and high-profile landmarks. Cyber-terrorism involves attacks against computers and networks to intimidate or coerce a government or its people for political or social objectives. A brief categorisation of man-made hazards is discussed in the following subsections:

### 1.2.2.1 Sociological Disasters

These can be classified as follows:

- Arson:** Arson is the crime of intentionally and cruelly setting fire to buildings, wild lands, vehicles or other property with the intention to cause damage. In 2002, a passenger train was set on fire, resulting in the death of more than 1,000 people. The Godhra train burning was an incident that occurred on the morning of 27 February 2002, in which 59 people, including 25 women and 15 children, died in a fire inside the Sabarmati Express train near the Godhra railway station in the Indian state of Gujarat. The event is widely believed to be the reason behind the violence that followed, which resulted in widespread loss of life, destruction of property and homelessness. The casualties are estimated at upwards of 2000 individuals.
- Civil disorder:** Also known as civil unrest or civil strife, it is a term that is characteristically used by law enforcement to describe one or more forms of unrest caused by a group of people. Civil disorder is typically a symptom of, and a form of protest against, major socio-political problems; the severity of the action coincides with public expression(s) of displeasure. Examples of civil disorder are illegal parades, sit-ins and other forms of obstructions, riots, sabotage and other forms of crime. Civil disorder is intended to be a demonstration to the public and the government, but can escalate into general chaos. In Muzaffarnagar, Uttar Pradesh, on 27 August 2013, clashes between the Hindu and Muslim communities claimed 43 lives and injured 93. The attacks have been described as 'the worst violence in UP in recent memory'; the army was deployed in the state for the first time in 20 years.
- Terrorism:** Terrorism is the systematic use of violence (terror) as a means of coercion for political purposes. In the international community, terrorism has no legal or criminal law definition. Common

definitions of terrorism refer only to those violent acts that are intended to create fear (terror) or intended to achieve a religious, political or ideological goal. Acts of terrorism deliberately target or disregard the safety of non-combatants (civilians). Some definitions now include acts of unlawful violence and war. The Mumbai attacks were planned and directed by Lashkar-e-Taiba militants inside Pakistan and were carried out by 10 young, trained armed men sent to Mumbai and directed from Pakistan.

### 1.2.2.2 Political Disasters

Political disasters can be classified into the following types:

- War:** War is an organised and often prolonged conflict that is carried out by states or non-state actors. It is generally characterised by extreme violence, social disruption and economic destruction. War should be understood as an actual, intentional and widespread armed conflict between political communities, and therefore is defined as a form of political violence or intervention. The set of techniques used by a group to carry out war is known as warfare. An absence of war is usually called peace. The spring and summer incursion of Pakistan-backed armed forces into the territory on the Indian side of the Line of Control around Kargil in the state of Jammu and Kashmir and the Indian military's campaign to repel the intrusion that left 524 Indian soldiers dead and 1,363 wounded, according to 1 December statistics by the then Defense Minister George Fernandes, is a recent example of a localised war. Wars can be classified on the basis of the types of weapons used in the following manner:
  - Chemical weapons:** A chemical weapon (CW) is a device that uses chemicals formulated to inflict death or harm on human beings. They are classified as weapons of mass destruction. Chemical weapons can be widely dispersed in gas, liquid and solid forms and may easily afflict other than the intended targets. Nerve gas and tear gas are some examples. Although chemicals have been used as tools of war for thousands of years – for example, poisoned arrows, boiling tar, arsenic smoke and noxious fumes – modern chemical warfare has its genesis on the battlefields of World War I. During World War I, chlorine and phosgene gases were released from canisters on the battlefield and dispersed by the wind. These chemicals were manufactured in large quantities by the turn of the century and were deployed as weapons during the protracted period of trench warfare. The first large-scale attack with chlorine gas occurred on 22 April 1915 at Ypres in Belgium. The use of several different types of chemical weapons, including mustard gas (yperite), resulted in 90,000 deaths and over 1 million casualties during the war. Those injured in chemical warfare suffered from the effects for the rest of their lives; thus, the events at Ypres during World War I scarred a generation. By the end of World War I, 124,000 tonnes of chemical agent had been expended.
  - Biological weapons:** Biological weapons are biological agents used for mass destruction and are also known as germ warfare. They involve the use of biological toxins or infectious agents such as bacteria, virus and fungi with the intent to kill or incapacitate humans, animals or plants as an act of war. Biological weapons (often termed 'bio-weapons', 'biological threat agents' or 'bio-agents') are living organisms or replicating entities (viruses, which are not universally considered 'alive') that reproduce or replicate within their host victims. Entomological (insect) warfare is also considered a type of biological weapon. The German army was the first to use weapons of mass destruction, both biological and chemical, during World War I, although their attacks with biological weapons were on a rather small scale and were not particularly successful: covert operations using both anthrax and glanders were attempted to infect animals directly or to contaminate animal feed in

several of their enemy countries. After the war, with no lasting peace established, as well as false and alarming intelligence reports, various European countries instigated their own biological warfare programmes, long before the onset of World War II.

- **Nuclear weapons:** A nuclear weapon is an explosive device that derives its destructive force from nuclear reactions, either fission or a combination of fission and fusion. Both reactions release vast quantities of energy from relatively small amounts of matter. Two nuclear weapons have been used in the course of warfare, both times by the United States near the end of World War II. On 6 August 1945, a uranium gun-type fission bomb code-named 'Little Boy' was detonated over the Japanese city of Hiroshima. Three days later, on 9 August, a plutonium implosion-type fission bomb code-named 'Fat Man' was exploded over Nagasaki, Japan. These two bombings resulted in the deaths of approximately 2,00,000 people – mostly civilians – from acute injuries sustained from the explosions.
- **Armed conflict:** An armed conflict as defined in the *Journal of Peace Research* is 'a contested incompatibility which concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths'.<sup>[5]</sup> Examples of recent non-international armed conflicts include the hostilities that broke out in northern Mali in early 2012 between armed groups and Malian armed forces, and the fighting in Syria between armed groups and Syrian government forces.

2. **Massacre**: A massacre is a specific incident in which a military force, mob or other group kill many people – and the perpetrating party is perceived as in total control of force, whereas the victimised party is perceived as helpless or innocent. No clear-cut criteria define when a mass killing is a massacre. Terming mass killing as massacre is dependent on the public perception during and after the event, and collective assessment of how the circumstances align with given ideas of acceptable use of force, and on how a culture or nation wants to hold an event in collective memory. Massacres have often accompanied the sack of a captured city. Massacre is also a verb that means to kill (people or, less commonly, animals) in numbers, especially brutally and indiscriminately. On 13 April 1919, a multitude of Punjabis gathered in Amritsar's Jallianwala Bagh as part of the Sikh festival 'Baisakhi fair' and to protest at these extraordinary measures taken: the British government had decided to put most of the Punjab under martial law. The legislation restricted a number of civil liberties, including freedom of assembly; gatherings of more than four people were banned by the British Government. On the orders of Brigadier-General Reginald Dyer, the army fired on the crowd for 10 minutes, directing their bullets largely towards the few open gates through which people were trying to run out. Dyer – without warning the crowd to disperse – blocked the main exits. He explained later that this act 'was not to disperse the meeting but to punish the Indians for disobedience'. Dyer ordered his troops to begin shooting toward the densest sections of the crowd. Cease-fire was ordered only when ammunition supplies were almost exhausted, after approximately 1,650 rounds were spent. The throng, penned in a narrow space smaller than Trafalgar Square, had been peacefully listening to the testimony of victims when General Dyer appeared at the head of a contingent of British troops. Giving no word of warning, he ordered 50 soldiers to fire into the gathering, and for 10–15 min, 1,650 rounds of ammunition were unloaded into the screaming, terrified crowd, some of whom were trampled by those desperately trying to escape. The incident in Jallianwala Bagh was 'an extraordinary event, a monstrous event, an event which stands in singular and sinister isolation', as expressed by Winston Churchill.

### 1.2.2.3 Industrial Disasters

Industrial disasters can be classified into the following types:

1. **Chemical spills:** A chemical spill accident is a release occurring during the production, transportation or handling of hazardous chemical substances. A chemical accident is the unintentional release of one or more hazardous substances which could harm human health or the environment. Chemical accidents may occur under certain circumstances in systems where chemical hazards exist. Such events include fires, explosions, leakages or the release of toxic or hazardous material that can cause illness, injury, disability or death in people. An example is the introduction of hydrocarbon methyl in the body, which increases the risk of heart cancer because it changes the way blood cells flow through the body.

While chemical accidents may occur whenever toxic materials are stored, transported or used, the most severe accidents are industrial accidents, involving major chemical manufacturing and storage facilities. The most significant chemical accident in recorded history was the 1984 Bhopal Gas Tragedy in India, in which more than 3,000 people were killed after a highly toxic vapour (methyl isocyanate) was released at a Union Carbide pesticides factory.

Efforts to prevent accidents range from improved safety systems to fundamental changes in chemical use and manufacture, referred to as primary prevention or inherent safety. The Elk River chemical spill occurred on 9 January 2014 when crude 4-methylcyclohexanemethanol (MCHM) was released from a Freedom Industries facility into the Elk River, a tributary of the Kanawha River, in Charleston in the US state of West Virginia.

2. **Explosion (involving buildings or structures):** An explosion can involve industrial structures. An explosion is a rapid increase in volume and release of energy in an extreme manner, usually with the generation of high temperatures and the release of gases. Explosions can be divided into the following categories:

• **Nuclear plant explosion and radiation:** A nuclear disaster could take several forms. The most obvious would be a meltdown at a nuclear reactor plant. Though the plant could not explode, the results of such a disaster would very likely be the release of massive amounts of radiation and radioactive material into the environment. And it would take hundreds of years to decay to anything near 'safe' levels. Cleaning it up is out of the question, as exemplified by the Chernobyl disaster. In this Ukraine event, the reactor actually caught fire and burned. The Chernobyl disaster was a catastrophic nuclear accident that occurred on 26 April 1986 at the Chernobyl Nuclear Power Plant in Ukraine (then officially the Ukrainian SSR), which was under the direct jurisdiction of the central authorities of the Soviet Union. An explosion and fire released large quantities of radioactive particles into the atmosphere, which spread over much of the western USSR and Europe. The Chernobyl disaster is widely considered to have been the worst nuclear power plant accident in history, and is one of only two classified as a level 7 event (the maximum classification) on the International Nuclear Event Scale (the other being the Fukushima Daiichi nuclear disaster in 2011). It became impossible to contain the contamination and avert a greater catastrophe ultimately, which involved over 5,00,000 workers and cost an estimated 18 billion rubles. About 31 people died during the accident itself, and it had long-term effects such as cancers and deformities. Worldwide, many nuclear accidents have occurred since the Chernobyl disaster in 1986. Two-thirds of these mishaps have occurred in the United States. The French Atomic Energy Commission (CEA) has concluded that technical innovation cannot eliminate the risk of human errors in nuclear plant operation.

An interdisciplinary team from Massachusetts Institute of Technology (MIT) have estimated that given the expected growth of nuclear power from 2005 to 2055, at least four serious nuclear power accidents would be expected in that period.

- **Explosion at other industrial plants:** Natural disasters have claimed countless human lives throughout history, with their unexpected waves of destruction. But there is still something uniquely terrifying and heart-breaking about an industrial disaster, when our best precautions fail and our achievements turn deadly. A potential explosion hazard exists whenever flammable vapours and/or combustible dusts in air suspension exceed the minimum concentration required for combustion, a condition that is likely to present in numerous industrial processes. If an ignition occurs, an uncontrolled explosion can result, creating over-pressures, which can cause equipment rupture, possible injury to personnel and probable expulsion of burning material into adjacent areas or connected equipment. The pressure wave from a primary explosion event can stir up residual dust in the surrounding area. This risks causing a devastating secondary explosion propagating through the workspace. Although it is commonly assumed that an explosion is an instantaneous event, there is a measurable amount of time from ignition until the pressure builds to destructive levels. Explosion protection systems use this time to detect the incipient explosion and activate protection equipment accordingly. The Oppau Explosion, Oppau (now Ludwigshafen), in Germany, on 21 September 1921 is an example of an industrial explosion where safety could not be ensured in the system. A tower silo storing 4,500 tonnes of ammonium nitrate fertiliser and ammonium sulphate exploded at a plant. The explosion was estimated to be about 1–2 kilotonnes TNT (trinitrotoluene) equivalent, and the pressure wave ripped roofs off and destroyed windows up to 18 miles (30 km) away.

### 3. Transport accident: Transport accidents refer to accidents involving mechanised modes of transport. They comprise four disaster subsets:

- **Air:** These are accidents involving aeroplanes, helicopters, airships and balloons. An aviation accident is defined by the Convention on International Civil Aviation Annex 13 as an occurrence associated with the operation of an aircraft, which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, where a person is fatally or seriously injured, the aircraft sustains damage or structural failure or the aircraft is missing or is completely inaccessible. The first fatal aviation accident occurred in a Wright Model A aircraft at Fort Myer, Virginia, US, on 17 September 1908, resulting in injury to the pilot, Orville Wright, and death of the passenger, Signal Corps Lieutenant Thomas Selfridge.
- **Water:** These could be accidents involving sailing boats, ferries, cruise ships, other boats, shipwreck or a boat collision. The *Titanic* is not the only notable shipwreck (though it is famous for crashing into an iceberg on 15 April 1912, killing over 1,500 people). The *Lusitania*, a British luxury liner, was sunk by a German submarine on 7 May 1915, killing 1,195 people. *Joola*, a Senegalese ferry, sank in 2002, drowning 1,863 people.
- **Railways:** Accidents involving trains can take place anywhere. Even the most advanced technology cannot ensure accident-free and 100%-safe working conditions. What is required is a scientific investigation into it, to find out the reasons and take necessary remedies to avoid recurrence of such incidents. And particularly when there are a series of accidents costing large numbers of human lives, such introspection and investigation should not be confined to the incidents in an isolated manner, but should look at it from an overall point of view. The recent increase in the number of

accidents in the railways requires such introspection. Technology alone cannot ensure safety. It is ultimately human intervention and a human approach which can ensure safety. On 17 October 2013, passengers of the Danapur–Kamakhya Capital Express (train no. 13248) had a providential escape when 12 of its coaches derailed near gate number 71 'C' at home signal of Patna Saheb. A fault in the tracks or a major technical snag by the Railway authorities must have caused the accident, which is considered rare on the mainline section of the Danapur division.

- **Roadways:** These include accidents involving motor vehicles on roads and tracks. A traffic collision, also known as a traffic accident, motor vehicle collision, motor vehicle accident, car accident, automobile accident, road traffic collision, road traffic accident, wreck (in the US), car crash or car smash (in Australia) occurs when a vehicle collides with another vehicle, pedestrian, animal, road debris or other stationary obstruction, such as a tree or utility pole. Traffic collisions may result in injury, death, vehicle damage and property damage. A number of factors contribute to the risk of collision, including vehicle design, speed of operation, road design, road environment, driver skill and/or impairment, and driver behaviour. Worldwide, motor vehicle collisions lead to death and disability as well as financial costs to both society and the individuals involved. In a recent example of a road accident, one can see a combination of disasters already discussed. Seven persons were charred to death and nine injured when a petrol-laden tanker overturned at Charhoti naka on National Highway 8 in the neighbouring district of Thane, Maharashtra, on Saturday afternoon. The tanker, belonging to the Reliance company, was coming to Mumbai from Ahmedabad. Six vehicles were also burnt in the ensuing explosion, but the persons inside managed to escape. The injured were admitted to the Thane civil hospital. The driver of the tanker had to suddenly apply brakes at a circle. The tanker turned turtle and exploded. All four persons inside the tanker and three others walking on the road were charred to death.

- 4. **Engineering failure:** Engineering is the science and technology used to meet the needs and demands of society. These demands include buildings, aircraft, vessels and computer software. To meet society's demands, the creation of newer technology and infrastructure must be created efficiently and cost-effectively. To accomplish this, managers and engineers have to have a mutual approach to the specified demand at hand. This can lead to shortcuts in engineering design to reduce costs of construction and fabrication. Occasionally, these shortcuts can lead to unexpected design failures that cause engineering disasters. The 1940 Tacoma Narrows Bridge was the first Tacoma Narrows Bridge, a suspension bridge in the US state of Washington, that spanned the Tacoma Narrows strait of Puget Sound between Tacoma and the Kitsap Peninsula. It opened to traffic on 1 July 1940 and dramatically collapsed into Puget Sound on 7 November of the same year. At the time of its construction (and till its destruction), the bridge was the third longest suspension bridge in the world in terms of the main span length, behind the Golden Gate Bridge and the George Washington Bridge.

- **Structural collapses:** Structural failures and collapses, including some aircraft, bridges, dams and radio masts/towers, are also quite common. The Space Shuttle Columbia disaster occurred on 1 February 2003, when Columbia disintegrated over Texas and Louisiana as it re-entered Earth's atmosphere, killing all seven crew members. During the launch of STS-107, Columbia's 28th mission, a piece of foam insulation broke off from the Space Shuttle external tank and struck the left wing. Most previous shuttle launches had seen minor damage from foam shedding, but some engineers suspected that the damage to Columbia was more serious. NASA (National Aeronautics and Space Administration) managers limited the investigation, reasoning that the crew could not have fixed the problem. When the shuttle re-entered the atmosphere,

the damage allowed hot atmospheric gases to penetrate and destroy the internal wing structure, which caused the spacecraft to become unstable and slowly break apart.

#### 1.2.2.4 Human Disasters

Human disasters are disasters that take place due to intentional or unintentional human behaviour. The conventional view of man-made disasters, as a number of things suddenly going wrong at the time and the place of the incident, concentrates attention on the overt measurable event at the time of the occurrence. In fact, errors occur in a context which itself may allow the unsafe act or error to have its consequences. To reveal human causes that originate in pre-existing conditions in work systems, we need to take into account all of the various ways in which the human element can contribute to an incident. This is perhaps the most important consequence of taking a broad view of the role of human factors in accident causation. Higher incidence of human failures surfaces as technical safeguards and back-ups do not always replace the human effort. Though an accident occurs only when both fail, but it usually gets logged as 'human error', with a tendency of glossing over technical failure. Under optimum field conditions and with the best of intentions, a human being is likely to commit a mistake from time to time. This is the reason why operating rules include many redundancies in safety procedures and operating practices involve a number of checks and balances. More and more automation is resorted to prevent human errors.

- Human error of judgement:** To be of use in preventive strategy formulation, however, the challenge is not to simply describe the various ways in which the human element is involved but rather to identify where and how it may be possible to intervene most effectively. This is possible only if the model used has the capacity to describe accurately and comprehensively the complex network of interrelated factors involved, including the nature of the factors, their relative timing and their relative importance. Some disasters which result from human error of judgement are as follows:

- 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. The worst stampede in recorded history took place in Chongqing, China, during World War II. Japanese bombing of the city on 6 June 1941 triggered mass panic at an air raid shelter, killing approximately 4,000 people, most of them by suffocation.
- Airplane crashes:** The world's deadliest air disaster, a crash in Nigeria on 3 June 2013 that killed all 159 people aboard and deflated the country's booming airline industry as Dana's operations were grounded after that, was likely to have been caused by a pilot's failure to turn on certain fuel pumps or valves, according to people familiar with the joint investigation by US and Nigerian officials. The McDonnell Douglas MD-83, operated by Nigeria's Dana Air, lost power from both engines while approaching the airport in Lagos and slammed into an apartment building, killing at least six more people on the ground. The most likely cause of the accident was the crew's failure to properly monitor fuel flow and turn on certain fuel pumps, according to industry and government safety experts familiar with the investigation. This would have resulted in both engines shutting down almost simultaneously from lack of fuel. No other significant problems were discovered with the engines or other aircraft systems, these people said, and the 22-year-old plane had plenty of fuel on board to reach the airport.
- Railway accidents:** Collisions are the most dreaded accidents for any railwayman. In Indian Railways, collisions accounted for 6% of the accidents, of which only 4% involved passenger

#### 1.2 CAUSES AND TYPES OF DISASTERS

carrying trains, but these resulted in 32% of the total casualties. Accidents at level crossings, accounting for 20% of the total accidents, were responsible for 48% deaths. Derailments though constituted bulk (71%) of the train accidents, accounting for 17% of the casualties. Collision of 9168 UP Sabarmati Express with a stable goods train at Samlaya Junction station of Western Railway on 21 April 2005 at 03.10 hrs is a case for analysis for human error of judgement. As a result of this accident, 16 persons lost their lives, 38 persons were grievously injured and 98 persons suffered simple injuries. The signaling and operating staff at Samlaya Junction station failed to follow the procedure prescribed for failure of signal, as result of which the 9168 UP Sabarmati Express, which was planned to pass through the main line, entered the loop line and collided with the stable goods train.

- Road accidents:** Road danger is a man-made crisis, with human error accounting for over 90% of accidents, said Bob Joop Goos, Chairman of the International Organisation for Road Accident Prevention. 'More than 90% of road accidents are caused by human error. We, therefore, have to focus on people in our traffic safety programmes', he stated at the opening day of the international symposium on 'The Role of Media in Traffic Safety'. The public, especially road users, are advised to obey traffic rules and be careful when on the road because 65% of road accidents are caused by human error. Up till March 2013, there were about 1.49 million vehicles on Sarawak roads. There are 6,88,116 cars; 6,50,744 motorcycles; 82,447 goods vehicles and 69,827 other vehicles, he said. He also disclosed statistics from the Malaysian Institute of Road Safety Research (Miros), predicting that in 2015, there would be 8,670 road fatalities throughout the country or 24.3 fatalities per day.

- Poisoning:** These can be classified into the following categories:

- Food poisoning:** Food poisoning is a common yet distressing and sometimes life-threatening problem for millions of people in the US and throughout the world. People infected with food-borne organisms may be symptom-free or may have symptoms ranging from mild intestinal discomfort to severe dehydration and bloody diarrhoea. Depending on the type of infection, people can even die as a result of food poisoning. More than 250 different diseases can cause food poisoning. Some of the most common diseases are infections caused by bacteria such as *Campylobacter*, *Salmonella*, *Shigella*, *Escherichia coli* O157:H7, *Listeria* and *Clostridium botulinum*.
- Carbon monoxide (CO) poisoning:** Another danger that has recently received national attention is CO poisoning, a silent killer. As a result of several tragic deaths linked to this colourless, odourless and tasteless gas, a great deal of research has been initiated into this silent killer, much of it taking place in Arizona.

One of the common CO poisoning occurs in passenger boats. To avoid the dangers of CO, boat personnel should not operate the boat with passengers in close proximity to the engine and generator exhausts, particularly on days with little or no wind.

Early symptoms of CO poisoning include nausea, headache, dizziness and irritated eyes. One should not risk confusing CO poisoning with motion sickness or intoxication from alcohol – the affected individual should be taken away from any running engines or generators and into fresh air as quickly as possible.

### 1.3 Summary of Types of Disasters

Disaster Generic Group	Disaster Group	Disaster Main Type	Subtype Disaster	Sub-subtype Disaster
Natural disasters	Meteorological	Storm	Tropical storm Extra-tropical cyclone (Winter storm) Local/Convective	Thunderstorm/ Lightning Snowstorm/Blizzard Sandstorm/Dust storm Tornado
		Storm		
	Geophysical	Earthquake	Ground shaking Tsunami	
		Volcano	Volcanic eruption	
		Mass movement (dry)	Rockfall Avalanche	Snow avalanche Debris avalanche Mudslide Debris flow
			Landslide	Sudden subsidence Long-lasting subsidence Debris avalanche
			Subsidence	
Climatological	Flood	General (river) flood		
		Flash flood		
		Storm surge/Coastal flood		
		Rockfall		
		Mass movement (wet)	Landslide Avalanche	Debris flow Snow avalanche Debris avalanche
	Extreme temperature			
			Subsidence	Sudden subsidence Long-lasting subsidence
Biological	Drought	Heat wave		
		Cold wave		
		Extreme winter conditions		
	Wildfire	Drought		
		Forest fire		
		Land fire (grass, scrub, bush)		
	Epidemic	Viral infectious diseases		
		Bacterial infectious disease		
		Parasitic infectious diseases		
		Fungal infectious diseases		
		Prion infectious diseases		
	Insect infestation	Grasshopper/Locust/Worms		
	Animal stampede			

### 1.4 Dimensions of Natural and Anthropogenic Disasters

Disaster Generic Group	Disaster Group	Disaster Main Type	Subtype Disaster	Sub-subtype Disaster
Man-made disasters	Sociological	Arson		
		Civil disorder		
		Terrorism		
		War	Chemical weapons Biological weapons Nuclear weapons Armed conflict	
	Political	Massacre		
		Chemical spill Explosion	Nuclear plants	
		Transport accident	Other plants Airways Water Railways Roadways Structural collapse	
Industrial	Engineering failure	Human error of judgement	Stampede Airplane crashes Railway accidents Road accidents	
		Poisoning	Food poisoning Carbon monoxide poisoning	
	Human			

### KEY IDEAS

- There are two types of disasters: natural disasters and man-made disasters.
- Natural disasters are naturally occurring physical phenomena caused by either rapid- or slow-onset events which can cause great harm to lives and property.
- Technological or man-made disasters are caused by humans and occur in or close to human settlements.

### 1.4 Dimensions of Natural and Anthropogenic Disasters

A disaster is an unfortunate event that causes a large number of fatalities and damages. According to published reports, economic losses from natural disasters have amplified over the last few decades. Moreover, millions have met untimely death and many rendered homeless due to these brutal disasters. The increasing trend towards losses of both lives and property can be attributed to two broad reasons: the first being the increase in the population density worldwide. It is evidenced that heavily populated large cities are growing in highly hazardous areas. Second, the standards of living have augmented, which has

resulted in a huge increase in property values. These two developments amplify the economic losses from disasters manifold.

Disaster risk stems from an interaction of physical hazards and the vulnerabilities of the exposed elements which cause an impending interruption of the normal operation of the affected society. As discussed earlier, an individual's risk to disasters is determined both by exposure and vulnerability to a given hazard. Wisner *et al.* (2004)<sup>[6]</sup> have defined vulnerability as the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (an extreme natural event or process). Therefore, it can be said that the degree of vulnerability of the population largely depends on the location of its people, the kind of dwellings or homes they occupy, their level of preparedness, information and other resources they have access to. Along with these, the other factors that are equally important are their social class, gender and age. Moreover, there are many social and political processes that result in asymmetrical exposure to hazards and disproportionate access to opportunities for reducing risk.

Disasters cause severe alterations in the normal functioning of society. The adverse impact on human beings requires immediate response and recovery. Each year numerous disasters occur which affect one or the other part of the world negatively. The aftermath of any disaster is disheartening. Major disasters grab the attention of media and agencies provide necessary help, but there are still many small disasters that go unreported. The images of destruction from all these events, whether major or minor, are shattering. Disasters grind down the community's ability to develop by deflecting resources kept for development purposes to fund recovery and restoration measures. According to estimates, the GDP losses due to disasters vary from 2% to 15%. In spite of the enormous losses that disasters cause, they are often thought of as inevitable episodic events beyond anyone's control. This is a dangerous assumption as the view that disasters are simply natural occurring and destined events makes us ignore the core cause of disaster and makes us neglect many vital points that can help reduce the impact of disaster. Disasters are not isolated instances but are the products of a complex chain of social, material, economic and political processes. There are many dimensions of a disastrous event, and an understanding of these dimensions can further help in understanding and managing disasters.

Both natural and anthropogenic disasters cause havoc. The disaster's impact can be depicted in concentric circles. Any disaster at the core affects the individual, then the society or community and then comes the region and the nation; global is the outermost crust. Any disaster has various dimensions: economic, political, psychological and social. The worst impact of any disaster is seen on the individual. The person concerned breaks down completely. The individual is psychologically devastated and economically bankrupt. The psychological dimension has various manifestations and can be evidenced from behavioural impacts. Any individual is an integral part of a society. Due to disasters, the social class is also affected, which has greater implications. A disaster-struck society also suffers a setback, both economically and socially. At the regional level, disasters cause havoc as politically and economically, the region suffers a setback. Due to large-scale devastation caused by disasters, developmental projects are stalled; in fact, they suffer major obstruction. At the national level, the country faces impediments as and war, the political impact is even greater. The zone becomes regionally unstable and weak, and the on individuals and nations.

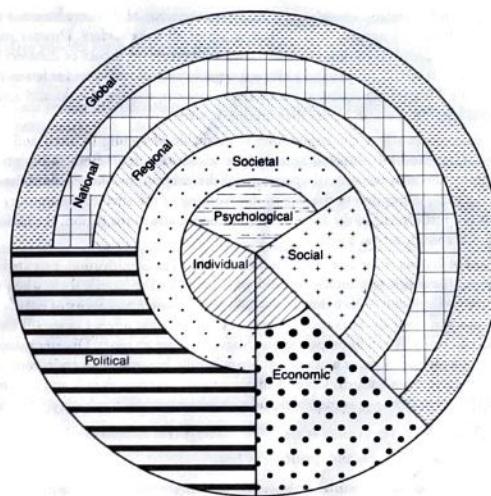


Figure 1.1 Dimensions of disaster.

#### KEY IDEA

The various dimensions of disaster are as follows:

- Economic
- Political
- Psychological
- Social

#### 1.5 Aims of Disaster Management

Disasters, as we know, disrupt the normal lives by causing havoc and destruction. From individuals to nations, all face the ill-effects. The destruction that is caused in a few seconds takes years and decades to recompense. But the most important aspect of disasters is that though they cannot be done away with, surely

the extent of damage can be reduced considerably. Thus, management of disasters becomes an important agenda for both individuals and nations. It is, in fact, a job of all stakeholders. Disaster management is defined as the activities undertaken to minimise the extent of damage or impact of disasters by intelligent use of available resources. It entails proper and judicious organisation of resources for lessening the impact of disasters substantially. Disaster management necessitates a pre-emptive set of tasks and actions taken to reduce and control hazardous events before they become disasters.

Disasters are circumstances where the community is incapable of coping by itself and thus seeks the assistance of other national and international agencies. These disasters, apart from ruining normal lives of the affected community, threaten the normal operations of the community and region. Disasters, whether natural or man-made, cause disruption to the day-to-day working of the affected community. The negative impact of disaster is not just limited to the affected community; it affects the region, the nation and, sometimes, the international community as a whole.

Thus, management of disaster is a pre-requisite. It includes the steps of mitigation, preparedness, response and recovery activities. The aim is to minimise the risk of disasters and to handle them when they do occur in an effective manner to limit and reduce the quantum of loss. Disaster management entails tasks targeted at controlling the crisis situation. Disaster management is the study that offers a covenant for dealing with disaster-related risks efficiently. It entails preparing for a disaster before its onset. Disaster management is the continuous process by which all persons and communities handle hazards in an endeavour to contain the impact of disasters resulting from hazards. Disaster management is everyone's task and calls for integration and coordination of all levels of the governmental and non-governmental machinery. The aims of disaster management are as follows:

1. To reduce the impact of disasters and quantum of loss.
2. To create an environment where individuals and community work together in groups and are able to achieve selected aims effectively and efficiently.
3. To develop important strategies to reduce and control the occurrence of disasters.
4. To train individuals and community to remain prepared for sudden disasters.
5. To organise recovery and rescue mechanism.
6. To trigger the affected region's and community's emergency resources for quick response.
7. To coordinate and communicate for proper management of resources, namely man, material and economic resources available for the purpose of disaster response and recovery.
8. To foster team spirit, where persons rise above their self to help the victims of disasters in whatever way they can.
9. To generate resources necessary for rescue, recovery and post-recovery work.
10. To elicit action for management of disaster in a time-bound manner.
11. To facilitate the non-governmental and governmental machinery to work in tandem for disaster management.
12. To commit resources for disaster mitigation, preparedness, rescue and recovery.

13. To draw the attention of national and international agencies for disaster relief and rescue.
14. To formulate policies for curbing the menace called disaster before its onset.
15. To develop a systematic approach to management of disasters.
16. To foster local resilience to disasters by adopting a consensus-building approach in consultation with the local community.

Though there are varied aims or goals of disaster management, as listed above, they all have a unified mission and that is to *reduce the quantum of loss to life and property*.

#### KEY IDEA

Disaster management aims to reduce the impact of disasters and quantum of loss by creating an environment where individuals and community work together in groups and are able to achieve selected aims effectively and efficiently.

### **1.6 Principles and Components of Disaster Management**

There are certain principles of disaster management which act as guidelines for effectively managing disasters. They are as follows:

1. **Principle of comprehensiveness:** This principle states that disaster management should consider and take into account all hazards and all stages irrespective of the nature, location and affected community.
2. **Principle of prevention and protection:** This states that in anticipating future disasters, a preventive approach should be followed as far as practicable. The quest should be to prevent what can be prevented, and for disasters which cannot be prevented, a protective mechanism which helps reduce damage to life and property should be followed. The focus should be to build disaster-resistant and disaster-resilient communities.
3. **Principle of shared responsibility:** Disaster management is everyone's responsibility. Any sole individual or department is not capable of handling disaster effectively. Therefore, individuals, communities and nations should play an active and responsible role in disaster management.
4. **Principle of judicious use of available resources:** The resources available specifically for handling disasters are limited. It is impractical to build and maintain large holdings of dedicated disaster resources. Therefore, this principle states that by judicious use of available resources and minimum budget allocation, coupled with effective management strategies, the menace of disasters can be managed well.
5. **Principle of collaboration and coordination:** Disasters are events which are beyond the capacity of individuals to respond to; therefore, this principle of collaboration and coordination states that the various agencies working for response and rescue should be well coordinated and collaborate in their efforts for disaster management.

there should be room for adoption and practice of innovations. Moreover, there should be space for deviation of plans, if

In disaster situations, many persons face trauma, but for some it becomes a means for siphoning funds through illegal means. The highest ethical standards should be maintained by all who are aiding in management of disasters.

**Principle states that priorities should be assigned to different job functions:** Accordingly, relief and rescue operations should be carried out.

**Principle of identification:** All hazards are different and so are the impacts; therefore, hazard identification is required. Moreover, impact of each disaster varies from one to another, and therefore, these vital points should be considered in

For effective and effective disaster management, everyone should take initiative. It is every individual's responsibility; it is every individual's prerogative, which should be followed. At all levels of government and community, everyone should try and

**Principle of accountability:** This principle states that in the case of disasters, individuals, communities and persons holding responsible positions should take responsibility of their actions. It is essential to ensure effective response mechanism and that there is no passing the buck in crises situations.

**12. Principle of equity:** Victims should be treated as equally as possible. There can be a system of grading the affected population on the basis of the injury, and medical and rescue services should be provided accordingly. However, equal treatment is a must.

**13. Principle of subordination of individual interest to common interest:** The interests of individuals should not take precedence over the interests of the affected population. All should rise above their self and help the community in coping with disaster.

**14. Principle of order and discipline:** To work efficiently and in a coordinated manner, the management of rescue materials and men involved should have a disciplined approach. The right things should be made available at the right time and place.

**15. Principle of unity:** A feeling of harmony and unity among those who are serving the affected population is a pre-requisite. People should rise above their self, personal gains and selfish intent and work in a dedicated manner. Caste, creed, culture and region should not hinder the management of disasters; people should unite and work together.

The components of disaster management entails mitigation and preparedness measures aimed at risk reduction. The other components of disaster management include relief, rescue, reconstruction and rehabilitation.

### KEY IDEA

The principles of disaster form the foundation for effective and efficient management of disasters by providing guidelines for the decisions and actions.

### 1.7 Summary

This chapter discusses the concept of risk, hazard and vulnerability and the relationship between these. The damage and destruction caused by disasters greatly depend on the capability of the affected community to cope. The greater is the capability to cope, the lesser is the damage caused from disasters. There are various types of disasters and, on the basis of agent, they can be classified into two distinct groups: natural disasters and man-made (anthropogenic) disasters. Natural disasters can be further classified into five groups or categories depending on source: biological disasters, climatological disasters, geophysical disasters, hydrological disasters and meteorological disasters. Man-made disasters can be classified into political, social, industrial and human disasters. There are various dimensions of disasters as disasters affect in various proportions and degrees. The primary impact is on the individuals and the community – they get broken down, psychologically, economically and socially. Then, the region in which the disaster takes place is also affected. Disasters also adversely impact the nation and the world as a whole. The chapter further discusses the concept of management of disaster and its aims. It throws light on the various principles of disaster management. These principles are guidelines that serve as the blueprint for effective and efficient management of disasters.

### CASE PROBLEM: WHO IS INSANE?

Erawadi in Tamil Nadu is famous for the Dargah of Quthbus Sultan Syed Ibrahim Shaheed Valiyullah of Medina who came to India to propagate Islam. It was believed that the 'holy water' and oil from the lamp burning in the Dargah have immense power to cure all sorts of illnesses. It was specially believed that insane persons can be cured of all mental ailments. The treatment at the Dargah was unique as it included frequent thrashing for driving away the evil which was believed to have possessed the patients.



People in mourning at Erawadi.

Source: [http://news.bbc.co.uk/2/hi/south\\_asia/1479958.stm](http://news.bbc.co.uk/2/hi/south_asia/1479958.stm)

During the day, patients were fastened securely to trees with thick ropes and, at night, they were tied to their beds with iron chains. The patients religiously waited for celestial dominion in their dream to go back home. It was expected to take anything from 2 months to several years for such commands.

Shreedhar, a farmer, firmly believed that his wife Shanthi, who was suffering from mental illness, had developed this illness after she lost her 2-year-old daughter. Since the death of her child, Shanthi had become disinterested in life and was often seen talking to herself and looking around her as if searching for someone. She was in a state of shock as she could not come to terms with the reality. The villagers suggested Shreedhar that she was possessed by evil spirits and she could be cured at the Dargah. Gullible as Shreedhar was, he left Shanthi at the Dargah. He remembered that while leaving the premises of the Dargah, when Shreedhar turned to have a glimpse of his beloved wife, he saw that she was being tied to a tree. The owner of the Dargah told Shreedhar that he would keep him informed about his wife's status and would ask him to come and take her when she recovered. Every day, since Shanthi had left, Shreedhar would eagerly wait for a word from the Dargah. Years passed by and he had no news about his wife. Whenever he wanted to go and meet her, his elders dissuaded him, saying that it would interfere with the process of healing.

One afternoon, he got a message that his wife was being taken to the hospital from Erawadi. He hurried to meet her. Upon reaching the hospital, he saw her covered under a slab of ice and was crying in pain. He was shocked at the sight. Later, he came to know that on the fateful day of 6 August, a fire broke at the asylum, which caught the thatched roof of the building where patients were kept in chains. The fire became uncontrollable. The inmates shouted their lungs out for help, but all they could see was smoke and fire. According to reports, 28 chained inmates had died because they were unable to escape the fire that engulfed the thatched shed that housed them. Subsequently, the Dargah was closed.

After this incident, a five-judge bench of the Supreme Court was set up to investigate the matter. The bench observed that the Erawadi incident raised important questions regarding human rights of inmates of the mental asylum who could not escape the blaze as they had been chained to poles or beds. The owner of the Badsha Home for the Mentally Challenged, his wife and two relatives were sentenced to 7 years' imprisonment by the magistrate court of Erawadi.

Shanthi was saved because her rope, which was made of jute, burnt and she managed to break free and save her life. But this incident had affected her gravely. It is evidenced in her gait. She hobbles along, dragging her feet, as if she were pulling the chains that bind her. She is yet to realise that she is free of the manacles that bound her for years. Shanthi is one among the many mentally ill persons who were transferred to the Institute of Mental Health in Chennai following the closure of the 'mental homes' at Erawadi. Her husband Shreedhar took her back to village, where villagers have now labelled her 'mad'. This ill-fated lady still looks up into the sky as if questioning, 'why me God?'

### Critical Thinking Question

1. Who do you think is insane: Shanthi, Shreedhar, who was gullible, or the system and society of which we all are a part?

## 1.8 *Keywords and Phrases*

Anthropogenic disasters	Avalanche	Capacity
Arson	Biological disasters	Civil disorder

Climatological disasters	Hydrological disasters	Risk
Epidemic	Infestation	Storm surge
Geophysical disasters	Meteorological disasters	Subsidence
Hazard	Political disasters	Vulnerability

### 1.9 Objective Type Questions

### A Fill in the Blanks

1. Disaster has its roots in the Italian word \_\_\_\_\_.
  2. Disaster means any \_\_\_\_\_ situation blamed on an \_\_\_\_\_ position of the stars.
  3. A hazard becomes an \_\_\_\_\_ when an imminent situation requires immediate attention.
  4. \_\_\_\_\_ means susceptibility to harm of those at risk.
  5. The Oxford dictionary describes \_\_\_\_\_ as a situation involving exposure to danger or possibility that something unpleasant or unwelcome will happen.
  6. The two broad categories of disasters are \_\_\_\_\_ and \_\_\_\_\_.
  7. The tropical storm \_\_\_\_\_ caused 41 deaths and around \$5 billion in Houston.
  8. The heating of the Earth and deep moisture result in \_\_\_\_\_ storms.
  9. The earthquake can be of \_\_\_\_\_ or \_\_\_\_\_ origin.
  10. Several tragic deaths have resulted from \_\_\_\_\_, a silent killer.
  11. The unified mission of disaster management is to reduce the quantum of loss to \_\_\_\_\_ and \_\_\_\_\_.
  12. Any kind of rapid movement of a quantity of snow/ice down a mountainous side is called \_\_\_\_\_.
  13. An \_\_\_\_\_ is an unusual increase in the number of cases of an infectious disease.

### B. Multiple Choice Questions

1. An earlier definition of disaster places disaster as an event that caused
    - (a) more than 10,000 deaths
    - (b) between 8000 and 10,000 deaths
    - (c) 10,000 to 20,000 deaths
    - (d) More than 1000 deaths
  2. The first step of risk analysis is
    - (a) hazard characterisation
    - (b) hazard attribution
    - (c) hazard identification
    - (d) hazard quantification
  3. The types of coping capacity are
    - i. political capacity
    - ii. natural capacity
    - iii. socio-economic capacity
    - iv. material capacity
    - v. physical capacity

- The correct combination is
- i and iii
  - ii and iv
  - iii and v
  - iv and v
4. The storm that has the potential to quickly grow into hurricanes and generate more rain is
- a convective storm
  - a tropical storm
  - an extra-tropical storm
  - a desert storm
5. Which of the following about an earthquake is true?
- The deeper the origin of the earthquake higher is the impact on the surface.
  - The epicentre is the place of origin below the surface of the Earth.
  - The deeper the origin, lower is the impact on the surface.
  - The higher the reading on the Richter scale, the lower is the impact of the earthquake
6. Four serious nuclear power accidents are expected in the period between 2005 and 2055, according to
- CEA
  - NASA
  - MIT
  - CRED
7. Which of the following is untrue?
- Transport accident is an industrial as well as human disaster.
  - Massacre and war fall within the political type of disaster.
  - Poisoning is a human error of judgement.
  - Floods are hydrological disasters.
8. Of the two nuclear disasters classified as level 7 on International Nuclear Event Scale is the Chernobyl Disaster and the other is
- Bhopal Gas Tragedy, 1987
  - Fukushima Daiichi Nuclear Disaster, 2011
  - Takaimura Nuclear Accident, 1999
  - Mihama Nuclear Power Plant Accident, 2004
9. Tsunami results from
- an Earthquake
  - a volcanic eruption
  - a tropical disturbance
  - a tropical depression
10. Arson, civil disorder and terrorism fall under
- political disaster
  - industrial disaster
  - human disaster
  - sociological disaster

### 1.11 REFERENCES

- Impending exogenous events whose possible characteristics and frequency of occurrence can be approximated are
    - risks
    - emergencies
    - accidents
    - hazards
  - Weapons that can be widely dispersed in gas, liquid and solid forms are
    - biological weapons
    - nuclear weapons
    - radiological weapons
    - chemical weapons
- 
- ### 1.10 Questions for Review
- What are the aims of disaster management?
  - Explain the relationship between hazard, risk, vulnerability and capacity.
  - Discuss the types of disaster, giving suitable examples.
  - Explain the principles of disaster management. Which principle according to you is the most important principle and why?
  - Explain the various dimensions of disasters and how they affect the various stakeholders?
- 
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  - As defined by Hurricane Research Division, Miami retrieved from <http://www.aoml.noaa.gov/hrd/faq/A5.html>
  - The definition has been published in Appendix 2 in our articles in Journal of Peace Research 1993–2009, for instance, in Wallensteen, Peter & Margareta Sollenberg, 2001. 'Armed Conflict 1989–2000', Journal of Peace Research 38(5): 629–644.

6. Wisner, B. P. Blaikie, T. Cannon, and I. Davis (2004). *At risk: Natural hazards, people's vulnerability and disasters* (2nd ed). London and New York: Routledge.

### **1.12 Answers**

#### **A. Fill in the Blanks**

1. disastro
2. calamitous, unfavourable
3. emergency
4. Vulnerability
5. risk
6. natural, anthropogenic
7. Allison
8. convective
9. tectonic, volcanic
10. CO poisoning
11. life, property
12. avalanche
13. epidemic

#### **B. Multiple Choice Questions**

1. (a)
2. (c)
3. (c)
4. (b)
5. (c)
6. (c)
7. (a)
8. (b)
9. (a)
10. (d)
11. (d)
12. (d)

## **Chapter 2**

# **Disaster Management and Planning**

**E**ven with all our technology and the inventions that make modern life so much easier than it once was, it takes just one big natural disaster to wipe all that away and remind us that, here on Earth, we're still at the mercy of nature.

— Neil deGrasse Tyson

### **Learning Objectives**

After reading this chapter, you should be able to:

- Elucidate the importance of the nature and scope of disaster management.
- Explain in detail the disaster management policy and types of plans.
- Describe the hazard and vulnerability analysis.
- Explain organisational structure and design.
- Understand the importance of group dynamics.
- Explain the importance of the control process in disaster management.

## OPENING CASE

**M**ore than 2,000 years old, the festival – Kumbh Mela – is a key Hindu celebration that takes place every 3 years in four rotating places, namely Haridwar, Allahabad, Nashik and Ujjain. The Kumbh Mela is held at each of these four places every twelfth year. The festival has its pedigree in a Hindu tradition that says that the Hindu god Vishnu wrested a golden pot from demons which contained the nectar of immortality. In a 12-day battle for custody, four drops fell on earth, in the cities of Allahabad, Hardwar, Ujjain and Nasik. Every 3 years, a Kumbh Mela is held at one of these spots. In the Maha Kumbh Mela which comes around only once every 144 years and lasts for 55 days, around 100 million pilgrims attend the festival, making it the largest temporary gathering of people in the world.

Due to the huge number of people attending the mela, stampedes are a common phenomenon. The 1954 Kumbh Mela stampede is considered to be the most terrible as an estimated 1,000 people died. In the 2003 Kumbha Mela at Nasik, 39 people were killed in a stampede, and in the 2010 Kumbha Mela at Haridwar, 7 persons were killed. The most recent Kumbha Mela was held at Allahabad in 2013. Allahabad's Kumbha Mela is considered to be the holiest as the rivers Ganges and Yamuna meet the mythical river Saraswati here. The 2013 Kumbha Mela was, in fact, a celebration of the Maha Kumbha Mela. A temporary city covering some area was set up to house the crowds at the sandy banks of Allahabad. 10 February 2013 was considered the most auspicious day and 30 million people descended to Allahabad to bathe at the holy confluence, *Sangam*.



People crying after the stampede on a railway platform in Allahabad.

Source: PTI Photo: <http://www.hindustantimes.com/india-news/up-govt-orders-inquiry-into-allahabad-stampede/article1-1009641.aspx>

## OPENING CASE

Deadly stampedes are common at India's vast pilgrimages and religious festivals. But this news does not deter the enthusiasm of the people who risk their lives to attend such religious gatherings. A small girl Muskaan from Jabalpur, who was aged around 8 years, had accompanied her parents to take the holy dip. She was the youngest victim of the stampede that broke out at the Allahabad railway station. How the stampede occurred was not clear; some said that it happened after a railing on a footbridge collapsed, while others who claimed to be the eyewitness of the horrid act said that the stampede was prompted after the railway police present at the station charged at the crowd with wooden sticks to control the huge rush. This act of the police caused panic and people rushed to save their lives, which caused the stampede.

The pre-arrangements of the 2013 Kumbha Mela had been widely lauded for its infrastructure and event planning. The arrangements included 83 ambulances, 250 doctors, as many as 18,000 police officers, 5 bomb squads, 200 police boats and 18 temporary bridges. What caused this stampede is subject to investigation, but what is more important is that the station was not designed to handle such vast volume of people, which made this stampede very difficult to prevent. According to reports, 36 people were crushed to death and more than 50 injured. What was alarming was that more than 14 h after the stampede, it was not clear what caused the stampede. What was even more alarming was that the little girl Muskaan died because of lack of medical aid. She stayed in an injured condition at the railway station for over 2 h before railway officials took her to hospital which was less than 500 m away from the station! For 2 h, she struggled with death; the parents claimed there were no doctors at the scene.

It was simply a case of gross mismanagement that caused the deaths. Unlike impulsive mass gatherings, which are innately approving to stampedes, the Kumbh Mela is known for its extremely well-organised and well-coordinated administrative execution. But there were many unusual and unforeseen gaps in disaster planning, as was made evident by the stampede. The 2013 Kumbh Mela was an amazing festival and the stage was set to support the millions of pilgrims who would stay for all 55 days, that is, the entire duration, and more than 80 million travelling pilgrims who would enter and leave the festival grounds. All facilities were in place, that is, food, water, shelter, hospitals, police and administrative services. The planning had begun months in advance, keeping in mind the lessons learnt from past melas, especially that of 1954. Irrespective of all arrangements in line, the disaster occurred. Many witnesses claimed that deaths could have been prevented if those injured had been treated on time. About 36 people died and 50 people were injured. In spite of massive arrangements, no aid came to the spot, even as victims cried for help. There were frenzied scenes at the railway station and local hospitals, with relatives running hither-thither to get information about their near and dear ones. The Central Government announced an *ex-gratia* of Rs. 5 lakhs to the next of kin of those killed and Rs. 1 lakh each to the seriously injured pilgrims.

But the question that still lingers is: Can Rs. 5 lakhs bring 'Muskaan' back to her parents?

### Case Questions

1. Who is to be blamed for this stampede: The authority, the railways personnel, the police or the public?
2. Who, in your opinion, is responsible for the death of Muskaan?

## 2.1 Nature, Scope and Management Process

Almost every day, there is news of a disaster taking place somewhere in the world. It has become an all-encompassing and all-pervasive phenomenon. At times, a feeling of helplessness creeps in when we think about disasters. How vulnerable we are before Nature. But then, we also come across news about people who have acted wisely and averted a major disaster. It is true that given the nature of our existence, we are all living in a risk-prone hazardous zone and any disaster can strike at any time. But if we plan ahead and are prepared, these disasters can be managed to a great extent and the damage that these disasters can cause can be reduced substantially. The truth is that there is a trend of increase in general awareness about disasters and all stakeholders want to act wisely and save themselves and their community from ensuing disasters. The problem that then comes to our minds is that we want to act, but still we are unable to avert disasters from occurring altogether. This is due to two reasons: one being mismanagement of resources and the other being the underestimation of the impact of such an event. Therefore, a holistic approach towards management of disasters is warranted.

Management is about accomplishing goals by optimum and judicious utilisation of resources. At times of disasters, it is rarely the scarcity of resources that causes a disaster, but it is always about non-use or misuse of resources. Many a time, we find that resources available were not put to good use. Therefore, setting up goals and ascertaining responsibility of utilisation of both human and material resources is required. With the proper utilisation of people and other resources, the desired objectives of disaster management can be accomplished. Management is indispensable to any of the disasters, irrespective of the size or nature of events. With proper management practices, we can avert a major disaster and the losses can be controlled. Wherever there are groups of people working together to attain some common objectives, it becomes necessary to steer, systematise and control them, and management again has an important role to play as the ends and means of any disaster-related activity are men. Seldom do we call an earthquake a disaster if it occurs at an uninhabited place and loss of life is zero. So, disaster management should focus on optimal utilisation of available resources for reducing or limiting the impact of disasters.

Disaster management by nature is both an art and a skill. An art is understood as 'a skill in conducting any human activity', and management as an art requires no specific body of knowledge, only skill. It is characterised by application of practical knowledge. Every art requires application of knowledge practically. In disaster situations, application of learned theory is necessary; otherwise, instead of reducing the impact, it may cause greater harm. Also, just like an art, creative and innovative techniques are a pre-requisite for disaster management. An artist attains perfection through practice; therefore, training of personnel is required for attaining the requisite skills and utilising those skills during disasters. Disasters are situations which generally trigger a terror alarm and people are unable to respond as they get panicky. But with practice and exposure, this skill can be developed.

Disaster management, like any art, is result oriented as it seeks to achieve concrete results. But disaster management is also a science, which is 'any skill or technique that reflects a precise application of facts or a principle'. It means that, like any science, there should be application of precision and a meticulously prescribed way in which individuals should act. In practice, individuals use a specific body of information and a systematic body of knowledge concerning a precise field of study. There are cause-and-effect relationships between two or more variables, and underscoring the principles governing their relationship is the basic objective of the disaster management activity. There are certain scientific principles relating to disasters that are developed through the scientific method of observation and verification through testing. As scientific principles correspond to basic truths, there are universally applicable principles for all situations, at

### 2.1 NATURE, SCOPE AND MANAGEMENT PROCESS

all times and at all places equally. This is true for disaster management too. For example, there is a scientific way of measuring earthquakes' intensity, which is held as a standard and is applied throughout the world. Moreover, these principles of disaster management stand the test of time, and their validity can be tested at any time or any number of times, and each time, the result will be the same. Further, any science is inherently characterised by experimentation and observation. Also, in disaster management, we find that there is an ongoing scientific investigation and research to find ways for better management of disasters. The basic motive of this is to study the cause and try to remove the cause before it affects our lives. Medical investigations to contain epidemics causing havoc in the world can be said to be an example. In 1918, influenza resulted in the death of 8,000 people in New Zealand. Now, vaccination is available to contain the losses and also guidelines have been made by the World Health Organization.

There is involvement of both science and art in management of disasters. Science takes care of well-laid principles, and how they are implemented is dependent on the skill of individuals, which is inherently an art. The field of disaster management seeks to replace intuitive explanations with a systematic study, with the aim to explain, predict and control disasters. Its scope is large as it covers the entire gamut of stakeholders. From individuals to communities, regions and nations, all are covered. The various formal and informal agencies that are at work are also included. The process of disaster management covers all actions that are taken to reduce the losses from disasters. The first step is planning, which is the process of identifying and selecting appropriate goals and courses of action for disaster management. Planning helps by providing clear goals and map the activities needed to achieve them efficiently and effectively. It starts with collecting information about past disasters, defining objectives, developing planning premises, discovering alternative courses of action for managing disasters, evaluating alternatives and choosing the best alternative on the basis of available resources and goals. Planning is of immense help in disaster management as it helps us remain focused on the desired objectives. It helps to minimise risk, improve efficiency and avoid confusions. It also serves as the basis of control.

Organising is the second step where roles and responsibilities are defined. It helps in arranging and coordinating the resources needed to successfully carry out disaster-management related plans. It involves grouping people into departments according to the kinds of job-specific tasks they are expected to perform during disasters. Proper lines of authority and responsibility are laid out. Groups are assigned activities and a formal system of task and reporting relationships that coordinate and motivate members who work for the management of disasters.

Then, there are the managerial functions of staffing, which involves manning the organisational structure through proper and effective selection and development of personnel to fill the roles designed into the structure. Staffing is concerned with acquiring, developing, utilising and maintaining personnel involved in disaster management. It also ensures matching jobs with individuals so that the right man is available for the right job. This is a very crucial step in the management of any disaster.

The task of leading is the next step in the process of disaster management. Articulating a clear organisational vision for its members to accomplish, energise and enable employees so that everyone understands the part they play in achieving organisational goals is vital for the success of any disaster management. People should be motivated time and again to work for the benefit of individuals and communities facing disaster. Planning, organising and staffing are mere preparations for disaster management. Leading encompasses the tasks of influencing, guiding, supervising and motivating persons for the achievement of goals.

Controlling means an evaluation of how well an agency or a group has achieved its goals. It is essential as it shows the direction in which one is heading. The purpose of controlling is to guarantee that everything

occurs in conformity with the standards. It also helps in initiating any corrective action needed to maintain or improve performance and regulate efficiency and effectiveness.

Management of disasters is a dynamic process consisting of various elements and activities that have to be coordinated and controlled for effectiveness.

### KEY IDEAS

- The focus of disaster management is on optimal utilisation of available resources for reducing or limiting the impact of disasters.
- The process of disaster management covers all actions that are taken to reduce the losses from disasters.

## 2.2 Policy of Disaster Management

Policy is a principle of action adopted to guide decisions and achieve rational outcomes. It is a statement of intent that assists and aids decision-making. Policies are constituted to help in guiding action for achievement of goals and to avoid some negative effects and seek some positive benefits. These are statements aimed at preserving the interest of the community at large. The disaster management policy aims at the following:

1. To provide guidance and direction to set priorities for managing the disaster situation.
2. To promote community-based disaster management and execution at the grass-root level.
3. To develop capacity of all stakeholders.
4. To consolidate past initiatives and develop best practices for future use.
5. To facilitate cooperation with agencies at national, regional and international levels.
6. To ensure multi-sectoral synergy for compliance and coordination.
7. To create and uphold a culture of prevention and preparedness.
8. To prioritise disaster management as the principal priority at all echelons and at all times.
9. To promote disaster mitigation measures on the basis of state-of-the-art technology and environmental sustainability.
10. To integrate disaster management issues into the development planning process.
11. To create and protect the veracity of an enabling regulatory environment and a compliance system.
12. To promote a culture of coordination where all the stakeholders work in tandem for generating awareness and developing capacity.
13. To ensure well-organised response and relief measures to aid the disaster-affected persons.
14. To visualise reconstruction and opportunity to build disaster-resilient structures.
15. To take time-bound actions for response, relief, rehabilitation and reconstruction.

The disaster management policy emphasises on effective management of disasters. It stresses on the need and creation of a culture of preparedness for the reduction of risks arising from disasters. The thrust, therefore, is on setting up of and strengthening disaster management institutions and working in a unified manner. Creation of a disaster management policy should encompass a full band of activities, from preparedness, mitigation and response to recovery. The policy should also aim at augmenting and maintaining the pliability of vulnerable communities to disasters by putting in place workable financial and emotional solutions for the affected population. The focus of the policy is not limited to just providing relief; it also aims at the overall development of the community at large. It contributes to sustainable development in the country by helping the risk-prone communities to cope with challenges. It aims at building an all-inclusive hands-on, multi-disaster and technologically sound strategy for disaster management.

### KEY IDEA

Disaster management policy helps in setting priorities and guiding action. It stresses on the need and creation of a culture of preparedness for the reduction of disasters.

## 2.3 Types of Plans: Management by Objectives

In disaster management, planning plays a crucial role. It deals with chalking out a future course of action and deciding the most fitting course of actions for achievement of goals. It answers questions like what to do, when to do and how to do, and as such bridges the gap between the present and the future state. It is a systematic and logical process of finding ways and means for achievement of preset goals. It is an indispensable part of the disaster management process as it helps in ensuring proper utilisation of available resources. It also helps in circumventing confusion and uncertainties. But sometimes, it is seen that even the best-laid plans fail for lack of clarity. Management by objectives (MBO) was first presented by Peter Drucker in his book *The Practice of Management* in 1954. The core of MBO is participative goal setting, course of action selection and decision-making. In MBO, goals achieved are then measured and compared with the set goals taken as standards. It is observed that in participative goal setting, an individual is more motivated and committed towards achieving the goals. MBO also helps by maintaining better communication and coordination among the stakeholders. As MBO warrants frequent reviews and interactions between groups, it helps in solving problems effectively. Other benefits of MBO include the following:

1. **Clarity of goals:** The individuals working for the management of disasters have a clear goal in their mind, to which they are accountable. Their commitment and motivation is also higher as they are involved in the setting up of goals. Moreover, they have prior knowledge about the situation and their job; therefore, they are clear about their tasks and goals.
2. **Effective synergy between overall objectives and individual's objectives:** Disaster management is everyone's business. All are involved in one way or the other, and every individual has a role to play in mitigating and preparing for disasters. Therefore by MBO, effective synergy can be established between overall (group) objectives and individual's objectives so that each individual contributes in one unified direction.

3. **Timeliness:** MBO ensures that objectives are achieved within a given time frame, known as the 'operational period'. Questions such as 'what has to be achieved', 'how it has to be achieved' and 'by when it has to be achieved' are answered. There is a specific time period within which the work has to be completed, and this is very necessary.
4. MBO involves a series of interrelated functions that involve the setting up of objectives and taking steps to achieve them. In disaster management, MBO is immensely helpful as it ensures committed action from stakeholders.

**KEY IDEAS**

- MBO involves a series of interrelated functions aimed at setting up of objectives and taking steps to achieve them.
- MBO is immensely helpful in Disaster management as it ensures committed action from all stakeholders.

**2.4 SWOT Analysis**

SWOT analysis is a method used to evaluate the strengths, weaknesses, opportunities and threats concerned with disasters. It involves enumerating the objectives of disaster management authorities and then ascertaining the internal and external features that may hinder or help in achieving the stated objectives. Generally, objectives relating to disaster management should be set up after an analysis of the strengths, weaknesses, opportunities and threats. Knowledge of this would help in setting up achievable goals. Information about the strengths and weaknesses can help in giving a clear picture of the readiness of the response mechanism in an event of disaster. It can also help in finding new solutions to existing risks. SWOT can help in recognising and categorising barriers that may limit or hinder the achievement of objectives. Moreover, SWOT gives insights into the limited capacity and capability of the members of the community to face disasters. It also aids in choosing a direction for work that will be most effective in disastrous situations.

SWOT analysis can be carried out from micro to macro level. The three levels at which it should be done as follows:

1. **Community level:** At the community level, information relating to the capacity of households in terms of economic status and social status, age group to which most of the individuals of the community belong in order to ascertain their response capacity, gender division of the population, the nature and construction of houses, vulnerability of the community to risk, etc. should be gathered for SWOT analysis.
2. **Regional level:** At regional level the information needed for ascertaining the strengths, weaknesses, opportunities and threats should include regional vulnerability to disasters, the overall capacity of the people living in the region to cope with and combat disasters, the developmental aspects of the

**2.5 HAZARD AND VULNERABILITY ANALYSIS**

region such as infrastructure development, the type of dwellings, population density and nature of occupation, etc.

3. **National level:** At the national level, the information a SWOT analysis should take into account are with respect to the political vulnerability, economic status and regional proneness to risk.

This analysis is helpful in giving a clear picture of what is and what needs to be done for effectively managing disasters. SWOT analysis is an important task concerning both government and private sectors working for managing disasters. It helps in making workable plans which cover the precise needs of communities. Earlier, the criteria for state intervention were based on the enormity of the event rather than the needs of the communities that were distressed by the disaster. It is seen that normally, the perspective on disasters is limited to emergency responses. But for management of disasters, a long-term perspective is required so that developmental planning can be tuned to the needs of the community. Also, SWOT analysis provides information about opportunities and threats, which can form an important ingredient for making mitigation and preparedness strategies for disaster management. As disaster management efforts at community and regional levels have to be integrated into national development strategies, SWOT analysis provides comprehensive inputs so that there is no duplication of efforts at any stage.

**KEY IDEA**

**SWOT analysis** is a method used to evaluate the *strengths, weaknesses, opportunities, and threats* concerned with disasters. It can be done at community, regional and national levels.

**2.5 Hazard and Vulnerability Analysis**

Hazard recognition helps in ascertaining the areas that are affected by disasters, the probability of occurrence of a disaster and the severity of the disaster. It is defined as a process of 'defining and describing a hazard, including its physical characteristics, magnitude and severity, probability and frequency, causative factors, and locations/areas affected' (Schwab *et al.*, 1998).<sup>[1]</sup> Vulnerability is a community's defencelessness to a given hazard, which is ascertained by the extent to which they can foresee, handle, respond to and recover from its impact. It is a set of conditions and processes arising from physical, social, economic and environmental factors, which increase the vulnerability of a community to the impact of hazards. There are various dimensions of vulnerability according to the availability of assets which a community possesses:

1. **Economic dimension:** It discusses the economic aspect of the community and covers levels of savings debt and access to credit and insurance, etc.
2. **Physical dimension:** Under the physical dimension of vulnerability, information about the location and levels of infrastructure development, etc. are studied.
3. **Social dimension:** The social dimension includes security issues, level of literacy, access to good governance, social justice, level of respect for human rights, conventional values and customs, and tribal, religious and political alliances.

It is important to note that one significant facet of vulnerability in the face of hazards is that of exposure. Accordingly, due to hazards, the population living in close proximity will be affected the most but the impact on individuals will differ according to their economic status. A hazard and vulnerability analysis takes into account these subtleties to make disaster management efforts fruitful. Its aims are as follows:

1. To assess the risks and hazards the communities face and the capacities of the population to respond to such situations.
2. To determine the facilities at risk and the degree to which they might be affected.
3. To analyse each probable event from start to end.
4. To involve communities, government authorities and organisations in the identification of hazards and assessment of vulnerability.
5. To make action plans to prepare for and respond to the identified risks.
6. To identify activities to avert or reduce the effects of expected hazards, risks and vulnerabilities.

Vulnerability analysis is a risk, hazard, vulnerability and capacity mapping exercise that helps in recognising the threats to communities. This analysis helps in addressing the specific areas of risk and vulnerability for making action plans. The information generated by a vulnerability analysis can provide significant inputs for gauging regional and national vulnerabilities and capacities.

Hazard and vulnerability analysis helps in identifying and focusing attention on most crucial hazards that may affect the community. There are four classes in which hazards are divided according to the chance of occurrence, state of response mechanism, effects on human beings or the community and economic impact. The steps of a hazard and vulnerability analysis are as follows:

1. Recognition of hazards and vulnerabilities. The vulnerabilities should cover diverse aspects, including social, infrastructural, economic, environmental, behavioural and political hazards.
2. Estimation of the probability of occurrence of an event.
3. An analysis of the probable human impact of each disaster in terms of loss of lives and quantum of physical injury.
4. An assessment of the probable damage to the property. This includes analysis of replacement cost, setting-up cost and cost of repair.
5. An assessment of capacity, highlighting the capability and availability of resources with the community to reduce disaster risks and to organise effective response.

Hazard and vulnerability analysis is a comprehensive analysis of hazards that can cause disastrous effects. It is an evolving document and must be reviewed annually.

### KEY IDEA

Vulnerability analysis is a risk, hazard, vulnerability and capacity mapping exercise that helps in recognising the threats to communities.

### 2.6 Identifying Crisis Situations: A Framework

Crisis is an unwanted situation that takes people by surprise and poses a threat to the community at large. The time to take a decision for responding to this type of situation is usually very short, because of which the situation gets out of control and results in huge losses of both humans and property. A crisis has the potential to cause harm if not handled timely or properly. But if identification of crisis can be done before, the losses can be diluted to a great extent. And thus, the concept of management of crisis came forth. Crisis management can be defined as a process by which a community deals with a disaster which adversely affects the community and its stakeholders. The concept was in vogue only in 1980s when large-scale industrial and environmental disasters started taking place all of a sudden. It is different from risk management. Risk management involves assessing potential threats and ascertaining the best ways to avoid those threats, whereas crisis management deals with ascertaining threats before, during and after they appear. It is a study that deals with recognising, measuring, comprehending and coping with an emergency situation from the moment it appears to the point where rescue and recovery start.

Normally, it is very difficult to predict accurately a crisis situation, but with diligence and by adopting a structured approach, to a great extent, crisis can be identified. Crisis management can reduce the impact of damages arising out of a crisis. The three phases of crisis management are as follows:

1. **Pre-crisis phase** where the focus is on the identification of the crisis, its prevention and preparation for combating the situation.
2. **Crisis response phase** when the community has to respond to the crisis.
3. **Post-crisis phase** wherein the stakeholders review the situation and ascertain the reasons of occurrence of crisis. This phase is especially helpful because it gives insights to be better prepared for the next crisis.

As crisis identification forms the integral part of crisis management, it is important to know the process of identification. The dictum, a stitch in time saves nine, can be applied aptly to the identification of a crisis. The steps are as follows:

1. An analysis of the current situation based on information of past crises that the place might have had (i.e., defining the risks).
2. A study of regional vulnerability to both types of disasters – man-made and natural – and gaining knowledge of what makes situations worse.
3. Identification of the ideal situation in which the crisis could be easily handled and the specific requirements.
4. Identification of a gap-based analysis of what is and what should be.
5. Formulation of detailed strategies to deal with the ensuing crisis.
6. Communication of the plans to all stakeholders.
7. Monitoring of the situation closely to help in identifying the crisis.

The essence of crisis management lies in taking control of the situation in order to contain the losses. It is seen that being unprepared usually leads to severe crises. So, preparedness is the key. Learning from other

people's failures to respond effectively also helps a lot. Effective collaboration and coordination between stakeholders is essential for developing a common framework for the identification of crisis situations. This can help in incorporating the perspectives and contributions of different stakeholders and in preventing both immediate and longer-term crises.

**KEY IDEA**

The three phases of crisis management are

- Pre-crisis phase
- Crisis response phase
- Post crisis phase

**2.7 Organisational Structure and Design**

Based on the objectives of disaster management, a blueprint of an organisational structure should be made to determine the responsibility and accountability of each stakeholder. It is a formal division of the authorities and roles for ease of decision-making and serves as an integrating and controlling mechanism. The organisational structure for disaster management has four distinct departments based on the functionalities:

1. Disaster mitigation division
2. Disaster preparedness division
3. Disaster response division
4. Disaster recovery division

The organisation is headed by a Chief Executive Officer. These four divisions are manned by Directors to whom their subordinates, that is, additional and deputy directors, report. Under them, there are various regional coordinators. The organisational structure facilitates allocation of responsibilities for different tasks and processes to different individuals. There is clarity of role and avoidance of duplication of roles. The organisational structure facilitates action by providing a foundation for following the standard operating procedures and helps determine the decision-making authorities. Moreover, the span of control is also evident from the organisational structure, and there is no scope of confusion whatsoever about reporting relationships and hierarchical levels.

Organisational design and size are important aspects of organisation and help in strategically achieving the goals. The organisational structure facilitates task allocation, coordination and supervision. These are essential for achievement of organisational aims. Moreover, having a well-laid organisational structure guarantees high-performance behaviours as accountability is ascertained. Clarity of roles leads to superior execution of work processes and effective and efficient support processes and systems. The description and specification for each job in the hierarchical structure help pool in the requisite number of talented personnel fit for the job, which helps in organisational excellence.

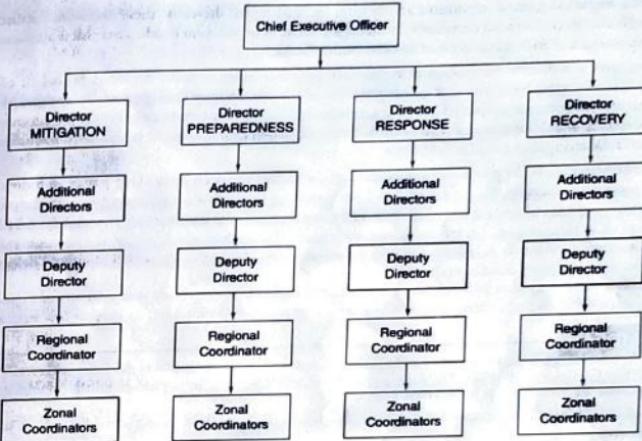


Figure 2.1 Organization structure.

**KEY IDEAS**

- Organisation Structure is a blueprint of formal division of the authorities and roles for ease of decision-making.
- The organisational structure for disaster management has four distinct departments based on the functionalities:
  - *Disaster Mitigation Division*
  - *Disaster Preparedness Division*
  - *Disaster Response Division*
  - *Disaster Recovery Division*

The word 'authority' is used to mean power vested formally on an individual by a state. Delegation is the transfer of authority and responsibility to a person or position to carry out definite activities. These are the essence of management and very vital from disaster management perspective. Disasters are situations that

call for the highest degree of responsible action from the authorities; therefore, these two words, authority and delegation, become crucial for effectively managing them. A person who is delegated task is accountable for the outcome and tries his or her best to carry out the work.

**Delegation** is basically the process of empowering a subordinate to make decisions on behalf of the authority. It saves time by reducing response time, but this is a temporary arrangement. As at times of disasters, all the jobs cannot be carried out by a single individual, so to a certain extent, jobs are allocated to the subordinate which otherwise would be done by the person in charge himself. It also helps in enhancing skills and motivating the subordinates.

**Decentralisation** is the process of reallocation of duties and the decision-making power to individuals away from a core authority. This is essential as disaster calls for immediate action and anyone on the ground level should have the power to take decisions. For every decision, the core authority cannot be called for; moreover, it is time taking. Therefore, decentralisation is the answer, which means the decision-making power, to a great extent, is distributed among the stakeholders. Authority, decentralisation and delegation are important aspects of disaster management.

### KEY IDEAS

- Authority and delegation are two crucial aspects for eliciting highest degree of responsible action from the disaster management authorities.
- Decentralisation is important for disaster management since it aids in taking immediate action at the ground level.

## 2.9 Roles, Skills and Competencies

For effective management of disasters, there are certain roles that individuals have to play; these are as follows:

1. **Leader:** A leader's role entails taking the initiative to act and influence people to work for the achievement of goals. The leader organises the requisite support from the agencies by collaborating with them and helps aid rescue and relief work. The duty of a leader is also to motivate people towards action, in both the pre-disaster and post-disaster phase.
2. **Informational Role:** It deals with the collection and dissemination of accurate information relating to the exact situation of disasters in order to handle them carefully.
3. **Resource Allocator:** During disastrous events, a lot of resources in terms of materials pour in. It is important to make judicious allocation of the resources by ascertaining the needs of the affected population. This is an important role that has to be played well by persons in charge.

For properly taking on these roles, certain skills are required. These are as follows:

1. **Leadership skills:** These are required to ensure availability of the right person at the right place and right time during chaotic situations like that of a disaster.

2. **Conceptual skills:** These are required to gauge the reason of disaster and understand the intricacies relating to the affected population. Conceptual skills are the capabilities to visualise the situation. They help the person involved in identifying the causes of the problems and in solving them to reduce losses and damage.
3. **Human relations skills:** These are required to manage the affected community. The affected community needs emotional support; therefore, understanding them and their needs is of prime importance. These skills help an individual to work with distressed and confused people. Developing these skills help him/her in understanding and communicating with others by motivating and developing team spirit.
4. **Managerial skills:** These are required to manage the available resources to meet the objectives and goals by effective and efficient utilisation. These skills help an individual coordinate and control the situation. They help him/her in finding the best solution for solving a disaster-related problem. With these skills an individual can take quick decisions and implement them.

It is important to note that the degree of these skills changes with the levels of management and according to the type and severity of the disaster. For playing the roles effectively, certain competencies are required. They are as follows:

1. **Knowledge, which is acquired through learning:** This refers to an understanding that is developed through learning about job performance. It is what people have to know to be able to perform a job.
2. **Experience:** With experience, people become proficient in doing a job. It acts as a foundation for developing response and rescue skills.
3. **Behaviour:** The noticeable manifestation of skills, knowledge and experience. It is a fundamentally authoritative expression of a competency that can be learned and measured.

### KEY IDEAS

- Leadership roles, informational roles and resource allocator roles are essential roles for effective management of disaster.
- The skills required are leadership skills, conceptual skills, human relations skills and managerial skills.

## 2.10 Importance of Control Process in Disaster Management

The plans for disaster management are directed towards the achievement of goals and objectives. The control function is a check mechanism that ensures all the activities in the organisation take place according to the plan, and if there is any deviation, timely action is taken to bring back the activities on the path of planning. The benefits of a control process are as follows:

1. **Helps in achieving goals:** Controlling helps in optimal use of resources the achievement of goals.
2. **Makes efficient use of resources by ensuring that each activity is performed according to predetermined standards.** As a result, there is most and effective use of resources.

- 3. Improves employee motivation:** An effective control mechanism communicates the goals well in advance so that the personnel concerned know what is expected of him/her and how he/she has to achieve the goals.
- 4. Ensures order and discipline:** An effective controlling system makes sure that the functions are performed efficiently. It can act as an instrument to check dishonesty and fraud that can be committed during the time of disasters.
- 5. Facilitates coordination in action:** Control helps to retain a balance between the means and the ends, which is a pre-requisite for disaster response. By controlling, one makes sure that the appropriate direction is taken. All the departments are controlled according to predetermined standards of operation and are well coordinated with one another. Control provides for unity of direction.
- 6. Helps in minimising errors:** An effective controlling system helps in minimising errors by continuous monitoring and check. The personnel try to detect the error on time and take remedial steps to minimise the effect of error.

Under the control function, it is made sure that all the personnel know their duties and responsibilities very clearly so that they can work efficiently. There are three types of control:

- 1. Feed forward control:** A process by which the consequences of an action are pre-judged on the basis of the situation and control is triggered. This is especially important for disaster situations; before deciding to act, the situation is analysed and responded to accordingly.
- 2. Concurrent control:** When working or responding to disasters, many a time it is found that the actions do not lead to the expected response; in such cases, it is imminent that the action should be stopped immediately and the situation is brought under control. This is concurrent control.
- 3. Feedback control:** An analysis of the action of the past gives insights and learning about what went wrong, so that in future, such errors are not repeated.

#### KEY IDEAS

- The control function in Disaster management is a check mechanism that ensures all the activities take place according to the plan, and if there is any deviation, timely action is taken to bring back the activities on the path of planning.
- There are three types of control: feed forward, feedback and concurrent control.

### 2.11 Group Dynamics: Nature, Approach and Attitudes Required to Establish Effective Autonomous Work Groups

A noted social psychologist Kurt Lewin coined the term 'group dynamics' in the early 1940s. According to him, people working in groups play distinct roles and exhibit certain behaviours. Group dynamics is a classification of behaviours and processes taking place within and between social groups. It provides insights into the functioning of groups and its members. An understanding of the intricacies relating to group behaviour helps in decision-making for allotment of tasks for effectively tackling disaster situations.

The study of group dynamics brings forth sensitive information about social class divisions, regionalism and other forms of social prejudice and inequity. In addition, it also talks about attitude and power dynamics among individuals in a society. The knowledge of group dynamics is crucial for gaining sound knowledge about the nature and attitude of persons involved in a group task. This information about how individuals relate to each other helps in determining group activities and the amount of supervision. People who work collectively are connected by the shared tasks that they must complete together. As disasters call for cooperation, communication and patience, an understanding of group processes helps in making proper decision about establishing autonomous work groups. The members of a group are socially connected, share common social identification and can perform roles interdependently. Therefore, while setting up autonomous work groups, an understanding of group dynamics helps. It can throw light on inter- and intra-group processes.

Disaster situations are complex and intriguing situations and operating in a complex environment calls for an adaptive and well-coordinated group process. If a group of individuals who belong to the same status and who share a set of common values or norms are brought together to work for disaster management, they would give better results. The inter-relationships among various groups and the intra-relationships of individuals should be good so that the achievement of goals is facilitated. Instead of being competitive, the individuals have to be adaptive and cooperative. Therefore, knowledge of group norms, structure and psychology is warranted. Members of a group follow the code of conduct of the group, and the responsibilities and obligations of each member are dictated by group norms. These are important aspects of a group that are essential for a harmonious functioning among group members. In execution of any disaster management policy, these relationships and processes play a vital role as they dictate the attitudes that the members should adopt in various circumstances. If a group is highly cohesive, the members may settle a conflict and can clear misunderstandings easily. Groups have standard processes which enable members to better understand the behaviours of their co-members. Moreover, a person's judgement is formed by involvement in group life and by internalisation of the rules that exist in the group.

The influence that a group may have depends largely on the attitude of the members of the group. Attitude is a decisive factor, and the success or failure of the group as a whole depends on the dominant attitude of the members. Moreover, it also determines to what extent one is willing to devote himself/herself to the activities of the group. A study of group dynamics helps in devising strategies to mould the behaviour of group members and thereby foster cooperation. The important aspect of an autonomous work group is that members trust one another and collaborate towards achieving goals. There is accountability and responsibility sharing. Having poor group dynamics is a serious situation as it hampers collective decision-making and individuals inhibit reaching goals in the long run. There is always a fear of taking a faulty and ineffective decision which may be fatal in disaster-like situations.

To reinforce group dynamics, a positive attitude is required where individuals work together to tackle problems. The attitude of collaborative decision-making is warranted so that the group can take quick decisions at times of crises. These autonomous work groups call for responsibility sharing according to the wish of the members; this can be possible when there is strong liaison between individuals. Moreover, autonomous work groups have a high level of commitment, which is an essential ingredient for managing disasters.

#### KEY IDEA

Group dynamics provides insights about group behaviour and helps in decision-making in disaster situations.

## Understanding the Importance of Team-Building in Disaster Management

**2.12** Team work within and between teams is essential in disastrous situations. In teams, individuals collaborate in order to deliver the desired results. Team work helps foster better and open communication between individuals, thereby making it easy to operate in disastrous situations. The quality of work is enhanced by cooperation and so are the results. Team-building for disaster management helps in motivating individuals and building trust among them. The other reasons as to how team-building helps in disaster management are as follows:

- 1. A team has shared values and a common goal:** The members of a team share common values and attributes. The goals of the team are based on an elaborate study of key capabilities of team members.
- 2. No individual identity of members:** The team has a unique identity where individuals are equal and fairly treated. The team does not suffer from 'most valuable player syndrome', which is detrimental for the team's progress. Team work as a whole is rewarded and promoted.
- 3. A team has individuals who can be trained as members rather than as high performers:** Strong teams and not strong individuals are what make up a strong association. In disaster management, individuals who are ready to learn and are committed to deliver good results. So, when building teams, individuals who are coachable should be selected.
- 4. A team shares values, integrity and commitment:** When individuals take membership in disaster teams, a transformation takes place – their individual association ends and a team identity is created. There are shared values which are held above the self. A strong bond is created between members who are ready to prepare for overcoming any kind of obstacles that may come in the way of achievement of the team's purpose. Working in disastrous situations is tough as nothing can be predicted with certainty, so a high level of commitment is required. The members stay absorbed in their goals, which gives them the plasticity and toughness they need to thrive in the middle of a disaster.
- 5. An effective team takes risks:** For effective management of disasters, a team has to take a lot of risks. It operates in an unstable and unpredictable environment where yesterday's plans tend to become obsolete. This calls for pushing boundaries and moving ahead. A team cannot follow rules and guidelines in such situations. What guides it is the high level of integrity when taking risks.

An ideal disaster management team must have members who are social, knowledgeable, observant, culturally sensitive and tactful. Persons with a strong ethical character must be recruited. Excellent communication help cultivate and promote team-based virtues and individual traits of good sense, impartiality, clarity, empathy and toughness. In developing useful, skilled and truly excellent disaster teams, a cautious approach should be adopted as working in disaster situations is different from a normal day situation. In disaster situations, life is tough and individuals are stressed out because it poses a lot of demands on them and on the teams. So, individuals who help in improving the quality of work substantially and bring honour and integrity to the forefront of this dignified and gallant service should be made a part of these teams.

**KEY IDEA**

Team-building for disaster management helps in motivating individuals and building trust among them.

## 2.13 Capability Assessment

For effectively managing disasters, an assessment of capability is required. Capability assessment helps in getting a realistic view of the quality and quantity of available resources for mitigating disasters and responding to disasters. This analysis helps in gauging the current requirement of resources and making suggestions for improvement. It involves compiling a list of the resources available with a community and what use those resources can be put to at times of emergency. Capability assessment is a very important part of emergency management plans. It can be done by ascertaining the availability of resources to respond to a disaster in terms of:

- 1. Personnel:** It means the number of persons who are ready to come forward to help at times of disasters and the skills and experience they possess. Choosing the personnel involves the identification of tasks as well as of the persons who will be assigned those tasks. The tasks can be varied, such as providing health and medical services, supplying food and water, providing transportation, and provisioning police and crisis counselling.
- 2. Equipment and materials:** This involves assessing the current availability of equipment and relief materials, such as vehicles, storm shelters, alarm systems, communications equipment, security, emergency power system and fuel, sanitation, medical or first-aid, cots and blankets, etc.

There are three rating areas in capacity assessment: Satisfactory, needs improvement and deficient. A satisfactory rating does not require any action. Everything is in accordance with the plan, and the system and the community are in a state of readiness to combat disasters. Those areas indicated as needing improvement are basically suggestions for improving certain portions of the existing system in terms of personnel or equipment. A rating signifying an area as deficient must be corrected by the specified date.

*Capability Enhancement Plans* are documents based on the capability assessment data. Capability assessment must be done at regular intervals.

**KEY IDEA**

Capability assessment is an important part of emergency management plans. It can be done by ascertaining the availability of resources to respond to a disaster in terms of personnel and equipment.

## 2.14 Summary

Almost every day, a disaster takes place in some corner of the world. It has become a common phenomenon that affects communities and nations at large. Management of disaster is essential for reducing the losses. In this chapter, the nature of disaster management, its scope and process are discussed. The concept and design of the organisational structure is also discussed. Organisational structure is a formal division of the authorities and roles for ease of decision-making, and it serves as an integrating and controlling mechanism which is essential for the proper and effective management of disasters. Also, the policy of disaster management, which forms the backbone of any disaster management activity, is discussed.

Planning plays a crucial role in disaster management. It is a future course of action. The concept and benefits of management by objectives, as presented by Peter Drucker, is explained. The concept of SWOT

analysis and its applicability in disaster management is also explained. A hazard and vulnerability analysis helps in identifying specific areas of risk and vulnerability, which further helps in determining action plans to address them. A framework for identifying a crisis situation is given. The concept of authority, delegation and decentralisation is explained. The roles, skills and competencies required for managing disasters are listed. The control function is a mechanism that ensures that all the activities in the organisation take place according to the plan, and if there is any deviation, timely action is taken to reduce the losses arising out of deviation from the plan. The concept of group dynamics and the attitudes required to establish effective autonomous work groups is also discussed. Finally, the chapter focuses on the importance of team-building in disaster management and the importance of capability assessment.

### CASE PROBLEM: GOD'S WILL OR MAN'S FAULT!

Vikram, an 11-year-old boy, was the sole breadwinner of a family of two. His mother was a TB (tuberculosis) patient and was totally dependent on her son for food. The boy lost his father, who was balloon seller, a year ago and now he had adopted the occupation. It was a Sunday and Vikram was very happy; it was the first day of the festival of Navratri and the sales would soar. He had made all preparations for the day. He had inflated 30 balloons and securely tied them to the bamboo stick. He had kept another 100 in his bag. He reached the Naina Devi temple early. Tens of thousands of people had gathered for the festival. His business picked pace as the day advanced.

Suddenly, he heard a crashing sound and saw a few men coming crashing down from the hill top towards him. He tried hard to escape but could not. He was hit on his head and died on the spot.

The accident had occurred when a railing at the narrow, steep staircase leading to the popular shrine had collapsed under the weight of devotees. The fall of the railing resulted in turmoil and terror among pilgrims who had come to offer prayers to the goddess Nanda Devi. About 145 people died and about 80 people were injured. Most people died of suffocation, and around 30 of the dead were children.

Temple stampedes are common in India during festivities. Earlier, in March 2008, nine people were killed and many more injured at a religious congregation in Central India when a railing broke at the temple premises, leading to a stampede among 100,000 devotees. In another bizarre incident, another 115 persons were trampled to death in Dantewada temple in Madhya Pradesh in 2013. The stampede occurred on the ninth day of the Navratri festival when lakhs of devotees visited the Ratangarh temple to offer prayers. It was reportedly triggered by the rumour that a bridge across the Sindh river, which devotees were crossing to reach the temple, was about to collapse. The police lathi-charged during the panic, which worsened the situation, forcing many to jump off the bridge. Earlier in 2006, about 50 people had been washed away at exactly the same spot. Some 102 Hindu devotees were killed in a stampede in January 2011 in the state of Kerala, while 224 pilgrims died in September 2008 as thousands of worshippers rushed to reach a 15th-century hill-top temple in Jodhpur.

#### Critical Thinking Question

- Who according to you is responsible for Vikram's death: God or man? Could these disasters be averted? Give reasons for your answer.

### 2.15 Keywords and Phrases

Authority	Delegation	Policy
Capability assessment	Group dynamics	Roles
Competencies	Hazard and vulnerability analysis	Skills
Crisis	MBO	SWOT analysis
Decentralisation	Organisational structure	Team-building

### 2.16 Objective Type Questions

#### A. Fill in the Blanks

- The two reasons behind our inability to avert disasters are \_\_\_\_\_ of resources and \_\_\_\_\_ of the impact of such an event.
- Disaster management makes it necessary to \_\_\_\_\_ and \_\_\_\_\_ the common objectives it tries to attain.
- Disaster management is both a \_\_\_\_\_ and an \_\_\_\_\_.
- \_\_\_\_\_ in disaster management helps to minimise risk, improve efficiency and avoid confusions.
- Arranging and coordinating resources for successfully carrying out disaster management is done by the \_\_\_\_\_ function.
- Sometimes the best laid plans fail due to lack of \_\_\_\_\_.
- Management by objectives was first presented by \_\_\_\_\_ in his book \_\_\_\_\_ in 1954.
- SWOT analysis is a method used to evaluate \_\_\_\_\_ and \_\_\_\_\_.
- \_\_\_\_\_ is a community's defencelessness in a given hazard.
- A situation that takes people by surprise and poses a threat to the community at large is a \_\_\_\_\_.
- The three phases of crisis management are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
- Delegation is the process of \_\_\_\_\_ a subordinate to make decisions on behalf of the authority.
- The distribution of decision-making power among the stakeholders is \_\_\_\_\_.
- The \_\_\_\_\_ motivates people towards action in both pre-disaster and post-disaster phases.
- Behaviour is the fundamental authoritative expression of \_\_\_\_\_.
- Individuals within a group should be \_\_\_\_\_ and \_\_\_\_\_ instead of being competitive.
- The term "group dynamics" was coined by the noted psychologist \_\_\_\_\_.
- The control process corrects \_\_\_\_\_ through timely action.
- A high level of integrity while taking risks helps a team to push boundaries when yesterday's plans become \_\_\_\_\_.

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20. Capability assessment helps in getting a \_\_\_\_\_ view of the quality and quantity of available resources.

**B. Multiple Choice Questions**

1. Disaster management is a science because
  - (a) it involves skill in conducting human activity
  - (b) it involves an ongoing scientific investigation and research to find ways for better management of disasters
  - (c) it attains perfection through practice
  - (d) creative and innovative techniques are its pre-requisites
2. Matching jobs with individuals so that the right man is available for the right job forms the part of the following function:
  - (a) Planning
  - (b) Organising
  - (c) Staffing
  - (d) Controlling
3. SWOT analysis should take into account the political vulnerability, economic status and regional proneness to risk at
  - (a) village level
  - (b) community level
  - (c) regional level
  - (d) national level
4. Information about the location and levels of infrastructure development form the \_\_\_\_\_ of vulnerability.
  - (a) Social dimension
  - (b) Physical dimension
  - (c) Economic dimension
  - (d) Environmental dimension
5. Review and ascertaining of reasons of crisis to give better insights to preparedness falls in
  - (a) pre-crisis phase
  - (b) response phase
  - (c) post-crisis phase
6. 'A stitch in time saves nine' is a dictum applied aptly to
  - (a) identification of crisis
  - (b) analysis of crisis
  - (c) response to crisis
  - (d) preparedness for crisis
7. Allocating job to a subordinate which otherwise would have been done by the person in charge himself is
  - (a) decentralisation
  - (b) specialisation
  - (c) authorisation
  - (d) delegation

**2.19 ANSWERS**

8. Understanding and providing emotional support to the affected community is an essential element of
  - (a) human relations skills
  - (b) managerial skills
  - (c) leadership skills
  - (d) conceptual skills
9. What is not true about group-dynamics?
  - (a) It is a classification of behaviours and processes taking place within and between social groups.
  - (b) It brings forth sensitive information about social class division, regionalism and other forms of social prejudice and inequity.
  - (c) It involves people who work collectively and are connected by the shared tasks that they must complete.
  - (d) It develops and encourages competitive spirit.
10. The rating parameters for capacity assessment does not include
  - (a) sufficient
  - (b) satisfactory
  - (c) needs improvement
  - (d) deficient

**2.17 Questions for Review**

1. What is the nature of disaster management? Explain with examples.
2. How can SWOT analysis help in effective management of disasters?
3. Explain the steps of a hazard and vulnerability analysis.
4. Having a well-established structure of organisational roles is important for management of disasters. Agree or disagree?
5. Explain the importance of team-building in disaster management.

**2.18 Reference**

1. Schwab, Jim, Kenneth C. Topping, Charles C. Eadie, Robert E. Doyle, and Richard A. Smith, 1998. *Planning for Post-Disaster Recovery and Reconstruction*. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp.

**2.19 Answers****A. Fill in the Blanks**

1. Mismanagement, underestimation
2. Steer, systematise, control

3. Science, art
4. Planning
5. Organising
6. Clarity
7. Peter Drucker, Practice of Management
8. Strengths, weaknesses, opportunities, threats
9. Vulnerability
10. Crisis
11. Pre-crisis, crisis response, post-crisis
12. Empowering
13. Decentralisation
14. Leader
15. Competency
16. Adaptive, cooperative,
17. Kurt Lewin
18. Deviations
19. Obsolete
20. Realistic

**B. Multiple Choice Questions**

1. (b)
2. (d)
3. (d)
4. (b)
5. (c)
6. (a)
7. (d)
8. (a)
9. (d)
10. (a)

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**Chapter 3** Disaster Mitigation

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**Chapter 4** Disaster Preparedness

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**Chapter 5** Disaster Response

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**Chapter 6** Disaster Recovery

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## Part II

# Disaster Management Cycle: Practical Applications

# Disaster Mitigation

Living things have been doing just that for a long, long time. Through every kind of disaster and setback and catastrophe. We are survivors.

—Wolfeye

## Learning Objectives

After reading this chapter, you should be able to:

- Explain the concept of disaster mitigation.
- Explain in detail the structural mitigation approach: selection of sites for industries and residential buildings, stability of structures: issues and concerns.
- Explain the plan for fire escapes in buildings.
- Describe non-structural mitigation: land use regulations, hazard zoning and building codes and construction.
- Explain the emerging trends in disaster mitigation and its role in sustainable development for disaster mitigation.

## OPENING CASE

**S**heena was a very bright student. She wanted to become an engineer. Her parents were few who resided in a village in Kolhapur. Looking at Sheena's zest for learning, she was sent to her aunt in Thane. She was admitted to a nearby government school. Both her uncles worked as labourers in a nearby construction site. Sheena proved to be an above average student. Sheena's summer vacation was due to start by the end of April 2013, and she was to go home to meet her parents after 6 months. She was very happy and wanted to complete her homework before going back to Kolhapur, so she used to stay back at her friend's place to do her homework. It was a fateful day of 4 April 2013. Sheena and her friends were doing their homework. At around 6.30 pm, the building in which they were studying started shaking, then it tilted and then the entire building collapsed within seconds like a pack of cards. Each friend pulled the other in a try to save each other. But before they could do anything, the wall and the bricks fell on them, and they were crushed under the rubble.



Yet another building has collapsed in Mumbai. Here, firefighters and rescue workers are seen working at the site of the building collapse.  
Source: Hindustantimes.com

## 3.1 DISASTER MITIGATION: MEANING AND CONCEPT

Sheena regained consciousness after two days, only to know that she had lost her friend. This building collapse was reported to be the worst building collapse in the area. The collapse was the result of using poor-quality building material. Around 74 people, including 18 children, 23 women and 33 men died. Some like Sheena were lucky and were saved. But they all are psychologically wrecked.

The building was under construction and did not have an occupancy certificate. It was illegally inhabited by 100–150 low- to middle-income group people, most of whom were site construction workers and their families. The dwellers also included rickshaw drivers and their families. Lack of housing facilities, high population growth and low income are some of the reasons that work in favour of the builders. These illegal buildings attract lower-income people because of the low housing costs. In this case also, it was alleged that the builder wanted the building to be inhabited to prevent it from being demolished since it was built illegally on forest land. The building practices and laws were not followed and the building was constructed in a span of just three months. The safety measures were blatantly flouted. Poor construction materials were used by the builder to cut costs of construction, and hefty bribes were paid to authorities to turn a blind eye to these illegal structures.

Workers, along with the disaster management team members, used bulldozers, hydraulic jacks, power saws and sledgehammers to cut the 'mound of steel and concrete'. The rescue effort was knotty by the way in which the floors crammed one on top of the other in the collapse, making it hard to find individuals in the debris. The National Disaster Management Team dug beyond the basement level in search of the survivors.

This was not the first building that collapsed. In 2010, the Government of Maharashtra reported that there were around 490,000 illegal buildings within the Thane district. Most of these were badly constructed using sub-standard materials. These structures were occupied by mostly low- to middle-income group persons. It includes slums, shops, chawls and other residential buildings. Although the court ordered demolition of all such illegal buildings, due to government's apathy no illegal structures were demolished and no action was taken against the offenders. Instead, many illegal buildings had come up due to officials—police—politicians nexus. The fact is that these buildings were made to collapse and under the debris lay shattered dreams, faith and hope, which no amount of compensation was enough to replace.

## Case Questions

1. Should all the illegal buildings be demolished? If yes, why? If no, why not?
2. If you were in Sheena's place, how would you feel?

## 3.1 Disaster Mitigation: Meaning and Concept

Disaster mitigation is the first phase of disaster management cycle. It entails measures that seek to remove or decrease the impacts and risks of hazards through proactive and predetermined measures. The main aim of mitigation is to reduce loss of life and property by attenuating the impacts of disaster. Mitigation is a proactive step, taken to reduce human loss and financial costs that may arise as an aftermath of disaster. Effective mitigation can help reduce damage from disasters to a great extent. The mitigation efforts are generally organised into three primary activities, namely *risk analysis, risk reduction and risk insurance*. These activities are focused

according to the level of intervention required. At the local level, communities can deal with disasters, understanding the risks and hazards in their area that affect them repeatedly. The mitigation efforts would include an assessment of risks and recurring problems, making a plan to solve the problems and taking subsequent actions to implement the plan. These mitigation plans can be supported by policies and strategies at the regional and national levels. Mitigation is an ongoing effort to minimise the effect of disasters on people and their assets. The mission of any mitigation effort is to proactively avert or moderate its impact.

The mitigation measures are designed to reduce the vulnerability of local citizens and property at risk; it can be applied to enhance protection from natural disasters such as floods, tsunamis, earthquakes, cyclones, storms and other natural disasters. The mitigation measures help the community avoid severe damages to their assets and help them remain operational in the face of calamity. Further mitigation aids in strengthening infrastructural facilities such as roads, railways, hospitals, fire stations and other significant service facilities so that they can remain active in an event of disaster.

Pre-disaster planning helps in achieving mitigation objectives by creating an awareness of risks and hazards. On the basis of this knowledge, long-term planning can be done by communities. Some major mitigation projects that can be taken up by the communities include improved drainage systems, construction of earth bunds, contour planting, checking dams, strengthening infrastructures, rain water harvesting, strengthening dwellings, building codes and policies, hazard zoning, etc. Apart from these, there are some non-structural measures such as public health campaigns, vaccination programmes, etc. Whatever be the strategy, all the mitigation measures are aimed at reduction of the frequency, extent, intensity and effect of disasters.

The essence of the term *mitigation* is prevention. In this sense, it is a means to prevent the severity of the human and material damage caused by calamity. Its objective is to guarantee that any human action or natural occurrence does not lead to disaster. Thus, the key to mitigation lies in *reduction-aversion-avoidance* of the risk from an event by taking pre-emptive action. Moreover, it is a known fact that hazards cannot be removed altogether but surely the vulnerability can be decreased substantially. This can be achieved by enhancing the capacity of the community to withstand, respond and recover from these disasters, and mitigation helps in strengthening the capacity. There are a lot of mitigation measures such as physical planning measures, which include checking the population density, designing infrastructure and roads, making land use regulation and policies. The economic measures relate to diversification of economic activity, providing grants and loans, etc. The societal measures are aimed at informing the community about the benefits of prevention over recovery and response. It entails running public information campaigns, education, community involvement, etc. Apart from these, there are structural mitigation measures aimed at improving engineering and construction, and reducing the physical vulnerability of infrastructure. These measures can be categorised into three parts, depending on the nature and phase of work. First is the reconstruction of infrastructure destroyed by disaster, the various rules and regulations that can be adhered to. Second is planning a new infrastructure and third is retrofitting, which means strengthening of existing facilities. In all these cases, it should be ensured that stronger individual structures, that are hazard resistant, are constructed so that the cycle of destruction, rebuilding and destruction again is broken.

Mitigation can be carried out in a systematic manner. Strategies can be built to avert, adjust or circumvent the potential hazard. Amending the hazard involves modifying the nature of the hazard by eliminating or reducing the incidence of its occurrence. Averting the hazard involves transmission of the impact of hazard away from a susceptible location to protect people and property from harm. Construction of embankment and dams are good examples of this. Adjusting the hazard means changing structural designs and standards of construction with the aim of reducing vulnerability from disasters. Circumventing

### 3.2 STRUCTURAL MITIGATION

the hazard involves keeping people away from the hazard zones by limiting development in a risk area. Non-structural measures such as zoning regulations and building codes are proposed to control, limit or deny access to specially identified risk areas.

Mitigation, according to World Development Report published in 1998, comprises evaluating building codes; vulnerability analysis updates; zoning and land use management and planning; reviewing of building use regulations and safety codes; and implementing preventative health measures. The main aim of any disaster management activity is to prevent disasters wherever possible and to mitigate those that are unavoidable. There are four sets of tools that could be used to mitigate disasters:

1. Hazard management and vulnerability reduction
2. Economic diversification
3. Political intervention and commitment
4. Public awareness.

Of these, (1) and (2) apply to natural disasters while (3) and (4) are used to mitigate any other hazards. The term *mitigation* is applied to events that reduce loss of life and property from disasters. Basically, mitigation activities can be broadly classified into two categories, namely *structural mitigation* and *non-structural mitigation*. Structural mitigation includes actions to reduce the impact of disasters by involving robust construction programmes such as constructing dams and hazard-resistant buildings. On the other hand, non-structural mitigation is used to refer to policies and procedures that are aimed at reducing the ill-effects of disasters. Non-structural mitigation measures include land-use regulations, zoning, crop diversification, building codes. Mitigation is most successful as part of a medium- to long-term development programme, which incorporates hazard-reduction procedures into regular investment projects.

### 3.2 Structural Mitigation

Structural mitigation, as discussed above, deals with construction projects that are aimed at reducing the economical and social impacts of disaster. After carrying out a risk analysis, the information can be used to describe and execute hazard mitigation activities. The available mitigation options must be identified, and a cost-and-benefit analysis of each of the option must be performed. Based on this evaluation, mitigation strategies can be defined. Various long- and short-term mitigation measures may be thought of when planning infrastructure development. These measures are aimed at minimising the destructive and disruptive effects of disasters on the built environment. These interventions help in substantial reduction of disasters.

#### 3.2.1 Selection of Sites for Industries and Residential Buildings

India is witnessing a high growth rate and is emerging as a major global business giant. The population in many cities is in excess of 1 million, and there are many more towns joining the list. This has led to increase in investments in urban infrastructure. The construction activities have received new impetus and they are going on a high speed. The builders, in the quest to construct more buildings and, thus, to earn more profit, many a times flout government regulations. They do not give much attention to site

selection or other environmental issues. Selection of site is mostly based on the locality. Other issues such as use of construction materials, distance between buildings, etc. are not addressed substantially. This has resulted in unplanned and unsustainable urban development and has led to severe environmental pressures. The green cover, ground water resources have been forced to give way to the rapidly developing urban centres. In construction of modern buildings, security, health, environment and equity issues are not duly considered.

Selection of site for industries and residential buildings the following should be considered:

- 1. Site planning:** Site planning is a vital component of any type of building activity. With growing urban development and equally high environmental degradation, it has become important to determine landscape design parameters, keeping in view the protection, conservation and modification of surrounding environment. Ideally, the site selection should be done after the design phase to assess the appropriateness of the site relative to the proposed development. An investigation and evaluation of site quality, in terms of availability of light, air and water, without damaging the natural environment should be carried out for selecting the site. Site selection and site analysis are important aspects of site planning, which in turn is an integral aspect of structural mitigation. Its goal is to integrate an architecturally sustainable design with the natural environment, with least damage to the nature and at best improving it by restoring its balance.

Site planning covers site selection process and site analysis. Disaster mitigation options are addressed in the site analysis phase. It aims to reduce the negative impact of large construction projects on natural resources by discussing important factors such as soil conditions, hydrology of the site, landscape, existing vegetation, solar access and wind patterns. The process of site selection involves identifying and evaluating the suitability of the site with respect to sustainable building design criteria. Site selection and analysis should be carried out to ensure that the construction activities should not cause damage to the natural surroundings of the site. Site selection should be carried out keeping in mind the existing land use regulations and preservation of the environment. The various concerns of site planning should be addressed substantially.

- 2. Land-use pattern:** Before starting a new project, the existing land use pattern of the neighbourhood should be carefully studied. It should be ensured that the proposed developmental project conforms to the development pattern for that area. Location of site should not adversely affect the existing biodiversity and ecosystem of the site. The new project should not upset sites of historical value. Also, the project to be constructed should not affect the aesthetics and scenic beauty of a location. The levels of air, noise and water pollution should be studied carefully before implementing the building design. Availability of utilities such as roads, water and power should form the basis of site selection. An analysis of the expected water and power requirement by the proposed buildings and the existing capacity should be done.

- 3. Other factors:** Site selection process should include analysis of other factors such as land use, ecosystem and urban and environmental considerations. Suitability of the site is the most important aspect of site selection. The suitability should be analysed with respect to the development of the area and the natural environment. It should be ensured that the proposed development is best suited to the considered site. The planned land use must conform to the approved development plan of the area; proposed site plan must be cleared by the local development authority; and environment clearance should be obtained. The effect of development of site on ecosystems and diversity should

### 3.2 STRUCTURAL MITIGATION

be carefully assessed. There may be some endangered species of plants and animals in the vicinity of the proposed site and such sites are not to be disturbed. Further an analysis of the layout of roads and open space should be done before site selection. A needs assessment of the construction project should be done, and issues such as connectivity, availability of public transport systems, power requirement and power source, water requirement and its source, disposal of garbage and sewage should be suitably addressed. It is also advantageous to integrate the existing utility and infrastructure, and identify whether additional infrastructure such as schools, gymnasium, club, parks and dispensary need to be planned for the proposed project. In addition, an assessment of existing air quality of the site in terms of suspended particulate matter, respirable suspended particulate matter (RSPM), sulphur dioxide, oxides of nitrogen and carbon monoxide should be done.

Site selection for industrial buildings involves measuring the needs of a new project against the merits of potential locations. For construction of industrial buildings, the site selection should be done properly. It should not be located at the heart of the town. They should be constructed away from residential buildings and should have electricity supply and access to roads and railways. The transportation of workers and employees should also be considered as an important determinant of site selection.

#### 3.2.2 Minimum Distances from Sea: Orientation of Buildings

Of late, there has been a lot of devastation from tsunami and cyclones. Particularly, the coastal areas are found to be vulnerable to these natural calamities. Therefore, it is essential to consider the issues relating to construction of buildings near these water bodies. The National Building Code of India 2005 (NBC, 2005)<sup>[1]</sup> is a comprehensive building code that provides guidelines for regulating the building construction activities across the country. It serves as a model code for adoption by all agencies involved in building construction works. The code mainly contains administrative regulations, control rules and general building requirements; fire safety requirements; stipulations regarding materials, structural design and construction (including safety); and building and plumbing services. It is said that 'Put the building or dwelling at a high enough elevation where the highest water will not reach it, and make it sturdy enough so the fastest winds will not destroy it' (Pilkey et al., 1981).<sup>[2]</sup> This recommendation should be applied to all constructions in coastal areas. There are five factors that have to be considered to increase resistance of a home from cyclonic winds: *roof covering, windows and doors, and roof sheathing attachment, walls and foundations*. Residential structures are best able to survive exposure to environmental forces when the envelope of the structure consisting of exterior walls, roofs and exterior opening closures remains intact as a unit. The design of a resist vertical loads is not prepared to withstand the wind forces. It is seen that once any one building element fails, the other elements of the structure are at an increased risk. Thus, it is imperative that the buildings constructed at coastal areas are strong enough to resist forces from different directions.

Roofs must be designed and constructed to remain intact and attached to the rest of the structure during cyclones. Roofs have to stand wind forces from many directions. Direct wind pressure can slacken shingles and tiles, and suction forces on the surface of the roof and vortices on the roof corners can lift both the roof shield and casing. Internal pressure produced when windows, doors or sections of the roof itself are smashed can raise and separate the roof from the rest of the structure. A properly designed and constructed roof must be able to withstand all these forces. Proper roof design and appropriate fasteners should be used to attach casing to the roof and roof to the walls. This will ensure that in most situations the roof will remain attached and structurally intact.

The design of the building must consider beyond the requirements of only gravity loads. Walls of the building should be constructed to perform the critical function of transferring stress from the roof to the foundation. Concrete block construction should be preferred over wood frame construction as there are fewer joints and they are stronger. Concrete block walls must be preferred. Foundations are at comparatively lower risk from wind forces, but are at higher risks from water forces in wave erosion zones and flood zones. In these zones, homes are normally elevated above base flood elevation, which is defined as the elevation having a 1% chance of being reached in any given year. Piles are used to provide the most protection against flooding. The most common piling sizes suitable for coastal areas are of 8-and 10-in. diameters. Eight inch is the minimum size generally accepted for high-wind areas. In places where the wind speed is greater than 100 m/h, 10-in. piles should be used.

Placement of the building in relation to the surrounding elements is just as important as the design of the building. The proposed building orientation should respect the orientation of surrounding buildings, existing pedestrian paths and sidewalks, and the orientation of surrounding streets. Rows of buildings which create a monotonous 'cookie-cutter' design are discouraged. The proposed building orientation should respect the climatic conditions by minimising the heat gain and considering the impact of shade on adjacent land uses and areas. Buildings should maximise public comfort by providing shaded public outdoor areas, minimising glare and facilitating breeze. Building exposures, subject to solar intensity, should minimise the use of glass and provide landscaping and architectural surface relief to reduce heat gain on the building itself. Buildings should be oriented to allow for the use of common driveways, especially along arterial streets, where a reduction in the number of curb openings will enhance the streetscape and promote traffic safety. Properly connected load paths are a key requirement during home design and construction. Homes must be regarded by builders not only as affordable, aesthetically pleasing lodgings, but also properly engineered structures that can stand climatic abuses.

The distance from the edge of a coastal bank to a building is called as setback distance. The selection of a setback distance is one of the most important choices that a builder should make while constructing a house on the sea coast because the setback distance is an important determinant of the life of the building. The setback distance is calculated on the basis of ordinary high water mark (OHWM) or average high water mark, which is the high water mark that can be expected to be produced by a body of water in non-flood conditions. The setback distance is measured as the horizontal distance from the OHWM and is generally 75 ft from the OHWM. Minimum setback distances are easy to justify and simple to administer. It is an important way of providing an environmental corridor along the margins of a water body by helping reduce degradation of water quality, natural vegetation and shore habit.

### 3.2.3 Stability of Structures: Issues and Concerns

The recent disasters due to collapse of buildings at various places across the country is a pointer to the fact that the building codes and regulations are blatantly flouted by the developers. To provide safe and healthy habitat, careful considerations need to be made to the building construction activity. Building planning, designing and construction activities have developed over the centuries. Technological and socio-economic growth in recent times has led to significant increase in demand for more and more style and intricacy in buildings, resulting in ever increasing complexities. Often it is seen that the quality of buildings is not up to the mark and this raises serious problems. Thus, there are certain issues and concerns regarding the stability of structures that should be addressed substantially. The land should be used effectively to cater to the needs of the community. There should not be too many buildings cluttered in an area. The width of roads and

### 3.2 STRUCTURAL MITIGATION

the distance between two adjacent buildings should be taken care of. The materials used for construction should be of good quality. The design of high-rising buildings should be architecturally sound. Daylight utilisation and natural ventilation should be emphasised. There should be optimum utilisation of renewable energy sources duly integrated in the overall energy system design, with consideration of active and passive aspects in building design, including thermal performance of the building envelope. Further, the design of building should be such that it is easily maintainable. Interlinking of fire alarm system, fire protection system, security system, ventilation and electrical system should be done, and an analysis of emergency power, standby power requirement and captive power systems should also be done. By adopting scientific principles of construction management, quality management, cost and time control, the construction projects can be made viable as well as optimal. Engagement of specialised executing and supervising agencies, which meet the specified norms of skills, specialisation, experience, resourcefulness, etc. for the construction work, can prove useful. Further, the technological and legal aspects that incorporate the dos and don'ts of construction should be considered with due diligence as the integrity of structures may be compromised due to: weathering, foundation shifting or deterioration, weakening through direct impact and any combination of these or other factors.

### 3.2.4 Fire Escapes in Buildings: Plan

Many deaths have been reported due to fire in buildings. Due to lack of fire escapes in buildings, when fire breaks, people are unable to escape and many deaths are caused due to burning and suffocation. The National Building Code of India clearly prescribes the minimum standards of fire protection and fire safety of buildings. It is necessary for all concerned to comply with all requirements of fire safety as prescribed in fire-related legislative provisions. The requirements of the code should be completely implemented for ensuring a fire-safe design while constructing buildings. Standing Fire Advisory Council, Government of India, which is the highest policy making body for the Fire Protection Services in the country, advocates using experts who have experience in dealing with fire in the planning and design of the building. It should be noted that absolute safety from fire is not attainable in practice. But definitely the quantum of losses from fire can be reasonably reduced if proper mitigation strategies are adopted. Having a fire plan of the building is one such move. The plan clearly specifies the materials used in construction and the quantum of damage that can be caused if there are instances of fire. The plan also indicates the escape routes in the building and their functionality. When fire breaks, people are bound to get panicky but if the residents are aware of the distance of exits, they can save their lives. The presence of smoke and fumes may hamper the movement of residents towards exit. There are chances that persons may stumble and fall on stairs. Threat from fright is larger when a huge number of people are trapped in a limited area.

Keeping in view these intricacies, the fire plan stipulates minimising the obstruction or congestion near the emergency exits. Moreover, the location of exits and their numbers must be adequate. Safe exit for the occupants in a building on fire requires a safe path of escape from the fire in the shortest possible time. Often it is seen that concealed spaces within a building such as space between ceiling and false ceiling, horizontal and vertical ducts, etc., tend to act as tunnels during a fire. The fire plan should have adequate provision to stop the fire from spreading within these spaces. Also, the plan should limit the heights and areas of buildings based on fire safety of the occupants. Automatic fire detection and alarm system for detecting a fire and initiating an alarm should be made. Points of such systems should be indicated in the plan. In addition, manual fire alarm call points should also be indicated. The fire detectors have to be properly installed, maintained and tested to ensure adequate fire protection. Both audible and visual alarms are used to alert the occupants

through a central control panel. The sole purpose of this plan is to provide a guideline to the occupants of the building regarding the action they should take in case fire breaks in the building. Thermo-sensitive device such as automatic sprinkler system, which are universally recognised as the most effective fire protection systems, should be installed. The systems can automatically detect fire, control them and extinguish them by automatically releasing water in specific patterns and quantities over designated areas. The plan also postulates an arrangement of fire fighting within the building by means of down comer pipe connected to the terrace tank through terrace pump, gate valve and non-return valve, and having mains not less than 100 mm internal diameter with landing valves on each floor landing. Fire fighting arrangements are should also be fitted with inlet connections at ground level for charging with water by pumping from fire services appliances and air release valve at roof level to release trapped air inside. In addition, there should be dry risers in the building. These are fire fighting arrangements within the building using vertical rising mains not less than 100 mm internal diameter with landing valves on each floor or landing, which is normally dry but is capable of being charged with water usually by pumping from fire services appliances. There should also be emergency lighting systems that can be used when the supply to the normal lighting fails. These emergency lights should use standby power source to light the lamps. The Uphaar Cinema fire caused a lot of deaths and one reason was the lack of alternate lighting system. The escape route should be illuminated at all times. Horizontal exits are particularly useful during fire emergencies in hospitals for evacuation of bedridden patients. An analysis of the floor area of adjoining compartments should be done to ensure horizontal evacuation and availability of sufficient space for accommodation of evacuees from the adjoining compartment. In case of fire, there is smoke that affects breathing and causes suffocation. Therefore, the building design and construction should take into account the replacement of stale, poisonous or contaminated air inside, with clean air from outside. This can be achieved through either natural or mechanical means.

### 3.2.5 Cyclone Shelters

The increased number of deaths in cyclone-affected areas was mostly due to the non-availability of safe shelters in the coastal villages, which could withstand the intensity of the cyclone and storm surge. Cyclone shelters should be constructed to provide safe shelters to vulnerable people during floods and cyclones. Cyclone shelters are located on high ground above flood levels. These are constructed near the evacuating community, which can be directly accessible from a public roadway and are situated away from sources of hazards. These specialised buildings are designed to endure wind speed up to 300 km/h, as experienced in Category 5 cyclones and moderate earthquakes. Its plinth is above high flood line and standing on a stilted floor, it can remain unaffected in storm surge up to the first floor level. The cyclone shelter's structure differs from normal buildings as it is intended to endure more severe wind pressures and wind-borne rubble caused by wind gusts. The roof, walls, windows, doors and ventilation grills of the cyclone shelter are constructed to resist wind-borne debris. Glass windows may be protected by screens to prevent the debris from entering the cyclone shelters. If the aperture in the debris screen is larger than 8 mm, the glass in the window is laminated to increase its resistance. The external fabric of the shelter building can also withstand high speed winds. The doors to cyclone shelters are fitted with barrel bolts to strengthen the door to oppose winds. An emergency generator is installed to provide power for lighting, fire warning systems and selected power outlets fails. Lighting within the public cyclone shelter is necessary to calm shelter occupants during the cyclone and to permit safe movement within the shelter. Minimum desirable lighting levels are provided when powered by the generator. Minimum lighting levels for safe movement are provided by the battery backup.

### 3.3 NON-STRUCTURAL MITIGATION

The public cyclone shelter is conventionally ventilated before the lock-down period, with windows and doors open. During the lock-down period, when wind gusts exceed 100 km/h and the windows and doors are closed, there is a provision of natural ventilation system in these shelters. They are fitted with manual dampers to enable fine tuning of the level of ventilation during the cyclone. Carbon dioxide alarms could be installed to indicate if ventilation needs to be increased. The cyclone shelters have a kitchen to facilitate the preparation of basic food for the occupants. Where gas cooking appliances are used, the gas cylinders are kept far away from the shelter and are isolated by a valve that is manually closed during the cyclone shelter mode. Water supply to the building is also maintained and at times bottled water is provided for drinking. The community members are involved in the process and all types of equipment relating to first-aid are supplied to the shelters. Basic training on shelter management is provided to the members of all cyclone shelters. They are taught to administer first-aid and are trained in search and rescue techniques.

#### 3.3.1 Non-Structural Mitigation

Non-structural mitigation involves measures that seek to reduce the likelihood or consequence of risk through modifications in human behaviour. These techniques are often considered mechanisms where man adapts to nature. Non-structural mitigation measures are less costly than structural measures and can be adopted by communities having few financial or technological resources to implement. These entail policies and practices that raise awareness of hazards to reduce the impact of disasters. The general non-structural mitigation includes regulatory measures, community awareness and education programmes, environmental control and behavioural modifications. Reviewing building codes, vulnerability analysis updates, zoning and land-use management and planning, reviewing of building-use regulations and safety codes, and implementing preventative health measures are some of the non-structural mitigation measures. Regulatory measures that are applied to different facets of societal and individual life limit hazard risk by legally dictating human actions. These actions are aimed at the common good of society. But compliance to these measures is a must to decrease vulnerability of a community.

#### 3.3.1 Land-Use Regulations

Land-use regulations are important for non-structural mitigation that ensures orderly and planned development of cities and public services. Two aspects of land use in Indian cities are floor area ratio (FAR), which is an indicator of the capital-land ratio allowed in each city, and urban land ceiling.

Floor area ratio regulations are intended to prevent haphazard development and avert congestion around human settlements. It is the most readily available measure of the capital-land ratio. The mono-centric urban model centres the FARs that fall within a distance from the central business district. The rationale is that low commuting costs for sites near the city centre lead to high land values, which in turn lead to high FARs. This is, however, not true in the realistic world and in Indian cities it is seen that FAR is high toward the city's periphery where the land values are relatively lower. In Indian cities, FAR determines the total built-up space that a plot is allowed to hold, subject to the land availability and requirements, household densities and dwelling sizes, and availability of parking.

The Urban Land (Ceiling and Regulation) Act (ULCRA) enacted in 1976 stipulates that individuals or firms cannot hold vacant land beyond a certain size. If there is any such land, they have to declare it and sell the extra land to the government. This law was ratified with a socialist mission. It seeks to build an adequate

stock of urban land for the interest of general public purposes such as road widening and development of open spaces for public utilities.

### 3.3.2 Hazard Zoning

Hazard zoning is an essential non-structural mitigation measure and it enjoys high acceptance among communities and disaster management authorities. It also helps in increasing sensitivity of the population for natural hazards. The Indian subcontinent has a history of devastating disasters. A World Bank and United Nations report estimates that around 200 million city dwellers in India will be exposed to storms and earthquakes by 2050.

According to geographical statistics, in India almost 54% of the land is susceptible to earthquakes. The main cause for the high frequency and intensity of the earthquakes is that the Indian plate is driving into Asia at a rate of approximately 47 mm/year. The earthquake zoning map of India divides India into four seismic zones, namely Zone 2, 3, 4 and 5, where Zone 5 is associated with the highest level of seismicity and Zone 2 is associated with the lowest level of seismicity. The code follows a dual design philosophy: First, under low probability or extreme earthquake events, the structure damage should not result in total collapse, and second under more frequently occurring earthquake events, the structure should suffer only minor or moderate structural damage. The specifications given in the design code are based on the effective period peak ground accelerations that may be generated during the maximum considered earthquake ground motion in that zone. Each zone indicates the effects of an earthquake at a particular place based on the observations of the affected areas and can be described using a descriptive scale like Modified Mercalli intensity scale or the Medvedev-Sponheuer-Karnik scale (MSK).

1. Zone 5 covers the areas with the highest risk that suffer earthquakes of intensity MSK IX or greater. The zone factor of 0.36 is assigned to Zone 5 and civil engineers use this factor for building earthquake-resistant design of structures in Zone 5. The zone factor of 0.36 is indicative of effective peak horizontal ground acceleration of 36% of gravity that may be generated during earthquake in this zone. It is referred to as the Very High Damage Risk Zone. Parts of Jammu and Kashmir, western and central Himalayas, the North-Eastern states and the Rann of Kutch fall in this zone. It is also found that the areas comprising basaltic rocks are prone to earthquakes.
2. Zone 4 is called the High Damage Risk Zone and covers areas liable to MSK VIII. The zone factor of 0.24 is assigned to Zone 4. Areas near Indo-Gangetic basin, Delhi and parts of Jammu and Kashmir and Maharashtra fall in Zone 4.
3. Zone 3 is a Moderate Damage Risk Zone that is liable to MSK VII. The zone factor of 0.16 is assigned to Zone 3. The Andaman and Nicobar Islands, parts of Kashmir, Western Himalayas fall under this zone.
4. Zone 2 is liable to MSK VI or less and is categorised as the Low Damage Risk Zone. The zone factor of 0.10 is assigned to this zone.

### 3.3.3 Building Codes and Construction

Building codes and construction are an integral aspect of non-structural mitigation. The various aspects relating to building codes are ground coverage, basement, projections, etc. Ground coverage is defined as the total area

covered by a building immediately above the plinth level. There are clearly defined codes for each and every aspect of a building. If there is more than one building on a given site, the distance between the buildings should be half the height of the tallest building. For accessing the building, public roads should not be more than 30.0 m in length from the existing public road and the minimum width of such access roads should be 3.5 m. If the width of access road is less than 3.5 m, then the maximum floor area permitted in such cases should not exceed 150 and 50 m<sup>2</sup> in residential and commercial zones, respectively, irrespective of the location of site. FAR and height of the building is regulated according to the width of public street or road.

Basement is the storey that is partly or wholly below the average ground level, with a height not exceeding a projection of 1.2 m above the average ground level. The overall height of the basement under any circumstances should not exceed 4.5 m between the floor and the ceiling of the basement in case of normal parking. In case of stacked or mechanical parking, the height of the basement may be permitted up to a maximum of 4.5 m. If the area of a site is less than 200 m<sup>2</sup>, then car parking should not be permitted in the basement floor. There are other rules and regulations stipulated in National Building Code which have to be strictly adhered to while constructing a building.

### 3.4 Disaster Mitigation Strategies

Disaster management activity cannot be unilaterally mandated and implemented. The success of disaster mitigation strategy likewise requires collaboration among the stakeholders. Working in collaboration helps in building trust and capacity to achieve significant results through joint efforts. Since disastrous situations change rapidly, it calls for efficient and flexible action from the stakeholders. The mitigation strategies should be fine-tuned to meet the needs of the local community and should be capable of adjusting to varying conditions and seizing opportunities when they arise.

Moreover, the mitigation strategy should be selective. The measures should be adopted prudently to achieve maximum impact. The countries should work together for disaster management, and assistance allocations among countries should be based on need. The strategic objectives should be prioritised according to the specific needs of the region. In quest for development, the scope of the degradation of infrastructures should not be undermined. The developmental initiative should also include changes in human and social systems in its development agenda. The disaster mitigation policies should steer disaster prevention as an indispensable aspect of sustainable development. For making mitigation strategies, experts in the field of disaster and development policy should be involved and these strategies should be uniformly implemented at national, regional and local levels.

### Importance of Information and Communication in Disaster Mitigation

Communication is an indispensable aspect of disaster management. To deal with disasters to our satisfaction, efficient communication at all levels is necessary. Without communication even the best-laid mitigation strategy will be useless. In the mitigation phase of disaster management, a thorough study of all possible causes of disasters and ways of mitigating them is studied and communicated. It is implicit that efficient communication can prevent the occurrence of a disaster or reduce its impact, and play a decisive role in the

success of disaster management efforts. For proper disaster mitigation, efficient and perfect communication is essential. Structural mitigation entails adoption of concrete measures for the prevention of disasters. This involves the efforts of all stakeholders, which is not possible without communication. The policies and plans that are made as part of non-structural mitigation should also be communicated to the public in general so that they are able to adopt the necessary measures. Communication can play an important role in highlighting risks and vulnerabilities.

The importance of timely disaster warning in mitigating negative impacts can never be underestimated. The incidence of a hazard does not essentially result in a disaster. While hazards cannot be evaded altogether, their harmful impacts can be mitigated. The goal of communication is to ensure that the hazard does not become a disaster. Explicit warning should be given to people and communicated succinctly. The aim is to provide necessary guidance to prevent disaster. Information and communication technology helps in spreading early warning and aid in taking vital decisions about preventive actions that save lives, decrease damage to property and curtail human suffering. Information management and communication is an indispensable part of disaster mitigation strategy. The capability to engender and circulate information determines the success of any mitigation effort. There are many new communication technologies that aid in reaching the community. Disaster mitigation efforts are supported by communication, by helping in identification, risk assessment and finally, the timely dissemination of information about the menace to the susceptible population so that they can take action to prevent negative consequences. Communication helps in educating and creating awareness in the community so that its members are able to respond to disasters in an appropriate manner.

### **3.6 Emerging Trends in Disaster Mitigation**

Disaster management has traditionally consisted of activities for efficient response and recovery, and mitigation measures were not given due emphasis. But recently emphasis has shifted to mitigation as it now understood that mitigation plays a vital role in proper management of disaster. Disaster mitigation involves activities aimed at minimising the destructive effects of disasters. It entails taking precautionary measures to reduce the effect of impending disaster by assessing, developing and implementing plans for reducing threats and vulnerabilities. Of late, there has been a paradigm shift in the perception of disaster management relating to mitigation efforts. Earlier these were taken as an aftermath of response and restoration activity. Interventions in the form of structural as well non-structural measures are being increasingly adopted to reduce disaster risk. The activities of disaster mitigation are closely being linked to cater to the needs of community. Development projects are being fine-tuned to address the risks and vulnerabilities of community. There is an increased awareness about the importance of mitigation in the overall management of disaster. Disaster risk reduction is integrated into other disaster management aspects but the benefactors operate as independent agencies. Lately, there has been a mainstreaming of disaster mitigation efforts across sectors. The efforts are directed to nip the menace called disaster in the bud. And failure of communities to prepare, respond to and recover from disasters is increasingly characterised not as a collapse in response mechanism alone, but as a malfunction in the overall disaster management efforts. In fact, considering disasters as extreme events caused by natural forces has been challenged lately and it is well understood as a failure accountable for their actions. Fitting with this trend is the increased sense of responsibility of its own role in terms of broader human rights. Development of a culture of resilience is mandated. Agencies are working in

unison to achieve this state through joint efforts. The quest is to strive to sustain in emergency situations by exhibiting an acceptable level of functioning, despite disruptions and failures. Mitigation activities are now intricately interwoven into central activities of both development and response. Persistence and sustenance are the emerging themes of disaster mitigation. Community participation and capacity building are being considered as central to the identity of disaster mitigation. Involvement and empowerment are considered central to mitigation efforts. Community's active participation in effectively achieving mitigation goals is increasingly recognised and solicited.

### **3.7 Strengthening Capacity for Reducing Risk**

Disaster risk reduction is a team work that entails active participation from all the agencies working for disaster management. Capacity development and risk reduction are interdependent. If the community is capacitated, it will lead to substantial reduction in risks, and risk reduction cannot be achieved without capacity building. Capacity development facilitates achievement of the objectives of disaster management by ensuring sustainable development. The various steps of capacity development for reducing risks are as follows:

- 1. Soliciting active participation from all stakeholders:** This involves those who stand to benefit the most from enhanced capacity. This group comprises all the key stakeholders who are authorised and expected to make significant contributions to the efforts of reducing disaster risks. The key stakeholders should be involved since they know what will work best for them and when. Moreover, involvement leads to an increased sense of commitment.
- 2. An assessment of the current capacity:** This step entails gauging the existing capacity of the stakeholders so that intervention strategies can be made to develop the weaker areas. The capacity assessment task should be a highly customised work to incorporate various situations and suit the needs of the beneficiaries. This also helps in measuring progress in capacity development efforts. Moreover, gaps can be identified and the target level of capacity required to achieve development or organisational objectives can be fixed. A capacity assessment exercise should be based on the assumption that there are existing capacities that can be built upon. Then existing capacity is measured and compared with the desired capacity level. Realistic goals with a reasonable timeframe for developing capacities should be made. And one should not get overambitious in setting goals. Capacity development programmes should be based on this comparison.
- 3. Formulation of capacity development strategies:** On the basis of assessment of existing capacity, development strategies should be formulated. It is often observed that mostly the stakeholders prefer to enhance their strength to do things better. This may be fatal since the overall development of capacity is advocated for.
- 4. Implementation of capacity development strategy:** In the implementation phase, the strategies are implemented and stakeholders are imparted agreed upon necessary skills to enhance their capacity.
- 5. Evaluation of capacity development:** The capacity development programmes should be evaluated to gauge the progress. It is evidenced by the changes in performance, which can be measured in terms of improved efficiency and effectiveness.

Capacity development is a long, ongoing process and all the phases discussed above are critical to its success. Capacity development should be carried out in a systematic manner. It is an evolving process, where needs and gaps of the beneficiaries are assessed and necessary interventions are made.

### **3.8 Role of Team and Coordination**

Team and coordination among its members play a vital role in pre- and post-management of disasters. Coordination helps in integrating the activities related to disaster management. Coordination is the essence of management and it helps in achieving goals effectively and efficiently. It eases the attainment of goal and enhances the achievement substantially. Without coordination even the best of teams become dysfunctional. Disaster management is basically a team-based activity and coordination is the essence of any team activity. Coordination helps in achievement of objectives by reducing conflicts and rivalries. It encourages the employees to work as a team and achieve the common objectives of disaster management. Coordination helps in directing the efforts of individuals towards achievement of goals without duplicating the job. Coordination helps in integrating the activities of team members by motivating them. A team comprises experts from diverse fields who come together for a common purpose. They take initiatives since there is a common goal they seek to achieve. Coordination helps in encouraging the employees to take initiative. Since timely action is a must for proper management of disaster, coordination helps by encouraging team members to act. It also facilitates the optimum utilisation of limited resources. Team work and coordination improve interpersonal relationship and help in managing across hierarchical levels. Team work leads to higher efficiency since the work within teams are well defined according to the expertise of individuals and needs of disaster management.

### **3.9 Sustainable Development for Disaster Mitigation**

Disasters and development are closely linked. Disasters can undo development, and development can prevent disasters. In fact, development initiatives can both be created and destroyed by disasters. Also, development schemes can both increase and decrease vulnerability. The unchecked growth in urbanisation enhances exposure and vulnerability of large numbers of people to hazards and thus threatens sustainable development to a great extent. But the losses triggered by disasters can be substantially reduced if development is used as a tool to prevent disasters. The need is to highlight and reinforce the importance of sustainable development in disaster mitigation. The much accepted notion that disasters are an act of nature much beyond human control has to be changed. This skewed notion led to accepting death and damage to lives and property as a natural phenomenon. Accepting this notion as a reality, most of the development plans were designed without consideration of the effect of disasters. It was generally believed that nothing can withstand the effect of disaster. And much in line with this thought were the disaster management activities that were basically related to providing relief and rehabilitation.

However, time has changed and so has the belief. The disaster management of today incorporates disaster mitigation as an integral aspect and structural mitigation as an effective tool. Sustainable development has become the focus of disaster management activity. The intricate relationship between disasters and development is now recognised and revolves around four basic themes:

### **3.9 SUSTAINABLE DEVELOPMENT FOR DISASTER MITIGATION**

1. First, it is believed that disasters are detrimental to development since they destroy years of development initiatives at one go. This is true to a great extent since disasters destroy whatever comes in its way.
2. The second belief is about rebuilding after a disaster. It is now believed that wreckage and havoc caused by disasters provide significant opportunities to initiate development programme.
3. Third is that the development programme can increase an area's susceptibility to disasters. This is true if unchecked and haphazard development efforts are carried out.
4. The fourth notion somewhat negates the third belief as it says that development programme can be designed to decrease the susceptibility to disasters and their negative consequences.

These themes should not be ignored while designing developmental programmes because they are true and exhibit to a great extent the mutual relationship between disasters and development. Projects should be designed to incorporate long-term development needs of the region. Proper and systematic analysis of developmental projects *vis-à-vis* its effect in terms of vulnerability should be done. Development requires institutional and structural alteration of communities to be more responsive and accountable to the needs of the region. Sustainable development goals can be achieved only when communities and government work in tandem with each other.

Disasters offer opportunities for development. They are agents that trigger change. But it is up to the people to seize the opportunity. Entire infrastructure should be revamped and just fixing of what went wrong is not enough. Developmental programmes should be treated as a priority. Proper reformation in policies and strategies is essential. Actions must be taken to reduce vulnerability as development programmes both increase and decrease vulnerability. Development in urban areas often leads to an influx of low-income groups who migrate in search of jobs. There are large-scale settlements having high population densities with very poor quality housing. Any incident of fire or earthquake can cause havoc. Coastal areas and hilly regions are targets for builders who develop regions as tourist spots. This also leads to concentration of populations in these areas who are exposed to cyclones, flash floods and landslide risks. Moreover, construction of transportation lines and poorly managed forestry programmes will lead to deforestation and increased risks of landslides. This is one negative aspect of development that increases vulnerability. This has to be addressed in a substantial manner. Building dams on rivers has both positive and negative sides. On the one hand, it adversely affects the natural habitats and this development can lead to dam failures. On the other hand, it reduces and checks the risks of severe flooding. Development projects such as setting up industries may lead to increase in air and water pollution, and exposure to risks by release of toxic materials. Also, agricultural projects promoting cash crops may reduce the production of staple foods. Therefore, before embarking on any development project a thorough risk assessment should be done.

Mitigation is most effective as part of a medium- to long-term development programme, which involves incorporation of hazard-reduction measures into regular investment projects. Developmental programmes can help decrease vulnerability to a great extent. The objective of any development project is to strengthen the urban utility systems and industrial support infrastructures. Constructing hazard-resistant buildings can substantially reduce injuries and deaths from natural disasters. The strict application of building codes and zoning regulations in urban development reduce the risk for the local population and the likelihood of damage to industrial facilities. Improved drainage systems and flood protection measures can further protect people and facilities in hazardous areas. Agricultural and forestry programmes provide a wide range

of opportunities for mitigation of disaster. Developmental programmes, including reforestation, reduce risks of soil erosion, landslides and flash flooding. Changes in harvesting patterns are developmental projects that have wide implications. It can reduce erosion problems and losses due to floods and drought. Programmes for soil preservation, water harvesting and improving on-farm storage facilities can mitigate the effects of disaster.

### 3.10 Summary

This chapter discusses the third phase of disaster management, which is disaster mitigation. The concept of disaster mitigation and its significance is highlighted. Disaster mitigation measures are intended to reduce the vulnerability of community and property at risk. There are two types of mitigation strategies, namely structural mitigation and non-structural mitigation. Structural mitigation deals with construction projects, which are designed to reduce the economic and social impacts of disaster. Selection of sites for residential buildings is discussed, highlighting the major building codes. Issues relating to stability of structures are discussed. Many deaths have been reported due to fire in buildings. Fire plan is a necessary element of a building plan as it indicates the escape routes in the building and their functionality. The chapter further throws light on the need for cyclone shelters and the facilities required in these shelters. Non-structural mitigation such as land use regulations, hazard zoning, and building codes and construction are discussed. The success of any disaster mitigation strategy requires collaboration among the stakeholders. Importance of information and communication, team building among stakeholders and emerging trends in disaster mitigation are discussed. The various steps of capacity development for reducing risks are soliciting active participation from all stakeholders, an assessment of current capacity, formulation of capacity development strategies, implementation of capacity development strategy and evaluation of capacity development. Disasters and development are two sides of the coin and are closely linked. Both these aspects are dealt with in this chapter.

### CASE PROBLEM: HOME CHEAT HOME

**A**ccording to a report by Global Construction Perspectives and Oxford Economics, India's construction industry is set to touch US \$1 trillion a year by 2025, adding 11.5 million homes a year to become the world's third largest construction industry. The construction industry of India is a chief indicator of the development as it creates investment opportunities across various related sectors. But this astounding growth has often come at the cost of safety standards. There have been many building collapses in the past two to three years. Mostly, multi-storied buildings made from sub-standard materials fall apart, killing hundreds. The regulations are in place but corruption is rampant. The builders pay bribe and get necessary clearances. The general public are aware of this but still they buy flats in the buildings because everyone's dream is to own a house.

A behavioural scientist, Abraham Maslow, had given the hierarchy of needs theory, which stated that food, clothing and shelter are the basic physiological needs that drive the human being to act. His theory of motivation at least was true for Robert Gonzales. He had bought a flat in Goa as he always wanted to own a 'home'. He had stayed in the rented apartment all his life so when he retired he used the money he got from gratuity to

### 3.12 OBJECTIVE TYPE QUESTIONS

fund this flat in Canacona. He selected the site because of the location of the building, which was just 1 km off the national highway linking Goa to Karnataka. He used to visit the site regularly to see the construction work.

It was a Saturday and Robert decided to visit the site. In the afternoon he went to the site and found that there was a huge crowd gathered near the site. He somehow made his way to the site of the building. He was shocked to see that the five-storey under-construction structure had collapsed. At least seven people were killed and about 40 others were trapped in the rubble. Rescuers were digging through the debris in search of survivors. Rescue operations by army personnel and local civic agencies using earth-moving machinery continued; and ambulances were lined up near the site.

Robert felt cheated and sad. He was in a fix; he did not know whether he should thank God for saving his life because sooner or later the building would have collapsed and he would have died, or curse him because his hard earned money was lost.

#### 2 Critical Thinking Question

- How would you feel if you were in Robert's place? Give reasons for your answer.

### 3.11 Keywords and Phrases

Mitigation	Hazard zoning	Team
Orientation of building	Strategies	Risk
Cyclone shelter		

### 3.12 Objective Type Questions

#### A. Fill in the Blanks

- Mitigation efforts are generally organized into three primary activities risk \_\_\_\_\_, risk \_\_\_\_\_ and risk \_\_\_\_\_.
- The essence of the term mitigation is \_\_\_\_\_.
- Measures taken for reducing the vulnerability of infrastructure is done in three parts \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
- Systematic mitigation strategies are developed in order to \_\_\_\_\_, \_\_\_\_\_ or \_\_\_\_\_ a potential hazard.
- \_\_\_\_\_ mitigation includes \_\_\_\_\_ involving robust construction programs where as \_\_\_\_\_ mitigation is used to refer to \_\_\_\_\_ and \_\_\_\_\_.
- \_\_\_\_\_ and \_\_\_\_\_ are important aspects of site planning.
- Rows of buildings which create a \_\_\_\_\_ design are discouraged.
- The distance from edge of a coastal bank to a building is called a \_\_\_\_\_.
- The \_\_\_\_\_ systems can automatically detect fire, control them and extinguish them by automatically releasing water in specific patterns and quantities over designated areas.
- An automatic sprinkler system is a \_\_\_\_\_.

11. \_\_\_\_\_ ratio is an indicator of the capital-land ratio allowed in each city.
12. It is found that areas comprising \_\_\_\_\_ rock are prone to earthquakes.
13. FAR is \_\_\_\_\_ toward the city's periphery where the land values are relatively \_\_\_\_\_.
14. \_\_\_\_\_ and risk reduction are inter dependent.
15. \_\_\_\_\_ helps in integrating activities of team members by motivating them.

**B. Multiple Choice Questions**

1. Risk analysis, risk reduction and risk insurance are primary activities of
  - (a) preparedness
  - (b) mitigation
  - (c) response
  - (d) recovery
2. The first phase of disaster management cycle is
  - (a) preparedness
  - (b) mitigation
  - (c) response
  - (d) recovery
3. Transmission of the impact of hazard away from a susceptible location is the following systematic activity:
  - (a) Amending
  - (b) Averting
  - (c) Adjusting
  - (d) Circumventing
4. RSPM is an assessment of
  - (a) suspended particulate matter
  - (b) chemical composition of air
  - (c) suspended particulate material
  - (d) suspended physical material
5. National Building Code of India 2005 talks contains
  - (a) regulations regarding general building requirements
  - (b) regulations regarding heritage buildings
  - (c) regulations regarding general township plans
  - (d) regulations regarding environmental requirements of a building
6. Cyclone shelters are specialized buildings designed to endure
  - (a) wind speed up to 300 km/h
  - (b) wind speed up to 180 km/h
  - (c) wave height up to 30 m
  - (d) wave height up to 80 m
7. During lock-down period, wind gusts exceed
  - (a) 300 km/h
  - (b) 200 km/h
  - (c) 100 km/h
  - (d) 140 km/h

**3.15 ANSWERS**

8. The Urban Land (Ceiling and Regulation) Act, 1976 stipulates
  - (a) prevention of private acquisition
  - (b) prevention of commercial acquisition
  - (c) prevention of holding vacant land
  - (d) prevention of rural to urban movement of population
9. The percentage of land susceptible to earthquakes in India, according to available statistics is
  - (a) 64%
  - (b) 34%
  - (c) 24%
  - (d) 54%
10. Highest level of seismicity is in
  - (a) Zone 4
  - (b) Zone 5
  - (c) Zone 6
  - (d) Zone 7

**3.13 Questions for Review**

1. Explain the concept of mitigation. Discuss the types of mitigation with examples.
2. Discuss the importance of fire plan and cyclone shelters.
3. Explain the disaster mitigation strategies.
4. What do you mean by hazard zoning?
5. Explain the role played by the team in disaster mitigation.
6. Discuss the importance of information and communication in disaster mitigation.

**3.14 References**

1. "National Building Code updated" retrieved from <https://law.resource.org/pub/in/bis/S03/is.sp.7.2005.pdf> retrieved on 8th May, 2014.
2. Pilkey, Orrin H., Sr.; Walter D. Pilkey; Orrin H. Pilkey, Jr.; and William J. Neal (1981). *Coastal Design: A Guide for Builders, Planners, and Home Owners*. New York: Van Nostrand Reinhold.

**3.15 Answers****A. Fill in the Blanks**

1. Analysis, reduction and insurance.
2. Prevention
3. Reconstruction, planning a new infrastructure, retrofitting
4. Amend, avert, adjust, circumvent
5. Structural, actions, non-structural, policies and procedures

6. Site selection, site analysis
7. cookie-cutter
8. setback
9. sprinkler
10. Thermo-sensitive device
11. Floor area
12. basaltic
13. High, lower
14. Capacity development
15. coordination

**B. Multiple Choice Questions**

1. (b)
2. (b)
3. (b)
4. (x)
5. (a)
6. (a)
7. (c)
8. (c)
9. (d)
10. (b)

# Disaster Preparedness

**B**y failing to prepare, you are preparing to fail.  
—Benjamin Franklin

## Learning Objectives

After reading this chapter, you should be able to:

- Elucidate the importance of disaster preparedness.
- Explain in detail the organisational structure for disaster preparedness.
- Describe the value of essential services preparedness and logistical readiness.
- Explain the importance of contingency planning in disaster management.
- Identify the importance of building team and community relations in disaster management.
- Explain the process of training need analysis and draw a human resource development plan.
- List the contents of an emergency operational plan.

## OPENING CASE

**A**tropical disturbance had built in the South China Sea in October 1999. It trailed westward, arranged itself and moved towards the Andaman Sea on October 25, and after the assimilation of the convective area, it became Tropical Depression 5B over the Malay Peninsula. This tropical depression was traced northwestwards under the influence of the subtropical crest to its north. The high temperature and complimentary winds at high level helped in strengthening the wind further to become Tropical Storm 5B. The storm crossed Myanmar, strengthening continuously, and intensified into a cyclone. On October 29, at 10:30 am, the cyclone hit the state of Odisha (formerly, Orissa). The cyclone was so devastating that the anemometer, used for measuring wind speed, installed at the India Meteorological Department (IMD) office and at Paradeep failed to record its speed. The northern crest helped in blocking further inland movement, and the cyclone slowed down at about 50 km inland of the ocean. It gradually weakened, retaining its strength as it drifted southwards. The cyclone reappeared into the Bay of Bengal and gradually degenerated over the open waters. But between its arrival and departure, the cyclone left behind massive devastation and gloom.

This cyclone of 1999 is said to be the most strapping and lethal of all tropical cyclones of the North Indian Ocean. The extent of the destruction was deadening. This was a catastrophe of historic proportion.



Trees uprooted at Chhatrapur Circuit House due to turbulent winds of Cyclone Phailin in Chhatrapur, Odisha.

Source: PTI Photo: <http://www.hindustantimes.com/india-news/phailineyeofthestorm/cyclone-phailin-hits-odisha-power-cut-off-at-several-places/article1-1134374.aspx?hts0021>

## OPENING CASE

Nearly 2,75,000 homes were destroyed and more than 1.67 billion people were rendered homeless. More than 19.5 million were affected, and according to official records, this cyclone killed over 9,885 people, though according to unofficial sources, the death toll was estimated to be above 50,000. Many children had died clinging to their mothers and around 1,500 children were orphaned. According to reports, around 13 million people – including 3.3 million children, 5 million women and nearly 3.5 million elderly people – were affected in 1999. The storm had injured 7,505 people. According to the estimates, 17,110 km<sup>2</sup> of crops were destroyed, and around 90 million trees were deracinated. The number of animal fatalities was reported to be around 2.5 million, and the number of farm animals that perished in the cyclone amounted to 3,15,886. Around 16,50,086 houses were damaged, 23,129 houses washed away, 7,46,337 houses fully destroyed and 8,80,620 houses partially damaged. The severe damage that was caused due to this cyclone was estimated to cost approximately \$4.5 billion. The large-scale devastation highlighted the limited capacity of individuals to effectively respond to unusual severe disasters.

Some 14 years after the ghoulish event, in October 2013, another tropical depression developed in the Gulf of Thailand. It moved westwards, passed over the Malay Peninsula and further stirred out of the Western Pacific Basin to emerge into the Andaman Sea. At its onset at the Andaman Sea, the IMD started monitoring the system as Depression BOB 04. The depression further moved towards the west-northwest and became even deeper early on October 9. It further intensified, and the United States Joint Typhoon Warning Center (JTWC) consequently issued advisories on the depression and termed it as Tropical Cyclone 02B. The cyclone slightly weakened as it passed the Andaman Islands and moved into the Bay of Bengal. After moving into the Bay of Bengal, it quickly restructured as it stirred beside the southern edge of a subtropical ridge of high pressure. The IMD reported that the system had intensified into a cyclonic storm and named it Phailin. Later, the IMD reported that the system had become a very severe cyclonic storm, and the JTWC reported that Phailin had become equivalent to a Category 4 hurricane. The system subsequently made landfall later that day in Odisha at 21:30 IST (Indian Standard Time) as a very severe cyclonic storm, with a maximum sustained wind speed of 140 kmph. By the next day, as a result of frictional forces, it weakened substantially over land, and some 13 h later, it was the equivalent of a Category 1 hurricane, with winds of about 80 mph. It then degenerated into a well-marked area of low pressure.

According to reports of Odisha's state government, around 90 lakh people were affected, but the death toll was only 23, as opposed to the 1999 cyclone. Phailin, as any cyclone does, left behind a trace of ruins. It knocked down lakhs of homes, affecting many, and the gushing waters destroyed crops worth Rs 2,400 crores. The loss of life was minimal because of the large-scale evacuation efforts. The high wind speed disrupted power supply as 40 transmission towers were destroyed by the cyclone's fury. As a preventive measure, trains and flights were cancelled, roads barricaded, and help lines and control rooms put up. Satellite phones and generators were dispatched to the heads of districts to ensure that they remained in contact with the state capital. Warnings were issued 5 days before the onset of the deadly storm. Food rations and packaged drinking water were made available in the shelters, where over 1 million people were stationed. As part of the arrangements, 600 buildings were identified as cyclone shelters and people were evacuated from coastal areas to these centres to take refuge. Round-the-clock control rooms were set up at the district headquarters in the town. Disaster response teams were deployed at various crucial locations, and helicopters and boats were kept ready for rescue and relief operations. After the cyclone hit, defence and paramilitary forces were used to carry out relief and rehabilitation measures and for restoring infrastructure badly affected by the storm.

It is evidenced that India's eastern coast is vulnerable to cyclones as it is routinely hit by cyclonic storms between April and November, which cause deaths and widespread damage to property. Between 1999 and 2013, people have learnt that prevention is better than cure. Till recently, the approach to disaster management

has been reactive and that of providing post-disaster assistance. But as witnessed by the preparations made for Cyclone Phailin, it is evident that the severity of the event was well understood, and accordingly, preventive measures have been taken up by the concerned authorities. An integrated approach which emphasises on strengthening pre-relief operations is becoming the order of the day. Keeping the loss of lives to a minimum was a challenge posed by the deadly cyclone. The attempt made by the personnel engaged in the management of the disaster was successful to a great extent. This only proves that any event does not become a disaster by itself, and even the deadliest of storms cannot cause damage if prior preparation is done.

### ? Case Questions

1. What are the points of difference between the 1999 cyclone and the 2013 cyclone that hit the state of Odisha?
2. Do you think preparedness played a role in preventing the effects of Cyclone Phailin?

### 4.1 Introduction to Disaster Preparedness

There has been a phenomenal increase in the number of disasters in the last decade. Though we have also been able to sail through successfully in rough weather conditions and substantially reduce the quantum of losses, a lot still needs to be achieved. The disasters that we have faced have left behind sorrows and woes. They have also left behind important lessons to be learnt for future management of disasters. The more the magnitude of a disaster, the greater is the opportunity for reflection and corrective action. These disasters serve as an important wakeup call and provide important clues to the mistakes of the past and help ensure that the same are not repeated in the future.

It is observed that there are many occurrences that have the potential to cause damage to life and property. These are not disasters; these are hazards. These hazards become disasters when they cause serious disruption to the day-to-day functioning of society and, at the same time, lead to a great loss of life and property. The situation is so grave that it is beyond the normal capacity of the affected society to cope with the damage on its own. A hazard does not become a disaster on its own. The impending damage arising out of a hazard or threat can be certainly reduced and contained to a great extent. Experience has it that with preparation any event that is a probable threat can be controlled to a great extent from turning into a disaster. The key to effective management of disasters lies in preparation. Preparedness, which is an important stage of the disaster management cycle, plays a very significant role in recognising, evaluating and controlling hazards.

Disaster preparedness consists of actions that facilitate individuals, societies and governmental agencies to respond efficiently in the event of a disaster-like situation. Broadly speaking, it refers to the process of preparing for a disastrous event to reduce and contain its ill-effects. It deals with the prediction of an event that is hazardous in nature and the preventive measures taken for the reduction of the quantum of ill-effect that can be caused by the impending threat. The aim of preparedness is the reduction of the impact of the disaster on susceptible populations by responding effectively and efficiently.

It is vital to note here that disaster mitigation and disaster preparedness are two distinct but overlapping stages of the disaster management cycle. Disaster mitigation policies and measures cannot stop a disaster from occurring and persisting. The aims of mitigation policies and measures are to reduce the vulnerability or increase the resilience to the effects of inevitable disasters. Disaster preparedness includes

### 4.2 THE THREE A'S OF DISASTER PREPAREDNESS

the implementation of measures aimed at ensuring that people can respond to and recover from any disastrous event. Preparedness aims at minimising loss by an impending disaster by the 'response and recovery activity'. Disaster preparedness is an ongoing and integrated course of action taken with the aim to reduce the pre – and post-impact of a disaster. Disaster preparedness is more than just the first stage of the disaster management cycle. In fact, it is a mission.

#### KEY IDEA

The aim of preparedness is the reduction of the impact of the disaster on susceptible populations by responding effectively and efficiently.

### 4.2 The Three A's of Disaster Preparedness

There are three A's of preparedness, namely *aim*, *action* and *accountability*. For effectively managing any disaster, it is important to ensure that all these important aspects are attended to.

#### 4.2.1 Aim

Aim is a target that one chooses before taking any action. Without aim, one cannot work as it is impossible to know what one wants to achieve. Similarly, for preparedness for disasters, the aim has to be categorically stated. Once the aim is clear, the efforts can be tuned at guaranteeing that the essential preparations for responding effectively to a disastrous event are in place. Aim also provides a broad guideline to the respondents to react and know how to use the resources at hand for the impending disaster. Moreover, preparedness plans can be drawn up only when the aim is clear. The broad aims of preparedness include an efficient allocation of resources for an effective response situation.

Aim provides a direction to other important activities that are commonly associated with disaster preparedness such as:

1. Developing planning processes to ensure readiness.
2. Formulating disaster plans.
3. Stockpiling resources necessary for effective response.
4. Developing skills and competencies to ensure an effective performance of related tasks in disaster preparedness.

Preparedness is generally seen as entailing activities aimed at improving response activities and coping capabilities. Ensuring safety is the primary aim of preparedness. It encompasses the actions that are meant to enhance the ability to respond in emergency situations that pose a threat to life and property. This broad aim can be further split into specific objectives to be achieved at this phase, which are as follows:

1. Constitution of emergency response policies and standards.
2. Creation of plans to be followed before and after a disaster.

3. Improvement in the efficiency and effectiveness of disaster response mechanisms.
4. Education and training of emergency response teams and the population at risk.
5. Development of an operational strategy for undertaking activities that are essential in responding to disastrous situations.
6. Provision of rapid and equitable recovery and response.
7. Development of a culture of preparedness.

#### 4.2.2 Action

The aim of the preparedness phase of disaster management is to improve response activities to enhance the coping capability of the affected population. It deals with both short-term and long-term recovery aspects. It consists of actions premeditated to enhance the ability to carry out emergency actions in order to protect property and control disaster damage and disruption, as well as the ability to engage in post-disaster restoration and early recovery activities. The aim of disaster preparedness is achieved partially through readiness measures that accelerate emergency response and recovery systems and through activities that are aimed at capacity building of the people. Disaster preparedness is everyone's business as there are many stakeholders and it requires the assistance from many different areas. It is imperative that all the stakeholders act in tandem to achieve the aims and objectives of preparedness. Any failure to act by a stakeholder can result in total breakdown of the system. Disaster preparedness is a continuous and integrated process concerning an extensive range of activities that are to be undertaken by many people. For any disaster preparedness measure to be successful, it is important that those involved in the process must be ready for action. Without action, no aim can ever be accomplished. Therefore, action is the second key (after aim) to the successful implementation of preparedness measures. Disaster preparedness, as already stated, is a broad concept that describes a set of measures that reduce the ill-effects of a hazard by containing the damage of life and property. Without proper action, no measure can be implemented.

#### 4.2.3 Accountability

It is very important to facilitate ascertaining the responsibility of action. Everyone knows a lot can be done for disaster preparedness, but the question that comes to mind is what, how and who? Aim answers the question of what is to be done, action talks about how it is to be achieved and accountability focuses on who will achieve it. Accountability, in simple terms, means accounting for one's actions. It is explicit in nature, which is to say that it details expectations and actions and, at the same time, ascertains responsibility. In disaster preparedness, it is of immense value as it is the guiding principle on how people make commitments, measure progress and to what extent do people take ownership of their actions. Without accountability, every effort towards disaster preparedness will fall apart, and preparedness measures will turn out to be inefficient and ineffective. In fact, the ability to execute and deliver results is directly related to accountability as it rules out evasion of responsibility. Accountability provides a clear focus on the results to be achieved and helps in accelerating progress and becoming successful. Each and every stakeholder knows what to do and how much is within his/her purview. This clarity of thought is important when responding to disastrous situations.

#### KEY IDEA

There are three A's of preparedness, namely

- *Aim*
- *Action*
- *Accountability*

#### 4.3 Principles of Disaster Preparedness

There are certain principles on which preparedness should be based for they provide important guidelines for action. For navigating successfully through the challenges of pre- and post-disaster preparedness, these principles, which are based on research, provide guidance for achieving the preparedness aims effectively. These general principles of preparedness are applicable to all units of analysis and for all types of disasters.

##### 4.3.1 Principle of Realistic Planning

An all-inclusive implementable preparedness plan is an essential component of disaster management. Plans are made for future course of action. To achieve goals, a detailed preparedness plan must be articulated. But there is a word of caution. As plans have to be implemented, therefore, before making a plan, all the important resources needed should be enlisted and an actionable plan must be made as many a time plans are 'locked cast in the air documents'. Though they provide assurance to provide workable solutions in the event of disaster, when it comes to implementation, they prove to be useless. Preparedness plans, thus, have to be well grounded in reality. Moreover, the preparedness plans should be based upon realistic assumptions and not on myths and misunderstandings about the response behaviour of public during disasters. According to researches, it is seen that public can be educated and trained to take preventive measures. In general, information-seeking by people greatly increases in the event of a disaster. It is important to know how to tackle panic-stricken people. Preparedness plans should incorporate subtle elements. It is suggested that preparedness activities should not endeavour to control behaviour, but should try to understand public sentiments and react accordingly. Thus, an understanding of and an accommodating attitude to public responses are warranted during disasters. There are numerous instances in disaster management literature where officials have acted on assumptions and preparedness plans have failed miserably. Some instances such as restraining from issuing warnings for fear of causing panic should be avoided and how to deal with such situations should be included in the plans.

##### 4.3.2 Principle of Continuous Improvement

This principle states that the plans must be regularly regulated and updated to meet the changing environmental requirements. Disaster preparedness is an ongoing task and there is no end to it. Therefore, preparedness plans have to be constantly improved upon by incorporating changes in the environment. Persons who are in charge of making preparedness plans must be open to learning. And the lessons learnt from past disasters must be incorporated in the plans suitably to meet future challenges. Also, those entrusted with the task of

making preparedness plans must continuously seek information for the refinement of the plans at periodic intervals. Preparedness plans must be flexible enough to incorporate the demands of changing circumstances. There should be room for creating innovative solutions to disaster-related problems rather than being confined to rules and regulations.

#### 4.3.3 Principle of Collaboration and Coordination

Disaster preparedness entails a series of ongoing interrelated steps to be undertaken by diverse stakeholders. There is no end-point in preparedness, so to say. Once a goal is achieved, another more challenging goal emerges from it. There are distinct steps that lead towards the goal and it needs a coordinated effort from multiple agencies. Thus, it is imperative that there is mutual collaboration of all the stakeholders. The stakeholders should be involved directly on an ongoing basis in framing preparedness plans so that they remain committed to the plans. Creating a strong sense of ownership is warranted in disaster preparedness, for it gives the benefit of commitment and cooperation of the involved parties. Stakeholders have to act as partners and understand that no plan can succeed without their concerted efforts. Collaboration in sharing of both resources and responsibilities is required. Preparedness activities, both at the planning level and at the operational level, should be well coordinated. At the planning level, those entrusted with making plans should do a disaster-specific vulnerability analysis and collaborate with the local representatives while making the plans. At the operational level, when the plan is actually implemented, a well-coordinated mechanism should be at hand. Prior knowledge of capacity and expertise of all involved in preparedness should be gathered and plans should be made accordingly. For gaining proper coordination, both top-down and bottom-up coordination should be encouraged.

#### 4.3.4 Principle of Motivation

It is seen that generally people are averse to disaster-related issues. They always suffer from 'this will never happen to me' attitude. And this is what makes people reluctant to act in spite of being able to. As performance is a product of ability and motivation, therefore, it is important to know how to motivate the general public and mould their behaviour to elicit a positive response from them. Disaster preparedness efforts often face an indifferent and somewhat resistive attitude from stakeholders. This principle of motivation states that it is essential to know what motivates people and how to motivate them for action. First, people have to be communicated about the importance of preparedness and then about their role and duties. Many a time, it is seen that people fail to respond. Allocation of resources for preparedness often has to compete with other issues considered to be important by stakeholders, thus pushing preparedness activities backstage. It is not that people do not think preparedness to be important; it is just that they adopt a casual attitude and thus fail to prioritise this as an important duty that must be given due weightage. Therefore people have to be motivated to act. Also, preparedness endeavours should be supported by pragmatic beliefs relating to social behaviour during crises. That is to say, a realistic prediction of the behaviour of people based on available records should be made. What motivates people and how they respond to a crisis should be understood and preparedness plans must incorporate all these intricate aspects of motivation.

#### 4.3.5 Principle of Time-Bound Implementation

A sustained disaster preparedness effort is required. It is seen that people prepare and if no disasters happen over a period of time, the stakeholders become less cautious. Moreover, having a well-prepared plan gives a sense of false security to the personnel involved, and they feel that as a plan is ready, they can tackle

the situation. This false sense of security is dangerous as disastrous situations cannot be completely predicted with certainty. Therefore, developing a plan in collaboration with the response teams is a must because the onus of implementation of preparedness plans lies on them as they will ultimately be responsible for implementing the plans. Preparedness plans have to be implemented in a time-bound manner and this is true for both pre- and post-disaster preparedness measures.

#### 4.3.6 Principle of All-Disaster Inclusiveness

A disaster is disaster no matter how big or small it may be. So, the principle of inclusiveness states that preparedness efforts should take into account all hazards irrespective of the probability of damage. This is important as all hazards have the potential to become great disasters and a well-prepared system has the capacity to turn even a high-consequence event to a small one and save lives of millions. It is a well-established fact that disasters of the past form the basis of future prediction. Thus, any vulnerability analysis should not undermine the potential of any disaster. Moreover, rapid urbanisation and development has opened up ways for new and severe disasters. All this should be taken into account while taking preparedness measures. It is natural that the preparedness efforts hover around the last disaster that took place, but it should not be so. It should rather address all potential disaster events. Also, preparedness activities should have a broad spectrum around which the plans are made. It is easier and practicable to focus on generic challenges than on specific disaster events. Preparedness planners should try to find out the common elements of any disaster and the agent that causes it. As the response to any disaster is similar; therefore, irrespective of the agent causing the disaster, the focus should be on the common response mechanism. The preparedness task should incorporate both the differences and the similarities with respect to the response. Also, 'hazard-specific' planning, training and resource allocation should be undertaken in those cases where agents require distinctly different responses.

The principles of disaster preparedness must be adhered to for taking effective preparedness measures. These principles form the backbone of preparedness activities.

#### KEY IDEAS

##### Principles of Disaster Preparedness

- *Principle of Realistic Planning*
- *Principle of Continuous Improvement*
- *Principle of Collaboration and Coordination*
- *Principle of Motivation*
- *Principle of Time-Bound Implementation*
- *Principle of All-Disaster Inclusiveness*

#### 4.4 Steps of Disaster Preparedness

Preparedness is a systematic task having a series of interrelated steps that are described in the following subsections.

#### 4.4.1 Hazard, Risk and Vulnerability Evaluation

The first step of disaster preparedness is hazard, risk and vulnerability analysis. Hazard is defined as any event or thing that has the potential to cause harm. Risk, however, is the chance and the extent of harm that can be caused. An understanding of hazard and risk is essential for undertaking preparedness measures. An evaluation of vulnerability is also crucial for disaster preparedness. Vulnerability assessments help in establishing the approaches to disaster preparedness. It also indicates the quantum of threat and the present level of preparedness. Vulnerability assessments, in addition, provide a blueprint of a country's vulnerability to disasters. Thus, vulnerability assessments form a basis for creating an essential knowledge base for making realistic preparedness plans. All disaster preparedness measures have to be based on susceptibility assessment. It should then gauge the ability of the affected people to cope with the threats and challenges. A clear picture of the nature, incidence and impending severity of the hazard can be drawn after a vulnerability analysis. It also provides information about communities and areas that are most susceptible to specific hazards. Apart from this, it also provides insight into the ways in which people might be affected. Based on the above information, an analysis can be done to understand the response mechanism of the affected people. Vulnerability assessments serve as the basis for determining preparedness plans, and the information is vital for drawing up of preparedness plans.

#### 4.4.2 Assessment of Current Capability and Response Mechanism

Preparedness efforts and plans are aimed at strengthening and increasing the effectiveness of an emergency response. But before strategies are made and efforts are planned out, it is essential to understand the response mechanism of the affected people to specific disasters. *One plan cannot be fit for all disaster events.* That is to say that the response strategy during fire is different from strategies adopted during flood. So, disaster-specific response mechanism should be clearly stated. On the basis of this understanding, a capability assessment should be done. This may include a detailed review of the evacuation procedures of both the local community's as well as the search and rescue teams. Also, a knowledge base of resources available at the local level should be created.

#### 4.4.3 Developing Preparedness Plans

On the basis of report of capability assessment, the goals and measures of performance can be made. The next step in preparedness is to make a detailed plan for preparedness measures to be taken. Preparedness planning is a must for ensuring timely response in the event of a disaster. Preparedness planning helps in addressing organisational and technical issues for the effective functioning of response systems. It facilitates coordination among various agencies that have to work in tandem. A clear identification and definition of the problem is the first stage of planning. Planning entails identifying available resources, developing policies and procedures for making optimum use of those resources and detailing on the various roles and responsibilities of the stakeholders. The plan has to take into account all the hazards and risks a community may be exposed to. It is important that all the stakeholders are involved in preparing plans as it ensures commitment and collaboration. Moreover, the first responders in the event of any disaster are the local people, including police and medical teams, and their concerns have to be given importance. They are the ones who are responsible for carrying out the successful implementation of the plans, so their involvement is necessary. Communication is another vital issue that needs due space in preparedness plans. Many a time, it is seen that due to communication failure, response becomes difficult irrespective of the readiness of

#### 4.4 STEPS OF DISASTER PREPAREDNESS

the system. Questions such as who needs to communicate with whom, when, for what purpose and under what circumstances have to be answered. It is a well-known fact that all plans are constructed upon the available information; therefore, proper care should be taken to gather all relevant information and sieve it according to the needs. The plan should address all aspects crucial to decrease susceptibility, react effectively and convalesce efficiently from a disaster.

The plan should start from a general perspective, and as the planning proceeds, specific aspects should be incorporated. It should provide guidelines to get the most out of the knowledge, skills and abilities of the people involved for improving resilience. Collecting information about the past is the backbone of any planning activity. Then comes a clear definition of the objectives. The planning premises should be very clearly written. These incorporate the limitations of resources, both human and material, needed for preparedness. A realistic and logical estimate is vital for the success of any plan. The plan should incorporate the subsidiary plans, which are detailed in nature. Individual and community preparedness is fundamental to the success of the plan as they prepare for protection at their own level. Therefore, the plan made should be transmitted to stakeholders and suggestion for improvement in the plan should be elicited. An effective response and recovery is not possible unless all stakeholders work with dedication and commitment. For synchronisation of work, it is essential that each and every individual clearly knows his/her role in the successful implementation of plan. Each one can then contribute to the goal of preparedness. Also, the capability and skills of each stakeholder can be used optimally as per the plan. A clear plan tries to identify and close the gap between the current level and the desired level of preparedness. Planning helps in prioritising goals, assessing risks and setting performance standards for preparedness activities. In addition, it also helps in attaining, measuring and sustaining preparedness measures.

The concept of preparedness planning is the key to effective disaster management. Having a well-made preparedness plan helps in responding to disasters and controlling the ill-effects to a great extent. Though 100% success of any plan cannot be ascertained with certainty, nevertheless, making preparedness plans helps a great deal in improving the quality, timing and effectiveness of the response to a disaster.

#### 4.4.4 Implementation of Preparedness Plans

Planning is not enough; it has to be implemented. It is seen that stakeholders raise significant concerns about the way the plan is communicated and executed. To ensure proper communication, coordination and collaboration from all stakeholders, proper implementation of the plan is essential. Implementation of the preparedness plan should focus specifically on resource mobilisation and setting up of early warning systems as a part of the preparedness activity. The organisational structure clarifying authority and roles should be made, and every stakeholder should be allocated his/her duties and responsibilities accordingly. A leadership and succession plan should also be made and implemented because people retire and the vacancy caused should be filled up. When preparedness plans are implemented, collection and analysis of data for assessment of goals against performance standards should be made a priority. This step helps in monitoring the effectiveness of actions with respect to performance goals. The deviations, if any, should be rectified to save further damage. The implementation of preparedness plans also includes addressing the need of communications requirements and resource management. Proper implementation of plans helps in focusing the attention on desired objectives. It helps in reducing risks, improving efficiency and avoiding confusions. In addition, it helps in gaining cooperation and serves as the basis of control.

#### 4.4.5 Public Education, Training and Rehearsals

Public education, training and rehearsals form an integral part of preparedness measures. In the absence of these, the plans, no matter how well defined, are doomed to fail. For any kind of cooperation and coordination, it is imperative to know the basic nature of the work one is supposed to perform. Training of first responders and public officials is a must. Training should focus on imparting disaster survival skills and skills required for working in teams. The general public should be educated about the importance of preparedness and convinced to treat disaster preparedness as a priority. Effective disaster response necessitates confidence and coordination of efforts among the agencies involved in an emergency response. For ensuring that coordination mechanisms are functional, work rehearsals should be carried out at intervals. As disaster preparedness is an ongoing task, therefore, an analysis of the response to disasters should be done on a periodic basis and communicated to agencies during and after disasters. Incorporating the suggested changes again requires training, and people should be accordingly trained to take decisions in crisis situations. Training and rehearsals are of utmost importance as they show the real state of preparedness in the event of a real disaster.

#### KEY IDEAS

Preparedness is a systematic task that involves the following:

- Hazard, Risk and Vulnerability Evaluation
- Assessment of Current Capability and Response Mechanism
- Developing Preparedness Plans
- Implementation of Preparedness Plans
- Public Education, Training and Rehearsals.

## 4.5

#### Organisational Structure for Disaster Preparedness

Organising is a process by which roles and responsibilities are arranged and coordinated for the successful implementation of plans. An organisational structure is a formal division of the authorities and roles for the ease of decision-making. It deals with the establishment of integrating mechanisms for coordination and control of activities. For effective management of disasters, it is essential to clarify the roles and responsibilities of the people involved in disaster preparedness. The occurrence of natural hazards cannot be completely avoided, but effective planning and organising may help in minimising its impact to a great extent.

The *Preparedness Division's* role is to prepare national, state and local agencies in responding to disasters effectively. The aim is to help the community recover from the effect of disasters by generating public awareness, facilitating training and providing technical and financial support by collaborating with various agencies. The organisational structure for a Disaster Preparedness Division should be headed by Director of the Preparedness Division. Under him/her should be placed the President, who should represent the commander of the National Disaster Preparedness Committee. The Committee should contain members of the government and representatives from local communities, military forces, medical, media and non-governmental organisations. This Committee should perform an advisory function.

There are five distinct units in a Disaster Preparedness Division. These units are headed by Additional Directors, who report to the Director. These five units are as follows:

1. **Emergency operations and preparedness unit:** The function of this unit is to keep a track of preparedness activities before, during and after a disaster. This unit should be further divided into two wings, each headed by two Deputy Directors. One wing should take an account of preparedness during normal times and the other wing should be crucial time wing. The job of the prior is to constantly review programmes intended to prepare the community to face disasters and reduce vulnerability. The second wing's primary aim is to react and respond in the event of emergency situations. In times of disaster, the Deputy Director is required to make decisions to aid rescue and recovery. His/Her responsibility is to ensure coordination among various agencies. The two wings are further divided into regional centres, which are headed by regional coordinators. The duties of these centres entail providing necessary technical advice and assistance in implementing disaster preparedness measures. These regional centres are further divided into zonal centres, headed by zonal heads.
2. **Logistical unit:** This is headed by Additional Director. The unit should be instrumental in providing relief and rescue activities after a disaster. There should be a Deputy Director for logistics, who should be involved in coordinating with Railways, Military and Aviation Departments for providing relief. The other Deputy Director, for relief operations, is responsible for providing food, clothing and other amenities at rescue camps. His/Her primary responsibility is to ensure an incessant supply of basic food items, medicines, relief appliances, cooking utensils, temporary shelters and sleeping cots. Liaising with other agencies that volunteer to help in the rescue is also one of the important tasks. Ensuring storage and distribution of incoming relief items in the event of a disaster is the duty of Deputy Director – Relief Operation and his/her team.
3. **Communications unit:** This is also headed by Additional Director. This unit is responsible for dissemination of information to the public through news releases and advisories. The unit arranges press conferences, press briefings and works with the media to promote preparedness policies and programmes. The director of this division is supported by a Public Information Officer and a Management Information System (MIS) officer. The role of the Public Information Officer is to disseminate information to various external agencies, whereas the MIS officer's job is to address the information needs to the internal agencies involved in preparedness tasks. He/She and his/her team gather, sieve, analyse and provide customised information for response and recovery. Their duties entail providing and constantly updating the information on websites.
4. **Training and development unit:** The Additional Director who has direct responsibility of this unit is responsible for providing training and development activities. This unit should be committed to provide training in areas of public education and awareness on disasters, both natural and man-made. The team consists of a pool of energetic and inspired staff who is involved in providing training to various stakeholders. It is responsible for running ongoing public education programmes relating to preparedness. The team organises workshops and lectures on aspects of disaster preparedness.
5. **Plan development, implementation and monitoring unit:** The duty of this unit is the development, execution and monitoring of preparedness plans. It also seeks to identify opportunities for the funding of projects and programmes in vulnerability reduction and disaster management. It is responsible for coordination and monitoring of the execution of preparedness projects. It, time and again, reviews the preparedness plans and helps in identifying variations. The nature of disaster management preparedness encompasses all areas of disaster management planning and draws from resources and expertise across all the units in executing preparedness plans. The unit plays a key role in ensuring that the other units work in tandem and carry out their responsibilities in a timely and efficient manner.

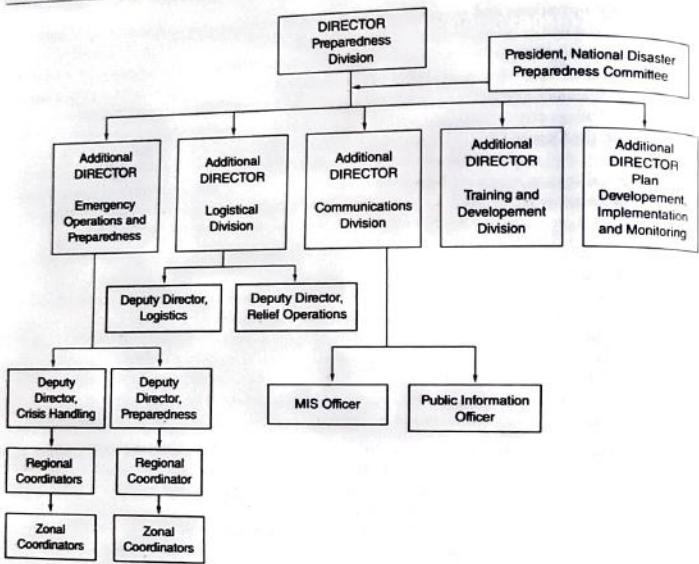


Figure 4.1 Organisational structure of the Disaster Preparedness Division.

The organisational structure of Disaster Preparedness Division is shown in Figure 4.1.

### KEY IDEAS

An organisational structure is a formal division of the authorities and roles for the ease of decision-making. The divisions are as follows:

- Emergency Operations and Preparedness Unit
- Logistical Unit
- Communications Unit
- Training and Development Unit
- Plan Development, Implementation and Monitoring Unit

### 4.6 Essential Services Preparedness and Logistical Readiness

Essential service preparedness and logistical readiness is a task of both the logistical division and the emergency operations and preparedness division. For effectively managing disasters and reducing the quantum of losses, it is important to pay attention to essential services preparedness. Logistical readiness should be ensured to contain the losses during and after the onset of a disastrous event. Logistics deals with making plans, implementing and controlling the flow of goods and services between the point of origin and the point of utilisation to meet the needs of community. It deals with materials management, which ensures the storage of inventory of goods and distribution which primarily deals with the movement of flow of goods and services. Logistics preparedness is an important aspect of any disaster preparedness effort. Vulnerability analysis is the basis of logistical preparedness as it provides an overview of the location, types and needs that such disasters will be likely to create. It also provides an overview of resource estimation. Based on the assessment of needs, a list of emergency relief items is prepared and, accordingly, the transport planning, reception and distribution of emergency supplies is made. The emergency stock preparedness is essential for catering to the initial needs of any disaster. The pre-positioned emergency response stock should be sufficient to meet the needs of the affected community in the event of a disaster. The location at which the inventory of goods is placed is of strategic importance. The Logistics Division is in charge of providing the logistics services and materials resource management, apart from facilitating response and recovery. The transportation, stock collection and piling, inventorying, managing supplies, all are covered under the gamut of logistics management. Coordinating and providing timely and appropriate resources during an incident is of utmost importance as it is a measure of the performance of the entire preparedness team. It is also important to prioritise and coordinate resource allocation and distribution during incidents among various regions. The vision of the Logistics Division is to provide exceptional logistics and resource management support to enable it to be disaster-ready at all times.

To deal effectively with disasters, preparedness teams have to be trained and equipped to operate under hazardous, difficult, vague and grave conditions. The equipment is worthless if there are no trained personnel to operate and utilise it. On the other hand, obsolete and unreliable equipment can hinder the efficacy of the most highly motivated and skilled personnel. To fight disasters effectively, the personnel must be trained to carry supplies under demanding conditions. Quality personnel, equipment and training are the essential dimensions for combating the ill-effects of disasters. Failure in logistical preparedness can lead to major setbacks and a significant loss of life. Many a time, it is seen that soon after a disaster, materials such as food and clothing start pouring from across the world, but due to inadequate logistical and improper supply-chain management, these supplies do not reach the beneficiaries in time and are ultimately wasted. The challenging logistical readiness requires a wise and effective leadership at various levels for smooth functioning. Preparedness needs logisticians to ensure their readiness for a sudden disaster. A fleet of emergency vehicles and trucks should be maintained and should be strategically located. Warehouses should be created and make-shift distribution centres should be readied as a part of the preparedness plan. Other aspects that need to be considered are emergency services, which include medical and healthcare services. Apart from these, providing clean drinking water also becomes a challenge after a disaster. Supply of drinking water is a must for survival and should be ensured. An emergency supply of electricity and the modes of telecommunications have to be ensured. These are certain things that are bound to be affected in the event of a disaster. There is very little that can be done to save electric poles and wires from snapping and jamming telecommunication lines. Nevertheless, it should be ensured that these facilities are restored within the least possible time or temporary alternatives to these services are developed till regular services are restored. For this, the local administration may need the help of military or specialists. Again, some help from area experts should be ensured.

**KEY IDEA**

Essential services preparedness and Logistical readiness is essential for effectively managing disasters and reducing the quantum of losses.

#### **4.7 Contingency Planning**

Planning is a formal process that deals with the setting up of objectives and actions to achieve them. There are a lot of benefits of planning; plans show us the direction and help us use the resources in the best possible manner. But there are a few limitations of planning, too, that pose a threat in times of disaster. Generally, it is seen that people are rigid when it comes to compliance with plans. They strictly want to stick to the plans and do everything possible to adhere to the plans. There is an unwillingness to change because of fear. But when it comes to disaster management, very little can be predicted with certainty as there are external limitations. Therefore, in such situations, strict compliance with the plans may prove to be disastrous in itself. A fresh exploration of alternatives according to the turn of events may be needed. In such situations, planning is essential for onward movement. This plan is called contingency planning, which helps in responding effectively to disasters. In times of drought, flood and tsunami, well-made plans may fail because of the sudden turn of events. Contingency planning entails making a plan B to deal with situational changes.

There are many challenges that emerge with contingency planning. First, the agencies have to be convinced that the well-made plans can fail. People generally perceive that as all the problems arising out of all possible situations have been addressed, there is no need of any other plan. Second, they feel that if any problem arises, it will be addressed as and when it pops up. This casual attitude may be disastrous. People have to be convinced and motivated about the need for contingency planning. Furthermore, it is observed that in the presence of an existing plan, making a contingency plan is not viewed as an urgent activity. This attitude may prove to be fatal when it comes to management of disasters. Contingency planning needs an investment of time and resources. If one fails to invest here, the costs could be considerable if a disaster happens.

When preparing a contingency plan for disaster preparedness, there are certain points that have to be taken care of. The aim of the plan should be to ensure a minimum level of functionality of all the resources, and the focus should be on providing prompt service in the event of a disaster. Issues relating to airport clearance and logistical coordination for providing solutions to problems have to be addressed. Moreover, it should be made clear as to when this contingency plan has to be made functional. The incidents have to be clearly stated. The plan should provide the role and responsibility of each agency at every stage. The plan should be simple and understandable by all the persons who are supposed to use the plan. The limitation of resources, both human and material, should be clearly stated. The method for updating people about the changes in the plan should be clearly mentioned. A method of identifying problems in the implementation of the plan has to be in place to ensure performance improvement. The contingency plan should be practical and relevant. It should be communicated to everyone involved in disaster preparedness. People should be apprised of their roles and responsibilities and should be trained for fulfilling these roles and responsibilities. The plan should be reviewed at regular intervals for incorporating environmental and personnel changes. The reviewed plan document should be circulated to all concerned, and it should be ensured that the old plan is made redundant. Copies of the plan should be made accessible to the community.

The major disadvantage with humans is limited cognitive abilities and energies. Due to this, there is a limitation of finding new alternatives. The usefulness of a contingency plan cannot be ascertained before its implementation as disastrous situations are dependent on physical conditions far beyond any experience. Nevertheless, its usefulness cannot be undermined. Contingency planning is based on the probabilistic thinking that dwells on the worst-possible scenarios. The judgement of experts about the limits and extremities of situations is important. This judgement is mostly based on a review of past disasters that may have affected the area or disasters pertaining to other places that may have taught important lessons. A systematic approach should be adopted for defining situations and developing planning premises. Contingency planning has three stages: *readiness, standby and activation*.

According to available reports on Hurricane Katrina that struck New Orleans on 29 August 2005, the management plans did not work. The crisis situation went beyond control. Well-made management plans could not help control the crisis. The fire fighters involved have reportedly stated that the preparedness exercises proved to be futile and the plans that were made with due diligence were rendered useless. Nothing worked before the killer hurricane. This proves that contingency planning is essential. The plan should first have a detailed account of all the possible scenarios and then should list all the constraints, both human and material. With limited human capacity to respond and limited means available, a realistic plan should be made. The command centres and the roles of the employees at such centres with their decision-making power should be clearly stated. There should be decentralisation, and all the members of the team should be communicated about the roles and responsibilities. The rigid chain of command should be done away with. But accountability should be established. The role of citizens is very important in contingency planning. Thus, engaging the citizens is an important task. They should be communicated, informed and included in the decision-making process. Networking with the citizens is vital. It should be understood that the governmental agencies that follow strict command structures cannot do much because of their limited capacity. Research has stated that it has always been the citizens who have risen to the occasion during any crisis. Empowerment of citizens can do much in times of disaster, and any preparedness exercise should include them. Contingency planning is an important part of disaster preparedness as it works in extreme situations and helps save from losses of life and property.

**KEY IDEA**

Contingency planning is a formal process that deals with the setting up of a plan B to deal with situational changes.

#### **4.8 Importance of Building Team and Community Relations for Environmental and Emergency Managers**

Preparedness for disasters is a significant investment against disasters. Trying to face disasters individually may prove to be ineffective. When it comes to responding to disasters, whether man-made or natural, everyone tries his best to face the situation squarely, but the result is not as good as it would be if the team was in place and people got together and worked together in one direction. With individual capacities, people are not able to handle large-scale disasters.

If all agencies join hands and work together, more lives and property could be saved. People are generally aware of risks, but a casual attitude is what causes large-scale disasters to happen. Situations get uncontrollable, and individuals working singly cannot do anything worthwhile to contain the loss of lives and property. Partnering is essential as it provides the necessary impetus to plan ahead for such situations. Also, it provides a sense of direction to use limited resources wisely and judiciously.

It is said that 'even the most brilliant individual is less powerful than a cohesive, well-orchestrated team'. Team building is the need of the hour when it comes to disaster preparedness. The rapidly changing environment and extreme weather conditions pose a threat of disaster. It is warranted that the community remains prepared for impending disasters. For an effective management of disaster, it is important that the people involved work in tandem with each other. Preparedness is the best guard against a disaster and team building is one of the strategic steps of preparedness that enables an effective response in crisis situations.

A team is defined as a group of persons who have a common aim and work in synergy to accomplish the aim. The *role* of disaster management teams is to facilitate the implementation of disaster preparedness plans in times of emergency. The *function* of the disaster management team is to support and help the community members to defend themselves from future disasters. The team members gain the requisite skills to help in times of disaster. The teams swing into action as and when disaster strikes and help in providing rescue and relief operations. The disaster management teams consist of experts who are dedicated to their work and committed to the job they are entitled to do. These committees have representatives from all preparedness departments as well as the local community. While making the team, care should be taken to include all the stakeholders, namely representatives from the different communities, groups, gender, environmentalists and government. The team members should be informed about the objective behind the formation of the team. Though in a team, each one has a distinct role to play and everyone is equally important, but there is also a leader in each team. The roles and the chain of command need to be clearly communicated to the team members. Essentially how the activities and responsibilities will be coordinated should be chalked out and should form an integral part of the disaster preparedness team. The team-building process is a tedious process involving four stages, namely *forming*, *storming*, *norming* and *performing*.

In the *forming stage*, the team defines the problem, decides the goals and commits to tackle the problem by making strategies. The members discuss and determine the challenges and identify the information needed to solve the problems. During this stage, the leader should stress the importance of attitude and behaviour of team members. The roles of the team members should be communicated and effort should be to create a positive relationship among the team members. The expectations should be realistic.

The second stage of team formation is *storming*. In this stage, the members discuss and try to build skills in assessing the situation. Individuals take on roles and develop trust and communication. During the *storming* stage of team building for preparedness, the team members realise that the task is more difficult than they imagined. They have their own fears and prejudices. They suffer from fluctuations in attitude about chances of success and feel resistant to take on tasks. There are some issues relating to collaboration that prop up.

The next stage is the *norming stage*, in which members accept their team, their roles in the team, team rules and procedures. They accept the team members with their weaknesses and strengths. They understand the urgency and need of the preparedness team and start helping each other. They help each member to develop. Team members with time gain knowledge about personal and team processes and learn to resolve conflicts. They try to resolve differences and conflicts and develop a close attachment to the team. The members commit themselves to shared goals and objectives.

The last stage is that of *performing*, where each member of the team tries to meet the objective of the team by giving his or her best. The team members try to achieve the goal of preparedness by bringing out their best. The team functions on relationships of trust and loyalty. Team building is an ongoing process that helps a work group evolve into a cohesive unit. The first tenet of team building is productivity. In disaster preparedness, the team's aim is to provide all help to people who are caught in the disaster. Managing diversity is the key to team building.

Team building and community relations are very important for emergency managers. By building a team, emergency managers are able to delegate responsibility effectively. It becomes very easy to handle disastrous situations because of role clarity. Building a team entails involvement, which leads to motivation. A climate of cooperation is created, and with trust and support of the team members, emergency managers can sail through storms easily. Team building generates higher levels of job satisfaction and commitment. There are many benefits of team building for emergency managers. It generates higher levels of trust and support. It brings together experts of many areas together. Team members work with clear objectives in mind and are determined to accomplish them at all costs. Team building leads to the creation of a transparent work culture where the policies and procedures are simple and easy to follow. Moreover, team members can be trained to respond to crisis situations according to the skills needed by them. Community relations are another aspect which are very important from the point of view of emergency managers. By involving the community and building better relations, the preparedness planning process can be streamlined. Potential problems can be identified at the right time. The solutions to problems can be better addressed. Many a time, it is seen that the preparedness exercise does not yield good results as the plan does not meet the needs of the stakeholders. Good community relations are a guide for better action. It is considered as a good tool of preparedness and disaster management because of its benefits. The basic premise on which building community relations is based is the involvement of the community. Being an important stakeholder, it is imperative that the community should be given due importance.

According to research in the area of disaster management, people caught in disastrous situations go through many emotional phases. The first stage is the *acute stage*, where individuals try to save their own life and that of their near and dear ones. The second stage is the *reaction stage*, where individuals involve in search and rescue work and help in providing medical care to those injured. They assess the damage done to life and property and are in a state of shock. The third stage is called the *recovery phase*, where survivor management teams swing into action to take control. The fourth stage is the *reorientation phase*, where survivors come to terms with the real situation; they feel perturbed and are depressed about the state of affairs. It is normally seen that it is in the third phase that the team of disaster management experts start acting. With proper team-building efforts, proper coordination and communication among different agencies can be established. Team members can be trained to understand the mental condition of the victims and ensure a proper response.

### KEY IDEAS

- Preparedness is the best guard against a disaster and team building is one of the strategic steps of preparedness that enables an effective response in crisis situations.
- The team-building process is a tedious process involving four stages, namely forming, storming, norming and performing.

## Training Needs Analysis and Human Resource Development Plan

Training needs analysis is a process by which the training and development needs of the personnel in disaster preparedness is identified. To face threats and challenges of disastrous situations, the personnel entrusted with the task have to be trained. Nations spend a lot of money on training and development staff for dealing with hazards. Before committing such huge resources, it is important to assess the training needs of the concerned staff. By needs assessment, it is easy to identify their needs to make development efforts fruitful and rewarding. The starting point of any training or development activity is needs assessment. It helps in ascertaining the gaps between the existing skills of the employees and the skills required by them so that the training modules can be well suited to meet the requirements of the staff. Needs assessment also helps in predicting the future skill needs of the personnel. All this is very important as it effectively tells what the needs are and how they should be improved to meet the current and future demands arising out of crisis situations.

The needs assessment exercise is carried out at two levels: group and individual. An individual assessment is done when the concerned staff's performance falls short of expectations. This leads to performance deficiency, which can be a result of lack of skills or knowledge or any other problem. The substandard performance can be caused by the absence of skills or knowledge, which can be remedied by training. An assessment of training needs must, therefore, focus on anticipated skills required in dealing with hazards. With rapid changes in the environment and the increase in the number of disasters, the development of skills for effective handling of disasters is the need of the hour. The personnel and the community have to be well equipped with the knowledge to deal with disasters. For this, the necessary skills have to be imparted. The personnel are trained to acquire new skills so that they can take the challenges posed by the environment in their stride. The primary step in training is to determine that a need for training essentially exists. Before committing the resources to a training activity, it is vital to know if the training can be expected to achieve some organisational goal. A needs assessment should be systematic and objective. The determination of training needs involves an analysis of goals and resources, task analysis and training need area identification. An analysis of a person's skill and the identification of sources of discrepancy between actual and expected behaviour is done to make proper interventions to fill up the discrepancies.

An assessment of training needs at the group level is also important as it can foretell the reasons as to why certain remedial measures are required for an effective response. Moreover, disaster preparedness is a group effort, where tasks are divided among groups of people who work in consonance. Division of labour on an individual basis and at the group level is required and, accordingly, training has to be imparted both at the individual level and at the group level. Training needs assessment at this level deals with issues of transfer, job redesign and improvement in the quality of supervision. Also, any change in the organisation's strategy necessitates training of groups of employees. Several methods are available for training needs assessment, both at the individual level and at the group level. Some of these useful methods are individual performance appraisal and analysis, drawing of personnel skills inventories by the method of work sampling, efficiency indices questionnaires and qualitative rating scales, to name a few. Training needs are ascertained on the basis of current and projected changes in the environment, disaster proneness and expertise.

There are certain issues which should be addressed to when needs assessments are carried out. A needs assessment instrument should be carefully designed. Obviously, the analyst needs to take steps to work effectively with all parties and gain the trust and support of the participants in needs assessment. There is always the temptation to begin training without a thorough analysis of the needs. And this practice results in

## 4.10 EMERGENCY OPERATIONAL PLAN: CONTENTS

the training programme inappropriate, and its implementation turns out to be perfunctory. Proper needs assessment analyses are not carried out for a number of reasons. It is felt that training needs assessment is a difficult and a time-consuming process. The research efforts relating to needs assessment are not given due weightage. Moreover, pre-emptive assumptions about the knowledge of the level of an individual and their training needs render the need for a needs assessment exercise futile. Many a time, the top management does not support this exercise.

However, it is vital that the trainers are informed about the broader needs of the trainees so that the trainer can customise the training to suit the needs of the individual and the group. An assessment makes the training department more accountable and their efforts more fruitful. The significance of needs assessments can be better understood by looking at the consequences of an inadequate needs assessment or its absence. The failure to conduct a needs assessment can contribute to unpreparedness in times of disaster and the inability to respond effectively. It may lead to loss of training effectiveness in the area of achievement of preparedness objectives.

### KEY IDEA

Training needs analysis is a process by which the training and development needs of the personnel involved in disaster preparedness is identified. The needs assessment exercise is carried out at two levels: group and individual.

## 4.10 Emergency Operational Plan: Contents

Emergency operation plan, which is commonly known as EOP, is an essential aspect of preparedness. It provides a broad scope of activities that are required for disaster preparedness. It is a general guideline for a community that provides insights into what can be realistically done in the event of a disaster. The EOP helps the community in responding to threats and in post-disaster recovery. The main reason for having an EOP is to respond to emergency situations without getting panicky. EOP helps the members of a disaster preparedness team to ascertain that they work in consonance. The aim of an EOP draws from the vision of disaster preparedness. The EOP is documented and transmitted to the preparedness team. The plan document consists of a statement of objectives, an overview of the planning premises, details of the planning process, detailed steps about implementation and directions about the use of the plan and its circulation.

The EOP is a well-narrated descriptive on operating procedures about the preparedness teams. The plan is well structured and divided into sections for the ease of understanding.

1. The first section of the plan contains a general statement of purpose indicating its mission and what the plan aims to achieve.
2. The second section of the plan clarifies the various situations in which the plan will work. It gives a picturesque narration of the emergency situations and the diverse ways in which a community should respond. Here, the plan tries to incorporate the various hazards that can cause disasters. Special emphasis is put on unique and unusual situations that can lead a community to a dangerous situation. These statements of emergency events are mostly based on past research and assumptions drawn from past events.

3. The third section delves on the organisational issues and discusses the roles and responsibilities of preparedness team members. It clearly indicates the process in which the emergency functions will be carried out and who would be allotted what responsibilities.
4. The next section of the plan document details about operations and logistics. It describes the roles of various stakeholders in an emergency situation. More importantly, it discusses the issue of communications with various agencies involved in the response. The effective management of available services and resources and policies relating to administrative requirements are dealt with in this section.
5. The development of the plan and its implementation is discussed next. This section is very important as it details about the changes that are suggested on the basis of a review of situations, time and again. This section incorporates the modifications that arise due to changing emergency situations and in the community's profile.
6. The last section of the plan document has the details of statutes, executive orders and formal agreements issued time and again by disaster management authorities and government agencies relating to disaster preparedness. This section also has a sub-section on definitions of terms for a common understanding of the members, who are the ones entrusted with the successful implementation of the plan.

An EOP contains a functional annexes section that imparts exact and explicit data and route about specific operations that needs to be carried out during an emergency. It clarifies the duties and roles of the various agencies involved in preparedness activities. It also provides an overview of actions that need to be taken for carrying out preparedness measures, both before and after the disaster. The EOP also deals with important aspects of communication and control.

Before the implementation, the plan has to be tested for estimating its effectiveness. The agencies involved in preparedness exercise the plans to see whether the plan can be made operational during emergency situations. The agencies are provided induction training to prepare and familiarise themselves with the plan. The roles and responsibilities are clearly communicated to avoid confusion. Simulation exercises are also conducted to see how agencies respond to the emergency in real circumstances. After the testing exercise is complete, the EOP is made public. The involvement of the community is very important for the success of any EOP. In this case, members of EOP serve to increase the awareness of the citizens to the citizens about risks and vulnerabilities. The pamphlets and brochures bearing the information about the EOP are circulated. The information about the plan is disseminated through the media. The success of an EOP is dependent on the coordination and cooperation of different agencies involved in preparedness activities. A judicious allocation of men and material resource is vital. A motivated and dedicated pool of personnel is the most essential resource for the success of any EOP.

### KEY IDEA

EOP is a well-narrated descriptive on operating procedures about the activities of preparedness teams.

### 4.11 Summary

Recently, there has been a spurt in disasters across the globe. This chapter discusses the importance of preparedness in disaster management. Preparedness in disaster management entails actions that assist individuals, societies and governmental agencies to respond efficiently in the event of a disaster-like situation.

### 4.11 SUMMARY

Disaster preparedness is an important task that requires the assistance from many different areas. It is an incessant process, and it is important that all the stakeholders act together to achieve the aims and objectives of preparedness. There are three A's of preparedness, namely aim, action and accountability. There are general principles of preparedness which form the backbone of all preparedness activities, namely, principle of realistic planning; principle of continuous improvement; preparedness of collaboration and coordination; principle of motivation; principle of time-bound implementation; and principle of all-disaster inclusiveness. Preparedness is a systematic task that includes a series of steps: hazard, risk and vulnerability evaluation is the first step; assessment of current capability and response mechanism is the second; and then comes the development of preparedness plans, followed by the implementation of preparedness plans and public education and training and rehearsals. The issue of logistical readiness and essential services preparedness is dealt with at length. The chapter discusses the organisational structure of a disaster preparedness division; it also throws light on the importance of contingency planning, developing good relations with the community and team building.

### CASE PROBLEM: CAN PREPAREDNESS SAVE LIFE?

**S**hibu returned home after a hard day's work. His two children Mishru and Bisnu came running to him. He was not in his usual mood. Something was amiss. His wife Leena brought him some tea. He sipped his tea slowly. He remembered the fateful black Friday of 1999 when the monstrous storm snatched away everything he had. He was 14 years old then. It had all begun with speedy winds that blew the thatched roof of his hut. The storm surged further, and within seconds, everything was gone. Shibu clung to a bamboo and was swayed far away, but somehow he was saved. Blurred memories of his mother and sister clinging together tightly and being washed away by the surging sea remained with him. His eyes were filled with tears. The cyclone was ravaging.

The loud sound of the radio announcement woke him up from his reverie. The shouting loud speakers warned of the impending disaster. People were urged to leave their houses and take refuge in rescue shelters. Shibu listened to the announcement and Leena enquired about his decision. The villagers were reluctant to leave their belongings and move out. But Shibu decided that he will take refuge in government shelters. He also tried to convince other villagers.

Taking refuge at the government shelter was tough decision for Shibu, but still he took it. He thought he was acting selfish by pressurising his family members against their will to follow his commands. As predicted, Cyclone Phailin hit the coast of Orissa and caused devastation and destruction. After spending 15 days at the camp, Shibu decided to return to his village. He was shocked to learn that nothing remained, as expected; the village was completely washed away. He was sad and he glanced upwards, as if to ask God, 'why me again?' He felt four small hands clutching his waist. He lowered his gaze. He saw smiling faces of his children. Tranquillity engulfed him. His eyes were filled with tears. This time, it was tears of happiness. Everything was lost but life remained!

### Critical Thinking Question

1. Do you think this time Shibu made the right decision?

#### 4.12 *Keywords and Phrases*

Preparedness	Logistical readiness	Contingency planning
Vulnerability analysis	Emergency operational plan	

#### 4.13 Objective Type Questions

#### A Fill in the Blanks

1. The more the \_\_\_\_\_ of the disaster, the greater is the need for reflection and \_\_\_\_\_.
  2. Occurrences that have potential to cause damage to life and property are \_\_\_\_\_ and not \_\_\_\_\_.
  3. Disaster \_\_\_\_\_ and disaster \_\_\_\_\_ are two distinct but overlapping stages of disaster management.
  4. The 3 A's of preparedness are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
  5. \_\_\_\_\_ answers the what of disaster preparedness.
  6. Preparedness should leave room for creating \_\_\_\_\_ solutions rather than being confined to \_\_\_\_\_ and \_\_\_\_\_.
  7. In keeping with the response behaviour of people struck by disaster, preparedness plans must incorporate intricate aspects of \_\_\_\_\_.
  8. The principle of \_\_\_\_\_ states that preparedness efforts should take into account all hazards irrespective of the probability of damages it may cause.
  9. Rapid \_\_\_\_\_ and development have opened up ways of new and severe disasters.
  10. Vulnerability assessment provides a \_\_\_\_\_ of a country's vulnerability to disasters.
  1. Preparedness planning helps in prioritizing \_\_\_\_\_, assessing \_\_\_\_\_ and setting performance \_\_\_\_\_.
  2. Implementation of preparedness plans focus on \_\_\_\_\_ and setting up \_\_\_\_\_.
  3. Coordinating with railways, military and aviation departments for providing relief is carried on by the \_\_\_\_\_ units.
  4. Planning related to a fresh exploration of alternative according to turn of events is called \_\_\_\_\_ planning.
  5. The three stages of contingency planning are \_\_\_\_\_ and \_\_\_\_\_.

**B. Multiple Choice Questions:**

1. Forming, storming, norming and performing are stages of
    - (a) preparedness planning
    - (b) contingency planning
    - (c) preparedness monitoring
    - (d) team-building
  2. The second emotional phase of disaster affected people is
    - (a) acute phase
    - (b) reaction phase
    - (c) recovery phase
    - (d) reorientation phase

3. Taking into accountable possible hazards irrespective of the probability of damage is a component of the principle of
    - (a) time-bound implementation
    - (b) motivation
    - (c) inclusiveness
    - (d) collaboration and coordination
  4. Moving a plan from a general perspective to specific aspects is involved in
    - (a) vulnerability assessment
    - (b) developing the preparedness plan
    - (c) implementation of preparedness plans
    - (d) coordination and control of plans
  5. No matter how well defined the preparedness plans are, they are doomed to fail in the absence of
    - (a) vulnerability evaluation
    - (b) public education and rehearsals
    - (c) organisational structure
    - (d) contingency plans
  6. Strict compliance with the plans without fresh exploration of alternatives may prove to be disastrous in them self
    - (a) contingency planning
    - (b) emergency response
    - (c) communication channels
    - (d) integration activities
  7. Defining, determining and identifying problems and goals for a team is done in
    - (a) forming stage
    - (b) storming stage
    - (c) norming stage
    - (d) performing stage
  8. The phase emotional impact where the disaster management teams swing into action to take control is
    - (a) acute phase
    - (b) reaction phase
    - (c) recovery phase
    - (d) reorientation phase
  9. Training is customised to suit the needs of the individual and the group by the
    - (a) Assessor
    - (b) Coordinator
    - (c) Director
    - (d) Trainer
  10. EOP is
    - (a) Emergency Operation Procedure
    - (b) Emergency Operation Plans
    - (c) Elementary Operation Procedure
    - (d) Elementary Operation Plans

**4.14 Questions for Review**

- What is the importance of disaster preparedness in the era of unpredictable weather conditions?
- Explain the various principles of preparedness. Do you think these principles are important and should be followed; if yes, why?
- Discuss the importance of logistical readiness in disaster preparedness.
- Draw the organisational structure for disaster preparedness. Explain the duties of different disaster preparedness divisions.
- Explain the importance of contingency planning in disaster preparedness. What are the contents of an emergency operational plan?

**4.15 Answers****A. Fill in the Blanks**

- Magnitude, corrective action
- Hazards, disaster
- Mitigation, preparedness
- Aim, action, accountability
- Aim
- Innovative, rules, regulations
- Motivation
- Inclusivity
- Urbanisation, development
- Blueprint
- Goals, risks, standards
- Resource mobilisation, early warning systems
- Logistics
- Contingency
- Readiness, standby, activation

**B. Multiple Choice Questions**

- (d)
- (b)
- (c)
- (a)
- (b)
- (a)
- (a)
- (c)
- (d)
- (b)

# Disaster Response

**D**read of disaster makes everybody act in the very way that increases the disaster. Psychologically the situation is analogous to that of people trampled to death when there is a panic in a theatre caused by a cry of fire!

—Bertrand Russell

## Learning Objectives

After reading this chapter, you should be able to:

- Explain the aims of disaster response.
- Explain in detail issues such as evacuation and migration, administering first-aid, transportation of affected people to hospital.
- Discuss the restoration of essential services.
- Describe the search and rescue work.
- Explain a model of an Ideal Command Centre.
- Describe the various modern and traditional methods of response.

## OPENING CASE

The Kedarnath Temple, abode of one of the 12 Jyotirlingas, is considered to be one of the Hindu temples dedicated to Lord Shiva. It is located on the Himalayan range near the Mandakini river in the state of Uttarakhand in India. The temple is believed to have been built by Parshuram who pleased Lord Shiva by doing penance in Kedarnath. The temple is located at a high altitude and is not directly accessible by road. An uphill trek of about 14 km is required to reach the temple. Due to extreme weather conditions, the temple is opened only between the months of April and November. The temple is also one of the four major sites in India's Chota Char Dham pilgrimage of Northern Himalayas.

Ishwar Chand Vajpayee was a devout Hindu. He belonged to a traditional Brahmin family of Pauri. Every year during the summer vacation, he, along with his wife and three children, used to take a trip to some holy place. In 2013 they decided to go for the Chota Char Dham pilgrimage. Ishwar had heard a lot about Kedarnath and was very excited. He thought that the God had been especially kind on him because he believed that only the lucky ones could take this trip. But fate had something else in store for him.



Disaster struck Uttarakhand. Over 200 bodies were extricated in the previous two rounds, with sources saying that the official toll has now crossed the 1,000 mark.

Photo: AFP.

### 5.1 AIMS OF RESPONSE

On 15 June 2013, the Vajpayee family reached the temple town of Kedarnath. They had their dinner at the rest house where they were put up. While having dinner they heard discussion about the changes in weather conditions but they thought it was a rumour. On 16 June 2013, Ishwar and his children got up early in the morning and got ready to visit the temple. When they were going towards the temple, water with full rage descended towards them. They somehow entered the temple. Ishwar thought that he was safe as he was near God. But flash flood washed away everything. He saw his wife and his elder son being carried away. He held his younger son and daughter. But could not hold onto them for long, they also swayed away with the moving debris. The children were lying in a pathetic state. Ishwar himself was drowning in the mud and debris. It was raining incessantly. He looked around and saw that the fury of floods had left behind a trail of devastation in this temple valley. He could not make sense of all that happened to him.

He spotted his daughter who sank in the mud in front of his eyes. He tried to move towards her but could not as he himself was caught in chest-deep mud. He saw his son holding a rock with one hand and with the other holding the hand of his sister. Ishwar was devastated at the sight. He somehow pulled himself and managed to reach his son. By the time he reached him, this child was already half sunk in the debris. Ishwar dragged him to the shrine. He tried hard to revive his son, but he was gone. Ishwar took him in his lap and screamed. After several hours, he placed the body of his son in the temple premises and placed a rock above it. He went inside the temple and screamed in pain and desperation, pulled his hair and thumped his chest. But everything was gone. He felt that even God was not hearing. His faith in divine powers was lost forever. After two days and three nights, the eerie silence of the place was broken by the sound of the chopper. Ishwar hid himself under a rock, he never wanted to return and even if he did to whom would he go to. He lost everything and the only thing that remained was a life worth nothing.

#### Case Questions

- How would you respond if you were caught in a similar situation?
- It is seen that places of pilgrimage are exposed to vulnerable risks. Is faith worth the risk? Give reasons for your answer.

### 5.1 Aims of Response

Disaster management has received a greater impetus as a result of the increasing number of disasters. Additionally, there is a growing awareness of costs associated with improper management of disasters and hence communities and government are trying hard to improve the first responder efforts. An understanding of disaster management cycle and its phases provide a systematic direction to the stakeholders for effectively managing disasters. The disaster management cycle depicts the ongoing process by which governments and communities coordinate and plan to reduce the impact of disasters. Mitigation and Preparedness are the first two phases of Disaster Management Cycle. The third phase of this cycle is the response phase. It deals with the immediate reaction of the individuals, communities and agencies working for disaster management immediately following a disaster. Disaster response is aimed at providing instant support to maintain life and health of the affected population.

There is a wide array of response activities that are carried out after a disaster. These include aid, first aid, transportation, shelter and food. It may also involve initial repairs to damaged infrastructure. The mission of the response phase is to meet the basic needs of the people until more permanent and sustainable solutions are formulated.

The level and kind of disaster response depends on a number of factors such as the scale of disaster, nature and number of affected people and site-specific conditions. Response comprises the decision and actions taken to deal with an urgent situation that has adversely affected life and property. It calls for collaboration, coordination and communication between the agencies involved in administering rescue and relief operations. One of the main aims of response is to save and protect human life. This involves a gamut of activities from searching alive individuals to rescuing them and helping them reach safe places. Other aims of response are discussed as follows:

1. To guarantee the continued existence of the maximum possible number of affected population, ensuring that they are in the best possible physical and mental health in the circumstances.
2. To reinstate critical services and provide food, clothing and water.
3. To restore or replace demolished or damaged infrastructure. To make alternate housing arrangements in camps.
4. To help in relieving suffering.
5. To protect the health and safety of responding personnel.

#### KEY IDEA

The mission of the response phase is to meet the basic needs of the people until more permanent and sustainable solutions are formulated

#### 5.2

### Control Process and Measurement

Disaster plans are made to guide emergency action and help in making decisions in situations when accurate information is not available. The plans are implemented after a disaster to provide instant relief to the affected community. There is no time to go through lengthy decision-making process. Everything has to be done swiftly. Controlling helps to check the errors and to take corrective actions so that deviations from standard operating procedures are minimised and response goals are achieved. Controlling is a systematic effort by which it is ensured that plans are strictly followed and actual performance is measured and compared with the standard performance. If any glaring deviation is found, it is immediately corrected to save from future losses. Further controlling is of immense importance in disaster response as it aids in the coordination of activities to be performed at ground level. Immediately after a disaster, there are a lot of activities that have to be carried out. At the planning level, the tasks and roles are clearly stated and responders are made aware of their responsibilities. This helps them to control their behaviour and prioritise their tasks. Thus, controlling at the individual level ensures proper coordination and clarity of tasks and roles among the agencies involved in providing relief.

#### 5.3 SECURITY ISSUES

After a disaster, basic relief materials have to be distributed amongst the victims. The planning process helps in gauging the needs and the control process helps in ascertaining the extent to which the needs are met. It also helps check the outflow of relief materials and provides for the judicious allocation of materials to the victims. The control process is a three-step process that comprises setting performance standards, measuring actual performance and comparing actual performance with standards. Setting up standards immediately after a disaster is difficult. To deal with these unanticipated situations certain Standard Operating Procedures, also known as SOPs, are developed. The objective of a standard procedure is to help make the response routine and to eliminate the need for a lengthy decision-making process. If certain criteria are met, the response mechanism is triggered automatically. The SOPs for specific types of disasters are compiled and presented in an emergency action manual. These manuals ascertain the tasks that must be carried out during each phase of an emergency and describe the procedure for undertaking each in an appropriate sequence. These help in structuring the response tasks to a great extent. These SOPs not only guide action, but also act as a control mechanism. They also help in keeping a track of the tasks to be undertaken. In addition, SOPs can act as a standard against which the actual performance can be measured. Controlling helps in the efficient and effective use of resources and helps in effectively responding to disasters. It helps in regulating the day-to-day work related to schedules and specifications.

#### KEY IDEA

The control process is a three-step process that comprises

- *Setting performance standards*
- *Measuring actual performance*
- *Comparing actual performance with standards*

#### 5.3

### Security Issues

Generally, it is seen that security is not always a priority issue after a disaster because rescue and relief operations are considered paramount. But nevertheless security issues are vital to survivor response and coping. The protection of the human rights and safety of displaced populations and refugees is essential. Social order has to be established at all costs. The police ensure that the emergency services personnel, such as fire and ambulance services, do their job effectively. They cordon off the disaster area, manage the traffic and sometimes set up a safety zone around the disaster area. But if the area is large then the police sets up helpline numbers to help the victims. Along with the police, military personnel are also deployed to respond to a disaster. Their duties include evacuating people and taking them to secure places.

Disasters can be very difficult to predict and the victims are almost often caught unaware. Disasters have far-reaching effects on the well-being of individuals and communities. The victims are often caught unaware and thus, the disasters have overwhelming effects. Both property and lives are affected. After the Uttarakhand disaster in 2013, many newspapers reported of theft. The unfortunate victims of disaster were robbed by the miscreants. Gory incidents of cutting fingers of victims and robbing them of their jewellery were reported. Given the state of vulnerability of the affected community, physical security and public order in the disaster-affected areas should be established. It helps prevent the public order from turning into an undesirable state of panic and chaos.

A human security approach is needed that should 'encourage systematic information sharing, continuing action plans, needs assessment and better coordination of responses and offers of assistance'. This perspective focuses on the needs of the most vulnerable population that is women, children and the elderly.

**KEY IDEA**

It is vital to ensure the security of the most vulnerable population that is women, children and the elderly.

#### **5.4 Profile of an Effective Crisis Leader**

Disasters are situations where leaders can work wonders. They can be really effective in managing the disasters and controlling the situations. These are challenging situations that bring the best and worst in leaders. Leaders have to take charge of the situation. Certain pre-requisites of an effective crisis leader are as follows:

- Understanding:** The leader should understand the situation well. Only then can he or she find solutions to the problems.
- Truthful:** The leader has to face reality squarely. He or she has to be very transparent in his or her conduct. He or she has to acknowledge the existence of crisis and must be honest in all communications.
- Patient:** Leaders have to be patient and not jump to conclusions. They should take a moment to figure out what is going on. They should provide direction and respond to the situation in a timely fashion and should not hurry.
- Suave in conduct:** There are no quick fixes to crises. Response takes time. But in disastrous situations, people want it to be over right away. The leader has to know the situation, be in control of all that is happening and be tactful in dealing with the disaster victims.
- Composed:** A leader should be composed and calm, when all the persons are in a state of shock and are feeling helpless. This demeanour of a leader can really work wonders by instilling the required faith in the system.
- Should be willing to delegate:** A leader should delegate tasks and responsibilities. In a crisis, many leaders feel that only they can solve the problem. But leaders should delegate and help people devise solutions to the problems at hand. This helps in motivating the people and gaining their commitment.
- Committed to selfless service:** Before asking others to sacrifice, the leader must be the first to volunteer. They should be ready to uphold general interest above individual interest.
- Decision maker:** Leaders should make decisions and not be averse to taking risk. They should have a perspective so that they can see the situation from all angles and consider all conditions while making a decision.

The true worth of a leader is often tested during a crisis. The task of a crisis leader is not only to contain and eliminate crises as they occur, but also to help the victims sail through swiftly to a safe harbour. The lead response aims efficiently.

**KEY IDEA**

Understanding, truthful, patient, suave, composed, committed to selfless service, decision maker are qualities of a crisis leader.

#### **5.5 Leading at the Time of Crisis: Competencies and Challenges**

Crisis management is the process by which a major disastrous event is brought under control. There are two elements of crisis that pose a threat to the community: First, they are shocking incidents that take individuals by surprise and second, there is very little time to make decisions. In dealing with these situations, a leader should make timely, decisive and correct decision individually and collectively. He or she should be able to limit death and suffering through preventative, curative and supportive care; take care of the physical and mental health; and meet the social needs of vulnerable populations. The leader should bolster the ability of individuals and community to rebound from traumatic and tragic events.

There are many challenges that these situations throw and consequently there are certain specific competencies required. The **first challenge** is the unpredictability of the situation. No one knows what exactly will be the nature and quantum of damage. Moreover, the situation after the disaster also keeps twisting and turning. This makes people more vulnerable and helpless. To deal with such a situation and manage it, patience is required. A patient and calm person can make a proper decision after evaluating the situation. A person who lacks patience cannot make effective decisions.

The **second challenge** is the general mood of the affected persons. They are disgusted and are in a state of shock. They feel helpless and are in a distressed state. They are emotionally and psychologically broken. An atmosphere of trust and hope has to be built. It is a herculean task but a compassionate person can handle this challenge dexterously.

The **third challenge** relates to misinformation. Proper and up-to-date information is not available in a disastrous situation. The leader has to be wise to be able to sieve information and take actions. His or her communications skill should be good. He or she should be able to bypass jammed communication lines and optimise internal communications.

It is aptly said that a leader is not a person who can do the work better than his or her men; he or she is a person who can get his or her men to do the work better than he or she can. In crisis situations, handling a team is difficult and this throws a great challenge. The competency required for attaining this is very simple: it is faith. The leader should instil confidence and faith in his or her co-workers. If the team members believe in their leader's capabilities, they will yield phenomenal results. The leader should be receptive, flexible and knowledgeable. In addition, he or she should be considerate towards the needs of his or her subordinates.

**KEY IDEA**

The three challenges of a crisis situation are:

- Unpredictability
- General mood of affected people
- Misinformation

## 5.6 Evacuation and Migration

Evacuation involves the relocation of individuals and members of the affected community from risk-prone zones to a safer location. After a disaster, the preferred course of action is to evacuate people from the affected area. Evacuation can help individuals and communities avoid the aftermath of disasters such as building collapse, outbreak of diseases, etc. But unfortunately, not all evacuations run effortlessly. People are reluctant to evacuate even in the most dangerous situations because of inadequate social or economic resources. There are other barriers such as physical or mental disabilities and risk perception of affected persons. The chief concern is the protection of live persons who have braved disaster and the immediate treatment of those who are injured. For evacuation there must be:

- A plan of action and place to relocate the evacuees:** A plan and location has to be pre-determined to relocate the victim. Proper arrangements of food and shelter have to be made by the administration to house the evacuees.
- Clear identification of escape routes:** For evacuation to be successful, clear escape routes have to be identified. After a disaster, the roads are blocked, so alternate paths have to be identified and the safety of the path should be ascertained before evacuation begins.
- A timely and accurate warning system to inform about the exact turn of events:** When evacuation is carried out, all the minute changes in the environment such as weather conditions have to be clearly informed.

Evacuation is the immediate and urgent movement of people away from the threat or actual occurrence of a rapid onset of a disaster. But in the case of a slow onset of a disaster, such as severe drought, the movement of people from the zone where they are at risk to a safer site is not, in fact, evacuation, but migration. This migration as a response mechanism is usually not organised and coordinated by authorities but is an impulsive and unprompted response to the perception by the migrants that food can be obtained elsewhere. All famines induce people to move for a short term in search of food and source of livelihood. Much of the movement is from rural areas to the urban areas. This type of migration is temporary in nature and after the crisis is over the families return to their homes.

### KEY IDEAS

- Evacuation involves the relocation of individuals and members of the affected community from risk-prone zones to a safer location.
- The three pre-requisites of effective evacuation are:
  - A plan of action and place to relocate the evacuees.
  - Clear identification of escape routes.
  - A timely and accurate warning system to inform about the exact turn of events.

## 5.7 Administering First-Aid

The initial process of evaluating and addressing the needs of a person who is physically injured or is psychologically distressed is referred to as first-aid. It entails determining a person's physical condition and

swiftly administering the medical aid. Though first-aid is not a substitute for professional medical help, but still it can make a difference between life and death. After the disaster, there are many who are physically injured and many more who are psychologically distressed. They need help and support to survive. First-aid helps in relieving the trauma to a certain extent. The injured persons feel that their needs are being addressed to and it gives them the confidence required to fight the situation. Disastrous situations are different than the normal scenes of accidents. There are many persons who are injured and need support. The persons are in a serious situation, caught between life and death. Moreover, very little help is available. It takes time for the formal medical aid to come. The victims' exact nature of wounds is difficult to assess. In this crisis situation, first-aid can help save many lives. Therefore, when administering the first-aid after disasters, there are certain aspects that need to be taken care of. These are as follows:

- Check the surroundings:** The person who is administering the first-aid should first evaluate the situation and try to get a rough idea of the situation. He or she should not rush; instead he or she should take a stock of the situation, ensure his or her own safety and then proceed to help others.
- Seek help wherever necessary:** If there are chances of endangering one's life in the process of helping a victim, help of others should be sought. If professional help is available, seek help from them as they have been trained to handle these situations. Remember first-aid is of no use if the person who is administering it is himself or herself unsafe. Call emergency services right away if someone is seriously injured.
- Remain with the victim:** The victim should not be left alone at any cost. Helping the victim to breath is the first thing to do.
- Stay calm:** Many a times it is seen that the person who is helping the victim gets nervous and it affects the victim psychologically. Strength and support is the need of the hour. A person who has gone through serious trauma needs both physical treatment and emotional support. So it is warranted that the person who is helping the victim should remain calm and constantly try and reassure the person that help is on its way and that everything will be alright.
- Determine responsiveness:** If a victim is in an unconscious state, he or she should be brought back to the conscious state by gently tickling his or her bare hands and feet or by speaking to him or her. If he or she does not respond to sound, touch or other stimulation, his or her breathing and pulse must be checked to ascertain his or her actual state.
- Help to stop bleeding first:** Once it is established that the victim is breathing and has a pulse, the next task should be to control any bleeding. Using direct pressure on a wound before trying any other method of controlling bleeding is often helpful.
- Nurse shock next:** A person in a state of shock has a cool, clammy skin and is in an agitated state. The skin around the face and lips turn pale. If shock victims are not treated in time, they may die. Anyone who has suffered a loss of blood due to severe injury and faced a traumatic life-threatening situation is at risk due to shock. First-aid in terms of psychological support has to be provided.

Training in first-aid should be made compulsory at school level. No one knows what will happen next. Disasters can strike anywhere and at anytime. Persons who are trained can help themselves and others and save many lives. Moreover, the kind of first-aid differs according to the nature of disaster. The kind of first-aid required for a person who has suffered burns is different from one who has a broken arm. So training is a must as it helps in customising response. First-aid training must be packaged in a way that clearly outlines its aims, mechanism, when it is used, where it can be applied and who benefits from its use, who can deliver it.

**KEY IDEAS**

- The process of addressing the needs of a person who is physically injured or is psychologically distressed is referred to as first-aid.
- When administering the first-aid after disasters, certain aspects that need to be taken care of:
  - Check the surroundings
  - Seek help wherever necessary
  - Remain with the victim
  - Stay calm
  - Determine responsiveness
  - Help to stop bleeding first
  - Nurse shock next

**5.8 Handling of Injured at Hospitals: Challenges and Issues**

Disasters are sudden events that affect the population adversely. To save people from further damage and injury, it is required that they are transported to safer places. Those injured are taken to hospitals after administering first-aid. The hospitals have to be ready to take care of the victims as they arrive. An emergency health kit that contains antibiotics and supplies for wound care, surgical care and other essential materials should be kept ready. Since the medical facilities are also limited, the victims are triaged. Though triaging is difficult and definitely harsh, it has to be done to do the greatest good for the greatest number of victims. Moreover, medical care has to be administered according to the nature and kind of injury. Triage area should be identified where initial registration and triage should be done. This area should be manned by a Registration officer on the registration desk, doctors, nurses, and stretchers and hospital attendants.

Colour-coded tagging systems are normally used to identify those with minor injuries, moderate injuries or severe injuries. The **black tag** is used for the dead, **red tag** for those needing immediate resuscitation, **yellow tag** for those suffering from potentially life-threatening injuries and **green tag** for minor injuries or wounded. Assessing the status of victims is a continuous and dynamic process as the critical may be out of danger and the condition of those with moderate injuries may become critical. Also, it is seen that the initial assessments of the condition of victims are accurate only 70% of the time. Also, for conducting triage, the medical personnel have to be experienced. After the victims are triaged, they are taken to various medical centres where they are subjected to basic medical interventions such as intravenous lines, wound care, oxygen and pain killers. It is imperative that after a disaster, the health-care providers should do what they have expertise in. Paramedics should perform the initial assessment, triage, stabilisation and transport. They cannot replace nurses. The physicians and nurses with special field training should be in the field. Also, specialised medical aid should be provided to the victims.

If there is a necessity, the patients may be shifted to hospitals having specialised and definitive care for specific ailments. The medical team determines and arranges for medically supported transport. Immediately after a disaster, a committee should be formed. Representatives of all departments should be a part of the committee

The committee should assess the hospital's capability, potential problem areas and other concerns that must be addressed urgently. Status of equipment and supplies must be reviewed and need for additional supplies must be ascertained. Communication is one of the main problems in major disasters. People throng hospitals in search of their relatives and there is a chaotic situation. There should be an established means of communications to keep the relatives' of the victims updated about the condition. Wireless sets for security and ambulance personnel should be provided. An area should be identified and designated as a communication room within the hospital and all internal and external information must be made available from here. Communication with other hospitals to obtain additional blood, equipment and supplies should be carried out from here. Other essential ancillary services departments, such as lab, radiology, blood bank and mortuary services, should be adequately staffed. Hospital dietary services department should be prepared to serve food to in-house patients and personnel as the need arises. This department should be responsible for setting up menus in disastrous situation and maintain adequate food and drinking water supplies. Adequate sanitation services within and around the hospital should be ensured by the hospital administration. The hospital administration should also ensure sufficient supply of clean hospital linen, sterile dressing and sterile supply of instruments to the essential areas of the hospital. Adequate arrangements should be made to meet the additional requirement of water and power supply. Standby generators should be installed to provide light and power to essential areas of the hospital such as emergency department, operation theatres and ICUs.

**KEY IDEAS**

- Colour-coded tagging systems are used to identify those with minor injuries, moderate injuries or severe injuries.
- The **black tag** is used for the dead, **red tag** for those needing immediate resuscitation, **yellow tag** for those suffering from potentially life-threatening injuries and **green tag** for minor injuries or wounded.

**5.9 Mobilisation and Restoration of Essential Services**

To ensure effective command and control of an emergency situation, it is crucial that essential services are organised. The following essential services should be made functional on a priority basis:

1. **Telephone lines:** Primarily, the channel of communication should be established. The damaged mobile towers should be fixed and telephone lines made functional.
2. **Electricity and power supply:** The generation, transmission and distribution of electricity should be ensured. The broken lines should be fixed.
3. **Drinking water supply and non-perishable food:** Supply of water for drinking purposes should be established. Non-perishable food packets must be made available.
4. **Alternate roads:** The most severely affected areas in a disaster are the roads and railways. This hampers the supply of necessary items to victims. Therefore, it is vital to repair the roads or prepare alternate routes to reach the affected area.

The coordination of all essential services should be performed in a unified manner. At the national level, all the response strategies must be developed, communicated and closely monitored. The strategy should include prioritising the needs of all agencies working at local levels. The delivery of emergency relief will require logistics facilities and capacity. A well-organised supply service is vital for handling the procurement or receipt, storage and dispatch of relief supplies for distribution to disaster victims. These essential services must be mobilised and restored.

### KEY IDEA

Telephone lines, electricity and water supply, drinking water supply, non-perishable food items and medical care are essential services that should be provided on priority basis.

## 5.10 Search and Rescue Work

Disaster response activities begin with the detection of the crisis and end with the normalisation of the situation following impact. The aim of disaster response is 'to save lives and property by positioning emergency equipment and supplies; evacuating potential victims; providing food, water, shelter and medical care to those in need; and restoring critical public services'. It is seen that due to the advent of technology, in many cases, the authorities are promptly alerted to disaster onset by means of systematic forecasts or prompt detection. There is substantial forewarning and thus a long period of time is available to trigger the emergency response. However, in other cases there are no such predictions and only post-disaster information is available. It calls for prompt assessment of the impact area to respond quickly and direct the emergency response resources to the most severely affected areas. The response activities undertaken to control the primary threat include evacuation from the affected area. It entails triggering search and rescue mechanism to find the injured, providing emergency medical care and transferring them to safer places. Operations undertaken to counter secondary threats include all actions undertaken to reduce the chances of further damage. This entails putting off urban fires after earthquakes, identifying contaminated water supplies or preparing for flooding following glacier melt.

During the response stage, search and rescue of the victims is the primary task of the disaster response team. Search and rescue operations comprise all activities related to locating and recovering persons either in distress/potential distress or missing, and delivering them to pre-identified secure places. There are a number of agencies working for search and rescue. These agencies are committed to a cohesive and cooperative effort, the aim of which is to find and rescue every living individual in the affected area. The key functions of search and rescue are to coordinate efforts of all agencies involved in the process of search and rescue. It also includes effective communication between them. They constantly exchange information about the details of persons caught in distress, their physical condition and the actions undertaken to rescue them. In addition, search and rescue team members also provide basic assistance to affected persons and deliver survivors to a place of safety or where further assistance can be rendered.

It is seen that usually local emergency responders dominate the response period and are most actively engaged in search and rescue work. But there are other teams also which includes police, fire fighters and emergency management personnel who are especially trained in this area.

The response phase differs from other phases of disaster management in the sense that there are two important aspects namely, uncertainty and urgency, which are less prevalent in other phases but dominate here. In the disaster response phase, time becomes a crucial factor. Minutes of delay can cost lives and property, so swift action is essential. However, speed of response must be reasonably balanced with proper and judicious planning. An intelligent assessment of the situation should be done prior to taking action to avoid further damage. Actions that are impulsive and possibly counterproductive should be avoided. In Uttarakhand, a chopper that was engaged in search and rescue crashed. And in another incident, members of team engaged in rescue and relief operations were feared killed as they were swept away by the Mandakini river. The incident occurred when they were crossing a makeshift bridge. These instances reveal the fact that even search and rescue work, if not done properly, may prove to be fatal. Thus, the personnel offering rescue services have to be alert.

The emergency response actions should be well coordinated with disaster recovery as they form the foundation for carrying out recovery activities. Saving life and property is a priority. In addition, damage assessments are also done simultaneously to gauge the quantum of losses. These are later used to support requests for financial aids from governments. It is also used for debris removal from roadways that are essential for restoring infrastructure. The response phase ends when the situation is stabilised. The search and rescue operations are stalled when it is ensured that there are no chances of finding a living being in the affected area.

### KEY IDEA

The response activities entail triggering search and rescue mechanism to find the injured, providing emergency medical care and transferring them to safer places.

## 5.11 Modern and Traditional Methods of Response

Disasters are situations that need collective effort as they are beyond the capability to cope. The people affected by disasters need external assistance to survive and recover. The responses to disasters may utilise a mix of methods from traditional to modern, with these tactics moving back and forth depending on the type and location of disaster. The situation and nature of the affected population play a decisive role in choosing an effective response mechanism.

The traditional means of response have been used since long. They are the most common and practical methods of response. They entail assistance provided in the form of food, shelter materials, blankets, etc. Money is also provided so that affected people can buy things according to their needs from local markets. A prominent means of disaster response has been the transfer of funds, where people residing outside the disaster area channel sums of money to be sent over to those affected. Charitable organisations offer help to communities that have suffered a disaster. These organisations solicit donations to assist disaster survivors in their recovery and supervise the distribution of these products.

New technologies can be very useful and powerful in disaster response. These basically form the basis of the modern methods of disaster response. Mobile phones can act as warning devices. Short message services provided by operators can prove to be a useful medium to send warning signals of imminent threat.

Many a times it has been used by persons caught in disastrous situation to send their exact location for aid search and rescue.

The disaster management team also uses the potential of mapping technologies, such as geographic information systems (GIS), remote sensing (satellite imagery) and global positioning systems (GPS), to aid emergency response operations. These technologies help in damage mapping of affected areas, search and rescue, risk assessment and task communication.

### 5.11.1 Remote Sensing

Remote sensing is the use of electromagnetic wave radiation to obtain information about an object by a recording device that is not in physical contact with the object. It is used in disaster management as a response tool. In situations such as flood, there is a risk of damage or disruption to normal living including communication, transportation, environment and infrastructure. Given the extent of damage, many areas are cut off from the main land. While the task of providing assistance to victims is critical and time dependent, a physical presence in the affected area could increase the persons at risk. In these situations, remote sensing can greatly assist by allowing users of the technology the opportunity to view the affected area, gather pertinent information and take a stock of the current situation without jeopardising the safety of the user, since they will not be actually at the site. Remote sensing has several advantages.

1. The users of the technology do not have to be in direct contact with danger zones and hence it saves lives.
2. Through the use of images, very large areas can be seen and the data collected can be regularly and routinely acquired and archived.
3. It can also assist in damage assessment monitoring.

Remote sensing uses electromagnetic waves and hence is classified by three wavelength regions, namely, *Visible and Reflective Infrared Remote Sensing, Thermal Infrared Remote Sensing and Microwave Remote Sensing*. In Visible and Reflective Infrared Remote Sensing, 'everyday' light and infrared lasers, with wavelength ranging from approximately 0.4 to 0.8 micrometers, are used. Cameras or video recorders are attached to airplanes to capture aerial photos of the affected area. This is the most readily used and economical form of remote sensing. This type of remote sensing helps in making before and after comparisons in the event of a disaster.

The second type of remote sensing is the Thermal Infrared Remote Sensing. In this night goggles which are specially made from infrared sensor are used. The advantage of Infrared sensors is that they can capture temperature differences that cannot be seen with naked eyes. Infrared sensors exploit the fact that all matter emit a type of electromagnetic radiation called 'blackbody radiation'. Thermal Infrared Remote Sensing helps in viewing a part of the electromagnetic spectrum that cannot be seen with naked eyes. This can be used in disasters caused by volcanic eruptions.

The third type of remote sensing is the Microwave Remote Sensing, which uses microwave radiation. Since microwaves are seldom affected by atmospheric conditions and can often image beneath or through objects, therefore it serves as an effective technique used in remote sensing.

The data gathered from remote sensing can be used in effective management of disasters. It is of immediate help in affecting effective disaster response. It helps in providing a clear picture of the actual state of affairs and decisions can be made on the information gathered. During floods, the communication and

### 5.11 MODERN AND TRADITIONAL METHODS OF RESPONSE

transportation channels to the affected area are snapped. Gaining access to these areas is difficult, but by the use of remote sensing a comprehensive picture of the affected area can be taken and decisions can be made without jeopardising the safety of the user. The response workers can stay away from danger zones and safely carryout rescue efforts. The detailed information produced from remote sensing provides up-to-date and accurate information about the affected area.

After an earthquake, the access to worst affected areas is restricted. In these situations it is difficult for disaster management personnel to gain access to survivors in a short span of time. By using remote sensing technology in search and rescue, deep searching of survivors from debris can be done with unusual results.

With the increased incidents of natural and man-made disasters, remote sensing is fast proving to be a phenomenal technology. It has got several advantages some of which are discussed below:

1. It saves response time.
2. It helps save life of the users of the technology by helping them avoid direct contact with affected areas.
3. By use of remote sensing, images of very large areas of land or space can be captured.
4. It can detect features at wavelengths not visible to the human eye.
5. Data can be regularly and routinely acquired without putting human life at risk.
6. Remote sensing is cost-effective.
7. It helps in monitoring change over large areas.
8. It can aid with damage assessment monitoring.

Though remote sensing is an excellent technology that can help in disaster management, but nevertheless it has certain challenges also. It is costly to build and operate. The data collected by remote sensing is difficult to interpret and requires expert skills.

### 5.11.2 GIS

GIS are systems that are capable of assimilating, storing, editing, analysing, sharing and displaying geographically referenced information. GIS technology can provide the user with accurate information on the exact location of disaster. This would prove useful as less time is spent trying to determine the exact location. GIS can also be used as a floor guide for disaster response to point out evacuation routes, assembly points and other evacuation details. It can also assist in the distribution of relief materials, by identifying the specific areas where clusters of victims are located and their needs.

Mapping and geo-spatial data using GIS provides a comprehensive display on the exact level of damage from disasters. It can provide details of the exact nature of damage and the number of persons who are affected. By providing these intricate details, the GIS help in facilitating the process of stock demands and distribution. It can help identify the specific areas where clusters of victims are located and the unique needs of persons within these areas. The need of food and clothing can be satisfied according to the information thus provided. GIS helps in making assistance organised. It is an innovative and interactive technology tool having following advantages:

1. GIS represents three-dimensional spatial information of a wide geographic area.

2. It helps in better understanding of the situation by integrating the different geo-spatial information which includes models, maps and other graphic forms.
3. GIS effectively collects, analyses and distributes up-to-date information.
4. GIS is versatile and easy to use.

GIS has a lot of advantages but it is not without flaws. The biggest flaw is that it can adversely impact on people, economy and environment by revealing personal and zone-specific information. It is complex to understand and needs a hoard of information for decision making. But nevertheless it is a technology that has produced exceptional results especially in managing post disaster scenarios. It is proving to be an indispensable tool for disaster management planners, Meteorologists, Geologists and communications personnel.

### 5.11.3 Other Methods

Apart from the above two modern methods of response, social media and social networking sites are increasingly being used as a tool of disaster response. Social networking sites, such as Twitter and Facebook, are effective channels of communication. They aid in response by publicising the event and engaging volunteers to share recovery-relevant expertise. Additionally, blogs can help to rapidly publicise the need for assistance grants. Geo-tagged photo groups to document damage are also created and local information are made available. These sites can also help in integrating volunteer directories with social networks to simplify information sharing.

### KEY IDEAS

- The traditional means of response are the most common and practical methods of response.
- Remote sensing is the use of electromagnetic wave radiation to obtain information about an object by a recording device that is not in physical contact with the object.
- GIS are systems that are capable of assimilating, storing, editing, analysing, sharing and displaying geographically referenced information.

### 5.12

#### *A Model of an Ideal Command Centre*

After a disaster, it is extremely essential to respond to the situation in a systematic manner so that future losses arising out of the current situation is kept within limits. Incident Command Centre is a standardised, on-scene, all-hazard incident management concept. The primary role of this centre is the coordination of efforts for effective and efficient management of incident. The centre sets incident objectives, strategies and priorities and has overall responsibility. The process of the Incident Command Centre is simple. When the disastrous event occurs, they first identify and assess the situation. Then a plan is developed and implemented. The necessary resources are procured. Monitoring of the efforts is done to control the situation. This process

serves as the foundation of Incident Command Centre and applies to any routine emergency situation. The functions of an Incident Command Centre are:

1. Development of objectives.
2. Preparation of Incident Action Plan to meet incident objectives, collection and evaluation of information.
3. Maintenance of resource status and incident documentation.
4. Providing logistics support to meet operational objectives.
5. Financials administration to monitor costs, accounting, procurement and cost analysis.

The Incident Command Centre follows the dictum of 'Locate, Isolate, Evacuate' in responding to disasters. They first try to precisely locate the problem, then isolate the problem so that it cannot influence other unaffected persons and then they try to evacuate from the affected area. The centre is manned by an Incident Commander who is in charge of the centre. There are three to seven persons who report to the Commander depending on the situation. The Incident Command Centre is divided into sections and each section is responsible for certain geographic areas of the incident. Each section is headed by a section manager. Apart from this, there are teams that are responsible for functional areas of operations, namely human resources, finance and operations. It is important to note here that teams and divisions are at an equal level in the centre, that is to say, one does not supervise the other. Teams are based on function, and divisions are based on geography. As incidents grow in complexity, the Incident Commander may elect to designate certain command responsibilities to command staff. There is a Public Information Officer in each command centre who is responsible for providing information to internal and external stakeholders. There is a Safety Officer who monitors the safety conditions and develops safety protocols. The Liaison Officer is the primary contact for agencies supporting the incident. He or she plays the role of communications manager also by collecting and disseminating valid and reliable information to all stakeholders.

The Incident Command Centre provides a management structure and scheme for conducting onsite emergency operations. It is applicable to both minor incidents and major ones. It is a useful and flexible management system that is particularly adaptable to incidents involving multi-jurisdictional and multi-disciplinary responses.

### 5.13

#### *Summary*

In this chapter, the fourth phase of disaster management cycle is discussed. The main aim of response is to ensure the survival of the maximum possible number of victims, keeping them in the best possible health in the circumstances. It also aims to re-establish self-sufficiency and essential services as quickly as possible for all population groups. The process of control and its measurement is discussed. There are many security issues that need to be considered in the post-disaster scenario. Especially children, women, aged and injured are susceptible to harm. The post-disaster scenario needs to be tackled with a lot of diligence and patience. The leader's behaviour in a crisis situation is different from normal situation. It requires patience. The leader has to be of a calm demeanour, willing to make decisions and ready to offer selfless service. Leading at the time of crisis requires specific competencies that a leader must possess.

Evacuation involves the relocation of individuals and members of affected community from risk prone zones to a safer location. For this a proper plan must be made and identification of escape routes needs to be done. The initial process of evaluating and addressing the needs of a person who is physically injured or is physiologically distressed is referred to as first-aid. It entails determining a person's physical condition and swiftly administering the medical aid. Those injured are taken to hospitals after administering first-aid. The hospitals have to be ready to take care of the victims as they arrive. There is a triage process that is followed to divide the injured into categories. Colour-coded tags are used to identify those who have minor injuries, moderate injuries or severe injuries. Search and rescue of victims is one of the key tasks of the disaster response team. There are modern response systems such as social networking sites, GPS and remote sensing and traditional response systems such as collection of aids by charitable organisations. The chapter discusses the concept and structure of an ideal Command Centre that helps in triggering an effective response mechanism after disaster.

### CASE PROBLEM: HORROR HOSPITAL

**O**n 8 December 2011, Annapurna Bose, a lady in her early 60s slipped and fractured her right ankle. She had also hurt her head, though there was no bleeding but she experienced excruciating pain. She was admitted to one of Calcutta's popular hospitals AMRI where the tests were conducted and she was given medication. Annapurna was recovering fast and was advised to stay for three more days in the hospital. Her daughter's wedding was scheduled on 13 December and Annapurna wanted to get released from the hospital early but the family members did not pay heed to her requests. She was reluctant but had to stay back since there was no option.

In the wee hours of 9 December 2011, a fire broke out in the hospital. All the patients, hospital staff and nurses ran towards exit doors. Annapurna did not know what to do, she could not run with a fractured ankle. She somehow tried to leave the cabin but somebody pushed her from behind and she fell down. She could not get up and remained there. After sometime she again tried to stand up but she could not. She saw the smoke entering her cabin and after sometime she fell down.

Though the fire was primarily initiated and restricted within the basement of the hospital, poisonous smoke was sucked by air conditioning ducts that carried it through the rooms and the corridors of the seven-storey centrally air conditioned hospital. The centrally air-conditioned hospital did not have windows, as a result smoke could not be ventilated outside the building. The whole building was filled with thick pile of smoke that caused tremendous suffocation for all the indoor patients. Ninety of the 160 patients admitted at the time were killed in the incident. It was suspected that fire was caused due to negligence of hospital authorities. Flammable substances were kept in the basement of the building that caught fire after a short circuit in the electrical system. The license of the hospital was revoked after the incident.

On noticing the fire, the security staff of the hospital tried to douse the fire with their own available resources. Fire Department swung into action after receiving the distress call and rushed to the spot. Around 25 fire engines and hydraulic ladders were used for the rescue and dousing of the massive fire and smoke. None of the smoke alarms worked as they were in a switched off mode because they would otherwise go off at the slightest smoke and disturb patients. The sprinklers, the gas jets and other water

### 5.15 OBJECTIVE TYPE QUESTIONS

releasing equipment that are meant to fight fire, were non-functional. The angry relatives of patients resorted to stone pelting and they smashed panes at the hospital registry, as they were being given no information about the patient's conditions and whereabouts. Police had to lathicharge a group of people throwing bricks.

#### Critical Thinking Question

- What would you do if you were caught in such a situation?

### 5.14 Key words and Phrases

Response	First-aid	Coping
Evacuation	Restoration	Survivor
Mitigation	Mobilisation	Command centre

### 5.15 Objective Type Questions

#### A. Fill in the Blanks

- The control process in disaster response is a \_\_\_\_\_ step process.
- Disasters are challenging situations in which \_\_\_\_\_ leaders take charge.
- Before asking others to sacrifice, the leader must be the first to \_\_\_\_\_.
- The three challenges of a crisis situation are \_\_\_\_\_, the general mood of affected persons and \_\_\_\_\_.
- \_\_\_\_\_ involves relocation of individuals and members of affected community from risk prone zones to safer zones.
- Though \_\_\_\_\_ is not a substitute for professional medical help, it makes a difference between life and death.
- In order to identify minor, moderate or severe injuries \_\_\_\_\_ tagging system are used.
- To ensure effective command and control of an emergency situation, it is crucial that \_\_\_\_\_ are organised and made functional.
- Due to the advent of technology there is substantial \_\_\_\_\_ and time available for response.
- The \_\_\_\_\_ methods of response are the most common and practical methods of response.
- \_\_\_\_\_ is the use of electromagnetic wave radiation to obtain information about an object by a recording device that is not in physical contact with the object.
- Rapid publicising, assistance grants, integration of volunteer directories can be done through social \_\_\_\_\_ and social \_\_\_\_\_.

13. The Incident command centre follows the dictum \_\_\_\_\_.
14. \_\_\_\_\_ can also be used as a floor guide for disaster response to point out evacuation routes, assembly points and other evacuation details.
- B. Multiple Choice Questions**
1. A leader who is in control of the situation and tactful in dealing with the victims is
    - (a) composed
    - (b) suave
    - (c) truthful
    - (d) patient
  2. The fact that the victims of a disaster needs to be helped in breathing as the first and foremost duty is
    - (a) checking the surrounding
    - (b) seeking help wherever necessary
    - (c) remaining with the victim
    - (d) staying calm
  3. Victims who need immediate resuscitation are tagged
    - (a) black
    - (b) red
    - (c) yellow
    - (d) green
  4. The essential services that ensure supply of necessary items to victims are
    - (a) telephone lines
    - (b) electricity and power supply
    - (c) drinking water and non-perishable food supply
    - (d) alternate roads
  5. Which of the following is not a mapping technology?
    - (a) Short message service
    - (b) Geographic information system
    - (c) Global positioning system
    - (d) Remote sensing (satellite imagery)
  6. Systems capable of assimilating, storing, editing, analysing, sharing and displaying geographically referenced information are
    - (a) GIS
    - (b) GPS
    - (c) SMS
    - (d) SOP
  7. Which of the following is not generally a command staff?
    - (a) Certifying officer
    - (b) Public information officer
    - (c) Safety officer
    - (d) Liaison officer

**ANSWERS**

- 5.17 **ANSWERS**
8. Response is the \_\_\_\_\_ stage of disaster management cycle.
    - (a) First
    - (b) Second
    - (c) Third
    - (d) Fourth
  9. The *black tag* is used for
    - (a) the dead
    - (b) those needing immediate resuscitation
    - (c) those suffering from potentially life-threatening injuries
    - (d) minor injuries or wounded
  10. The users of remote sensing do not have to be
    - (a) in direct contact with danger zones and hence it saves lives.
    - (b) in contact with danger zones and hence it saves lives.
    - (c) in contact with safe zones and hence it saves lives.
    - (d) in direct contact with safe zones and hence it saves lives.

**5.16 Questions for Review**

1. Discuss the traditional and modern methods of response.
2. Write a short note on an Ideal Command Centre.
3. Discuss the security issues in disaster response.
4. What are the aims of disaster response?
5. Sketch the profile of an effective crisis leader.

**5.17 Answers****A. Fill in the Blanks**

1. Three
2. Crisis
3. Volunteer
4. Unpredictability, misinformation
5. evacuation
6. First-aid
7. Color coded
8. Essential services
9. Forewarning
10. Traditional
11. Remote sensing
12. Media, networking
13. Locate, isolate, evacuate
14. GIS

**B. Multiple Choice Questions**

1. (b)
2. (c)
3. (b)
4. (d)
5. (a)
6. (a)
7. (a)
8. (c)
9. (a)
10. (a)

## Disaster Recovery

**W**hen I was a boy and I would see scary things in the news, my mother would say to me, "Look for the helpers. You will always find people who are helping". To this day, especially in times of "disaster", I remember my mother's words and I am always comforted by realizing that there are still so many helpers - so many caring people in this world.

*—Fred Rogers*

### Learning Objectives

After reading this chapter, you should be able to:

- Explain the medium-term and long-term recovery aspects.
- Discuss strategies for identifying and ascertaining the impact of disasters.
- Discuss community participation in defining objectives and their priorities.
- Explain the concept of participative rehabilitation.
- Discuss the importance of capacity building for reconstruction and rehabilitation.
- Explain the process of getting compensations from insurances companies and the government.
- Explain the various coping strategies and the role of counselling and psychological support.

**OPENING CASE**

**O**n 26 January 2001, Gujarat experienced a dreadful earthquake of magnitude between 7.6 and 7.7 on the Richter scale. The loss of lives was estimated to be over 20,000, and about 1,67,000 people were injured. Nearly 1 million homes were destroyed. Health systems received the worst blow, two district hospitals and over 1,200 health clinics, most of which were situated in the rural areas, were destroyed. The education system was spoilt as over 11,600 schools were damaged. Apart from this, the water supply was gravely affected as over 240 earthen dams for small reservoirs, providing water for irrigation, industry and domestic needs, were also damaged. Losses in public sector assets were estimated to amount to Rs. 2,500 and included asset losses in health of Rs. 220 crore, a loss of Rs. 470 crore in education, Rs. 14 crore worth of municipal infrastructure, Rs. 339 crore of public buildings and monuments, Rs. 231 crore of rural water supply, Rs. 186 crore loss to irrigation, Rs. 186 crore to power, a cumulative of Rs. 321 crore loss to roads, bridges, railways, and airports, Rs. 98 crore to ports and Rs. 51 crore to telecommunications.



Gujarat: Then and now. Two decades after this massive earthquake, the region has now become a marvellous exemplar of a recreated town. The picture clearly depicts both the status just after the massive earthquake and Gujarat after rehabilitation measures were adopted.

Source: <http://gbgmumc.org/umcor/emergency/images/india/highres/gujara3.jpg> & [http://articles.economictimes.indiatimes.com/2011-01-27/news/28428720\\_1\\_bhuj-kutch-district-cement-plan](http://articles.economictimes.indiatimes.com/2011-01-27/news/28428720_1_bhuj-kutch-district-cement-plan)

**OPENING CASE**

The earthquake caused massive destruction to other infrastructure services such as electricity and telecommunications, and even small enterprises were severely affected.

The earthquake hit in the wake of two successive years of drought in 1999 and 2000, which added to the woes of the people. It caused wide destruction to private assets in the affected districts. Of the approximate Rs. 9,900 crore (\$2.1 billion) total asset losses, Rs. 7,400 crore (\$1.6 billion) were private assets. The earthquake shattered lives, social infrastructure and economic foundations of the region. The main sources of employment of people were agriculture, animal husbandry, salt mining and refining, handicrafts and trade, which suffered a setback.

After the earthquake and the massive destruction it caused, bringing the region back to normalcy was a challenge. The foremost requirement that had to be met before the onset of the monsoon season in July was setting up of temporary shelters for the affected people. Then was the need to reconstruct the damaged infrastructure. The third item in the agenda was to revive the staggering economy. For this, wage employment to the local people for debris removal, construction and the restoration of heritage sites had to be initiated. A process of empowering individuals and communities by enhancing local participation and contributions to the reconstruction was warranted. A rationalisation of expenditures to be made was required. As the earthquake caused massive destruction to property, setting up of standards for reconstruction of both public and private buildings was required. Also community-driven reconstruction had to be emphasised upon. Members of the affected community and their wishes had to be made the core of the government's rehabilitation and recovery programme. For the successful and harmonious implementation of recovery plans, transparency in communication and coordination had to be encouraged.

Two decades after this massive earthquake, the region has now become a marvellous exemplar of a recreated town. The approach to rehabilitation was systematic and scientific and involved leading non-governmental organisations (NGOs) and experts in the process of rehabilitation. The recovery plan did wonders. Development has outdone the anguish of the region. There are signs of prosperity in the region. In fact, the quake helped rebuild the region. The Central Government declared a 5-year excise exemption and the State Government pronounced exemptions in sales tax to the quake-hit region, as a result of which many multinational companies established their shops there. Some of the world's greatest companies have set up plants in the region. The connectivity of the region has drastically improved post earthquake, and now the region serves as a major point of trade and transaction. The 450-year-old congested township with narrow lanes and a dense population has undergone transformation and the roads have been widened. The region is promoted as a tourist destination and it has worked wonders for the tourism industry. The cost of property has skyrocketed after the restoration.

The infrastructure planning is systematic, and mostly, the towns have grown horizontally due to ban on high-rise buildings. Only single-storied buildings are permitted. People of the area are lured to a luxurious life by multiplexes, retail chains, restaurants and showrooms of international brands.

The eerie silence of devastation is lost in a hullabaloo of life. Sarita Ben who used to live in a rented house now owns her own home. The development plan of the government has worked wonders. The rehabilitation and reconstruction is commendable, and the government has won accolades from experts who have worked in restoring quake-affected settlements across nations. Those who live in rented houses always dream of owning one. Ironically, the killer quake made it possible for many.

### Case Questions

- What are the important lessons than can be learnt from the Gujarat earthquake rehabilitation programme?
- Disasters mostly give an opportunity to build better and bigger. Agree/Disagree, giving reasons.

## 6.1 Introduction to Medium- and Long-Term Recovery Aspects

Recovery is defined as that activity which is aimed at helping a society distressed by disaster in restoration of the physical infrastructure and reinstallation of emotional, social, economic and physical well-being. Recovery in disaster management involves coordinating efforts and processes with an aim to bring about short-term, medium-term and long-term holistic renaissance of a community following a disaster. The main thrust of any recovery plan is on increasing the awareness of the fact that asset and infrastructure improvement after the disaster can play a vital role in developing community toughness.

Though there are differences in the ways recovery is defined, but they all point to some common aspects around which restoration practices must revolve. These are related to community, infrastructure, natural environment and economic development. The most important aspect of disaster recovery is the understanding of how one aspect of recovery is connected to the other. No community exists in seclusion, and each part within the community life is intricately interconnected, which makes tasks complex. Thus, planning for the recovery of one aspect innately impacts others. To make things clear, if businesses are developed, the community will prosper because both are innately connected as businesses provide jobs.

The objectives of recovery are as follows:

1. Making the affected area fit for human habitation and ensuring restoration of livelihoods.
2. Preparing national, regional and local agencies in disaster recovery so that they are well equipped to carry out a post-disaster recovery process in a timely and effective manner.
3. Educating people and generating awareness in the community so that they can help in post-disaster recovery.
4. Co-ordinating and controlling stakeholders involved in recovery processes.
5. Making policies and plans that form the basis of recovery processes and facilitate decision-making and implementation of plans post disaster.
6. Planning a quick recovery of routines and facilities for instituting normalcy as quickly as possible.
7. Chalking out policies and plans for linking medium- and long-term recovery aspects by minimising the uncertainties that can lead to inappropriate decisions.
8. Establishing the foundations for effective medium- and long-term recovery.
9. Restoring sustainable livelihood, governance and security within the affected community.
10. Helping in social, emotional, economic and physical rehabilitation of the affected people and communities.
11. Minimising the consequences of the disaster and reducing exposure to future risks.

Recovery is a continuous process that focuses on building prospects and capacities to reduce vulnerabilities. There are several grounds on which the recovery approaches are based. First, disaster management and governance are closely related issues. Post-disaster recovery should be treated with utmost seriousness, and the government should try and help the community restore normalcy. Moreover, it is the responsibility of the government to ensure respect for human rights and welfare during the time of disasters. Second, appropriate and timely response should be a priority. This is especially important as it can substantially

reduce the quantum of losses. Third, recovery processes should be approached from the perspective of reducing risks as it can help in effectively contributing to sustainable development. It should involve the entire institutional structure and focus on sustainable development. As the phases of disaster management are dynamic and interrelated, the recovery process can aid in effective mitigation and can serve as an opportunity to foster resilience.

The recovery process entails enhancing the coping capacity of the affected people. Knowledge of the occupations and ways of life of the population, especially the poorest, and how the social fabric functions after a disaster is important. Post-disaster recovery is a series of decisions and actions taken after the occurrence of a disaster. It is done with an aim to improve the pre-disaster living circumstances of the affected community, while encouraging and facilitating necessary adjustments to reduce disaster risk. Managing recovery entails improving capacities, reinstating coping mechanisms, empowering communities and establishing the core causes and vulnerabilities which make societies disaster-prone. Disasters can be converted into opportunities for sustainable development. Therefore, recovery is not limited to replacing and repairing the affected infrastructure, it is also about working on the root causes of disasters. One must take advantage of all opportunities for change while responding to the most critical needs of the affected community. It helps build long sustainability of the recovery efforts and sets the base for development. Recovery is part of a continuum that begins with actions that happen before the incidence of an event that calls for instant emergency attention from authorities in order to save lives and ends with the restoration of operations of the affected society. Of late, there has been a shift in focus from traditional recovery methods, which were aimed at preventing and preparing for emergencies, to modern methods, which call for identifying relevant lines of authority and actions that make it possible to put into place post-disaster recovery planning and preparation processes.

The effort of recovery-related actions is to recover and restore the affected community effectively and efficiently. Disaster recovery involves a distinct set of stages. These may occur sequentially or simultaneously. These can be divided into three phases as follows:

1. **Phase I – Triggering of immediate recovery mechanism:** This first step in the recovery process is providing the affected community with relief supplies and housing facilities. The agencies try to ascertain the losses and damages. The efforts are aimed at caring for the wounded and satisfying basic needs such as water, shelter and health of the affected persons. It starts with the activation of the disaster recovery plan. The focus of recovery teams is aimed towards restoration of basic utilities such as power, water and sewerage. Once essential services have been restored, the emphasis will gradually shift to detailed damage assessments and reconstruction.
2. **Phase II – Damage assessment and response:** After providing for basic amenities, the next phase deals with ensuring the liveability of the damaged buildings, removing debris and restoring livelihoods. The aim is to restore critical functions of the locality in the quest to bring normal.
3. **Phase III – Reconstruction and rehabilitation:** Every disaster comes with an opportunity to reduce risks from future events. Ascertaining the exact causes and customising remedial measures helps in addressing the long-term objectives of disaster reduction. If buildings have been destroyed by earthquakes, opportunities exist to avoid building in the hazard-prone area or congested areas. The focus should be to build in a way that better addresses the relevant risks specific to the area. Similarly, if a community has suffered considerable losses because of economic or social factors such as a lack of insurance, future assistance can include incentives to address their vulnerabilities.

The recovery aspects revolve around four Rs. They are *reduction, readiness, response* and *restoration* and are discussed as follows:

- **Reduction:** As the word itself suggests, it deals with reducing the impact of disasters. The response mechanism works with an aim to reduce further losses by trying to bring the situation under control.
- **Readiness:** Readiness is a critical aspect of response activities and includes three elements that address recovery issues. The first aspect is training and learning; agencies involved in response should gain insights into the various recovery roles and the development of competencies. Based on this knowledge, training should be provided to the personnel. There should be provision for regular exercises to confirm plans. The second critical element includes educating the public and generating awareness. It entails addressing recovery issues relating to public awareness of the availability of the response mechanism and a deep understanding of the processes involved. The general public's expectation should form the basis of any response mechanism and they should be made aware about the available assistance and places from where they can seek assistance. The third aspect is enhancing community capacity so that they are in a state of readiness. Active community participation to gauge pre-event readiness should be encouraged.
- **Response:** The response in recovery plays a significant role in minimising the losses due to disasters. It covers response planning, which entails allocation of roles and responsibilities for response activities. It facilitates effective coordination, commitment and a judicious use of available resources. The response agencies should be involved in recovery planning activities. It gives them prior knowledge of what has to be done and how. It also facilitates an effective response. It is seen that due to deficiencies in the recovery process, the situation can turn out to be worse than the disaster itself. A workable response plan should be made, with the objective of recognising pertinent approaches and actions that make it possible to allocate resources during post-disaster recovery. The response plan provides an effective solution to help recover all vital processes of the community within the required time. It entails procedures in which emergency situations can be dealt with. These plans are made to facilitate coordination between individuals and agencies and ensure provable recovery capability.
- **Restoration:** This is the most important aspect of recovery. This aspect provides mechanisms to ensure that while reconstructing rational steps are taken to identify and mitigate potential risks that exist. It is a time-taking process because it involves planning, developing and implementing best practices in disaster recovery. It involves restoration of current facilities in such a way that the current needs are fulfilled and also future challenges are addressed. This element of disaster recovery management lays down procedures and processes to ensure the efficient and effective resumption of essential functions in the event of a disaster. Restoration calls for a proactive approach so that normalcy is restored; care is taken while restoring facilities that they act as a cushion against future disaster events. The restoration plan should be updated at regular intervals to incorporate changes that take place in the environment and should always be readily available to agencies working on recovery and rehabilitation.

There are various recovery facets that need to be considered while making recovery plans. Post-disaster recovery actions are orientated towards opening up windows of opportunity for transformation towards sustainable development. It is important to ensure that the risks are dealt with proactively so that the same situation does not arise in future. The functionality of the region and re-establishment of the rights of the affected population is an important task. This is done in two steps: First, planning of the recovery, and second, by execution of the plan thus made. Moreover, disaster recovery can be planned on the basis of

time frame and propinquity of the needs. It can be broadly classified into medium- and long-term recovery aspects. Much of the short-term recovery aspects are intertwined and addressed by the immediate disaster response mechanism. Therefore, medium- and long-term aspects become essential aspects. The division of medium- and long-term aspects need to be addressed by

1. An evaluation of the needs of the affected population.
2. Establishment of long- and medium-term recovery objectives on the basis of needs.
3. Formulation of the plans on the basis of objectives to connect the diverse sectoral apparatus in coordinated actions.
4. Prioritisation of action: On the basis of availability of resources and institutional capacity, the tasks are divided for attainment of medium- and long-term objectives.

Recovery planning includes tools to increase resilience and reduce vulnerability by building capacity to cope and restore. Thus, the plan serves to establish the foundations to trigger the recovery mechanism once the disaster occurs. The broad recovery phase clearly specifies both the medium- and long-term recovery actions to be undertaken. It includes the development of a mechanism to ensure that recovery actions and inputs, which are aimed at rebuilding livelihoods, become assets for a long-term growth and thereby cultivate the self-sufficiency of the affected populations.

Medium-term recovery entails the following:

1. Facilitate reinstatement of essential services.
2. Guarantee suitable transitional shelter.
3. Distribute tools and other goods and services that help to revive socio-economic activities.
4. Provide temporary employment to members of the affected community and strengthen the self-help efforts and capacity of the affected population.
5. Restore the environment essential to facilitate the rebuilding of livelihoods and basic levels of collective and human security.
6. Provide steps to be taken to prevent risks from being recreated.
7. Identify critical elements of goods and services that aid in the restoration of sustainable livelihoods.
8. Foster equality and local capacity building to prevent any kind of discrimination.

Long-term recovery aspects address the following issues substantially:

1. Community participation in defining objectives and their priorities for overall development of region.
2. Provision for sustainable development of the region by providing for social well-being and economic diversification of the affected population.

The recovery should not be limited to assessing and repairing damaged infrastructure; in fact, it must look beyond to find long-term solutions to management of disasters. There must be pre-designed and pre-tested tools to address various micro- and macro-level recovery aspects.

**KEY IDEAS**

- Recovery is defined as that action aimed at helping a society distressed by disaster. It entails restoration of the physical infrastructure and reinstallation of emotional, social, economic and physical well-being of affected population.
- Recovery is a sequential process having three phases: Triggering of immediate recovery mechanism, damage assessment and response and reconstruction and rehabilitation.
- The recovery aspects revolve around four R's. They are *reduction, readiness, response and restoration*.

## 6.2 Community Participation in Defining Objectives and Their Priorities

After the occurrence of a disaster, the efforts are coordinated to provide immediate, medium- and long-term holistic renaissance of a community. Recovery is a developmental and curative process that provides for curtailing the intensification of the effects of the disaster by the implementation of well-laid recovery plans. Post-disaster recovery has to address the social, emotional, economic and physical issues of individuals and communities and ensure their well-being. Disasters, though destructive, can serve as opportunities to meet the social, economic, legal and infrastructural needs. They can help in substantially reducing future hazard and the allied risks. To make the best of the opportunities, involvement of the affected community is essential, for it is around them that all the activities revolve. They are the most important stakeholders. Successful recovery plans need to recognise that both communities and individuals have an extensive and varying array of recovery needs. One of the vital issues in the recovery planning process is needs assessment. It helps by providing the information about the nature and impact of the disaster on the community and aids in making strategies for sustainable development. It provides a solid foundation for an effective recovery process by preventing errors of judgement. The recovery planning approach should not be limited to the assessment of damages to the infrastructure; it must also include a study of the impact of disaster on the social, economic and basic needs of the affected families. Recovery can only be successful where all needs are addressed in a coordinated way. Therefore, community participation is required both in pronouncing their priorities and subsequently setting up of recovery objectives.

Community priorities would involve the restoration of a community's functions, social structures and systems after a disaster. A community cannot achieve this single handed and thus requires the help of external agencies in setting up the social, economic, natural and built environments of the community. To what extent the support is required and in which manner are also to be decided by the affected community. The efforts will then bear fruits because only then can the needs be addressed in a coordinated way. A successful recovery needs to recognise that both communities and individuals have a wide and varying range of recovery needs. Recovery can only be successful if these objectives and priorities are set after consulting the members of the affected community. The recovery priorities of an affected community are as follows:

1. **Shelter and safety:** The foremost priority in any recovery activity is to guarantee the safety of the community and especially persons who are living in the affected area. Though response covers the scheme of activities to fulfil the immediate needs of the community, the threat to lives looms large till the entire disaster management process is over. Thus, recovery plans include the destruction of damaged buildings and

## 6.3 IDENTIFYING AND ASCERTAINING IMPACT OF DISASTER

limiting access to them, fixing up of sanitation and hygiene facilities, setting up of temporary facilities, and providing housing and emergency medical facilities. Shelter is the basic need of an individual after food and water. Ensuring the availability of safe and sound dwelling facilities is the first priority.

2. **Health:** It includes a broad range of services ranging from those individuals who are affected/injured from the event and the follow-up care they require, to the management of individuals/groups who may have been exposed to hazards (e.g., chemicals, dust, etc.) or traumatised by their experiences. It is also important to recognise those vulnerable groups such as children or the elderly who may require specialist care post event. Additionally, existing health clients may need access to extra resources to ensure the continuity of their care following the event, for example, pharmaceutical supplies.
3. **Physical and mental well-being:** After disaster strikes, the community and individuals face a setback, both in terms of loss of livelihood and death of loved ones. The individuals are witness to the gory sight of death and destruction. It affects them mentally, physically and emotionally. Thus, psychological support is required to ensure an individual's emotional, spiritual, cultural, psychological and social needs. These needs are addressed by counselling. For physical and mental well-being of the affected individuals, community participation is solicited because the community as a whole has suffered the loss. Reinstating facilities for sports and education help the affected community divert its attention towards constructive rehabilitation and thus help in early recovery.

To provide productive recovery, the participation of the affected community in setting up objectives is a must, only then can the recovery needs be understood appropriately and addressed suitably.

**KEY IDEAS**

- Successful recovery plans need to recognise that both communities and individuals have an extensive and varying array of recovery needs.
- Community priorities would involve the restoration of a community's functions, social structures and systems after a disaster.

## 6.3 Identifying and Ascertaining Impact of Disaster

After disasters, the very fabric of society and the affected communities undergoes a paradigm change. The recovery stage of disaster management extends beyond just refurbishing physical assets or providing relief. It calls for recognising recovery needs of individuals and the community and addressing them in a coordinated way. Recovery is a long-lasting process that can extend up to months and years. Agencies involved in providing recovery need to identify and ascertain the exact nature of impact and accordingly customise the recovery programmes to suit the needs of individuals. An all-inclusive and integrated structure is needed to recognise and determine the complicated aspects of disaster, so that the recovery mechanism can be tuned to meet the needs of the affected community. A systematic framework is required to identify and ascertain the impact of the disaster, which encompasses the following environments:

1. **Social environment:** The social environment can provide insights into the effect of disaster on the social fabric of society. The classes of individuals who are most affected, their caste and religion provide for important inputs for recovery planning.

- 2. Economic environment:** Post disaster, the economic activity of the affected community comes to a standstill. People lose their livelihoods and are left unemployed. Their economic status is severely affected. So, insights into the primary occupation of the affected community and their sources of income are required. Also, this gives an idea about the skill-set possessed by individuals. A reliable estimate of the damage caused to industries and agriculture helps in customising the recovery package to suit the needs of the community.
- 3. Natural environment:** The natural environment, which comprises the flora and fauna of the region, is affected at times of natural disasters such as drought, flood, earthquake, volcanic eruption or storms. The ecological balance is disturbed and has to be reinstated. So, an identification of damage caused to the natural environment provides inputs for the exact nature of recovery processes that have to be initiated.
- 4. Built environment:** What takes years to build, comes down to rubble within seconds, such is the impact of disasters. Some buildings are completely destroyed, some partially damaged. An identification of the quantum of damage to infrastructure is required so that reconstruction work can be initiated according to the needs. Hospitals, medical centres, sanitation facilities and education systems have to be restored on a priority basis.

The recovery activities have to be integrated to address the needs of all four environments in a coordinated manner. For recovery to be an effective and efficient process, a holistic approach is required where all the environmental demands are addressed concurrently. It is a multifaceted process and is best achieved when the agencies work closely with the members of the affected community. The reinstatement of utilities is a central mechanism of the process of recovery planning. The awareness and assessment of disasters can help to identify circumstances of the affected region in terms of the physical losses, social vulnerability and their geographical distribution, and the economic losses from disasters. Based on updated information, a sketch of the damaged scenario can be made. The scenario thus constructed gives a primary outlay of the total estimated economic losses, the number of houses and people affected, the number of dead and wounded and their geographical distribution. This information helps in further gauging the exact nature of demands of the affected region so that the needs can be fulfilled accordingly. It also helps to feed into policy decisions during the recovery process. Replicating damage scenarios for identifying and ascertaining the impact must emphasise the following actions:

1. Understanding the nature and extent of damage and quantifying the losses in approximate terms.
2. Integrating the measurement of impacts and subsequent needs of the population based on damage estimates.
3. Making approximations of possible recovery costs.
4. Making plans according to the impact and systematically applying recovery processes.

An identification of the impact of the disaster serves as an input for triggering effective response and recovery measures.

### KEY IDEA

A systematic framework is required to identify and ascertain the impact of the disaster, which encompasses **Social environment**, **Natural environment** and **Built environment**.

### 6.4 Participative Rehabilitation: Physical and Social Infrastructure

Disasters disrupt the working of the affected communities and efficient and effective rehabilitation has to be carried out. After ascertaining and identifying the impact of disasters, the next step is to work towards participative rehabilitation. As post-disaster rehabilitation is beyond the scope of a single individual, therefore, participative rehabilitation is required. The success of this depends on the scale of the disaster and the complexity of the situation. Rehabilitation is a complex process and calls for unified action from all stakeholders. Participative rehabilitation is advocated in disaster recovery because of the following reasons:

1. The services provided during the recovery phase have to be utilised efficiently; therefore, it calls for involving the members of the affected community during decision-making.
2. Participative rehabilitation can help in mobilising existing financial, material and human resources for improvement of local health and environmental conditions.
3. It generates commitment from agencies and provides decision-making right to the members of the affected community on their lives and livelihoods.
4. It uses the experience of the local people as they have a lot of experience about what works, what does not work and why.
5. Participative rehabilitation can help the affected community develop technical and managerial skills and thereby increase their opportunities for employment.
6. Participative rehabilitation helps in 'social learning' for both recovery planners and beneficiaries. A sense of partnership between parties helps in developing teamwork, which helps in recovery.

An important aspect of the recovery process is participative rehabilitation, which entails engaging in physical and social rehabilitation activities. Social rehabilitation involves assisting the affected community in identifying and mobilising the existing resources in a community. The community needs to actively share the responsibility of caring for itself and its susceptible members. The aim of social rehabilitation activities is to enhance and strengthen the available coping mechanisms in the community and thereby minimise the dependency on external agencies. The objective is to encourage self-reliance. A community-based participatory approach is a pre-requisite of social rehabilitation activities. This involves guaranteeing community participation at all levels, starting from planning to implementation, monitoring and evaluation.

The most important social problems have to be identified before implementing any rehabilitation activity. The assessment can give insights into the vulnerabilities and needs of the affected group as well as the capacities and local resources. The task of social rehabilitation process is to support, revitalise and reinforce existing social structures and capacities of the community. The activities are aimed at strengthening the social capability of the affected community, with the aim to reduce the social impact of the disaster and help facilitate recovery. The main aim of social rehabilitation activities is the creation of an endurable day and to ensure a sense of security. It aims at reducing the stress level of the affected population by fostering a sense of togetherness among the target groups. The purpose is to invigorate and regenerate the dented social structures. The social rehabilitation process is instrumental in ensuring peaceful integration between

members of the community who belong to different socio-economic status and different ethnic groups. By restoration of the community and strengthening of skills, the affected communities' capacities are enhanced and they are now in a position to deal with the new situation easily and are also capable of earning their livelihood.

Physical rehabilitation can be defined as activities that are aimed at rebuilding and ensuring the availability of physical infrastructure for fulfilling basic needs to live a normal life. Physical rehabilitation can be done at two levels: one, to benefit individuals and families, and second, to benefit the whole community. Accordingly, the rehabilitation activities can range from providing individual shelters to the affected persons to constructing and repairing buildings for public use. The individual assistance in providing shelter for people in need can vary from distribution of plastic sheets to reconstruction of a house, depending on resource availability and the degree of emergency. If situation is so grave that people are forced to live in open air, distribution of plastic sheets is required and proper reconstruction projects can be pushed farther to a later phase of rehabilitation. The more unpredictable the situation, the more short term are the solutions applied. The assistance given for physical rehabilitation is according to a given time frame, the number and state of the people in need, funding prospects, environmental conditions and the scale of damage to buildings. Setting up of schools, rehabilitation of rural markets and health facilities, and construction of public facilities are covered under physical rehabilitation.

### KEY IDEAS

- The aim of social rehabilitation activities is to enhance and strengthen the available coping mechanisms in the community and encourage self-reliance in order to minimise the dependency on external agencies.
- Physical rehabilitation can be defined as activities that are aimed at rebuilding and ensuring the availability of physical infrastructure for fulfilling basic needs to live a normal life.
- Physical rehabilitation can be done at two levels: one, to benefit individuals and families, and second, to benefit the whole community.

### 6.5 Social and Economic Rehabilitation: Capacity Building for Reconstruction and Rehabilitation

Economic impacts of disasters are generally categorised as either direct or indirect. Direct costs can be attributed to damages caused to fixed assets, road and rail network as well as debts caused to crops and materials, in addition to injuries and deaths. Indirect costs occur from the flow-on effects of direct damages that harm or disrupt the production, distribution and sale of goods and services. Apart from this, there are some intangible damages, which can be attributed to costs arising from the destruction of legacy, loss of public amenities, loss of confidence and quality of life and the negative impact on the psychological health of disaster-affected communities.

Calculating the total costs of a disaster is a herculean task as an exact determination of indirect costs is impossible. But at the same time, for the purpose of economic rehabilitation, the costs are estimated and the exact nature of rehabilitation intervention is designed. Economic rehabilitation should provide for both individual and community-level intervention. At the micro level, individual needs such as maintaining livelihoods by giving employment security, payment of salaries and wages, access to banking services and insurance payouts should be facilitated. Direct assistance in the form of loans may be provided to individuals. Moreover, restoration of the broken infrastructure is a critical requirement for stabilising business activity. Capacity building of individuals and community should be emphasised.

### 6.6 RECOVERY AND REBUILDING WORKS

Capacity building in terms of disaster management is defined as the ability of individuals and communities to identify limitations and to plan and manage disastrous situations effectively and efficiently. This definition entails both the development of individuals and the development of the community as a whole. Capacity building is the process by which individuals and societies develop their capabilities individually and collectively, to identify and deal with their problems. An individual capacity building exercise involves enabling individuals to embark on an unrelenting process of learning to recover from disasters. Capacity building comprises various processes of building new capacities, effectively activating and exploiting existing capacities and sustaining the created capacity over time. These facets of capacity development are interactive and vibrant. The creation of successful individual and community capacity rests on a strong base that assists in the formation of new capacities through learning opportunities, as well as putting in place methods which augment the compliance required for dealing with a changing environment. Such a base is created through education and training. Capacity utilisation is the second important aspect of capacity building. The failure to use human resources effectively has been recognised as one of the key factors hindering development. The cause for this underutilisation can be traced to the existing non-conducive environment. Therefore, knowledge of existing capacities and marshalling them to achieve a set of development goals is required. By making the best use of existing capacities, the community can recover fast from the disaster. It is important to note here that the capacity that is being created and utilised to realise goals will need to be reserved, developed and sustained over time.

Capacity-building programmes have to be sustainable. Sources of financial support to sufficiently compensate workers are a significant constituent of sustainability and capacity retention. Moreover, sustainable capacity building will need to address the capacity to mobilise domestic resources. The procedure of capacity building is entrenched in complex environments that influence community's ability to achieve the proposed objectives. It deals with the economic, social and political environment in which individuals endeavour to carry out their activities and also the extent to which conditions in the environment facilitate or constrain performance. Capacity building from a community perspective involves the opening and widening of opportunities that enable people to use and expand their capacities to the fullest. Social capital and unity are at the heart of a community's capacity, and therefore, it calls for creating an atmosphere where individuals as a part of a group are able to work as partners for rehabilitation through reliance on local capacities and expertise. Therefore, capacity building is vital and the starting point of any rehabilitation task. The specific recovery needs should be recognised, recovery planned and implemented by the community in consultation with the agencies working for providing recovery and relief in order to be most effective.

### KEY IDEA

Capacity building in terms of disaster management is defined as the ability of individuals and communities to identify limitations and to plan and manage disastrous situations effectively and efficiently.

### 6.6 Recovery and Rebuilding Works

Recovery constitutes the phase of garnering the support of society so that it is able to respond to a large-scale disaster efficiently and contribute to rebuilding activities earnestly. The recovery mechanism is activated after the disaster strikes. The first objective of the recovery mechanism is to provide for the bare minimums. Then, other efforts are initiated to reinstate and repair the infrastructural systems. The infrastructural or built environment component of recovery comprises four elements, namely, residential, infrastructural or built environment component of recovery comprises four elements, namely, residential,

commercial, government-owned public buildings and assets, and other lifeline utilities such as hospitals, roads, railways, etc. Recovery of the built environment deals with repair, reconstruction or relocation of various infrastructural facilities to control damage. The recovery and rebuilding works relating to each of the four elements are discussed as follows:

- Residential:** After the disaster, the houses of the affected people are damaged. These houses can be completely damaged, severely damaged or partially damaged. In the former two cases, the situation calls for evaluating the structures and completely demolishing them. This is necessary as these structures may collapse and can cause major disasters. If the residential buildings are partially damaged, then an assessment and repair has to be done and refurbishing work has to start as a priority so that people can go back to normal life.
- Commercial:** Disasters can cause damage to commercial buildings and industrial properties. For continuation of business, it is vital to restore these infrastructures on a priority basis as it is essential for the economic viability and sustainability of the affected area. Location of the buildings and rules to be followed while constructing should be adhered to at all costs.
- Public buildings and assets:** Due to disasters, critical public buildings such as hospitals and schools and facilities such as sanitation and water treatment plants suffer a setback. These have to be identified on a priority basis. They have to be made functional as soon as possible as they play a critical role in bringing life back to the normal state. Many of these have social, cultural, religious and historic values and they serve as landmarks and are significant for the community and the region. These may be symbolic also; therefore, ensuring their functionality is very important.
- Essential lifeline utilities:** Essential lifeline utilities such as modes of transport and communication have to be recovered. The supporting structures and systems should be restored and connectivity of the region should be re-established.

Caution should be exercised while ensuring the physical recovery of the built environment. Physical recovery must be based on long-term strategies of sustainability. Certain mitigation measures that prevent or reduce the effects of future hazard events should be adopted.

For effectively contributing to recovery, plans need to be developed in advance for both the restoration of the physical infrastructure and carrying out of rebuilding activities. Proper urban planning should be done, keeping in mind the region-specific needs, threats and vulnerabilities. Skills and resources required for effective recovery planning and management of available resources are required. Rebuilding can be done in phases, starting from impact assessment and identification of damage. Renovation proposals relating to decisions regarding repair works, reinstatement of facilities or discard of infrastructure should be made on the basis of available information. Funding arrangements should be made according to the nature of work that is to be carried out. The infrastructural design should be made in consultation with experts of urban planning, and other regulatory approvals should be sought before commencement of work.

### KEY IDEA

Recovery of the built environment deals with repair, reconstruction or relocation of various infrastructural facilities to control damage.

### Facilitating Compensations to be Paid through Insurances and Government

Every disaster has some financial cost, which can be ameliorated to a great extent by the advance purchase of insurances and government compensation. After almost each disaster, the government announces some compensation to the members of the affected community. The rationale for this is to provide a basis for restarting a normal life. All is lost after disaster, and sufferers have to start from scratch, for which the amount received in compensation acts as seed money. In addition, there are various insurances that provide for losses incurred by individuals. Life insurance, health insurance, disability insurance and accidental death insurances are some of the insurances that help an individual to recuperate from the losses. Apart from these, there are property insurances that cover damages caused to property by fire and other accidents and provide a shield to individuals by compensating for the losses to physical property. The main aim of insurance policies is to cover the risk of individual loss in non-disaster settings, but they can also help in the event of a disaster.

Despite all prevention efforts, major disasters do occur. The government has to take a pre-emptive step by keeping victim compensation arrangements in place even before the disaster strikes. Generally, we tend to psychologically discount the occurrence of disasters and thus do not buy insurance policies. But even if one does, there are a lot of hassles faced by a person who seeks compensation. Facilitating the receipt of compensation for the consequences of a disaster is one of the tasks of the government. The insured party's legal rights have to be protected. The government can enforce insurance contracts so that insurers have funds to pay what they owe. By opening help centres, the government can ensure that the claims of those who bought the insurance before a disaster occurred are rebuffed. In cases where the insurance companies refuse to pay valid claims, the government can intervene and help the victims to assert their claims. If the victims are able to provide proper proof, the government can help victims sue the company for punitive damages and win substantial additional financial compensation. This is essential in order to force the insurers to live up to their contractual obligations.

Moreover, the government can announce for the payment of compensation from the relief funds to the members of the affected community. The government can generate money by encouraging collection of donations by providing tax benefits for donors. In addition, the government might try to endorse a view of moral obligation towards one's community members and countrymen in the event of a disaster. Even though there are funds and provisions of providing disaster relief, victims are a harassed lot when it comes to receiving compensation. It is often evident from surveys conducted after a disaster that the compensation did not reach the affected persons or only a partial amount was received by the community. Due to corruption and complex processes, the government money is siphoned off. For this, effective measures should be taken. Setting up of a single-window system where the members of the affected community get all help under one roof should be established. For effectively compensating the victims, members of the community have to authenticate the identity of the person claiming compensation; doctors and medical staff have to pronounce the extent of physical injury; lawyers and police have to aid in any kind of legal action; and counsellors have to advise the proper use of compensation received and also provide emotional and psychological support. In addition, the government should create social insurance programmes that come into play in the event of a disaster.

### KEY IDEA

Setting up of a single-window system where the members of the affected community get all help under one roof should be Government's priority.

## Coping Strategies: Providing Counselling and Psychological Support

For attaining effective disaster recovery objectives, one needs to be acquainted with the fact that both communities and individuals have a wide range of recovery needs which have to be fulfilled. Community recovery necessitates renewal of a community's tasks and social structures. The ability of a community to revive involves a fruitful interaction between the community's social, economic, natural and built environments, which should be supported by the local, regional and national agencies. The needs of the community have to be addressed in a coordinated way. Disaster affects the community and individuals in myriad ways. There are people who are directly affected by the disaster. They have suffered loss in terms of death and injury to their near and dear ones. There are financial losses in terms of loss to property and shelter. There are others who have survived but are emotionally in a traumatic state and are psychologically affected. The loss that disasters cause is enormous as individuals and communities are in a state of shock because they never anticipated its occurrence. They have lost their employment or source of livelihood and have witnessed the gory scenes of death and destruction. Whatever type and quantum of loss may be, individuals need to be counselled for emotional and psychological well-being.

Research indicates that most people who experience a disaster tend to recover with time. And counselling can help in early recovery from the disasters. Most people experience some psychological reactions usually within a manageable range and others may display more intense reactions. People who face disasters go through distinctive emotional phases during a disaster. The first phase is the *desperate phase*, also known in disaster literature as the *survival mode*. This is an intense phase where individuals try to struggle to keep themselves and their family alive. The second stage is the *response phase*, where individuals measure the damage. In this phase, the relationships are objective and functional. Individuals engage in emergency search and rescue work. The third phase is called the *recovery stage*, where crisis management teams take control of the situation to keep the response and rescue effort organised and coordinated. Individuals try to adjust to the situations. The final stage is the *reorientation phase*, where survivors are stressed about the situation. They are frustrated and hopeless. A sense of helplessness creeps in.

Facing a disaster is a traumatic experience, and it is important that the disaster management team understands the psychological status of the victims. They need to understand the reactions of survivors as well as their emotional condition. The effect of disasters on the affected population can be as follows:

- Physical effects** such as dizziness, tightness in the throat and chest, agitation, nervousness, fatigue and exhaustion, gastrointestinal distress and nausea, change in appetite, and headaches can affect the persons who have faced disasters.
- Behavioural manifestations** as an aftermath of the disaster include fearfulness, disturbing thoughts, inability to express feelings, isolation or withdrawal from others, increased use of alcohol and drug, anxiety of protecting loved ones, anger, rage and desire for revenge.
- Emotional and psychological effects** include sleep disturbances and nightmares, jitteriness, hyper-vigilance, crying and tearfulness, shock, disbelief, confusion and disorientation, poor concentration and memory problems, irritability and short temper.

These effects can take a toll on the individual's mental and psychological states and thus have to be addressed. For tackling these problems, community involvement is essential.

The need for community involvement after disasters is a significant means of contributing to the overall empowerment of individuals and communities to manage their own recovery. Rapid redevelopment can help individuals by shifting their focus to constructive activities. The well-being of all people should be protected through the restoration of security, governance and services that meet basic physical needs. For providing psychological benefits, the agencies working for disaster management should ensure placement of mature and responsible workers and volunteers in disaster-affected areas. These volunteers should be trained to understand and record the impact of disasters on the mental health of those affected. This is important for effectively addressing the psychosocial well-being of individuals. Moreover, the volunteers should be committed and motivated to promote mental health and psychological well-being of the affected persons by helping them lead a dignified life.

For providing support, the victims can be classified according to the impact on the mental health into three broad categories as follows:

- Very ruthlessly affected:** Persons belonging to this category are those who are severely affected by the disaster in terms of personal loss due to death of family members. These are lone survivors. They are emotionally broken and psychologically in a state of trauma. Their suffering is intolerable and they have significant difficulties in basic daily functioning. The assistance provided to these sufferers should include providing psychiatric support. Useful interventions include tracing family members or relatives and re-unification, in addition to providing assistance in mourning.
- Severely affected:** Persons belonging to this category are those who have suffered loss in terms of death of near and dear ones and loss to property, but still they have relatives and children who were saved. There is some hope for these people. These persons require focused individual, family and community interventions by trained workers. The interventions at this level could include supportive programmes and advice, direct support to children and facilitation of formal and non-formal educational activities.
- Moderately affected:** Persons belonging to this category are those who have suffered physical injuries. They are witness to the gory scenes, but they have not suffered death of any family members. These people are able to maintain their psychosocial well-being if they receive support in accessing key community and family supports.

A needs assessment is required to cater to the exact needs of the affected persons. The psychological and emotional support needed by the affected people can be provided by restoring the availability of essential goods and services to meet the basic needs. The main concern should be to provide assistance in helping the individuals return to their normal lives. Due to the disaster, the entire structure of a community faces a setback. This has to be reinstated. The trauma consists of more than the impact of the physical event and persists for a long time and thus has to be dealt in a compassionate manner. The aim should be to provide immediate and ongoing emotional comfort to the survivors.

### KEY IDEA

People who face disasters go through distinctive emotional phases: *desperate phase, response phase, recovery stage and reorientation stage*.

### 6.9 Summary

The chapter discusses on the concept, needs and methods of disaster recovery. Like any other approach, disaster recovery too involves planning of immediate, medium- and long-term recovery implementation.

The role of community participation in establishing priorities and priorities and, in the process, facilitating the process empirically provides authentic and feasible ways of identifying the magnitude of the impact and then bringing about rehabilitation which is in line with the capacities of the communities. This helps in capacity building, reconstruction and rehabilitation. In the four Rs, reduction, readiness, response and recovery, consolidate the community-based planned way. Recovery addresses the physical, social, economic and psychological impacts of disasters. This requires a coordinated, multi-pronged, objective-oriented effort that addresses health, safety, social aspects of loss of family and property, and economic aspects of compensation, insurance and rehabilitation processes.

### CASE PROBLEM: WAITING FOR GODOT

**B**hagwan Joshi used to run a guest house that could accommodate 30 tourists. He could earn ₹ 5,000 per annum for running his family of 6. All was well and his business was flourishing. He had plans for adding another storey to the building to accommodate more guests.

It was the month of June 2013 and it had rained heavily, which caused unprecedented flooding. Due to continuous rains, the Chorabari Glacier melted and this triggered the flooding of the Mandovi river, which further led to heavy floods in the region. The bridges and roads were damaged and 10,000 pilgrims were stranded, many were missing as they were washed away by heavy floods. According to the government, 5,700 persons died, including 934 locals; 392 persons were injured and 1,860 people were reported missing. Also, 2,232 houses, 154 bridges and 1,520 roads were damaged. The uncertainty for 72 h endangered the normal lives of the people. This total included 934 local residents. It was the country's worst natural disaster since the 2004 tsunami. Around 1,10,000 people were rescued from the flood-razed area. Landslides due to the floods, damaged several houses and structures, killing three people. They were trapped. The heavy rains resulted in large flashfloods and massive landslides and entire villages and settlements were obliterated.

Bhagwan Joshi was also severely affected as his guesthouse was washed away in the flash floods. He somehow saved his life. Now he lives in a tent and is unemployed. He does not know what to do as even the basic necessities of life are not within his means. Funds are available for carrying out rehabilitation efforts but due to the apathy of the government, nothing substantial has been achieved as yet. The government has failed to find land for rebuilding and has decided to give Rs. 5 lakh to each family so that they can buy land for reconstruction purposes. The safe housing norms are yet to be made. Rs. 3,500 crores have been allotted for rehabilitation but nothing has been done so far. The state of Uttarakhand was among the top tourist destinations of India and used to receive around 3 crore tourists each year. But post-disaster, the situation is so bad that chances of tourists coming to the state are bleak. Most people, whose main occupation was dependent on tourism, are a harried lot as their livelihood has been hit badly.

### 6.10 OBJECTIVE TYPE QUESTIONS

The residents are in a state of shock and despair. The disaster has made a permanent dent in the psyche of people. In the absence of psychological counselling and reassurance, the residents are in a state of misery. With no seeming respite in sight, every survivor suffers. The suffering ranges from the physical to the psychological, the minor to the intense. It drives some people to find solace and to endure the storm together, and for some, it leads to self-isolation as seeing people suffer is a kind of torture on its own. The place used to bristle with life with the pilgrims' charm. But now, there is an unnatural silence, something that will be hard to repair. For Bhagwan Joshi, life has come to a standstill. He waits for Godot, who he feels will make every wrong right!

#### Critical Thinking Question

- What do you think should Bhagwan Joshi do in such a situation?

### 6.10 Keywords and Phrases

Capacity building	Economic rehabilitation	Reconstruction
Community participation	Impact	Recovery
Compensation	Participative rehabilitation	
Counselling	Psychological support	

### 6.11 Objective Type Questions

#### A. Fill in the Blanks

- Two decades after the massive earthquake, Gujarat has become a marvelous \_\_\_\_\_ of a recreated town
- Recovery is not limited to replacing and repairing, it is also about working on the \_\_\_\_\_ of disaster.
- The immediate recovery mechanism is aimed towards restoration of utilities such as \_\_\_\_\_
- The post disaster recovery actions are oriented towards \_\_\_\_\_
- Rehabilitation is a complex process and calls for unified action from all \_\_\_\_\_
- \_\_\_\_\_ rehabilitation helps the affected community to develop technical and managerial skills.
- The community based participatory approach is a pre-requisite of \_\_\_\_\_ rehabilitation activities.
- Damages caused to fixed assets, road and rail network, crops and material and injuries and death are \_\_\_\_\_
- Economic rehabilitation of individual is done through \_\_\_\_\_ intervention.
- \_\_\_\_\_ is the process by which individual and societies develop their capabilities individually and collectively.
- During recovery the infra structural designed should be made in the consultation with aspects of \_\_\_\_\_

12. When insurance companies refuse to pay valid claims the \_\_\_\_\_ can intervene and assert their claims.
13. An endorsement of \_\_\_\_\_ obligations of governments official towards countries helps prevent \_\_\_\_\_ during payment of compensation to victims.
14. The \_\_\_\_\_ category of victims is those who have suffered the loss of family members and may include lone survivors.
15. \_\_\_\_\_ was a among the top tourist destinations of India before the flash floods struck region in June 2013.

#### B. Multiple Choice Questions

1. Removing debris and restoring livelihood is done in the
  - (a) reconstruction and rehabilitation phase
  - (b) damage and assessment and response phase
  - (c) tyranny of immediate recovery mechanism
2. Educating the public and generating awareness revolves around
  - (a) reduction
  - (b) readiness
  - (c) response
  - (d) restoration
3. Availability of resources for medium and long term response mechanism during
  - (a) evaluation
  - (b) establishment
  - (c) formulation
  - (d) prioritisation
4. Providing temporary employment to affected community is included
  - (a) temporary plans
  - (b) short term plans
  - (c) medium term plans
  - (d) long term plans
5. The foremost priority in any recovery activity is to guarantee
  - (a) the shelter and safety
  - (b) health
  - (c) physical and mental well-being
  - (d) infrastructural reconstruction
6. The traumatic experiences of a disaster creates
  - (a) physical impact
  - (b) material impact
  - (c) psychological impact
  - (d) socio-economic impact
7. Identification of damage to infrastructure and its reconstruction addresses the
  - (a) built environment
  - (b) economic environment
  - (c) social environment
  - (d) natural environment

#### ANSWERS

- 6.13**
8. The four elements of recovery and rebuilding do not include on a priority
    - (a) heritage
    - (b) residential
    - (c) commercial
    - (d) public and essential lifeline
  9. The most important role in facilitating compensation is performed by
    - (a) insurance companies
    - (b) politicians
    - (c) NGOs
    - (d) Government officials
  10. The most intense emotional phase when people struggle to survive is the
    - (a) desperate phase
    - (b) response phase
    - (c) recovery phase
    - (d) reorientation phase

#### 6.12 Questions for Review

1. Discuss major medium- and long-term recovery aspects with examples.
2. Do you think recovery objectives and priorities should be set by community participation? If yes, why?
3. Discuss the process of identifying and ascertaining the impact of a disaster.
4. Explain the concept of participative rehabilitation and issues in social and economic rehabilitation of the affected community.
5. How can the government help in facilitating the payment of compensation to disaster victims? Explain.
6. The most important aspect of coping is providing counselling and psychological support. Comment.

#### 6.13 Answers

##### A. Fill in the Blanks

1. Exemplar
2. Root causes
3. Power, water, sewerage
4. Sustainable development
5. Stakeholders
6. Participative
7. Social
8. Direct costs
9. Micro level
10. Capacity building
11. Urban planning
12. Government
13. Moral obligations, Harassment
14. Severely affected
15. Uttarakhand

**B. Multiple Choice Questions**

1. (a)
2. (c)
3. (d)
4. (c)
5. (a)
6. (c)
7. (a)
8. (a)
9. (d)
10. (a)

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Chapter 7 Ascertaining Roles and Responsibilities

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Chapter 8 Insights on Challenges in Management of Disaster

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Chapter 9 Behavioral Aspects of Disaster Management

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## Part III

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# Contemporary Issues and Challenges in Disaster Management

## Ascertaining Roles and Responsibilities

I always hated it when TV reporters stuck a microphone in the faces of people who'd just lost a home or a loved one, wanting to know how they felt. They felt like shit. They hurt, and they didn't know how they were going to get through the night. They wanted to scream and cry and hit the guy with the microphone.

—Suzanne Johnson

### Learning Objectives

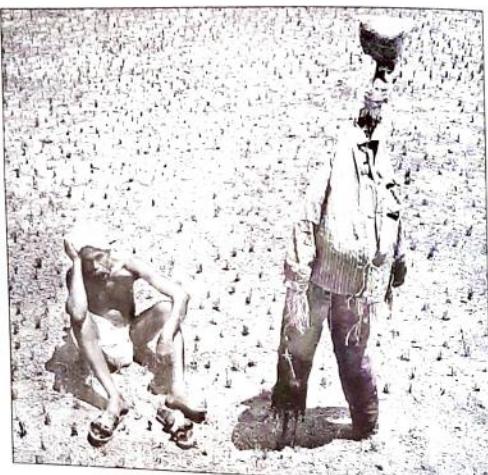
After reading this chapter, you should be able to:

- Explain the roles and responsibilities of agencies.
- Discuss the role of state and local bodies and philanthropic organisations.
- Elucidate the impact and role of media during and after disasters.
- Discuss the Planning Commission and its role.
- Explain community-based approach to disaster management.
- Explain the importance of community involvement in disaster management.

### OPENING CASE

**O**n 14 January 2014, Ganpati Samant's wife got the shock of her life when she saw the lifeless body of her husband lying on the floor. She started shouting and crying, but everything was useless. Along with Ganpati, there were two other farmers who had committed suicide the same night. The reason was also same – the drought due to inadequate rainfall. Ganpati was a farmer and relied on flooding during monsoon season for growing crops. If there were no rains, the chances of drought increased manifold. Inadequate rainfall could cause droughts, making crop failure more common. He had faced repeated crop failures and thus accumulated loans beyond his capacity to repay. History stands testimony to the fact that agricultural region of Vidarbha has been affected by droughts year on year. The suicide rates increase in the region because the farmers do not have money to pay the debt. Last year, nearly a thousand debt-ridden farmers in Vidarbha ended their lives. This year also most parts of the state are reeling under drought and chances are there that this year the suicide rate will be higher.

Ganpati, like other farmers, had suffered huge loss due to crop failure. He knew that the state government will do little to help him. He could see no way out as seeing his children sleeping empty stomach and remaining on water for days together was making him feel ashamed. He had no option; he was guilt-ridden as he could not provide the bare minimum to his family members. He had borrowed huge amounts of



A farmer sitting in his drought-ridden field in a hopeless condition.

money from the money lenders and was in trap. He was depressed, and finding no way out, committed suicide.

Ganpati's case is not unique, every year the scenario is the same. The government is well aware of the extremity of the situation. The state government, like each year, this year also held a number of meetings and made arrangements for transporting drinking water and cattle feed to the drought-prone areas. However, the experiences of the past do not generate any hope; the belief is that this year also the help will not reach them. False bills will be generated for providing tanker water and cattle feed shelters, and the money will be actually pocketed by the officials and the politicians. The farmers are fed up of waiting for the government measure every year. They know very well that for the corrupt persons in the system, every disaster is an opportunity to earn money.

Every year, the situation is same but the government has no mechanism to deal with the situation. Repeated crop failures and incapability to meet the growing cost of cultivation seem to create a condition that compels farmers to commit suicide. Ganpati had taken land on lease for a short time by securing loans. But due to lack of rains, the crops failed. He was caught in a situation where he did not know what to do, he was highly in debt: a burden so unbearable that he committed suicide.

Is there a way out of this plight? A permanent authority should be made to implement programme for drought-hit areas. There exists a dire need for effective regulatory mechanism. According to a report of Green Earth Social Development Consulting, farmers' demands were not taken into account while preparing the relief packages. The local government bodies and communities were also not consulted. Moreover, the basis for selection of beneficiaries under the assistance scheme was not well-defined. Also, the type of assistance that was provided led to problems like a farmer who needed a pump set was given a pair of bullocks and a farmer who had no access to water sources was given pump set. The most alarming finding was that awareness regarding the relief package was also fairly low. Given the situation, we can state an old saying in Marathi which means 'Farmer takes the birth in debt and dies in the same condition'.

#### Case Questions

1. Who do you think is responsible for Ganpati's death?
2. 'The recurrence of this drought is solely due to government apathy'. Agree/Disagree giving reasons.

#### 7.1 Roles and Responsibilities of Agencies

The prevailing principles of disaster management, that is *prevention, preparedness, response and recovery*, are evolving. Over the years it is seen that even the best made disaster management plans fail. Planning alone cannot help mitigate disasters and there has to be more to deal with disasters. If the plans are implemented properly in a time-bound manner, there can be a sea change in the quantum of losses. But who implements the plan and to what extent is the question. The fact that the scope of disaster management spreads across a number of different agendas and agencies, it is found that it is disjointed in nature and therefore there is a dire need for proper and judicious allocation of responsibilities and roles. The major roles and responsibilities of agencies working in disaster management are as follows:

1. To coordinate between national, state and local personnel.

2. To establish response and recovery operations by defining roles of specific positions during emergency.
3. To alert, coordinate, and direct national agencies to support the state in identifying and meeting disaster needs.
4. To establish an effective communications network with state and local agencies.
5. To assess disaster needs of local communities.
6. To assess the damage, and identification and prioritisation of needs.
7. To identify the full range of programmes and resources required to carry out the immediate, temporary, and long-term measures.
8. To coordinate and monitor assistance programmes.
9. To advise individuals, families and businesses concerning available assistance.
10. To identify staffing and other requirements.
11. To establish an environment of compassion, assurance, efficiency and expediency in all disaster-related activities.

It is important to provide a clear definition and understanding of the role, function, and responsibilities of both the agencies and its members as this will provide a good knowledge of the work and tasks to be performed. Disaster management is neither a single man's job nor a single agency's task. Therefore the first step should be to divide the tasks within the agency and allocate the responsibility. This will sort out the creases that occur when agencies fail to respond and try to put the blame on their countrymen. Ascertaining responsibilities becomes easy, moreover, the agencies and individuals working for them know their job and mindset aspects about reporting, etc. This helps in delivering the duties at the time required. Further, the roles and responsibilities should be ascertained under the following three fundamental parameters: *collaboration, communication and strategic planning*. We will discuss these one by one in the following subsections.

### 7.1.1 Collaboration

Collaboration is a working practice where individuals work together to achieve a common goal. Collaboration can help in team building, communication, conflict resolution, providing feedback and mentoring. For effectively collaborating for disaster management, first, an identification of the affected population and joint assessment of their local capacity and needs are vital. Without collaboration between agencies, no agency would individually replicate a similar exercise in a disastrous situation. As a result, the affected population may suffer from 'assessment fatigue' which occurs when the respondents become justifiably annoyed at answering same questions. Second, all the agencies working in the area of disaster management should agree on the basic standards of assistance and services to avoid the pitfalls of incoherent or missing standards. Moreover, the agencies should also collaborate for joint resource mobilisation which is fundamental to any humanitarian assistance operation. The funds available through grants should be supervised and maintained by one agency in collaboration with others. Collaboration results in unified voice for demand for access to emergency areas and helps negate the political pressure at ease. During disasters, local agencies may be

severely overburdened and under-resourced. Therefore, one of the important roles of agencies is supporting and rebuilding these local institutions. The capacity building of these institutions is a pre-requisite to the full recovery of the community is one of the important responsibilities of the agencies working for disaster management.

The execution of emergency response plan requires a varied set of skills and capabilities. Trained people who have formal training in dealing with emergency situation are scarce. Pre- and post-disaster functions are good opportunities to configure the management experience and develop their knowledge and proficiency. Joint training sessions can be organised and managed by the agencies as they could go a long way in equipping the participating agencies in the skills required to manage disaster effectively.

### 7.1.2 Communication

Communication is the central and critical activity of disaster management. It entails sharing of information about the roles and responsibilities of each agency and the specific resources they are used with to tackle the emergency situation. Also information about the parameters of the contributions of each organisation, that is, the number and capabilities of the personnel involved, kind and quantity of assistance, geographical area of operations, and tools and facilities available should be clearly communicated. Moreover, various agencies must share their goals, mutual interests, strengths, weaknesses and constraints as this helps in setting expectation from the agencies in disastrous situations. Also it helps in identifying gaps and overlaps in humanitarian assistance. This is important in efficient allocation of responsibilities or areas to the agencies based on their availability and interest. Setting up and maintaining early warning systems are an integral part of communication.

### 7.1.3 Strategic Planning

Strategic planning is one of the doctrines of disaster management. For providing humanitarian assistance, organisations should engage in strategic planning. To amputate the usefulness of disaster management exercises, all agencies should contribute in planning phases. The teamwork imposed by working through preparedness plans boosts morale and the ability to work with one another in emergency situations. Agencies could agree to fund a project jointly, to merge budgets or to purchase services or material from a common source. Moreover, strategic plan allows sharing of talented personnel for common purposes. To offset the high cost of running agencies and post-disaster rescue operations, individuals may pool resources in order to extend their assistance budget further. Moreover, joint implementation of plans can be done. Proper planning helps in ensuring effective command, control and discipline within the agencies. This would guarantee the maximum possibility of agencies working in unison to maximise results.

#### KEY IDEA

The roles and responsibilities of agencies are ascertained according to the three fundamental parameters:

- *Collaboration*
- *Communication*
- *Strategic planning*

## 7.2 International and National Agencies

International and national agencies play a significant role during disaster. They provide necessary help and aid to the victims. Immediately after a disaster, Central Government's assistance is made available if it is beyond the state government's capacity to cope with the disaster. The extent of the impact of natural or man-made disaster in a region of a state is the basis to declare that region disaster struck. Once such declaration is made, the central agencies react as swiftly as possible to the devastation caused by a disaster. They provide immediate aid and relief to the affected, financial packages for carrying out relief and rehabilitation works are announced. The national and international agencies can provide three types of grants:

1. Individual assistance for individuals, families, farmers and businesses by providing loans at low interest rates; grants; emergency housing, tax relief and unemployment assistance.
2. Public assistance where funds are provided to restore public systems and facilities. These grants are basically related to post-disaster phase of response and relief.
3. The third assistance is related to disaster mitigation phase wherein the agencies provide fund to increase resilience towards disasters. They provide funds to reconstruct buildings or utility systems to withstand future disasters. These funds are used to remove or reduce an area's vulnerability to a hazard.

Moreover, Central Government's assistance for state and local governments may include aids for equipment, supplies, facilities and personnel, technical assistance, and financial assistance in the form of loans and grants. The assistance and role the national agencies play depends much on the nature, quantum and region of disasters.

The national and international agencies provide assistance for relief and rescue work in phase I. The kind of responsibility these agencies take depends greatly on the situation and on the immediate needs of the affected people. The most pressing needs during or soon after the disaster are food, rescue, shelter, communications, etc. Response involves mobilizing resources, getting people out of danger, providing medical services, etc. When the affected people are out of danger, relief agencies' focus shifts to rebuilding. Therefore, relief agencies have to gauge the needs and provide for them. Rebuilding after a disaster can take years to complete. The rebuilding efforts must focus on the development of community, regional and state services and infrastructure; operations; and the lives and livelihoods of thousands of people.

Since recovery costs are beyond the capacity of local agencies, it is essential for the national and international agencies to intervene and provide aid for rebuilding homes, businesses and public facilities, clearing debris, and repairing of roads and bridges.

Further, the national agencies play an active role in the identification of disasters and in mobilizing resources. These efforts augment state and local responses and facilitate provision of the types of other assistance a state or a local body is likely to need. The Emergency Support roles are transportation, communications, fire fighting, providing relief packages, and health and medical services. All these activities are carried out in consultation and coordination with state and local bodies. National and international agencies are also instrumental in managing and coordinating food, shelter and first-aid for victims. They also provide for bulk distribution of relief supplies and other needed equipment, materials, supplies and personnel to the state and local agencies during response operations. These agencies also provide assistance for public health and medical care needs.

The scope of response at the level of national and international agencies is determined in accordance with their existing policy of financing relief expenditure and other factors like the enormity of a disaster both

natural and man-made; the scale of the relief operation necessary; and the requirements of assistance for augmenting financial resources and logistic support at the disposal of regional agencies. Moreover, there are mechanisms available with national and international agencies to identify initiatives required to be taken by various agencies in the wake of disasters. It clearly lays down the procedures and determines the focal points in the administrative machinery to facilitate launching of relief and rescue operations without delay. In India, the Ministry of Home Affairs is the nodal ministry for the management of relief and response and overall natural disaster management, and the Department of Agriculture and Cooperation, Ministry of Agriculture is the nodal ministry for drought management. Other ministries are allocated the responsibility of providing emergency support in the case of disasters that fall in their purview.

In addition, there are decision-making and standing bodies which are responsible for disaster management at the national level in India. They are the Union Cabinet, headed by the Prime Minister; the empowered Group of Ministers, headed by the Deputy Prime Minister or the Home Minister; and National Crisis Management Committee under the chairmanship of the Cabinet Secretary. There is also the Crisis Management Group (CMG) which functions under the chairmanship of the Central Relief Commissioner consisting of senior officers from various ministries and other related departments. The CMG reviews contingency plans and measures necessary for dealing with a natural disaster, and coordinates the activities of the central ministries and the state governments in relation to disaster preparedness, response and relief.

Apart from these nodal committees at the national level, there are certain organisations having expertise in technical field, which play an active role in disaster mitigation and response. Some of these organisations are the Indian Meteorological Department whose prime responsibility is to predict cyclones and earthquake; Central Water Commission who is responsible for managing floods; Building and Material Promotion Council for making and reviewing construction laws; Directorate General Civil Defence to provide specific technical support for the coordination of disaster response and management functions.

National Disaster Management Authority (NDMA) is a national-level body specifically made by the Ministry of Home Affairs for the purpose of disaster management. It is a self-governing, independent and constitutionally established institution mandate. The NDMA formulates and enforces national disaster policies at national and regional levels and collaborates with various government ministries, military forces and other agencies to jointly coordinate efforts for the effective management of disaster. Main objectives of NDMA are to coordinate and widen sustainable operational capacity and professional competence to undertake its humanitarian operations in its full capacity. It acts as an implementing, coordinating and engaged in strategic-level planning and arranging resources to meet the needs of the affected society.

### KEY IDEAS

1. International and national agencies provide necessary help and aid to the disaster victims.
2. The national and international agencies can provide three types of grants.
  - Individual assistance
  - Public assistance
  - The third assistance is related to disaster mitigation phase wherein the agencies provide fund to increase resilience towards disasters.
3. The national agencies play an active role in the identification of disasters and in mobilizing resources.

### 7.3 State and Local Bodies

There are national and international agencies that commit their resources to disaster management, but it is the prime duty of the state and local bodies to ensure that the aid reaches the victims. The operational challenges in the implementation of programmes and plans have to be faced by the state and local governments. This means ensuring that suitable plans, strategies and administrative structures are in place to guarantee proper disaster management. The state and local bodies coordinate and monitor the implementation of the national policy. The responsibility to handle natural disasters is a fundamental task of state-level agencies. The role of national agencies is supportive and limited to provide physical and financial resources. At times of disasters, the Chief Secretary of the State heads a state-level committee which undertakes the relief operations in the state. The relief commissioners are in charge of the relief and rehabilitation measures in the wake of natural disasters in their states and these commissioners work under the direction and control of the state-level committees. The state governments have instruction manuals on relief and rehabilitation and the local-level agencies have their contingency plan that is updated from time to time.

At the local levels, town administration is the focal point for the implementation of all governmental plans and activities relating to disaster management. The person in charge of district administration is responsible for implementing the plans at local levels. His primary job is to coordinate and supervise district-level activities relating to disaster management. In India, Panchayats are local-level institutions which have self-governing powers. These local bodies can be effective instruments in tackling disasters through early warning system, relief distribution, providing shelter to the victims, medical assistance, etc. The local bodies should have a disaster-response capability and have an approved local disaster management plan. In addition, it should be ensured that local agencies are capable of disseminating disaster-related information to state and national agencies. Local agencies can have local disaster management groups. The role of members of the groups should be clearly defined and should be to develop, review and assess effective disaster management practices, and help local government to prepare a local disaster management plan by providing important inputs. They should be responsible for training the community in responding to disasters and providing relief operations. They should be able to coordinate with other agencies and manage disaster resources and operations effectively. In addition, they should play an active role in generating awareness and motivating the population about hazards, risks and the impact it may have on the fabric of society.

Many countries are situated in risk-prone zones where disasters continue to occur on a continuous basis. It is generally seen that increasing occurrence of disasters can be foretold and thus there are chances of them being factored into planning and mitigating decisions. The focus should be on strengthening the capacities of local communities to minimise loss and suffering from the aftermath of disasters. Installation of early warning systems and ensuring its usage is essential. The effective disaster preparedness planning should be closely integrated into community-development plans. Moreover, local-level agencies should ensure that disaster management should aim at reducing risks and consolidating sustainable human development. When major calamities destroy human settlements and infrastructure, they also offer unique opportunities to substantially reduce future disasters.

The focus towards effective disaster management and development of a national culture of prevention necessitates an awareness generation at all levels. Disaster awareness should be made a priority. The local-level agencies should ensure dissemination of disaster-related information on a sustained basis. Proper training facilities should be arranged for and training should be imparted at regular intervals so that communities are alert and aware. Specialised training in disaster response should be imparted by trained faculty members and should focus on building the knowledge, attitude and skills of a community to cope with the effects

of disasters. A team of volunteers should be made whose primary role would be to ensure effective first response. Periodic drills should be introduced in vulnerable areas to enable prompt and suitable community response in the event of a disaster. These drills, if conducted at regular intervals, can help save lives. Effective disaster management tasks have to be grounded and linked to the community and also to the institutional machinery of the state and the nation.

The goal of any disaster management plan is to create a disaster-resilient community capable of satisfying its needs and serve its own development purposes. As the local-level agencies and communities are the first responders in any crisis situation, therefore community participation becomes a special component for disaster management. Community participation helps the agencies working at local levels to identify the vulnerable members of the community and provide special assistance in terms of evacuation, relief, aid and medical attention to them in disastrous situations.

Effective disaster management is the task of all agencies and it is expected that they coordinate their efforts and work in unison. The national agencies play a crucial role in reinforcing state and local disaster response. Similarly, the task of local agency is to implement the plans made by national agencies and ensure sustainable development.

#### KEY IDEA

The primary task of state and local bodies is to coordinate and monitor the implementation of the national policy on Disaster management.

### 7.4 Philanthropic Organisations

The word 'philanthropy' etymologically means 'love of humanity'. An organisation that engages in values of giving and volunteering for the cause of humanity is a philanthropic organisation. Natural disasters are acute events that are beyond the capacity of human beings to respond. These are complex humanitarian emergencies that produce widespread human suffering. The disaster can be either man-made or natural depending on the agent but the aftermath of both is usually similar, that is, large-scale devastation and loss of life and property. Therefore, the philanthropic organisations usually do not maintain any distinctions for aiding disaster recovery and relief operations. The main aim of these organisations is to support emergency relief; disaster prevention, mitigation and preparedness; and capacity building of the community and its development.

Disasters can be tackled to a great extent by supporting people's ability to withstand the impacts. A comprehensive management across all sectors and levels is required for effective management of disasters. Starting from taking risk-reduction initiatives to providing emergency relief, a unified approach is needed to deal with disasters. Recognizing the vulnerability and susceptibility of communities to disaster is an important aspect of disaster response. Disasters affect productivity and are closely linked to poverty. Damaged infrastructure and loss of productive capital can compel the agencies to divert available resources into disaster response. The funds of developmental projects are often diverted to meet the demands of these exigencies. Thus, humanitarian relief from philanthropic organisations help to meet these short-term demands. But grave disasters call for prolonged aids. Though these sorts of aids are often criticised for creating a dependency syndrome among their recipients, but these are important sources of help without which survival is threatened.

Both natural and man-made disasters tend to be sporadic, but they are also recurrent. As a result, many philanthropic organisations have continually donated their resources to fund disaster-relief operations without having established clear policies or priorities for doing so. Therefore, the first and foremost responsibility of these agencies should be to formulate clear-cut guidelines on which they will work. This will help them as well as the other agencies working in the area of disaster relief and rescue. A rough estimate of the kind of grant and resources available can help national- and state-level agencies to effectively gauge their needs and coordinate with them. Critical gaps in under-funded areas like disaster rehabilitation, prevention, and research and education services can be identified and filled by making suitable arrangements. It will also save these agencies from duplication of services. These philanthropic organisations should provide ongoing relationships with local organisations.

The decision-making of agencies should be based on a rational appeal. When a disaster takes place, there are myriad appeals for help. There should be an internal plan for handling disaster requests. The agencies should learn about disaster situation before responding and should know how and when to contribute and in what manner. These agencies should coordinate with each other by monitoring and evaluating disaster grants. They should think of providing for sustainable development and not just immediate relief.

### KEY IDEA

- The main aim of philanthropic organisations is

  1. To support emergency relief
  2. Disaster prevention, mitigation and preparedness
  3. Capacity building of the community and its development

## 7.5 Role of Stakeholders

Stakeholders are a group of people who have a personal interest in the outcome of a disaster management plan. This interest motivates them to attempt to influence the development of disaster management plan and take active interest in its implementation. Every individual as the national of a country and also as a citizen of the world is an important stakeholder of any disaster management activity. It is more so because disasters are not limited by the boundaries of the countries and have a widespread impact not only geographically but also for a long period of time. Oil spills in the ocean affects all the surrounding countries and it is the case with nuclear disasters. Every individual is thus affected by the decision-making in disaster management. Consequently, it can be said that an emergency management stakeholder is an individual who is affected by disaster either directly or indirectly. Since all citizens are likely to be affected by emergency management policies and decisions, they all form an important pool of stakeholders. But having said that this is not true that the kind of effect each one has greatly varies from another; therefore, for clear understanding, the stakeholders are divided into community stakeholders groups, Social groups, Economic groups, Political groups, Academicians and Researchers. We will discuss these groups in the following subsections.

### 7.5.1 Social Groups

A social group consists of two or more individuals who cooperate with one another, share similar characteristics and work together with a sense of unity. Social groups play a very vital role in the management of disasters. The irreducible unit of a social group is the household. They play a vital role in disaster mitigation and preparedness. Moreover, in an event of disaster, these groups suffer the most; therefore, they are the important stakeholders irrespective of their size and have an interest in disaster management policies. These groups can provide inputs for development and implementation of disaster management practices in their locality. Moreover, these social groups and their actions affect their vulnerability to ecological hazards. Their choice of location of residence, kind of materials used for construction, design of houses, etc. determines their level of vulnerability. If these social groups are assigned the task of developing emergency management policy in their region, they can give workable solutions and also play an active role in the implementation of these solutions. Social groups can get together to organise the community or neighbourhood Emergency Response Teams whose primary task would be to train first responders at the local level. They can be organised and trained to provide basic first-aid, assist in search and rescue, fire control, and determine damage estimates at the local level. In addition, there are other groups such as religious organisations and other non-governmental organisations which have an impact on the social and personal lives of people and play an important role in disaster management. All of these groups differ in size, mode of operation, amount of resources available, the kind of functions they perform in society and consequently on the level of influence on the society. These religious groups and other non-governmental organisations are also important stakeholders. It is often seen that the places of religious significance like temples, churches, gurudwaras and mosques have traditionally played key roles in disaster management. From disseminating information about impending disasters and communicating message in acting as shelters during evacuations, these places of importance have always had a bearing on the society and its members as a whole. Thus, these stakeholders should be included into disaster management planning. In fact, these centers can act as nodes to ensure effective implementation of disaster plans.

### 7.5.2 Economic Groups

Businesses are the fundamental units in the hierarchy of economic stakeholders, because they are responsible for smooth flow of goods and services. Disaster causes widespread destruction and damage, and adversely affects local economic structure. Since businessmen control their resources, they have an important say in the regulation of business during disasters. Moreover, big business houses are important funding agencies for disaster management as a part of their corporate social responsibility efforts. Moreover, the small traders are mostly vulnerable to disruption following disasters. They are affected economically but are willing to respond favourably to appeals for aid. Apart from traders and big businessmen, there are public utility providers who are responsible for providing basic amenities like electricity, telecommunications, water, sewer services, etc. These people play an active role in emergency management because they are accountable for quick restoration of basic services to all their customers. The vital services are restored by them during disasters which help in quick recovery. These units are important stakeholders and their work should be closely integrated in disaster management phases so that the business interruption is minimised and is quickly restored. These units can influence persons to adopt mitigation measures. The insurance industry, real estate developers, bankers are also active stakeholders in local disaster management. The suppliers, customers, infrastructure systems are closely linked and if any of these relationships is upset by a disaster, businesses can experience

serious economic losses even if their own facilities are intact. So these stakeholders have to be supportive of emergency management goals. In fact, they need to work like partners and get involved in hazard mitigation and disaster preparedness.

Another important stakeholder is media because their coverage of all phases of emergency management can be a significant way to educate the public about hazards that might strike the community. They not just update the public of an impending disaster, but can help to build support for disaster management and have a vital role to play in all the phases of disaster management.

### 7.5.3 Political Groups

Political groups are responsible for making disaster management policies and plans, and also plead for funds. These groups play lead roles in lobbying for increased attention to and funding for hazard mitigation and emergency preparedness at the national level. Governments at state and national levels basically comprise these political groups. These play a vital role in disaster management and perform analogous and complementary role. Apart from these, there are labour associations which have political affiliations and they can lobby for disaster-relevant legislation.

### 7.5.4 Academicians and Researchers

The people who specialize in specific hazards and mitigation measures are also important stakeholders. They provide the indispensable scientific knowledge on which sound emergency management policies and practices are based. There are researchers who focus on one type of hazard, while there are some who study all hazards and are multi-disciplinary or focus on the social impacts of disasters. These academic institutions provide consultancies in the area of disaster management.

#### KEY IDEAS

- Every individual as the national of a country and also as a citizen of the world is an important stakeholder of any disaster management activity.
- The various stakeholder groups are Social groups, Economic groups, Political groups, Academicians and Researchers.

## 7.6 Impact and Role of Media

Every day when we switch on our television or read the newspaper, there is at least one news of a disaster that occurred in some part of the world. Disasters are on the rise and will continue to make news. The media plays a very important role in spreading essential information to the public before, during and after disasters. The media serves as a link between the general public and persons who have suffered during disasters by showing their plight. It informs, persuades and helps generate awareness about disasters. It also links the populace with organisations working for disaster management. In a sense, the media supports the efforts of these organisations by generating awareness in public about the risks and hazards. They also serve as a medium for publishing warning of disasters. The media gathers and

transmits information about areas affected by disasters and the ongoing relief operations. It also aids the continuous improvement in the area of disaster management by finding and showing the missing links. It helps in the effective flow of information and serves as a link between the affected community or area and the general public.

There are basically two main types of mass media: the electronic and print media. Electronic media entails radio, television and the Internet. The *radio* is the most accepted and pervasive information tool used in disaster management due to its reach. Radios are inexpensive and are readily available in rural areas. In fact, now days it is also found in usage in urban areas. The mobile handset sets also have integrated radio in them and are even found in cars and at the petrol pumps and workplaces. They can quickly and easily transmit disaster-related information to the public through documentaries, commercials designed to build awareness, organising group discussions and interviews and dramas. *Satellite radios* can play an important role during pre- and post-disaster phases. The most important advantage of satellite radio is the ability to work even in remote areas which are not covered by normal radio channels. These satellite radios can function when the transmission towers of the normal radio channels are damaged in disaster.

Second to radio is *television* which is a powerful audio-visual tool in broadcasting disaster-related information and is widely used in countries across the globe. The television creates a visual impact and thus provides a remarkable chance for spreading messages with a greater impact on the public. It can show the real suffering and help generate fear and awe. They can serve as effective channels for disseminating disaster risk information. It is more so because disasters are not limited by the boundaries of the countries and have a widespread impact which lasts for decades.

*Print media* entails newspapers, magazines and journals. Newspapers are one of the oldest means of reliable communication mediums. People generally take the first sip of tea reading a daily newspaper. Newspapers serve as a medium for disseminating early warnings and aids in response and recovery. *Other Printed Materials* like magazines and journals are also effective means for spreading disaster-related information to target populations.

The media plays an essential role in the management of disasters. News channels and reporters help in informing and generating public awareness. In addition, they help in influencing global public opinion. Since disaster episodes grab attention of audience, therefore the media provides visibility for disaster-related issues. The media can help in disaster management by lobbying for political commitment on disaster-related issues. They can influence the leaders of political parties to be more responsive to the needs of affected communities. Through constant reporting, they can increase awareness about risks and vulnerabilities and can compel public officials to act towards mitigating and preparing for disasters. The media can serve as an eye opener for the general public as they show the real picture after disasters. The media can help the disaster victims by urging people to help by donating

Further, the media can persuade the government to prioritise disaster-related issues. The media may expose unwarranted and unproductive expenditure of the government for disaster victims. The media can trigger government sensibility towards disasters and urge the government to increase budgetary allocations for disaster management. The media serves in disaster mitigation by serving as Early Warning Systems and provide information about existing machinery that can aid in combating disasters. The media can play an active role in the improvement of coordination between policymakers and philanthropic organisations.

The media is a tool for generating awareness and can be used in a positive or negative manner. The media is the first to inform about the occurrence of a disastrous event and gives estimates about the losses. In that sense, they are the ones to define the event as an official disaster. They increase awareness and inform general public about



The terms of reference included three aspects. First is to examine the mode in which the process of mitigation, preparedness and capacity building should be enhanced and incorporated into the development plans of the Centre and the states; second is to create guidelines that needs to be followed by the Planning Commission itself while approving programmes and projects in order to ensure assimilation of disaster management principles in planning and plan implementation; and third is to develop guidelines for going into cost estimates the requisite financial provisions for disaster management. The main aim of having a disaster management plan is to have proper urban planning and zoning for the reduction of vulnerability and hazards. Enforcing the adherence to building codes is essential for mitigating disasters. It is important to encourage and facilitate individual home builders to use disaster-resilient designs, materials and techniques in the construction. People should be made aware of the imminent need to incorporate safety features in their houses. To reduce risks from flood, flood proofing, which is a process of constructing earthen mounds to raise house and its premises above the flood level, should be encouraged. Properly planned urban settlement and housing is obligatory for disaster risk management. It should be ensured that the building codes are religiously followed. Any new construction project relating to roads, railways or telecommunications should address the disaster-mitigation issues. Moreover, there is a need to identify and establish fitting institutional activities for encouraging disaster risk management. Initiatives should be taken to develop the skills, capacities and tools necessary to change the current focus on disaster response to one of disaster reduction. No matter how much preparation is there but almost in all cases disasters shock us. The loss to life and property can be greatly enhanced if there is no preparation, so having well-made disaster management plans and ensuring adherence to the plans is vital. The planning commission should appraise the projects and schemes on Disaster Management for allocating funds.

### KEY IDEAS

- The Planning Commission of the Government of India disasters has a very important role to play in disaster management.
- A Working Group on Disaster Management was specially constituted as a part of the formulation of the 11th Five Year Plan (2007–2012).

### 7.8

### *Community-Based Approach to Disaster Management*

Disaster management is an essential function of local community that is supported by state and central agencies. Community-based approach to disaster management requires coordinating with various stakeholders in constructing recovery operations plans and its implementation. Local community involvement will improve the flow of information, services and supplies during a disaster. Local communities are valuable forums for effective disaster management process. The community residents can comment on local disaster plans and can get actively involved in emergency planning. For involving the community, the residents must be informed that a disaster plan for the locality is being made. All the local residents must be made aware of the hazards and the types of mitigation strategies that are being taken to reduce the risks arising out of these

### 7.9 SUMMARY

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They should also be informed about the steps taken for monitoring the hazard and the protective actions that can be executed in an emergency situation. Feedback should be solicited from the community to know their stand on the preparation measures. The feedback must be suitably incorporated into the preparedness process to enhance the credibility of the plan.

There are myriad techniques of community involvement in disaster management. One of the simple techniques is obtaining feedback and support from the members of the community. This can be elicited by formal and informal means. Structured interviews can be conducted and informal reactions to various issues on disaster management can be undertaken. Second technique for gathering information and involving community comprises setting up a 'hazard hotline' telephone number. Local community must be made aware of this mechanism and feedback on various issues should be solicited. This arrangement helps to gather and disseminate information on a routine basis and can serve as a rumour control or warning confirmation line during times of disaster (Perry, 1982).<sup>[1]</sup>

A third technique for corresponding with the community is to ascertain direct contact with the local public. Public meetings at schools, colleges and community buildings can be organised. Such meetings serve as an opportunity to gauge the awareness level of general public and encourage them to actively participate in disaster management efforts. Discussions can provide emergency managers important inputs about the community's perception of the disaster management efforts and the extent to which they are helpful. Finally, persistent citizen involvement can be attained by creating citizen advisory committees. These committees can be attached to departments to provide general guidance on specific topics of disaster planning. A citizen advisory committee can provide timely and accurate information on specific points of disaster planning and can also mobilise strong support within the community. These committees can act as pivot points in involving people in the administrative aspects of emergency planning.

### KEY IDEAS

- The objectives of disaster management can be achieved if the local community is supported by state and central agencies.
- Community involvement in disaster management is achieved by obtaining feedback and support from the members of the community.

### 7.9

### *Summary*

The chapter discusses the role of various agencies in prevention, preparedness, response and recovery in the management of disasters. It is important for various existing agencies to identify, assess, coordinate and establish a network of assistance that is not just planned and managed but is also practically implemented in terms of local requirements. This entails ascertaining roles and responsibilities of the various agencies with respect to collaboration, communication and strategic planning. International and national agencies focus on grants that provide individual assistance, public assistance and disaster mitigation. These are also provided in a phased manner so as to take care of the immediate, intermediate and ultimate requirements.

The chapter also discusses the role of various decision-making and standing bodies at the national level in India. These various agencies also involve organisations which have expertise in technical fields for mitigation and response. The nodal initiatives permeate to local levels in town administration which is the focal point for implementation of disaster management measures. Apart from these, there are philanthropic organisations which also provide a support mechanism to these macro- and micro-level plans. The stakeholders too have an equal degree of involvement in ascertaining the roles and responsibilities. All these culminate into and emanate from the Planning Commission which on a periodical basis contemplates future actions by ascertaining various roles and responsibilities. The chapter also throws light on the positive as well as the negative role of the media depending upon the positive or the negative impact it has on the management of disaster.

### CASE PROBLEM: EVERY SECOND REPORTING SYNDROME

In 1995, a woman in Hong Kong took her life by burning barbecue charcoal in a closed room. The charcoal produces high levels of carbon monoxide which is a highly toxic gas. This was a new method of suicide that was unheard of before. It was extensively reported by the mass media, and by the end of 2004, suicide by charcoal-burning became the second most common form of suicide in Hong Kong. This proves that the mass media has immense effect on the impressionable minds of persons. This effect is called the *Werther Effect* which is the imitation of process of suicide due to constant exposure to the detailed information on the mode of suicide and graphic demonstrations and images of the suicide in the media. It leads to an increase in the rate of suicide. Imitation can take the form of contagion, which is 'a process by which exposure to the suicide or suicidal behaviour of one or more persons influences others to commit or attempt suicide' (Centers for Disease Control and Prevention, CDC, 1984).

It is true that suicide rates can be increased by increasing the exposure to suicides; similarly, it can also be reduced by limiting the access to common suicide methods. Media has a very vital role to play in abetting or encouraging suicides both directly and indirectly. The media generally assumes that news of suicides and other methods will always win an audience. The adage can be said to be, 'If it bleeds, it leads'. The syndrome then the reporters suffer from is 'every second reporting'. In the quest to be ahead and make sensational news out of very ordinary incidents, the media persons generally cross all limits. They exaggerate and show things out of events without thinking about its effect on the society. It creates an unnecessary sense of insecurity among the viewers and is often wildly misleading.

It is believed that dramatic and interesting reporting helps win an audience. Frequent reporting is dull and boring but situation demands that they are delivered once in every minute and that also in theatric tones. Moreover, during and after disasters the media reporters run to get a shot of the calamity. They do not wish to help the victims; they need to just report the condition of the victims. The same situation was faced by a teenager who was travelling by one of the Express trains when it derailed. Her parents lost their lives before her eyes. She was horror-struck. She herself was saved but seeing the bodies of her parents in the crushed state, finding no help was more devastating than the disaster itself. Some persons had avoided her and she reluctantly embarked from the train. A news reporter caught her by her arm, took her alive

### 7.11 OBJECTIVE TYPE QUESTIONS

and started asking questions about the accident. Soon others followed; she kept murmuring syllables while her wound kept bleeding. People were making news but no one cared about her trauma. Everyone was unfeeling or unresponsive to her state. Suddenly all the television cameras clustered around another man who upon finding his dear one dead had started shouting uncontrollably.

These reporters are possibly unaccustomed to inconvenience and discomfort of the victims. Their objective is clear: they need to make news and they do it with all dexterity while humanity sleeps.

Once the opening episode of a disaster is over, coverage slightly seeps away because there is nothing new to report. As one of the reporters of a newspaper who was requested to go back to Florida a month after Hurricane Andrew to report about the present status of the victims remarked, 'I am not sure that it is still a story.'

#### 2 Critical Thinking Question

- Do you think media can play an important role in disaster management? If yes, how?

#### 7.10 Keywords and Phrases

Philanthropic organisation

Planning commission

Stakeholders

Stakeholders

Community involvement

Media

#### 7.11 Objective Type Questions

##### A. Fill in the Blanks

- \_\_\_\_\_ is a working principle where individual work together to achieve a common goal.
- In India the ministry of \_\_\_\_\_ is the nodal ministry for the management of relief and response in natural disaster management.
- The operational challenges in the implementation of programs and plans have to be faced by the \_\_\_\_\_ and \_\_\_\_\_ governments.
- Periodic \_\_\_\_\_ should be introduced in vulnerable areas to enable prompt and suitable community response.
- The word \_\_\_\_\_ etymologically means 'love for humanity'.
- \_\_\_\_\_ are a group of people who have personal interest in the outcome of a disaster plan.
- \_\_\_\_\_ serves as a link between the general public and victim of disasters.
- The \_\_\_\_\_ radios function even when the transmission towers of the normal radio channels are damaged in disaster.
- Setting up a \_\_\_\_\_ telephone number is a technique for gathering information and involving the community.
- Informal reactions to various issues on disaster management can be had through \_\_\_\_\_.

**B. Multiple Choice Questions**

1. Review of contingency plans and measures necessary for dealing with a natural disaster is done by the
  - (a) Crisis Mitigation Group
  - (b) Crisis Management Committee
  - (c) Crisis Mitigation Committee
  - (d) Crisis Management Group
2. The Relief Commissioners are in charge of relief and rehabilitation measures at the
  - (a) International level
  - (b) National level
  - (c) State level
  - (d) Local body level
3. Countries situated in zones where disasters continue to occur on a continuous basis are
  - (a) risk prone zones
  - (b) hazard zone
  - (c) disaster zone
  - (d) seismic zone
4. Communities are made alert and aware by
  - (a) periodic drills
  - (b) training
  - (c) volunteer teams
  - (d) institutional machinery
5. Emergency relief which helps in identifying critical gaps by suitable arrangements is provided by
  - (a) National agencies
  - (b) NGOs
  - (c) Volunteers
  - (d) Philanthropic organizations
6. The fact that disasters are not limited by boundaries makes every individual a
  - (a) citizen
  - (b) stakeholder
  - (c) investor
  - (d) manager
7. Indispensable scientific knowledge on which sound emergency management policies and practices are based are provided by
  - (a) social groups
  - (b) economic groups
  - (c) media
  - (d) academicians and researchers
8. Media that shows real suffering and helps generate fear and awe
  - (a) print media
  - (b) television
  - (c) mobile handset
  - (d) radio

**7.14 ANSWERS**

9. One of the oldest means of reliable communication medium is
  - (a) newspaper
  - (b) radio
  - (c) television
  - (d) telephone
10. The legislation for creating and monitoring the execution of disaster management plans is named
  - (a) Disaster Management Act 2005
  - (b) Disaster Mitigation Act 2005
  - (c) Disaster Management and Mitigation Act 2005
  - (d) Disaster Preparedness and Management Act 2005

**7.12 Questions for Review**

1. Explain the roles and responsibilities of the following in disaster management:
  - (a) National and International agencies
  - (b) State and Local agencies
  - (c) Stakeholders
2. Explain the impact and role of media in disaster management.
3. Discuss the importance of community-based approach to disaster management.
4. What is philanthropic organisation?
5. What is the role of Planning Commission in disaster management?

**7.13 Reference**

1. Perry, Ronald W., (1982). *The Social Psychology of Civil Defense*. Lexington, MA: D.C. Heath.

**7.14 Answers**

- A. Fill in the Blanks
1. Collaboration
  2. Home Affairs
  3. State, local
  4. Drills
  5. Philanthropy
  6. Stakeholders
  7. Media
  8. Satellite
  9. Hazard hotline
  10. Interviews

**B. Multiple Choice Questions**

1. (a)
2. (c)
3. (a)
4. (b)
5. (d)
6. (b)
7. (d)
8. (b)
9. (a)
10. (a)

## Insights on Challenges in Management of Disaster

We live in the midst of alarms; anxiety clouds the future; we expect some new disaster with each newspaper we read.

—Abraham Lincoln

### Learning Objectives

After reading this chapter, you should be able to:

- Explain the role of education and public awareness on disasters.
- Explain the importance of public health system's role in disaster prevention.
- Discuss the challenges of disaster management.
- Explain the hazard map.
- Elucidate the effect of culture and disaster management.
- Discuss environmental degradation and strategies for addressing these challenges

## OPENING CASE

**I**t was a bright morning and Shazia Khanum was very happy; she, along with her children Amaan and Saida, was going to meet her parents after a long wait of one-and-a-half years. This was her first trip alone with her kids, usually her husband Sikander used to accompany them. This trip was long due and Sikander was not able to get leaves. So, unwillingly, he agreed to send the three alone. He went to the station to see them off and promised the kids that he would come to bring them back from their grandparents' house.

It was a Wednesday (8 January 2014) and Sikander got up late; there was an eerie silence in the house. With Amaan and Saida around, everyone had to get up early in the morning. The usual hustle-bustle was missing. He went to the kitchen and prepared a cup of tea for himself. He switched on the television and started surfing the channels. He was stunned as if in a state of shock because breaking news reported of accident of Mumbai–Dehradun Express. He grabbed his mobile phone and dialled his wife's number. The reply was same each time he redialled 'All routes are busy, please dial after sometime'. All sorts of weird scenes kept coming before his eyes. He took a deep breath and composed himself as if to prepare himself for action. The news reporter repeated again 'fire has engulfed three coaches of the speeding Mumbai–Dehradun Express near Dahanu town in Maharashtra's Thane district'. He shifted to other channels but almost all the news channels had the similar content to report. He hurriedly went to his friend's place and all of them left for the station. When he reached the station, his phone rang; he took the call and heard his wife's voice. She informed about them being safe at one of their relatives' place who had come to help them.



Fire Brigade officials putting off fire that engulfed and gutted the train.

8.1

Later, it was reported that around nine passengers, including a woman, were charred to death when a fire engulfed the three coaches. The fire erupted in S-3 coach and soon spread to other adjoining coaches when the passengers were sleeping at about 2:50 am. Ten passengers, injured due to the smoke and toxic fumes, were administered first-aid in the accident relief vans which were rushed from Mumbai and Gujarat. The injured were later shifted to hospitals in Dahanu and Ghowlawad. Four other persons sustained minor injuries. The authorities made arrangements for free travel to Dahanu for the victims' relatives, and 500 packets of food and beverages for the passengers on the train.

The fire was noticed on the speeding train by a level-crossing gateman who alerted the guard. The guard informed the driver and the train was stopped. The fire was brought under control shortly after the train was brought to a halt at Ghowlawad station, around 145 km from north of Mumbai on the Maharashtra-Gujarat border. The gateman did a commendable job and averted a major disaster.

In a similar incident, a major train tragedy was averted near Guntakal railway station due to the alertness of the train driver Srinivasulu. Amaravathi Express proceeding to Vijayawada from Hubli reached the Guntakal station at its scheduled time. After a halt of 15 minutes during which the staff changed the engine, the train proceeded on its onward journey. But, due to the alleged negligence of the railway staff, the train was given a wrong signal and it proceeded on a line leading towards Gooty and Chennai instead of Guntur route. The driver, Srinivasulu, noticed the fault and immediately brought the train to a halt. He informed the station officials about the mistake and drove the train back to the Guntakal station.

### Case Questions

- 1. What are the important lessons than can be learnt from these accidents?
- 2. Most disasters give a warning and with alertness they can be averted. Agree/Disagree giving reasons.

### 8.1 Education on Disasters

In 1817, the Hawkesbury and Nepean rivers were flooded again. The government had recommended creating townships only on high ground above the flood marks because the area was prone to disasters from floods. Governor Lachlan Macquarie issued a declaration soon after the floods which stated:

*'...it must be confessed that the compassion excited by their misfortunes is mingled with sentiments of astonishment and surprise that any people could be found so totally insensible to their true interests, as the settlers have in this instant proved themselves.'*

This declaration to a great extent echoes the sentiments of disaster managers of today. It is a known fact that a single catastrophic event can reverse the developmental gains by several years. Still people are not averse to taking risks. They suffer from 'this will not happen to me' syndrome which compels them to take risks. For any kind of risk-reduction activity to be successful, access to appropriate information and knowledge is critical. Apart from ensuring accessibility of information, it is also important to educate people about implementation of information in order to mitigate disasters.

The three aspects that are critical to reduction of losses from disasters are education, knowledge and awareness. These are the building blocks of any disaster mitigation strategy. They equip the community with the necessary information and help to build the capacity to respond and recover effectively from the extremities of disastrous events. For any disaster management plan to be successful, it is essential to have public education and awareness embedded in the structure of program. Without education, awareness and knowledge, even the best of strategies are bound to fail. The term 'education' includes formal and informal diffusion of knowledge for effective response and recovery. Education entails activities aimed at the employment of individuals of diverse age groups, gender and profession in identifying hazards and preparing for the ensuing threats. Data are the raw facts, but when these data are arranged into meaningful forms, it becomes information. When this information is put into a milieu that gives it meaning and relevance to action or inaction, it becomes knowledge. Organised knowledge, which is gained through years of experience, is called wisdom which is a source of awareness. In the context of a disaster all these aspects (knowledge, education and awareness) are of great importance since all the facets of disaster management, that is, prevention-preparedness-response-recovery get sustenance from these facets. There is an imminent need for public education in disaster management. There has been an increase in the number of disasters in the recent past. The ill-effects of disasters include physical damage, human suffering and death, loss of livelihood, and psychological trauma. It is a common perception that humanity has the ability to vanquish nature by the employment of technology and provide individual safety. This belief has led to perpetuating the illusion that risk is controllable or manageable and has thus increased expectations of public from governments. The government alone cannot stop the disasters. The community as a whole and individuals have an equally significant role to play.

The government can ensure availability of hazard-related information to all the stakeholders because in the absence of appropriate measures for the dissemination and assimilation of disaster-related information, the disaster management strategies will not yield the desired results. The government should take initiatives for the creation of policies to address the incongruities between the types of information that are generated and the needs of the people who need information to reduce their loss. Information, knowledge management and education have a key role to play in the formulation of disaster management initiatives.

The traditional top-down approach to information dissemination and education will not yield results. It should be ensured that there is an accommodation of local knowledge and good practices in disaster education policy. Disaster education can be effective in risk-reduction only if it concentrates on the social intricacies and disparities that constitute the disaster management profiles of societies. Vulnerability, mitigation needs, and the ability to access and learn disaster information vary across societies. The role of government is to communicate the disaster information to all the stakeholders and educate them for early warning, evacuation planning and post-disaster relief operations.

Disaster education is recognised by The United Nations Educational, Scientific and Cultural Organization (UNESCO) as an essential element in sustainable development since it hastens the progress of societies toward disaster resilience. Disaster education affects all facets of life through the resolute effort to conquer impediments such as ignorance, indifference and lack of determination in communities. Education also entails the enrichment of indigenous knowledge for protecting people from hazards. Education is also important, because preparation through education is less costly than learning through tragedy. Similarly, it is extensively accepted that an educated community is better able to prepare for, and respond to, disasters, and that education for disaster reduction is intricate and difficult yet essential to any suitably executed, centrally managed disaster strategy.

People can be educated about disasters through diverse means which include formal education systems, vocational and professional training courses, community-based self-assessment exercises and public discussions involving the media, awareness campaigns, and special events. Of late, there has been a renewed

attention to public education which is being used as a tool for disaster mitigation. The 1990s was celebrated as the 'Decade for Natural Disaster Reduction' and the importance of governments' educating and training their citizens to increase awareness was greatly emphasised.

It is researched and believed that schools are the best places for instilling collective values and thus can serve as important venues for educating about disasters. The inclusion of disaster education in syllabi across strategy. Children can play an important role in reducing losses during disastrous events. Also they perform the role of agents of transmission from classrooms to their communities, thus adding to the development of more resilient societies. Disaster education for children promotes awareness about the immediate environment in which they and their families live and work, and helps them understand how disaster loss-reduction strategy can be implemented. Children are effective communicators and influencers and thus the lessons learnt at school are transmitted to the homes. Students from primary schools to post-graduate level can enthusiastically study the safety status of their own schools and colleges and work with the teachers and community members to find ways to protect themselves and their communities.

Moreover, the disaster education interventions at the primary level help children become aware and responsible adults. They are better equipped with the knowledge of ill-effects of human actions on the environment and of the consequences of poor disaster management. In fact education for disaster reduction can be directly linked with sustainable development as education, knowledge and awareness are vital to building the capability for hazard loss reduction. Children can serve as catalysts for the reduction of disasters.

Disaster education in schools must focus on the tailoring of disaster information to the mental capacity of children so that they can absorb the information. Apart from pedagogy and curriculum development, there must be ways to gauge the level of awareness of the children. The mode of teaching should take into account the practical implementation apart from purely academic orientation. The teachers entrusted with imparting disaster information to children should be trained. They should be effective communicators and have sound knowledge of disaster management. Since disaster management has far and wide implications and is a sensitive issue, therefore, it should be dealt with seriously. Just inclusion of a compulsory course on disaster management in school curriculum is not enough. To have a multiplier effect on the wider society in terms of increased levels of awareness, it should be ensured that trained teachers are available. The customisation of information towards specific groups is a significant component of pedagogic methodology. Thus, to make the best use of the wealth of collective information, it should be warranted that disaster information dissemination to children must take into account issues such as age, level of literacy, language and dialects and other important cultural factors.

An evaluation of existing knowledge is also necessary. The evaluation technique should be in consonance with the age, level of literacy and mental capacity of children. Using games for communicating is one of the strategies used by the educators across nations for effectively communicating and educating children of all age groups. It can also help gauge the levels of disaster awareness among children. Other interactive and visual techniques such as hands-on and experiential learning methods can be used for educating children.

One such technique is Disaster Awareness Game (DAG). DAG was designed to fill gaps in the competence of Caribbean disaster managers to communicate disaster risk in a susceptible environment. This technique is used for measuring levels of hazard and disaster awareness, educate children as well as adults about hazards and disasters that are relevant to their environment, encourage constructive conduct at all stages of the disaster management cycle and clear myths about disasters. These tools include lectures and presentations on local hazards and the pertinent disaster management context. It uses a board game with related question cards and a score sheet to evaluate the levels of awareness prior to and after exposure to the game. The board game also helps to update the players about the cost of poor conduct in hazardous situations.

Disaster-related teaching is imparted in many parts of the world. According to the estimates, half of the world's nations provide some form of modes of education about natural hazards and safety at schools levels. In addition, national and state governments, NGOs, international organisations also provide education by way of lectures, skits and other accessible forms of electronic materials. Consider the following examples:

1. In South Africa, no national curriculum exists that deals specifically with disasters; but at the same time various individual states are pursuing relevant educational initiatives. These curricula deal with life and safety education, and violence prevention. Songs are used to teach the basics of safety to younger children in South Africa.
2. In China, there is a prescribed textbook for senior middle schools on natural hazards and their mitigation.
3. In Japan, disaster education is a community priority. Children grow up seeing adults practicing civil responsibility in a myriad ways. In residential areas and urban homes, small red buckets of water are kept outside the front door as a remnant of traditional community fire brigades, which have existed in many cities since the 1700s. Disaster preparedness and mitigation are taught in Japanese schools by way of lectures.
4. In Germany, there are 16 different curricular arrangements that entrust the responsibility for education to sub-national states. The textbooks focus on regions of the world at risk, the natural reasons of risks and the impact of hazards on surroundings. The teachers attempt to sensitise students to the difference between a natural event and a disaster, and show the requirement of early warning systems in disaster management. The schools carry out voluntary workshops called *arbeitsgemeinschaft* in afternoons, a group of students indulge in research work relating to earthquakes and floods in their own region.
5. In Algeria, the mode of education about natural disasters is through stories at the rate of one lesson per year. In the pre-university years, the teaching gets more systematic and students are taught geology, plate tectonics and, again, earthquakes.
6. In Jamaica, Disaster Preparedness Day is celebrated in schools. These events take place in January and June as the latter month signals the start of hurricane season. Disaster preparedness is introduced in the curriculum for different subjects at the primary, secondary and tertiary levels. School children take part in an innovative disaster-themed culinary competition which is organised each year at the Annual Independence Festival. Children prepare meals using only the ingredients that would be available after a disaster. In Jamaica, an annual hazard awareness month is celebrated in June every year. On this Day, schools are encouraged to make their students more aware of the types of hazards that affect Jamaica and also to involve them in hazard awareness activities such as creating original items in dance, drama, song and poetry to express themselves about their vulnerabilities to all types of disasters.

As evident, different countries have different modes of educating individuals about disasters. The main aim of each mode is to reduce the impact of disasters. It is important to note here that disaster education is not merely an academic exercise. Its benefits are many and it can make a difference between life and death, between economic progress and penury, and between sustainable development and environmental degradation.

### KEY IDEA

The three aspects that are critical to reduction of losses from disasters are

- Education
- Knowledge
- Awareness

### 8.2 Public Awareness

Every country is at the risk of exposure to some type of disaster, whether natural or man-made. In order to prepare for any kind of disaster, every country must inform its citizens about different types of disasters. The local residents must also be aware of how they can effectively participate in preparing for a disaster, mitigating potential impacts of a disaster and the recovery process after a disaster. One of the most effective mechanisms for a country to prepare for a disaster is by conducting educational and public awareness programmes at the local community level. Public awareness in disaster management is a process of educating and empowering the population through sharing the knowledge and information about various types of disasters and their potential risks as widely as possible so that the people act appropriately when a disaster happens.

Public awareness is the process of transmitting information to the general population to increase their levels of consciousness about disaster risks so they can prepare appropriately to cope with a disaster.

Public awareness is an integral part of disaster education. The target audiences for both public awareness and education extend like waves in a pool. At the centre are those people who are already acting constantly to make themselves and those around them safe and pliant. Beyond that core are the people who are interested in disaster management and are willing to act. They are motivated to act but do not know how. These people need support and confidence. These people are followed by group of persons who have heard about the disaster management efforts and have started to think and talk about the issue. Next follows a larger group that seems resistant to act. People falling in this category are fatalists and are vaguely aware of the issues but have no intention to act yet. Finally, there are many who do not have any inkling about their risks. Public education and awareness efforts need to recognise these layers and draw their inhabitants towards the centre. For generating awareness, categorisation of people on the basis of their level of knowledge is required and accordingly the awareness mechanism can be customised to meet their information needs.

An example will further make the reason for the customisation of information clear. According to survey results provided by the Washington Post of a survey titled: 'Survey of Hurricane Katrina Evacuees', 680 individuals who had been evacuated from the Gulf Coast to shelters in Houston, Texas, were surveyed and it was found that 73% of respondents were aware of the fact that an evacuation order had been issued before Katrina hit. Sixty-six percent of those who heard an evacuation order confirmed that it gave clear information about how to evacuate; however they did not evacuate before the storm hit. About 64% of those who did not leave never imagined that this kind of situation would arise. Forty-two percent of those stated that they waited too long. Fifty-five percent stated that their reason for staying back was lack of conveyance. Twenty-two percent of those who stayed back before the storm stated that they were physically unable to leave; approximately, the same number stated they had to care for someone who was physically unable to evacuate and 37% of those who did not vacate stated they just simply did not want to leave. (Bentley, 2006).

This survey indicates two important points: the first is that though there is a uniform dissemination of information, uniform reception cannot be guaranteed; the second is people have to be made aware about the aftermath of disasters. Efforts should be directed towards getting individuals to think about a disaster ahead of time and to prepare themselves for impending disasters. Public awareness is a primary component of disaster risk reduction. Therefore, attention must be given to improve education, training and awareness in all communities. The more the awareness in public about disasters, the less is the loss from disasters. The relationship between hazards/disaster impact and sustainable development is increasingly being highlighted in risk-reduction initiatives. This relationship is especially evident in developing countries where a single catastrophic event can reverse the developmental gains by several years. A concurrent and compelling argument

is that the provision of and the access to appropriate information and knowledge is a critical ingredient in the risk-reduction menu and advancement towards the goals.

Public awareness about hazards is a critical element in disaster management. For generating awareness, campaigns can be conducted in communities, schools and colleges through the print and electronic media. The responsibility for generating awareness lies with governments. It is a continuous process and to create a culture of prevention, there needs to be a great degree of public participation and popular understanding of disasters and their ill-effects. Public awareness on disaster management entails Do's and Don'ts in disastrous situations. Thus, simple information can save many lives during disaster. The messages that are spread for generating awareness should be reliable, clear, precise and specific. The awareness campaigns should be conducted at regular intervals so that the information is kept alive in the community. It should be ensured that the disaster risk reduction becomes a central part of the culture and everyday life of the community, and the information is passed on from generation to generation. To motivate individuals and generate greater interest in disaster risk-reduction activities, some other activities that can be undertaken by communities and agencies are as follows:

- 1. Celebration of Disaster Safety Day:** A day in the calendar year should be dedicated to disaster safety as it will serve as the constant reminder of the oath and commitment towards reducing the risks of disasters. The day should be marked by celebrations across the country. Individuals and communities who follow best risk-reduction practices must be awarded. Apart from this, painting and essays writing competitions must be planned to mark the occasion. Also, drills and demonstrations for the public must be organised. It is important to note here that the 2nd Wednesday of October is observed as the United Nations Day for Natural Disaster Reduction and ASEAN Day for Disaster Reduction.
- 2. National Public Awareness Program:** This program should be organised at local, regional and national levels. It should be customised to the needs of local persons. There should be a mechanism to measure the awareness levels of individuals, and accordingly short- and long-term strategies for generating awareness should be made. National Awareness Program should include awareness generation through distribution of posters, videos and leaflets on natural and man-made disasters. The posters on the negative impacts of disasters can be put up on community notice boards. The important issues in preparation for and response to disasters can be highlighted. Awareness can also be generated through community theatre and dramas. These measures can help in effective dissemination of information especially in rural areas. Local theatre groups provide information and entertainment to the local community. These groups can dramatise and showcase events pertinent to the kind of disaster the community is prone to.
- 3. Inclusion of disaster management as a subject in school and college curriculum:** Inclusion of disaster-related lessons in curricula can help generate awareness in students about management of disaster. Moreover, disaster management is an upcoming field and requires research and development in its various areas.
- 4. Disaster management training:** Disaster management training can be imparted to private- and public-sector employees and individuals to educate them and generate awareness amongst them. The training can be formal and informal. The informal training can be imparted outside the formal learning or training institution to community leaders and should cover important information for the people residing in disaster-prone regions. The awareness training programme should be evaluated at regular intervals.

Organizing workshops to create awareness can be an important vehicle towards raising responsiveness of communities. Experts in disaster management can assist in organizing such workshops. Community leaders can be made a part of the workshops as the dissemination of knowledge and awareness through community leaders can be effectively transferred to other members of the community.

It is essential that the whole process of awareness is mainstreamed across communities. The assimilation and participation of disaster management is everybody's business, but the central aim should be the community. The awareness training should be geared towards supporting communities to understand and manage their hazard to reduce and mitigate their risks. The government, communities, and public and private organizations should not only cooperate and be partners to discourage risk-contributing activities and factors, but also act in facilitating awareness amongst individuals. The process of making people aware and educating them about disasters should be a priority of the Government and agencies working for disaster management. The major approaches can be awareness generation through campaigns, participatory learning and formal and informal education. Successful awareness-generation programs should follow certain principles that guide their efforts. The first is consistency in generating awareness. The modes can be different but the end result should be the same. Second, the awareness programs should be customised to meet the needs of local population. In a cyclone-prone area, generating awareness about avalanches will be of no or little help. The third principle is evaluation of the awareness program. It is imperative to judge at regular intervals the extent to which the programs have been successful in delivering the intended message.

### KEY IDEAS

- Public awareness is the process of transmitting information to the general population to increase their levels of consciousness about disaster risks so they can prepare appropriately to cope with a disaster.
- To motivate individuals and generate greater interest in disaster risk-reduction activities, some other activities that can be undertaken by communities and agencies are as follows:
  - Celebration of Disaster Safety Day
  - National Public Awareness Program
  - Inclusion of disaster management as a subject in school and college curriculum
  - Disaster management training

### 8.3 Public Health System: Its Role in Disaster Management Prevention

The public health system includes public-sector agencies and private-sector organizations whose actions have an important impact on the health of the community. The mission of the public health system is to ensure health and well-being of the population at large. On the basis of the mission, the goals are conceived and operationalised. The main aim of any public health system is to ensure creating an environment in which people can be healthy, both mentally and physically. The structure of any public health system is derived from broad objectives that it tends to accomplish. The structure basically consists of collective resources, duties and responsibilities necessary to carry out the vital processes of public health. The structural capacity

of a public health system includes human, physical and fiscal resources. Without the availability of these resources, no system can function.

The working of public health system includes key processes through which the public health agencies seek to recognise, prioritise and deal with communities' health problems. It also includes key processes and interventions designed to address health issues of a community. The success of a public health system can be ascertained from the immediate and long-term changes experienced by the individuals and communities. The outcomes are the result of an effective and efficient interaction of the public health system's structural capacity and processes vis-à-vis the system's mission and purpose. These outcomes can be used to provide important clues about the system's overall performance in terms of efficiency, effectiveness and ability to cater to the health needs of the community.

Public health system has a vital role to play in disaster management and prevention. After a disaster, there is a fear of spreading of communicable diseases and the government with public health agencies should take pre-emptive steps to control the menace arising out of the outbreak of diseases. Public health agencies have a vital role to play during and after disasters as they have to work towards prevention and transmission of communicable diseases because if uncontrolled, these diseases may lead to greater disasters. The main communicable diseases that occur after disasters can be classified into the following categories:

- Diseases transmitted by contact:** These diseases spread through personal contact or being around the people who are already infected. These diseases include common cold, influenza, bronchitis, diphtheria and pneumonia. Diseases such as Acute Respiratory Infections (ARI) also spread and affect the common people, especially the children, after a disaster.
- Diseases transmitted by agencies:** These diseases spread through agents such as mosquitoes and include malaria, yellow fever, dengue, leptospirosis and chikungunya. These infections generally occur when there is a natural imbalance in the environment such as in the case of disasters. There are other pathogenic agents such as bacteria, parasites, fungi which cause diseases. The pathogenic agents are omnipresent and generally human bodies and the environment learn to balance these, but under disastrous situations, communities migrate to new places. When this migration happens, pathogenic agents also find themselves in new environments. This may lead to health disasters and primary victims of such incidents are the displaced communities given that they have no immunity to new pathogenic agents they confront. The local community may also be adversely affected given that their vulnerability could be higher to new pathogenic agents.
- Disease transmitted through poor personal hygiene or from contaminated environment:** These diseases include food poisoning, cholera, typhoid fever and diarrhoea diseases. Further diseases can be transmitted through faecal matter consumed orally such as drinking contaminated water or eating sordid food and fruits.
- Diseases transmitted through air:** Breathing contaminated air can spread air-borne diseases such as tuberculosis, measles, meningococcal meningitis and whooping cough.

Research in developing countries on the pattern of communicable disease outbreaks has helped identify risk factors that lead to outbreak of diseases. The risks concerned with communicable diseases and the imminent need to control them must be well understood by the affected community. An understanding of these risk factors is essential for public health system workers. It can help in predicting and preparing to prevent and

combat communicable disease outbreaks during and after disasters. The prevention mechanism that should be triggered at various levels during times of emergency is as follows:

- Primary prevention:** It is defined as the biological and clinical demonstration of an infection. The intervention includes immunisation of communities and awareness generation through education on basic hygiene and sanitation methods.
- Secondary prevention:** It includes thwarting an embryonic form of a disease before it develops into serious form that is prone to cause death or complications. The initial diarrhoeal attack can take disease from developing further. The availability of indigenous medicines to the infected people to treat these conditions can help in the absence of pharmaceutical provisions.
- Tertiary prevention:** It covers rehabilitation following the illness such as nutritional rehabilitation after measles, tuberculosis, etc.

Intervention at the onset can help check the development of infectious agents that can attack susceptible individuals. Vaccination can help modify the immune status of communities as well as help in controlling disasters. Also, health education should be imparted to communities to prevent and control health-related disasters. A health education programme should be developed keeping in mind the health needs of the community. The program should identify the health problems of the community and study the behaviours adopted by its members to cope with these problems. The objective and process of implementation of health education programme should be designed in such a way as to meet the needs of the community. The program should be implemented and results should be evaluated to take further action.

Apart from this, the public health system should also provide for environmental health of a community. It is evidenced from the history that bad housing, improper water supplies, insufficient drainage and consumption of infected food cause many diseases and deaths. Thus, the public health system should recognise the challenges and address the main constraints of environmental health. This entails the following:

- Recognizing and responding to uncertainties from disasters and prioritising treatment of different conditions.
- Clarifying roles and tasks of various personnel involved in providing public health both before and after the disaster.
- Ensuring co-ordination between various agencies working for public health.
- Ensuring early detection of diseases and efficient transportation and communication systems of infected population.
- Understanding that different communities respond in unexpected ways to medical emergencies in times of disasters, members of health system should be trained and authorised to handle these different situations.

The public health system is an integral part of disaster management agency. It facilitates proper response to disasters by use of available resources in a way so as to contain the losses from disasters and its aftermath.

### KEY IDEA

The mission of the public health system is to ensure health and well-being of the population at large.

## 8.4 Addressing Challenges Through Triage Process

Disaster is an emergency situation that disrupts normal functioning of a society causing concern for the safety of its members. *Triage* is a term whose origin can be traced to the French verb 'trier' which means 'to separate'. It was first used in Napoleonic Wars and finds a mention in the work of Dominique Jean Larrey. During World War I, French doctors used this term while treating the wounded soldiers. The wounded soldiers were categorised in three groups according to the state of their wounds. In the first category, the soldiers who were likely to survive were included. In the second category, those who were likely to die in all probability irrespective of medical aid were included. In the third category were the soldiers who needed immediate care and would survive if they got medical attention. Though this model of categorising patients is an old one, it may still be applied in disastrous situations.

Triage is commonly referred today as the process of deciding the priority of patients' treatment on the basis of severity of their condition. It deals with sorting and prioritising patients for medical attention according to the degree of injury or illness and expectations for survival. This helps in providing out proper treatment to patients when sufficient resources are not available. By providing care to those with minor injuries, health facilities are freed to attend to more critical patients who need immediate medical attention. Triage helps in determining the order and priority of emergency treatment and transport that has to be arranged for the patient. Today the triage uses scientific models for the categorisation of the victims. It is done on the basis of triage scores which use specific physiological assessment findings. Triage is a process carried out to reduce the burden on health facilities and it is done by the most experienced experts of a triage team. Triage is a continuous process that begins when patients arrive at the medical post and continues as their condition evolves until they are released from the hospital.

Simple triage is usually used in a scene of an accident or a 'mass-casualty incident'. It helps in sorting out patients into categories. Triage is done before transportation for the injured is possible. An initial assessment of those injured is carried out by medical or paramedical personnel. Each patient is labelled accordingly. These labels help in identifying the patients, displaying the injury and the priority of the patient's need for medical treatment and transport. Coloured flags and pre-printed cards used for this purpose are known as triage tags. Triage helps in setting priorities for evacuation and transport. Those who are dead are left where they fell. It is ensured that these people are not breathing and efforts to revive them have been unsuccessful. Victims falling in Priority 1 list are labelled red. They need urgent and advanced medical care at once or within 1 h. These people are in critical condition and would die without immediate assistance. Patients in the category of Priority 2 are given yellow cards. Their medical evacuation can be delayed until all critical ones needing immediate care are transported. These individuals are injured but in stable condition. They do require medical assistance but can still wait. Minor or Priority 3 category individuals are given green cards. They do not need immediate attention. These persons are attended after the second category individuals are evacuated. These people suffer minor injuries and are able to move, all they require is first-aid.

### KEY IDEA

Triage deals with sorting and prioritising patients for medical attention according to the degree of injury or illness and expectations for survival.

## 8.5 CHARTING A HAZARD MAP

### Charting a Hazard Map

For effectively managing disasters, a common visual aid is used to point out safe escape routes and safe harbours in an event of disaster. These aids act as a guide for people and help them save their lives in disastrous situations. It is a community-based approach used to map the risk-prone and safe zones. Risk areas can be mapped using these simple hazard maps and risk-reduction activities can be carried out in those areas. The hazard map helps people to know the correct escape routes and take refuge at safe places when disaster strikes. These maps are useful tools that help save losses to lives and property. There are complex hazard maps also that are generally used by experts of disaster management.

#### Example: Simple Hazard Map

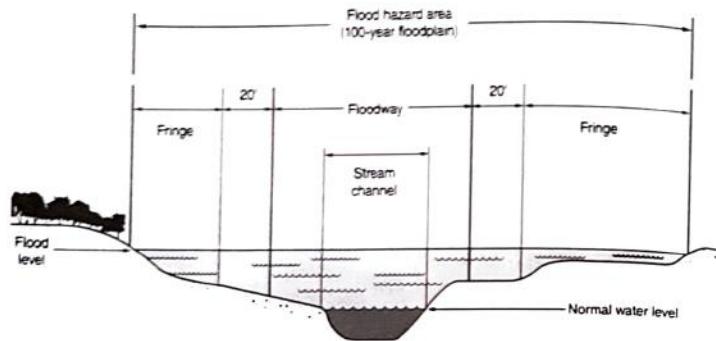
A simple hazard map of a flood-prone area is discussed here.

Flood hazard maps describe and demarcate flood hazard areas beside streams and lakes using planned flood levels recognised as part of flood hazard studies. The Flood Hazard Identification Program assists communities to prepare for a flood event. Information is collected through a systematic and standardised format known as a flood hazard study for a specific location. The study focuses on a single river but may also include information about other smaller tributaries that may also influence a flood event. Also if the region has more than one water body, all are considered for study. The cause and effect of any change in one water body on another is also studied.

The river system's hydrology and topography is assessed and modelled with known river data. On the basis of the study, a visual representation or a flood hazard map is created for anticipated areas that would be influenced by a flood event. Flood hazard areas are areas that can be affected by flood under intrusion conditions. Flooding areas are classified as floodway zones and flood fringe zones. Overland flow areas are rated to be the part of a flood fringe zone. Floodway zone is that section of the flood hazard area where flood can be most destructive. In this zone, the water body is deep and water flows at the fastest speed. The floodway typically includes the main waterway of a river and a segment of the adjacent overbank area. The floodway is necessary to convey the design of flood-prone area. Any new development in the area is discouraged. Flood fringe is the segment of the flood hazard area outside of the floodway. Water here is shallower and the water flows slowly as compared to the floodway. Here new developments are allowed subject to flood proofing. Areas of overland flow are special areas of the flood fringe. Flood levels are computed elevations in water level under encroachment conditions where the flood fringe is fully developed and flood flows are carried completely within the floodway. The flood levels are used as standards and do not change as a result of development or obstruction of flows within the flood fringe. These hazard maps have to be updated according to the change in the hydraulic system and should be used for the Disaster Recovery Program (DRP) in assessing the location of flood ways and flood fringes. The map should be interactive so that the users can get a lot of information about flood-specific locations along the river systems. An example of flood hazard map is shown in Figure 8.1.

### KEY IDEA

A hazard map is a common visual aid is used to point out safe escape routes and safe harbours in disastrous situations.



**Figure 8.1** Flood hazard map of Dublin. (Retrieved from <http://dublinohiousa.gov/engineering/floodplain-management-in-dublin/> on 31.05.2014.)

## 8.6 Effect of Culture and Disaster Management

Culture can have a great impact on disaster management practices. An understanding of cultural characteristics can strengthen, empower and enrich management effectiveness and success. Culture can be a useful resource for education and public awareness programmes on disaster management. Some cultural qualities, however, may interfere with or constrain disaster management process and efficacy.

Before understanding the effect of culture on disaster management, it is important to comprehend the concept of culture. The word 'culture' comes from the Latin word 'cultura' which is related to cult. In its broadest sense, the term refers to the result of human interaction. It can be defined as acquired knowledge that people use to interpret experience and generate social behaviour. This knowledge gained through experience forms values, creates attitudes, and influences behaviour. Certain characteristics of culture as follows:

- 1. Culture is learned:** Culture is not inherited or biologically based; it is attained by learning and experience.
- 2. Culture is shared:** People as members of a group, organisation or society share culture. It is not limited to a single individual.
- 3. Culture is trans-generational:** We say so in the sense that it is cumulative knowledge arising out of experience that is passed down from one generation to the next.
- 4. Culture is symbolic:** It uses the human capacity to symbolise or use one thing to represent another.
- 5. Culture is patterned:** It follows a structure and is integrated. A change in one part will bring changes in another.
- 6. Culture is adaptive:** It is based on the human capacity to change or adapt to its surroundings.

Because different cultures exist in the world, an understanding of the effect of culture on human behaviour is crucial to the study of disaster management. There are various ways in which culture can affect disaster management. In some societies, the community leaders make all important decisions. In others, these decisions are diffused throughout the community and all actively participate in and make key decisions. From the perspective of disaster management, this knowledge is essential. In a society where community leaders take decisions, preparedness and mitigation measures should be communicated to them and they will be responsible for disseminating the information to their community.

In some societies, organisational decision makers are risk averse and have great difficulty with conditions of uncertainty. In others, risk taking is encouraged, and decision making under uncertainty is common. In disastrous situations, this information about communities is vital and helps the agencies know about reactions of local communities to disasters. In some countries like Japan and China groups rewards are preferred to individual rewards. In others, individual awards are given importance. Therefore the awards should be suitably customized keeping in mind the culture of the country. In some societies, much is accomplished through informal means. In others, formal procedures are set forth and followed rigidly. Accordingly disaster management training and mitigation strategies should be tuned to meet the needs of individuals.

Culture can also be a barrier to the development and effective implementation of these disaster programmes. Local people know best about the kind of damage caused by previous disasters and about culturally accepted beliefs, rituals and norms. Before imparting training on disasters, it is vital that agencies recognise the culture and protocol of the people they are addressing. They must be responsive to cultural norms and values and must incorporate this in the awareness programs. Culture becomes a barrier when training and awareness programmes are insensitive to cultural norms and values of a given community. Different aspects pertaining to culture which is vital for disaster management are as follows:

- 1. Roles and responsibilities of persons in community:** Certain members of a community command a respectable position and hence whatever they say is followed by the entire group. They are valued and thus should be made a part of disaster reduction implementation programmes delegation. They must be imparted awareness training so that they can disseminate information to the community. Indigenous community leaders such as mayors, gram pradhans, mukhiyas, religious leaders and teachers in local schools are members who play an important role in the community and have a say in community affairs.
- 2. Language:** Language plays an important role in disaster awareness generation. The local residents are more receptive if training is conducted in their native language because it is easily understandable and they feel interested. Caution should be exercised in the usage of words, terms or expressions. They must be appropriate and acceptable to the people. Use of taboo words or expressions should be avoided as they will do more harm than good.
- 3. Correct translations:** It is essential that translation of messages from one language to another is precise and message is being exactly relayed to the people of a community. Meaning of the message may become distorted or not received by the target audience if the translation is improper. Intonation and voice modulation should be taken into consideration while communication.
- 4. Medium of transmission:** Medium chosen for education and public awareness should use and take into account the modes which are accessible to the members of the community. Also methods which people are familiar with should be used. Indigenous knowledge may also be included into public awareness programmes.

**5. Traditional healing methods:** These methods, which use herbal medicines, are century-old mechanisms followed by communities. Instead of just discarding them in favour of modern medicines, their efficacy should be established. If in an agreement with modern medical systems, these medicines can well be used when disaster strikes and outside help gets delayed. Their use can help save lives in emergencies.

Exposure to disasters have made communities develop traditional strategies or preventive measures to prepare and deal with disasters. These are culture-specific and should be given weightage.

### KEY IDEAS

- The word 'culture' comes from the Latin word 'cultura' which is related to cult.
- Culture has certain characteristics; they are learned, shared, trans-generational, symbolic, patterned and adaptive.

## 8.7 Environmental Degradation and Disasters: Addressing Challenges

Growth in industrialisation and environmental abuse are often accused of causing of catastrophes across the globe. Disasters are causing havoc day in and day out and much is attributed directly or indirectly to the environmental degradation. The way people are killed and communities are washed off across the globe clearly demonstrates how disasters strike. However, it is important to note that the same disaster strikes differently at different places depending precisely on how the ground was prepared for them. Due to extensive deforestation in Haiti, large hillsides are made bare which allows the rainwater to run off unswervingly to the villages and towns at the bottom of the slopes. This kills many and leaves many injured. But in the neighbouring Dominican Republic which is hit by the same storm the devastation is much less. The reason behind this discrepancy is that the hilly areas of Dominican Republic are covered by a protecting forest. The destruction and loss of life produced by the storms is primarily due to deforestation in the hills. In fact there is a clear relationship between environmental degradation and disasters. It is important then that the central goal of any disaster management activity should be to reinforce the need to address environmental concerns because it can serve as a tool to prevent disasters and lessen their impact on people, their homes and livelihoods.

Degradation of the environment has opened a Pandora's Box of cataclysm across the planet. We all are witnesses to the horrors of drought and extreme weather conditions that assault one or the other part of the world each day. The growing number of devastating hurricanes, typhoons, droughts and floods across the globe is a result of climate change. Research says that these are set to become more recurrent and brutal. The important aspect is that most of these natural disasters are triggered by human action. If an individual exhibits controlled and regulated behaviour in a responsible manner towards the environment, these disasters may well be prevented to a great extent. Addressing environmental issue at every stage of disaster management is essential.

Imbalances in ecology have disturbed the relationships between living organisms and their environment. It calls for taking actions to improve the quality of the human environment. The unrestrained urbanisation

and industrialisation has led to the depletion of natural resources. One of the important causes of disasters is environmental degradation. In alarming situations such as drought or flood, the 'environment' acts as agent that causes harm to communities. These extremes of weather conditions can be attributed to global warming, the root of which is human actions. Also, the selection of building sites and materials significantly affect a community's vulnerability to environmental disasters.

In fact, it is difficult to define an environmental hazard as there is a fine distinction between an environmental hazard and an environmental resource. Water out of control is flood whereas water in control is a reservoir. Floods damage natural habitats and ecosystems and forest fires cause harm to forest ecosystems. Nevertheless, floods are necessary to renew and enrich soils and recharge aquifers, forest fires also help by weeding out undergrowth that could fuel larger fires and they can re-vitalise biodiversity. Whatever be the case, excess of anything is bad and it is important to control degradation of the environment.

Improper handling of solid wastes causes build-up of explosive gases which endangers the physical environment. Pollution of water bodies by discharging of waste in rivers and lakes makes water undrinkable and affects flora and fauna of the region. Marine accidents release massive toxic discharges which affect water resources. Dangerous chemicals enter the urban food chain and affect health. Of late, there is a growing understanding of environmental degradation as a contributing factor in disaster effects. Environmental degradation affects humans as well plants and animals and also water and air quality adversely.

Environmental hazards are interdependent and one may trigger other or make the other worse. Floods can contaminate water and make it impure by release of chemicals and other contaminants. Transportation spills, industrial chemical releases through infrastructure damage can be caused by earthquakes. An example is the destruction of the World Trade Centre in America. The damaged WTC infrastructure released asbestos, respiratory irritants, polycyclic aromatic hydrocarbons which were a possible source of carcinogens and pulverised metals into the atmosphere. It contaminated the surrounding area and adversely affected the rescue and recovery work. Thus environmental hazards present everywhere are only waiting for a spark to make a natural disaster even worse.

The environment and disasters are intrinsically linked. Environmental degradation disturbs natural processes, amends humanity's resource base and amplifies vulnerability. It aggravates the impact of natural hazards and reduces overall toughness. Thus, an assessment of environmental causes of hazards occurrence, vulnerability and environmental actions that can reduce vulnerability should be done. Also an evaluation of the effect of disaster reduction actions and adoption of strategies to enhance the quality of the environment can help build healthy environment. The challenges of environmental degradation can be addressed by undertaking activities for pollution prevention. Environmental management professionals can make considerable contributions during the disaster management phases by identifying possible improvements. They can monitor and assess environmental performance indicators to ensure that goals are met. Addressing issues of environmental degradation throughout all four phases disaster management, that is mitigation, preparedness, response and recovery, can contribute directly to the practice of disaster management.

At mitigation phase, an inventory of environmental assets can be built. As part of hazard mitigation planning, environmental projects and environmental enhancement opportunities can be identified. Local land use and growth-management ordinances can be integrated into hazard mitigation planning and accordingly hazard mitigation plans can be developed. On the basis of mitigation plans, progress and operation of environmental projects can be conducted. Identification of environmental regulatory requirements and funding programmes to support environmental mitigation actions is a challenge. At preparedness phase, this can be addressed by assessing environmental vulnerabilities and providing assistance in developing response procedures to ensure that environmental hazards are addressed.

At the response stage, environmental impact assessments can be done to identify the damages done to the environment as a result of disaster effect. Assisting the community in responding to environmental hazards or emergencies is also important. At the recovery stage, damage done to the environment can be identified and possible recovery options for environmentally sensitive areas can be developed. Aid in debris removal and clean-up especially for hazardous materials should be provided. Also communities should be taught the basic causes of environment degradation and its long- and short-term effects.

To a great extent, the concepts and practices of environmental management and disaster management overlap and interact in mutually supportive ways. From setting up of disaster mitigation and recovery plans to local disaster planning committees, all the steps should encompass activities to integrate environmental considerations to broad planning purview. Disaster managers generally ignore environmental issues. But issues such as thinning of the forests, chemical spills, global warming, pollution and uncontrolled infrastructure development, are all related to disaster directly or indirectly and have a potential to cause severe disasters. It is warranted that environment degradation is clearly intertwined in the disaster management initiatives and should seek solutions that will maximise the environmental quality as well as meet the needs of disaster preparedness and recovery.

### KEY IDEAS

- There is a clear relationship between environmental degradation and disasters.
- The central goal of any disaster management activity should be to reinforce the need to address environmental concerns because it can serve as a tool to prevent disasters and lessen their impact on people, their homes and livelihoods.

### 8.8 Summary

The chapter highlights the role of public awareness and education in meeting the challenges in the management of disasters. Education and awareness is linked with preparedness which in turn directly addresses management of any crisis situation. Public health systems address health issues related to disaster whether it means preparing people and the system for health hazards or addressing health issues after disaster strikes. Disaster, thus, involves a three-fold approach towards its management which is brought about through widespread education, generating awareness and disseminating relevant knowledge. The process entails integration of these with the cultural specifications of the community. Children being educated in schools bring in an element of analytical understanding of disaster management as they have a questioning mind and play a significant role in disaster management and equip the society to handle any unforeseen situation. The Triage process discussed in the chapter also helps in understanding how prioritisation of post-disaster treatment of injured victims provides a more practical approach towards handling medical aid to be provided on the basis of the degree of injury and the level of urgency. Further, hazard maps create visual escape routes and safe harbours in the event of a disaster. Finally, the chapter integrates all aspects discussed with the local specifications related to the culture of the community. Culture can help mitigate disaster management on one hand or even hinder the process on the other. It is therefore important that an understanding of the culture is integrated with all efforts for meeting the challenges posed by the management of disasters.

### CASE PROBLEM: THE GEOGRAPHY LESSON

**T**he term tsunami comes from the Japanese words 'tsu' meaning 'harbour' and 'nami' meaning 'wave'. As evident, Tsunamis generally consist of a series of waves which span from minutes to hours, arriving in a series resembling a 'wave train'. The waves of tsunami ranges to tens of metres in heights and their destructive power can be enormous. They have the capacity to affect entire ocean basins. The 2004 tsunami of Indian Ocean was amongst the deadliest natural disasters in human history. Around 290,000 people were killed or went missing from over 14 countries bordering the Indian Ocean. But many lives were also saved.

It was 26 December 2004, Tilly Smith, an 11-year-old British schoolgirl, was on a holiday in Thailand with her family. The Smiths, from southeast England, were celebrating Christmas at Mai Khao Beach in Phuket, southern Thailand. Triggered by a massive earthquake off northern Sumatra, deadly tsunami waves were already on their way. Tilly saw the water was swelling and kept coming in and there was froth on it. She sensed something wrong. Her mind kept going back to the geography lesson Mr. Kearney gave just two weeks before she flew out to a Thai resort with her family. She acknowledged the signs of the receding sea as a sign of an imminent disaster. The beach was getting smaller and smaller. Tilly remembered what she had studied about tsunamis in school. The slow rising of the sea and formation of froth and whirlpools before the big waves came, was similar to what she had seen in a video of a tsunami that hit the Hawaiian Islands in 1946. Tilly knew that the consequences of not acting when something strange happened would be grave. She got more and more frantic and started screaming to get off the beach. She warned her parents of the impending disaster and as a consequence all the hotel guests were rapidly moved from the beach.

The family took refuge on the third floor of the hotel where they stayed. Set well back from the shore, it withstood the surge of three tsunami waves. When tsunami struck everything including beds, palm trees were displaced due to storm. If they had stayed on the beach they would not have survived. In the disaster's aftermath, the Smiths met people from nearby resorts who had lost whole families.

A simple geography lesson saved lives. Tilly's geography teacher, who has taught the course for at least 11 years, uses audio-visual teaching aids such as interactive white boards to harness geographic information online. Tilly's class had looked up U.S. websites about tsunami early-warning systems. Children were also given practical tasks such as building earthquake-proof houses out of balsa wood. Students do not learn much from books and any subject can be dull if it is taught that way. To get children involved and interested, practical lessons are a must.

UN International Strategy for Disaster Risk Reduction aims to inform and mobilize Governments, communities and individuals to ensure that disaster risk reduction is fully integrated into school curricula in high-risk countries and that school buildings are built or retrofitted to withstand natural hazards. Sensitising the next generation about living with hazards can help make our societies better able to cope with disasters when they do happen. In December 2005, Tilly was named 'Child of the Year' by the French magazine *Mou Quotidien*. On the first anniversary of the Official Tsunami Commemorations at Khao Lak, Thailand on 26 December 2005, she was given the honour of closing the ceremony with a speech to thousands of spectators.

A simple geography lesson to a school girl can save thousands of lives.

### Critical Thinking Question

1. Do you think children can play an important role in disaster management? Give reasons for your answer.

**8.9 Keywords and Phrases**

Public health system	Environmental degradation	Education
Hazard map	Public awareness	Triage
Culture		

**8.10 Objective Type Questions****A. Fill in the Blanks**

1. The three aspects critical to reduction of losses from disaster are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
2. \_\_\_\_\_ are raw facts when arranged into meaningful form become \_\_\_\_\_.
3. The traditional \_\_\_\_\_ approach of information dissemination does not yield results.
4. The \_\_\_\_\_ was celebrated as celebrated as a decade of Natural Disaster reduction.
5. Children can serve as \_\_\_\_\_ for reduction of disasters.
6. In Germany, the voluntary workshops in which a group of students indulge in research work is called \_\_\_\_\_.
7. The second \_\_\_\_\_ of October is celebrated as the UN day for natural disaster reduction and ASEAN day for disaster reduction.
8. \_\_\_\_\_ is a process of determining the priority of patients' treatment.
9. The flood hazard map assesses the \_\_\_\_\_ and \_\_\_\_\_ with known river data.
10. Imbalances in \_\_\_\_\_ disturbed the relationships between living organisms and their environment.
11. It is difficult to define as environmental hazard as there is a fine distinction between an environmental \_\_\_\_\_ and resource.
12. Environmental hazards are \_\_\_\_\_ as one may trigger other or make the other worse.
13. The Japanese word 'tsu' means \_\_\_\_\_ and 'nami' means \_\_\_\_\_.
14. \_\_\_\_\_ the next generation about living with hazards can help make our societies better able to cope with disaster when they do happen.
15. \_\_\_\_\_ was designed to fill gaps in the competence of Caribbean disaster managers to communicate disaster risk in a susceptible environment.

**B. Multiple Choice Questions**

1. Disaster education does not yield result if it is limited to
  - access and learning disaster information across societies
  - communication of disaster information top all stakeholders
  - traditional top-down approach
  - warning, evacuation planning and post disaster relief operations.
2. Disaster education is recognized by UNESCO as an essential element of
  - economic development
  - social development
  - national development
  - sustainable development

**B.10 OBJECTIVE TYPE QUESTIONS**

3. Disaster education is most effective amongst
  - children
  - women
  - adult
  - youth
4. Responsible adults better equipped with knowledge of ill effects of human action are result of educational interventions at the
  - primary level
  - secondary level
  - college level
  - professional level
5. Disaster Awareness Game designed to
  - educate people across globe about disaster preparedness
  - increase disaster awareness amongst disaster prone population
  - update information to increase awareness
  - fill gaps in the competence of Caribbean disaster managers to communicate disaster risk
6. Small red buckets are kept outside urban homes as remnants of traditional community fire brigades in
  - Japan
  - South Africa
  - Algeria
  - Jamaica
7. Tuberculosis and measles are diseases transmitted due to
  - person hygiene
  - air
  - agencies
  - water
8. Thwarting an embryonic form of a disease which can take a serious form is
  - primary level of intervention
  - secondary level of intervention
  - tertiary level of intervention
  - terminal level of intervention
9. The triage process of prioritizing categories of victims was first used during
  - World war I
  - World war II
  - American civil War
  - Vietnam war
10. Change in one part brings change in another part because culture is
  - patterned
  - symbolic
  - adaptive
  - generational

**8.11 Questions for Review**

1. Is education on disasters important? If yes, why?
2. Through public awareness, disaster can be prevented effectively? Agree/Disagree giving suitable reasons for your answer.
3. What is Triage? How can it help in classifying injuries?
4. Explain the role of public health system in disaster management.
5. Explain the importance and role of culture in disaster management.
6. What is a hazard map? Explain with an example.
7. Explain the relationship between environmental degradation and disaster.

**8.12 Reference**

1. Bentley, E. and Waugh, W., (2006) Katrina and the necessity for emergency management standards (Ed.), *Journal of Emergency Management*, Vol. 3, No. 5, 9–10.

**8.13 Answers****A. Fill in the Blanks**

1. Education, knowledge and awareness
2. Data, information
3. Top-down
4. 1990s
5. Catalysts
6. Arbeitsgemeinschaft
7. Wednesday
8. Triage
9. Hydrology and topography
10. Ecology
11. Hazard , environment
12. Interdependent
13. Harbor, wave
14. Sensitizing
15. Disaster Awareness Game

**B. Multiple Choice Questions**

1. (c)
2. (d)
3. (a)
4. (a)
5. (d)
6. (a)
7. (b)
8. (b)
9. (a)
10. (a)

**Chapter 9**

# Behavioral Aspects of Disaster Management

**B**ad things do happen in the world, like war, natural disasters, disease. But out of those situations always arise stories of ordinary people doing extraordinary things.

—Daryn Kagan

## Learning Objectives

After reading this chapter, you should be able to:

- Explain the process of identifying socio-psychological needs in mass emergency.
- Discuss different psychological considerations of victims of disasters.
- Explain the importance of training in humanitarian professionalism.
- Explain community building in developing local resilience to disasters.
- Discuss the importance of developing leaders.
- Elucidate the importance of communication and commitment.
- Negotiate the conditions and effects of vulnerability.

## OPENING CASE

**O**n 16 April 2014, more than 500 divers, 166 vessels and 29 aircraft struggled with strapping waves and many waters as they searched for hundreds of missing school children of the Dariwon High School in Asan, a Seoul suburb after the ferry carrying them capsized. Students had gone on a high school trip to the holiday island of Jindo. The vessel named Sewol, carrying 476 passengers, including 335 children and teachers from the school, capsized 20 km off the coast of South Korea. This 6,823-tonne main-deck vessel suddenly capsized and then sank within the space of 90 min. What caused the vessel to capsize is unknown, but many passengers of the ill-fated ship spoke of a loud knock and the vessel coming to an abrupt, sudden stop, suggesting it had straddled or hit a submerged object. The 146 metres (479 feet) long and 22 metres wide ship was over three times overloaded, according to official reports, with cargo, poorly stowed and inadequate ballast. There were 105 containers on board, some of which toppled into the sea as the ship tilted. Forty-five were loaded onto the front deck and 60 into the lower decks. According to reports, altogether the ship was carrying 3,600 metric tonnes of cargo including containers, vehicles and other goods.

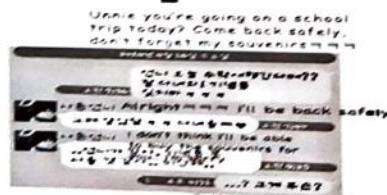
As the ferry began to sink, the crew told the children to stay in their cabins. Most of those who obeyed died. Many of those who floated or did not hear the instructions and went out on the deck were rescued. Some of the bodies had their hands held tightly like firecrackers to try to keep warm, a newspaper said. But the last text messages from the passengers trapped in the ferry and their relatives were depressing. Both the family members and the children were gripped in despair. While the ship was sinking, the parents and relatives of those on board were feeling helpless and the children and passengers were eagerly waiting for rescue. Both sides held onto last hopes and God's grace in the moment of this crisis.

"I think we are all going to die. If I did anything wrong to you, please forgive me."

"I love you all."

Father: "I know there is a rescue operation under way, but if it is possible, get out of your room."

Student: "No Dad. The ship has tilted and I can't get out. No one is in the hallway."



Text messages sent by students on board the ill-fated ship to their parents.

## OPENING CASE

The text messages sent by students trapped in the lower deck to their parents revealed fear. They were asked to 'stay put' by the captain when the first sign that the ship was in trouble was noticed. Parents sat by helpless as their kids sent them text messages, passing on their fear. Many said their final 'I love you' and 'good bye'. The messages as shown in the picture depict sorrow and helplessness of trapped students. How does a parent feel when they know that their child is alive at that moment, but this was perhaps the last communication they will ever have with the child for the rest of their life? The helpless parents sat there weeping their hearts out but were unable to do anything. The panic in the kids' voices is the last memory of words spoken between the child and parent for many of the parents of the missing students. Heart-wrenching messages of fear, love and despair were sent by high school students. They were in a state of despair. One of the students on board, Shin Young-Jin, texted his mother:

*'Sending this in case I may not be able to say this again. Mom, I love you'*

Shin's mother texted back, 'Oh, I love you too son'.

A few parents received text messages from their kids saying they could not get out of the ship because it was at too much of a tilt and they could not walk out. When a 16-year-old sent a frantic message to his older brother saying:

*'My room is tilting about 45 degrees. My mobile is not working very well'*

His big brother messaged back trying to calm him down:

*'So don't panic and just do whatever you're told to do. Then you'll be fine.'*

Sadly his brother's advice was similar to that of the crew, who ordered passengers to stay put when the ship first foundered. The passengers who heeded this advice were trapped below in the capsized vessel, where suddenly everything was at a 45° angle, making it impossible to walk anywhere. The gloomy situation on the ferry was summarised in the texts that an 18-year-old student sent to her father:

*'Dad, don't worry. I'm wearing a life vest and am with other girls. We're inside the ship, still in the hallway. Her distraught father wrote back urging her to try and get out, but it was already too late.'*

*'Dad, I can't. The ship is too tilted. The hallway is crowded with so many people'*, responded in a final message. Some of the messages were calls for immediate help, while others were sent to say a final goodbye to their loved ones. Some parents managed a last, traumatic phone call with their children as they tried to escape. 'He told me the ship was tilted over and he couldn't see anything', one mother recalled of a panicked conversation with her student son. 'He said, "I haven't put on the life jacket yet", and then the phone went dead', the mother told.

The first distress call from the sinking vessel was made by a boy with a shaking voice, 3 min after the vessel made its fatal last turn, a fire service officer reported. The boy called the emergency 119 number which put him through to the fire service, which in turn forwarded him to the coastguard 2 min later. This was followed by about 20 other calls from children on board the ship to the emergency number.

A boy and girl trapped in a sinking South Korean ferry with hundreds of other high school students tied their life jacket cords together, a diver who recovered their bodies said, presumably so they would not float apart. As the prospects of pulling survivors from the submerged vessel dimmed, the anger and disgust boiled over among anguished relatives. Bad weather fuelled the sombre mood, with persistent rain and rough seas further obstructing diving teams who were already struggling with low visibility and strong currents.

The tragedy has stunned a country whose rapid modernisation was thought to have consigned such large-scale accidents to the past. This disaster is one of South Korea's worst peacetime disasters and all the

more traumatic since it accounted for the death of a number of children. Fellow students filed past, offering white chrysanthemums in solemn homage. Yellow ribbons, with names and messages emblazoned, were tied around a chain-link fence.

In the classrooms of the missing, friends wrote messages on desks, blackboards and windows.  
‘If I see you again, I’ll tell you I love you, because I haven’t said it to you enough’, read one.

## Case Questions

1. Explain how you would feel if you were related to one of the passengers on board this ship? What suggestions would you give?
2. It is not always wise to follow the instructions. Agree/Disagree giving reasons.

## 9.1 Identifying Socio-Psychological Needs in Mass Emergency

For decades, natural disasters and the means of controlling them have been a subject of study. Approximately 86% of the total deaths in the last decade were caused by natural disasters. Seventy-five percent of these deaths were of Asians. The trauma has been great. Whether it is the death of one family member or the entire family, the trauma is unbearable. It is said that time heals all wounds but it is not true. Actually people learn to adjust and live with the loss as time passes. Psychosocial support for victims of natural disasters is a must. It should, however, be community-based and suitable to the culture of the region and should also take into account the needs of specific groups such as women, children, aged, disabled, etc. It is apparent that children and old people almost certainly face similar problems after the incident; however, the methods of expressing these problems are found to be completely different. Fear, anxiousness and fright, and behavioural changes are observed in children who have faced disasters.

The response and recovery activities mainly focus on the response activities undertaken post-disaster and concern the physiological needs of survivors. But it is evidenced that most of the survivors are affected mentally. The findings of a seminal work done on Iran earthquake showed that 68% of the subjects studied were affected with major depression, of which 38% suffered severe types of depression. Another study conducted among the children three years after the earthquake found that 60% exhibited one or the other kind of behavioural disorders. What was even more alarming to know was that 51.7% of these children aged between 9 and 16 years suffered post-traumatic stress disorder, commonly known as PTSD. Moreover, evidence of mental illness years after the natural disaster in children is similar to the incidence in adults.

It is important to note that psychological stress and trauma are the root causes of psychiatric disorders. PTSD is the best-known psychiatric response to stress. It is depicted by the recurrence of the traumatic experience in the form of disturbing and distressing memories of the incident through horrendous flashbacks. It causes sleeplessness, petulance, angry outbursts, hyper alertness, difficulty in concentrating, and overstrained response; evading of stimuli related to the trauma; and a general deadening of emotions with a feeling of disinterest in life and people. Other psychological disorders that are associated with post-disaster stress are depression and panic disorders.

The victims suffer from major depressive disorder, which is exhibited by depressed mood or loss of attention in nearly all activities. Other symptoms include sudden weight loss, fatigue, excessive guilt

feeling and feeling of worthlessness, indecisiveness or difficulty in judgment, and recurrent thoughts of death and devastation. The survivors experience ‘intermittent panic attacks marked by distinct periods of extreme fear accompanied by palpitations; pounding heart or accelerated heart rate; excessive sweating, trembling, or shaking; sensations of shortness of breath or smothering; feeling of choking; chest pain or discomfort; nausea or abdominal distress; feeling dizzy, unsteady, lightheaded, or faint; feeling of detachment; fear of losing control or going crazy; fear of dying; numbness or tingling; and chills or hot flashes’ (APA 2000).<sup>[1]</sup>

When PTSD, depression and panic disorder associated with traumatic stress co-occur in the same individual, the situation is referred to as co-morbidity. Rates of psychiatric co-morbidity have been found to be high in community at-risk, and in individuals who have been diagnosed with PTSD (Resick 2001).<sup>[2]</sup> In a study conducted for assessing the rates of mental disorders in the general population, it was found that among the subjects diagnosed with PTSD, 88% of men and 79% of women also met the criteria for at least one other co-morbid mental disorder.

Psychiatric problems have varied implications. Their effects are not limited to the suffering of the individual and his or her immediate family. They also cause loss of workdays and sub-optimal performance which has economic implications. It is estimated that post-disaster disorders approximately cause 3.6 days' loss of work per month, on average. This may vary from region to region and the level of stress across communities. Co-morbidity is also associated with marital instability and increased unemployment. Moreover, this also has other social ramifications, and findings indicate that there is substantial effect on public mental health of the responder population. This makes them vulnerable to health and social risks.

Given the distressed state of the population, it is thus warranted that the immediate needs of the affected population are addressed empathetically. Their socio-psychological needs have to be satisfied. Strategies have to be made according to the needs of the specific group of beneficiaries. For women who have lost family members apart from money, property, comfort and convenience, their foremost need is the need for security. They take refuge in tents and lead a disrupted personal and marital life. There is a sense of insecurity in them. They get nightmares and it is hard to find proper sleep. Women who lost their husbands and guardians have to assume responsibilities of their siblings and children. Children are in a state of shock; they are in a state of loss. Having lost their toys and companions, their situation is even graver. They need access to educational services. For the elderly, loss of money and properties is huge. What they had built in ages came down in minutes. Their life is in shambles. They have problems regarding comfort and convenience. Special attention is required to meet their needs. For the disabled, there is a need to have access to welfare facilities. They have economic problems and other health-related issues that need to be addressed.

The secondary effects of disaster create needs for these groups of people. These needs have to be planned and managed properly because if timely action is not taken, a bigger and deeper tragedy may be in the offing. The psychosocial reverberations and trauma would present their effects on individuals for years to come. Providing mental and emotional support for disaster-struck families is one of the most important tasks for people working on recovery and rehabilitation.

## KEY IDEAS

- Psychosocial support for victims of natural disasters is a must.
- Fear, anxiousness and fright, and behavioural changes are observed in children who have faced disasters.

## 9.2 Different Psychological Considerations

Bad things happen to everyone and it is unfortunate. Studies indicate that a majority of adults are exposed to at least one potentially traumatic event in their lifetime. This one event or many such events leave a permanent scar on the psychology of the individuals. If not taken care of at an early stage, this may lead to acute and chronic disorders. A traumatic experience is defined as an exposure to an extreme traumatic stress or direct personal experience of an event that involves actual or serious injury, threat to one's physical integrity, witnessing an event involving injury, death, or threat to the physical integrity of another person, or learning about an unexpected or violent death or serious harm. These events affect the survivor psychologically and its imprint is hard to remove. Therefore, for the survivors of a disaster, apart from providing for food and shelter, other psychological needs have to be fulfilled.

Psychological needs of the victims vary according to gender, age and physical conditions. Women who have faced disasters feel anxious and worried. They suffer from acute depression, fear, aggression, psychological pressures. Their mental state has to be considered with due diligence. Children who have braved disasters are almost always in a state of fear. Having witnessed large-scale devastation makes them feel vulnerable and scared. These may have dangerous repercussions on their mental health. They can get startled even by the slightest sound. They can get disturbing thoughts, or suffer from acute depression, feel lonely and isolated. The education system comes to a standstill and needs to be revived as soon as possible. The energies of the children should be diverted to constructive work at the earliest possible so that they are able to forget the trauma to a great extent. Moreover, they will be left with only some time or no time to brood over the event.

For the elderly, disaster has a greater traumatic effect. They are terrified since they never thought anything of that intensity would occur to them. They may be found sitting near the debris of their houses in a state of shock and fear. All assistance should be provided to them to rebuild what they lost. They may feel disinterested in life and thus should be counselled. The state of disabled persons is also pathetic, more so because they become all the more vulnerable and dependent. They are afraid, anxious, confused and need support.

Unlike other types of post-disaster actions, psychological actions include processes and capacities such as knowledge, concern, recognition and feelings that are aimed at getting a better understanding of one's psychological response to disasters. Being cooler, calmer and more collected helps in understanding the mental state of victims and accordingly dealing with them. Consideration for the psychological state of victims can aid people to think clearly and rationally about post-disaster counselling, which in turn may reduce the suffering to a great extent. Being directly involved in any potentially critical situation can be genuinely terrifying and leave a permanent mark on the mind of the victim.

It is, in fact, difficult to think that all psychological conditions can be considered because dealing with victims is in itself an emotionally and cognitively tiring situation. Nonetheless, psychological considerations can play a crucial role in disaster response and coping. A patient and realistic approach can have a calming effect on the victims. The aims of psychological considerations should be clear. Identification with the feelings of the survivors is important. Responding in a controlled and patient way can help in establishing a rapport with the victims.

### KEY IDEAS

- Studies indicate that a majority of adults are exposed to at least one potentially traumatic event in their lifetime.
- Psychological needs of the victims vary according to gender, age and physical conditions.

## 9.3 Training in Humanitarian Professionalism

The post-disaster environment is challenging and complex. It throws multiple challenges on agencies involved in rescue and rehabilitation work. There are multiple agencies working in tandem where coordination issues emerge. In addition, there are many new and evolving standards and guidelines which have to be adhered to. These and many more such intricacies pose challenges for agencies in accessing and providing relief to the affected community. This complexity in operations is not generally matched with sufficient training to prepare those involved in delivering humanitarian relief and assistance.

It is obligatory for the teams working in disaster-struck areas to start quick assessments and execute proper interventions within days of a disaster. The need for a rapid response in conditions of extreme physical and mental stress, coupled with a compulsion to deal with unknown demographics and climates adds to the complication of implementing relief activities in a humanitarian fashion. It calls for newer set of skills to succeed in today's complex environment. Thus, a novel and innovative approach to skills development is needed in order to respond to the demands of complex environments. These skill development initiatives should be aimed at improving the efficiency of humanitarian operations.

The persons involved in providing aid to the affected community have to be adept in rapidly adapting to changes in working and living conditions, communication, and professional practice and standards. Since this experience can be very unsettling, providing training becomes mandatory. It is seen that only those who had relevant prior experience tend to be successful. Worker providing aid should be able to assemble and coordinate in teams. Those entrusted with providing humanitarian aid should know how to communicate effectively with many stakeholders simultaneously.

Training in humanitarian professionalism is necessary since it builds high morale by developing positive attitude and job satisfaction. It helps in building skills required to perform their job efficiently. It also helps in improving the quality of work which is very essential in disastrous situations. One wrong step can lead to a series of distressing events. Training reduces the learning period and saves time and efforts in learning through trial and error, since dealing with communities and individuals who are affected by disasters calls for having an extra cautious and humane approach. Training develops self-dependent and motivated persons who need not be guided at each step. But the lacuna is that much of the humanitarian intervention in training is classroom-based. It comprises role-playing and table-top simulations. Since the participants lack cross-cultural experience and effective communication skills, they can be impressed by these trainings; however, when they are deployed they face problems. The reason is that the real situation is different from the simulated situation. Moreover, completing a classroom training course does not qualify people for complex humanitarian operations. Thus, a focussed approach towards training is required. The persons involved in providing relief should be prepared for meeting exigencies and should be trained by experienced facilitators. The mission of humanitarian training is to place participants in situations of extreme physical and psychological stress, similar to those they are likely to experience while working in disaster-struck regions. Both theoretical and practical knowledge is imparted to them. Mentors who have expertise in working for humanitarian purposes along with the proven ability to coach, mentor and support personnel in working environments are chosen to impart training. These mentors endorse continuous learning and are themselves engaged in sharpening their own pedagogical skills and creativity.

The learning objectives of these training programs are clearly articulated in a definite curriculum. Participants are generally divided into small groups of five to seven persons, and are engaged to work with communities. Based on the feedback from the participants, plans are assessed and accordingly with communities. Based on the feedback from the participants, plans are assessed and accordingly

short-term interventions are executed. The main aim of such training is improving communication skills. Through training the participants learn to build trust and deal with day-to-day problems. They are taught to identify priority needs of individuals and work under stressful conditions. They learn to work against tight deadlines and use existing disaster response tools effectively. Coordination, commitment and motivation are three aspects that are dealt with during these training sessions.

The training modules emphasise on multi-disciplinary learning and working with local volunteers in communities. Moreover, there are many agencies working for communities, generally a mix of international, regional and local agencies with diverse backgrounds. Through training, coordinating with these agencies is learnt. The volunteers are exposed to a range of opportunities and are able to see different perspectives. These humanitarian trainings are more than just skill enhancement schedules. They teach the participants to understand the value of life and empathise and deal with the most ill-fated persons. The participants learn about 'service before self'.

The training in humanitarian professionalism entails highest ethical standards and does away with harmful elements of learning from trial and error. The needs of the affected community are upheld and volunteers are trained to fulfil those needs to the greatest extent. Through training, the participants acquire new skills and expertise in working in post-disaster situations which leads to increased motivation.

#### KEY IDEA

Training in humanitarian professionalism is vital. It helps in building high morale, developing skills and improving the quality of work.

#### 9.4

#### *Community and Individual Empowerment*

Communities are collections of groups of individuals who have common interests, preferences, resources and capabilities. They are connected through kinship and generational relationships. The communities are characterised by inclusiveness, influence and co-operation. They share common priorities and experiences that bind them together. Communities can play a very important role in withstanding and recovering from disasters. Disaster resilience is the collective responsibility of communities and individuals. They need to work together with a shared sense of responsibility to improve disaster resilience. Disaster resilience is a long-term outcome, which requires a long-term commitment from communities. It calls for focussed approach. Individual and community empowerment is essential for effectively responding to disaster situations. The common characteristic of disaster-resilient communities and individuals is their ability to function well while under stress. They should be able to adapt to changing situations and should be self-reliant and capable. The resilient communities can only function if they are empowered.

An empowered community and individual can be of great help in mitigating disasters. These people understand the risks and hazards that may affect them and others in their community. They have access to complete local information about who, what and where of hazards and risks. They clearly know who is

exposed to risks and who is most vulnerable. In addition, they also know what to do in a crisis. The members of the community are well equipped to take action to prepare for disasters and are prepared to respond appropriately during crisis. If they are not empowered, even if they know the dangers, they cannot act and save their lives and that of others.

Empowered community and individuals are ready to take decisions for safeguarding the interests of their fellowmen. They readily anticipate disasters and play an active role in protecting themselves, their assets and their livelihoods. They work towards minimising physical, economic and social losses that may arise due to disasters. Being empowered gives these individuals and community the necessary confidence to commit the essential resources for preparedness and mitigation of disasters. They are capable of organising themselves before, during and after disasters which helps to reinstate their social, institutional and economic activities efficiently.

The community members take proactive steps to coordinate with local agencies using their knowledge and funds to prepare for and deal with disasters. They use personal and community potency, and accessible community networks and structures to offer support to individuals and families during crisis. The main advantage of having an empowered community is that functioning is restored quickly after a disaster. The individuals are well-versed with the mechanisms and processes through which recovery assistance may be made available, and they work towards helping the vulnerable community members.

Further, individual and community empowerment can be said to have the following five dimensions:

1. *Empowerment gives rise to confidence.* It provides for enhancing people's skills and knowledge, and instilling in them a belief that they can make a difference.
2. *Empowerment is all inclusive,* that is, it advocates promotion of equality of opportunity for all within a group.
3. *Empowerment calls for accountability and responsibility of action.* It allows persons to work for common issues and concerns but at the same time be responsive, responsible and accountable for their actions.
4. The most important aspect of empowerment of both individuals and communities is *it helps in creating positive associations and in promoting cooperation among various agencies.*
5. *An empowered community is influential,* that is, they can take part and influence decisions to mould services and activities for their welfare.

These five dimensions provide a structure for planning work which can be used for identifying indicators and evaluating the work of individuals and communities. Community empowerment helps in building active and sustainable communities based on social justice and mutual respect. It helps in removing the barriers that prevent people from participating in the issues that affect their lives.

#### KEY IDEA

Individuals and communities can play a very important role in withstanding and recovering from disasters by providing social justice and mutual respect.

## 9.5 Community Building in Developing Local Resilience to Disasters

According to Carpenter *et al.* (2001),<sup>[3]</sup> resilience is defined as the amount of disturbance a system can absorb and still remain within the same state or domain of attraction, the degree to which the system is capable of self-organization (versus lack of organization or organization forced by external factors), and the degree to which the system can build and increase its capacity for learning and adaptation<sup>4</sup>. An incessant continuous change is experienced in the social and ecological system, and it is important for communities to be resilient so that they are equipped to absorb shocks while maintaining function. Losing resilience can be fatal as it can lead to increased vulnerability. It is a fact that resilience and sustainability are intrinsically connected to each other. Low-resilient systems can survive the changes for some time but when these changes reach a critical threshold, the chances of sliding into a less desirable state looms large. In such cases, the ill-effects may be grave and significantly constrain options for social and economic developments. It may lead to reduced opportunities for livelihoods and also have negative impact on communities and environment.

It is a well-recognised fact that the welfare of persons is facilitated by resilient communities and that local community involvement in disaster-recovery efforts can help in early recovery. Research in this area supports the fact that existence of strong community base is critical in helping communities to adapt to situations after the disaster. To increase community resilience, community-led action should be encouraged. A basic understanding of community complexity and diversity helps in developing and strengthening partnerships between communities and government. The community-led action plays a key role in strengthening the resilience of communities.

For building a resilient community, the community leaders play a significant role. Knowledge about the basic structure and functioning is important in understanding community dynamics, which in turn is vital for making strategies for building a resilient community. A resilient community can work together in identifying their own needs and in creating shared solutions.

The members of communities can adapt to adversity or risk easily. Resilience, according to experts, is viewed as a capacity that grows out of people and communities rather than as something imposed on them. Community resilience is a process, not an outcome. It is a means and not an end. Any community can never be fully prepared for any disaster at any point of time. New challenges, newer problems crop up every now and then. Resilience can only be measured on a scale indicating low or high resilience in terms of preparedness. The greater the resilience, the better it is for the community. Greater disaster resilience can be attained through harnessing knowledge and coordinating activities. Learning, innovating and developing skills and resources at the individual, community and operational levels can be applied by responding to and recovering from a wide range of disasters.

In developing disaster-resilient communities, the experience of individuals and communities can be of immense help. New learning gained while recovering from disaster provides for strong reflection for making new choices. The information helps to review their decisions and lifestyles to reduce their future exposure to disaster and gain long-term sustainable recovery. Moreover, resilient communities have practical emergency response arrangements. Comprehensive preparedness activities are critical to the management of disasters. They should be developed in the social, built, economic and natural environments. The focus of such activities should be based on the variety, requirements, strengths and susceptibility within communities. For better results, strategies should be developed in a coordinated and integrated way.

To build resilient communities, a new and improved focus on disaster management is needed. All stakeholders need to understand their roles in a better way, and be equipped and ready to ensure delivery of

## 9.6 DEVELOPING LEADERS

services as and when required. A resilient community must also evaluate its efforts and capabilities at regular intervals to update and modify them.

### KEY IDEA

A resilient community can work together in identifying their own needs and in creating shared solutions.

## 9.6 Developing Leaders

Articulating a clear vision to accomplish, and energise and enable individuals and communities so that everyone understands the part they play in achieving goals is known as *leadership*. It involves using power and persuasion to mould the behaviour of subordinates. The outcome of leadership is a highly motivated and committed workforce, which is very important when it comes to managing disasters. Leaders are individuals who can influence the behaviours of others without having to rely on force. For a leader to be a leader, it is important that people recognise him or her as a leader and are ready to follow him or her. In disaster situations, leaders emerge from public. They influence people towards working for the welfare of others. These leaders are not vested with special powers formally, but they are made powerful by the general public who listen to them and put their trust on them. These leaders make use of non-coercive influence to reach the goals. They motivate others' behaviour towards goals.

Many people believe that leadership qualities are inherited and many others believe that ordinary individuals are transformed into leaders due to situational demands. Whatever be the case, leadership qualities are essential and can be developed. Developing leaders has the following advantages in disaster management:

1. It helps in motivating the leader to be passionate about making a difference in the quality of lives of others.
2. It makes one capable of taking responsibility of the chaotic situation.
3. It helps one to be creative in finding solutions to problems.
4. It helps one learn to care about others.
5. It makes one equipped to deal with chaotic situations.
6. It helps leaders evoke members of disaster-affected community to dream.
7. It helps leaders to inspire others with visions of what they can contribute.
8. It helps people to prepare actively for pre-disaster situations.
9. It makes people courageous.

A successful leadership development program begins with the alignment of leadership development with disaster management strategy. Leadership is needed to strive towards perfection in disaster resilience. The responsibility of leaders should be to maximise the benefits from limited resources. The increasing

complexity surrounding disasters means that dealing with them reaches beyond the limits of the emergency services. All leaders can help build and strengthen existing partnerships among governments, businesses, non-government sectors and communities. The importance of leadership is well articulated by the fact that a good leader can make a weak disaster plan successful, but a poor leader can ruin even the best plan. That is why developing effective leadership by using a consistent talent management program at individual and community levels can be of significant value.

For the development of leaders, the following steps can be followed:

1. Competency models can be developed. This can help in identifying leadership potential of the agents working for disaster management.
2. Identify and determine current and future leadership requirements.
3. Comparison of these requirements with the current leadership team.
4. Identify the gaps in skills and the time required to fill those gaps.

Leaders strive to identify and comprehend the risks that disasters pose to their own and their community's welfare. They are responsible for extenuating these risks. They have to take a proactive part in strategic planning processes so that they can respond to managing the disasters in a systematic manner. Also, since disaster situations unfold in layers and no one exactly knows what lies beneath the other, therefore, being fully prepared to deal with such situation is out of question. The leaders have to prepare for the worst by doing their best. They have to exercise influence in order to keep things under control.

Leaders are instrumental in driving development of disaster-resilient infrastructure and collaborations to build resilience at the community, local and regional levels. These alliances are based on a sense of collective responsibility and recognition of the need for coordinated planning and response in disaster situations. Leadership development is an all-inclusive exercise where all the stakeholders are involved. The agencies working for disaster management play a lead role in developing community leaders by providing disaster plans and guidelines. They provide necessary inputs to support resilience-based planning at community levels. It is the duty of a leader to engage the community and guarantee capability development of the members.

### KEY IDEA

A successful leadership development program begins with the alignment of leadership development with disaster management strategy.

### 9.7

### *Importance of Communication and Commitment*

Failed communication can cause the damage to increase manifold after the disaster. This situation can be said to be worse than the disaster itself. Communication and commitment are two vital aspects for effective management of disaster. Communication plays a very important role in controlling the potential damages from a disaster event. There is an upsurge in disasters that is impacting people throughout the globe. With the new developments in technology, people around the world are able to observe the unfolding of

major disasters. This has negative as well as positive impacts on human minds. Some persons are shocked while others learn lessons. The unexpected and unpredictable event poses severe threat and demands an immediate response. Thus, it is warranted that disaster management teams know how to respond to a disaster and communicate throughout the course of its unfolding. The communication should be both internal, that is within the agencies involved in relief and rescue works, and external, that is with the public who are the major stakeholders. An emergency response team should have a public information officer who is in charge of managing the flow of key information to the public.

Communication is essential as disaster situations are chaotic, and rumours and confusion may run unchecked. Also, disaster victims need lucid, apt, consistent and precise information to find help and resources. Access to information also helps in avoiding hazards and in minimising additional injuries or damage. Effective and truthful communication can save lives and property, as well as help in guaranteeing public faith and trustworthiness.

Communication serves five major functions within a group: *Control, motivation, coordination, emotional expression and information*. Communication acts to control member behaviour, ensuring that people adhere to the formal guidelines they are required to follow in crisis situations. Informal communication controls behaviour too. Communication fosters motivation by clarifying to the public what they must do to help the victims. Also the process can be communicated.

Communication within the disaster team members is a fundamental mechanism by which members contact each other and work. It helps in coordinating with each other. Communication helps the victims give vent to their feelings, and exhibit their satisfaction and frustrations. The most important function of communication is to aid decision making. Communication aids individuals, communities and groups in decision making by providing necessary information for identification and evaluation of choices. Almost every communication that takes place in a disaster scenario entails one or more of these functions. Communication is vital to effective performance of groups since it facilitates control over members, inspires members to perform, allows emotional expression and enables them to take decisions.

Communication needs a purpose to take place. A message is needed to be conveyed between a sender and a receiver. The sender encodes the message and sends it through a medium to the receiver, who decodes it. The result is the transfer of information from one person to another. Misunderstanding of a few words can literally mean the difference between life and death.

### Example

The Tenerife airport disaster was a lethal collision between two Boeing 747 passenger aircraft which occurred on Sunday, 27 March 1977, on the runway of Tenerife North Airport on the Spanish island of Tenerife. With a total of 583 deaths, the crash is the deadliest accident in the aviation history. The miscommunication between the pilot of KLM flight and the air traffic controller caused the disaster when two flights collided.

There are certain rules of communication that should be followed while communicating in disaster situations:

1. **Planning:** A crisis communications plan should be in place and an emergency operations centre equipped with phone line, Internet and other essential modes of communication like office materials,

a fax machine, a computer and an inverter, maps, a TV and radio, camera, agency letterhead and press release templates. All the stakeholders should be made aware of the plan.

2. **Liaison:** The disaster management team should appoint one public information officer. He/She should be updated about the latest incidents and the developments at regular intervals. He/She should act as a link between the public and the management personnel, and should report directly to the Chief Executive Officer. This person serves as the main point of contact for media and the public. Also, it should be ensured that the contact details of the Public Information Officer are made available to all concerned. The person-in-charge should show empathy, competence, honesty and commitment. He/She should ensure that all information is made available to him/her so that he/she can prepare key points ahead of time.
3. **Communication methods:** The mass media is an important way to reach disaster victims. But special press releases should be made to update the public about the situational developments. Moreover, direct interference of media at the ground level can give rise to confusion; so effort should be made to disseminate information through one reliable source.
4. **Evaluate performance:** When the crisis subsides, it is indeed important to review the communication efforts and note improvement areas. Working with public and focus groups can shed light on the issues concerned and lapses.

Commitment is another important aspect in the management of disaster. There is a positive relationship between organisational commitment and job productivity. Theoretical models propose that committed employees are less likely to engage in work withdrawal even if they are dissatisfied, because they have a sense of allegiance and loyalty. However, less committed employees feel less loyal to the organisation and tend to show lower levels of enthusiasm. Research in the area of commitment confirms this theoretical proposition. It does appear that even if employees are not currently happy with their work, they are willing to make sacrifices for the work if they are committed enough. From disaster management perspective, it is necessary to understand the model of commitment given by Meyer and Allen. The model has the following three distinct components that affect how individuals feel about the work they are doing:

1. **Affective commitment:** It means affection for the job, which occurs when one feels a strong emotional attachment to the work that he or she does. These people are likely to identify with the goals and values, and work with dedication towards realizing those goals. This is essentially important for disaster management as the volunteers need to be passionate about their work. They have to forget their personal needs and work with full dedication towards providing relief to victims. This level of dedication can only come if one truly loves his or her job, otherwise it will be just duty. Helping others should make them feel good and give them a sense of satisfaction. In turn, this increased job satisfaction is likely to add to the feeling of affective commitment.
2. **Continuance commitment:** It means fear of loss. Continuance commitment occurs when one suffers from a fear of loss. Persons weigh the pros and cons of a situation and continue to have an urge to stay. This is necessary in disaster management since the more the experience, the better the way in which one handles the situation.
3. **Normative commitment:** It means sense of obligation to stay. Normative commitment which is the sense of obligation to stay occurs when one feels a sense of obligation to the job even if one is unhappy with the oddities of the situation, stay on the job because they feel that it is the right thing to do. This sense

of obligation can stem from the fact that one should give back to the society by being a human. This obligation can also result from one's upbringing. If the helping nature is inculcated at a tender age, people are ready to take initiative and help till the last person is rescued.

These three types of commitment are not mutually exclusive. In disaster situations, one can experience all three, or two of the three, in varying degrees. The application of this model can help develop greater, positive and affective commitment. It can help individuals feel an increased commitment to the work and team. The result is a team of positive and motivated workers who work for a cause and experience greater job satisfaction. They feel passionate about their job. It is important to note that team members with only continuance and normative commitment may feel bored and unmotivated. These team members may block other enthusiastic individuals or even lower the morale of the team. These persons should be counselled and if they do not change, they should be removed from the task as this may be dangerous for disaster relief and rescue missions. For developing affective commitment, positive emotions are necessary. Making people observe the reunion of family members after a disaster can really give the necessary impetus to working with commitment. Moreover, encouraging people to struggle and to enjoy the work they are doing helps in infusing commitment. Individuals should be praised regularly so that they are satisfied and productive. Enriching and empowerment also helps in enhancing individual commitment.

#### KEY IDEA

Communication and commitment are two vital aspects for effective management of disaster.

### Negotiating the Conditions and Effects of Vulnerability and Disaster

Around the globe, people are affected by changes in ecosystems which cause much of the damage to the well-being and loss of life. People are under severe stress from environmental, health and socio-economic pressures as a result of this. The threats arising from changes in ecosystems are not only limited to physical environment, but also to ecosystem services that intermingle with these stressors to threaten the well-being of people. It is high time that constructive steps are taken to curb the menace.

In fact, vulnerability indicators and indexes have been defined. These have been used to map relevant global patterns of disasters. Since these patterns use different conceptual frameworks and reflect on vulnerability to different types of threats, they identify different national-scale patterns of vulnerability. Thus, large-scale improvements in the state of knowledge and methodology development are needed to expand the understanding of these global patterns and their causes.

The globe is experiencing an aggravation in the trend of human suffering and economic losses from disasters over the past several decades. In the last 40 years, the number of 'great' disasters has augmented by a factor of 4, while economic losses have amplified by a factor of 10. The implication of these disasters to the social vulnerability of weak human population is of special concern. Further vulnerability to desertification is the product of the interface between environmental change and social systems. The driving forces of environmental change are uneven, and effects vary widely with differences in social and

geographic scales. Food insecurity is another byproduct of ecosystem services. Environmental change, development and livelihoods are interlinked and so change in one will affect the other. Efforts should be made to identify sources of resilience and increase the adaptive capacity. Poverty and hazard vulnerability are frequently directly related, as the poor often lack assets and entitlements that allow them some safeguard from environmental degradation and unpredictability. The changes in economic, social and physical environments can augment and reduce vulnerability abruptly or gradually. The changes are uneven and thus pose greater threats.

For vulnerability analysis, an analysis of the human driving forces of vulnerability as well as stressors is required. The inter-linkage between vulnerability and situations should be established and a tracking of sequences of stresses and perturbations that produce cumulative vulnerability should be established. On the basis of the result, the role of institutions in creating and mitigating vulnerability should be assessed. The need for systematic interventions aimed at reducing vulnerability should be laid down.

Natural hazards and disasters have always been a part of human history. Civilisations have been wiped away, and over the years human relationship with hazards has evolved as the power of humans to shape natural landscapes. Over the centuries, humans have changed from relatively powerless victims in the face of natural hazards and disasters to active participants shaping natural hazards and our vulnerability to them. Disasters are no longer recognised as simple 'Acts of God'. People now seem to realise the human flaws and ascertain the accountability. The shift of disaster management from providing response and relief to an active commitment with mitigation, preparation and amalgamation of hazard management into development planning has been recognised. It is well established that the impacts of natural disasters persist to generate uneven patterns of loss in populations around the globe. The rising costs, the mounting numbers of people affected and the increasing loss of life display the dynamics of vulnerability across scales and as experienced in local places. A clear understanding of vulnerability and its conditions can help in negotiating its effects.

#### KEY IDEA

In order to gain insights about vulnerability and its conditions a systematic evaluation of the human driving forces of vulnerability as well as stressors is required.

#### 9.9 Summary

The chapter gives insights into challenges in the management of disaster and focuses on the socio-psychological as well as psychosocial needs of a community during mass emergency. It throws light on different types of psychological impact on different categories of people taken age-wise, gender-wise, or class-wise. Their recovery involves providing emotional and psychological support to disaster-stuck families, in addition to the other material and medical assistance provided in course of recovery and rehabilitation. All this is facilitated through training in humanitarian professionalism, community and individual empowerment, developing local resilience to disasters, developing leaders, practising continuous commitment and communication and negotiating the conditions and effects of vulnerability and disaster.

#### CASE PROBLEM: UPHAAR – THE GIFT

Capt. Manjinder Singh Bhinder of the 61st Cavalry of the Indian Army and a talented horse-rider, wanted to celebrate his success at national games with his family and a junior officer. He decided to go and watch the new movie Border at Uphaar Cinema. The tickets were booked for the 3-6 show and they were enjoying the show when a fire broke out at 5.10 pm. A 1000 kVA electricity transformer, maintained by the Delhi Electricity Board, and housed in the theatre's overcrowded basement car park, spread and engulfed some 20 cars, where some 36 cars were parked instead of the admissible 18. The fire eventually spread to the five-storey building which housed the cinema hall and several offices. Most of the victims were trapped in the balcony; they tried to reach dimly marked exits to escape the smoke and fire but found the doors locked. Capt. Manjinder Singh Bhinder along with his family rushed out at first, but realising the gravity of the situation, he returned and tried to set order and guide people out to safety. He saved 150 lives but lost his own. Fifty-nine people died, mostly due to suffocation, and 103 were gravely injured in the stampede that ensued.

Fire services were delayed due to the heavy evening traffic and the location of the cinema hall, situated in one of the busiest areas of South Delhi. Forty-eight fire tenders rushed to the scene at 5.20 p.m. and it took them more than an hour to put out the fire. Later, the dead and the injured were rushed to the nearby hospitals where scenes of chaos and pandemonium followed, as relatives and family members of the victims scurried around to look for known faces. Lack of trauma centre at the hospital added to the death toll from injuries.

The victims of the tragedy and the families of the victims formed 'The Association of Victims of Uphaar Fire Tragedy' (AVUT), and filed a Civil compensation case. In a landmark judgement, they won Rs. 25 lakh compensation for the relatives and families of the victims. The enquiries done by the agencies found a number of fire code violations. There was no functional public announcement system in place, and no announcement was made when the fire broke out. Neither was the movie stopped nor was any effort made to evacuate the audience. Non-availability of emergency lights, foot lights or exit lights made it difficult for the occupants to leave the place and this was probably one of the causes of stampede. There were unauthorised extensions in the hallway and in the spaces that were supposed to be vacant, shops were running. The exits were blocked and all the effort to escape was futile. There was a gross violation of Indian Electricity Rules as there was no periodic maintenance, no fire extinguishers, no isolation device and the electric cables were run in a haphazard manner. Installation and maintenance of the DVA transformer was not done. The owner of another Delhi cinema hall reportedly agreed that most theatres in Delhi did not follow any safety norms and licence was taken by bribing the licensing authorities. Moreover, the fire brigade personnel were not properly equipped to handle a tragedy of this magnitude.

Post-disaster, the accused were charged under Sections 120-B (criminal conspiracy), 201 (causing disappearance of evidence or giving false information to screen offenders) and 409 (criminal breach of trust) of the Indian Penal Code for allegedly removing, tampering and mutilating important documents of the Uphaar fire tragedy case, in conspiracy with a clerk in the trial court in 2003.

The Uphaar cinema blaze is to date one of the worst fire tragedies in Indian history. The other two major fire tragedies were the Dabwali (Haryana) conflagration that claimed about 450 lives, mostly of children, on 22 December 1995, and the Baripada (Orissa) fire on 22 February 1995 that resulted in the death of

more than 200 devotees. The lack of sufficient exit points was the reason for the high death toll; and both incidents were caused by short circuits.

### 2 Critical Thinking Question

1. Corruption was responsible for this tragedy. Agree/Disagree giving suitable reasons for your answer.

### 9.10 Key Words and Phrases

Psychological needs	Empowerment	Communication
Humanitarian	Leaders	Commitment
Professionalism		

### 9.11 Objective Type Questions

#### A. Fill in the Blanks

1. Psychological \_\_\_\_\_ and \_\_\_\_\_ are causes of psychiatric disorders.
2. When panic disorder associated with stress and PTSD co occur in the same individual it is called \_\_\_\_\_.
3. \_\_\_\_\_ needs of the victims vary according to gender, age and physical conditions.
4. Training in \_\_\_\_\_ professionalism builds high morale by developing positive attitude.
5. An \_\_\_\_\_ community and individuals are ready to take decisions for safeguarding the interests of fellowmen.
6. The community members take \_\_\_\_\_ steps to coordinate with local agencies.
7. Community resilience is \_\_\_\_\_ not an outcome.
8. \_\_\_\_\_ are individuals who can influence the behavior of other without having to rely on force.
9. Identification of potential leadership of the agents working for disaster management can be done by developing models.
10. The model given by \_\_\_\_\_ has three distinct components that affect how individuals feel about the work they are doing.

#### B. Multiple Choice Questions

1. PTSD is a
  - (a) Post traumatic stress disorder
  - (b) Post traumatic serious disorder
  - (c) Post thematic stress disorder
  - (d) Post threat serious disorder
2. What is not a symptom of PTSD?
  - (a) distress
  - (b) intermittent panic attack
  - (c) pounding heart
  - (d) hallucinations

3. The lacuna in training for humanitarian professionalism due to the
  - (a) inadequacy of relevant information
  - (b) humanitarian intervention is classroom based
  - (c) community as a whole is not receptive
  - (d) non-responsive ancillary alternative
4. The training module for humanitarian professionalism emphasizes on
  - (a) psychological responses
  - (b) multidisciplinary learning
  - (c) individual needs
  - (d) social aptitude
5. Using power and persuasion in moulding the behaviour of subordinates is involved in
  - (a) community and individual empowerment
  - (b) community building and developing resilience
  - (c) developing leaders
  - (d) improving communication and commitment
6. The five major functions of control, motivation, coordination, emotional expression and information are served by
  - (a) training
  - (b) communication
  - (c) leading
  - (d) community building
7. Reviewing of communication efforts when crisis subsides is done through the rule of
  - (a) method
  - (b) public information
  - (c) planning
  - (d) evaluation
8. The commitment that creates an obligation to stay in a job is
  - (a) affective commitment
  - (b) continuance commitment
  - (c) emotional commitment
  - (d) normative commitment
9. Confidence, inclusiveness, accountability, influence and creation of positive association are dimensions of
  - (a) leadership
  - (b) commitment
  - (c) empowerment
  - (d) communication
10. Identification of the changes in economic, social and physical environments for averting threats is done in
  - (a) response
  - (b) vulnerability analysis
  - (c) hazard management
  - (d) disaster mitigation

**9.12 Questions for Review**

- What is the process of identifying socio-psychological needs in mass emergency?
- Explain the different psychological considerations in disaster management.
- How can community and individual empowerment be helpful in disaster management?
- Explain how community building can help in developing local resilience to disasters.
- Explain the importance of commitment and communication in disaster management.

**9.13 References**

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**9.14 Answers****A. Fill in the Blanks**

- Stress, trauma
- Co-morbidity
- Psychological
- Humanitarian
- Empowered
- Pro-active
- Process
- Leaders
- Competency
- Meyer and Allen

**B. Multiple Choice Question**

- (a)
- (d)
- (b)
- (b)
- (c)
- (b)
- (c)
- (d)
- (c)
- (b)

**Model Question Paper 1****Subject:** Disaster Management**Time:** 3 hrs**Instructions, if any:** Answer All questions**Max. Marks:** 100

<b>Q. No.</b>	<b>Question</b>
1.	What is disaster management? Explain with the example of any disaster.
2.	Explain the concept of Disaster Management Cycle. Explain its phases with examples.
3.	Can education and public awareness help prevent disasters? If yes, how?
4.	Explain the advantages and disadvantages of role of media in disaster management.
5.	Explain the relationship between disaster management and development.
6.	Explain with examples the health issues related to disaster management.

# Model Question Paper 2

Subject: Disaster Management

Max. Marks: 100

Time: 3 hrs

Instructions: Questions 1 and 2 are Compulsory and answer any THREE from the rest

# Model Question Paper 4

Subject: Disaster Management

Time: 3 hrs

Instructions, if any: Answer All questions

Max. Marks: 100

Q. No.	Question
1.	(i) Explain the positive and negative impact of media in disaster management. (ii) Analyse the role of media in Disaster management keeping in mind the disasters in (a) Tsunami in Andaman (b) Cyclone in India
2.	Explain the different phases of disaster management cycle giving suitable examples.
3.	Differentiate between man-made and natural disasters with relevant examples.
4.	'Awareness plays a major role in mitigating disasters.' Explain the methods of generating public awareness stating their merits
5.	Explain the relationship between disaster management and development.

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