

Chapter 3

Natural Disaster

Disasters are as old as human history. The risk of disasters has increased dramatically in the recent past. These disasters cause huge damages to the life, property and livelihood. The state of Jammu and Kashmir is prone to various natural and anthropogenic (man-made) disasters. The 7.6 magnitude earthquake that struck on 8th October, 2005 killed about 1400 people in this part of Jammu and Kashmir, damaged thousands of buildings, roads and caused huge landslides. Similarly about 79,000 people died, more than 1,00,000 got injured and extensive damage was done to the houses, property and other physical infrastructural facilities in Pakistan and Pakistan administered Jammu and Kashmir. Thousands of people have died in our state due to snow avalanches, landslides, cloudbursts, terrorist activities and other disasters.

HAZARD is a situation that poses a level of threat to life, health, property or environment. A hazard becomes a disaster when it hits an area affecting the normal life.

DISASTER

Disasters occur when hazards meet vulnerable situations. A disaster is a natural, man-made or

technological event that causes significant physical damage or destruction, widespread loss of life or drastic change to the environment. Disasters can destroy the economic, social and cultural life of people.

MITIGATION is an effort to reduce loss of life and property by reducing the impact of disasters. Mitigation is taking preventive actions before the next disaster happens in order to reduce human and financial consequences.

Disasters can be Natural or Anthropogenic (Man-made)

A NATURAL DISASTER is an event that is caused by natural hazards and leads to loss of life and damage to physical infrastructure and environment. Examples of natural disasters are 2004 Indian Ocean Tsunami, 2005 Muzaffarabad earthquake, 2005 Waltengo snow avalanche, 2010 cloudburst in Leh, landslides etc.

MAN-MADE DISASTERS cause serious damages to life, property and environment due to human induced activities. Examples of man-made disasters are 1984 Bhopal Gas tragedy, 1994 Kumbakonam school fire, terrorist attacks, bomb blasts, road and rail accidents, global warming etc.

NATURAL DISASTERS

The state of Jammu and Kashmir is prone to various natural disasters like earthquakes, landslides, floods, snow avalanches, cloud bursts etc. These disasters are perceived to be on increase in terms of their magnitude, frequency and economic impact.



An old man sitting on the remains of his house destroyed in 2005 Muzaffarabad earthquake at Tangdhar, J&K

EARTHQUAKE

An earthquake is a sudden shaking of earth's surface due to release of energy in the Earth's crust. This energy is released when two parts of the rock masses move suddenly in relation to each other along a fault. Earthquake is the most destructive natural hazard and its occurrence is usually sudden with little or no warning. Earthquakes result into collapse of buildings, damage to infrastructure and environment and loss of life. Electric short circuit and gas leaks can create big fires and broken water pipes, damaged water tanks/dams can lead to severe flooding leading to misery of the affected community. The impact and nature of earthquake is dependent on number of factors including its magnitude, location, soil and geological conditions of the particular area.

Some important earthquakes in Jammu and Kashmir

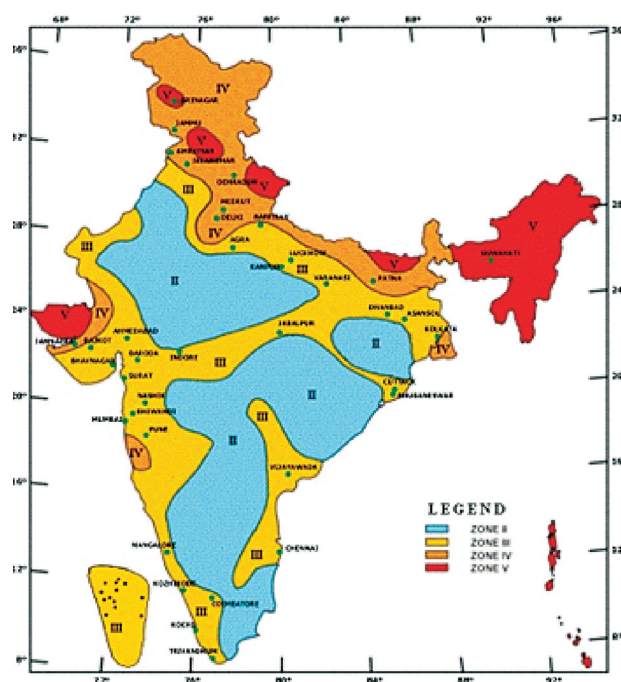
Area	Year	Magnitude
Udhampur,	1951	6.0
Udhampur,	1962	6.0
Kathua,	1947	6.0
Kathua,	1950	6.0
Kathua,	1951	6.0
Uri Muzaffarabad	2005	7.6

Seismic (Earthquake) zones

The earthquake zoning map divides India into four seismic zones (Zone II, III, IV and V). As per this classification, the state of Jammu and Kashmir falls in seismic zone IV and V and is prone to severe and very severe earthquakes.

Some important Earthquakes in India

Area	Year	Magnitude
Rann of Kuch	1819	8.0
Assam	1897	8.7
Kangra	1905	8.0
Arunachal P.	1950	8.5
Uttarakashi	1991	7.0
Kutch	2001	7.7
Indonesia	2004	9.3
(Indian Ocean Tsunami)		
Sikkim	2011	6.9



Seismic map of India

Measurement of Earthquake

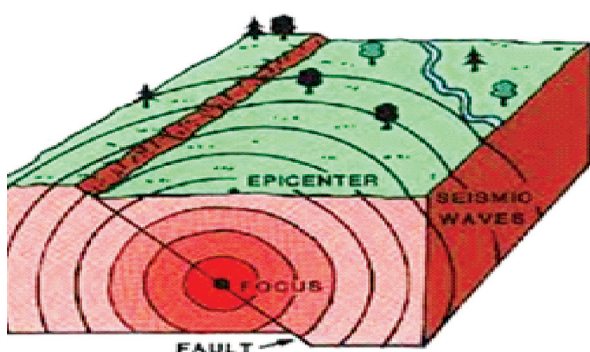
Earthquake magnitude or amount of energy released is determined by use of a **seismograph**, an instrument that continuously records ground vibrations. A scale developed by a seismologist named Charles Richter in the year 1935, to record the magnitude of earthquakes is called as Richter scale. An increase of one magnitude signifies a

10-times increase in ground motion or roughly an increase of 30 times the energy.

The **epicentre** is the point on the Earth's surface that is directly above the **focus**, the point where an earthquake originates.

Earthquakes generate seismic waves which can be detected with a sensitive instrument called a **seismograph**.

Liquefaction is an earthquake-induced phenomenon when saturated, loose, granular soils lose shear strength and behave as a liquid.



EFFECTS

Earthquakes are the most destructive of natural hazards. The impact of the event is most dangerous because it affects large area, occurs all of a sudden and is unpredictable. These can cause:

- Large scale loss of life and property.
- Landslides and avalanches
- Fire due to damage to electric plants and gas pipelines.
- Floods due to overflow from some natural water bodies and breaking of Dams.
- Trauma or psychological disturbances to victims and their near ones.
- Disruption of essential services such as

water supply, sewerage systems, communication, power and transport etc.

- Destabilization of economic and social structure of the nation.

On 8th October, 2005 at 9.20 a.m., an earthquake with magnitude of 7.6 on Richter scale and epicenter near Muzafarabad, struck the northwestern part of the Himalaya causing heavy damage to buildings and infrastructure and loss to life. It was one of the deadliest earthquakes in the history of Indian subcontinent in terms of loss of life and property. The earthquake devastated about 40,000 km² in both parts of Jammu and Kashmir and Northern Pakistan and killed more than 80,000 people and injured about one lac people. The earthquake affected more than 500,000 families. About 3.5 million people got dislodged including about 1.6 million children. Besides, more than 3100 schools got damaged, 20000 children got killed and another 20000 injured in Pakistan and its administered part of Kashmir. In addition, approximately 250,000 farm animals died due to collapse of stone barns.

It is estimated that more than 780,000 buildings were either destroyed or damaged beyond repair, and many more were rendered unusable for extended periods of time. Property loss is placed at 4 billion US dollars. Three lac people got unemployed in the aftermath. In the State of Jammu and Kashmir, the Karnah and Uri Tehsils and Poonch District were badly hit. Buildings collapsed, roads got damaged, power and communication got destroyed, heavy landslides and rockfalls took place, besides heavy toll to the life (both people and cattle).

MITIGATION MEASURES

As we have learnt till now, that earthquakes can cause devastating effects on human lives, physical property and economy of a region, there is a need to analyze some mitigation measures that can be taken up to minimize the impact of this natural disaster.



Village Ibhot (Tangdhar) before 2005 earthquake.



Village Ibhot (Tangdhar) after 2005 earthquake.



Cracks on Jehlum River bank near Kichhama, Baramulla due to 2005 earthquake



Earthquake does not kill people but buildings do. The structures/ buildings/ houses should be designed and built in a way that these can withstand ground shaking. Architectural and engineering inputs need to be put together to improve building design and construction practice. Soil types must be analyzed before construction and structures must not be built on soft soils without proper designing. Buildings built on soft soils are more likely to get damaged even if the earthquake is not particularly strong in magnitude. Buildings/ houses should not be constructed very close to each other in earthquake prone areas. This can cause much damage due to collisions during the occurrence of earthquake.

Enforcement of building codes: During construction, we must strictly follow the Building Codes and Guidelines published by The Bureau of Indian Standards and National Disaster Management Authority (NDMA) to reduce the impact of earthquakes.

Verification of building plans: Municipality should verify that buildings are constructed in compliance with building guidelines set by the government.

Retrofitting of existing buildings: The existing earthquake non-resistant buildings especially hospitals and educational institutions can be made safe by retrofitting. Retrofitting is the process of strengthening older buildings in order to make them earthquake resistant.

Public awareness: Training programmes should be conducted for Architects, Engineers, Contractors, Government functionaries etc. regarding adoption of safe construction practices for building and structures. Mock drills and earthquake awareness programmes must be conducted among people especially students.

Safety Rules: We can not predict or stop the earthquakes, but we can minimize the impact of earthquakes. The following points should be kept in mind to minimize damage to life and property due to an earthquake.

What to do before an earthquake?

- Bolt down or provide other strong support to gas and power appliances.
- Place large and heavy objects on ground or lower shelves of storage almirahs etc.
- Do not stack glass or crystal wares as slight shaking will topple these.
- While constructing new buildings, follow building codes and other sound practice to minimise earthquake hazards. Build on solid ground or dig down to bed rock when laying foundations. Avoid filled and sediment areas as much as possible.
- Strengthen the existing unsafe buildings by retrofitting them.
- Regular mock drills to make people aware about safety practices.

What to do during an Earthquake?



Hiding under a table during an earthquake

- Remain calm, try to be calm and reassure others to derive an action plan.
- If you are inside a building, watch for falling plaster/bricks/stones, light fixtures and other objects.
- Watch for high book cases, shelves and other cabinets which might slide or topple
- Stay away from glass, windows, mirrors and chimneys
- If in danger get under a table, desk or bed in a corner away from the window with your head covered by your arms.
- Encourage others to follow your example and don't run and create panic, instead walk calmly outside to an open area
- If outside avoid high building walls, power poles and other objects that could fall. Do not run through streets. If surrounded by buildings take shelter in the nearest strongest one.
- If in an automobile, stop in a safe place available, preferably an open area
- Don't use elevators while coming out of a building instead use stair cases.

What to do after an Earthquake?

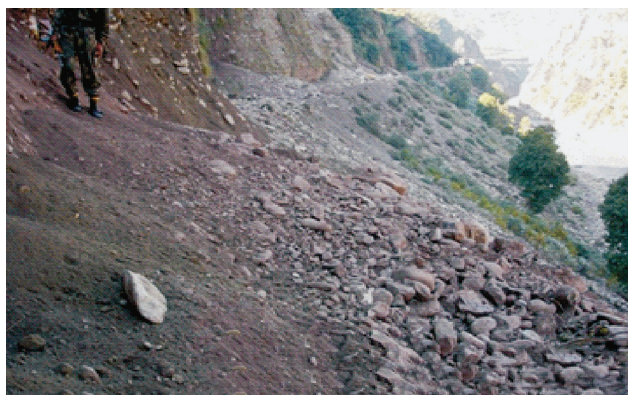
- Check for injuries, do not attempt to move seriously injured persons unless they are in immediate danger of further injury.
- Check for fires.
- Wear shoes in all areas near debris and broken glass.
- Check utility lines and appliances for damage. Do not use matches/lighters until it has been established that there are no gas leaks.
- Check and see that sewage lines are intact before using / flushing of toilets.
- Draw moderate quantity of water in case service is disrupted. Do not draw large quantity as this would interfere with fire-fighting.
- Do not eat or drink anything from open

containers, especially near shattered glass.

- Do not turn light switches on and off. This creates sparks which may ignite fire due to gas leakage.
- Do not spread rumours, these often do great harm following a disaster?
- Call 100, 101 only, if you have a life-threatening emergency.
- Respond to request for help from civil defence, fire services, police and home guards
- Do not crowd into damaged areas unless help has been requested, co-operate with the public safety officials.

LANDSLIDES

What is a landslide? If you happen to travel by road on Jammu-Srinagar National Highway especially during rainy seasons, you must have seen large blocks of rocks or mountain debris slide on the way. During such phenomenon, vehicles are often stopped for some time until the road is cleared. Incidents of landslides can also be seen in areas where activities such as excavation for roads or buildings take place.



Photographs of landslide and rockfall along Uri-Kaman Post Road triggered due to Muzaffarabad earthquake in 2005

A landslide is a geological phenomenon which includes the movement of a mass of soil, rock or debris down slope. Landslides are caused due to heavy rainfall, snowfall or earthquakes.

EFFECTS

Landslides are mostly observed to affect hilly areas and are recurring phenomenon occurring in all parts of India, from Kerala to Himalayas. Areas prone to landslides include the Eastern and Western Ghats, the Nilgiris, the Vindhyans, mountains of northern and north-eastern states throughout the Himalayan range. The incidence of landslides mostly occurs during and after spells of heavy rains. The major consequences of landslides include:

- Blocking of streams
- Overflowing of lakes
- Disruption of vehicular movements
- Risk to life (people, cattle)
- Risk of accidents.
- Loss of vegetation
- Loss or damage to infrastructure (roads, shops, buildings etc.)

MITIGATION MEASURES

Drainage Management: Landslides occur

mostly when water infiltrates into the land during heavy rains. In order to prevent or minimize this infiltration, natural drains should be strengthened to allow the smooth flow of water which otherwise gets stranded and infiltrated.

Retaining walls: Construction of concrete retaining walls prevents the slippage from slopes.



Plantation: Growing more and more plants along the landslide zones helps in total or maximum arrest of the slippage. This is the most effective and cheapest way of landslide mitigation. The roots of plants bind the top soil which prevents excessive soil erosion as well as water run-off thereby lowering the chances of landslides.

Mapping: Mapping helps to identify the landslide risk areas. This data can help to avoid such areas to use for settlements.

Awareness programmes: People should be educated about various signs and caution boards installed at various landslide risk zones.

SNOW AVALANCHES

About 200 persons were killed in January 1995 after avalanches buried the highway connecting Srinagar and Jammu. Five buses

plunged off the highway into valley below near Jawahar Tunnel.

February 19-20, 2005: Around Waltengoo, Kashmir about 250 people got killed in avalanches after heavy snowfall in Kashmir. On February 8, 2008, 29 people were killed, 500 were rescued in snow avalanches from various parts of Kashmir Valley.

Avalanche means down slope movement of snow. It is a large mass of snow that moves rapidly down a mountain slope sweeping and grinding everything in its path. Avalanches can occur anywhere with steep slopes and unstable snow. These are generated by an external disturbance such as a person or animal passing over a slope, due to warming, or due to structural failure of snow heap lying on mountain slopes. Such structural failures may occur due to:



Movement of snow during an avalanche

- (a) Excessive melting of upper layer of the snow mass lubricates the bottom surface of the snow mass which enables it to slip and create a snow avalanche.
- (b) External stresses caused by large accumulation of snow mass from heavy snowfall making excessive loading and

movement of persons, animals, and thunder traffic vibrations etc. create a snow avalanche.

- (c) Physical happenings (compactions fracturing etc.) within the snow mass which would weaken layers within it creating a snow avalanche.



A hut dumped under heap of snow

North-western part of Himalaya is prone to snow avalanches and Jammu and Kashmir, Himachal Pradesh and Uttarakhand are the most affected states in India. In general avalanches occur when more winter conditions exist for a long duration and heavy snowfall occurs over glaciated slopes which are devoid of vegetation cover.



People trapped in a snow avalanche

Sometimes snow mass can even come down flying from a cliff through air fall over an unprepared community resulting in serious disaster.

Effects of Snow Avalanche

Avalanches move unnoticed in most of the cases and large amount of snow comes down with speed on often unprepared communities. The effects and impact of avalanches causes physical damage such as blockage of roads, streams, damage to buildings, electric and communication lines and loss of life.

Mitigations Measures

Snow Avalanches can be mitigated by shifting people and property from the areas which are prone to avalanches, or by protecting the people and property by using engineered sheds, walls, berms and deflectors to absorb, dissipate or redirect moving avalanches. In addition the following mitigation measures can be adopted:

- Stopping indiscriminate mining and quarrying in mountain areas which may lead to avalanches during winter.
- Afforestation of zones prone to snow avalanches.
- Modifying the slopes removing unstable material through engineering measures.

FLOODS

Floods are temporary inundation of large regions as a result of rivers overflowing their banks because of heavy rains, high winds, cyclones, storm surge along coast, tsunami, melting of snow or cloud burst.

Floods are one of the most common hazards in India. About 12 per cent of total land area is prone to floods. However, all floods are not alike. Riverine floods develop slowly, sometimes over a

period of days. Flash floods can develop quickly, sometimes in just a few minutes, without any visible signs of rain.

Be aware of flood hazards no matter where you live, especially if you live in a low lying area, near water or downstream from a dam. Even very small streams, gullies, or low lying ground that appears harmless in dry weather can flood.

FLASH FLOODS

The National Weather service defines a flash flood as "A rapid and extreme flow of high water into a normally dry area, or a rapid rise of a stream above a predetermined flood level beginning within six hours of the causative event (e.g. intense rainfall, dam failure etc.)"

EFFECTS

The damage resulting from floods is not only dependent on the intensity and frequency of the flood that occurs at a location but also is a reflection of the extent of human interference with nature such as construction of structures across or along the floodway and the manner of utilizing the flood plains for human activities. Some of the major effects of floods are:

- Casualty to lives due to drowning.
- Damage to property (roads, buildings, drains, sewerage etc.)
- Contamination of drinking water supplies.
- Spread of water borne diseases.
- Evolving up of unhygienic conditions.
- Damage to crops and shortage of food.
- Damage of top soil, making it unfit for agricultural purposes
- Loss of vegetation due to submergence.
- Disruption of transport due to damage to

major road and rail links,

- Economic loss– economic hardship due to temporary decline in tourism, rebuilding costs, food shortage leading to price increase, etc.
- Psychological impact– flooding can be highly traumatic for individuals, in particular where deaths, serious injuries and loss of property occur.

MITIGATION MEASURES

Embankments/flood walls:It is the oldest and most common methods of construction of artificial high banks.

Storage reservoirs:Cleaning of the complete natural water storage should be done regularly especially before the monsoon season. Encroachments on tanks and ponds or any natural drainage channels should be removed before the onset of rains.

Construction on higher areas:The construction of any kind (houses, buildings, shops etc) should be done on elevated areas in flood prone areas.

Retention basins: Construction of a raised ring surrounding the area that needs to be protected from floods should be done. Such rings like structures are called ‘Ring Bunds’. Besides, some dams can also be constructed which can be used as temporary storing space which will reduce the chances of lower plains getting flooded.

Flood zonation mapping: Mapping of flood prone areas is the basic exercise in reducing the risk of hazard.

Land use planning: No major development or construction should be allowed in flood prone areas. This will minimize loss of life and property.



Devastation due to flash floods in Uttarakhand



Jammu flash floods



Floods in Gangetic Plains



2005 Mumbai floods

Awareness and information dissemination:

Awareness among the general public should be made regarding the floods and their causes. Governmental agencies should emphasize more on the flood warnings through televisions, newspapers, radio, internet and other sources of media.

During a flood emergency, the following is a basic checklist of essential tasks:

- Identify a safe place where you, your family and your pets can keep away from the floodwater.
- Gather essential items together. These include warm clothes, blankets, regular medication, a torch, food supplies, a mobile phone and a battery operated or wind-up radio.
- Turn off gas, electricity and water supplies at the mains.
- Move electrical items and valuables to the first floor or higher position.
- Floods can kill. NEVER attempt to walk or drive through any depth of floodwater.
- WAIT for the emergency services. Follow their instructions. If an evacuation order is issued you MUST comply.
- For the latest information, stay tuned to local radio.

Drought and Famine

Drought can be defined as a lack or shortage of water for an unusually long period. A drought is an extended period of months or years when a region notes a deficiency in its water supply whether surface or underground. A situation of drought occurs generally when a region receives consistently below average precipitation. It can have a substantial impact on the ecosystem and agriculture of the affected region. Drought, if it takes place can occur for years together but even a short, intense drought can cause significant damage and disturb the local economy.



Poor farmers sitting on a dry barren land

A famine is a widespread scarcity of food, caused by several factors including crop failure, population unbalance or government policies. Drought results in shortage in the agricultural production thereby causing food shortages that can lead to famine. Famines are caused either or by both of the following reasons:

- (a) Decline in the availability of food
- (b) Reduction in people's access to or their ability to acquire food.

The main characteristics of drought are:

- It builds over a period of time (varying from months to years) with increased scarcity of water.
- It does not have a well-defined start.
- It does not have a well-defined ending. Sometimes a prolonged period of drought can come to a sudden end through a fairly long spell of heavy rainfall.
- It can occur in a small area and can even spread to wide region.

EFFECTS

Droughts can have significant impact on environment, agriculture, health, economy and

social aspects. The effect varies according to vulnerability. For example, poor farmers are more likely to migrate during drought because they do not have alternative food sources. Drought can also reduce water quality, because there is reduction in dilution of pollutants and increase in contamination of remaining water sources due to lower water flows. Common consequences of drought include:

- Diminished crop growth and reduced grazing grounds for livestock.
- Dust storms, resulting from desertification and erosion
- Famine due to lack of water for irrigation
- Habitat destruction, affecting both terrestrial and aquatic life
- Malnutrition, dehydration and related diseases
- Mass migration, resulting in internal displacement
- Reduced electricity production due to reduced water flow through hydroelectric dams
- Shortages of water for industrial users
- Snake migration and increases in snakebites
- Social unrest
- War over natural resources, including water and food
- Wildfires are more common during times of drought

MITIGATION MEASURES

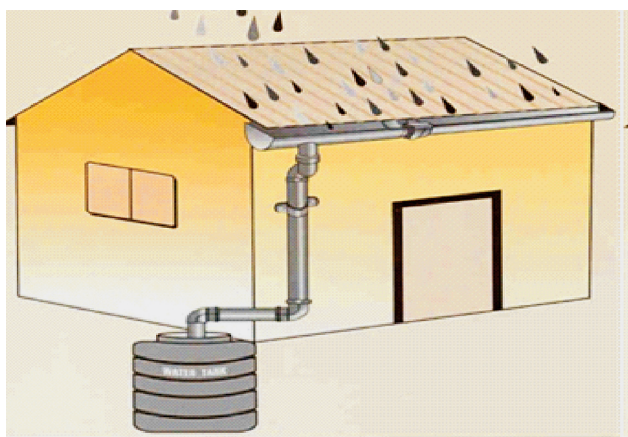
To reduce the impacts of a drought expected to happen in future, emphasis is required to be made on preparedness and mitigation. The first step in drought mitigation is to identify areas that are at a risk. In this situation, historical records can be analyzed. After the identification of vulnerable areas, priority zones should be established.

Thereafter, comprehensive and integrated development programmes should be initiated. The commonly adopted mitigation strategies are as follows:

- Construction of dams/check dams to store water
- Watershed management
- Proper selection of drought resistant crop for drought affected areas
- Soil conservation techniques
- Reducing deforestation and cutting of firewood in affected areas
- Education and awareness to people

Revival of existing system: The traditional water harvesting structures should be revived and strengthened like canals, tanks etc. For example in Jammu Division, construction of artificial ponds (locally called as Chappad) in Kandi belt, especially in villages are quite predominant. The existing ponds must be maintained and desilted regularly.

Rain water harvesting: Rain water harvesting must be adopted to store water which can be utilized in cases of scarcity. Roof top rain water harvesting is one of the best practices which can be easily adopted without much efforts and investments. Water harvesting can be done by allowing the run-off water from all the areas to a common point (ponds) or allowing it to infiltrate into the soil, thereby increasing the ground water level.



Construction of Dams: A dam is a barrier that impounds water or underground streams. Dams store water in the form of reservoirs which can be supplied during of droughts.

Desalination: It involves removal of some amount of salt and other minerals from saline water. Salt water is desalinated to produce fresh water suitable for human consumption or irrigation. Along with recycled wastewater, this is one of the few rainfall-independent water sources.

Monitoring: Continuous monitoring and providing early warning can be helpful for preparedness and decision making well before the onset of a drought. Monitoring all the components of hydrological system is the only mechanism for detecting the early onset of drought and its potential impacts.

Awareness: Many organizations including governmental, non-governmental and other key players have been organizing programmes and activities to create awareness regarding water conservation, land use planning, traditional water conservation methods etc. Apart from this, students should also participate and organize such awareness programmes to help prevent the occurrence of drought situations.

Crop insurance: It provides insurance to the farmers who have lost their crops due to drought or acute water shortage.

CLOUD BURST

Read story: The maximum ever recorded rainfall in Leh was 96.2 mm in a 24 hour period measured in 1933. It was a cloud burst that took place around 0000–0030hours IST on 6th August, 2010

in Leh. The cloudburst yielded 250mm rainfall within an hour. People were in their deep sleep during a dark night, when flash floods carrying muddy water from uphill in three different routes devastated the settlements by burying most of the houses and washing away everything on the course of the running water and leaving deep silt deposits and huge boulders. It did not leave even a moment for victims to wake up and manage to fight for life. Whosoever came in the way got into the trap of mighty flood. At least 255 people are reported to have died due to flash floods, mudslides, and debris flows. Thousands were rendered homeless after the flooding caused extensive damage to property and infrastructure. Overall, 9000 people were directly affected by the event. Buildings were razed, communication lines snapped and highways leading to Srinagar and Manali washed away.

The **cloud burst** is a disastrous weather event in which, the heavy rainfall occurs over a localized area at a faster rate. The rate of rainfall may be of the order of 100mm per hour. It is sometimes



Mudflows seen after 2010 cloudburst in Leh

associated with hail and thunder and is capable of creating flood conditions. The cloud bursts in India occur during monsoon season in Himalayan region, Northeastern states and the Western Ghats. Cloudbursts lead to flooding, landsliding, ponding of rivers due to huge landslides, mudflows. Cloudbursts cause huge damage to buildings, infrastructure, communication links etc.

The cloud bursts lead to sudden flash floods, mudslides and debris slides. It is therefore necessary to follow the same mitigation measures as are to be followed in case of floods.

EXERCISE

Conduct a small social survey in your locality/ street/ village/ town and collect the information against each question. Based upon the data received, try to assess how prepared the people are against different disasters. Also, try to pen down some suggestions that may be helpful to minimize the chances of any disaster to happen.



Social Survey Form					
S. No	Question	Yes/ No	Disaster risk	Yes/ No	Suggestions
1.	Do you live near the foot of a hill?		Risk of landslide		
2.	Is your house located in a congested/ overpopulated area?		Risk of earthquake		
3.	Do you have adopted measures like rainwater harvesting, canals construc- tion, bund formation in your village?		Risk of drought		
4.	Have you observed retaining walls along the hill side of the road in your area?		Risk of landslide/ avalanche		
5.	Is your locality situated in a low lying or flood prone area.		Risk of flood		
6.	Have you followed the building codes while constructing your house?		Risk of earthquake		

Fill in the blanks

1. Disasters that are caused by nature are called as.....
2. The earthquake zoning map divides India into seismic zones.
3. The state of Jammu and Kashmir falls in seismic zone and
4. is a large mass of snow that moves rapidly down a mountain slope.
5. can be defined as a lack or shortage of water for an unusually long period.
6. A is a widespread scarcity of food in an area.
7. Storing rain water on the roofs of the houses is called as
8. is a disastrous weather event in which, the heavy rainfall occurs over a localized area.
9. An is a natural disaster in which the sudden shaking of earth's surface is involved.
10. Instrument used to measure the magnitude of an earthquake is called as

One word Answers

1. Which disaster hit Muzaffarabad region in year 2005?
2. Which disaster involves the movement of a mass of soil, rock or debris down the

slope?

3. Which disaster hit the famous Kedarnath Shrine area at Uttarakhand in June, 2013?
4. Which disaster devastated the normal life in Leh on 6th August, 2010?
5. Which disaster hit the Baderwah area in year 2013

Very short/ short answers

1. What is the difference between hazard and disaster?
2. What do you understand by a natural disaster? Enlist few.
3. Write down some events of earthquakes in India?
4. What is the difference between drought and famine?
5. Illustrate briefly how an earthquake occurs.

Long answers

1. What do we understand by Mitigation? Give some examples.
2. List some of the major natural disasters that are likely to occur in hilly regions. Elaborate any one of them.
3. What is a drought? Describe how it can be prevented?
4. What are the relief steps that need to be taken in the aftermath of landslides or snow avalanches?
6. Describe some of the safety measures that should be adopted during an earthquake.