AN OVERVIEW OF NATURAL DISASTERS

This appendix could include important and frequently affected natural disasters in India with its nature, risk and do’s and don’t in such disasters.

An Overview of Earthquake

Earthquakes are one of the most powerful natural forces on earth and regularly affect people around the world. Earthquakes can have a range of magnitudes with the strongest having devastating consequences for the areas where they are centered, nearby areas, and even some far away in the case of earthquake-generated tsunamis.

Most earthquakes are quite small but are not readily felt. Larger and more violent earthquakes are those that occur in a release of energy as the plates slide past or collide into one another.

Large earthquakes can focus on the boundaries where two plates meet, but they are not limited to these areas. As the plates move, fractures in the earth’s crust develop and earthquakes are often located on them. These fractures are referred to as faults, and all generate earthquakes when they move.

The most damaging earthquakes happen when the blocks of rock become locked together due to the intense friction created when they move. As they continue attempting to move once they are locked, pressure continues to build until it has enough energy to move the rock and the blocks move, creating an earthquake.

The point where the energy is released is called the focus and the focal depth is the depth beneath the earth’s surface where the energy release originates. The epicenter is another term used in studying earthquakes and this is the point on the earth’s surface directly above the focus. From here, the energy released spreads out in rings moving across the surface - not unlike those caused when a rock hits still water.
In addition to the main shaking created by an earthquake, there are often foreshocks and aftershocks. Foreshocks generally increase in magnitude leading to the main earthquake, whereas aftershocks happen after the main event and decrease in strength.

Once an earthquake finishes its movement, its magnitude (strength) is determined with the Richter and or Mercalli Scale. The Richter scale measures the energy released by an earthquake while the Mercalli scale measures the felt or observed intensity at a particular location.

The impacts of earthquakes vary based on their energy and intensity. The strongest earthquakes that occur can result in ground rupture, causing damage to bridges, dams, roads, railroad tracks, and the foundations of buildings. They can also cause landslides and avalanches as a result of the shaking. Intense shaking can also cause liquefaction of ground built on landfill when water mains break. The shaking of an earthquake is increased in areas of landfill.

Another major cause of damage is the fires that ignite when power lines fall and gas lines rupture. In addition, undersea earthquakes can generate tsunamis that are capable of traveling great distances from the epicenter and cause significant damage to coastal communities.

In an effort to reduce the impacts of earthquakes, areas prone to them have taken steps to retrofit buildings and educate citizens (in schools and the media for example) on what they should do when an earthquake occurs. Knowledge of what to do and always being prepared for an earthquake is the best way to reduce injuries, deaths, and damage to cities and towns when they occur.

**Risk and Mitigative Measures**

About 59% of India’s land area is under the threat of moderate to severe earthquakes of intensity VII and higher. The regions far away from the Himalaya and other inter-plate boundaries, which were once considered to be relatively safe from strong shaking, have also experienced several devastating earthquakes.

The huge losses of life and property in the earthquake-prone areas of the country have shown that the built-environment is extremely fragile, and country’s ability to respond to these events is extremely inadequate.
Post earthquake damage survey revealed that 90% of casualties result directly from the collapse of buildings that had usually no earthquake resistant features. Secondary events, such as landslides, fires, and tsunamis, account for the remaining 10% of the casualties.

This emphasizes the need for strict compliance of town and country planning bye-laws and compulsory earthquake-resistant infrastructure design in India.

**Review of Building Bye-laws and their Adoption**

Structural mitigation measures are the key to make a significant impact towards earthquake safety. The earthquake prone zones have been directed to review, and if necessary, amend their building byelaws to incorporate the BIS seismic codes for construction in the concerned zones. Appointment of an Expert Committee to annual review for Earthquake Risk Mitigation programmes, amendments to the existing Town & Country Planning Acts, Land Use Zoning Regulation, Development of Control Regulations & Building Bylaws, which could be used by the State Governments & the local bodies there-under to upgrade the existing legal instruments are the measures to tackle earthquakes. The Model Building Bylaws ensures the technical implementation of the safety aspects in all new constructions and upgrading the strength of existing structurally vulnerable constructions. To facilitate the review of existing building byelaws and adoption of the proposed amendments by the State Governments and UT administrations, discussion workshops at regional level in the country are being organized.

It is stressed that all planning authorities and local bodies are required to have development control regulations and building byelaws which would include multi-hazard safety provisions.

**Revision of Codes**

An action plan has been drawn up for revision of existing codes, development of new codes and documents/commentaries, and making these codes and documents available all over the country including online access to these codes. An Apex committee consisting of representatives of Ministry of Consumer Affairs, BIS and the concerned states have been constituted to review the mechanism and process of development of codes relevant to earthquake risk mitigation and establish a protocol for revision by BIS.
Hazard Safety Cells in States

The States have been advised to constitute Hazard Safety Cells (HSC) headed by the Chief Engineer (Designs), State Public Works Department with necessary engineering staff so as to establish mechanism for proper implementation of the building codes in all future government constructions, and to ensure the safety of buildings and structures from various hazards. The HSC will also be responsible for carrying out appropriate design review of all Government buildings to be constructed in the State, act as an advisory cell to the State Government on the different aspects of building safety against hazards and act as a consultant to the State Government for retrofitting of the lifeline buildings. Rajasthan, Gujarat, West Bengal, Kerala, Uttarakhand and Chhattisgarh have already constituted these cells and other States are in the process.

Capacity Building of Engineers and Architects in Earthquake Risk Mitigation

Conduct National Programmes for Capacity Building in Earthquake Risk Mitigation for Engineers and Architects. Give training to engineers and architects in seismically safe building designs and related techno-legal requirements. Provide assistance to the State/UTs to build the capacities to build State Engineering Colleges and Architecture Colleges to be able to provide advisory services to the State Governments to put in place appropriate techno-legal regime, assessment of building and infrastructures and their retrofitting.

Training of Masons

Give training to the masons of the state to include multi-hazard resistant construction and constitute an expert committee to revised curriculum of school children’s to give vocational training programmes.

Earthquake Engineering in Undergraduate Engineering/Architecture Curriculum

The role of engineers and architects is crucial in reducing earthquake risks by ensuring that the constructions adhere to the norms of seismically safety. In view of this, the elements of earthquake engineering are being integrated into the undergraduate engineering and architecture courses. The model course curricula for adoption by various
technical institutions and universities have been developed and circulated to the Universities and Technical Institutions for adoption in the undergraduate curricula.

**Hospital preparedness and emergency health management in medical education**

Hospital preparedness is crucial to any disaster response system. Each hospital should have an emergency preparedness plan to deal with mass casualty incidents and the hospital administration / doctor trained for this emergency. The curriculum for medical doctors does not include Hospital Preparedness for emergencies. Therefore capacity building through in-service training of the current heath managers and medical personnel in Hospital Preparedness for emergencies or mass causality incident management is essential. At the same time, the future health managers must acquire these skills systematically through the inclusion of health emergency management in the undergraduate and post graduate medical curriculum.

**Retrofitting of lifeline buildings**

The problem of unsafe existing buildings has been looming large. As it is not possible to address the entire existing building stock, the life line buildings like hospitals, schools or buildings where people congregate like cinema halls, multi-storied apartments are being focused on. The States should take initiatives to assesses these buildings and where necessary retrofitted. The Ministry of Finance has advised Reserve Bank of India to issue suitable instructions to all the Banks and Financial Institutions to see that BIS codes/bye laws are scrupulously followed while financing/refinancing construction activities in seismically vulnerable zones.

**Urban Earthquake Vulnerability Reduction Programme**

Give orientation programmes to senior officers and representatives of the local planning and development bodies to sensitize them on earthquake preparedness and mitigation measures. The training programme for engineers and architects are being organized to impart knowledge about seismic safe construction and implementation of BIS norms. The States are also being assisted to review and amend their building bye-laws to incorporate multi hazard safety provisions.
**Earthquakes - Do’s and Don’t’s**

An earthquake does not cause death or injury by itself. People are hurt by falling plaster and collapsing walls or falling of heavy objects. Collapsing buildings and vibrations can cause short circuits and electric fires. Lighted gas or stoves may also cause fires. All this leads to panic and confusion. With some precautions it is possible to avoid such confusion.

**Emergency Services**

Damage to emergency services, such as to hospitals, fire stations and disruption of electricity and water supply causes spread of fire and diseases. This adds to the chaotic situation created by an earthquake.

**Special Structures**

It is very important that special structures are protected from the effects of earthquakes. Nuclear power plants, dams, bridges and industrial complexes, which deal with hazardous chemicals, can also be designed to withstand damage from future earthquakes. These special structures are designed and constructed after study of all aspects of earthquake problem at the site.

**Earthquake Effects**

Violent shaking during an earthquake can cause large fissures and can also rupture the ground. Shaking is amplified in soft sediments, which may cause liquefaction of soil. Sometimes fountains of sand and water are also witnessed. Landslides may sometimes artificially dam rivers to form lakes. When such dams fail, flash floods cause further havoc downstream. An earthquake shakes houses as well as other structures. If these structures are well designed and well constructed then even violent earthquakes will not be able to destroy them. Technology has been developed for constructing houses, which will resist the onslaught of earthquakes.

**If you are caught indoors at the time of an earthquake**

- Keep calm
- Stay away from glass windows, doors, admirals, mirrors etc
• Stay away from falling plaster, bricks or stones
• Get under a table or a sturdy cot so that you are not hurt by falling objects
• Do not rush towards the doors or staircase. They may be broken or jammed

**If you are outdoors at the time of earthquake**

• If open space is available nearby, go there
• Keep away from tall chimneys, buildings, balconies and other projections
• Do not run through streets; hoardings or lamps may fall on you

**After an Earthquake**

• Check if you or anyone else is hurt. Use first aid at least on the cuts and bruises
• Keep the streets clear for emergency service
• Switch off all appliances like the refrigerator, TV or radio. Turn off the gas
• Wear shoes to protect your feet from debris
• A battery operated radio will help you to get important messages
• Be prepared for more shocks. These aftershocks always follow an earthquake
*Percentages ≤ 0.05 are displayed as zeros
Appendix - II

AN OVERVIEW OF LAND SLIDES

Landslides are sudden, fast movements of a cohesive mass of soil, rock or regolith. Landslides occur in two types- the first of which is a translational slide. These involve movement along a flat surface parallel to the angle of the slope in a stepped-like pattern, with no rotation. The second type of landslide is called a rotational slide and is the movement of surface material along a concave surface. Both types of landslides can be moist, but they are not normally saturated with water. It is a significant part of the process of erosion because it moves material from high elevations to lower elevations. It can be triggered by natural events like earthquakes, volcanic eruptions and flooding, but gravity is its driving force.

Although gravity is the driving force of landslides, it is impacted mainly by the slope material’s strength and cohesiveness as well as the amount of friction acting on the material. If friction, cohesion and strength (collectively known as the resisting forces) are high in a given area, landslides are less likely to occur because the gravitational force does not exceed the resisting force.

Once the force of gravity on a mass of rock or soil reaches the shear-failure point, it can fall, slide, flow or creep downs a slope. Although most landslides occur via natural phenomena like earthquakes, human activities like surface mining or the building of a highway or shopping malls can also contribute to landslide.

Landslide Risk and Mitigation Strategies

Hazard mapping will locate areas prone to slope failures. This will permit to identify avoidance of areas for building settlements. These maps will serve as a tool for mitigation planning. Land use practices such as:

Areas covered by degraded natural vegetation in upper slopes are to be afforested with suitable species. Existing patches of natural vegetation (forest and natural grass land) in good condition should be preserved.
• Any developmental activity initiated in the area should be taken up only after a detailed study of the region and slope protection should be carried out if necessary.

• In construction of roads, irrigation canals etc. proper care is to be taken to avoid blockage of natural drainage.

• Total avoidance of settlement in the risk zone should be made mandatory.

• Relocate settlements and infrastructure that fall in the possible path of the landslide.

• No construction of buildings in areas beyond a certain degree of slope.

Retaining Walls can be built to stop land from slipping (these walls are commonly seen along roads in hill stations). It’s constructed to prevent smaller sized and secondary landslides that often occur along the toe portion of the larger landslides. Surface Drainage Control Works implemented to control the movement of landslides accompanied by infiltration of rain water and spring flows. Engineered structures with strong foundations can withstand or take the ground movement forces. Underground installations (pipes, cables, etc.) should be made flexible to move in order to withstand forces caused by the landslide. Increasing vegetation cover is the cheapest and most effective way of arresting landslides. This helps to bind the top layer of the soil with layers below, while preventing excessive run-off and soil erosion.

**Community Based Mitigation**

The most damaging landslides are often related to human intervention such as construction of roads, housing and other infrastructure in vulnerable slopes and regions. Other community based activities that can mitigate landslides are education and awareness generation among the communities, establishing community based monitoring, timely warning and evacuation system. This can play a vital role in identifying the areas where there is land instability. Compacting ground locally, slope stabilization (procedures such as terracing and tree planting may reduce damages to some extent), and avoiding construction of houses in hazardous locations are something that the community has to agree and adhere to avoid damage from the possible landslides.
Debris Flows or Mudslides

Fast-moving flows of mud and rock, called debris flows or mudslides, are among the most numerous and dangerous types of landslides in the world. They are particularly dangerous to life and property because of their high speeds and the sheer destructive force of their flow. Hazardous Areas Debris flows start on steep slopes (slopes steep enough to make walking difficult). Debris flows can travel even over gently sloping ground. The most hazardous areas are canyon bottoms, stream channels, areas near the outlets of canyons, and slopes excavated for buildings and roads.

- Canyon bottoms, stream channels, and areas near the outlets of canyons or channels are particularly hazardous. Multiple debris flows that start high in canyons commonly funnel into channels. There, they merge, gain volume, and travel long distances from their sources.

- Debris flows commonly begin in swales (depressions) on steep slopes, making areas down slope from swales particularly hazardous.

- Road cuts and other altered or excavated areas of slopes are particularly susceptible to debris flows. Debris flows and other landslides onto roadways are common during rainstorms, and often occur during milder rainfall conditions than those needed for debris flows on natural slopes.

- Areas where surface runoff is channeled, such as along roadways and below culverts, are common sites of debris flows and other landslides.

Landslides Doe’s and Don’t

Develop a Family Disaster Plan

- Develop an evacuation plan. You should know where to go if you have to leave. Trying to make plans at the last minute can be upsetting and create confusion.

- Discuss landslides and debris flow with your family. Everyone should know what to do in case all family members are not together. Discussing disaster ahead of time helps reduce fear and lets everyone know how to respond during a landslide or debris flow.
During a Landslide

- Stay alert and awake. Many debris-flow fatalities occur when people are sleeping. Listen to early warning of intense rainfall. Be aware that intense, short bursts of rain may be particularly dangerous, especially after longer periods of heavy rainfall and damp weather.

- If you are in areas susceptible to landslides and debris flows, consider leaving if it is safe to do so. Remember that driving during an intense storm can be hazardous. If you remain at home, move to a second story if possible. Staying out of the path of a landslide or debris flow saves lives.

- Listen for any unusual sounds that might indicate moving debris, such as trees cracking or boulders knocking together. A trickle of flowing or falling mud or debris may precede larger landslides. Moving debris can flow quickly and sometimes without warning.

- If you are near a stream or channel, be alert for any sudden increase or decrease in water flow and for a change from clear to muddy water. Such changes may indicate landslide activity upstream, so be prepared to move quickly. Don’t delay! Save yourself, not your belongings.

- Especially alert when driving. Embankments along roadsides are particularly susceptible to landslides. Watch the road for collapsed pavement, mud, fallen rocks, and other indications of possible debris flows.

After the Landslide

- Stay away from the slide area. There may be danger of additional slides

- Check for injured and trapped persons near the slide, without entering the direct slide area. Direct rescuers to their locations.

- Help a neighbour who may require special assistance - infants, elderly people, and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
• Listen to local radio or television stations for the latest emergency information.

• Watch for flooding, which may occur after a landslide or debris flow. Floods
  sometimes follow landslides and debris flows because they may both be started
  by the same event.

• Look for and report broken utility lines to appropriate authorities. Reporting
  potential hazards will get the utilities turned off as quickly as possible,
  preventing further hazard and injury.

• Check the building foundation, chimney, and surrounding land for damage.
  Damage to foundations, chimneys, or surrounding land may help you assess the
  safety of the area.

• Replant damaged ground as soon as possible since erosion caused by loss of
  ground cover can lead to flash flooding.

• Seek the advice of a geotechnical expert for evaluating landslide hazards or
  designing corrective techniques to reduce landslide risk. A professional will be
  able to advise you of the best ways to prevent or reduce landslide risk, without
  creating further hazard.
Map 4
LANDSLIDE AFFECTED STATES

Legend
- Highly Affected
- Moderately Affected
- Marginally Affected
Appendix - III

AN OVERVIEW OF CYCLONE

The term ‘cyclone’ is used in the Bay of Bengal and Arabian Sea, the term typhoon is used in the Pacific Ocean and the term Hurricane is used in North America and parts of Europe but they all refer to the same thing: a strong tropical storm with very high winds and large amounts of rain.

The birth of a cyclone starts as a low pressure zone and builds into a tropical wave of low pressure. In addition to a disturbance in the tropical ocean water, the storms that become cyclones also require warm ocean waters (above 80°F or 27°C down to 150 feet or 50 meters below sea level) and light upper level winds.

Once average winds reach 39 mph or 63 km/hr then the cyclonic system becomes a tropical storm and receives a name while tropical depressions are numbered. Tropical storm names are preselected and issued alphabetically for each storm.

It is at 74 mph or 119 km/hr that a tropical storm becomes a cyclone. Hurricanes can be from 60 to almost 1000 miles wide. They vary widely in intensity; their strength is measured on the Saffir-Simpson scale from a weak category 1 storm to a catastrophic category 5 storm.

Cyclone damage results from three primary causes:

1) Storm Surge. Approximately 90% of all cyclone deaths can be attributed to the storm surge, the dome of water created by the low pressure center of a cyclone. This storm surge quickly floods low-lying coastal areas with anywhere from 3 feet (one meter) for a category one storm to over 19 feet (6 meters) of storm surge for a category five storm. Hundreds of thousands of deaths in countries such as Bangladesh have been caused by the storm surge of cyclones.

2) Wind Damage. The strong, at least 74 mph or 119 km/hr, winds of a cyclone can cause widespread destruction far inland of coastal areas, destroying homes, buildings, and infrastructure.
3) **Freshwater Flooding.** Hurricanes are huge tropical storms and dump many inches of rain over a widespread area in a short period of time. This water can engorge rivers and streams, causing cyclone-induced flooding.

Fortunately, cyclones ultimately diminish, reverting to tropical storm strength and then into a tropical depression when they move over cooler ocean water, move over land, or reach a position where the upper level winds are too strong and are thus unfavorable.

**Cyclone Does and Don’t**

Since pre-monsoon cyclone season of 1999, IMD has introduced a 4-Stage warning system to issue cyclone warnings. They are as follows:

- **Pre-Cyclone Watch**

  Issued when a depression forms over the Bay of Bengal irrespective of its distance from the coast and is likely to affect Indian coast in future. The pre-cyclone watch is issued by the name of Director General of Meteorology and is issued at least 72 hours in advance of the commencement of adverse weather. It is issued at least once a day.

- **Cyclone Alert**

  Issued at least 48 hours before the commencement of the bad weather when the cyclone is located beyond 500 Km from the coast.

- **Cyclone Warning**

  Issued at least 24 hours before the commencement of the bad weather when the cyclone is located within 500 Km from the coast. Information about time/place of landfall are indicated in the bulletin. Confidence in estimation increases as the cyclone comes closer to the coast.

**Post landfall outlook**

It is issued 12 hours before the cyclone landfall, when the cyclone is located within 200 Km from the coast. More accurate & specific information about time/place of
landfall and associated bad weather indicated in the bulletin. In addition, the interior
distraction is likely to be affected due to the cyclone are warned in this bulletin.

Staying safe

• Keep your radio on and listen to latest weather warning and advisories from the nearest All India Radio Station. Pass the information to others.

• Avoid being misled by rumors, pass on only the official information you have got from the Radio to others.

• Provide strong suitable support for outside doors. Board up glass windows or put storm shutters in place. Use good wooden planks securely fastened. If you do not have wooden boards handy paste paper strips on glasses to prevent

• Do not go out and stay in safe place.

• Get away from low lying beaches or other location which may be swept by high tides or storm waves.

• Avoid going into the sea during cyclone.

• Be alert for high water in areas where streams of rivers may flood due to heavy rains.

• Get extra food, especially things which can be eaten without cooking or with very little preparation. Make provisions for children and adults requiring special diet.

• Store extra drinking water in suitable covered vessels.

• If you are, in one of the evacuation area, move your valuable articles to upper floors to minimize flood damage.

• When the authorities advice evacuation follow the instruction promptly and head for proper shelter or evacuation points indicated for your area. Remain in shelter until informed that you may leave.

• Be calm. Your ability to meet emergency will inspire and help others.

• Keep calm at all times. If instructions are observed promptly, there is little personal danger involved
AN OVERVIEW OF FLOODS

River and coastal flooding are the most frequently occurring natural disaster and are increasing in occurrence more rapidly than any other disaster. Urbanization and deforestation reduce the capability of the earth to hold excess water.

As asphalt- and concrete-covered surfaces expand and open spaces disappear at the edges of metropolitan areas, it takes less rain to flood communities as water running over the pavement collects quickly and easily disrupts storm drain systems.

Those areas which are most at risk for floods include low-lying areas, coastal regions, and communities on rivers downstream from dams. Flood waters are extremely dangerous; a mere six inches of swiftly moving water can knock people off their feet.

In some places flooding is caused by excessive monsoons, while in others flooding is caused downstream from dams when reservoirs, which normally help to prevent downstream areas of rivers from flooding, are opened due to unusually high levels of rain to prevent the reservoir from overflowing the dam. Dam breaks are also a cause of catastrophic flooding.

Floods - Risk and Mitigation

The Ministry of Agriculture in India has come up with a detailed management strategy plan for fighting drought in India. The plan is divided into two major sub groups: short term and middle/long term strategy planning.

Short Term Strategies

1. Judicious use of surface and groundwater for drinking and irrigation
2. Ensuring availability of quality fodder to animals
3. Livestock management including establishment of fodder/feed depots
4. Selection of crops, cropping sequences and agronomic practices for drought affected areas
5. Promotion of subsidiary income and employment generating activities
6. Deployment of Information technologies for collection, storage and dissemination on real time basis
7. Adoption of modified irrigation practices
8. Rescheduling of irrigation roasters
9. Proper and optimum utilization of ground water for irrigation
10. Use of poor quality water for irrigation, with a strict adherence to standardized water quality guidelines.
11. Rain water conservation
12. Installation of tanks and farm ponds for ground water recharge.
14. Application of suitable fertilizers and micro nutrients, intercropping, mixed cropping etc for optimized use of water for irrigation.
15. Meticulous planning for Rabi and summer crops in case of failure of Kharif crops.

**Middle/Long Term Strategies**

1. Judicious networking of rivers and other water bodies of high rainfall areas so that the transferred water can be used for ground water recharging or filling up dried lakes, water bodies etc.
2. Ground water recharge in dry areas with introduced water harvesting.
3. Less exploitation of ground water by resorting to low water demanding crops and adoption of precision micro-irrigation techniques.
4. Formulation of strict guidelines for judicious use of water for domestic and industrial purpose in all drought prone areas.
5. Recycling of used/waste waters after proper treatment and reclamation for agriculture, human and animal consumption
6. Enhancement of perennial vegetation in arid and semi arid regions
7. Development of fodder varieties of cultivated crops having tolerance for varying degrees of drought
8. Resorting to programme for improved live stocking, breeding and management
9. Upgradation and fine tuning of crops, cropping and farming systems
10. Exploiting under exploited and underutilized plant resources

Floods - Do’s and Don’t

India, being a peninsular country and surrounded by the Arabian Sea, Indian Ocean and the Bay of Bengal, is quite prone to flood. As per the Geological Survey of India (GSI), the major flood prone areas of India cover almost 12.5% area of the country. Every year, flood, the most common disaster in India causes immense loss to the country’s property and lives.

Protections against floods are provided by way of construction of embankments, drainage channels, town protection works and providing raised platforms. The Union Government is also providing Central assistance to the flood prone States to take up some of the critical works.

Staying Safe

- Move to the safer place or highlands with dry food/baby food/ and potable water on receipt of warning.
- Valuable household articles/documents etc. to be tied to a high roof or concealed with polythene in deep underground for safety. Insure any household articles.
- Move the cattle to a safe place/high land with ample fodder and drinking water.
- Listen to radio for detail and latest news warning on flood.
- Turn off all the electrical systems and equipments.
Every year as summer approaches, concerns grow about drought. Drought is defined as a period in which a region has a deficit in its water supply. Drought is a normal feature of climate which happens in all climate zones from time to time.

Agricultural droughts impact crop production and cause changes to the natural distribution of various species. The farms themselves also cause droughts to happen as soil is depleted and therefore cannot absorb as much water, but they can be impacted by natural droughts as well.

Because drought is defined as a deficit in water supply, it can be caused by a number of factors. The most important one though relates to the amount of water vapor in the atmosphere as this is what creates rain. If there is an above average presence of dry, high pressure air systems, less moisture is available to produce rain (because these systems cannot hold as much water vapor) and this results in a deficit of water for the areas over which they move.

The same can also happen when winds shift air masses and warm, dry, air moves over an area as opposed to cooler, moist, oceanic air masses. El Nino, which affects the ocean’s water temperature, also has an impact on precipitation levels because in years when the temperature cycle is present, it can shift the air masses above the ocean, often making wet places dry (drought prone) and dry places wet.

Finally, deforestation for agriculture and/or building combined with the resultant erosion can also cause drought to begin because as soil is moved away from an area it is less able to absorb moisture when it falls.

Most of the economic impacts of drought are associated with agriculture and the income generated from crops. In times of drought, the lack of water can often cause a decline in crop yields, and thus a reduction in income for farmers and an increase in the
market price of products since there is less to go around. In a prolonged drought, unemployment of farmers and even retailers can occur, having a significant impact on the economy of the area.

In terms of environmental problems, drought can result in insect infestations and plant diseases, increased erosion, habitat and landscape degradation, a decrease in air quality and that of what water is present, as well as an increased risk of fire because of drier vegetation. In short-term droughts, natural environments can often rebound, but when there are long term droughts, plant and animal species can suffer tremendously, and over time desertification can happen with an extreme lack of moisture.

Finally, droughts have social impacts that can cause disputes between users of available water, inequalities in water distribution between wealthy and poor, disparities in areas in need of disaster relief, and a decline in health.

In addition, population migration can begin when one area experiences drought because often people will go to areas where water and its benefits are more prevalent. This then depletes the natural resources of the new area, can create conflicts among neighboring populations, and takes workers away from the original area. Over time, increased poverty and social unrest may develop.

**Drought Risk Mitigation**

Drought is the most complex of all natural hazards as it affects more people than any other hazard. Drought should not be viewed only as a physical phenomenon or natural event as it has subsequent negative impact on the economic, environment and the society. The less predictable characteristics of droughts, with respect to their initiation and termination, as well as to their severity, make drought both a hazard and a disaster. A hazard because it is a natural accident of unpredictable occurrence, and a disaster because it corresponds to the failure of the precipitation regime, causing the disruption of the water supply. Globally, examining the effects of the recent drought in many areas demonstrates its wide reaching impacts on society and the environment. This is quite apparent through the widespread crop failures and livestock losses; increased disease, stress and other social problems; reduced hydropower generation and increased soil
erosion and fire occurrence, forced mass migration to urban areas and other countries, and reduced security and the local and national levels.

Major emphasis should be placed on developing appropriate drought plans that outline proactive strategies that can be implemented before, during and after drought in order to reduce drought impacts, and to decide on the specific mitigation actions that can be taken to reduce short and long terms drought risks.

**Drought planning**

Drought planning provides an opportunity for decision makers to identify sectors that are vulnerable to drought and investigate management options before a crisis occur and thereby decide on and implement the most appropriate and cost effective strategies available, in a strategic and systematic manner. Recent drought and increasing demands on available water along with unfavourable climate change resources have brought greater awareness of the need to plane for future drought events. In addressing solutions to mitigate drought, a comprehensive and systemic approach is needed to understand the causes, effects and management mechanisms of drought crisis.

Plans should be viewed as a practical step by step process for identifying actions that can be taken before a drought occurs. Four fundamental steps have to be carefully followed. The first, the crucial one, begins with making sure that the right people are brought together and supplied with adequate data to make informed decisions during the process. The second is identifying high priority drought related impacts and the third is to understand the underlying environmental, economic and social causes of impacts. The fourth is to utilize all of the previous information to identify feasible, cost effective and equitable actions that can be taken to address the causes.

**Water resources management planning and drought mitigation**

The traditional approach has been characterized as being of the reactive type, or emergency response or crisis management or unplanned response. This approach is not only extremely costly but also not effective in reaching equitably the needy areas and people. Activities in this approach are often fragmented between several institutions, with limited coordination.
The proactive approach consists of measures that are planned in advance, as a strategy to prepare for drought and to mitigate its effects. The planning process takes place before the onset of drought whereas its implementation is partitioned over a long period of time. A proactive planning approach to drought consists of two categories of measures, both planned in advance:

- Long-term actions, oriented to reduce the vulnerability of water supply systems to drought.
- Short-term actions, which try to face an incoming particular drought event within the existing framework of infrastructures and management policies.

The overriding objectives of the long-term actions is adjustment to drought conditions, as a proactive and preparatory measure, such as the increase of water storage capacity, the adoption of water saving technology, the recharge of ground water, etc. These are supplemented by short term measures including relief programmes, crop insurance schemes, changes in land use, use of both surface and underground water, as well as use of non conventional water resources.

**Drought mitigation policies**

Policies should be developed by placing greater emphasis on risk management rather than the crisis one. Simply it could be stated that a drought policy should establish a clear set of principals or operating guidelines to govern the management of drought and its impact. Equally, the policy should be consistent and equitable for population groups, economic sectors and with the goals of sustainable development and reducing risk by developing better awareness and understanding of the drought hazard.

**Drought - Do’s and Don’t**

A drought is a disaster that few people can manage their own. Citizens will need significant help from the government to get over the problems caused by drought, particularly the lack of food and sufficient drinking water. It is imperative for the government officials to respond quickly and with well thought out strategies, which can include the following:
• Undertake contingency crop planning
• Provide support to farmers
• Provide relief employment to those who have no prospect of getting work due to the ongoing drought
• Strictly enforce Water Resource Management rules and regulations
• Provide food and water to the most needy
• Provide gratuitous assistance and/or relief through Tax Waivers and Concessions
• Pay additional attention to health and hygiene
• Finance relief expenditure
• Ensure smooth and clear flow of information to the media

**Long Term Steps**

• Implementing Drought Mitigation Measures
• Water Harvesting and Conservation
• Water Saving Technologies: Drip and Sprinkler Irrigation Systems
• Long-term Irrigation Management
DROUGHT HOTSPOT IN INDIA
Appendix - 6

Top ten countries by number of disaster events in 2010

Top Ten Countries in Terms of Disaster Mortality in 2010
### Top Ten Countries by Victims in 2010

<table>
<thead>
<tr>
<th>Country</th>
<th>Disaster distribution</th>
<th>No. victims (millions)</th>
<th>Country</th>
<th>Disaster distribution</th>
<th>Victims/ pop. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China P Rep</td>
<td></td>
<td>145.7</td>
<td>Haiti</td>
<td></td>
<td>40.1</td>
</tr>
<tr>
<td>Pakistan</td>
<td></td>
<td>20.4</td>
<td>Somalia</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>Thailand</td>
<td></td>
<td>15.5</td>
<td>Thailand</td>
<td></td>
<td>22.8</td>
</tr>
<tr>
<td>India</td>
<td></td>
<td>4.8</td>
<td>Cooks Is</td>
<td></td>
<td>19.8</td>
</tr>
<tr>
<td>Haiti</td>
<td></td>
<td>4.0</td>
<td>Chile</td>
<td></td>
<td>15.7</td>
</tr>
<tr>
<td>Philippines</td>
<td></td>
<td>3.9</td>
<td>Zimbabwe</td>
<td></td>
<td>13.4</td>
</tr>
<tr>
<td>Chile</td>
<td></td>
<td>2.7</td>
<td>Pakistan</td>
<td></td>
<td>12.0</td>
</tr>
<tr>
<td>Somalia</td>
<td></td>
<td>2.4</td>
<td>China P Rep</td>
<td></td>
<td>10.9</td>
</tr>
<tr>
<td>Colombia</td>
<td></td>
<td>2.2</td>
<td>Mauritania</td>
<td></td>
<td>9.4</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td></td>
<td>1.7</td>
<td>Benin</td>
<td></td>
<td>9.3</td>
</tr>
</tbody>
</table>

**Legend:**
- Climatological
- Geophysical
- Hydrological
- Meteorological

### Top Ten Countries by Damages in 2010

<table>
<thead>
<tr>
<th>Country</th>
<th>Disaster distribution</th>
<th>Damages (US$ Bn.)</th>
<th>Country</th>
<th>Disaster distribution</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td></td>
<td>30.0</td>
<td>Haiti</td>
<td></td>
<td>123.5</td>
</tr>
<tr>
<td>China P Rep</td>
<td></td>
<td>19.9</td>
<td>Chile</td>
<td></td>
<td>18.3</td>
</tr>
<tr>
<td>Pakistan</td>
<td></td>
<td>9.5</td>
<td>Pakistan</td>
<td></td>
<td>5.9</td>
</tr>
<tr>
<td>United States</td>
<td></td>
<td>9.2</td>
<td>New Zealand</td>
<td></td>
<td>5.1</td>
</tr>
<tr>
<td>Haiti</td>
<td></td>
<td>8.0</td>
<td>St Vincent and The Grenadines</td>
<td></td>
<td>4.3</td>
</tr>
<tr>
<td>Australia</td>
<td></td>
<td>8.0</td>
<td>Tajikistan</td>
<td></td>
<td>4.1</td>
</tr>
<tr>
<td>New Zealand</td>
<td></td>
<td>6.5</td>
<td>Guatemala</td>
<td></td>
<td>4.0</td>
</tr>
<tr>
<td>Mexico</td>
<td></td>
<td>5.9</td>
<td>Fiji</td>
<td></td>
<td>1.4</td>
</tr>
<tr>
<td>France</td>
<td></td>
<td>5.7</td>
<td>Guyana</td>
<td></td>
<td>1.3</td>
</tr>
<tr>
<td>Russia</td>
<td></td>
<td>5.7</td>
<td>Jamaica</td>
<td></td>
<td>1.2</td>
</tr>
</tbody>
</table>

**Legend:**
- Climatological
- Geophysical
- Hydrological
- Meteorological
<table>
<thead>
<tr>
<th>Events</th>
<th>Country</th>
<th>Persons killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquake, January</td>
<td>Haiti*</td>
<td>222,570</td>
</tr>
<tr>
<td>Heat wave, June-August</td>
<td>Russia</td>
<td>55,736</td>
</tr>
<tr>
<td>Earthquake, April</td>
<td>China P Rep</td>
<td>2,968</td>
</tr>
<tr>
<td>Flash flood, July-August</td>
<td>Pakistan</td>
<td>1,985</td>
</tr>
<tr>
<td>Mass Movement Wet, August</td>
<td>China P Rep</td>
<td>1,765</td>
</tr>
<tr>
<td>Flood, May-August</td>
<td>China P Rep</td>
<td>1,691</td>
</tr>
<tr>
<td>Earthquake, February</td>
<td>Chile</td>
<td>562</td>
</tr>
<tr>
<td>Tsunami, October</td>
<td>Indonesia</td>
<td>530</td>
</tr>
<tr>
<td>Cold wave, July-December</td>
<td>Peru</td>
<td>409</td>
</tr>
<tr>
<td>Mass Movement Wet, Feb-March</td>
<td>Uganda</td>
<td>388</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>288,604</strong></td>
</tr>
</tbody>
</table>

*On January 12th 2011, the Prime Minister of Haiti updated the mortality figures and added 93,430 people to the death toll, making a total of 316,000 deaths. At present, this figure still needs to be validated by CRED and is therefore not included.*

<table>
<thead>
<tr>
<th>Events</th>
<th>Country</th>
<th>Victims (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood, May-August</td>
<td>China P Rep</td>
<td>134.0</td>
</tr>
<tr>
<td>Flash Flood, July-August</td>
<td>Pakistan</td>
<td>20.4</td>
</tr>
<tr>
<td>Flood, October-December</td>
<td>Thailand, Cambodia*</td>
<td>9.0</td>
</tr>
<tr>
<td>Drought, March-August</td>
<td>Thailand</td>
<td>6.5</td>
</tr>
<tr>
<td>Flood, June-August</td>
<td>China P Rep</td>
<td>6.0</td>
</tr>
<tr>
<td>Earthquake, January</td>
<td>Haiti</td>
<td>3.9</td>
</tr>
<tr>
<td>Flood, September</td>
<td>India</td>
<td>3.3</td>
</tr>
<tr>
<td>Earthquake, February</td>
<td>Chile</td>
<td>2.7</td>
</tr>
<tr>
<td>Drought, February-December</td>
<td>Somalia</td>
<td>2.4</td>
</tr>
<tr>
<td>Flood, April-December</td>
<td>Colombia</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>190.3</strong></td>
</tr>
</tbody>
</table>

*Thailand (8,970,911 victims), Cambodia (8 victims)*

<table>
<thead>
<tr>
<th>Events</th>
<th>Country</th>
<th>Damages (in 2010 US$ bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquake, February</td>
<td>Chile</td>
<td>30.0</td>
</tr>
<tr>
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<td>China P Rep</td>
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<td>9.5</td>
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<tr>
<td>Earthquake, January</td>
<td>Haiti</td>
<td>8.0</td>
</tr>
<tr>
<td>Earthquake, September</td>
<td>New Zealand</td>
<td>6.5</td>
</tr>
<tr>
<td>Winter storm 'Yynthia', February-March</td>
<td>France, Germany, Spain, Portugal, Belgium, Luxembourg, Netherlands, Switzerland, United Kingdom*</td>
<td>6.1</td>
</tr>
<tr>
<td>Flood, December</td>
<td>Australia</td>
<td>5.1</td>
</tr>
<tr>
<td>Hurricane 'Karl', September</td>
<td>Mexico</td>
<td>3.9</td>
</tr>
<tr>
<td>Flood, May</td>
<td>Poland, Hungary, Czech Rep, Croatia, Serbia, Slovakia**</td>
<td>3.6</td>
</tr>
<tr>
<td>Storm, May</td>
<td>United States</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>93.4</strong></td>
</tr>
</tbody>
</table>

*France (4.23), Germany (1.00), Spain (0.34), Portugal (0.27), Belgium (0.16), Luxembourg (0.03), Netherlands (0.03), Switzerland (0.01), United Kingdom (0.001)*

**Poland (3.20), Hungary (0.36), Czech Rep (0.06), Croatia (0), Serbia (0), Slovakia (0)
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<tr>
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<td>Somalia</td>
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<tr>
<td>Flash Flood, July-August</td>
<td>Pakistan</td>
<td>9.5</td>
</tr>
<tr>
<td>Earthquake, January</td>
<td>Haiti</td>
<td>8.0</td>
</tr>
<tr>
<td>Earthquake, September</td>
<td>New Zealand</td>
<td>6.5</td>
</tr>
<tr>
<td>Winter storm 'Xynthia', February-March</td>
<td>France, Germany, Spain, Portugal, Belgium, Luxembourg, Netherlands, Switzerland, United Kingdom*</td>
<td>6.1</td>
</tr>
<tr>
<td>Flood, December</td>
<td>Australia</td>
<td>5.1</td>
</tr>
<tr>
<td>Hurricane 'Karl', September</td>
<td>Mexico</td>
<td>3.9</td>
</tr>
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<td>Flood, May</td>
<td>Poland, Hungary, Czech Rep, Croatia, Serbia, Slovakia**</td>
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<tr>
<td>Storm, May</td>
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**Poland (3.20), Hungary (0.36), Czech Rep (0.06), Croatia (0), Serbia (0), Slovakia (0)
Economic Damage

*Percentages ≤ 0.05 are displayed as zeros*
MINISTRY OF LAW AND JUSTICE
(Legislative Department)

New Delhi, the 26th December, 2005/Pausa 5, 1927 (Saka)

The following Act of Parliament received the assent of the President on the 23rd December, 2005 and is hereby published for general information:—

THE DISASTER MANAGEMENT ACT, 2005
No. 53 of 2005

[23rd December, 2005.]

An Act to provide for the effective management of disasters and for matters connected therewith or incidental thereto.

Be it enacted by Parliament in the Fifty-sixth Year of the Republic of India as follows:—

CHAPTER I
PRELIMINARY

1. (1) This Act may be called the Disaster Management Act, 2005.

(2) It extends to the whole of India.

(3) It shall come into force on such date as the Central Government may, by notification in the Official Gazette appoint; and different dates may be appointed for different provisions of this Act and for different States, and any reference to commencement in any provision of this Act in relation to any State shall be construed as a reference to the commencement of that provision in that State.

Short title, extent and commencement.
Definitions.

2. In this Act, unless the context otherwise requires,—

(a) "affected area" means an area or part of the country affected by a disaster;

(b) "capacity-building" includes—

(i) identification of existing resources and resources to be acquired or created;

(ii) acquiring or creating resources identified under sub-clause (i);

(iii) organisation and training of personnel and coordination of such training for effective management of disasters;

(c) "Central Government" means the Ministry or Department of the Government of India having administrative control of disaster management;

(d) "disaster" means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area;

(e) "disaster management" means a continuous and integrated process of planning, organising, coordinating and implementing measures which are necessary or expedient for—

(i) prevention of danger or threat of any disaster;

(ii) mitigation or reduction of risk of any disaster or its severity or consequences;

(iii) capacity-building;

(iv) preparedness to deal with any disaster;

(v) prompt response to any threatening disaster situation or disaster;

(vi) assessing the severity or magnitude of effects of any disaster;

(vii) evacuation, rescue and relief;

(viii) rehabilitation and reconstruction;

(f) "District Authority" means the District Disaster Management Authority constituted under sub-section (1) of section 25;

(g) "District Plan" means the plan for disaster management for the district prepared under section 31;

(h) "local authority" includes panchayati raj institutions, municipalities, a district board, cantonment board, town planning authority or Zila Parishad or any other body or authority, by whatever name called, for the time being invested by law, for rendering essential services or, with the control and management of civic services, within a specified local area;

(i) "mitigation" means measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation;

(j) "National Authority" means the National Disaster Management Authority established under sub-section (1) of section 3;

(k) "National Executive Committee" means the Executive Committee of the National Authority constituted under sub-section (1) of section 8;

(l) "National Plan" means the plan for disaster management for the whole of the country prepared under section 11;
(m) "preparedness" means the state of readiness to deal with a threatening disaster situation or disaster and the effects thereof;

(n) "prescribed" means prescribed by rules made under this Act;

(o) "reconstruction" means construction or restoration of any property after a disaster;

(p) "resources" includes manpower, services, materials and provisions;

(q) "State Authority" means the State Disaster Management Authority established under sub-section (7) of section 14 and includes the Disaster Management Authority for the Union territory constituted under that section;

(r) "State Executive Committee" means the Executive Committee of a State Authority constituted under sub-section (7) of section 20;

(s) "State Government" means the Department of Government of the State having administrative control of disaster management and includes Administrator of the Union territory appointed by the President under article 239 of the Constitution;

(t) "State Plan" means the plan for disaster management for the whole of the State prepared under section 23.

CHAPTER II

THE NATIONAL DISASTER MANAGEMENT AUTHORITY

3. (1) With effect from such date as the Central Government may, by notification in the Official Gazette appoint in this behalf, there shall be established for the purposes of this Act, an authority to be known as the National Disaster Management Authority.

(2) The National Authority shall consist of the Chairperson and such number of other members, not exceeding nine, as may be prescribed by the Central Government and, unless the rules otherwise provide, the National Authority shall consist of the following:

(a) the Prime Minister of India, who shall be the Chairperson of the National Authority, ex officio;

(b) other members, not exceeding nine, to be nominated by the Chairperson of the National Authority.

(3) The Chairperson of the National Authority may designate one of the members nominated under clause (b) of sub-section (2) to be the Vice-Chairperson of the National Authority.

(4) The term of office and conditions of service of members of the National Authority shall be such as may be prescribed.

4. (1) The National Authority shall meet as and when necessary and at such time and place as the Chairperson of the National Authority may think fit.

(2) The Chairperson of the National Authority shall preside over the meetings of the National Authority.

(3) If for any reason the Chairperson of the National Authority is unable to attend any meeting of the National Authority, the Vice-Chairperson of the National Authority shall preside over the meeting.

5. The Central Government shall provide the National Authority with such officers, consultants and employees, as it considers necessary for carrying out the functions of the National Authority.
6. (1) Subject to the provisions of this Act, the National Authority shall have the responsibility for laying down the policies, plans and guidelines for disaster management for ensuring timely and effective response to disaster.

(2) Without prejudice to generality of the provisions contained in sub-section (1), the National Authority may —

(a) lay down policies on disaster management;

(b) approve the National Plan;

(c) approve plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan;

(d) lay down guidelines to be followed by the State Authorities in drawing up the State Plan;

(e) lay down guidelines to be followed by the different Ministries or Departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects in their development plans and projects;

(f) coordinate the enforcement and implementation of the policy and plan for disaster management;

(g) recommend provision of funds for the purpose of mitigation;

(h) provide such support to other countries affected by major disasters as may be determined by the Central Government;

(i) take such other measures for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with the threatening disaster situation or disaster as it may consider necessary;

(j) lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

(3) The Chairperson of the National Authority shall, in the case of emergency, have power to exercise all or any of the powers of the National Authority but exercise of such powers shall be subject to ex post facto ratification by the National Authority.

7. (1) The National Authority may constitute an advisory committee consisting of experts in the field of disaster management and having practical experience of disaster management at the national, State or district level to make recommendations on different aspects of disaster management.

(2) The members of the advisory committee shall be paid such allowances as may be prescribed by the Central Government in consultation with the National Authority.

8. (1) The Central Government shall, immediately after issue of notification under sub-section (1) of section 3, constitute a National Executive Committee to assist the National Authority in the performance of its functions under this Act.

(2) The National Executive Committee shall consist of the following members, namely:

(a) the Secretary to the Government of India in charge of the Ministry or Department of the Central Government having administrative control of the disaster management, who shall be Chairperson, ex officio;

(b) the Secretaries to the Government of India in the Ministries or Departments having administrative control of the agriculture, atomic energy, defence, drinking water supply, environment and forests, finance (expenditure), health, power, rural development, science and technology, space, telecommunication, urban development,
water resources and the Chief of the Integrated Defence Staff of the Chiefs of Staff Committee, *ex officio*.

(3) The Chairperson of the National Executive Committee may invite any other officer of the Central Government or a State Government for taking part in any meeting of the National Executive Committee and shall exercise such powers and perform such functions as may be prescribed by the Central Government in consultation with the National Authority.

(4) The procedure to be followed by the National Executive Committee in exercise of its powers and discharge of its functions shall be such as may be prescribed by the Central Government.

9. (1) The National Executive Committee may, as and when it considers necessary, constitute one or more sub-committees, for the efficient discharge of its functions.

(2) The National Executive Committee shall, from amongst its members, appoint the Chairperson of the sub-committee referred to in sub-section (1).

(3) Any person associated as an expert with any sub-committee may be paid such allowances as may be prescribed by the Central Government.

10. (1) The National Executive Committee shall assist the National Authority in the discharge of its functions and have the responsibility for implementing the policies and plans of the National Authority and ensure the compliance of directions issued by the Central Government for the purpose of disaster management in the country.

(2) Without prejudice to the generality of the provisions contained in sub-section (1), the National Executive Committee may—

(a) act as the coordinating and monitoring body for disaster management;

(b) prepare the National Plan to be approved by the National Authority;

(c) coordinate and monitor the implementation of the National Policy;

(d) lay down guidelines for preparing disaster management plans by different Ministries or Departments of the Government of India and the State Authorities;

(e) provide necessary technical assistance to the State Governments and the State Authorities for preparing their disaster management plans in accordance with the guidelines laid down by the National Authority;

(f) monitor the implementation of the National Plan and the plans prepared by the Ministries or Departments of the Government of India;

(g) monitor the implementation of the guidelines laid down by the National Authority for integrating measures for prevention of disasters and mitigation by the Ministries or Departments in their development plans and projects;

(h) monitor, coordinate and give directions regarding the mitigation and preparedness measures to be taken by different Ministries or Departments and agencies of the Government;

(i) evaluate the preparedness at all governmental levels for the purpose of responding to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness;

(j) plan and coordinate specialised training programme for disaster management for different levels of officers, employees and voluntary rescue workers;

(k) coordinate response in the event of any threatening disaster situation or disaster;

(l) lay down guidelines for, or give directions to, the concerned Ministries or Departments of the Government of India, the State Governments and the
State Authorities regarding measures to be taken by them in response to any threatening disaster situation or disaster;

\((m)\) require any department or agency of the Government to make available to the National Authority or State Authorities such men or material resources as are available with it for the purposes of emergency response, rescue and relief;

\((n)\) advise, assist and coordinate the activities of the Ministries or Departments of the Government of India, State Authorities, statutory bodies, other governmental or non-governmental organisations and others engaged in disaster management;

\((o)\) provide necessary technical assistance or give advice to the State Authorities and District Authorities for carrying out their functions under this Act;

\((p)\) promote general education and awareness in relation to disaster management; and

\((q)\) perform such other functions as the National Authority may require it to perform.

11. (1) There shall be drawn up a plan for disaster management for the whole of the country to be called the National Plan.

\((2)\) The National Plan shall be prepared by the National Executive Committee having regard to the National Policy and in consultation with the State Governments and expert bodies or organisations in the field of disaster management to be approved by the National Authority.

\((3)\) The National Plan shall include—

\((a)\) measures to be taken for the prevention of disasters, or the mitigation of their effects;

\((b)\) measures to be taken for the integration of mitigation measures in the development plans;

\((c)\) measures to be taken for preparedness and capacity building to effectively respond to any threatening disaster situations or disaster;

\((d)\) roles and responsibilities of different Ministries or Departments of the Government of India in respect of measures specified in clauses \((a), (b)\) and \((c).\)

\((4)\) The National Plan shall be reviewed and updated annually.

\((5)\) Appropriate provisions shall be made by the Central Government for financing the measures to be carried out under the National Plan.

\((6)\) Copies of the National Plan referred to in sub-sections \((2)\) and \((4)\) shall be made available to the Ministries or Departments of the Government of India and such Ministries or Departments shall draw up their own plans in accordance with the National Plan.

12. The National Authority shall recommend guidelines for the minimum standards of relief to be provided to persons affected by disaster, which shall include,—

\((i)\) the minimum requirements to be provided in the relief camps in relation to shelter, food, drinking water, medical cover and sanitation;

\((ii)\) the special provisions to be made for widows and orphans;

\((iii)\) ex gratia assistance on account of loss of life as also assistance on account of damage to houses and for restoration of means of livelihood;

\((iv)\) such other relief as may be necessary.

13. The National Authority may, in cases of disasters of severe magnitude, recommend relief in repayment of loans or for grant of fresh loans to the persons affected by disaster on such concessional terms as may be appropriate.
CHAPTER III
STATE DISASTER MANAGEMENT AUTHORITIES

14. (1) Every State Government shall, as soon as may be after the issue of the notification under sub-section (1) of section 3, by notification in the Official Gazette, establish a State Disaster Management Authority for the State with such name as may be specified in the notification of the State Government.

(2) A State Authority shall consist of the Chairperson and such number of other members, not exceeding nine, as may be prescribed by the State Government and, unless the rules otherwise provide, the State Authority shall consist of the following members, namely:—

(a) the Chief Minister of the State, who shall be Chairperson, ex officio;

(b) other members, not exceeding eight, to be nominated by the Chairperson of the State Authority;

(c) the Chairperson of the State Executive Committee, ex officio.

(3) The Chairperson of the State Authority may designate one of the members nominated under clause (b) of sub-section (2) to be the Vice-Chairperson of the State Authority.

(4) The Chairperson of the State Executive Committee shall be the Chief Executive Officer of the State Authority, ex officio:

Provided that in the case of a Union territory having Legislative Assembly, except the Union territory of Delhi, the Chief Minister shall be the Chairperson of the Authority established under this section and in case of other Union territories, the Lieutenant Governor or the Administrator shall be the Chairperson of that Authority:

Provided further that the Lieutenant Governor of the Union territory of Delhi shall be the Chairperson and the Chief Minister thereof shall be the Vice-Chairperson of the State Authority.

(5) The term of office and conditions of service of members of the State Authority shall be such as may be prescribed.

15. (1) The State Authority shall meet as and when necessary and at such time and place as the Chairperson of the State Authority may think fit.

(2) The Chairperson of the State Authority shall preside over the meetings of the State Authority.

(3) If for any reason, the Chairperson of the State Authority is unable to attend the meeting of the State Authority, the Vice-Chairperson of the State Authority shall preside at the meeting.

16. The State Government shall provide the State Authority with such officers, consultants and employees, as it considers necessary, for carrying out the functions of the State Authority.

17. (1) A State Authority may, as and when it considers necessary, constitute an advisory committee, consisting of experts in the field of disaster management and having practical experience of disaster management to make recommendations on different aspects of disaster management.

(2) The members of the advisory committee shall be paid such allowances as may be prescribed by the State Government.
18. (1) Subject to the provisions of this Act, a State Authority shall have the responsibility for laying down policies and plans for disaster management in the State.

(2) Without prejudice to the generality of provisions contained in sub-section (1), the State Authority may —

(a) lay down the State disaster management policy;

(b) approve the State Plan in accordance with the guidelines laid down by the National Authority;

(c) approve the disaster management plans prepared by the departments of the Government of the State;

(d) lay down guidelines to be followed by the departments of the Government of the State for the purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefor;

(e) coordinate the implementation of the State Plan;

(f) recommend provision of funds for mitigation and preparedness measures;

(g) review the development plans of the different departments of the State and ensure that prevention and mitigation measures are integrated therein;

(h) review the measures being taken for mitigation, capacity building and preparedness by the departments of the Government of the State and issue such guidelines as may be necessary.

(3) The Chairperson of the State Authority shall, in the case of emergency, have power to exercise all or any of the powers of the State Authority but the exercise of such powers shall be subject to ex post facto ratification of the State Authority.

19. The State Authority shall lay down detailed guidelines for providing standards of relief to persons affected by disaster in the State:

Provided that such standards shall in no case be less than the minimum standards in the guidelines laid down by the National Authority in this regard.

20. (1) The State Government shall, immediately after issue of notification under sub-section (1) of section 14, constitute a State Executive Committee to assist the State Authority in the performance of its functions and to coordinate action in accordance with the guidelines laid down by the State Authority and ensure the compliance of directions issued by the State Government under this Act.

(2) The State Executive Committee shall consist of the following members, namely:—

(a) the Chief Secretary to the State Government, who shall be Chairperson, ex officio;

(b) four Secretaries to the Government of the State of such departments as the State Government may think fit, ex officio.

(3) The Chairperson of the State Executive Committee shall exercise such powers and perform such functions as may be prescribed by the State Government and such other powers and functions as may be delegated to him by the State Authority.

(4) The procedure to be followed by the State Executive Committee in exercise of its powers and discharge of its functions shall be such as may be prescribed by the State Government.
21. (1) The State Executive Committee may, as and when it considers necessary, constitute one or more sub-committees, for efficient discharge of its functions.

(2) The State Executive Committee shall, from amongst its members, appoint the Chairperson of the sub-committee referred to in sub-section (1).

(3) Any person associated as an expert with any sub-committee may be paid such allowances as may be prescribed by the State Government.

22. (1) The State Executive Committee shall have the responsibility for implementing the National Plan and State Plan and act as the coordinating and monitoring body for management of disaster in the State.

(2) Without prejudice to the generality of the provisions of sub-section (1), the State Executive Committee may—

(a) coordinate and monitor the implementation of the National Policy, the National Plan and the State Plan;

(b) examine the vulnerability of different parts of the State to different forms of disasters and specify measures to be taken for their prevention or mitigation;

(c) lay down guidelines for preparation of disaster management plans by the departments of the Government of the State and the District Authorities;

(d) monitor the implementation of disaster management plans prepared by the departments of the Government of the State and District Authorities;

(e) monitor the implementation of the guidelines laid down by the State Authority for integrating of measures for prevention of disasters and mitigation by the departments in their development plans and projects;

(f) evaluate preparedness at all governmental or non-governmental levels to respond to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness;

(g) coordinate response in the event of any threatening disaster situation or disaster;

(h) give directions to any Department of the Government of the State or any other authority or body in the State regarding actions to be taken in response to any threatening disaster situation or disaster;

(i) promote general education, awareness and community training in regard to the forms of disasters to which different parts of the State are vulnerable and the measures that may be taken by such community to prevent the disaster, mitigate and respond to such disaster;

(j) advise, assist and coordinate the activities of the Departments of the Government of the State, District Authorities, statutory bodies and other governmental and non-governmental organisations engaged in disaster management;

(k) provide necessary technical assistance or give advice to District Authorities and local authorities for carrying out their functions effectively;

(l) advise the State Government regarding all financial matters in relation to disaster management;

(m) examine the construction, in any local area in the State and, if it is of the opinion that the standards laid for such construction for the prevention of disaster is not being or has not been followed, may direct the District Authority or the local authority, as the case may be, to take such action as may be necessary to secure compliance of such standards;

(n) provide information to the National Authority relating to different aspects of disaster management;
(o) lay down, review and update State level response plans and guidelines and ensure that the district level plans are prepared, reviewed and updated;

(p) ensure that communication systems are in order and the disaster management drills are carried out periodically;

(q) perform such other functions as may be assigned to it by the State Authority or as it may consider necessary.

23. (1) There shall be a plan for disaster management for every State to be called the State Disaster Management Plan.

(2) The State Plan shall be prepared by the State Executive Committee having regard to the guidelines laid down by the National Authority and after such consultation with local authorities, district authorities and the people’s representatives as the State Executive Committee may deem fit.

(3) The State Plan prepared by the State Executive Committee under sub-section (2) shall be approved by the State Authority.

(4) The State Plan shall include,—

(a) the vulnerability of different parts of the State to different forms of disasters;

(b) the measures to be adopted for prevention and mitigation of disasters;

(c) the manner in which the mitigation measures shall be integrated with the development plans and projects;

(d) the capacity-building and preparedness measures to be taken;

(e) the roles and responsibilities of each Department of the Government of the State in relation to the measures specified in clauses (b), (c) and (d) above;

(f) the roles and responsibilities of different Departments of the Government of the State in responding to any threatening disaster situation or disaster.

(5) The State Plan shall be reviewed and updated annually.

(6) Appropriate provisions shall be made by the State Government for financing for the measures to be carried out under the State Plan.

(7) Copies of the State Plan referred to in sub-sections (2) and (5) shall be made available to the Departments of the Government of the State and such Departments shall draw up their own plans in accordance with the State Plan.

24. For the purpose of assisting and protecting the community affected by disaster or providing relief to such community or, preventing or combating disruption or dealing with the effects of any threatening disaster situation, the State Executive Committee may—

(a) control and restrict, vehicular traffic to, from or within, the vulnerable or affected area;

(b) control and restrict the entry of any person into, his movement within and departure from, a vulnerable or affected area;

(c) remove debris, conduct search and carry out rescue operations;

(d) provide shelter, food, drinking water, essential provisions, healthcare and services in accordance with the standards laid down by the National Authority and State Authority;

(e) give direction to the concerned Department of the Government of the State, any District Authority or other authority, within the local limits of the State to take such measure or steps for rescue, evacuation or providing immediate relief saving lives or property, as may be necessary in its opinion;
(f) require any department of the Government of the State or any other body or authority or person in charge of any relevant resources to make available the resources for the purposes of emergency response, rescue and relief;

(g) require experts and consultants in the field of disasters to provide advice and assistance for rescue and relief;

(h) procure exclusive or preferential use of amenities from any authority or person as and when required;

(i) construct temporary bridges or other necessary structures and demolish unsafe structures which may be hazardous to public;

(j) ensure that non-governmental organisations carry out their activities in an equitable and non-discriminatory manner;

(k) disseminate information to public to deal with any threatening disaster situation or disaster;

(l) take such steps as the Central Government or the State Government may direct in this regard or take such other steps as are required or warranted by the form of any threatening disaster situation or disaster.

CHAPTER IV

DISTRICT DISASTER MANAGEMENT AUTHORITY

25. (1) Every State Government shall, as soon as may be after issue of notification under sub-section (1) of section 14, by notification in the Official Gazette, establish a District Disaster Management Authority for every district in the State with such name as may be specified in that notification.

(2) The District Authority shall consist of the Chairperson and such number of other members, not exceeding seven, as may be prescribed by the State Government, and unless the rules otherwise provide, it shall consist of the following, namely:

(a) the Collector or District Magistrate or Deputy Commissioner, as the case may be, of the district who shall be Chairperson, ex officio;

(b) the elected representative of the local authority who shall be the co-Chairperson, ex officio:

Provided that in the Tribal Areas, as referred to in the Sixth Schedule to the Constitution, the Chief Executive Member of the district council of autonomous district, shall be the co-Chairperson, ex officio;

(c) the Chief Executive Officer of the District Authority, ex officio;

(d) the Superintendent of Police, ex officio;

(e) the Chief Medical Officer of the district, ex officio;

(f) not exceeding two other district level officers, to be appointed by the State Government.

(3) In any district where zila parishad exists, the Chairperson thereof shall be the co-Chairperson of the District Authority.

(4) The State Government shall appoint an officer not below the rank of Additional Collector or Additional District Magistrate or Additional Deputy Commissioner, as the case may be, of the district to be the Chief Executive Officer of the District Authority to exercise such powers and perform such functions as may be prescribed by the State Government and such other powers and functions as may be delegated to him by the District Authority.

26. (1) The Chairperson of the District Authority shall, in addition to presiding over the meetings of the District Authority, exercise and discharge such powers and functions of the District Authority as the District Authority may delegate to him.
(2) The Chairperson of the District Authority shall, in the case of an emergency, have power to exercise all or any of the powers of the District Authority but the exercise of such powers shall be subject to _ex post facto_ ratification of the District Authority.

(3) The District Authority or the Chairperson of the District Authority may, by general or special order, in writing, delegate such of its or his powers and functions, under sub-section (1) or (2), as the case may be, to the Chief Executive Officer of the District Authority, subject to such conditions and limitations, if any, as it or he deems fit.

27. The District Authority shall meet as and when necessary and at such time and place as the Chairperson may think fit.

28. (1) The District Authority may, as and when it considers necessary, constitute one or more advisory committees and other committees for the efficient discharge of its functions.

(2) The District Authority shall, from amongst its members, appoint the Chairperson of the Committee referred to in sub-section (1).

(3) Any person associated as an expert with any committee or sub-committee constituted under sub-section (1) may be paid such allowances as may be prescribed by the State Government.

29. The State Government shall provide the District Authority with such officers, consultants and other employees as it considers necessary for carrying out the functions of District Authority.

30. (1) The District Authority shall act as the district planning, coordinating and implementing body for disaster management and take all measures for the purposes of disaster management in the district in accordance with the guidelines laid down by the National Authority and the State Authority.

(2) Without prejudice to the generality of the provisions of sub-section (1), the District Authority may—

(i) prepare a disaster management plan including district response plan for the district;

(ii) coordinate and monitor the implementation of the National Policy, State Policy, National Plan, State Plan and District Plan;

(iii) ensure that the areas in the district vulnerable to disasters are identified and measures for the prevention of disasters and the mitigation of its effects are undertaken by the departments of the Government at the district level as well as by the local authorities;

(iv) ensure that the guidelines for prevention of disasters, mitigation of its effects, preparedness and response measures as laid down by the National Authority and the State Authority are followed by all departments of the Government at the district level and the local authorities in the district;

(v) give directions to different authorities at the district level and local authorities to take such other measures for the prevention or mitigation of disasters as may be necessary;

(vi) lay down guidelines for prevention of disaster management plans by the department of the Government at the districts level and local authorities in the district;

(vii) monitor the implementation of disaster management plans prepared by the Departments of the Government at the district level;
(viii) lay down guidelines to be followed by the Departments of the Government at the district level for purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefor;

(ix) monitor the implementation of measures referred to in clause (viii);

(x) review the state of capabilities for responding to any disaster or threatening disaster situation in the district and give directions to the relevant departments or authorities at the district level for their upgradation as may be necessary;

(xi) review the preparedness measures and give directions to the concerned departments at the district level or other concerned authorities where necessary for bringing the preparedness measures to the levels required for responding effectively to any disaster or threatening disaster situation;

(xii) organise and coordinate specialised training programmes for different levels of officers, employees and voluntary rescue workers in the district;

(xiii) facilitate community training and awareness programmes for prevention of disaster or mitigation with the support of local authorities, governmental and non-governmental organisations;

(xiv) set up, maintain, review and upgrade the mechanism for early warnings and dissemination of proper information to public;

(xv) prepare, review and update district level response plan and guidelines;

(xvi) coordinate response to any threatening disaster situation or disaster;

(xvii) ensure that the Departments of the Government at the district level and the local authorities prepare their response plans in accordance with the district response plan;

(xviii) lay down guidelines for, or give direction to, the concerned Department of the Government at the district level or any other authorities within the local limits of the district to take measures to respond effectively to any threatening disaster situation or disaster;

(xix) advise, assist and coordinate the activities of the Departments of the Government at the district level, statutory bodies and other governmental and non-governmental organisations in the district engaged in the disaster management;

(xx) coordinate with, and give guidelines to, local authorities in the district to ensure that measures for the prevention or mitigation of threatening disaster situation or disaster in the district are carried out promptly and effectively;

(xxi) provide necessary technical assistance or give advise to the local authorities in the district for carrying out their functions;

(xxii) review development plans prepared by the Departments of the Government at the district level, statutory authorities or local authorities with a view to make necessary provisions therein for prevention of disaster or mitigation;

(xxiii) examine the construction in any area in the district and, if it is of the opinion that the standards for the prevention of disaster or mitigation laid down for such construction is not being or has not been followed, may direct the concerned authority to take such action as may be necessary to secure compliance of such standards;

(xxiv) identify buildings and places which could, in the event of any threatening disaster situation or disaster, be used as relief centers or camps and make arrangements for water supply and sanitation in such buildings or places;
(xxvi) establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice;

(xxvii) provide information to the State Authority relating to different aspects of disaster management;

(xxviii) encourage the involvement of non-governmental organisations and voluntary social-welfare institutions working at the grassroots level in the district for disaster management;

(xxviii) ensure communication systems are in order, and disaster management drills are carried out periodically;

(xxix) perform such other functions as the State Government or State Authority may assign to it or as it deems necessary for disaster management in the District.

31. (1) There shall be a plan for disaster management for every district of the State.

(2) The District Plan shall be prepared by the District Authority, after consultation with the local authorities and having regard to the National Plan and the State Plan, to be approved by the State Authority.

(3) The District Plan shall include—

(a) the areas in the district vulnerable to different forms of disasters;

(b) the measures to be taken, for prevention and mitigation of disaster, by the Departments of the Government at the district level and local authorities in the district;

(c) the capacity-building and preparedness measures required to be taken by the Departments of the Government at the district level and the local authorities in the district to respond to any threatening disaster situation or disaster;

(d) the response plans and procedures, in the event of a disaster, providing for—

(i) allocation of responsibilities to the Departments of the Government at the district level and the local authorities in the district;

(ii) prompt response to disaster and relief thereof;

(iii) procurement of essential resources;

(b) establishment of communication links; and

(v) the dissemination of information to the public;

(e) such other matters as may be required by the State Authority.

(4) The District Plan shall be reviewed and updated annually.

(5) The copies of the District Plan referred to in sub-sections (2) and (4) shall be made available to the Departments of the Government in the district.

(6) The District Authority shall send a copy of the District Plan to the State Authority which shall forward it to the State Government.

(7) The District Authority shall, review from time to time, the implementation of the Plan and issue such instructions to different departments of the Government in the district as it may deem necessary for the implementation thereof.

32. Every officer of the Government of India and of the State Government at the district level and the local authorities shall, subject to the supervision of the District Authority,
(a) prepare a disaster management plan setting out the following, namely:—

(i) provisions for prevention and mitigation measures as provided for in the District Plan and as is assigned to the department or agency concerned;

(ii) provisions for taking measures relating to capacity-building and preparedness as laid down in the District Plan;

(iii) the response plans and procedures, in the event of, any threatening disaster situation or disaster;

(b) coordinate the preparation and the implementation of its plan with those of the other organisations at the district level including local authority, communities and other stakeholders;

(c) regularly review and update the plan; and

(d) submit a copy of its disaster management plan, and of any amendment thereto, to the District Authority.

33. The District Authority may by order require any officer or any Department at the district level or any local authority to take such measures for the prevention or mitigation of disaster, or to effectively respond to it, as may be necessary, and such officer or department shall be bound to carry out such order.

34. For the purpose of assisting, protecting or providing relief to the community, in response to any threatening disaster situation or disaster, the District Authority may—

(a) give directions for the release and use of resources available with any Department of the Government and the local authority in the district;

(b) control and restrict vehicular traffic to, from and within, the vulnerable or affected area;

(c) control and restrict the entry of any person into, his movement within and departure from, a vulnerable or affected area;

(d) remove debris, conduct search and carry out rescue operations;

(e) provide shelter, food, drinking water and essential provisions, healthcare and services;

(f) establish emergency communication systems in the affected area;

(g) make arrangements for the disposal of the unclaimed dead bodies;

(h) recommend to any Department of the Government of the State or any authority or body under that Government at the district level to take such measures as are necessary in its opinion;

(i) require experts and consultants in the relevant fields to advise and assist as it may deem necessary;

(j) procure exclusive or preferential use of amenities from any authority or person;

(k) construct temporary bridges or other necessary structures and demolish structures which may be hazardous to public or aggravate the effects of the disaster;

(l) ensure that the non-governmental organisations carry out their activities in an equitable and non-discriminatory manner;

(m) take such other steps as may be required or warranted to be taken in such a situation.
CHAPTER V

Measures by the Government for Disaster Management

35. (1) Subject to the provisions of this Act, the Central Government shall take all such measures as it deems necessary or expedient for the purpose of disaster management.

(2) In particular and without prejudice to the generality of the provisions of subsection (1), the measures which the Central Government may take under that sub-section include measures with respect to all or any of the following matters, namely:—

(a) coordination of actions of the Ministries or Departments of the Government of India, State Governments, National Authority, State Authorities, governmental and non-governmental organisations in relation to disaster management;

(b) ensure the integration of measures for prevention of disasters and mitigation by Ministries or Departments of the Government of India into their development plans and projects;

(c) ensure appropriate allocation of funds for prevention of disaster, mitigation, capacity-building and preparedness by the Ministries or Departments of the Government of India;

(d) ensure that the Ministries or Departments of the Government of India take necessary measures for preparedness to promptly and effectively respond to any threatening disaster situation or disaster;

(e) cooperation and assistance to State Governments, as requested by them or otherwise deemed appropriate by it;

(f) deployment of naval, military and air forces, other armed forces of the Union or any other civilian personnel as may be required for the purposes of this Act;

(g) coordination with the United Nations agencies, international organisations and governments of foreign countries for the purposes of this Act;

(h) establish institutions for research, training, and developmental programmes in the field of disaster management;

(i) such other matters as it deems necessary or expedient for the purpose of securing effective implementation of the provisions of this Act.

(3) The Central Government may extend such support to other countries affected by major disaster as it may deem appropriate.

36. It shall be the responsibility of every Ministry or Department of the Government of India to—

(a) take measures necessary for prevention of disasters, mitigation, preparedness and capacity-building in accordance with the guidelines laid down by the National Authority;

(b) integrate into its development plans and projects, the measures for prevention or mitigation of disasters in accordance with the guidelines laid down by the National Authority;

(c) respond effectively and promptly to any threatening disaster situation or disaster in accordance with the guidelines of the National Authority or the directions of the National Executive Committee in this behalf;

(d) review the enactments administered by it, its policies, rules and regulations, with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness;
(e) allocate funds for measures for prevention of disaster, mitigation, capacity-building and preparedness;

(f) provide assistance to the National Authority and State Governments for—
   (i) drawing up mitigation, preparedness and response plans, capacity-building, data collection and identification and training of personnel in relation to disaster management;
   (ii) carrying out rescue and relief operations in the affected area;
   (iii) assessing the damage from any disaster;
   (iv) carrying out rehabilitation and reconstruction;

(g) make available its resources to the National Executive Committee or a State Executive Committee for the purposes of responding promptly and effectively to any threatening disaster situation or disaster, including measures for—
   (i) providing emergency communication in a vulnerable or affected area;
   (ii) transporting personnel and relief goods to and from the affected area;
   (iii) providing evacuation, rescue, temporary shelter or other immediate relief;
   (iv) setting up temporary bridges, jetties and landing places;
   (v) providing, drinking water, essential provisions, healthcare, and services in an affected area;

(h) take such other actions as it may consider necessary for disaster management.

37. (1) Every Ministry or Department of the Government of India shall—

(a) prepare a disaster management plan specifying the following particulars, namely:—

(i) the measures to be taken by it for prevention and mitigation of disasters in accordance with the National Plan;

(ii) the specifications regarding integration of mitigation measures in its development plans in accordance with the guidelines of the National Authority and the National Executive Committee;

(iii) its roles and responsibilities in relation to preparedness and capacity-building to deal with any threatening disaster situation or disaster;

(iv) its roles and responsibilities in regard to promptly and effectively responding to any threatening disaster situation or disaster;

(v) the present status of its preparedness to perform the roles and responsibilities specified in sub-clauses (iii) and (iv);

(vi) the measures required to be taken in order to enable it to perform its responsibilities specified in sub-clauses (iii) and (iv);

(b) review and update annually the plan referred to in clause (a);

(c) forward a copy of the plan referred to in clause (a) or clause (b), as the case may be, to the Central Government which Government shall forward a copy thereof to the National Authority for its approval.

(2) Every Ministry or Department of the Government of India shall—

(a) make, while preparing disaster management plan under clause (a) of subsection (1), provisions for financing the activities specified therein;
(b) furnish a status report regarding the implementation of the plan referred to in clause (a) of sub-section (1) to the National Authority, as and when required by it.

38. (1) Subject to the provisions of this Act, each State Government shall take all measures specified in the guidelines laid down by the National Authority and such further measures as it deems necessary or expedient, for the purpose of disaster management.

(2) The measures which the State Government may take under sub-section (1) include measures with respect to all or any of the following matters, namely:—

(a) coordination of actions of different departments of the Government of the State, the State Authority, District Authorities, local authority and other non-governmental organisations;

(b) cooperation and assistance in the disaster management to the National Authority and National Executive Committee, the State Authority and the State Executive Committee, and the District Authorities;

(c) cooperation with, and assistance to, the Ministries or Departments of the Government of India in disaster management, as requested by them or otherwise deemed appropriate by it;

(d) allocation of funds for measures for prevention of disaster, mitigation, capacity-building and preparedness by the departments of the Government of the State in accordance with the provisions of the State Plan and the District Plans;

(e) ensure that the integration of measures for prevention of disaster or mitigation by the departments of the Government of the State in their development plans and projects;

(f) integrate in the State development plan, measures to reduce or mitigate the vulnerability of different parts of the State to different disasters;

(g) ensure the preparation of disaster management plans by different departments of the State in accordance with the guidelines laid down by the National Authority and the State Authority;

(h) establishment of adequate warning systems up to the level of vulnerable communities;

(i) ensure that different departments of the Government of the State and the District Authorities take appropriate preparedness measures;

(j) ensure that in a threatening disaster situation or disaster, the resources of different departments of the Government of the State are made available to the National Executive Committee or the State Executive Committee or the District Authorities, as the case may be, for the purposes of effective response, rescue and relief in any threatening disaster situation or disaster;

(k) provide rehabilitation and reconstruction assistance to the victims of any disaster; and

(l) such other matters as it deems necessary or expedient for the purpose of securing effective implementation of provisions of this Act.

39. It shall be the responsibility of every department of the Government of a State to—

(a) take measures necessary for prevention of disasters, mitigation, preparedness and capacity-building in accordance with the guidelines laid down by the National Authority and the State Authority;

(b) integrate into its development plans and projects, the measures for prevention of disaster and mitigation;
(c) allocate funds for prevention of disaster, mitigation, capacity-building and preparedness;

(d) respond effectively and promptly to any threatening disaster situation or disaster in accordance with the State Plan, and in accordance with the guidelines or directions of the National Executive Committee and the State Executive Committee;

(e) review the enactments administered by it, its policies, rules and regulations with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness;

(f) provide assistance, as required, by the National Executive Committee, the State Executive Committee and District Authorities, for—

(i) drawing up mitigation, preparedness and response plans, capacity-building, data collection and identification and training of personnel in relation to disaster management;

(ii) assessing the damage from any disaster;

(iii) carrying out rehabilitation and reconstruction;

(g) make provision for resources in consultation with the State Authority for the implementation of the District Plan by its authorities at the district level;

(h) make available its resources to the National Executive Committee or the State Executive Committee or the District Authorities for the purposes of responding promptly and effectively to any disaster in the State, including measures for—

(i) providing emergency communication with a vulnerable or affected area;

(ii) transporting personnel and relief goods to and from the affected area;

(iii) providing evacuation, rescue, temporary shelter or other immediate relief;

(iv) carrying out evacuation of persons or live-stock from an area of any threatening disaster situation or disaster;

(v) setting up temporary bridges, jetties and landing places;

(vi) providing drinking water, essential provisions, healthcare and services in an affected area;

(i) such other actions as may be necessary for disaster management.

40. (1) Every department of the State Government, in conformity with the guidelines laid down by the State Authority, shall—

(a) prepare a disaster management plan which shall lay down the following:—

(i) the types of disasters to which different parts of the State are vulnerable;

(ii) integration of strategies for the prevention of disaster or the mitigation of its effects or both with the development plans and programmes by the department;

(iii) the roles and responsibilities of the department of the State in the event of any threatening disaster situation or disaster and emergency support function it is required to perform;

(iv) present status of its preparedness to perform such roles or responsibilities or emergency support function under sub-clause (iii);

(v) the capacity-building and preparedness measures proposed to be put into effect in order to enable the Ministries or Departments of the Government of India to discharge their responsibilities under section 37;
(b) annually review and update the plan referred to in clause (a); and
(c) furnish a copy of the plan referred to in clause (a) or clause (b), as the case may be, to the State Authority.

(2) Every department of the State Government, while preparing the plan under sub-section (1), shall make provisions for financing the activities specified therein.

(3) Every department of the State Government shall furnish an implementation status report to the State Executive Committee regarding the implementation of the disaster management plan referred to in sub-section (1).

CHAPTER VI
LOCAL AUTHORITIES

41. (1) Subject to the directions of the District Authority, a local authority shall—
(a) ensure that its officers and employees are trained for disaster management;
(b) ensure that resources relating to disaster management are so maintained as to be readily available for use in the event of any threatening disaster situation or disaster;
(c) ensure all construction projects under it or within its jurisdiction conform to the standards and specifications laid down for prevention of disasters and mitigation by the National Authority, State Authority and the District Authority;
(d) carry out relief, rehabilitation and reconstruction activities in the affected area in accordance with the State Plan and the District Plan.

(2) The local authority may take such other measures as may be necessary for the disaster management.

CHAPTER VII
NATIONAL INSTITUTE OF DISASTER MANAGEMENT

42. (1) With effect from such date as the Central Government may, by notification in the Official Gazette appoint in this behalf, there shall be constituted an institute to be called the National Institute of Disaster Management.

(2) The National Institute of Disaster Management shall consist of such number of members as may be prescribed by the Central Government.

(3) The term of office of, and vacancies among, members of the National Institute of Disaster Management and manner of filling such vacancies shall be such as may be prescribed.

(4) There shall be a governing body of the National Institute of Disaster Management which shall be constituted by the Central Government from amongst the members of the National Institute of Disaster Management in such manner as may be prescribed.

(5) The governing body of the National Institute of Disaster Management shall exercise such powers and discharge such functions as may be prescribed by regulations.

(6) The procedure to be followed in exercise of its powers and discharge of its functions by the governing body, and the term of office of, and the manner of filling vacancies among the members of the governing body, shall be such as may be prescribed by regulations.

(7) Until the regulations are made under this section, the Central Government may make such regulations; and any regulation so made may be altered or rescinded by the National Institute of Disaster Management in exercise of its powers.

(8) Subject to the provisions of this Act, the National Institute of Disaster Management shall function within the broad policies and guidelines laid down by the National Authority and be responsible for planning and promoting training and research in the area of disaster
management, documentation and development of national level information base relating to disaster management policies, prevention mechanisms and mitigation measures.

(9) Without prejudice to the generality of the provisions contained in sub-section (8), the National Institute, for the discharge of its functions, may—

(a) develop training modules, undertake research and documentation in disaster management and organise training programmes;

(b) formulate and implement a comprehensive human resource development plan covering all aspects of disaster management;

(c) provide assistance in national level policy formulation;

(d) provide required assistance to the training and research institutes for development of training and research programmes for stakeholders including Government functionaries and undertake training of faculty members of the State level training institutes;

(e) provide assistance to the State Governments and State training institutes in the formulation of State level policies, strategies, disaster management framework and any other assistance as may be required by the State Governments or State training institutes for capacity-building of stakeholders, Government including its functionaries, civil society members, corporate sector and people's elected representatives;

(f) develop educational materials for disaster management including academic and professional courses;

(g) promote awareness among stakeholders including college or school teachers and students, technical personnel and others associated with multi-hazard mitigation, preparedness and response measures;

(h) undertake, organise and facilitate study courses, conferences, lectures, seminars within and outside the country to promote the aforesaid objects;

(i) undertake and provide for publication of journals, research papers and books and establish and maintain libraries in furtherance of the aforesaid objects;

(j) do all such other lawful things as are conducive or incidental to the attainment of the above objects; and

(k) undertake any other function as may be assigned to it by the Central Government.

43. The Central Government shall provide the National Institute of Disaster Management with such officers, consultants and other employees, as it considers necessary, for carrying out its functions.

CHAPTER VIII
NATIONAL DISASTER RESPONSE FORCE

44. (1) There shall be constituted a National Disaster Response Force for the purpose of specialist response to a threatening disaster situation or disaster.

(2) Subject to the provisions of this Act, the Force shall be constituted in such manner and, the conditions of service of the members of the Force, including disciplinary provisions therefor, be such as may be prescribed.

45. The general superintendence, direction and control of the Force shall be vested and exercised by the National Authority and the command and supervision of the Force shall vest in an officer to be appointed by the Central Government as the Director General of the National Disaster Response Force.
CHAPTER IX
FINANCE, ACCOUNTS AND AUDIT

46. (1) The Central Government may, by notification in the Official Gazette, constitute a fund to be called the National Disaster Response Fund for meeting any threatening disaster situation or disaster and there shall be credited thereto—

(a) an amount which the Central Government may, after due appropriation made by Parliament by law in this behalf provide;

(b) any grants that may be made by any person or institution for the purpose of disaster management.

(2) The National Disaster Response Fund shall be made available to the National Executive Committee to be applied towards meeting the expenses for emergency response, relief and rehabilitation in accordance with the guidelines laid down by the Central Government in consultation with the National Authority.

47. (1) The Central Government may, by notification in the Official Gazette, constitute a Fund to be called the National Disaster Mitigation Fund for projects exclusively for the purpose of mitigation and there shall be credited thereto such amount which the Central Government may, after due appropriation made by Parliament by law in this behalf, provide.

(2) The National Disaster Mitigation Fund shall be applied by the National Authority.

48. (1) The State Government shall, immediately after notifications issued for constituting the State Authority and the District Authorities, establish for the purposes of this Act the following funds, namely:

(a) the fund to be called the State Disaster Response Fund;

(b) the fund to be called the District Disaster Response Fund;

(c) the fund to be called the State Disaster Mitigation Fund;

(d) the fund to be called the District Disaster Mitigation Fund.

(2) The State Government shall ensure that the funds established—

(i) under clause (a) of sub-section (1) is available to the State Executive Committee;

(ii) under sub-clause (c) of sub-section (1) is available to the State Authority;

(iii) under clauses (b) and (d) of sub-section (1) are available to the District Authority.

49. (1) Every Ministry or Department of the Government of India shall make provisions, in its annual budget, for funds for the purposes of carrying out the activities and programmes set out in its disaster management plan.

(2) The provisions of sub-section (1) shall, mutatis mutandis, apply to departments of the Government of the State.

50. Where by reason of any threatening disaster situation or disaster, the National Authority or the State Authority or the District Authority is satisfied that immediate procurement of provisions or materials or the immediate application of resources are necessary for rescue or relief,—

(a) it may authorise the concerned department or authority to make the emergency procurement and in such case, the standard procedure requiring inviting of tenders shall be deemed to be waived;

(b) a certificate about utilisation of provisions or materials by the controlling officer authorised by the National Authority, State Authority or District Authority, as the case may be, shall be deemed to be a valid document or voucher for the purpose of accounting of emergency, procurement of such provisions or materials.
CHAPTER X
OFFENCES AND PENALTIES

51. Whoever, without reasonable cause—

(a) obstructs any officer or employee of the Central Government or the State Government, or a person authorised by the National Authority or State Authority or District Authority in the discharge of his functions under this Act; or

(b) refuses to comply with any direction given by or on behalf of the Central Government or the State Government or the National Executive Committee or the State Executive Committee or the District Authority under this Act,

shall on conviction be punishable with imprisonment for a term which may extend to one year or with fine, or with both, and if such obstruction or refusal to comply with directions results in loss of lives or imminent danger thereof, shall on conviction be punishable with imprisonment for a term which may extend to two years.

52. Whoever knowingly makes a claim which he knows or has reason to believe to be false for obtaining any relief, assistance, repair, reconstruction or other benefits consequent to disaster from any officer of the Central Government, the State Government, the National Authority, the State Authority or the District Authority, shall, on conviction be punishable with imprisonment for a term which may extend to two years, and also with fine.

53. Whoever, being entrusted with any money or materials, or otherwise being, in custody of, or dominion over, any money or goods, meant for providing relief in any threatening disaster situation or disaster, misappropriates or appropriates for his own use or disposes of such money or materials or any part thereof or willfully compels any other person so to do, shall on conviction be punishable with imprisonment for a term which may extend to two years, and also with fine.

54. Whoever makes or circulates a false alarm or warning as to disaster or its severity or magnitude, leading to panic, shall on conviction, be punishable with imprisonment which may extend to one year or with fine.

55. (1) Where an offence under this Act has been committed by any Department of the Government, the head of the Department shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly unless he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a Department of the Government and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any officer, other than the head of the Department, such officer shall be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

56. Any officer, on whom any duty has been imposed by or under this Act and who ceases or refuses to perform or withdraws himself from the duties of his office shall, unless he has obtained the express written permission of his official superior or has other lawful excuse for so doing, be punishable with imprisonment for a term which may extend to one year or with fine.

57. If any person contravenes any of the rules made under section 65, he shall be punishable with imprisonment for a term which may extend to one year or with fine or with both.
58. (1) Where an offence under this Act has been committed by a company or body corporate, every person who at the time the offence was committed, was in charge of, and was responsible to, the company, for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the contravention and shall be liable to be proceeded against and punished accordingly:

Provided that nothing in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence was committed without his knowledge or that he exercised due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a company, and it is proved that the offence was committed with the consent or connivance of or is attributable to any neglect on the part of any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also, be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Explanation.—For the purpose of this section—

(a) "company" means any body corporate and includes a firm or other association of individuals; and

(b) "director", in relation to a firm, means a partner in the firm.

59. No prosecution for offences punishable under sections 55 and 56 shall be instituted except with the previous sanction of the Central Government or the State Government, as the case may be, or of any officer authorised in this behalf, by general or special order, by such Government.

60. No court shall take cognizance of an offence under this Act except on a complaint made by—

(a) the National Authority, the State Authority, the Central Government, the State Government, the District Authority or any other authority or officer authorised in this behalf by that Authority or Government, as the case may be; or

(b) any person who has given notice of not less than thirty days in the manner prescribed, of the alleged offence and his intention to make a complaint to the National Authority, the State Authority, the Central Government, the State Government, the District Authority or any other authority or officer authorised as aforesaid."

CHAPTER XI
MISCELLANEOUS

61. While providing compensation and relief to the victims of disaster, there shall be no discrimination on the ground of sex, caste, community, descent or religion.

62. Notwithstanding anything contained in any other law for the time being in force, it shall be lawful for the Central Government to issue direction in writing to the Ministries or Departments of the Government of India, or the National Executive Committee or the State Government, State Authority, State Executive Committee, statutory bodies or any of its officers or employees, as the case may be, to facilitate or assist in the disaster management and such Ministry or Department of Government or Authority, Executive Committee, statutory body, officer or employee shall be bound to comply with such direction.

63. Any officer or authority of the Union or a State, when requested by the National Executive Committee, any State Executive Committee or District Authority or any person authorised by such Committee or Authority in this behalf, shall make available to that Committee or authority or person, such officers and employees as requested for, to perform any of the functions in connection with the prevention of disaster or mitigation or rescue or relief work.
64. Subject to the provisions of this Act, if it appears to the National Executive Committee, State Executive Committee or the District Authority, as the case may be, that provisions of any rule, regulation, notification, guideline, instruction, order, scheme or bye-laws, as the case may be, are required to be made or amended for the purposes of prevention of disasters or the mitigation thereof, it may require the amendment of such rules, regulation, notification, guidelines, instruction, order, scheme or bye-laws, as the case may be, for that purpose, and the appropriate department or authority shall take necessary action to comply with the requirements.

65. (1) If it appears to the National Executive Committee, State Executive Committee or District Authority or any officer as may be authorised by it in this behalf that—

(a) any resources with any authority or person are needed for the purpose of prompt response;

(b) any premises are needed or likely to be needed for the purpose of rescue operations; or

(c) any vehicle is needed or is likely to be needed for the purposes of transport of resources from disaster affected areas or transport of resources to the affected area or transport in connection with rescue, rehabilitation or reconstruction,

such authority may, by order in writing, requisition such resources or premises or such vehicle, as the case may be, and may make such further orders as may appear to it to be necessary or expedient in connection with the requisitioning.

(2) Whenever any resource, premises or vehicle is requisitioned under sub-section (1), the period of such requisition shall not extend beyond the period for which such resource, premises or vehicle is required for any of the purposes mentioned in that sub-section.

(3) In this section,—

(a) "resources" includes men and material resources;

(b) "services" includes facilities;

(c) "premises" means any land, building or part of a building and includes a hut, shed or other structure or any part thereof;

(d) "vehicle" means any vehicle used or capable of being used for the purpose of transport, whether propelled by mechanical power or otherwise.

66. (1) Whenever any Committee, Authority or officer referred to in sub-section (1) of section 65, in pursuance of that section requisitions any premises, there shall be paid to the persons interested compensation the amount of which shall be determined by taking into consideration the following, namely:

(i) the rent payable in respect of the premises, or if no rent is so payable, the rent payable for similar premises in the locality;

(ii) if as consequence of the requisition of the premises the person interested is compelled to change his residence or place of business, the reasonable expenses (if any) incidental to such change:

Provided that where any person interested being aggrieved by the amount of compensation so determined makes an application within the thirty days to the Central Government or the State Government, as the case may be, for referring the matter to an arbitrator, the amount of compensation to be paid shall be such as the arbitrator appointed in this behalf by the Central Government or the State Government, as the case may be, may determine:
Provided further that where there is any dispute as to the title to receive the compensation or as to the apportionment of the amount of compensation, it shall be referred by the Central Government or the State Government, as the case may be, to an arbitrator appointed in this behalf by the Central Government or the State Government, as the case may be, for determination, and shall be determined in accordance with the decision of such arbitrator.

Explanation.—In this sub-section, the expression “person interested” means the person who was in actual possession of the premises requisitioned under section 65 immediately before the requisition, or where no person was in such actual possession, the owner of such premises.

(2) Whenever any Committee, Authority or officer, referred to in sub-section (1) of section 65 in pursuance of that section requisitions any vehicle, there shall be paid to the owner thereof compensation the amount of which shall be determined by the Central Government or the State Government, as the case may be, on the basis of the fares or rates prevailing in the locality for the hire of such vehicle:

Provided that where the owner of such vehicle being aggrieved by the amount of compensation so determined makes an application within the prescribed time to the Central Government or the State Government, as the case may be, for referring the matter to an arbitrator, the amount of compensation to be paid shall be such as the arbitrator appointed in this behalf by the Central Government or the State Government, as the case may be, may determine:

Provided further that where immediately before the requisitioning the vehicle or vessel was by virtue of a hire purchase agreement in the possession of a person other than the owner, the amount determined under this sub-section as the total compensation payable in respect of the requisition shall be apportioned between that person and the owner in such manner as they may agree upon, and in default of agreement, in such manner as an arbitrator appointed by the Central Government or the State Government, as the case may be, in this behalf may decide.

67. The National Authority, the State Authority, or a District Authority may recommend to the Government to give direction to any authority or person in control of any audio or audio-visual media or such other means of communication as may be available to carry any warning or advisories regarding any threatening disaster situation or disaster, and the said means of communication and media as designated shall comply with such direction.

68. Every order or decision of the National Authority or the National Executive Committee, the State Authority, or the State Executive Committee or the District Authority, shall be authenticated by such officers of the National Authority or the National Executive Committee or, the State Executive Committee, or the District Authority, as may be authorised by it in this behalf.

69. The National Executive Committee, State Executive Committee, as the case may be, by general or special order in writing, may delegate to the Chairperson or any other member or to any officer, subject to such conditions and limitations, if any, as may be specified in the order, such of its powers and functions under this Act as it may deem necessary.

70. (1) The National Authority shall prepare once every year, in such form and at such time as may be prescribed, an annual report giving a true and full account of its activities during the previous year and copies thereof shall be forwarded to the Central Government and that Government shall cause the same to be laid before both Houses of Parliament within one month of its receipt.

(2) The State Authority shall prepare once every year, in such form and at such time as may be prescribed, an annual report giving a true and full account of its activities during the previous year and copies thereof shall be forwarded to the State Government and that Government shall cause the same to be laid before each House of the State Legislature where it consists of two Houses, or where such Legislature consists of one House, before that House.
71. No court (except the Supreme Court or a High Court) shall have jurisdiction to entertain any suit or proceeding in respect of anything done, action taken, orders made, direction, instruction or guidelines issued by the Central Government, National Authority, State Government, State Authority or District Authority in pursuance of any power conferred by, or in relation to its functions, by this Act.

72. The provisions of this Act, shall have effect, notwithstanding anything inconsistent therewith contained in any other law for the time being in force or in any instrument having effect by virtue of any law other than this Act.

73. No suit or prosecution or other proceeding shall lie in any court against the Central Government or the National Authority or the State Government or the State Authority or the District Authority or local authority or any officer or employee of the Central Government or the National Authority or the State Government or the State Authority or the District Authority or local authority or any person working for on behalf of such Government or authority in respect of any work done or purported to have been done or intended to be done in good faith by such authority or Government or such officer or employee or such person under the provisions of this Act or the rules or regulations made thereunder.

74. Officers and employees of the Central Government, National Authority, National Executive Committee, State Government, State Authority, State Executive Committee or District Authority shall be immune from legal process in regard to any warning in respect of any impending disaster communicated or disseminated by them in their official capacity or any action taken or direction issued by them in pursuance of such communication or dissemination.

75. (1) The Central Government may, by notification in the Official Gazette, make rules for carrying out the purposes of this Act.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:

(a) the composition and number of the members of the National Authority under sub-section (2), and the term of office and conditions of service of members of the National Authority under sub-section (4), of section 3;

(b) the allowances to be paid to the members of the advisory committee under sub-section (2) of section 7;

(c) the powers and functions of the Chairperson of the National Executive Committee under sub-section (3) of section 8 and the procedure to be followed by the National Executive Committee in exercise of its powers and discharge of its functions under sub-section (4) of section 8;

(d) allowances to be paid to the persons associated with the sub-committee constituted by the National Executive Committee under sub-section (3) of section 9;

(e) the number of members of the National Institute of Disaster Management under sub-section (2), the term of the office and vacancies among members and the manner of filling such vacancies under sub-section (3) and the manner of constituting the Governing Body of the National Institute of Disaster Management under sub-section (4) of section 42;

(f) the manner of constitution of the Force, the conditions of service of the members of the Force, including disciplinary provisions under sub-section (2) of section 44;

(g) the manner in which notice of the offence and of the intention to make a complaint to the National Authority, the State Authority, the Central Government, the State Government or the other authority or officer under clause (b) of section 60;

(h) the form in which and the time within which annual report is to be prepared under section 70;
(i) any other matter which is to be, or may be, prescribed, or in respect of which provision is to be made by rules.

76. (1) The National Institute of Disaster Management, with the previous approval of the Central Government may, by notification in the Official Gazette, make regulations consistent with this Act and the rules made thereunder to carry out the purposes of this Act.

(2) In particular, and without prejudice to the generality of the foregoing power, such regulations may provide for all or any of the following matters, namely:

(a) powers and functions to be exercised and discharged by the governing body;

(b) procedure to be followed by the governing body in exercise of the powers and discharge of its functions;

(c) any other matter for which under this Act provision may be made by the regulations.

77. Every rule made by the Central Government and every regulation made by the National Institute of Disaster Management under this Act shall be laid, as soon as may be after it is made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised of one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule or regulation or both Houses agree that the rule or regulation should not be made, the rule or regulation shall thereafter have effect only in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule or regulation.

78. (1) The State Government may, by notification in the Official Gazette, make rules to carry out the provisions of this Act.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:

(a) the composition and number of the members of the State Authority under sub-section (2), and the term of office and conditions of service of the members of the State Authority under sub-section (3), of section 14;

(b) the allowances to be paid to the members of the advisory committee under sub-section (2) of section 17;

(c) the powers and functions of the Chairperson of the State Executive Committee under sub-section (3), and the procedure to be followed by the State Executive Committee in exercise of its powers and discharge of its functions under sub-section (4) of section 20;

(d) allowances to be paid to the persons associated with the sub-committee constituted by the State Executive Committee under sub-section (3) of section 21;

(e) the composition and the number of members of the District Authority under sub-section (2), and the powers and functions to be exercised and discharged by the Chief Executive Officer of the District Authority under sub-section (3) of section 25;

(f) allowances payable to the persons associated with any committee constituted by the District Authority as experts under sub-section (3) of section 28;

(g) any other matter which is to be, or may be, prescribed, or in respect of which provision is to be made by rules.

(3) Every rule made by the State Government under this Act shall be laid, as soon as may be after it is made, before each House of the State Legislature where it consists of two Houses, or where such Legislature consists of one House before that House.
79. (1) If any difficulty arises in giving effect to the provisions of this Act, the Central Government or the State Government, as the case may be, by notification in the Official Gazette, make order not inconsistent with the provisions of this Act as may appear to it to be necessary or expedient for the removal of the difficulty:

Provided that no such order shall be made after the expiration of two years from the commencement of this Act.

(2) Every order made under this section shall be laid, as soon as may be after it is made, before each House of Parliament or the Legislature, as the case may be.
INTRODUCTION

The term tsunami is derived from the Japanese word ‘tsu’ means harbour and ‘nami’ means wave.\(^1\) The basic characteristic of tsunami waves that it can have the time periods between ten minutes and one hour and a wavelength in excess of 430 miles. It can travel at speeds over 700 kilometers (435 miles) per hour hit the typical beach which are wind generated. Their wind generated waves have a time period (the time between two successful waves) of five to twenty seconds and their wavelength (the distance between two successful waves) is usually about 50 to 600 feet.

**Table**

<table>
<thead>
<tr>
<th>Parametres</th>
<th>Ordinary wind generated waves</th>
<th>Tsunami waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time period</td>
<td>2 to 20 seconds</td>
<td>10 to 60 minutes</td>
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<tr>
<td>Wave length &amp; wave height</td>
<td>50 to 600 ft maximum</td>
<td>&gt; 430 miles can be as high as km</td>
</tr>
<tr>
<td></td>
<td>a meter</td>
<td></td>
</tr>
<tr>
<td>Visibility</td>
<td>Visible in the entire ocean</td>
<td>Visible only in the shore</td>
</tr>
<tr>
<td>Appearance near shore</td>
<td>Will not move beyond</td>
<td>Will be moving like a big wall of water much beyond the tide zone.</td>
</tr>
<tr>
<td></td>
<td>the normal off and tide zone</td>
<td></td>
</tr>
</tbody>
</table>

**Nature of Tsunami Waves in the High Sea and in the Shore**

Tsunami waves travel very efficiently across the ocean and that is why it shows up hundreds and even thousands of miles away with much of the same energy that it started.
It gains height only when it approaches the shore. In the high seas, everything looks normal and the ships there, will not feel uncomfortable, neither it can be detected from the air what causes Tsunami.

Tsunami velocity is dependent on the depth of water through which it travels. It travels approximately at a velocity of 700Kmph in 400m depth of sea depth. In 10m of water the velocity drops to about 36Kmph.

**Figure No.2**

Tsunami Velocity

Causes for Tsunami

(i) A big earthquake below the ocean floor is tsunami nature (eg 26th December 2004 Indian Ocean tsunami).  

(ii) Major a series of major landslides either in the mountain below the ocean or on the land.  

(iii) Huge volcanic eruptions either in the land or across the ocean (eg: Krakatau volcanic eruption in August 1883).  

(iv) A sizeable meteorite from space falling on the ocean.  

Tsunami-prone Countries

Most tsunamis are created near the margins of the Pacific Ocean along the pacific rig of fire. High risk areas of their pacific regions are northern California, Hawaii, South West Chile and Chile borders (Chile coast struck by destructive t by every 30 yrs). In the past a few devastating tsunami have occurred in the Indian ocean in the Mediterranean Sea. The most significant tsunami in the region of the Indian Ocean was the one associated with the violent explosion of the volcanic island of Krakolan in August 1883 which reportedly triggered a thirty meter high tsunami wave and killed 36,500 people in Java and Sumatra in Indonesia.  

As per National Geophysical Data Centre, Indian Ocean for the last 200 years had witnessed 63 tsunamis of various magnitudes. These details are given in Appendix-3 and the most deadly tsunamis given in table below.

Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Source</th>
<th>Deaths</th>
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</thead>
<tbody>
<tr>
<td>2nd April 1762</td>
<td>Bay of Bengal</td>
<td>500</td>
</tr>
<tr>
<td>16th June 1819</td>
<td>Arabian sea</td>
<td>1543</td>
</tr>
<tr>
<td>27th August 1883</td>
<td>Java/Sumatra</td>
<td>36,500</td>
</tr>
<tr>
<td>Date</td>
<td>Location</td>
<td>Destruction</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>4th Jan. 1907</td>
<td>Sumatra</td>
<td>400</td>
</tr>
<tr>
<td>26th, 28th June 1926</td>
<td>Sumatra</td>
<td>1400</td>
</tr>
<tr>
<td>26 January 1941</td>
<td>Andaman sea</td>
<td>5,000</td>
</tr>
<tr>
<td>28th Nov. 1945</td>
<td>Arabian sea</td>
<td>1,000+</td>
</tr>
<tr>
<td>19th Aug. 1977</td>
<td>Sundra Islands</td>
<td>500</td>
</tr>
<tr>
<td>3rd June 1994</td>
<td>East Java</td>
<td>223</td>
</tr>
<tr>
<td>26th Dec. 2004</td>
<td>Sumatra</td>
<td>1,50,00+</td>
</tr>
</tbody>
</table>


The entire sub continent is earthquake prone areas and there are frequent earthquake below the Bay of Bengal, Arabian Sea and the Indian Ocean.

Scientists cannot predict when earthquake will occur, they cannot determine exactly when it will be generated. It is recently what we have seen in Japan; a technologically developed country. The vast destruction has caused following a tsunami and nuclear disaster.

On December 26, 2004 an earthquake of magnitude 9.3 on the Richer Scale (3.316N latitude and 95.854E longitude), with its epicenter off the coast of Sumatra, triggered the tsunami in Indian Ocean at 6.29 am IST. The seismic fault ran north to south beneath the ocean floor, while the tsunami waves short out west to east. Within minutes of the earthquake, the first tsunami struck the Indonesian Island of Simeule, located approximately 40Km from the epicenter. The earthquake was felt widely along the coasts of India. The worst affected regions of India were the states of Tamil Nadu and Andaman and Nicobar Island. The states of Pondicherry, Andhra Pradesh and Kerala were affected to a lesser extent. The impact of tsunami in different states in a bird’s eye view is shown in table below.
### Table

**Impact of Tsunami in different States of India**

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Parametres</th>
<th>Tamil Nadu</th>
<th>Pondicherry</th>
<th>Andhra Pradesh</th>
<th>Kerala</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Length of coastal area affected</td>
<td>1,000km</td>
<td>25km</td>
<td>985 km</td>
<td>250 km</td>
</tr>
<tr>
<td>2</td>
<td>Incursion of water into land</td>
<td>1km to 1.5km</td>
<td>300m to 3km</td>
<td>500m to 2km</td>
<td>1km to 2km</td>
</tr>
<tr>
<td>3</td>
<td>Average height of waves</td>
<td>7m to 10m</td>
<td>10m</td>
<td>5m</td>
<td>3 to 5m</td>
</tr>
<tr>
<td>4</td>
<td>Village affected</td>
<td>362</td>
<td>33</td>
<td>301</td>
<td>187</td>
</tr>
<tr>
<td>5</td>
<td>Population affected</td>
<td>6.91 lakhs</td>
<td>43,000</td>
<td>2.11 lakhs</td>
<td>2.7 lakhs</td>
</tr>
<tr>
<td></td>
<td>Dwelling units affected</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,12,748</td>
<td>10,061</td>
<td>1,557</td>
<td>11,832</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cattle lost</td>
<td>5,477</td>
<td>506</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not reported</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Agricultural crops damaged</td>
<td>2,589 ha</td>
<td>792 ha</td>
<td>790 ha</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not reported</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Ministry of Home Affairs, Government of India

From the above table it can be found that among the Indian States Tamil Nadu was a second adversely affected state. Therefore, this study focuses on the victims of tsunami at Pattinapakkam circle in Chennai district. The sample has been taken among five hundred people who have not been rehabilitated even after seven years.

The government of India has developed guidelines for DO and DON’t in tsunami. They are as follows:

The death toll and destruction caused by the Indian Ocean tsunami is enormous because of the lack of awareness and better early warning system. Therefore the government of India has developed an Indian Ocean Tsunami Warning System (here in after referred as IOTWS). It specifies detailed requirements of the design and implementation of the tsunami warning and mitigation system for the Indian Ocean.

**Do’s and Don’t For Protection from Tsunami**

- You should find out if your home, school, workplace, or other frequently visits places are tsunami hazard area.
- Know the height of your area above sea level and distance of your area from coast.
- Plan evacuation routes from your home, school, workplace or any other place you could be where tsunamis present a risk.
• **Practice your evacuation routes**

  Familiarity may save your life. Be able to follow your escape route at night and during inclement weather. Practicing your plan makes the appropriate response more of a reaction, requiring less thinking during an actual emergency situation.

• Use a weather radio or stay tuned to a local radio or television station to keep informed of local watches and warning.

• **Discuss tsunami with your family**

  Make aware of every family member about what to do in a tsunami situation. This could help to reduce fear and save precious time in an emergency.

• **What to do if you feel a strong coastal earthquake**

  If the earthquake is for more than 20 seconds or longer when you are in coastal area, you should

  • Drop, cover and hold on- you should first protect yourself from the earthquake damages.

  • When the shaking stops- gather members of your household and move quickly to higher ground away from the coast. A tsunami may be coming within minutes.

  • Stay away from damaged buildings and bridges from which heavy objects might fall during and after shock.

**If you are on Land**

  Be aware of tsunami facts. This knowledge could save your life. Share this knowledge with your relatives and friends this could save their lives.

  • If you are in school, you should follow the advice of teachers and other school personnel.

  • If you are at home, you should make sure your entire family is aware of the warning. Your family should evacuate if you live in a tsunami evacuation zone. Move in an orderly, calm and safe manner to the evacuation site or to any safe place outside your evacuation zone. Follow the advice of local emergency and law enforcement authorities.
• If you are at the beach or near the ocean and you feel the earth shake, move immediately to the higher ground. Do not wait for a tsunami warning to be announced. Stay away from rivers and stream.

• Tsunami generated in distant locations will generally give people enough time to move to higher ground. For locally generated tsunamis, where you might feel the ground shake, you may only have a few minutes to move to higher ground.

• High, multi-stored, reinforced concrete hotels are located in many low lying coastal areas. The upper floors of these hotels can provide a safe place to find refuge should there be a tsunami warning and you cannot move quickly inland to higher ground.

• Homes and small buildings located in low lying coastal areas are not designed to withstand tsunami impacts. Do not stay in these structures should there be a tsunami warning.

• Off shore reefs and shallow areas may help break the force of tsunami waves, but large and dangerous wave can still be a threat to coastal residents in these areas.

• Staying away from all low lying areas is the safest advice when there is a tsunami warning.

If you are on a Boat

Since tsunami wave activity is imperceptible in the open ocean, do not return to port if you are at sea and a tsunami warning has been issued for your area. Tsunamis can cause rapid changes in water level and unpredictable dangerous currents in harbours and ports.

If there is time to move your boat or ship from port to deep, you should weight the following considerations.

• Most large harbours and ports are under the control of a harbor authority or vessel traffic system. These authority direct operations during periods of increased readiness and make keep in contact with these authorities.

• Smaller ports may not be under the control of a harbor authority. If you are aware there is a tsunami warning and you have time to move your vessel to deep
water, then you may want to do so in an orderly manner, in consideration of other vessels

- Owners of small boats may find it safest to leave their boat at the pier and physically move to higher ground, particularly in the event of a locally generated tsunami

**What to do After a Tsunami**

- You should continue using a weather radio or staying tuned to a coast guard emergency frequency station or a local radio or television station for updated emergency information

- Check yourself for the injuries and get first aid if necessary before helping injured or trapped persons

- If someone needs to be rescued, call professionals with the right equipment to help

Many people have been killed or injured while trying to rescue others in flooded areas

- Help people who need special assistance

  Infants, elderly people, disabled one or large family who need additional help in an emergency situation

- Avoid disaster areas

  Your presence might hamper rescue and other emergency operations and put you at further risk such as contaminated water, crumpled roads, landslides, mudflows and other hazards

- Use telephone only for emergency calls

  Telephone lines are frequently overwhelmed in disaster situations. They need to be clear for emergency calls to get through

- Stay out of a building if water remains around it

  Tsunami water like flood water can undermine foundations, causing buildings to sink, floors to crack, or walls to collapse
• When re-entering buildings or homes, use extreme caution

Tsunami driven flood water may have damaged buildings where you least expect it. Carefully watch every step you take

• Wear long pants, long sleeved shirt, and sturdy shoes

The most common injury following a disaster is cut feet

• Use battery powered lanterns or flashlights when examining buildings

Battery powered lighting is the safest and easiest to use, and it does not present a fire hazard for the user, occupants, or building. DO NOT USE CANDLES

• Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing

• Inspect foundations for cracks or other damage

Cracks and damage to a foundation can render a building uninhabitable

• Look for fire hazards

Under the earthquake action there may be broken or leaking gas lines, and under the tsunami flooded electrical circuits, or submerged furnaces or electrical appliances. Flammable or explosive materials may have come from upstream. Fire is the most frequent following the flood

• Check for gas leaks

If you smell gas or hear a blowing or hissing noise, open a window and get everyone outside quickly. Turn off the gas using the outside main valve if you can, and call the gas company

• Look for electrical system damage

If you see sparks or broken or frayed wires, or if you smell burning insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice. Electrical equipment should be checked and dried before being returning to service
• Check for damage to sewage and water lines

If you suspect sewage lines are damaged under the quake, avoid using the toilets and call a plumber. If water pipes are damaged contact the water company and avoid using water from the tap. You can obtain safe water from undamaged water heaters or by melting ice cubes that were made before the tsunami hit. Turn off the main water valve before draining water from these sources. Use tap water only of local health officials advice it is safe

• Watch out for wild animals

Be careful with poisonous snakes that might have come into buildings with water. Use a sick to poke through debris

• Watch for loose plaster, drywall and ceilings that could fall

• Take pictures of the damage, for insurance

• Check food supplies

Any food that has come in contact with flood water may be contaminated and should be thrown out

• Expect aftershocks

Depending upon the main shock (magnitude of 8 to 9 on the Richter scale) there is a chance to cause aftershock. So prepare for such one

• Watch your animals closely

The behavior of the pets may change dramatically after any disruption, become aggressive or defensive, so be aware of their well beings and take measure to protect them from hazards, including displaced wild animals, and to ensure the safety of other people and animals

**End Notes**

1. Tsunami is also known as flutevellen in German Vboedgolven in Dutch Hai-Chinese, maremoto in Spanish, Ran de Mareef Vagues sismiques in French, and seismic sea waves in English.
2. The Tectonic plates keeps on pushing and hitting each other and in the process, the plates crack & moves over each other giving rise to earthquakes. If it happen below the ocean, tsunami may happen.

3. Volcanic eruptions induced tsunami is also known as volcanogenic Tsunami. Majority of the earthquakes and volcanic eruption happen along the ring of the fire. Large number of Indonesian volcanoes force the Indian ocean and they have big potential to create tsunami as and when they erupt.

4. Landslides below the ocean is a source of t, this type of tsunami occurred in Unzen (Japan).

5. Splash tsunami is the result; its height is related to kinetic energy; wave height – a velocity quickly attenuates away from impact site; A 500m object like asteroid or comet may generate tsunami 10m high at 2000 km distant in Pacific its impact would result in 10km penetration on flat coasts).

This questionnaire is prepared for identifying the role of the State and NGO’s in disaster relief Programmes

**Basic Information**

1. Age ..... years
2. Gender  
   (a) male......... (b) female.........
3. Name of the locality……………………Urban  Semi-urban  rural
4. How long have you been here in the locality? ...........years

**Disaster related information**

5. Who were the first respondents to help in disaster?  
   (a) police --------  
   (b) politicians ........... (c) local people...... media  (d) volunteers .....  
   (e) ngo......
6. Where were you taken after the rescue  
   (a) Hospital....... (b) police station.....(c) rescue centre .......
   Where was your rescue centre (rehabilitation centre)  
   (a) School….. (b) community hall..... (c) tents built in open space........  
   (d) others please specify.....
7. Whether there was separate bathrooms and latrines for men and women  
   (a) yes…. (b) no.....
8. Whether there was any shortage of  water  
   Electricity….. Food….. Clothing …. Medicine…..  
   Doctor in the camps  ......
9 Who all visited the camp frequently

Police…. Doctors…. Media…. politicians minister…. Centralminister…. CM…. PM…..

10 What all valid documents did you loose

ID cards…….money…..driving licence…. electoral id card…. Documents…. marklist …. 

How long did it take for the state to issuee duplicates of your id cards

(a)6 months….. (b)1 year….. (c)2 year…. (d) 7 years…..

11 Did doctors/nurses stay in the camp?

(a) Yes…. (b) no…..

12 Whether the surviving victims were allowed to perform their rituals during the time of burial/disposal of dead bodies? Yes…… No……

Post disaster

13. Which all institutions helped you financially after disaster

(a)government ….. (b)NGO’s …..

14. Whether the state had given employment to the victims of disasters

(a) yes… (b) no….

If yes, where were you employed?

(a)casual work ….. (b) industry….. (c) self help…

15. Did you get house after the disaster?

(a) yes ….. (b) no……

If yes how long it had been taken to allot a house?

(a) After 1 year ….. (b) 5 years ….. (c) or yet to be get

Does the new house has
a. Portable water supply……..

b. Electricity……..

c. Bathrooms/latrines …….

16. when did the children start their school education after the disaster?
   (a) after 2 months ……(b) after 6 months …… (c) after 1 year……..

17. After the long period of disaster, (Dec 2004-2011) have you received full amount of compensation that state had announced?
   (a) yes …… (b) no ……

18. If you are not satisfied with the compensation that is provided by the state, did you approach the court of law for getting your rights?
   (a) yes …. (b) no …. 

19. What is your annual income now?
   (a) less than 10,000…… (b) 20,000-50,000 …….. (c) 50,000- 1,00,000…….