COMMON DISASTER TYPES IN INDIA

High Power Committee on Disaster Management identified 31 types of disasters. Tsunami has been added in 2005 in this list. List of various disasters

i. **Water and Climate related disasters**

a) Floods and drainage management

b) Cyclones

c) Tornadoes and Hurricanes

d) Hailstorms

e) Cloud burst

f) Heat wave and Cold wave

g) Snow avalanches

h) Droughts

i) Sea erosion

j) Thunder and lighting

k) Tsunami

ii. **Geological related disasters**

a) Landslides and mudflows

b) Earthquakes

c) Dam failure/Dam bursts

d) Mine disasters

iii. **Chemical, industrial and nuclear related disasters**

a) Chemical and industrial disasters

b) Nuclear disasters

iv**. Accident related disasters**

a) Forest fires

b) Urban fires

c) Mine flooding

d) Oil spills

e) Major building collapse

f) Serial bomb blasts

g) Festival related disasters

h) Electrical disasters and fires

i) Air, road and rail accidents

j) Boat Capsizing

k) Village fire

v. Biological related disasters

a) Biological disasters and epidemics

b) Pest attacks

c) Cattle epidemics

d) Food poisoning

Natural Disasters

Drought In India : In India around 68 percent of the agriculture land country is prone to drought in varying degrees. Of the entire area 35 percent receives rain falls between 750 mm and 1125 mm which is considered drought prone while 33 percent, which receives rainfalls between less than 750 mm is considered to be chronically drought prone. The primary cause of any drought is deficiency of rainfall and in particular, the timing, distribution and intensity of this deficiency in relation to existing reserves. A prolonged period of relatively dry weather leading to drought is a widely recognized climate anomaly. Drought can be devastating as water supplies dry up, crops fail to grow, animals die, and malnutrition and ill health become widespread The environmental effects of drought, including Stalinization of soil and groundwater decline, increased pollution of freshwater ecosystems and regional extinction of animal species.

(B) Floods: India is one of the most flood prone countries in the world. The principal reasons for flood lie in the very nature of natural ecological systems in this country, namely, the monsoon, the highly silted river systems and the steep and highly erodible mountains, particularly those of the Himalayan ranges. The average rainfall in India is 1150 mm with significant variation across the country. The annual rainfall along the western coast and Western Ghats, Khasi hills and over most of the Brahmaputra valley amounts to more than 2500 mm. Most of the floods occur during the monsoon period and are usually associated with tropical storms or depressions, active monsoon conditions and break monsoon situations. Flood destructions have always brought miseries to numerous people, especially in rural areas. Flood results in the outbreak of serious epidemics, specially malaria and cholera.

Simultaneously, scarcity of water also arises. It has a drastic effect on agricultural Figure 2: Flood Hazard Map of INDIA produce. Sometimes, waterremains standing over large areas for long span of time hampering the Rabi crops. Floods occur in almost all rivers basins in India. The main causes of floods are heavy rainfall, inadequate capacity of rivers to carry the high flood discharge, inadequate drainage to carry away the rainwater quickly to streams/ rivers. Landslides blocking streams; typhoons and cyclones also cause floods. Flash floods occur due to high rate of water flow as also due to poor permeability of the soil. Areas with hardpan just below the surface of the soil are more prone to floods as water fails to seep down to the deeper layers.

(**C) Cyclones**: The major natural disaster that affects the coastal regions of India is cyclone and as India has a coastline of about 7516 kms, it is exposed to nearly 10 percent of the world‟s tropical cyclones. About 71 percent of this area is in ten states (Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Puducherry, Andhra Pradesh, Orissa and West Bengal) Figure 3. The islands of Andaman, Nicobar and Lakshadweep are also prone to cyclones. On an average, about five or six tropical cyclones form in the Bay of Bengal and Arabian sea and hit the coast every year. Out of these, two or three are severe. When a cyclone approaches to coast, a risk of serious loss or damage arises from severe winds, heavy rainfall, storm surges and river floods. The effect of a storm surge is most pronounced in wide and shallow bays exposed to cyclones such as in the northern part of Bay of Bengal.

(D) Heat Wave: Extreme positive departures from the normal maximum temperature result in a heat wave during the summer season. The rising maximum temperature during the pre-monsoon months often continues till June, in rare cases till July, over the northwestern parts of the country. Decrease in the Diurnal Temperature Range (DTR) due to urbanisation is a new factor leading to human mortality and discomfort. Increased minimum temperatures in summer do not allow the necessary nocturnal cooling to neutralize the high maximum temperature during a heat wave epoch.

(E)Cold Wave and Fog Occurrences of extreme low temperature in association with incursion of dry cold winds from north into the sub continent are known as cold waves. The northern parts of India, specially the hilly regions and the adjoining plains, are influenced by transient disturbances in the mid latitude westerlies which often have weak frontal characteristics. These are known as western disturbances. The cold waves mainly affect the areas to the north of 20°N but in association with large amplitude troughs, cold wave conditions are sometimes reported from states like Maharashtra and Karnataka as well. UP and Bihar rank the highest in terms of casualties from cold wave and this could be due to poor level of development and lack of shelters to the outdoor workers and farmers

(F)Earthquake: India has been divided into four seismic zones according to themaximum intensity of earthquake expected. The entire Himalayan Region is considered to be vulnerable to high intensity earthquakes of a magnitude exceeding 8.0 on the Richter Scale, and in a relatively short span of about 50 years, four such major earthquakes have occurred in the region: Shillong, 1897 (M8.7); Kangra, 1905 (M.8.0); Bihar–Nepal, 1934 (M 8.3); and Assam–Tibet, 1950 (M 8.6). Scientific publications have warned that very severe earthquakes are likely to occur anytime in the Himalayan Region, which could adversely affect the lives of several million people in India.

(G) Landslides: Landslides constitute a major natural hazard in our country, which accounts for considerable loss of life and damage to communication routes, human settlements, agricultural fields and forest lands. Based on the general experience with landslides, a rough estimate of monetary loss is of the order of ` 100 crore to ` 150 crore per annum at the current prices for the country as a whole. Landslides mainly affect the Himalayan region and the western ghats of India. Landslides are also common in the Nilgiri range. It is estimated that 30 percent of the world‟s landslides occur in the Himalayas. The Himalayan Mountains, which constitute the youngest and most dominating mountain system in the world, are not a single

long landmass but comprises a series of seven curvilinear parallel folds running along a grand arc for a total of 3400 kilometers. Due to its unique nature, the Himalayas have a history of landslides that has no comparison with any other mountain range in the world. Landslides are also common in the western gate. In the Nilgiris, in 1978 alone, unprecedented rains in the region triggered about one hundred landslides which caused severe damage to communication lines, tea gardens and other cultivated crops. A valley in Nilgiris is called "Avalanches Valley". Scientific observation in north Sikkim and Garhwal regions in the Himalayas clearly reveal that there is an average of two landslides per sq. km. The mean rate of land loss is to the tune of 120 meter per km per year and annual soil loss is about 2500 tones per sq km.

(**H) Tsunami**: A tsunami (in Japanese „tsu" means harbor and „nami" means wave) is a series of water waves caused by the displacement of a large volume of a body of water, usually an ocean. In the Tamil language it is known as "Aazhi Peralai". Seismicitygenerated tsunamis are result of abrupt deformation of sea floor resulting vertical displacement of the overlying water. Earthquakes occurring beneath the sea level, the water above the reformed area are displaced from its equilibrium position. The release of energy produces tsunami waves which have small • Arson and sabotage Amplitude but a very long wavelength (often hundreds of kilometer long). It may be caused by nonseismic event also such as a landslide or impact of a meteor. Tsunami Sources for India :

For a tsunami to hit Indian coast, it is necessary that earthquake of magnitude > 7 should occur. Two such possible zones are

• Andaman-Sumatra • Makran

Man-Made Disasters

(A) **Industrial and Chemical Disaster**: Industrial disaster: Industrial disasters are disasters caused by chemical, mechanical, civil, electrical or other process failures due to accident, negligence or incompetence, in an industrial plant which may spill over to the areas outside the plant or with in causing damage to life, property and environment. New industries are also coming up at a rapid rate.

Chemical disaster: Chemical disasters are occurrence of emission, fire or explosion involving one or more hazardous chemicals in the course of industrial activity (handling), storage or transportation or due to natural events leading to serious effects inside or outside the installation likely to cause loss of life and property including adverse effects on the environment. "Chemical accident or emergency can result in extensive damage to the environment with considerable human and economic costs. Chemical and industrial emergencies may arise in a number of ways, such as

• Explosion in a plant

• Accidents in storage facilities of chemicals

• Accidents during the transportation of chemicals, misuse of chemicals

• Improper waste management

• Accidents in treatment plants

• Technological system failures

• Failures of plant safety design

. Arson and sabotage

• Human error

(B) **Stampede In stampede**: In Stampede, the term mob or crowd is used to refer to a congregated, active, polarized aggregate of people, which is basically heterogeneous and complex. Its most salient features include homogeneity of thought and action among its participants and their impulsive and irrational actions. Incidents of stampedes can occur in numerous socio-cultural situations. These stampede incidents can be categorized into the following types, where the causes and the impact are described in the incident. Though the list is not exhaustive, it provides a fair idea about various types of situations where stampedes can occur:

• Entertainment events

• Escalator and moving walkways

• Food distribution

• Processions

• Natural disasters

• Power failure

• Religious events

• Fire incidents during religious/other events

• Riots

• Sports events

• Weather related

(C) **Road Accidents** : The rapid expansion of road transport has brought with it the challenge of addressing adverse factors such as the increase in road accidents. Road accidents are a human tragedy. It involves high human suffering and monetary costs in terms of premature deaths, injuries, loss of productivity etc. Most deaths and injuries due to road accidents are invisible to society. They are a hidden epidemic. In India, motor vehicles including two wheelers are growing at a faster rate then the economic and population growth.

(D) **Rail Accidents** :"Railway Disaster is a serious train accident or an untoward event of grave nature, either on railway premises or arising out of railway activity, due to natural or human-made causes, that may lead to loss of many lives and /or grievous injuries to a large number of people, and/or severe disruption of traffic etc, necessitating large scale help from other government/non-government and private organizations." The preparation of Disaster Management Plan on Indian Railways and on the Zonal Railways in coordination with the different Departments of the Railway, other Central/State Govt. agencies, NGOs, private agencies, etc. has to be done by the Safety Department in the railway Board, on the Zonal Railway and Divisions. Railway Board has approved the nomination of GMs, AGMs or CSOs (when GM/ AGM are not available) for declaring an untoward incident as a Railway Disaster.

(E) **Air Accidents**: Air accidents are by and large of four types; mid-air collisions, forced landings, crash due to technical snags and air-crash in mountainous terrain due to poor visibility. While air accidents can occur at any time and at any place, areas within about 30 – 40 kms. radius of airports are most vulnerable. Experience shows that a majority of air accidents occur either during take-off or landing near major airports where flight paths get congested. In addition, air accidents also take place at remote inaccessible places like forests, hilly and mountainous regions, high seas, etc. Causes of air accidents are either human failure of pilots, air traffic controllers or technical failures of on board, landing instruments. In rare cases, it may also be the result of terrorist activities.

(F**) Mine Disasters** Mines Act, 1965 defines Disaster as an act Accident (unexpected event) causing loss of more than 10 lives. A mining accident is an accident that occurs in the process of mining minerals. The Act categories an accident involving loss of lives less than 10 major accident. Thousands of miners die from mining accidents each year, especially in the process of coal mining and hard rock mining. One of the greatest mining disasters in Indian mines occurred on 27 December 1975 due to water in rush from old abandoned incline working to a deep shaft mine working of Chasnallah Colliery leading to death of 375 miners. Following types of mining disasters, losses and impacts are classified by the DGMS. • Side fall (slope failure) disaster in opencast mines,

• Roof and side falls in underground mines,

• Collapse of mine pillars,

• Air Blast,

• Failure of rope haulage,

• Accident due to electricity,

• Mine fires,

• Accidents due to explosive,

• Inundations,

• Explosions in mines.

• Rock burst and bumps,

G) **Epidemics** Infectious diseases are a major public health problem in India. While many infectious diseases like tuberculosis and malaria are endemic, some of them occasionally attain epidemic proportion. An epidemic refers to an increase, often sudden, in number of cases of a

disease in a community clearly in excess of what is normally expected in that population. Epidemics are public health emergencies which disrupt routine health services and are major drain on resources. Epidemics include viral infections disease (mengitis, measles, dengue, polio, typhoid fever etc.) and Bacterial infectious diseases (cholera, diarrhea etc.) The main causes for epidemic are non availability of clean and hygienic drinking water contamination of drinking water sources, lack of awareness about sanitation, unhygienic food, and overcrowding, biological conditions in addition to ecological factors.

LEGISLATIONS IN INDIA ON DISASTER MANAGEMENT

1. RESPONSIBILITIES

While the primary responsibility of disaster management rests with the States, the Central Government supports the efforts of State Governments by providing logistical and financial support.

On behalf of the Central Government, DM Division in the Ministry of Home Affairs co-ordinates with disaster affected State Government(s), concerned lineministries/departments, National Disaster Management Authority (NDMA), National Disaster Response Force (NDRF), National Institute of Disaster Management (NIDM) and the Directorate General of Fire Services, Home Guards and Civil Defence, and Armed Forces for effective disaster risk reduction. The Division is responsible for legislation, policy, capacity building, prevention, mitigation, response and long term rehabilitation. Major responsibilities of the Disaster Management Division, MHA are as follows:

- Resource mobilization for relief and response to natural disasters except drought, hail storms, cold and frost waves and pest attack
- Operation of control room and situation reports
- Multi-hazard Early Warning Systems
- Matters related to State Disaster Response Fund and National Disaster Response Fund
- All matters related to disaster response, preparedness, prevention, mitigation and capacity building
- International cooperation in disaster management
- Post-disaster/long term rehabilitation and reconstruction
- All administrative and budget matters related to NDMA, NDRF and NIDM
- Strengthening of fire and emergency services
- All matters related to Fire Services, Civil Defence and Home Guards including Director General of (Fire Services, Civil Defence & Home Guards), National Civil Defence College (NCDC) and National Fire Service College (NFSC)
- Administration of the Disaster Management Act, 2005
- Provides secretarial support to NEC, HLC and NPDRR.

NATIONAL DISASTER MANAGEMENT POLICY

To build a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response.

Disaster Management

A disaster refers to a catastrophe, mishap, calamity or grave occurrence from natural or man-made causes, which is beyond the coping capacity of the affected community. DM involves a continuous and integrated process of planning, organising, coordinating and implementing measures which are necessary or expedient for:

- ¬Prevention of danger or threat of any disaster.
- ¬Mitigation or reduction of risk of any disaster or its severity or consequences.
- ¬Capacity building including research and knowledge management.
- ¬Preparedness to deal with any disaster.
- ¬Prompt response to any threatening disaster situation or disaster.
- ¬Assessing the severity or magnitude of effects of any disaster.

- Evacuation, rescue and relief.
- ¬Rehabilitation and reconstruction.

Objectives

The objectives of the national policy on disaster management are:¬

- Promoting a culture of prevention, preparedness and resilience at all levels through knowledge, innovation and education.
- Encouraging mitigation measures based on technology, traditional wisdom and environmental sustainability.
- ¬ Mainstreaming disaster management into the developmental planning process.
- ¬Establishing institutional and techno-legal frame works to create an enabling regulatory environment and a compliance regime.
- Ensuring efficient mechanism for identification, assessment and monitoring of disaster risks.
- ¬Developing contemporary forecasting and early warning systems backed by responsive and failsafe communication with information technology support.
- ¬Promoting a productive partnership with the media to create awareness and contributing towards capacity development.
- ¬Ensuring efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society.
- ¬Undertaking reconstruction as an opportunity to build disaster resilient structures and habitat for ensuring safer living.
- ¬Promoting productive and proactive partnership with media in disaster management.

The Disaster Management Act 2005

This Act may be called the Disaster Management Act, 2005.

It extends to the whole of India.

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.

Definitions.-In this Act, unless the context otherwise requires,-

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

"Capacity-building" includes-

- Identification of existing resources and resources to be acquired or created;
- (Acquiring or creating resources identified under sub-clause (i);
- Organization and training of personnel and coordination of such training for effective management of disasters;

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

"Disaster" means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade 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;

"Disaster management" means a continuous and integrated process of planning, organising, coordinating and implementing measures which are necessary or expedient for-

Prevention of danger or threat of any disaster;

- Mitigation or reduction of risk of any disaster or its severity or consequences;
- Capacity-buildin• Preparedness to deal with any disaster;
- Prompt response to any threatening disaster situation or disaster;
- Assessing the severity or magnitude of effects of any disaster;
- Evacuation, rescue and relief;

- Rehabilitation and reconstruction;
- "District Authority" means the District Disaster Management Authority constituted under sub-section (1) of section 25;
- "District Plan" means the plan for disaster management for the district prepared under section 31;g;
- "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;
- "Mitigation" means measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation;
- "National Authority" means the National Disaster Management Authority established under sub-section (1) of section 3;
- "National Executive Committee" means the Executive Committee of the National Authority constituted under sub-section (1) of section 8;
- "National Plan" means the plan for disaster management for the whole of the country prepared under section 11;
- "Preparedness" means the state of readiness to deal with a threatening disaster situation or disaster and the effects thereof;
- "Prescribed" means prescribed by rules made under this Act;
- "Reconstruction" means construction or restoration of any property after a disaster;
- "Resources" includes manpower, services, materials and provisions;
- "State Authority" means the State Disaster Management Authority established under sub-section (1) of section 14 and includes the Disaster Management Authority for the Union territory constituted under that section;
- "State Executive Committee" means the Executive Committee of a State Authority constituted under sub-section (1) of section 20;
- "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;
- "State Plan" means the plan for disaster management for the whole of the State prepared under section 23.

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.**

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:-

1. The Prime Minister of India, who shall be the Chairperson of the National Authority, ex officio;
2. 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.

Meetings of National Authority

- 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.
- The Chairperson of the National Authority shall preside over the meetings of the National Authority.
- 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.

Appointment of officers and other employees of the National Authority.-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.

Powers and functions of National Authority

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 -

o Lay down policies on disaster management;

o Approve the National Plan

o Approve plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan;

o Lay down guidelines to be followed by the State Authorities in drawing up the State Plan;

o 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;

o Coordinate the enforcement and implementation of the policy and plan for disaster management;

o Recommend provision of funds for the purpose of mitigation;

o Provide such support to other countries affected by major disasters as may be determined by the Central Government;

o 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;

o Lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

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.