INDIA

- NATIONAL PROFILE
- DISASTER RISK PROFILE
- INSTITUTIONAL SETUP
- INITIATIVES

1. NATIONAL PROFILE [1]

1.1 General

India is one of the oldest civilizations in the world with a kaleidoscopic variety and rich cultural heritage. It has achieved all-round socio-economic progress during the last 67 years of its Independence. India has become self-sufficient in agricultural production and is now one of the top industrialized countries in the world and one of the few nations to have gone into outer space to conquer nature for the benefit of the people. It covers an area of 3,287,590 sq. km (1,269,346 sq mi), extending from the snow-covered Himalayan heights to the tropical rain forests of the south. As the 7th largest country in the world, India stands apart from the rest of Asia, marked off as it is by mountains and the sea, which give the country a distinct geographical entity. Bounded by the Great Himalayas in the north, it stretches southwards and at the Tropic of Cancer, tapers off into the Indian Ocean between the Bay of Bengal on the east and the Arabian Sea on the west.

Lying entirely in the northern hemisphere, the mainland extends between latitudes 8° 4' and 37° 6' north, longitudes 68° 7' and 97° 25' east and measures about 3,214 km from north to south between the extreme latitudes and about 2,933 km from east to west between the extreme longitudes. It has a land frontier of about 15,200 km. The total length of the coastline of the mainland, Lakshadweep Islands and Andaman & Nicobar Islands is 7,516.6 km.

1.2 Physiography

The Indian peninsula is separated from mainland Asia by the Himalayas. The country is surrounded by the Bay of Bengal in the east, the Arabian Sea in the west, and the Indian Ocean to the south. The total geographical area is 3.3 Million sq. km. The mainland comprises of four regions, namely the great mountain zone, plains of the Ganga and the Indus, the desert region, and the southern peninsula.

1.3 Climate

The climate of India can broadly be classified as tropical monsoon. But, in spite of

much of the northern part of India lying beyond the tropical zone, the entire country has a tropical climate marked by relatively high temperatures and dry winters. There are four seasons:

- Winter (December-February)
- Summer (March-June)
- South-west monsoon season (June-September)
- Post monsoon season (October-November)

1.4 Socio-economic Profile

India's population, as on 1 March 2011 stood at 1,210,193,422 (623.7 million males and 586.4 million females). The average annual exponential growth rate stands at 1.64 per cent during 2001-2011. The Crude Birth rate was 18.3 in 2009 and the Crude Death rate was 7.3 in 2009. The life expectancy rate consists of 65.8 years (Males); 68.1 years (Females) in the period 2006-2011. According to 2011 census the sex ratio is 940 females per 1000 males. According to the provisional results of the 2011 census, the literacy rate in the Country stands at 74.04 per cent, 82.14% for males and 65.46% for females. In the country there are 22 different languages that have been recognised by the Constitution of India, of which Hindi is an Official Language. Article 343(3) empowered Parliament to provide by law for continued use of English for official purposes.

Agriculture, with its allied sectors, is unquestionably the largest livelihood provider in India, more so in the vast rural areas. It also contributes a significant figure to the Gross Domestic Product (GDP). Sustainable agriculture, in terms of food security, rural employment, and environmentally sustainable technologies such as soil conservation, sustainable natural resource management and biodiversity protection, are essential for holistic rural development.

1.5 Administrative Setup

India is a Sovereign Socialist Secular Democratic Republic with a Parliamentary system of Government. New Delhi is the capital and there are 29 States and 7 Union Territories in the country. The President of India is the Head of the State,

while the Prime Minister is the Head of the Government, and runs office with the support of the Council of Ministers who form the Cabinet of Ministries. The Indian Legislature comprises of the Lok Sabha (House of the People) and the Rajya Sabha (Council of States) forming both the Houses of the Parliament.

States and Capitals

1. Andhra Pradesh (Hyderabad)
2. Arunachal Pradesh (Itanagar)
3. Assam (Dispur)
4. Bihar (Patna)
5. Chhattisgarh (Raipur)
6. Goa (Panaji)
7. Gujarat (Gandhinagar)
8. Haryana (Chandigarh)
9. Himachal Pradesh (Shimla)
10. Jammu & Kashmir (Srinagar{S*}, Jammu{W*})
11. Jharkhand (Ranchi)
12. Karnataka (Bangalore)
13. Kerala (Thiruvananthapuram)
14. Madhya Pradesh (Bhopal)
15. Maharashtra (Mumbai)
16. Manipur (Imphal)
17. Meghalaya (Shillong)
18. Mizoram (Aizawl)
19. Nagaland (Kohima)
20. Odisha (Bhubaneshwar)
21. Punjab (Chandigarh)
22. Rajasthan (Jaipur)
23. Sikkim (Gangtok)
24. Tamil Nadu (Chennai)
25. Telangana (Hyderabad)
26. Tripura (Agartala)
27. Uttarakhand (Dehradun)
28. Uttar Pradesh (Lucknow)
29. West Bengal (Kolkata)

Union Territories and Capitals

1. Andaman and Nicobar Islands (Port Blair)
2. Chandigarh (Chandigarh)
3. The Government of NCT of Delhi (Delhi)
4. Dadra and Nagar Haveli (Silvassa)
5. Daman and Diu (Daman)
6. Lakshadweep (Kavaratti)
7. Puducherry (Puducherry)

2. DISASTER RISK PROFILE [2]

2.1 Vulnerability to Disasters

India has been vulnerable, in varying degrees, to a large number of natural, as well as, human-made disasters on account of its unique geo-climatic and socio-economic conditions. It is highly vulnerable to floods, droughts, cyclones, earthquakes, landslides, avalanches and forest fires. Out of 36 states and union territories in the country, 27 of them are disaster prone. Almost 58.6 per cent of the

landmass is prone to earthquakes of moderate to very high intensity; over 40 million hectares (12 per cent of land) are prone to floods and river erosion; of the 7,516 km long coastline, close to 5,700 km is prone to cyclones and tsunamis; 68 per cent of the cultivable area is vulnerable to drought and hilly areas are at risk from landslides and avalanches. A multi-hazard map of India is given in Figure 1.

(a) India is one of the ten most disaster prone countries of the world. The country is prone to disasters due to a number of factors; both natural and human induced, including adverse Geo- climatic conditions, topographic features, environmental degradation, population growth, urbanization, industrialization, non scientific development practices, etc. The factors, accelerating the intensity and frequency of disasters are responsible for heavy toll of human lives and disrupting the life support system in the country. As far as the vulnerability to disaster is concerned, the five distinctive regions of the country i.e. Himalayan region, the alluvial plains, the hilly part of the peninsula, and the coastal zone have their own specific problems. While on one hand the Himalayan region is prone to disasters like earthquakes and landslides, the plain is affected by floods almost every year. The desert part of the country is affected by droughts and famine while the coastal zone susceptible to cyclones and storms.

(b) The natural geological setting of the country is the primary basic reason for its increased vulnerability. The geo-tectonic features of the Himalayan region and adjacent alluvial plains make the region susceptible to earthquakes, landslides, water erosion, etc. Though peninsular India is considered to be the most stable portions, but occasional earthquakes in the region shows that geo- tectonic movements are still going on within its depth.

(c) The tectonic features, characteristics of the Hiamalaya are prevalent in the alluvial plains of Indus, Ganga and Brahmaputra too, as the rocks lying below the alluvial pains are just extension of the Himalayan ranges only. Thus this region is also quite prone to seismic activities. As a result of various major river systems flowing from Himalaya and huge quantity of sediment brought by them, the area is also suffering from river channel siltation, resulting into frequent floods, especially in the plains of Uttar Pardesh and Bihar.

(d) The western part of the country, including Rajasthan, Gujarat and some parts of Maharashtra are hit very frequently by drought situation. If Monsoon worsens the situation spreads in other parts of the country too. The disturbance in the pressure conditions over oceans, results into cyclones in coastal regions. The Geo-tectonic movements going on in the ocean floor make the coastal region prone to tsunami disaster too.

(e) The extreme weather conditions, huge quantity of ice and snow stored in the glaciers, etc. are other natural factors which make the country prone to various forms of disasters.

(f) Along with the natural factors discussed in the preceding text, various human induced activities like increasing demographic pressure, deteriorating environmental conditions, deforestation, unscientific development, faulty agricultural practices and grazing, unplanned urbanisation, construction of large dams on river channels etc. are also responsible for accelerated impact and increase in frequency of disasters in the country.

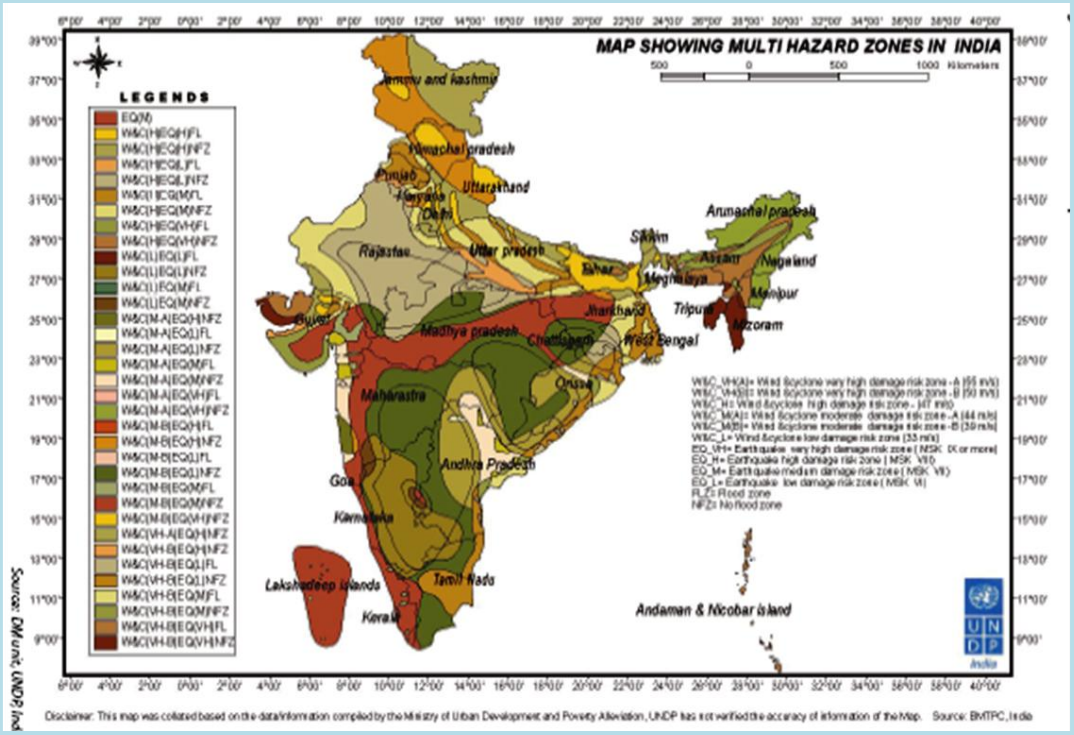


Figure 1: Multi Hazard Map of INDIA

2.2 Climate Conditions & Disaster

India is home to an extraordinary variety of climatic regions, ranging from tropical in the south to temperate and alpine in the Himalayan north. The nation's climate is strongly influenced by the Himalayas and the Thar deserts. For the purpose of identification of drought prone areas by Central Water Commission (CWC) the criteria adopted was that "drought is a situation occurring in an area when the annual rainfall is less than 75 percent of normal in 20 percent of the years examined. Any block or equivalent unit where 30 percent or more of the cultivated area is irrigated is considered to have reached a stage, which enables it to sustain a reasonable protection against drought". A study rainfall data from 1875 to 1998 indicated the percentage area of the country affected by moderate and severe drought. It may be noted that during the complete 124 year period there were three occasions i.e. 1877, 1899 and 1918 when percentage of the country affected by drought was more than 60 percent).

2.3 Common Type of Disasters 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

2.3.1 Natural Disasters

(A) Drought

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.

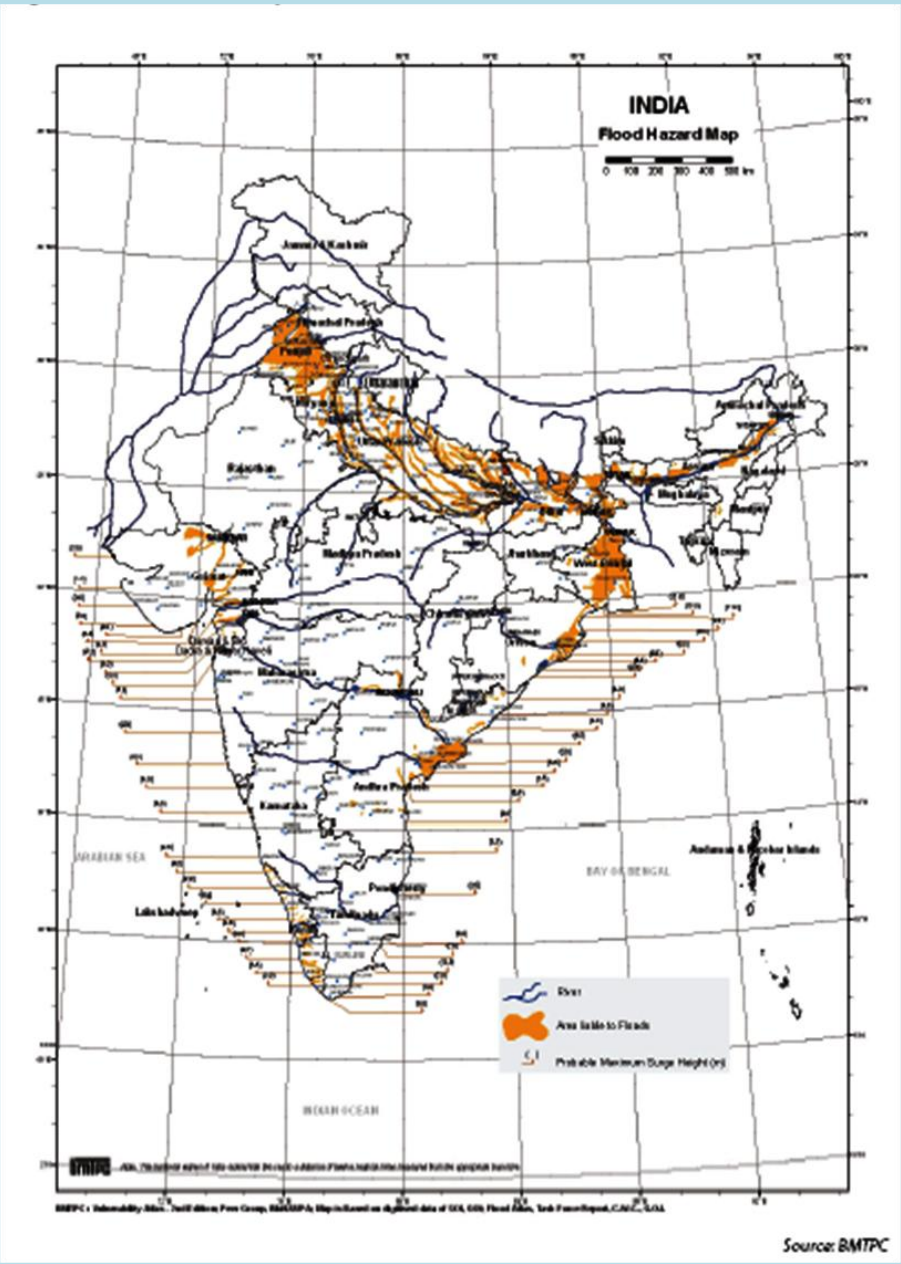


Figure 2: Flood Hazard Map of INDIA

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

produce. Sometimes, water remains standing over large areas for long span of time hampering the Rabi crops. The flood hazard map of India may be seen in the Figure 2.

Twenty-three of the thirty five states and Union Territories in the country are subject to floods and 40 million hectares of land, roughly one-eighth of the country's geographical area, is prone to floods. The National Flood Control Program was launched in the country in 1954. Since then sizeable progress has been made in the flood protection measures. By 1976, nearly one third of the flood prone area had been afforded reasonable protection; considerable experience has been gained in planning, implementation and performance of flood warning, protection and control measures (CWC, 2007). Table 1 presents the flood affected area and damages for the period 1953 to 2004 in India as per Water Data Complete Book 2005 and Central Water Commission, 2007).

Table 1 presents the flood affected area and damages for the period 1953-2012 in India as per CWC, Ministry of Water Resources, Govt. of India. An analysis of data of different states for the period of 1953-2012 reveals that average annual damage to crops, houses and public utilities in the country was around Rs. 3695.299 crore and maximum reported 32551.758 crore was in the year of 2009. On an average, an area of about 7.140 million hectares (17.50 mha maximum in 1978) was flooded, of which, on average crop area affected was of the order of 3.759 million hectares (12.299 mha in 2005). The impacts of floods claimed on an average 1641.400 human life and 95509.300 heads of cattle dead every year.

Table 1: Flood affected areas and damages in India (1953 -2011)

Area Affected (Million Hectare)	**7.140**	**17.500(1978)**
Crop Area Affected (Million Hectare)	3.759	12.299(2005)
Population Affected (Million)	32.135	70.450(1978)
Human Lives Lost (Nos.)	1641.400	11,316(1977)
Cattle Lost (Nos.)	95509.300	6,18,248(1979)
Houses Damaged (Nos.)	1236946.633	35,07,542(1978)
Value of damage to crops (crore)	1125.729	7307.230(2003)
Value of damage to house (crore)	560.232	10809.795(2009)
Value of damage to public utilities (crore)	1989.554	17509.353(2009)

Value of damage to crops, houses & public utilities (crore)	3695.299	32551.758(2009)

Source: Central Water Commission, Ministry of Water Resources, Government of India

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.

Vulnerability to floods and other natural disasters is caused by the high population density, widespread poverty, unemployment, illiteracy, enormous pressure on rural land, and an economy traditionally dominated by agriculture. Children and women are particularly vulnerable. Eighty- five percent of the deaths during disasters are of women and children (Centre for Research on the Epidemiology of Disasters, CRED 2000). Presently there is an inadequate level of protection in the country against floods. Though non-structural measures improve the preparedness to floods and reduce losses, the necessity of structural measures would always remain to reduce the extent of physical damage caused by floods. In future, programme, flood control and management planning along with climate change need to be integrated into development planning for the country.

(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. On an average, five or six tropical cyclones

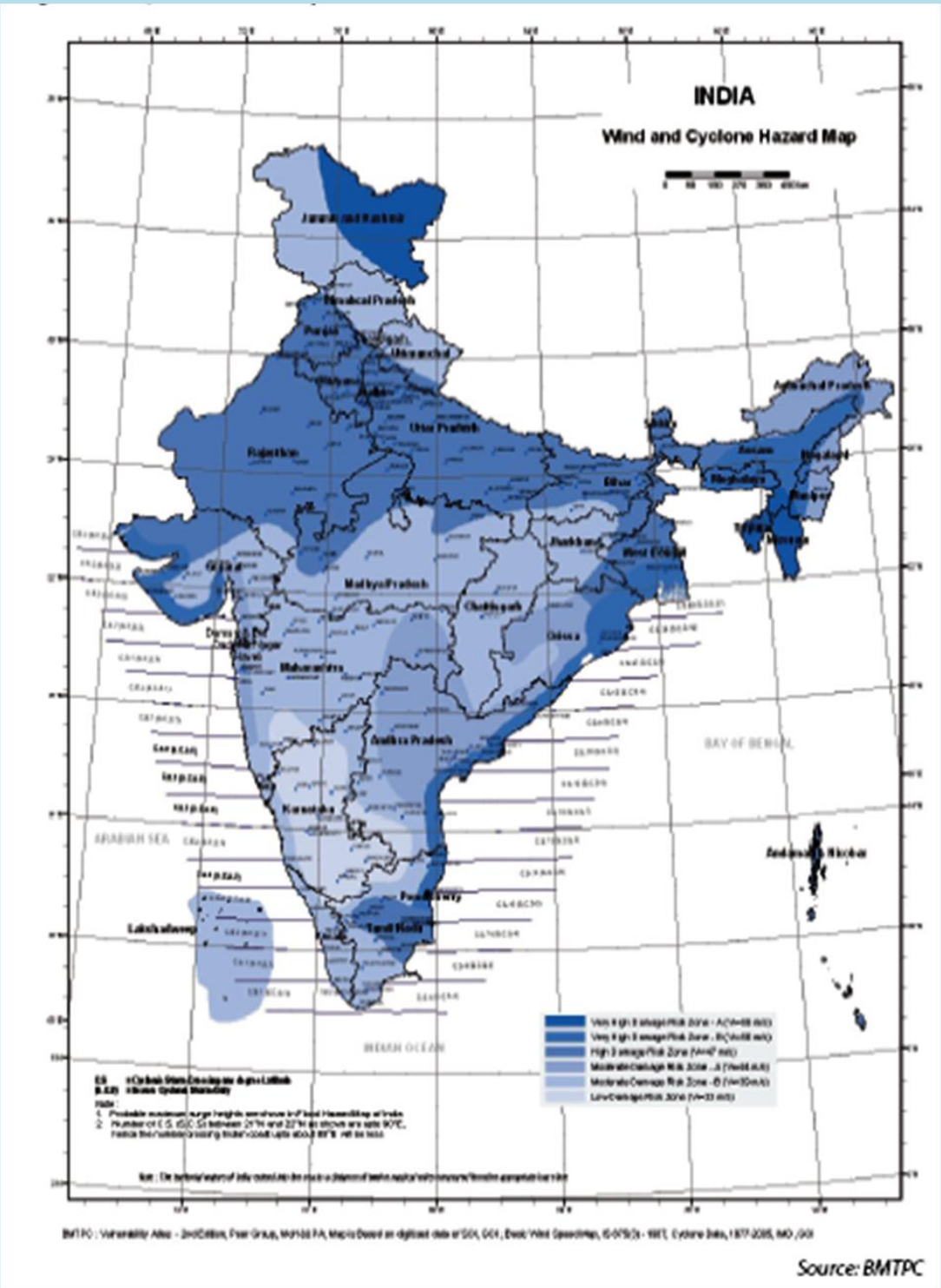


Figure 3: Cyclone Hazard Map

occur every year, of which two or three could be severe. Most cyclones occur in the Bay of Bengal followed by those in the Arabian Sea and the ratio is approximately 4:1. The incidence of cyclonic storms, with wind speeds between 65 Km/h and 117 Km/h and severe cyclonic storm with wind speeds between 119 Km/h and 164 Km/h, reaching Tamil Nadu and Andhra Pradesh is high during the north east monsoon season i.e. October – December, where as the highest annual number of storms, severe storms occur in the Orissa - West Bengal coast.

A severe super cyclonic storm with winds of up to 250 km/hour crossed the coast in Orissa on October 29, 1999. This may have been the worst cyclone of the country in the Orissa region and was responsible for as many as 10,000 deaths, rendering millions homeless and extensive damage to property and environment.

The yearly distribution of tropical cyclones in the north Indian Ocean indicates large year to year variations in the frequency of cyclonic disturbances and tropical cyclones, but no distinct periodicity. However, the trend indicates a slight decrease with time. The annual average of cyclonic disturbances in the North Indian Ocean is about 15.7 with a standard deviation of 3.1. The annual number of cyclonic disturbances range from seven in 1984 to twenty three in 1927. The annual average of tropical cyclones has varied from one in 1949 to ten in 1893, 1926, 1930 and 1976. The Cyclone hazard map of India may be seen in the Figure 3, gives the vulnerability map of hazard due to cyclone.

(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. Table 2 gives the number of heat waves observed in India during 1911-2012.

In recent years, heat wave induced casualties have somewhat increased. Abnormally high temperatures were observed during April 2002 across the country. On 10th May 2002, the maximum temperature at Gannavaram (Vijayawada) 49°C (WMO 2003) was recorded. 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.

Table 2: Deaths due to Heat Waves in India

Year	No of Deaths	Year	No of Deaths	Year	No of Deaths
1979	361	1989	44	1999	126
1980	156	1990	2	2000	57
1981	72	1991	252	2001	70
1982	16	1992	114	2002	806
1983	185	1993	42	2003	1539
1984	58	1994	434	2004	117
1985	142	1995	412	2005	587
1986	156	1996	20	2006	135
1987	91	1997	20	2007	476
1988	637	1998	1662	2008	294
2011	793	2010	1274	2009	1071
Source: NCRB 2009. 2010 and 2011 reports					

(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. Table 3 gives the frequencies of the occurrence of cold waves in different parts of the country for different periods. In recent years due to deterioration of the air quality in urban locations of India the deaths and discomfort from cold waves have been substantial. 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.

Table 3: Number of Cold Waves in India (1901-2009)

	Epochs					
	1901-10	**1911-67**	**1968-77**	**1978-99**	**2000-2009**	**1901-2009**
West Bengal	2	14	3	28	7	54
Bihar	7	27	8	67	12	121
Uttar Pradesh	21	51	8	47	13	140
Rajasthan	11	124	7	53	12	207
Gujarat, Saurashtra	2	85	6	6		99
Punjab	3	34	4	19	10	70
Himachal Pradesh		-	6	18	4	26
Jammu &	1	189	4	15	2	213
Maharashtra		60	7	18	1	83
Madhya Pradesh	9	88	-	12	1	117
Orissa	4	5	-	-	3	15
Andhra Pradesh	2		-	-		2
Assam	1	1	-	-	2	4
Haryana, Delhi & Chandigarh			4	15	15	34
Tamil Nadu		-	-	-		-
Karnataka		10	-	-		10
Jharkhand		-	-	-	1	1

Source: IMD Disastrous weather Event annual reports; EMDAT

Note: Epoch is defined as number of events

Table 3.1: Number of Cold Waves in India from Year (2010-2012)

State	**Year (2010-2012)**
UP, Himachal Pradesh	100 (2010)
UP, Haryana, Punjab	132 (2011)
New Delhi, Allahabad	80 (2011)
UP	133 (2012)
Karimnagar, Vishakhapatnam	85 (2012)

Source EMDAT

(F) Earthquake

1. India has been divided into four seismic zones according to the maximum intensity of earthquake expected (Figure 4). Of these, zone V is the most active which comprises of whole of Northeast India, the northern portion of Bihar, Uttarakhand, Himachal Pradesh, J&K, Gujarat and Andaman & Nicobar Islands. India has highly populous cities and the constructions in these cities are predominantly not earthquake resistant. Regulatory mechanisms are weak, thus any earthquake striking in one of these cities would turn into a major disaster. Six major earthquakes have struck different parts of India over a span of the last 15 years.

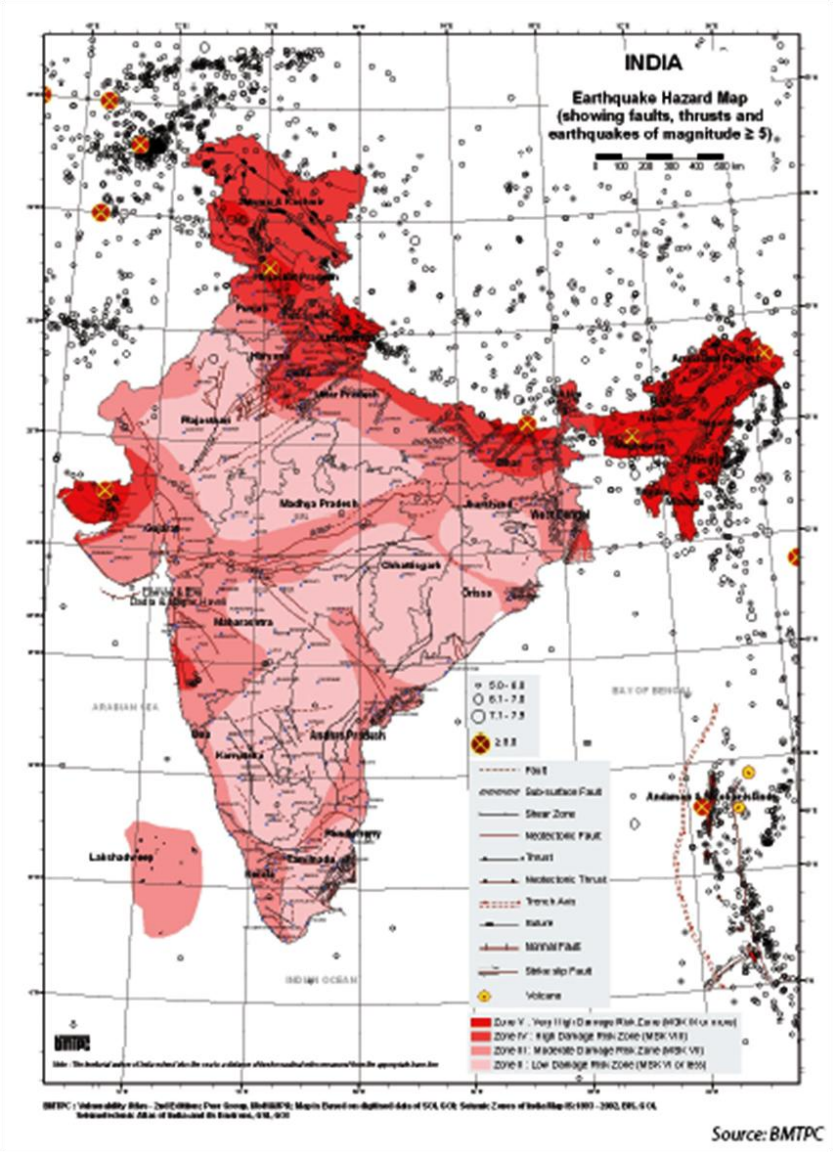


Figure 4: Earthquake Hazard Map of India

2. 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. Some significant earthquakes in India are listed in the Table 4.

Table 4: Some Significant Earthquakes in India

Date	Epicenter		Location	Magnitude
	Lat. (Deg. N)	Long. (Deg. E)		
10-Jun-2008	29.8	90.2	Tibet	6.4
27-Jun-08	11.0	91.6	Andaman Islands	6.7
28-Jun-08	10.8	91.7	Andaman Islands	6.1
25-Aug-08	30.9	83.6	Tibet	6.4
08-Oct-08	11.1	91.6	Andaman Islands	6
10- Nov.-2009	08.1	92.0	Nicobar Islands	6.1
30/03/2010	13.8°	92.8	North off Coast of Andaman Islands	6.8
12/06/2010	7.9	91.9	Off West Coast of Nicobar Islands	7.8
18/06/2010	13.4	93.0	Andaman Islands	6
10/11/2010	45.5	96.5	Southeast Indian Ridge	6.3
18/9/2011	27.7	88.2	Indo-Nepal border in Sikkim	6.9

Source: IMD & SADR

(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.

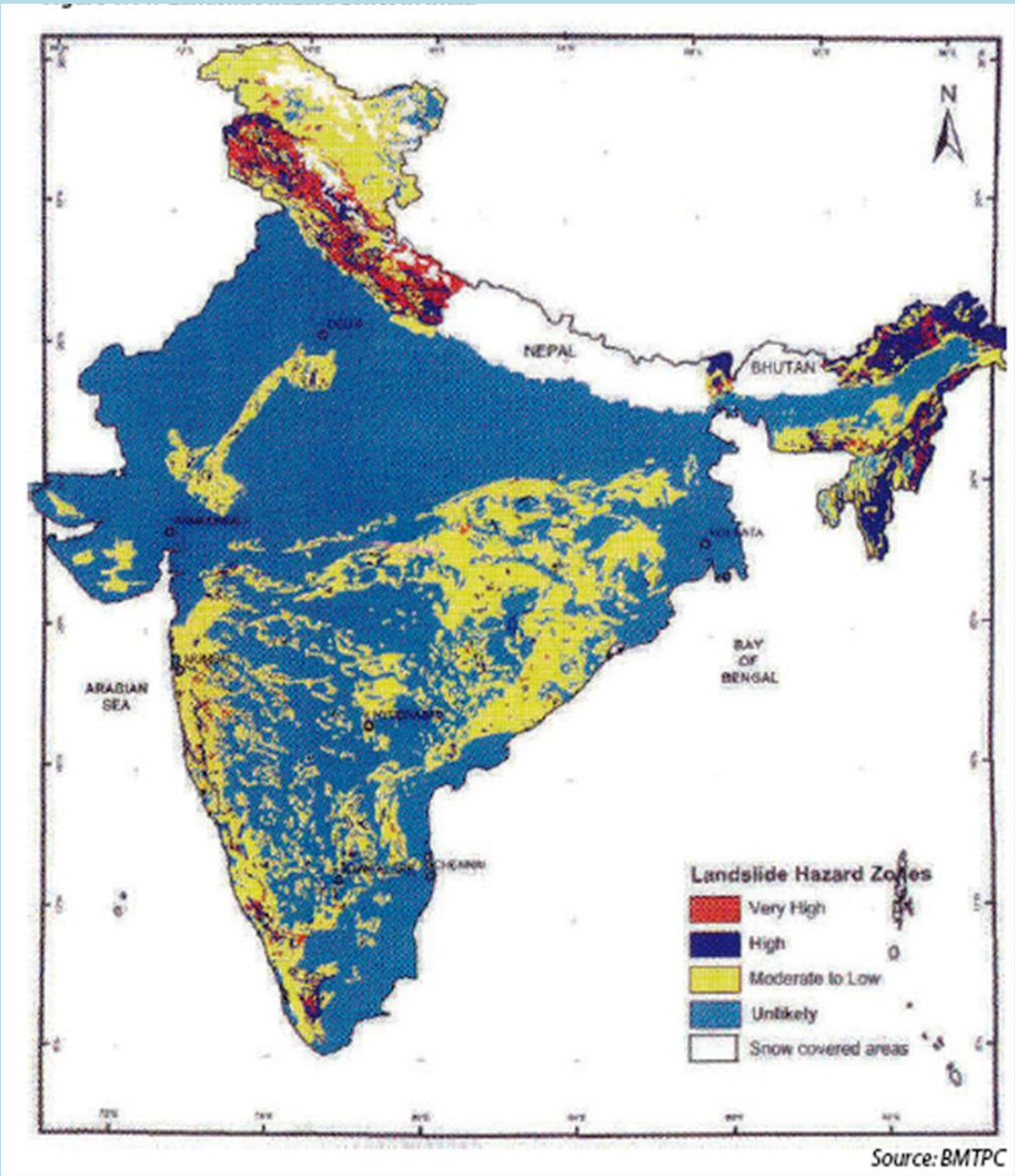


Figure 5: Landslide Hazard Zones in India

On 30 July 2014, a landslide occurred in the village of Malin in the Ambegaon taluka of the Pune district in Maharashtra, India and at least 115 people died.

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. Figure 5 shows the landslide hazard zones in India.

(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". Seismicity generated 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 amplitude but a very long wavelength (often hundreds of kilometer long). It may be caused by non-seismic 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

Historical Tsunamis in India

• 12 Apr, 1762 (Earthquake in Bay of Bengal)
• 31 Dec, 1881 (Car Nicobar Earthquake)
• 27 Aug, 1883 (Eruption of Karkatoa volcano (Sunda Strait) Indonesia)
• 26 Jun, 1941 (Andaman Earthquake)
• 27 Nov, 1945 (Makran Earthquake)
• 26 Dec, 2004 (Sumatra Earthquake)

December 2004: Tsunami in Indian Ocean

The Tsunami of 26th December 2004 caused extensive damage to life and property in the states of Tamil Nadu, Kerala, Andhra Pradesh, UTs of Puducherry and Andman & Nicobar Islands (A & NI). The Tsunami disaster had badly affected the fishermen community who not only lost their near and dear ones but also lost their means of livelihood. A population of 26.63 lakhs in 1396 villages in five states and UTs was affected by this disaster. Almost 9395 people lost their lives and 3964 people were reported missing and feared dead. Most of the missing persons were from Andaman & Nicobar Islands.

2.3.2. 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. A year wise list of chemical disasters for past decade may be seen in Table 5.

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

SL No.	Year	No. of incidents	No. of Deaths	No. of injured	States where the incidents were recorded
1.	2002	06	05	31	Gujarat, Kerala, Maharashtra
2.	2003	06	11	112	Andhra Pradesh, Assam, Kerala, Madhya Pradesh, Punjab
3.	2004	18	47	91	Andhra Pradesh, Gujarat, Haryana, Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttarakhand, West Bengal, Delhi
4.	2005	11	15	14	Andhra Pradesh, Assam, Gujarat, Kerala, Tamilnadu, Uttar Pradesh
5.	2006	16	32	24	Andhra Pradesh, Gujarat, Kerala, Maharashtra, Rajasthan, Uttarakhand, Uttar Pradesh, West Bengal
6.	2007	18	37	14	Assam, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Punjab, Uttarakhand, West Bengal
7.	2008	23	50	148	Andhra Pradesh, Gujarat, Jharkhand, Kerala, Maharashtra, Uttar Pradesh
8.	2009	24	50	128	Andhra Pradesh, Assam, Haryana, Kerala, Madhya Pradesh, Punjab, Rajasthan, Uttar Pradesh, Uttarakhand, West Bengal
9.	2010	08	12	01	Andhra Pradesh, Assam, Maharashtra, Punjab, Uttar Pradesh
10.	**Total**	**130**	**259**	**563**	

Source: Ministry of Environment and Forests

Table 5: Year wise Chemical disasters in India during the last decade

(B) 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

Table 6: Major Stampedes in India 2005-2010

Month & Year	Event	No. of	Injure
January 2005:	Hindu pilgrims stampede near a remote temple in Maharashtra,	265	
December 2005:	Flood relief supplies were handed out to homeless refugees in	42	
October 3, 2007	Train station in northern India	14	
March 27, 2008	Indian temple crush during a	8	10
August 3, 2008	At the Naina Devi temple in	138	47
	Pradesh		
September 30,	At the Chamunda Devi	147	
	Jodhpur, India.		
March 4, 2010	At Ram Janki Temple, in Kunda,	71	200
January 14, 2011	At Sabarimala, Kerala	104	50
January 14, 2012	At Hussain Tekri near Jaora town in Ratlam district, Madhya Pradesh	10	

Source: NIDM

(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.

Global Status Report on Road Safety (WHO, 2009) has estimated that 1.2 million people die on the world's road every year, and as many as 50 million others are injured. Over 90% of deaths occurred in low income and middle income countries, which have only 48% of the world's registered vehicles. The problem of road safety is acute in India. In the year 2008 alone, number of road accidents were 4.8 lakh resulting in close to 1.2 lakh deaths and 5.2 lakh injured, many of whom are disabled for rest of their lives. Sadly, many of these victims are economically active young people.
Trends in accidents, injuries, fatalities, motor vehicles & road network: Between 1970 and 2008, the number of accidents quadrupled with more than 7 fold increases in injuries and more than 8 fold increase in fatalities in the backdrop of about 64 fold increase in the number of registered motor vehicles and threefold increase in road network.

Profile of road accidents: The proportion of fatal accidents in the total road accidents has consistently increased since 2002 as reflected in Table 1.19 and 1.20. The severity of road accidents measured in terms of persons killed per 100 accidents is observed to have increased from minimum (20.8) in 2002 to maximum (28.6) in 2011(P).

Table 1.19: Number of Accidents and Number of Persons Involved 2001-2011

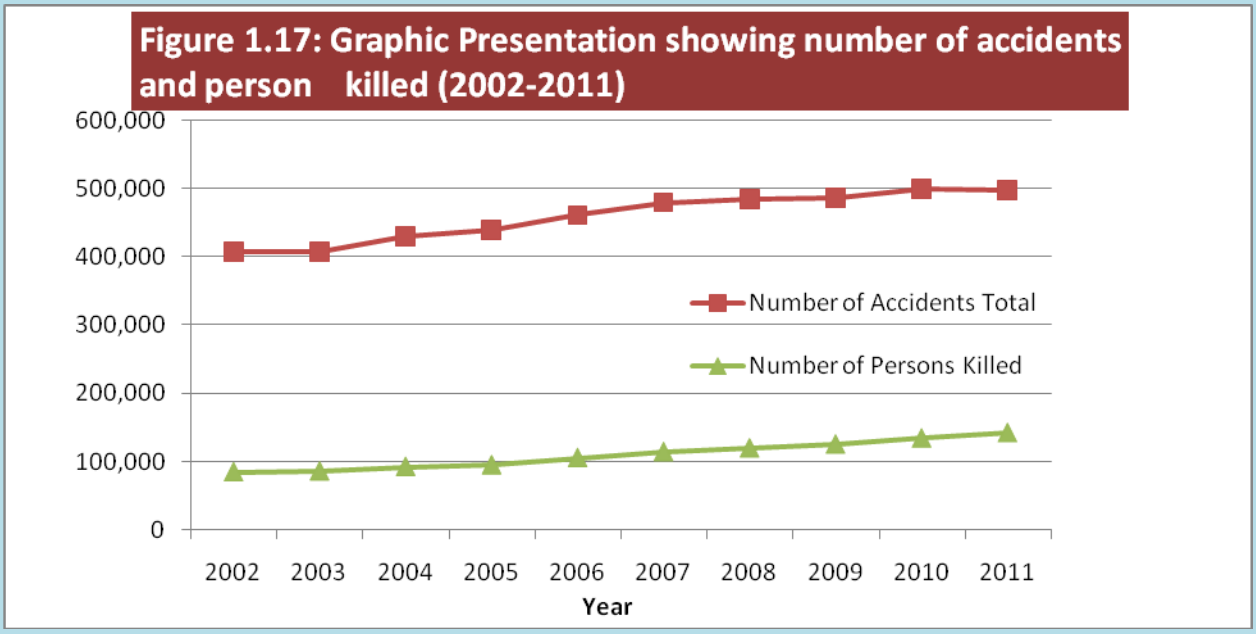
Number of Road Accidents and Number of Persons Involved: 2002 to 2011					
Year	Number of Accidents		Number of Persons		Accident Severity*
		Fatal	Killed	Injured	
2002	4,07,497	73,650(18.1)	84,674	408,711	20.8

2003	4,06,726	73,589(18.1)	85,998	435,122	21.1
2004	4,29,910	79,357(18.5)	92,618	464,521	21.5
2005	4,39,255	83,491 (19.0)	94,968	465,282	21.6
2006	4,60,920	93,917 (20.4)	105,749	496,481	22.9
2007	4,79,216	1,01,161 (21.1)	114,444	513,340	23.9
2008	4,84,704	1,06,591 (22.0)	119,860	523,193	24.7
2009	4,86,384	1,10,993(22.8)	125,660	515,458	25.8
2010	4,99,628	1,19,558(23.9)	134,513	527,512	26.9
2011 (P)	4,97,686	1,21,618(24.4)	1,42,485	5,11,394	28.6

(P): Provisional. Source: Information supplied by States/UTs (Police Departments). Figures within parentheses indicate share of fatal accidents to total accidents. * Accident Severity : No. of Persons Killed per 100 Accidents

Source Transport Research Wing, Ministry of Road Transport & Highways, GOI

Figure 1.17 shows that there is increasing trend in road accidents and death from year 2002 – 2011.



Road Accidents: Inter State Comparisons: Maharashtra, Tamil Nadu and Karnataka which had a share of around 30.4 % in total number of vehicles registered in India in 2006, accounted for about 38% of the total road accidents , 28 % of the total number of persons killed and 35% of the total persons injured in road accidents in year 2008 (Table 1.17).

Data from 2008- 2011 to added in Table 1.20. Table 1.20 with the following updated data also be attached in the book

Table 1.20: All India Shares of Select States (in %): Road Accidents, Injuries, Deaths and Registered Motor Vehicles: 2008 to 2011

All India Share of Select States (in %): Road Accidents, Injuries, Deaths and Registered Motor Vehicles: 2008 to 2011				
State/UT	2008	2009	2010	2011 (P)
Top* 5 States: Share in Total Number of Road Accidents (in %)				
Share of 5 States	55.4	55.3	55.5	54.8
1 .Maharashtra	15.6	14.8	14.3	13.8
2.Tamil Nadu	12.5	12.5	13.0	13.2
3. Madhya Pradesh	9.0	9.7	10.0	9.9
4.Karnataka	9.5	9.3	9.3	9.0
5.Andhra Pradesh	8.8	9.0	8.9	8.9
Share of the above 5 States in total Registered Vehicles.	42.0	42.1	42.6	42.7
***: Top 5 according to their respective shares in 2011 P : Provisional**				

Source Transport Research Wing, Ministry of Road Transport & Highways, GOI

(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."

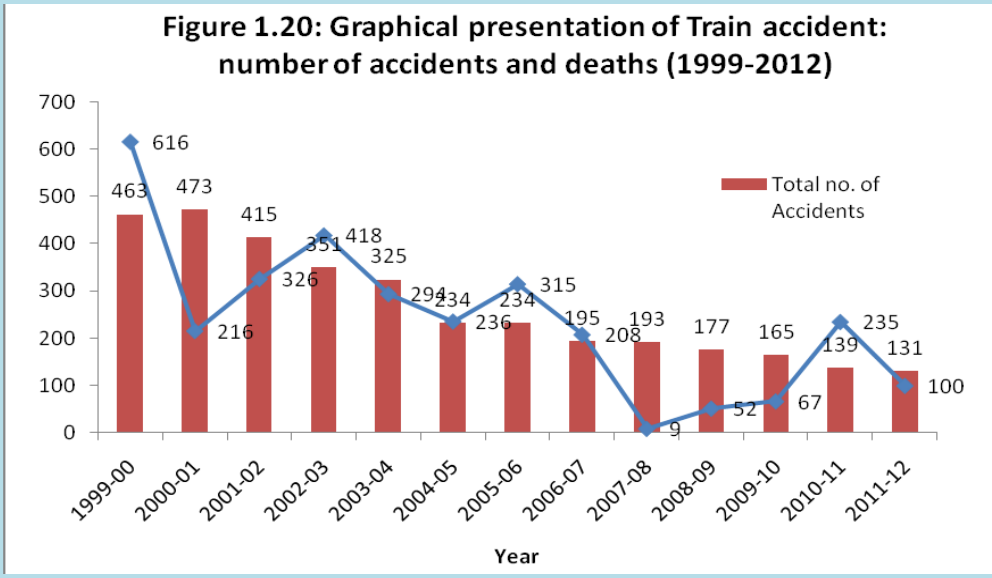
The preparation of Disaster Management Plan on Indian Railways and on the Zonal Railways in coordination with the different Departments of the Railway, other Central/State Govt. agencies, NGOs, private agencies, etc. has to be done by the Safety Department in the railway Board, on the Zonal Railway and 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. The statistics of the death and injured in the consequential train accidents during the last ten years are given in Table 7.

Table 7: Major Train Accidents in India between 1999-20012

Year	Collisions	Derail-mints	LC Accidents	Fire	Misc	Death	Injured	Total	Acct./ MTK
1999-	20	329	93	21		616	1121	463	0.65
2000-	20	350	84	17	2	216	488	473	0.65
2001-	30	280	88	9	8	326	808	415	0.55
2002-	16	218	96	14	7	418	982	351	0.44
2003-	9	202	95	14	5	294	492	325	0.41
2004-	13	138	70	10	3	236	412	234	0.29
2005-	9	131	75	15	4	315	627	234	0.28
2006-	8	96	79	4	8	208	402	195	0.23
2007-	8	100	77	5	4	186	412	194	0.22
2008-	13	85	69	3	7	207	416	177	0.20
2009-	9	80	70	2	4	67	253	165	0.17
2010-	5	78	53	2	1	235	358	139	0.14
2011-	9	55	61	4	2	100	586	131	0.12

Source Ministry of Railways

There is visible decreasing trend in rail accidents and deaths from the year 1999-2012 as shown in Figure 1.20. It shows that there is a better preparedness and latest technologies have been utilized in reducing the train accidents and subsequent deaths.



(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. Accidents to Indian Civil Registered Aircraft from 1990 to 2000 may be seen in Table 8.

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.

Table 8: Accidents to Indian Civil Registered Aircraft from 1990 to 2000.

S/N	Date/ Place	A/c Type/Regn.	Operator	Fatalities	Damage Details
1	14/02/1990	Airbus A-320 VT-EPN Banglore	Indian Airlines	92	Destroyed
2	16/08/1991, Imphal	Boeing 737 VT	Indian Airlines	69	Destroyed
3	05/09/1991, Patiala	Pushpak MK -1	Delhi Flying Club	2	
4	26/04/1993, Aurangabad	Boeing 737 VT-ECQ	Indian Airlines	55	Destroyed
5	11/07/1996, Near Kullu	L-410, VT-ETC	Archna Airways	9	Destroyed
6	12/11/1996, New Delhi	B-747 & IL-76 SV-763 & KZ- 1907	Saudi Arabian Kazakhstan	349	Destroyed
7	17/7/2000, Patna	B-737-200 VT-EGD	Alliance Air	60	Destroyed
8	29/7/2000, Near Mandi, HP	Super King Air B 200 VT-EIE	Aerial Svc. Pvt. Ltd	5	Destroyed

9	4 September 2009, Chhatrapati Shivaji International Airport, Mumbai	Air India flight 829, a Boeing 747-400	Air India	21 Injured	Partially damaged
10	22, May 2010, Manglore, International	Flight No. 812, Boeing 737800	Air India	158 died	Destroyed

Source: Director General Civil Aviation (DGCA)

(E) 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,

The details of disasters involving 10 or more fatalities in both coal & Non coal mines in India are given in the Table 9.

Table 9: Detail of Disasters (more than 10 fatalities) in Coal mines during 1901-2010 in India

SI. No.	Date of Accident	Name of Mine	Killed	Injured	Brief Cause
1	16-Jun-1908	Nadir Khas	20	0	Explosions of fire-damp
2	7-Feb-1910	Dishergarh	11	0	Explosion of fire-damp
3	15-Oct-1910	Sitalpur	12	0	Fall of roof
4	26-Nov-1910	Namdang	14	4	Explosion of fire-damp
5	9-Nov-1911	Kendwadih	14	0	Explosion of fire-damp
6	11-Jul-1912	Phularitand	21	0	Irruption of water
7	28-Jun-1913	Jotejanake	13	0	Irruption of water
8	22-Oct-1913	Chowrasi	27	0	Explosion of fire-damp
9	31-Aug-1915	Chanda	10	0	Miscellaneous on Surface
10	4-Feb-1916	Bhowra	24	0	Miscellaneous on Surface
11	20-Jul-1916	Dishergarh	14	4	Explosion of Are-damp
12	18-Nov-1918	Dishergarh	10	4	Explosion of Are-damp
13	24-Nov-1919	Kustore South	14	0	In Shaft (Rope/Chain
14	28-Feb-1921	Amlabad	11	0	Explosion or Fire-damp
15	9-Mar-1922	Khost	13	3	Explosions
16	4-Jan-1923	Parbelia	74	0	Explosion/Ignition of
17	14-Apr-1923	Rawanwara	16	1	Fall of Roof
18	17-Feb-1931	Nongah	13	3	Explosives
19	16-Jan-1935	Loyabad	11	0	Irruption of Water
20	29-Jun-1935	Bagdigi	19	7	Explosion/Ignition of
21	24-Jul-1935	Kurhurbaree	62	14	Explosion/Ignition of
22	30-Jan-1936	Loyabad	35	0	Fire/Suffocation by Gases
23	18-Dec-1936	Poidih	209	0	Explosion/Ignition of
24	6-Jul-1942	Makerwal	14	0	Irruption of Water
25	22-Feb-1943	Sodepur 9, 10 &11 Pits	13	3	Fall of Roof
26	8-Oct-1943	Jhamuria 7 &8	12	1	Sundries Underground
27	19-Mar-1946	Begunia	13	0	Explosion/Ignition of
28	12-Jul-1952	Dhemo Main	12	0	Fall of Roof
29	5-Aug-1953	Majri	11	0	Irruption of Water
30	14-Mar-1954	Damra	10	0	Explosion/Ignition of
31	10-Dec-1954	Newton Chikli	63	0	Irruption of Water

32	5-Feb-1955	Amla bad	52	1	Explosion of Intlamable Gas
33	26-Sep-1956	Burradhemo	28	0	Irruption of Water
34	19-Feb-1958	Chinakuri 1 &2 Pits	176	7	Explosions
35	20-Feb-1958	Central	23	0	Irruption of Water
36	5-Jan-1960	Damua	16	0	Irruption of Water
37	28-May-1965	Dhori	268	9	Explosion of Coal Dust
38	11-Apr-1968	West Chirimiri	14	16	Fall of Sides
39	18-Mar-1973	Noonodih	48	13	Explosion/Ignition of Gas/Dust
40	8-Aug-1975	Kessurgarh	11	1	Fall of Roof
41	18-Nov-1975	Silewara	10	1	Irruption of Water
42	27-Dec-1975	Chasnalla	375	0	Irruption of Water
43	16-Sep-1976	Central Saunda	10	0	Irruption of Water
44	4-Oct-1976	Sudamdih	43	3	Explosion/Ignition of Gas/Dust
45	22-Jan-1979	Baragolai	16	0	Explosion/Ignition of Gas/Dust
46	24-Jun-1981	Jagannath	10	4	Fire
47	16-Jul-1982	Topa	16	4	Fall of Roof
48	14-Sep-1983	Hurriladih	19	0	Inundation
49	25-Jan-1994	New Kenda	55	0	Fire
50	27-Sep-1995	Gaslitand	64	0	Irruption of Water
51	3-Mar-1997	New Moghla	10	12	Explosion/Ignition of Gas/Dust
52	24-Jun-2000	Kawadi	10	0	Fall of Sides
53	2-Feb-2001	Bagdigi	29	0	Irruption of Water
54	16-Jun-2003	Godavari No.7	17	0	Irruption of Water
55	17-Oct-2003	Godavari No.	10	2	Fall of Roof
56	15-Jun-2005	Central Sounda	14	0	Irruption of Water
57	6-Sep-2006	Bhatdee	50	0	Explosion/Ignition of Gas/Dust
58	6-May-2010	Anjan Hill	14	5	Other explosive accident

Source: Directorate of Mines Safety

(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. Besides direct costs in epidemic control measures and treatment of patients, the indirect costs due to negative impact on domestic and international tourism and trade can be significant. For example, plague which was not reported from any part of India for almost a quarter of century, caused a major outbreak in Beed district in Maharashtra and Surat in Gujarat in 1994 and resulted in an estimated loss of almost US$ 1.7 billion.

Several factors related to microbes, environment and host susceptibility contribute to the occurrence of epidemics. Because of prevalence of these factors, developing countries including India are frequently affected by epidemics/ outbreaks which result in high morbidity and mortality and affect the public health and economy adversely. Outbreaks reported by States under the Integrated Disease Surveillance Project (IDSP) during the period 2008-2010 are shown in Table 10.

Table 10: Disease-wise outbreaks/epidemics reported by states under IDSP, 2008-10

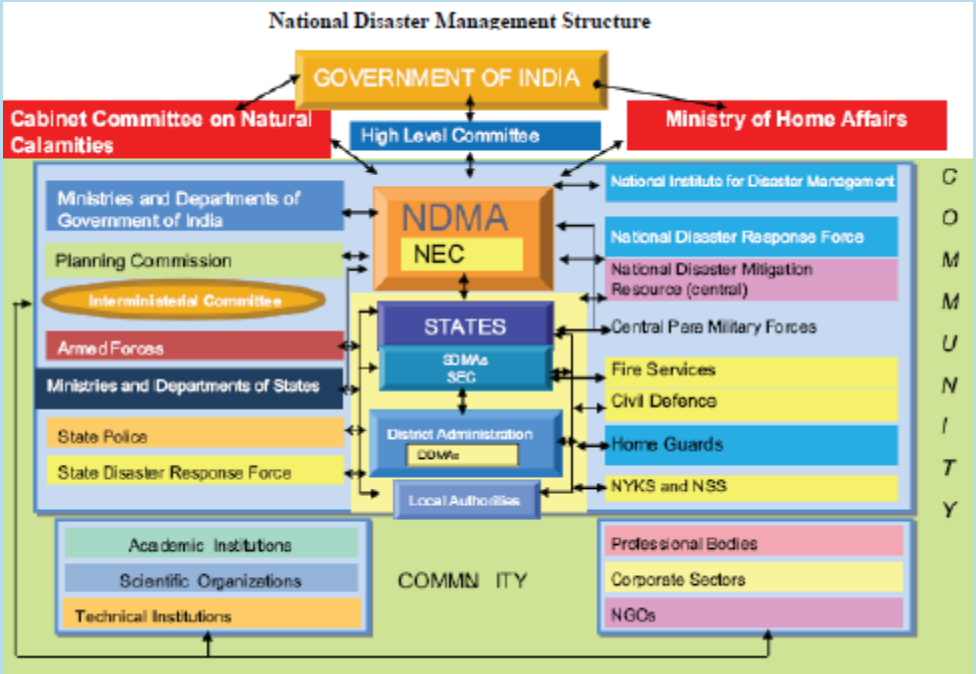
	Disease / illness	**No. of outbreaks**			**Total**
		2008	2009	2010	
	Acute Diarrhea Disease	228	332	411	971
	Food Poisoning	50	121	188	359
	Measles	40	44	94	178
	Malaria	43	34	37	114
	Chikungunya,	25	61	25	111
	Viral Fever	31	37	40	108
	Chicken Pox	12	4S	47	104
	Dengue	42	20	40	102
	Cholera	20	34	34	88
	Viral Hepatitis	28	30	24	82
	Enteric Fever	6	10	10	26
	Acute Encephalitis	6	5	11	22

	Syndrome				
	Leptosplrosis	6	3	6	15
	Anthrax	2	6	1	11
	Acute Respiratory Illness	4	3	3	10
	Meningitis	2	i	1	6
	Mumps	0	2	3	5
	Scrub Typhus	3	1	1	5
	Dysentery	0	1	3	4
	Kalazar	1	0	3	4
	PUO	2	2	1	5
	Diphtheria	1	1	1	3
	Rubella	0	1	2	3
	Others	1	1	2	6
Total		553	799	990	2342

Source: National Centre for Disease Control (NCDC)

3. INSTITUTIONAL SETUP [2]

The National Disaster Management Authority has been established at the centre, and the SDMA at state and district authorities at district level are gradually being



formalized. In addition to this, the National Crisis Management Committee, part of the earlier setup, also functions at the Centre. The nodal ministries, as identified for different disaster types of function under the overall guidance of the Ministry of Home Affairs (nodal ministry for disaster management). This makes the stakeholders interact at different levels within the disaster management framework.

3.1 National Disaster Management Authority

The National Disaster Management Authority (NDMA) was initially constituted on May 30, 2005 under the Chairmanship of Prime Minister vide an executive order. Following enactment of the Disaster Management Act, 2005, the NDMA was formally constituted in accordance with Section-3(1) of the Act on 27th September, 2006 with Prime Minister as its Chairperson and nine other members, and one such member to be designated as Vice Chairperson.

The NDMA has been mandated with laying down policies on disaster management and guidelines which would be followed by different Ministries, Departments of the Government of India and State Government in taking measures for disaster risk reduction. It has also laid down guidelines to be followed by the State Authorities in drawing up the State Plans and to take such measures for the management of disasters, Details of these responsibilities are given as under:

- Lay down policies on disaster management;
- Approve the National Plan;
- Approve plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan;
- Lay down guidelines to be followed by the State Authorities in drawing up the State Plan;
- 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;

- Coordinate the enforcement and implementation of the policy and plan for disaster management;
- Recommend provision of funds for the purpose of mitigation;
- Provide such support to other countries affected by major disasters as may be determined by the Central Government;
- 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;
- Lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

Besides the nine members nominated by the Prime Minister, Chairperson of the Authority, the Organizational structure consists of a Secretary and five Joint Secretaries including one Financial Advisor. There are 10 posts of Joint Advisors and Directors.

3.2 National Executive Committee (NEC)

A National Executive Committee is constituted under Section 8 of DM Act, 2005 to assist the National Authority in the performance of its functions. NEC consists of Home Secretary as its Chairperson, ex-officio, with other 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 forest, finance (expenditure), health, power, rural development science and technology, space, telecommunication, urban development, water resources. The Chief of Integrated Defence Staff of the Chiefs of Staff Committee, ex-officio, is also its Members.

NEC may as and when it considers necessary constitute one or more sub-committees for the efficient discharge of its functions. For the conduct of NEC, Disaster Management National Executive Committee (Procedure and Allowances) Rules, 2006 has been issued which may be visited at www.mha.nic.in. NEC has been given the responsibility to act as the coordinating and monitoring body for

disaster management, to prepare a National Plan, monitor the implementation of National Policy etc. vide section 10 of the DM Act.

3.3 National Institute of Disaster Management (NIDM)

In the backdrop of the International decade for Natural Disaster Reduction (IDNDR), a National Centre for Disaster Management was established at the Indian Institute for Public Administration (IIPA) in 1995. The Centre was upgraded and designated as the National Institute of Disaster management (NIDM) on 16th October 2003. It has now achieved the status of a statutory organization under the Disaster Management Act, 2005. Section 42 of Chapter VII of the Disaster Management Act, 2005 entrusts the institute with numerous responsibilities, namely to develop training modules, undertake research and documentation in disaster management, organize training programmes, undertake and organize study courses, conferences, lectures and seminars to promote and institutionalize disaster management, undertake and provide for publication of journals, research papers and books.

Figure 5: Governing Body of National Institute of Disaster Management

In terms of Section 42(4) of the Disaster Management Act, 2005 read with Rule 6 of the Disaster Management (National Institute of Disaster Management) Rules, 2006, Governing Body of the NIDM has been constituted vide Order No. 45/1/2007-NDM-IV dated 3rd May, 2007 with following members:-

i.	The Vice-Chairperson, National Disaster Management Authority (NDMA)	Chairperson
ii	Union Home Secretary	Vice-Chairperson
iii	Secretary (BM)	Member
iv	Secretary, Ministry of Finance, Department. of Expenditure	Member
v	Secretary/ Additional Secretary, NDMA	Member
vi	Additional Secretary and Financial Advisor, Ministry of Home Affairs	Member
vii	Secretary(Disaster Management), Government of Gujarat	Member
viii	Vice-Chancellor, Guru Gobind Singh Indraprastha University, Delhi	Member
ix	Director, Indian Institute of Technology, Roorkee	Member
x	Director, Indian Institute of Management, Kolkatta	Member
xi	Director, National Eco-physical Research Institute, Hyderabad	Member
xii	Secretary, Department of Space	Member
xiii	Secretary, Department of Science and Technology	Member
xiv	Executive Director, NIDM	Member Secretary

Management Structure: The Union Home Minister is the President of the Institute, It was constituted on 23rd February, 2007 and has a general body of forty two members comprising of secretaries of various ministries, departments of the Union Government and heads of national level scientific, research and technical organizations.

In terms of Section 42(4) of the Disaster Management Act, 2005 vide order dated 3rd May, 2007, the Government also constituted a 14 member Governing Body which may be seen in Figure 5 of the Institute.

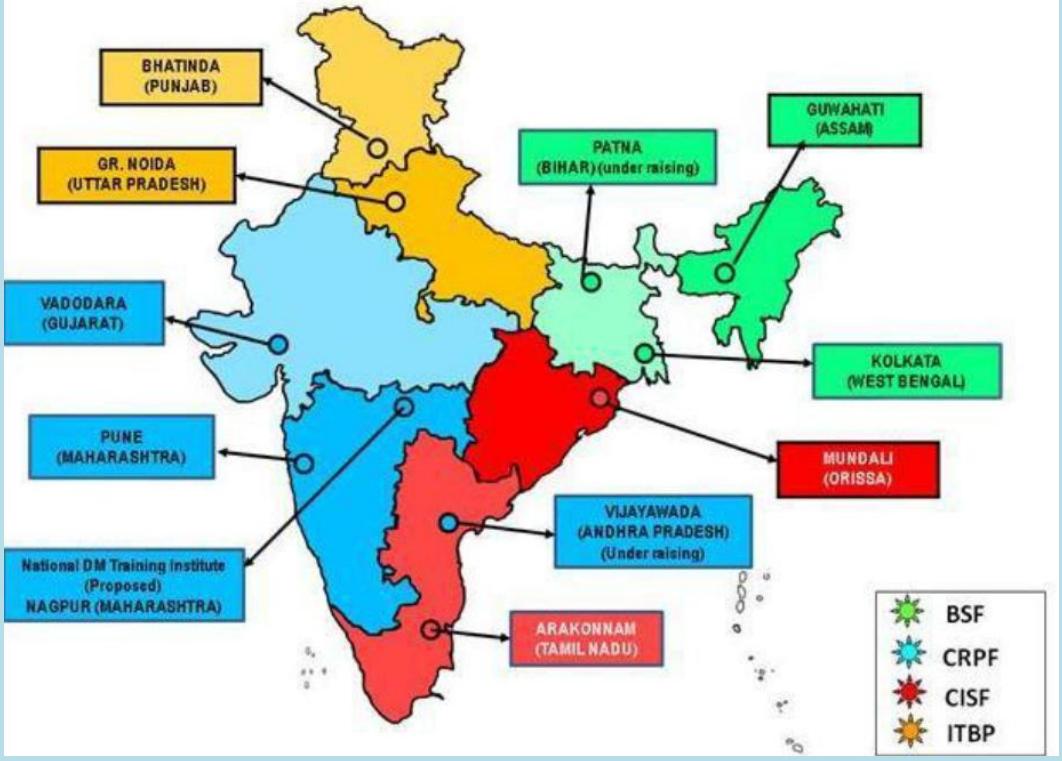
3.4 National Disaster Response Force (NDRF)

Constitution and role of NDRF: The National Disaster Response Force (NDRF) has been constituted under Section 44 of the DM Act, 2005 by up-gradation/conversion of eight standard battalions of Central Para Military Forces i.e. two battalions each from Border Security Force (BSF), Indo-Tibetan Border Police (ITBP), Central Industrial Security Force (CISF) and Central Reserve Police Force (CRPF) to build them up as a specialist force to respond to disaster or disaster like situations.

The ten battalions (1 battalion comprised of nearly 1000 person) of NDRF consist of 144 specialized teams trained in various types of natural, man made and non-natural disasters. 72 of such teams are designed to cater to the Chemical, Biological, Radiological and Nuclear (CBRN) calamities besides natural calamities. Each NDRF battalion consists of 1149 personnel organized in 18 teams comprising of 45 personnel, who are being equipped and trained for rendering effective response to any threatening disaster situation or disaster, both natural and man made. All these eight battalions are being trained in natural disasters while four of them are being additionally trained for handling CBRN disasters. The composition of such battalions may be visited at www.ndmindia.nic.in.

Based on vulnerability profile of different regions of the country, these specialist battalions have been presently stationed at the following ten places as may be seen from the map in Figure 7.

Figure 7: Location of NDRF Battalions



3.5 National Civil Defence College (NCDC), Nagpur

The first Disaster Management Training Institution of the country was founded on 29th April 1957 at Nagpur as the Central Emergency Relief Training Institute (CERTI) to support the Emergency Relief Organization of the Government of India. This Institute organized advanced and specialist training for revenue officials responsible for Disaster Relief Operations against any natural or manmade disaster. CERTI was renamed as National Civil Defence College on 1st April 1968. NCDC is mandated for conducting training courses for various groups of stakeholders. Details of training on capacity development are given in Chapter on Capacity Development.

3.6 National Fire Service College (NFSC), Nagpur

The National Fire Service College was established in 1956 as a sub- ordinate establishment of Ministry of Home Affairs with the aim of providing training to the Fire Officers of the country in advanced techniques of fire fighting and rescue,

and creating uniformity in the Fire Service organizations and their management across the country. NFSC began its activities with only one course; later, considering the needs of the country, industrialization and growth of Indian industry, had added many more courses to its curriculum to give the fire training a professional outlook.

The college has so far trained 15197 fire officers in the country. Being a residential college, National Fire Service College (NFSC), has its own hostel facilities with well furnished accommodation for about 200 trainees at a time.

The college awards certificates, diplomas, and advanced diplomas on successful completion of courses. These are recognized by the state, central government, the public and private sectors and the business community as well. In addition, the diploma and advanced diploma of NFSC are also recognized by the Union Public Service Commission for appointment in the middle management cadre.

3.7 State and District level Institutions

a) State Disaster Management Authority (SDMA)

The DM Act, 2005 provides for constitution of SDMAs and DDMAs in all the states and UTs. As per the information received from the states and UTs, except Gujarat and Daman & Diu, all the rest have constituted SDMAs under the DM Act, 2005. Gujarat has constituted its SDMA under its Gujarat State Disaster Management Act, 2003. Daman & Diu have also established SDMAs prior to enactment of DM Act 2005.

b) State Executive Committee (SEC)

The Act envisages establishment of State Executive Committee under Section 20 of the Act, to be headed by Chief Secretary of the state Government with four other Secretaries of such departments as the state Government may think fit. It has the responsibility for coordinating and monitoring the implementation of the National Policy, the National Plan and the State Plan as provided under section 22 of the Act.

c) District Disaster Management Authority (DDMA)

Section 25 of the DM Act provides for constitution of DDMA for every district of a state. The District Magistrate/ District Collector/Deputy Commissioner heads the Authority as Chairperson besides an elected representative of the local authority as Co-Chairperson except in the tribal areas where the Chief Executive Member of the District Council of Autonomous District is designated as Co-Chairperson. Further in district, where Zila Parishad exists, its Chairperson shall be the Co-Chairperson of DDMA. Other members of this authority include the CEO of the District Authority, Superintendant of Police, Chief Medical Officer of the District and other two district level officers are designated by the state Government.

The District Authority is responsible for planning, coordination and implementation of disaster management and to take such measures for disaster management as provided in the guidelines. The District Authority also has the power to examine the construction in any area in the district to enforce the safety standards and also to arrange for relief measures and respond to the disaster at the district level.

d) Institutional Framework for Metropolitan Cities

In the larger cities the recommendation of the second Administrative Reforms Commission has suggested that the Mayor, assisted by the Commissioner of the Municipal Corporation and the Police Commissioner to be directly responsible for Crisis Management. It has now been accepted by the Government.

e) Civil Defence

Aims and Objectives of Civil Defence Act: The Civil Defence Policy of the GoI until 1962 was confined to making the states and UTs conscious of the need of civil protection measures and to keep in readiness civil protection plans for major cities and towns under the Emergency Relief Organisation (ERO) scheme. The legislation on Civil Defence (CD) known as Civil Defence Act was enacted in 1968 which is in force throughout the country.

The Act defines CD and provides for the powers of Central Government to make rules for CD, spelling out various actions to be taken for CD measures. It further stipulates for constitution of CD corps, appointment of members and officers, functions of members etc. The Act has since been amended in 2010 to cater to the needs of disaster management so as to utilise the services of Civil Defence volunteers effectively for enhancement of public participation in disaster management related activities in the country.

The CD Organization is raised only in such areas and zones which are considered vulnerable to enemy attacks. The revision and renewal of categorized CD towns is done at regular intervals, with the level of perceived threat or external aggression or hostile attacks by antinational elements or terrorists to vital installations.

Compendium of instructions – CD deals very briefly with all different aspects of CD in India and includes references to important policy letters including legal aspects. It was first published in February 1969. Subsequently, its scope was enlarged by including the Master Plan of Civil Defence, Civil Defence Act 1968, training courses conducted at NCDC, Nagpur, training syllabus of states.

Role of Civil Defence: During times of war and emergencies, the CD organization has the vital role of guarding the hinterland, supporting the armed forces, mobilizing the citizens and helping civil administration for saving life and property, minimizing damage, maintaining continuity in production centers and raising public morale. The concept of CD over the years has shifted from management of damage against conventional weapons to also include threat perceptions against nuclear weapons, biological and chemical warfare and environmental disasters.

Three tier structure as given below has been created to formulate CD policy and for coordinating and supervising measures to implement it.

- Civil Defence Advisory Committee under the Chairmanship of Union Home Minister,
- Civil Defence Committee under the Chairmanship of Home Secretary and

- Civil Defence Joint Planning Staff Committee under the Chairmanship of Director General Civil Defence.

f) Fire Services

Fire services are mandate of the Municipal Bodies as estimated in item 7 of Schedule 12 under Article 243W of the constitution. The structure across is not uniform. Presently Fire prevention and Fire Fighting Services are organized by the concerned States and UTs. Ministry of Home Affairs, Govt. of India, renders technical advice to the States and UTs and Central Ministries on Fire Protection, Fire Prevention and Fire Legislation.

The Government of India in 1956, formed a "Standing Fire Advisory Committee" under the Ministry of Home Affairs. The mandate of the committee was to examine the technical problems relating to Fire Services and to advise the Government of India for speedy development and upgradation of Fire Services all over the country. This committee had representation from each State Fire Services, as well as the representation from Ministry of Home, Defence, Transport, Communication and Bureau of Indian Standards. This Committee was renamed as "Standing Fire Advisory Council" (SFAC) during the year 1980.

Fire Services in Gujarat, Chhatisgarh, Punjab, Maharashtra, Himachal Pradesh, Haryana and Madhya Pradesh excluding Indore are under the respective concerned Municipal Corporations. In other remaining States it is under the Home Department. While some States have enacted their own Fire Act, some others have not. As on today, there is no standardization with regard to the scaling of equipment, the type of equipment, or the training of their manpower. In each state it has grown according to the initiatives taken by the States and the funds provided for the Fire Services.

Presently the only Basic Life Line of Fire & Emergency Services which is fully committed to the common public, is the Municipal in some states and State Fire Services. The Airport Authority, Big Industrial Establishments, CISF and Armed Forces, however also have their own Fire Services and many a times in case of need rush in aid to the local Fire Services. Apart from the lack of being a proper

government department with a complete developmental plan, State Fire Services have their own organizational structure, administrative setup, funding mechanism, training facilities and equipments.

4. INITIATIVES [2]

4.1 Disaster Management Act, 2005

This Act provides for the effective management of disaster and for matters connected therewith or incidental thereto. It provides institutional mechanisms for drawing up and monitoring the implementation of the disaster management. The Act also ensures measures by the various wings of the Government for prevention and mitigation of disasters and prompt response to any disaster situation.

The Act provides for setting up of a National Disaster Management Authority (NDMA) under the Chairmanship of the Prime Minister, State Disaster Management Authorities (SDMAs) under the Chairmanship of the Chief Ministers, District Disaster Management Authorities (DDMAs) under the Chairmanship of Collectors/District Magistrates/Deputy Commissioners. The Act further provides for the constitution of different Executive Committee at national and state levels. Under its aegis, the National Institute of Disaster Management (NIDM) for capacity building and National Disaster Response Force (NDRF) for response purpose have been set up. It also mandates the concerned Ministries and Departments to draw up their own plans in accordance with the National Plan. The Act further contains the provisions for financial mechanisms such as creation of funds for response, National Disaster Mitigation Fund and similar funds at the state and district levels for the purpose of disaster management. The Act also provides specific roles to local bodies in disaster management.

4.2 National Policy on Disaster Management (NPDM)

The National Policy on Disaster Management (NPDM) has been approved by the Central Government on October 22, 2009 and circulated to all concerned. The policy envisages 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. The policy covers all aspects of disaster management including institutional and legal arrangements, financial arrangements, disaster prevention, mitigation and preparedness, techno-legal regime, response, relief and rehabilitation, reconstruction and recovery, capacity development, knowledge management, research and development. It focuses on the areas where action is needed and the institutional mechanism through which such action can be channelized.

The NPDM addresses the concerns of all the sections of the society including differently abled persons, women, children and other disadvantaged groups in terms of granting relief and formulating measures for rehabilitation of the persons affected by disasters. The issue of equity and inclusiveness has been accorded due consideration. It aims to bring in transparency and accountability in all aspects of disaster management through involvement of community, community based organizations, Panchayati Raj Institutions (PRIs), local bodies and civil society.

4.3 National Plan for Disaster Management

An institutional mechanism for preparation of the National Plan has been put in place, which is in three parts namely:

- National Response Plan,
- National Mitigation Plan and
- National Capacity Building Plan.

National Executive Committee has approved National Plan developed by MHA and NIDM in 2013 and submitted to NDMA for approval.

4.4 NDMA Guidelines

NDMA is engaged in the formulation of guidelines through a consultative process involving multiple stakeholders, including the government, non-government organizations, academic and scientific institutions, the corporate sector and community. Since its inception, NDMA has so far released various disaster

specific and thematic guidelines. These may be visited at the site ww.ndma.gov.in. Salient features of the guidelines issued are as follows:

- Management of Landslide and Snow Avalanches
- Management of Cyclones
- Management of Earthquake
- Management of Floods
- Chemical Disasters (Industrial)
- Management of Chemical (Terrorism) Disasters
- Preparation of State Disaster Management Plans
- Psycho-Social Support and Mental Health Services in Disasters
- Medical Preparedness and Mass Casualty Management
- Management of Nuclear and Radiological Emergencies
- Incident Response System
- Strengthening of Safety and Security for Transportation of POL tankers
- Management of Biological Disaster
- Management of Tsunami
- Role of NGOs in Disaster Management
- Urban Flooding
- Management of Dead in the Aftermath of Disaster
- Plan to counter threats to Municipal Water Supply and Water Reservoirs

4.5 NIDM's Training Modules & Other Documents

NIDM has developed number of training modules and other documents related to DM research and case studies. The list of main documents is as follows:

- Mainstreaming Climate Change Adaptation and Disaster Risk Reduction Into District Level Development Plans
- Database and Statistics for Disaster Risk Management
- Geoinformatics Applications in Chemical Risk Management
- Critical Infrastructures and Disaster Risk Reduction
- School Safety

- Urban Risk Mitigation
- Flood Disaster Risk Management - Hydrological Forecasts: Requirements and Best Practices
- Flood Disaster Risk Management: Gorakhpur Case Study
- Village Disaster Management Plan
- Comprehensive Landslides Risk Management
- Environmental Legislation for Disaster Risk Management
- Geoinformatics Applications in Disaster Management
- Flood Risk Mitigation and Management
- Chemical (Industrial) Disaster Management
- Psychosocial Care in Disaster Management
- District Disaster Management Plan

4.6 National Action Plan on Climate Change

On June 30, 2008, Prime Minister Dr. Manmohan Singh released India's first National Action Plan on Climate Change (NAPCC), outlining existing and future policies and programs addressing climate mitigation and adaptation. The plan identifies eight core "national missions" running through 2017 and directs ministries to submit detailed implementation plans to the Prime Minister's Council on Climate Change by December 2008.

Emphasizing the overriding priority of maintaining high economic growth rates to raise living standards, the plan "identifies measures that promote our development objectives while also yielding co-benefits for addressing climate change effectively." It stipulates that these national measures would be more successful with assistance from developed countries, and pledges that India's per capita greenhouse gas emissions "will at no point exceed that of developed countries even as we pursue our development objectives." The plan can be visited on the website of Ministry of Environment and Forest (MOEF).

National Action Plan on Climate Change identified eight missions.

• National Solar Mission
• National Mission on Sustainable Habitat
• National Mission for Enhanced Energy Efficiency

• National Mission for Sustaining The Himalayan Ecosystem
• National Water Mission
• National Mission for Green India
• National Mission for Sustainable Agriculture
• National Mission for Strategic Knowledge on Climate Change

I) National Earthquake Risk Mitigation Project (NERMP)

Understanding the importance of the management of such hazardous situations caused by the earthquake, the Government of India has taken a national initiative for launching a project of 'National Earthquake Risk Mitigation Project (NERMP). The proposed project aims at strengthening the structural and nonstructural earthquake mitigation efforts and reducing the vulnerability in the high risk districts prone to earthquakes. Necessary risk mitigation measures are proposed to be put in place in the highly seismic zones. NDMA, tasked with this project has prepared a Detailed Project Report (DPR) which is under consultation with all the stakeholders. The proposed components of the project include techno-legal regime, institutional strengthening, capacity building and public awareness etc.

II) National Building Code (NBC)

The National Building Code of India (NBC), a comprehensive building code, is a national instrument providing guidelines for regulating the building construction activities across the country. The NBC was first published in 1970 at the instance of Planning Commission and was revised in 1983. Thereafter three major amendments, two in 1987 and the third in 1997 were issued. Considering a series of further developments in the field of building construction, including the lessons learnt in the aftermath of number of natural calamities like devastating earthquakes and super cyclones, a project for comprehensive revision of NBC was taken up under the aegis of National Building Code Committee. The revised NBC has now been brought out as National Building Code of India 2005 (NBC 2005). The salient features of the revised NBC include meeting the challenges posed by natural calamities and reflecting the state-of-the-art and contemporary applicable international practices. The code may be accessed at http://www.bis.org.in/sf/nbc.htm.

III) National Cyclone Risk Mitigation Project

Aim: The scheme aims to upgrade cyclone forecasting, tracking and warning systems, build capacity in multi-hazard risk management and to construct major infrastructures including multi-purpose cyclone shelters and embankments.

Outcome: The project is expected to benefit 5.60 lac people in Orissa and over 5.50 lacs in Andhra Pradesh.

Execution Authority: The National Disaster Management Authority (NDMA) has been designated as the implementing agency. The scheme is regularly monitored by NDMA and MHA.

Principal Components: The major components under the scheme are as follows;

- Community mobilisation and training,
- Cyclone Risk Mitigation Infrastructure (construction of cyclone shelters, roads/missing links and construction/repair of Saline Embankments etc.),
- Technical assistance for capacity building on Disaster Risk Management (risk assessment, damage and need assessment),
- Capacity Building and knowledge creation along with project management and implementation support.

States covered: In the first phase of the project, states of Orissa and Andhra Pradesh are being covered.

Project cost: The total outlay of the project is `1496.71 crore. The World Bank is providing financial assistance equivalent to `1198.44 crore and contribution from the state governments is `298.27 crore (i.e. Orissa- ` 132.98 crore and Andhra Pradesh – `165.29 crore).

IV) Integrated Coastal Zone Management Project (ICZMP)

The Government of India under the aegis of Ministry of Environment and Forest (MoEF) has launched the ICZMP. The objective of the project is to assist GoI in

building the national capacity for implementation of a comprehensive coastal management approach in the country and piloting the integrated coastal zone management approach in states of Gujarat, Orissa and West Bengal.

There are four components of this project:

(i) Capacity Building: It includes mapping, delineation and demarcation of the hazard lines, and delineation of coastal sediment cells all along the mainland coast of India.
(ii) Piloting ICZM approaches in Gujarat: This component will support capacity building of the state level agencies and institutions, including preparation of an ICZM plan for the coastal sediment cell that includes the Gulf of Kachchh and pilot investments.

(iii) Piloting ICZM approaches in Orissa: It provides for capacity building of the state level agencies and institutions, including preparation of an ICZM plan for the coastal sediment cells that include the stretches of Paradip-Dhamra and Gopalpur-Chilika, including a regional coastal process study, and pilot investments.

(iv) Piloting ICZM approaches in West Bengal: The project cost is ` 1425 crores ($285.67 million) and it is slated to be completed by 31 Dec. 2015.

V) National Flood Risk Mitigation Project (NFRMP)

NFRMP has been envisaged for mitigation or reduction in risk, severity or consequences of floods. It aims at ensuring that arrangements are in place to mobilise the resources and capability for relief, rehabilitation, reconstruction and recovery from disasters besides creating awareness among vulnerable communities. NDMA has been entrusted to prepare a Detailed Project Report (DPR) on Flood Risk Mitigation Project.

Background: The FMP scheme was launched by Ministry of Water Resources under the central plan at a total cost of ` 8000 crores. The sanction of the scheme

was been conveyed vide MoWR Order No. 5/7/2006-Ganga (Vol.II) / 4749-77 dated 28.11.2007.

Aim: The scheme provides financial assistance to the state governments for undertaking flood management works in critical areas during the 11th Plan period (2007-12).

Components: (i) Critical flood control and river management works in the entire country (includes river management, flood control, anti-erosion, drainage development, anti-sea erosion, and flood proofing works besides flood prone area development programme in critical regions and restoration of damaged flood control/ management works).
(ii) The spillover works of on-going central plan schemes of Xth Plan would also be supported under this scheme during XI Plan.

Executing Authority: The FMP scheme has been implemented by Flood Control, Water Resources / Irrigation Departments of the state governments.

VI) National Landslide Risk Mitigation Project (NLRMP)

It aims at strengthening the structural and non-structural landslide mitigation efforts, reducing the landslide risk and vulnerability in the hilly districts prone to landslides and mud flows and minimize the risks arising out of disasters in landslides. NDMA has been entrusted to prepare Detailed Project Report (DPR) on Landslide Mitigation Project and is in the process of appointing consultants to conduct a study and prepare DPR after defining the scope of work in consultation with all the stakeholders.

VII) Drought Mitigation Measures

The Department of Agriculture & Cooperation, under the Ministry of Agriculture, Government of India released a manual for drought management in November, 2009. The manual suggests for looking beyond the traditional drought management through famine codes for dealing with situations of mass hunger and collective penury. It focuses on plans which take into account all capabilities of the state to

address the impact of drought i.e., focus on mitigation measures, tapping newer technologies, enabling the systems adapt to the new legal framework and including improvement and area development programmes in drought mitigation.

The National Institute of Agriculture and Extension (MANAGE), Hyderabad has been identified to launch a National Project for Integrated Drought Monitoring & Management, with MANAGE as the lead partner. A proposal submitted by MANAGES to implement this national project through available budgetary provisions of Department of Agriculture & Cooperation is under consideration. Another proposal to set up a National Institute of Drought Management is also under consideration of Ministry of Agriculture & Cooperation.

The Drought Prone Areas Programme (DPAP) and Desert Development Programme (DDP) are being implemented by the Government of India since 1973-74 and 1977-78 respectively. These programmes aim at drought proofing and minimizing desertification of fragile areas in the arid, semi-arid and dry-sub humid regions often affected by severe drought conditions and desertification.

National Rain fed Area Authority in the Ministry of Agriculture has been set up to address the issue of drought mitigation on a long term basis. It comprises experts who provide knowledge inputs regarding systematic upgradation and management of the country's dry land and rain fed agriculture.

VIII) Forest Fire Management

Fire prevention, detection and suppression activities are state subjects. The Central Government has been formulating policy, planning and financing the states from time to time. Forest Protection Division of Ministry of Forests headed by DIG of Forests is responsible for the forest fire management at the central level. The Joint Forest Management Committees, 36,165 in number across the country, have been given the responsibility to protect the forests from fires. The Central Government has issued the National Forest Fire, Prevention and Control guidelines and has also worked on a National Master Plan on Forest Fire Control.

A centrally sponsored scheme 'Intensification of Forest Management' initiated since the Tenth Five Year Plan has allocated 15 percent of the funds for forest fire management.

IX) Chemical Disasters Mitigation

The MOEF has taken the following measures towards developing a Regulatory Framework for Chemical Safety:

(i) The Environment (Protection) Act was enacted in 1986. Under the Act, two rules have been notified for ensuring chemical safety, namely,

(a) The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (MSIHC) amended in 1994 and 2000;

(b) The Chemical Accidents (Emergency, Planning, Preparedness, and Response) Rules, 1996 (EPPR) under the Environment (Protection) Act, 1986.

(ii) The Public Liability Insurance Act 1991, amended in 1992 and the Public Liability Insurance Rules 1991, amended in 1993 require maximum hazard units to procure an insurance policy and deposit an equal amount in the Environment Relief Fund to provide immediate relief to victims of chemical accidents.

X) Prevention of Disasters in Mines

The various safeguards and preventive measures against coal mine fires are outlined in the Coal Mines Regulations, 1957 and related circulars, notifications and technical instructions. The Directorate General of Mines Safety (DGMS) examines from each and every application for underground and surface mining from all considerations. Wherever necessary the DGMS imposes additional precautionary and preventive measures. The officers of the DGMS from time to time inspect the mines to assess the implementation of the measures and suggest modifications, etc.

For the new projects and reorganizational projects, after the issuance of the EIA Notification, 1994 under the Environment (protection) Act, 1986, it has become compulsory to get environmental clearance from the Ministry of Environment and Forests (MOEF) and for this the mines are required to develop their Environmental Management Plans (EMPs) in which the problems of the mine fires are adequately addressed as the mine fires have considerable environmental impacts.

XI) Epidemic Control Measures

The Ministry of Health & Family Welfare is instrumental and responsible for implementation of various programmes on a national scale in the areas of prevention and control of major communicable diseases and promotion of traditional and indigenous systems of medicines. This ministry also assists states in preventing and controlling the spread of seasonal disease outbreaks and epidemics through technical assistance. It is actively involved in disease diagnosis during epidemics and outbreaks, operational research, manpower development, advisory role and other multifarious activities towards prevention and control of a cascade of epidemic prone disease of larger public health importance in collaboration with National Institute of Communicable Disease (NICD) and external organizations and institutes. (Photo: A health camp at Akkarapettai Villager in Nagapattinam District-December 2004).

Post-disaster management of health, sanitation and hygiene services is crucial to prevent an outbreak of epidemics. The draft Public Health (Prevention, Control and Management of Epidemics, Bio-terrorism and Disasters) Bill prepared by the Ministry of Health & Family Welfare is under consideration for enactment.

National Vector Borne Diseases Control Programme (NVBDCP) is the key programme for prevention/control of outbreaks/epidemics of malaria, dengue, chikungunya etc., vaccines administered to reduce the morbidity and mortality due to diseases like measles, diphtheria, pertussis, poliomyelitis etc. Two key measures to prevent/control epidemics of water-borne diseases like cholera, viral hepatitis etc. include making available safe water and ensuring personal and domestic hygienic practices are adopted.

It is impossible to always prevent epidemics, but its impact can always be mitigated by anticipating them and by being prepared. Epidemic preparedness and response is a multisectoral and multi-agency activity. Health sector plays a lead role in preparing and executing the epidemic preparedness plan but need the expertise and support of other disciplines/sectors also. Planning process will inter alia require extensive review of health infrastructure, disease surveillance and response system, availability of laboratories, trained professionals, drugs, vaccines and equipment in the country, communication system, coordinating mechanism between different sectors and between the national and international agencies and legal issues.

Accordingly, Govt. of India launched Integrated Disease Surveillance Project (IDSP) in November 2004 to strengthen capacity at state/district levels to detect and respond to the epidemics in early rising phase. Under the project, the district and states have been strengthened by providing additional technical manpower (epidemiologists, microbiologists, entomologists), training of rapid response teams for outbreak investigation and control, strengthening of laboratories for detection of organisms causing epidemic prone diseases, and establishment of IT network for data compilation, dissemination and analysis. The states are at varying stages of implementation.

The key achievement of IDSP has been creation of capacity at sub-district/district/state levels to detect early warning signals and outbreaks of epidemic prone diseases so that they can be responded early. They collect weekly surveillance data, monitor disease trends and investigate rising in cases. About 85% of districts are reporting these data to Central Surveillance Unit through e-mail and more than 60% report through portal. The result is that states have detected and responded to more number of outbreaks after implementation of IDSP. For example, a total of 553 outbreaks were reported and responded to by states in 2008, 799 outbreaks in 2009 and 990 outbreaks in 2010. Earlier not many outbreaks were reported in the country by the States/ UTs.

Finally, a mention must be made about the International Health Regulations (IHR), 2005 which were adopted by the 58th World Health Assembly in May 2005 and came into force on 15 June 2007 (in India on 8 August 2007). IHR (2005) also provide us an opportunity to strengthen core capacities to detect, assess and notify and control all public health emergencies of international concern (PHEIC). These capacities will also help us to control endemic infectious diseases which may not spread to other countries.

XII) Measures taken for Rail Safety

Several measures have been taken to improve safety of Rail Transportation which is summarized as below:

Special Railway Safety Fund (SRSF): Arising out of an important recommendation of Railway Safety Review Committee (RSRC) (Khanna Committee), to pull up the backlog of arrears for track renewals, bridges, rolling stock and signaling gear within a fixed time frame, a non-lapsable 'Special Railway Safety Fund' of ` 17000 crores was set up with effect from 01.10.2001 with a contribution from the Ministry of Finance and Railways. Works related to replacement / renewal of over-aged bridges, signaling gears and replacement of narrow gauge locomotives is ongoing.

Corporate Safety Plan (2003-2013): Railway Safety Review Committee (1998), in its report recommended that railways formulate a safety plan with the following broad objectives:

- To achieve reduction in rate of accidents per million train kilometers from 0.44 (in 2002-03) to 0.17 by the year 2013,
- Implement measures to reduce chances of passenger fatality substantially in consequential train accidents by 2013,
- Focus on development of manpower through major improvements in working environment and training to reduce the accidents attributable to human failure by 40 percent by 2013,
- Achieve safety culture on all fronts including maintenance depots, worksites, stations, controls etc.,

- Progressively achieve an environment of “fail-proof” from the present “fail-safe” system of asset failures by upgrading the systems by 2013, and
- Prioritization of safety related projects.

It is estimated that index of accidents per million train kilometers would be reduced from 0.44 (in 2002-03) to 0.17 in 2012-13. Similarly, the performance indices targets have been laid down for track defects, coach defects/ failures, wagon detachments/ failure, poor brake power (goods), incidence of train parting (goods), motive power defects, signal defects/ failures, communication failures and OHE (Overhead Equipment) defects.

XIII) Road Safety Measure

The main thrust of accident prevention and control across the world has been on the four “E”s, namely,
(i) Education
(ii) Enforcement
(iii) Engineering
(iv) Environment and Emergency care of road accident victims.

The measures taken by Government of India to reduce the risk of road accidents are summarised as follows:

i. Road Engineering: These are design/specification related aspects of roads and highways to enhance road safety. The National Highway Authority of India (NHAI) is ensuring usage of road safety furniture and has taken a number of steps to enhance safety of road users. The safety measures are inbuilt in the projects during design, construction, operations and maintenance.

ii. Enforcement: The state governments and UTs are to take measures for enforcing the statutory provisions provided under the Motor Vehicles Act, 1988 and the Central Motor Vehicle Rules, 1989. The enforcement measures under the said statute provides for inspection, licensing and verification of fitness of vehicles.

iii. Education and Training: These primarily involve spreading road safety awareness and imparting training to drivers. The initiatives undertaken in the field of training are refresher training for heavy vehicle drivers and providing financial assistance to states/UTs for setting up model driving schools to turn out well trained drivers.

iv. Faster relief and evacuation of road accident victims: In order to reduce the trauma and probability of death and disability associated with the road accidents, National Highway Accident Relief Service Scheme has been initiated which provides for supply of cranes and ambulances to states/UTs and NGOs for relief, rescue and evacuation of accident victims to the closest medical centre and for clearing the
accident site.

v. Another measure is medical care in which financial assistance upto `1.50 crores was provided to the state government hospitals located on national highways for upgradation and strengthening of emergency facilities

vi. Road Safety Audit: The specific aim of the road safety audit is to minimise the risk and safety of accidents on the national highways and expressways.

XIV) Early Warning and Response

a) Forecasting of Disasters

Forecasting about climate change is pre requisite for taking preparedness measure to respond to the disaster is the most important element of disaster management. The Ministry of Environment & Forest (MoEF), Ministry of Earth Sciences (MoES), Ministry of Science & Technology (MST), Ministry of Agriculture (MoA), Ministry of Water Resources (MWR), Ministry of Human Resource Development (MHRD), Ministry of Non-conventional Energy (MNES), Defence Research & Development Organization (DRDO), Ministry of Defence (MoD), Ministry of Health and Family Welfare (MoHFW), Indian Space Research

Organization (ISRO) and Indian Meteorological Department (IMD) promote and undertake climate and climate change related research in the country.

Government of India has designated the offices as given below as the nodal agencies for early warning of different natural hazards:

Disaster wise nodal agencies for Forecast

Cyclone - Indian Meteorological Department
Tsunami - Indian National Centre for Oceanic Information Services
Floods- Central Water Commission
Landslides- Geological Survey of India
Avalanches -Snow and Avalanche Study Establishment
Heat & Cold Waves- Indian Meteorological Department

b) Forecast of Rainfall

India receives 80 per cent of its annual rainfall during the southwest monsoon season of June to September. Rainfall over the country during this season shows a wide range of spatial variation due to orographic influences and preferential occurrence of rain-bearing systems in certain regions. India has a very extensive rain gauge network and rainfall monitoring over the country.

The real-time monitoring and statistical analysis of district wise daily rainfall is one of the important functions of the IMD at New Delhi. Based on the real time daily rainfall data, weekly district wise, sub-division wise and state wise rainfall distribution summaries are prepared regularly by the Rainfall Monitoring Unit. Maps showing weekly and cumulative rainfall figures in 36 meteorological subdivisions of the country are prepared. This information is very important to many user agencies, particularly for agricultural planning.

c) Forecasting and Warning of Cyclones

IMD is the nodal agency in the country to monitor and predict the cyclonic disturbances and issue the warning and advisory bulletins. IMD, New Delhi also acts as a Regional Specialized Meteorological Centre (RSMC) for providing

tropical cyclone advisories to the World Meteorological Organization (WMO)/ Economic and Social Cooperation for Asia and the Pacific (ESCAP) Panel members countries viz Bangladesh, Myanmar, Thailand, Sri Lanka, Maldives, Pakistan and Oman. IMD, New Delhi also works as a Tropical Cyclone Advisory Centre (TCAC) for international civil aviation as per the requirement of International Civil Aviation Organization (ICAO).

The cyclone warning are issued to State Government officials in four stages: i.e.

I. pre-cyclone watch issued 72 hours in advance,
II. cyclone alert issued at least 48 hours in advance ,
III. cyclone warning issued at least 24 hours in advance, and
IV. as post landfall outlook issued at least 12 hours in advance of expected time of landfall.
V. IMD has prepared roadmap for cyclone genesis and further intensification, monitoring and prediction.

d) Flood Forecasting

The flood forecasting and warning system is used for alerting the likely damage centre well in advance of the actual arrival of floods, to enable the people to move and also to remove the moveable property to safer places or to raised platforms specially constructed for the purpose.

A beginning in scientific flood forecasting was made in November, 1958 by CWC (then known as Central Water & Power Commission) when a Flood Forecasting Centre was set up at its Headquarters, at Delhi for giving timely Forecasts and Warnings of the incoming floods to the villages located in the river areas around the National Capital, Delhi. The network has been expanding and by now the Flood Forecasting Network of the CWC covers the entire major flood prone inters State basins in the country.

The flood forecasting involves the following four main activities:

(i) Observation and collection of hydrological and hydro meteorological data,
(ii) Transmission of Data to forecasting centres,
(iii) Analysis of data and formulation of forecast, and
(iv) Dissemination of forecast.

e) Tsunami Warning – Indian National Centre for Oceanic Information System (INCOIS)

Post tsunami dated 26th December, 2004, Ministry of Earth Sciences has established the Indian National Tsunami Warning System at Indian National Centre for Ocean Information Services (INCOIS), Hyderabad. The Tsunami Early Warning System (TEWS) was made operational on 15th Oct 2007. This agency has developed a protocol for issue for Tsunami Watch, Alert and Warnings. The Centre gives information to all responders about the origin, time, location of the epicenter, magnitude and depth of an earthquake inside the ocean and accordingly issues bulletins.

The system is capable of detecting all earthquake events of more than 6 Magnitude occurring in the Indian Ocean in less than 20 minutes of occurrence and first report on the occurrence of an earthquake in India and the Indian Ocean region to sent to MHA within 25-30 minutes indicating the location and magnitude of the earthquake. Further, if any rise in water level is reported by NIOT, TEWC would issue a Tsunami warning within 60 minutes of the occurrence of the earthquake. The information so generated would be disseminated through various communication channels to the concerned user agencies in a fully automated mode.

f) Landslide Hazard Warning

Geological Survey of India (GSI), established in 1851 is a government organization under the Union Ministry of Mines with the Headquarter at New Delhi for conducting geological surveys and studies. It is one of the oldest of such organizations in the world.

The GSI was designated as nodal agency for coordinating geological studies, landslides hazard zonation, monitoring landslides, avalanches, studying the factors

responsible and suggesting precautionary and preventive measure on 29th January, 2004. The input from GSI as nodal agency help the Ministries and Departments concerned in the Central Government as well as the State Government for taking appropriate preventive and mitigation measures for reducing landslide hazard and responding in the mountainous areas and hill in the Himalayan and sub Himalayan regions. GSI is the nodal agency responsible for early warning relating to the landslides in the country.

g) Avalanche Warning

DRDO was formed in 1958 with the amalgamation of the then already functioning technical development establishments of the Indian Army and the Directorate of Technical Development and projection with the Defence Science Organization. DRDO was then a small organization with 10 establishment or laboratories. Over the years it has grown as multi directionally in terms of the Variety of disciplines, number of laboratories, achievements and stature.

Today network of more than fifty laboratories are deeply engaged in developing Defence technologies. Center for Snow and Avalanche Study Establishment (SASE) is one of the laboratories of the DRDO located at Chandigarh with its primary function to do research in the field of snow and avalanches and to provide avalanche control measures and forecasting support to Armed forces. The SASE is the nodal agency for issuing advisories and warnings about the avalanche in the country.

h) Disaster Management Support (DMS)

The Space activities in the country started during early 1960s with the scientific investigation of upper atmosphere and ionosphere over the magnetic equator that passes over Thumba near Thiruvananthapuram using small sounding rockets Realising the immense potential of space technology for national development, Dr. Vikram Sarabhai, the visionary leader envisioned that this powerful technology could play a meaningful role in national development and solving the problems of common man.

The objective of ISRO is to develop space technology and its application to various national tasks. ISRO has established two major space systems, INSAT for communication, television broadcasting and meteorological services, and Indian Remote Sensing Satellites (IRS) system for resources monitoring and management. ISRO has developed two satellite launch vehicles, PSLV and GSLV, to place INSAT and IRS satellites in the required orbits. Accordingly, ISRO has successfully operationalised two major satellite systems namely Indian National Satellites (INSAT) for communication services and Indian Remote Sensing (IRS) satellites for management of natural resources; also, Polar Satellite Launch Vehicle (PSLV) for launching IRS type of satellites and Geostationary Satellite Launch Vehicle (GSLV) for launching INSAT type of satellites.

i) Installation of Radiological Detection Equipment

As a part of preparedness measure Radioactive Detection Equipments (RDE's) are being installed at entry and exit points in the country. On the initiatives of MHA and in consultation with the various Stakeholders, the Bhabha Atomic Research Centre (BARC) and Electric Corporation of India Limited (ECIL) a technical survey of the entry and exit points in a phased manner was undertake for installation of the RDE's. The survey for installation of RDEs at 29 entry/exit points has been identified by BARC (12 seaports, 14 airports and 3 international borders).

The responsibility of installation of these RDE's rest with the concerned Ministries and Departments as the responsibility for allocating funds for prevention, mitigation etc. for Disaster rests with the concerned Central Ministries and Departments. As such Ministry of Shipping, Ministry of Civil aviation and Ministry of Home Affairs are taking necessary action to carryout installation of RDE's in the time bound manner in consultation with BARC and ECIL.

4.7 Capacity Development

UNDP describes 'capacity building' as the creation of an enabling environment with appropriate policy and legal frameworks, institutional development, including

community participation (of women in particular), human resource development and strengthening of managerial systems. It adds that capacity building is a long-term, continuing process, in which all stakeholders participate (ministries, local authorities, non-governmental organizations and water user association's professional associations, academics and others). Capacity may include physical, institutional, social or economic means as well as skilled personal or collective attributes such as leadership and management. Capacity may also be described as capability.

Disaster management requires trained human resources to deal with complex situation effectively to mitigate the impact of disaster on human life and property. Capacity Development is an integral process of knowledge and skill building. Capacity may include physical, institutional, social or economic means as well as skilled personal or collective attributes such as leadership and management. Capacity Development is much more then training and it includes human resource development, equipping individual with understanding, skills and access to information, knowledge and training that enables him to perform effectively.

National Policy on Disaster Management (NPDM) describes its approach to capacity development. NPDM further elaborates on National priorities, institutional capacity development, training communities, professional technical education, DM education in school, training to artisan and training to other group. Capacity development has focused on training of the DM officials, functionaries, trainers, elected representatives and community representatives. Various institutions like, NDMA, NIDM, NCDC, NFSC and ministries have developed the capacity development programme for disaster management.

The details included in this chapter are only illustrative and not exhaustive. Capacity Development strategies are now being mainstreamed in most of the ministries and Government department at National, State and District level to equip the DM personal and community with advance knowledge and skill in disaster management. It is expected that once the National Human Resource and

Capacity Development Plan is adopted, it will help in mainstreaming the capacity development in different activities of the ministries of Government of India concerned, state government and other stakeholders.

Capacity building includes:-

- Human resource development, the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively,
- Organizational development, the elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organisations and sectors (public, private and community),
- Institutional and legal framework development, making legal and regulatory changes to enable organisations, institutions and agencies at all levels and in all sectors to enhance their capacities.

Following are considered as vital components of the capacity development:

(i) Training: It is a learning process that involves the acquisition of knowledge, sharpening of skills, concepts, rules, or change of attitude and behavior to enhance the performance of individuals associated with different departments and institutions.

(ii) Education: Amidst changes of the past decades, school education sector, the most discussed topic of national importance, is planning for more contextual, practical and application oriented curriculum for students at different levels of schooling.

(iii) Research: Research is an organised and systematic way of finding answers to questions. Systematic because there are certain things in the research process which are always done in order to get most accurate result.

(iv) Awareness: Awareness is generally defined as knowledge created through interaction between an agent and its environment. It cannot be simply referred to as

"knowing what is going on." This concept of awareness involves state of knowledge as well as dynamic processes of perception and action.

4.8 Institutions for Capacity Development

a) National Institute of Disaster Management

The National Institute of Disaster Management constituted under the Disaster Management Act 2005 has been entrusted with the nodal national responsibility for human resource development, capacity building, training, research, documentation and policy advocacy in the field of disaster management. Upgraded from the National Centre for Disaster Management of the Indian Institute of Public Administration on 16th October 2003, NIDM is steadily marching forward to fulfill its mission to make a disaster resilient India by developing and promoting a culture of prevention and preparedness at all levels.

Management Structure

Union Home Minister is the President of the Institute. NIDM has a general body of 42 Members comprising of Secretaries of various nodal Ministries and Departments of Government of India and State Governments and heads of national levels scientific, research and technical organizations, besides eminent scholars, scientists and practitioners. The Institute has a Governing Body of 16 members chaired by Vice Chairman of National Disaster Management Authority. The Executive Director runs the day to day administration of the Institute. The Institute has following four Academic Divisions:

• Policy, Planning and Cross Cutting Issues
• Geo-hazards Risk Management
• Hydro-meteorological Hazards Risk Management
• Response and training

Vision

- To be a premier Institute of Excellence for training and research on disaster

risk mitigation and management in India and to be recognized as one of the leading Institutions at the international level.

- To strive relentlessly towards making a disaster free India by developing and promoting a culture of prevention and preparedness at all levels,

Mission

- To work as a think tank for the Government by providing assistance in policy formulation and;
- To facilitate in reducing the impact of disasters through:
  - Planning and promoting training and capacity building services including strategic learning.
  - Research, documentation and development of national level information base.
  - System development and expertise promo- tion for effective disaster preparedness and mitigation.
  - Promoting awareness and enhancing knowledge and skills of all stakeholders.
  - Strengthening institutional mechanisms for training and capacity building of all stakeholders.
  - Networking and facilitating exchange of information, experience and expertise.

Functions

Under the Disaster Management Act 2005, the Institute inter alia, has been entrusted with the following functions:

a. develop training modules, undertake research and documentation in disaster management and organize 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 various stakeholders;
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 for capacity-building;
f. develop educational materials for disaster management including academic and professional courses;
g. promote awareness among stake- holders including college or school teachers and students, technical personnel and others associated with multi-hazard mitigation, preparedness and response measures;
h. undertake, organize and facilitate study courses, conferences, lectures, seminars within and outside the country to pro- mote the aforesaid objects;
i. undertake and provide support for publication of journals, research papers and books and establish and maintain, libraries etc.

Thrust Areas

Training

Face-to-Face Training: NIDM conducts both in campus and off-campus training programmes on various themes covering a wide range of subjects and sectors for senior and middle level government officials and others.

Web Based Training: The Institute in collaboration of World Bank Institute Washington conducts on-line training programmes on various specialised subjects related to disaster management.

Satellite Based Training: The Institute collaborates with some of the Administrative Training Institutes to conduct satellite based training programmes through the ISRO community centres.

Self Study Courses: The Institute has introduced web based self study courses which anyone from anywhere at any time can log on.

Research & Documentation

NIDM documents major disasters taking place in the country to learn the lessons on its management and use the case studies as resource materials for the training classes and simulation exercises. Action oriented Research Projects are also undertaken by the Institute.

Policy Studies

NIDM provides assistance in national level policy formulation and state level policies, strategies and frameworks.

Consultancy Services

NIDM also provides consultancy services to the Central and State Government departments, UN Agencies, autonomous bodies & corporations, district administration and local authorities in developing their disaster management plans, frameworks and strategies.

Knowledge Integration

NIDM performs knowledge integration through networking, collaboration with a number of national and international level scientific, technical and other specialized organizations on programme based activities for training, research, documentation etc. NIDM has been developing an India Disaster Knowledge Network (IDKN) in partnership with many knowl- edge based institutions for creating a one stop portal on disaster management in the country.

Disaster Management Centres in the States

NIDM has been implementing the Central Sector Scheme for providing financial assistance to State ATIs/ other Institutions for operation of Faculty/Centre of Disaster Management. Presently 30 such Centres are operational in the country. Observing Disaster Reduction Day 2012 by NIDM : Shri A.K. Mangotra, Secretary (BM), MHA addressing at the programme.

SAARC Disaster Management Centre

NIDM is hosting the SAARC Disaster Management Centre, which has mandate for disaster risk reduction in eight South Asian countries- Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Professionals from these

countries work in the Centre to develop and implement plans and programmes on regional cooperation on various aspects of disaster risk reduction and management in South Asia.

Regular Publications

• Journal 'Disaster and Development'
• Quarterly Newsletter "Tidings"
• India Disaster Report

Recent Publications

• Training Modules on
    - Comprehensive Landslide Risk Management
    - Environmental Legislation for DRR - Geo-informatics Application in DM
    - Chemical (Industrial) Disaster Management
    - Flood Risk Mitigation & Management: A ToT Module
    - DM for NDRF Commanders
    - Psychosocial Care in DM: A ToT Module
• Formulation of DDMP
• Directory of Institutions and Resource Persons in DM
• Science Festival: Disaster Management
• Safeguard Environment for DRR: Poems & Slogans
• Eco system Approach to DRR

Location and Facilities

Located centrally at 5 B, IP Estate, Mahatma Gandhi Road, ITO (near Delhi Police HQ.), the Institute is equipped with the following facilities;

• Training and Conference Halls
• Well-stocked library
• GIS Lab
• Computer Centre
• Video Conferencing
• Boarding and Lodging facilities

b) Disaster Management Centers in the States

The Government of India through NIDM supports a four member faculty and two support staff besides the programme expenses of the Disaster Management Centers of the Administrative Training Institutes or other nodal institutes nominated by the states under a Central Sector Non-Plan Scheme (2007-12). Thirty one such centers have been set up throughout the country, one in each state and two each in Assam and U.P. The training programmes of the centers and NIDM are developed through a consultative process at the Annual Training Conference attended by the Relief Commissioners of the states, Director Generals of the ATIs, and representatives of the concerned nodal ministries and departments of the Government of India. Every centre has to conduct a minimum of 25 training programmes and train at least 490 participants annually. Together the centers train more than 35000 cutting edge functionaries of the government. The training calendar of NIDM may be visited at website 'http://nidm.gov.in'.

c) National Disaster Management Authority

NDMA undertakes several initiatives in the process of capacity development. Few of them are illustrated as follows:

Mock Exercises: NDMA undertakes mock exercises in vulnerable districts and industries on various types of natural and man-made disasters to help the state governments and district administration in reviewing the adequacy and efficacy of the state and district level Disaster Management Plans and to identify gaps in resources and systems. So far NDMA has conducted nearly 211 mock exercises including 90 similar exercises in schools. During the Commonwealth Games, similar exercises were under taken through coordinated conferences, table top exercises and the mock exercises on both natural and man-made disasters at different competition and practice venues and at accommodation areas of players and accompanying officials. Altogether, 55 such exercises were conducted at different venues of the Commonwealth Games including the Games Village.

Training of Panchayati Raj Institutions (PRIs): Capacity Building of PRIs is extremely important as they are the local authorities at the grassroots levels. For the PRIs in addition to their scheme based capacity building funds, the NDMA has undertaken a capacity building project in partnership with IGNOU and eleven states,

d) Incident Response System (IRS)

The incident response system is a standardized method of managing disasters, which is flexible and adaptable to suit any scale of natural as well as man made emergency/incidents. It has common terminology, organizational flexibility, specialized training, unity and chain of command and well rehearsed coordination mechanism. The system provides specialist incident management teams with an incident commander trained in different aspects of incident management such as logistic, operations, planning, safety, media management etc.

A revised roadmap for training and institutionalization of IRS in India has been prepared which envisages to increase the strength National Core Group to include all concerned national level training institutes, RTI's and ATI's; expansion of trained State Master Trainers, organizing training programmes for Core Group Trainers, State Master Trainers, training of members of national, state and district headquarters and IC teams. The amount for its implementation is proposed to be met from the Capacity Building Grant of the states and Non-Plan fund of MHA. NIDM has developed 11 training modules on IRS and implementing training of trainers' programmes.

e) National Civil Defence College (NCDC), Nagpur

The first Disaster Management Training Institution of the country was founded on 29th April 1957 at Nagpur as the Central Emergency Relief Training Institute (CERTI) to support the Emergency Relief Organization of the Government of India. This institute organized advanced and specialist training for revenue officials responsible for Disaster Relief Operations against any natural or manmade disaster. CERTI was renamed as National Civil Defense College on 1st April 1968.

Training programmes conducted by NCDC aim to train:

- Volunteers of Civil Defence about the aspects of civil defence so that they could further be trained for specialized jobs in various service in civil defence,
- Local volunteers in Civil Defence Wardens Service, duties before, during and after air raid,
- Staff of control and sub control centres except telephone and wireless operators,
- CD and Home Guards volunteers enrolled as ICO and wardens who have completed the CD Basic Course at a local level,
- Civil Defence Volunteers in basic rescue techniques
- All CD & HG volunteers in category-1A towns against NBC warfare,
- All CD volunteers for specialized jobs for various CD services,
- Civil Defence and Home Guards officers, volunteers and teachers of various, educational institutions to act as an training instructors at the local level,
- Civil Defence and Home Guards volunteers in advance fire fighting,
- Officers and volunteers of Civil Defence/ Home Guards to enable them to detect identify and report any unexploded bomb in the area,
- Civil Defence officers/ personnel in the science of NBC, warfare, possible ways and means of protection against the same and preparation of plan against nuclear threat,
- Civil Defence and Home Guards volunteer's officers and officials and members of rescue service in Disaster Management and relief during disasters,
- Civil Defence instructor's volunteers and Industrial Officers of various categorised towns and important industries in Civil Defence plan.

The college has been upgraded to one of the main Centers for Disaster Management Training and a nodal center for Radiological, Nuclear, Biological and Chemical Emergency Response Training. It has also been recognized as a premier training establishment in Chemical Disaster Response Training by the Ministry of Environment & Forests. Its up-gradation into 'institution of excellence' at a national level to train a professional cadre of trainers for Disaster Response & Recovery Management is in the final stages of completion and will involve a total cost of ` 18.95 crore.

f) National Fire Service College (NFSC), Nagpur

The National Fire Service College was established in 1956 as a sub-ordinate establishment of Ministry of Home Affairs with the aim of providing training to the Fire Officers of the country in advanced techniques of fire fighting and rescue, and creating uniformity in the Fire Service organizations and their management across the country. The college initially offered only one course and subsequently additional courses were added to meet the growing need of training in the fire services of the country. The college has so far trained 15197 Fire Officers in the country.

Courses: Following courses are conducted by the college:
• Sub- Officers' course,
• Station Officer and Instructors course,
• Divisional Officers' course.

The course enrollment capacity is variable and depends on the requirement of Fire Brigades in the country. The faculty includes Senior Fire Officers of various public and private sector undertakings, state government, municipal corporation, Fire Brigades, Port Trust, Air Port Authority and they impart comprehensive training on various aspects of fire prevention and fire protection.

g) Efforts of other Ministries in Capacity Development Programme on DM

Ministry of Human Resource Development

As an effort to mainstream disaster management concerns into the education curricula, NDMA has taken the initiative in conjunction with the Ministry of Human Resource Development, to ensure that DM curriculum forms part of the course curriculum in undergraduate science and humanities courses and medical, engineering, architecture courses besides in school education. It will also focus on the training of teachers and faculties in disaster management. Sarva Siksha Abhiyaan (SSA) will also include the concerns of disaster resilience in their adult literacy curriculum.

The topics on Disaster Management aim to:

i. Acquaint students about various disasters that India is vulnerable to and the hazard maps to enable them to visualize these vulnerabilities,
ii. Introduce a few key concepts in disaster management in simple terms, to orient them to the words used in media discussions, analysis etc. when a disaster strikes,
iii. Introduce the concept of being prepared for disaster through simple do-s and don'ts that school children can imbibe and spread to families and community,
iv. Develop interest in the subject through interactive activities in the classroom so that the student seeks more information on disaster.

Syllabus of different classes from VIII to XI: The Central Board of Secondary Education has taken the initiative of including disaster management topics as frontline curriculum in the subject of social science with effect from 2003-2004 in class VIIIth and extended it to class IXth and Xth in subsequent years. It was extended to class XI in 2005-2006 in the subjects of sociology and geography.

DM syllabuses are being introduced in universities. Pune, Madras, IGNOU, and Indraprastha and many other Universities have already started such courses and it is in the process of getting introduced in Symbiosis, Pune.

NDMA has undertaken to get such courses introduced in undergraduate course. A module has been provided to UGC similarly for introducing such courses in technical institutes. Modules have been provided to AICTE in course of Engineering and architect. ICAR has introduced a DM module for its courses in Agriculture and Vetenary

Organization of training programme: With the financial and technical support from Ministry of Home Affairs and the UNDP under the GOI_UNDP DRM programme (2002-2009), the Central Board of Secondary Education was able to successfully complete two master trainers programmes across the country during the year 2003-2006.These training programme helped the teachers to successfully transect the subject in the class room. Demonstrations were carried out on first aid,

search and rescue, evacuation etc by the health department, fire services etc. An impact study on disaster management textbooks was conducted by CBSE in July, 2006 with the purpose of updating the textual material by incorporating recent developments and obtaining feedback from the teacher and students.,. Feedback questionnaires were sent to 180 schools all over the country. The information received from schools was analyzed with the purpose of reviewing and updating the existing text books.

Ministry of Panchayati Raj & Rural Development

NDMA has advised the Ministry of Panchayati Raj and Rural Development to address the concerns of disaster management in the training of representatives of the Panchayati Raj Institutions and local bodies. The Ministry of Panchayati Raj has also issued a letter N-11012/35/2007-P&J Vol III dated 1.9.2010 in this regard. Accordingly, all the ongoing and future projects of this ministry should incorporate disaster resilient features into them. States efforts' towards training of Panchayati Raj functionaries and district level officials has been initiated in 11 states in association with IGNOU. Altogether 4,125 government functionaries and 12,375 PRI/ ULB representatives are targeted to be trained in disaster management under this project.

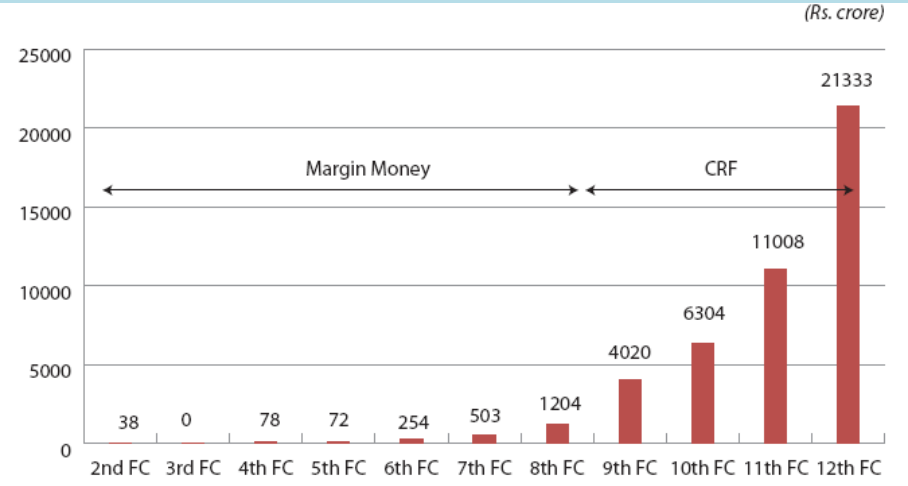
Financing the Relief Expenditure

Financial assistance in the wake of natural calamities is provided in accordance with the schemes of relief funds. These schemes are based on the recommendations of the successive Finance Commissions. While the budgetary provision of these relief funds is dealt with by Ministry of Finance, the processing of request of the state government for these funds is done by the Ministry of Home Affairs (DM Division). The present scheme of State Disaster Response Fund (SDRF) and National Disaster Response Fund (NDRF) are based on the recommendations of the 13th Finance Commission, operative from 1st April 2010 to 31st March 2015.

Recommendation of 13th Finance Commission

On the recommendation of the 13th Finance commission, the Minister of Finance GOI has allocated funds for strengthening disaster management institutions, capacity building and response mechanisms. Allocation made by Finance Commission towards erstwhile calamity Relief Fund is given in figure below.

Allocation made by Finance Commission towards erstwhile calamity Relief Fund



The Central assistance in the form of Margin Money Scheme (MMS) has continued in operation from 2nd to 8th Finance Commission. Later MMS got revised for funding relief expenditure from CRF and NCCF with the objectives:

(i) The assistance extended to the State in accordance with their need,
(ii) Relief to the victim is quick,
(iii) State to have greater functioning avenues,
(iv) State to be given more accessibility.

National Disaster Response Fund (NDRF)

Section 46(1) of DM Act 2005 provides for constitution of NDRF for meeting any threatening disaster management situation or disaster. Accordingly, DM Division issued notification for the constitution of NDRF on 28th September 2010. The Finance Ministry has also issued guidelines to the state for operation of NDRF.

Sourcing of National Disaster Response Fund (NDRF): The Government of India raised this Fund by levying the "National Calamity Contingency Duty" on

imported petrol and products, crude oil, motor cars, imported multi utility vehicles, two wheelers, mobile phones, pan masala and certain specific tobacco products. The collection for year 2009-10 was ` 3160.00 crore and was expected to be around ` 3900.00 crore in the financial year 2010-2011. For the year 2011-12, the estimate is ` 4525.00 crores.

State Disaster Response Fund

Section 48 (1) of Disaster Management Act 2005 provides for constitution of State Disaster Response Fund (SDRF) by the state Governments. The Ministry of Home Affairs has issued the guidelines to the state for operation of SDRF. Allocations to the State Relief Funds have been made based on the recommendations of the successive Finance Commissions. While allocating the funds to various states for a period of five years the factors considered include the expenditure incurred by the state government on relief operations during the last about 10 years, vulnerability of the state to natural disasters and economic status of the state. Currently, as per the recommendations of the 13th Finance Commission, the GoI has approved an allocation of ` 33580.93 crore in the State Disaster Relief Fund to all the states, comprising of ` 25847.93 crore as central share and ` 7733.00 crore as state share. The scheme of SDRF provides for release of the central share SDRF in two equal installments in the months of June and December.

Capacity Building Grant

On the recommendation of the 13th Finance Commission, Rs 525.00 crore has been allocated to the states for taking up activities for building capacity in the administrative machinery. The state wise allocation for the period 2010-15 is given in Table No- 8.2. The Ministry of Finance has issued the guidelines for the utilization of the fund. The guidelines provide for preparation of an action plan for the entire period of 2010-15 as well as action plans for each financial year. These plans would inter alia include items for training and capacity building of stakeholders and functionaries in states, preparation of disaster management plans

based on hazard, risk and vulnerability analysis and setting up and strengthening of emergency operations centres in states.

National Disaster Mitigation Fund

Section 47 of the Disaster Management Act 2005 provides for constitution of National Disaster Mitigation Fund. The provisions of the Act are as under:

a. The Central Government may, by notification in the Official Gazette, constitute a fund to be called the National Disaster Mitigation Fund (NDMF) 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.
b. The National Disaster Mitigation Fund shall be applied by the National Disaster Management Authority.

The modalities of constitution of NDMF have been discussed by MHA with the MoF, Planning Commission and NDMA from time to time. A reference was made to 13th Finance Commission. The 13th Finance Commission has given its report and as per its recommendations: “Mitigation and reconstruction activities should be kept out of the schemes funded through Finance Commission grants and met out of overall development plan funds of the centre and the states.” The issue is under consideration of Ministry of Home Affairs with other concerned Ministries.

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