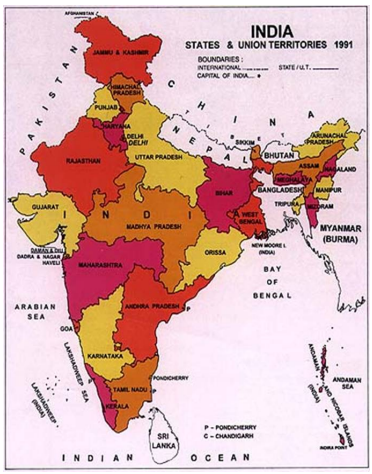
Country Report
Disaster Management in India

INDIAN PARLIAMENT



CONTENTS

I. Topography

1. Location

1.1 In the North, it is bounded by the Great Himalayas and stretches southwards tapering off into the Indian Ocean between the Bay of Bengal and the Arabian Sea . The main land extends between latitudes $8^{o}4'$ and $37^{o}6'$ North and longitudes $68^{o}7'$ and $97^{o}25'$ East It measures about 3,214 kms from North to South between extreme longitudes. It has a land frontier of 15,200 kms and coastline of 7,500 kms. It has also group of islands located both in the Bay of Bengal and Arabian Sea .

1.2 It has common boarder with Afghanistan and Pakistan in North-west China , Bhutan and Nepal in North and Myanmar and Bangladesh in the East. Sri Lanka is separated from India by a narrow channel of sea.

1.3 The main land comprises of four regions, namely, the Great Mountain Zone, Plains of the Ganges and the Indus , Desert Region and the Southern Peninsula . The Himalayan range comprises three almost parallel ranges interspersed with large plateau and valleys. The mountain wall extends over a distance of 2,400 kms with a varying depth of 240 to 320 kms.

1.4 The plains of the Ganges and Indus , about 2,400 Kms. long and 240 to 320 Kms. broad, are formed by basins of three distinct river systems, viz.; the Indus , the Ganges and the Brahmaputra . The desert region is clearly delineated in two parts - the Great Desert running beyond Rann of Kutch to Rajasthan - Sindh Frontier, while the little desert extends between Jaisalmer and Jodhpur upto the Northern wastes. Between the two deserts is a zone of absolutely sterile region, consisting of rocky land cut up by limestone ridges.

2. Area

2.1 India covers areas of 3.28 million sq. kms extending from now covered Himalayan heights to the tropical rain forests of the South. It is the seventh largest country in the world and is well marked off from the rest of Asia by mountains and the sea, which give the country a distinct geographical entity.

2.2 According to 2001 census, Indian has a population of about 1,000 million consisting of a male and female population in the ratio of 1000/933 .The decadal growth rate is 21.34%. The average population density in the country as a whole is 267 persons per sq. km. The literacy rate as per 2001 census is 65.38 per cent.

2.3 The country is a Union of 28 States and 7 Union Territories . The Union Territories are subject to the direct rule – making powers of the National Parliament and the administrative control of the Union Government. The States have elected Legislatures and Governments, which are fully autonomous in relation to the sphere of activities entrusted to them under the Constitution. The States are further divided into Administrative Units called Districts.

back

II. Weather

1. Climate

1.1 The climate of the country can be broadly described as a tropical monsoon type with four seasons: Winter Season (January–February), Hot Weather –Summer (March–May), Rainy Season–Southwest Monsoon (June– September) and Winter Season–North East Monsoon (October–December). The rainfall varies considerably from100mm in North–West desert to over 10,000 mm in parts of Assam . Similarly variation exists in temperature and rainfall, long coastlines and desert areas provides a variety of seasons and accompanied natural conditions often form a fertile ground for natural calamities like floods, cyclones, droughts, etc.

2. Rainfall

Country receives an annual precipitation of 400 million–hectare meters, 75 per cent of which is received between June and September. The heavy concentration of rainfall within a span of three months in most of the areas causes heavy run–off and high floods. Non–availability of moisture over most parts of the year, particularly in the arid and semi–arid regions, renders 68 per cent of the arable land as vulnerable to drought. The tectonic plates of Indian sub–continent make it vulnerable to frequent earthquake disturbances.

back

III. Overview of Natural Disasters

1. Floods

Among all the disasters that occur in the country, river floods are the most frequent and often the most devastating. While the area liable to floods is 40 million hectares, the average area affected by floods annually is about 8 million hectares. The annual average cropped area affected is approximately 3.7 million hectares. The average annual total damage to crop, houses and public utilities during the period 1953–97 was about Rs.9720.00 million, while the maximum damage was Rs. 46300.00 million in 1988.The average annual human lives is 1504, loss of livestock 96713 and damage to houses 11683 during this period. Information on extent of damage due to floods during 1981–1997 is given in Annexure–I

Flood Hazard Map

Water Map of India

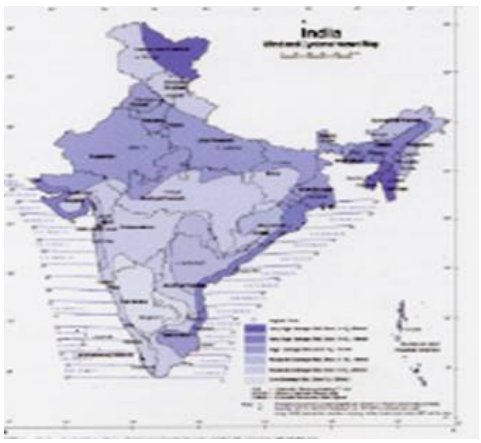
2. Droughts

. Due to erratic behavior of monsoon, both low (less than 750 mm) and medium (750 – 1125 mm) rainfall regions, which constitute 68 per cent of the total areas, are vulnerable to periodical droughts. The analysis of 100 years of rainfall behavior reveals that the frequency of occurrence of below normal rainfall in arid, semi-arid, and sub-humid areas is 54-57 per cent, while severe and rare droughts occur once every 8- 9 years in arid and semi-arid zones. In semi-arid and arid climatic zones, about 50 per cent of the severe droughts cover generally 76 percent of the area. In this region, rare droughts of most severe intensity occurred on an average once in 32 years and almost every third year was a drought year. The impact of drought varies from year to year. The 1987 drought, which was one of the worst droughts of the century, with the overall rainfall deficiency of 19 per cent, affected 58-60 per cent of cropped area and a population of 285 million.

3. Cyclones

3.1 India has a long coastline of 8,000 kms, which is exposed to tropical cyclones originating from Bay of Bengal and Arabian Sea . . On an average, about five to six tropical cyclones form in the Bay of Bengal and Arabian Sea every year, out of which two to three may be severe .The east coastline of the country is more prone than the west as cyclones as about 80 percent of the total cyclones generated in the region hit here. There are two definite seasons of tropical cyclones in the North Indian Ocean .

Wind and Cyclone Hazard Map



3.2 The impact of these cyclones is confined to the coastal districts, the maximum destruction being within 100 Km. from the center of the cyclones and on either side of the storm track. . Some of the severe cyclones occurred during 1990-1999 include: Andhra Pradesh, May 1990 (loss of 928 human life); Andhra Pradesh October,1996 (human life lost-1057): Gujarat , June ,1998(1261 loss of human life) and Orissa, October,1999 (8913 loss of human life)

3.3 Information on some severe cyclones in India since 1847 is at Annexure-II

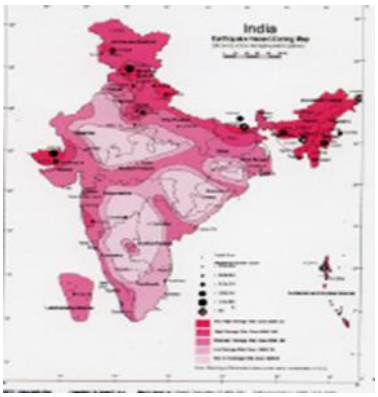
4. Earthquakes

4.1 Earthquakes are considered to be one of the most dangerous and destructive natural hazards. The impact of this disaster is sudden with very little or no warning, making it just impossible to predict it or make preparations against damage and collapse of building and other man-made structures. India has a large part of its land area liable to wide range of probable maximum seismic intensities where shallow earthquakes of magnitudes of 5.0 or more on Richter Scale, have been known to occur in the historical past or recorded in the last 100 years. About 56% of the total areas in the country are vulnerable to seismic activities of varying intensity. Most of the vulnerable area generally located in Himalayan and sub-Himalayan regions, Kutch and Andaman Nicobar Islands .

4.2 Some of the recent major earthquakes occurred in the country are: 1991-Uttarkashi-Uttranchal Pradesh, 6.6 richter scale: 1993-Lathur - Maharashtra , 6.4; 1997 - Jabalpur -Madhya Pradesh, 6.0; 1999 Chamoli- Uttranchal Pradesh6.8; and 2001 Bhuja-Gujarat, 6.9 Richter scale.

4.3 List of some of major earthquakes occurred since 1819 is at Annexure -III

Earthquake Hazard Map



5. Landslides

The landslides are simply defined as the mass movement of rock, debris or earth down a slope and have to include a broad range of motions whereby falling, sliding and flowing under the influence of gravity dislodges earth material. They often take place in conjunction with earthquakes, floods and volcanoes. The Himalayan mountain, the north-east hill ranges and the Western Ghats and the Nilgiris experience considerable landslide activities of varying intensities.

6. Avalanches

Avalanches constitute a major hazard in the higher reaches of the Himalayas . Heavy loss of life and property has been reported due to avalanches. Parts of the Himalayas receive snowfall round the year and adventure sports are in abundance in such locations. Severe snow avalanches are observed during and after snowfalls in Jammu & Kashmir, Himachal Pradesh and the Hills of Western Uttar Pradesh. Major causes of the avalanches are: Inclination of slope where avalanche occurs; scale of slope, shape of slope, location (ridge line or toe of slope); orientation of slope; depth of snow - cover, depth of snowfall, wind velocity , atmospheric and snow temperatures etc .

7. Forest Fire

Forest face many hazards but the most common hazard is forests fire. Forests fires are as old as the forest themselves. The forest fires are caused by natural causes and manmade causes. The most vulnerable stretches of the world are the youngest mountain ranges of Himalayas . The forests of Western Himalayas are more frequently vulnerable to forest fires as compared to those in Eastern Himalayas . In India, the hilly areas vulnerable to forest fires lie in the States Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and Uttranchal Pradesh. Forest fire incidents are not very uncommon. In the recent past, the fire in 1995 in the Uttranchal had destroyed more 375,000 hectares of forest wealth.

8. Pest Infestation

Food losses due to pests, disease, wild animals, insects and weeds are considerable. It is estimated that 35% of world crop production is lost in spite of pesticide and other control programs. The primary pests are insects, disease and weeds. Losses due to birds and wild animals are low compared to these. Causes of pest infestation include temperature, monoculture of crops, and introduction of plants new locations, weather pattern and migration of pest's species.

In India the locust infestation prone States are: Rajasthan, Gujarat , Punjab , Haryana, Andhra Pradesh, Karnataka, and Maharshtra. A desert area of over 200,000 sq.km covers the States of Rajasthan, Gujarat , Punjab and Haryana. Locusts caused substantial damage in the past. In recent years Indian experienced large-scale locust invasion in 1978. Again during July1993, the country experienced unprecedented level of locust invasion. The swarming activity continued till October1993 and a total of 172 swarms entered the country.

back

IV. Natural Disaster Management System

In the federal set up of India , the basic responsibility for undertaking rescue, relief and rehabilitation measures in the event of natural disasters is that of the State Government concerned. The role of the Central Government is supportive, in terms of physical and financial resources and complementary measures in sectors such as transport, warning and inter-state movement of food grains. The dimensions of the response at the level of Central Government are determined in accordance with the existing policy of financing the relief expenditure, based on the recommendations of the Finance Commissions appointed after every five years

Based on the past experience, an integrated administrative response mechanism has been evolved. A broad view of the administrative response at national, state and district levels is given below:

1. National Level Organization

Nodal Ministry: Ministry of Home Affairs

Other line Ministries:/Departments/Organizations: India Meteorological Department, Central Water Commission, Ministry of Home Affairs, Ministry of Defense, Ministry of Finance, Ministry of Rural Development, Ministry of Urban Development, Department of Communications, Ministry of Health, Ministry of Water Resources, Ministry of Petroleum, Department of Agriculture & Cooperation. Ministry of Power, Department of Civil Supplies, Ministry of Railways, Ministry of Information and Broadcasting, Planning Commission, Cabinet Secretariat, Department of Surface Transport, Ministry of Social Justice, Department of Women and Child Development, Ministry of Environment and Forest, Department of Food. Each Ministry/Department/Organization has their sectoral. Action Plan as Emergency Support System. The institutional mechanism at the National Level is as under:

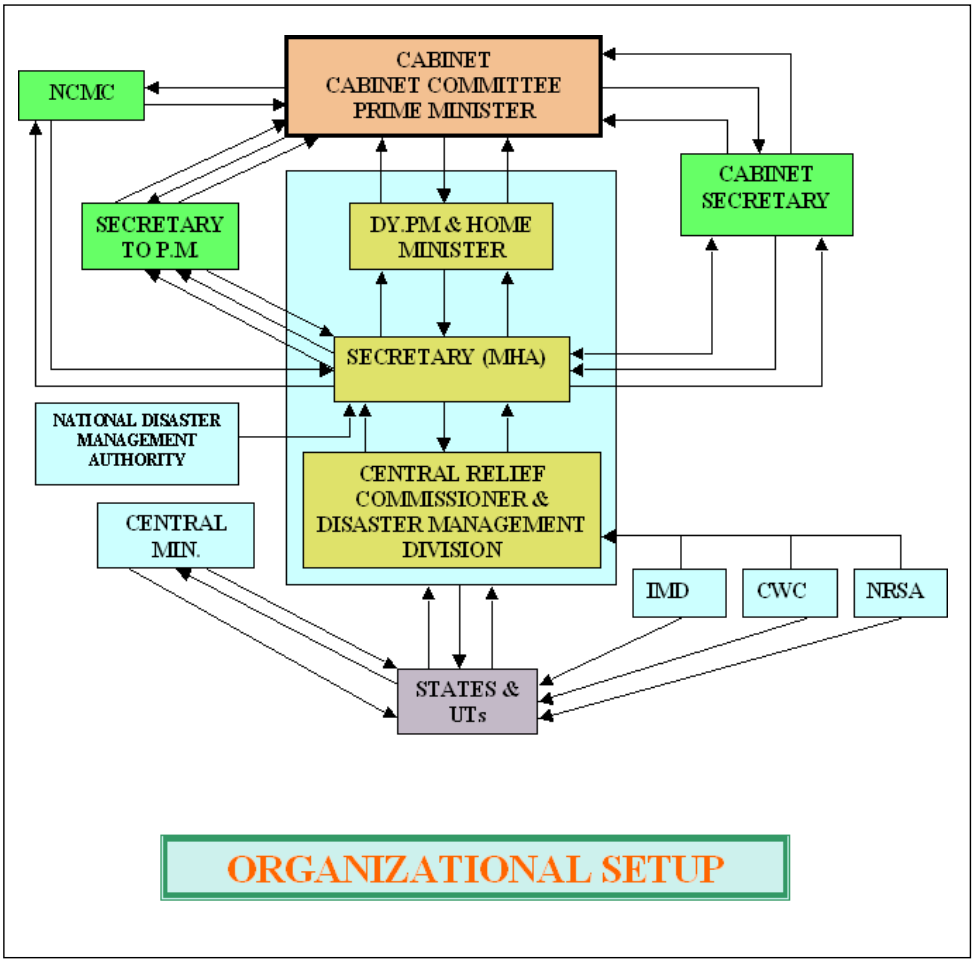
Cabinet Committee/Task Force: The Union Cabinet may set up a Cabinet Committee/Task Force / Group of Ministers for effective coordination and implementation of relief measures in the wake of a natural disasters. Such Committees/Task Force/Group of Ministers had been set up in the wake of Super Cyclone of Orissa in 1999, Earthquake of Gujarat 2001, severe floods in 2000 and drought in 2002.

National Crises Management Committee (NCMC): Cabinet Secretary, which is the highest executive officer, heads the NCMC. Secretaries of all the concerned Ministries /Departments as well as organizations are the members of the Committee. The NCMC gives direction to the Crisis Management Group as deemed necessary.

Crisis Management Group (CMG): The Central Relief Commissioner in the Ministry of Home Affairs is the Chairman of the CMG, consisting of senior officers (called as nodal officers) from various concerned Ministries. The CMG's functions are to review

Every year contingency plans formulated by various Ministries/Departments/Organizations in their respective sectors, measures required for dealing with a natural disaster, coordinate the activities of the Central Ministries and the State Governments in relation to disaster preparedness and relief and to obtain information from the nodal officers on measures relating to above.

Control Room (Emergency Operation Room): An Emergency Operations Center (Control Room) exists in the nodal Ministry of Home Affairs, which functions round the clock, to assist the Central Relief Commissioner in the discharge of his duties. During crisis period, providing additional manpower and equipment, as per the need, strengthens it.



2. State Level Organization

At the State level, a State Crisis Management Committee has been set under the Chairmanship of the Chief Secretary, who is the highest executive functionary in the State. The Committee is required to take into consideration the instructions and guidance received, from time to time, from the Government of India and formulates action plans dealing with the different natural disasters

. An officer of the level of Secretary in the State Government is designated as Relief Commissioner, which is the nodal officer in the State is the coordinator of all activities/programs for disaster management.

3. District Level

District level is the key level for disaster management related activities.

District Collector, the highest administrator in the district, is the focal point for preparation of the district level plans and for directing, supervising and monitoring relief measures for the natural disasters. A District Level Co-ordination and Relief Committee is constituted and is headed by the Collector as Chairman with participation of all other related government and non governmental agencies and departments in addition to the elected representatives

Contingency Action Plan

A National Contingency Action Plan (CAP) for dealing with contingencies arising in the wake of natural disasters has been formulated by the Government of India and it had been periodically updated. It facilitates the launching of relief operations without delay. The CAP identifies the initiatives required to be taken by various Central Ministries/Departments in the wake of natural calamities, sets down the procedure and determines the focal points in the administrative machinery

State Relief Manuals

Each State Government has relief manuals/codes for which identifies that role of each officer in the State for managing the natural disasters. These are reviewed and updated periodically based on the experience of managing the disasters and the need of the State.

back

V. Financial Arrangements

The Scheme and arrangements for financing the relief expenditure in the wake of natural calamities are governed by the recommendations of Finance Commissions appointed by Government of India after every five years.

The present scheme, in operation for the period 2000–2005, is based on the recommendations of Eleventh Finance Commission. As per the Scheme, each State has been allocated a certain annual corpus called Calamity Relief Fund (CRF), administered by a State Level Committee, headed by the Chief Secretary of the State Government.

The corpus is built by annual contributions of the Union Government and the State Governments concerned in the ratio of 3:1. The share of the Union Government is released in two equal installments irrespective of the fact that there is any calamity or not.

At present, the aggregate accretion in the States' CRF for a period of five years from 2000–2005 amounts to Rs 110,075.90 million against an amount of Rs 63042.0 million for the period 1995–2000.

The Scheme also provides for extending additional assistance to the States, over and above the provisions of CRF, in the event of a natural calamity of severe nature, after following the established procedure. This provision exists in the form of National Calamity Contingency Fund (NCCF) with an initial corpus of Rs. 5000.00 million (for 2000–2005) with the Union Government to supplement the financial resources needed for relief operations. This fund is required to be recouped by levy of a special surcharge on the Central taxes for a limited period.

back

VI. Legislative support to the Disaster Management

There is no mention of disaster management as a subject/item in any of the three lists (Central, State and concurrent) under the Schedule 7 of the Constitution of India. Keeping in view the importance of field of disaster management, the issue of inclusion of this subject appropriately is under active consideration of the Government of India. The National Committee on Disaster Management, set up in February 2001 under the Chairmanship of Prime Minister, is considering the matter.

The present arrangements and organizational set up for managing the natural disasters are based on the recommendations of the Finance Commissions (appointed from time to time) and various orders/notifications issued by the Government of India.

back

VII . Recent Major Disasters

India has faced two major disasters in the recent past viz. Super Cyclone of October 1999 in Orissa and Earthquake of January,2001in Bhuj, Gujarat . The brief description of these events is given below.

1. Super Cyclone of October,1999 in Orissa

A super cyclone slammed the state of Orissa on October 29, 1999 with a wind speed of 270–300 kmph, accompanied by torrential rains ranging from 400 mm to 867 mm continuously for three days. The surged to a turbulent sea surged to a height upto 7 meters, with waves rushed in and traveled up

to 30 kms inside the mainland and the storm wind had penetrated upto 200 kms inland from the sea coast. The system, which was sighted by India Meteorological

Department (IMD) on 25th October, was intensified into a super cyclone at 0230 hours on 29th October,1999 . The system was stalled for 8 hours, 300 kms off the coast within Bay of Bengal and finally hit Orissa coast between Ersama and Balikuda (southwest of Paradip) at 1030hrs on 29th October. The landfall took about 2 hours. The diameter of the cyclone was very large (about 200 Km) and gale force wind speed of over 260 Kmph.

The rehabilitation and reconstruction work is going on and is expected to be completed by December 2002.

(a) Extent of Damage

S.No.	Item	Extent of damage
1.	Number and names of the districts affected	14 out of total 30 districts
2.	Worst affected districts	Jagatsinghpur and Kendrapara
3.	Number of villages affected	14586
4.	Population affected	18.97 million
5.	Number of children affected	3.7 million
6.	Number of children orphaned	1500
7.	Number of human casualties	8913
8.	Number of persons injured	7507
9.	Number of houses damaged	2.03 million (0.72 fully and 1.31 partly)
10.	Number of livestock perished	04.44 million
11	Trees felled (Number)	90.00 million
12	School buildings damaged (Number)	13443
13.	Road damaged (Number)	2688
14	Building damaged (Number)	26819
15	Boats damaged (Number)	Inland—10154 Marine--9417
16	Nets damaged (Number)	Inland—20775 Marine--15211

Setting up Orissa State Disaster Mitigation Authority (OSDMA).

OSDMA came into existence after the catastrophic super cyclone of October 1999, which hit the Orissa coast and caused destruction and death in fourteen districts of the State. The State Government of Orissa had set up OSDMA with the objective:

- to have an autonomous body exclusively devoted to disaster management,
- to promote a culture of preparedness for different types of disasters and
- to coordinate disaster mitigation activities including restoration and strengthening of infrastructure

(for more details please log on to OSDMA website (www.osdma.org)

2. Earthquake of Gujarat of January 2001

A powerful earthquake measuring 6.9 at the Richter scale struck near the town of Bhuj in Gujarat at 08.45 am on 26th January 2001 . The earthquake caused extensive loss of human life and damage to property in the Kutch neighbouring districts. In the first time in India that extensive damage was incurred in urban centers besides rural areas. The cities of Bhuj, Anjar, Rapar and Bachau in Kutch district were very severely affected with a large number of building collapsing and causing heavy loss of life

A damaged House

It was the non-engineered buildings in rural areas and buildings with poor quality of construction in the cities that collapsed, bringing into focus the need to create awareness on safe building practices, and to enforce safety norms in the construction sector.

The Government response to the earthquake was immediate, notwithstanding the difficulties posed due to collapse of communication links and affect on the administration and emergency services. The response was far more coordinated, efficient and effective than in the case of Orissa Super Cyclone. Lessons learnt from the cyclone experiences paid results in Gujarat and responses of the Central and State Governments, as well as NGOs were better coordinated.

The first phase of rescue and relief has been completed. The work of rehabilitation and reconstruction is going on , which is likely to be completed soon.

Damaged building

Extent of Damage:

- Damage/Loss of Human Lives: Reported lives lost 13,805

  167,000 persons suffered injury

Damage to Housing:

- Fully destroyed: Over 2 lakh houses
- Partially damaged" Over 9 lakh houses

Financial Impact:

- Direct Loss: Gujarat earthquake estimate: Rs 153,083 Million
- Indirect Loss: Gujarat earthquake estimate: Rs 30,476 Million

- Tertiary Loss: Gujarat earthquake estimate: Rs 100,670 Million

Damage to other Infrastructure Facilities:

- Over 10,000 small and medium industrial units went out of production
- 50000 artisans lost their livelihood
- 45 sub-stations damaged/destroyed in Kutch and 7 in Jamnagar , Rajkot and Surendranagar
- 255 feeders snapped

Number of educational structures affected:

A damaged building

- Class rooms damaged/destroyed – 49506
- School buildings: 2267; is as follows
- The damage to health structures: 4396 (Numbers)
- The damage to dams and check-dams: 222 (Numbers)
- The damage to public buildings: 49506 (Numbers)

Setting up of the Gujarat State Disaster Management Authority (GSDMA)

In the wake of severe, earthquake of 26th January,2001 the State Government of Gujarat (GOG) established the Gujarat State Disaster Management Authority (GSDMA) on February 8, 2001 to inter alia co-ordinate the comprehensive earthquake recovery program, to prepare programmes and plans disaster reduction as a strategy for long term disaster preparedness, to undertake research and study regarding causes of losses due to disasters and suggest remedial measures for minimizing the same.,. (For more details please log on to GSDMA Wed -site (www.gsdma.org)

back

VIII. On going Initiatives for Disaster Reduction

Based on the experience of managing past major disasters and technological development being taken place in and outside the country, Government of India and State Governments have initiated /planning to undertake various activities/programs contributing towards reducing the adverse impact of natural disasters. Some of them are listed below:

1. Setting up of National Committee on Disaster Management under the Chairmanship of Prime Minister-after the earthquake of Gujarat of January 2001

-inter-alias to suggest institutional and legislative measures for an effective and long term strategy to deal with major natural disasters in future.

2.Setting up of a High Powered Committee on Disaster Management Plans-set up in August, 1999 and report submitted in October 2001

- to review the existing arrangements for preparedness and mitigation of natural and manmade disasters, recommend measures to strengthen organizational structures and recommend a comprehensive model plan for management of these disasters at National, State and District levels- Recommendations are being considered by the National Committee on Disaster Management.

3.Ministry of Home Affairs as focal Point for Disaster Management

- In order to have coordination of all disasters at one place.

4.Creation of Search and Rescue Teams

- Based on the experience of managing the major disasters of Super Cyclone of Orissa 1999 and Earthquake of Gujarat of 2001, it has been decided to create S&R Teams at the National to strengthen this weak area of Search and Research Capacity . State Governments have also been requested to create such Teams.

5. Setting up of a National Disaster Management Authority

- As a part of ongoing exercise for strengthening institutional mechanism in the country to respond immediately and effectively to the disaster situations-proposed to be set up under Ministry of Home Affairs.

6. Periodical review of Sectoral Emergency Support System of various Ministries/Departments/Organizations of Government of India

- As disaster management is an multi-dimensional, various Organizations of the Government has to play their role. The periodical review of Emergency Support System of various organizations in there will keep the machinery active and tools in the state of readiness.

7. Strengthening Institutional Network

a) Setting up of a National Institute for Disaster Management

Proposed to set National Institute by upgrading existing National Center for Disaster Management, as an autonomous body – to cater the need of the country in the areas of human resource development and creation of knowledge and its dissemination.

b) Faculty on Natural Disaster Management in States- to assist the State Governments in carrying out the disaster reduction related activities including human resource development- Faculties have been created in 24 out 28 States - rest are being persuaded.

c) Setting up of the Orissa State Disaster Mitigation Authority (OSDMA)-in the context of super cyclone of October 1999

- To strengthen the capacity of State to carry out disaster reduction related programs and management of future disasters.

d) Setting up of the Gujarat State Disaster Management Authority-in the context of severe, earthquake of 26th January,2001

- To strengthen the capacity of State to carry out disaster reduction related program and management of future disasters.

8. UN assisted Projects

(i) UNDP Project on Strengthening the disaster management capacity (1997-2001)

-imparted specialized training/increased skills and capabilities of the officers working in this area from Government of India, State Governments, National Center for Disaster Management, State Faculties on NDM through training programs/study tours, provided basic equipment, making available manual and guidelines for training centers and contributed in creating awareness about the importance of and the need of preparedness and mitigation measures.

(ii) UNDP Project on Natural Disaster Risk Management Programs (2002-2007)

-to be implemented in 125 the most multi-hazard prone districts of 12 States- with focus on district and community level activities.

9.USAID Programs for Enhancement of Emergency Response (1997-2004)

- for enhancing the capacity of the persons from first responders to meet the situation arising out of collapsed structures due to earthquakes and cyclones. to build a cadre of trainers for replicating the programs in various parts of the country.

10. Preparation of Vulnerability Atlas of India-for disasters of earthquakes, floods and cyclones

- to assist the disaster managers and planners for formulating action plans for achieving disaster reduction based on vulnerability of the area to various disasters

11.Legislation in the field of Disaster Management

-it is proposed to take measures for giving adequate legislative support to various disaster reduction and management related programs for their effective implementation.

12.Guidlelines for Disaster Resistant Construction

-for the use of concerned organizations and individuals for constructing disaster resistant building/houses.

13. Upgrading and Strengthening of Seismological Instrumentation Network

- to improve the capacity of the country for effective monitoring of seismic activities and assist in formulating earthquake preparedness programs.

14.Disaster Related Standardization- preparation of Codes and guidelines through Bureau of Indian Standards, Building Material & Technology Promotion Council and Structural Engineering Research Center

. for the use of concerned organizations and individuals for constructing disaster resistant building/houses.

15. Hazard Assessment and Mapping

- to improve the capacity of the country for effective monitoring of seismic activities and assist in formulating earthquake preparedness programs.

16. Preparation of Seism tectonic Atlas of India

- to be used for the seismic hazard risk assessment and preparation of reliable seismic zoning map of India

17. Jal Vigyan Technology Mission Project

- expected to improve hazard mitigation in the Himalayan.

18. Proposal to set up a Earthquake Risk Evaluation Centers

-expected to assist in translating the earthquake hazard related knowledge products in to seismic risk evaluation, hazard mitigation and preparedness.

19.Disaster Warning System (DWS)

-dependable communication tool in wake of disruption of normal communication system following the cyclones. Successfully operated during past cyclones and found to be very effective

20.Plan Scheme for Disaster Management

To improve disaster management strategy and to enhance our capability to mitigate the impact of disasters in the country in the long-run, A Central Sector Scheme on Natural Disaster Management Programs (NDMP) is being implemented from December 1993. The main objective of the program is to enhance the national capability for disaster reduction, preparedness and mitigation. The program is also expected to enhance the level of awareness of the community about disasters they are likely to face and prepare them adequately to face the crisis situation. The components of the program include human resource development, research and consultancy services, documentation of major events, operation of Centers for Disaster Management at the National and State Levels, public education and community participation, international cooperation.

21. Strengthening Forecasting and Warning Systems

- India Meteorological Department, Central Water Commission are continuously making efforts for strengthening forecasting and warning of various disasters, keeping in view the experiences of previous disasters and technological development taking place in and outside the country.

22. Extensive campaign for public education and community involvement

– Government is taking all steps to undertake more extensively activities relating to educating the people, particularly students, and motivating them to involve in various programs of the Government- assistance of non-governmental organizations and other private organizations are being taken.

23.Networking of various Institutions

– There are large number of organizations working in one or the other areas of disaster management including preparedness and mitigation. Efforts are being made to network them, so that the benefit of their work can be taken and also to avoid duplication of activities.

24. Involvement of Non –governmental organizations

– NGOs are required to play a vital role in the management disasters to supplement the efforts of the Government, keeping in view of vastness of the country. Efforts have been initiated to involve them more effectively.

25. Involvement of Private Sector

– In India, so far private sector has played very limited role in the disaster situations. It is planned to involve this sector more actively, as industries are one of the affected sectors in the wake of disasters.

back

IX. Approach/Mission/Priority Areas

- Preparedness rather than crisis management
- Coordinated participatory approach rather than only State responsibility
- Technology up-gradation and deployment
- Information-a tool for disaster management
- Regional and international cooperation
- Quick damage assessment technology
- GIS web enabled networking
- State of art control rooms
- Mobile onsite control rooms
- Human resource development
- Massive public education and community involvement campaign
- Greater attention in North Eastern Region
- Strengthening Institutional network
- Involvement of NGOs
- Effective linkage of disaster mitigation with development plans
- Involvement of Private Sector
- Legal and legislative support.

back

X. International Cooperation

1. Policy for acceptance of External assistance

The present policy of the Government of India to attract relief is, not to issue any formal appeal on behalf of the Government, either directly or through any other agency.. However, relief donated on a voluntary basis will be accepted and acknowledged as a sign of international solidarity. In case of assistance coming in cash, it should be sent to the Prime Minister's National Relief Fund and if it is in kind, it should preferably routed through the Indian National Red Cross.

We have not any objection to NGO's issuing appeals for donations, provided it is made clear that the appeals are not at the instance of the Government of India. In the case of UN organizations and agencies (like OCHA) such appeals would imply endorsement by member-countries; we should, therefore, continue to advise them against issuing appeals for international assistance.

2. Cooperation with various Countries and International Institutes

Country is making all efforts to have cooperation with the various countries and international institutions in the filed of disaster preparedness and mitigation, keeping in view the policy for acceptance of external assistance.

- Bilateral agreements with some countries like Switzerland, Russia, for emergency response are under consideration.
- Membership of the Asian Disaster Reduction Centre, Kobe, Japan
- Representation in the Board of Trustees and Consultative Committee of the Asian Disaster Preparedness Centre(ADPC), Bangkok .
- Member of United Nations Disaster Assessment and Coordination (UNDAC) system of United Nations Office of the Humanitarian Affairs (UNOCHA).
- A proposal to set up regional office of UNOCHA in New Delhi is under consideration of the Government of India.

3. International events organized in India

In the past, India has hosted/organized the following international events in the country:

- Hosted 4th Session of the Scientific and Technical Committee on IDNDR during February 1-5 ,1993
- Hosted a Workshop on Natural Disaster Reduction for the South-Asian Region on 30th March and 2nd April, 1994 in the context of the May, 1994 World Conference on Disaster Reduction held in Yokohama, Japan.
- Hosted the two-day Seminar in New Delhi on 28th & 29th September 1994 on Comprehensive Flood Loss Prevention & Management organized by ESCAP.
- Co- hosted GOI UNOCHA Workshop in June 2000 on International assistance in emergency response
- Organized 4th Annual meeting of the Asian Disaster Reduction Center , Kobe , Japan and UNISDR meeting in January 2002
- Organized UNDAC Training Program of UNOCHA in August 2002
- Organized 3rd Meeting of the Asian Disaster Preparedness, Regional Consultative Committee meeting on 29-31October 2002
- Co-hosted GOI-UNDP-CII (Chamber of Indian Industries) Seminar on disaster preparedness and mitigation from 21-23 November 2002

4. Possible Areas of International Cooperation

Regional co-operation for effective disaster management system is needed broadly in the following areas :-

- Hazard and vulnerability analysis
- Human resource development
- Exchange of information through inter-net and other latest tools of information technology
- Disaster management network at the regional level
- Networking of the regional institutes

back

Annexure-I

Statement showing flood damage during the years 1981-1997

Year	Area Affected (Million Hectares)	Population Affected (in millions)	Cropped area affected (M.Hect.)	Damage to houses	Animal Lost (in million)	Human lives lost (in number)	Damage to public properties	Total Damage (Rs.in million)

				(in million)			(Rs.in million)	
1981	6.12	32.49	3.27	0.91	0.08	1376	5123.1	11965.0
1982	8.87	56.01	5.00	2.39	0.24	1573	6716.1	16448.7
1983	9.02	61.03	3.29	2.39	0.15	2378	8734.3	24916.1
1984	10.71	54.55	5.19	1.76	0.14	1661	8181.1	19055.6
1985	8.38	59.59	4.65	2.45	0.04	1804	20500.4	40592.6
1986	8.31	55.50	4.58	2.05	0.06	1200	19825.3	37485/2
1987	8.89	48.34	4.94	2.92	0.13	1835	9505.9	25697.2
1988	16.29	59.55	10.15	2.27	0.15	4252	13778.0	46300.4
1989	8.06	34.15	3.01	0.78	0.07	1718	12987.7	24053.3
1990	9.30	40.26	3.18	1.02	0.13	1855	4552.6	17089.2
1991	6.17	33.84	2.51	1.12	0.04	1145	6856.2	14388.0
1992	2.09	19.09	1.43	0.56	0.77	1367	11708.0	20476.1
1993	4.63	22.90	3.13	0.47	0.12	930	480.9	3419.6
1994	2.75	21.02	1.89	0.60	0.21	1511	7396.4	17934.6
1995	6.11	38.83	3.36	1.19	0.70	2209	677.1	5718.6
1996	7.42	39.39	3.37	0.40	0.60	1306	8616.2	22047.8
1997	3.85	26.55	1.84	0.40	0.27	929	9716.1	15669.4

Annexure-II

Some severe Cyclones in **India**

Location	Period	Loss of human lives
Bengal	October,1847	75,000
Bengal	October,1874	80,000
Andhra Pradesh	November,1946	750
Tamil Nadu	December,1972	80
Bengal	Septemeber,1976	10
Andhra Pradesh	November , 1977	8547
TamilNadu	May,1979	700
Orissa	September,1985	84
Andhra Pradesh	November,1987	50
Orissa	June,1989	61
Andhra Pradesh	May,1990	928
Tamil Nadu	November,1991	185
Andhra Pradesh	October,1996	1057
Gujarat	June,1998	1261
Orissa	October,1999	8913

Annexure-III

Some of the major earthquakes in India

Year	Place of Occurrence	Magnitude on Richter Scale	Number of human lives lost
1819	Kutch	8.0	2000
1833	Bihar	7.7	Hundreds
1869	Assam	7.5	Not available
1885	Srinagar	7.0	Not available
1897	Assam (Shillong)	8.7	1600
1900	Kerala (Palghat)	6.0	Not available
1905	Himachal Pradesh (Kangra)	8.0	20,000
1906	Himachal Pradesh	7.0	Not available

1918	Assam	7.6	Not available
1930	Assam (Dubri)	7.1	Many*
1934	Bihar-Nepal	8.3	14,000
1941	Andamans	8.0	Many
1943	Assam (NE)	7.2	Not available
1950	Assam (NE)	8.6	1500
1952	Norther Eastern part of India	7.5	Not available
1956	Gujarat (Anjar)	7.0	Hundreds
1956	Uttar Pradesh (Bullandshahar)	6.7	Many
1958	Uttar Pradesh (Kapkote)	6.3	Many
1960	Delhi	6.0	Not available
1963	Kashmir (Badgam)	5.5	Hundreds
1966	Uttar Pradesh (Moradabad)	5.3	Not available
1967	Nicobar	6.2	Not available
1967	Maharashtra (Koyna)	6.5	200
1970	Andhra Pradesh (Bhadrachalam)	6.5	Not available
1970	Gujarat (Barouch)	5.7	Not available
1975	Himachal Pradesh	6.5	Not available
1988	Bihar – Nepal	6.6	1003
1988	Assam	7.2	Many
1991	Uttar Pradesh (Uttar Kashi)	6.6	715
1993	Maharashtra (Killari-Latur)	6.3	7928
1997	Madhya Pradesh (Jabalpur)	6.0	38
1999	Uttar Pradesh (Chamoli)	6.8	100
2001	Gujarat (Bhuj)	6.9	13805

Note :* Many means less than a hundred.

back

Annexure-IV

List of Institutions, organizations and Universities working in the field of disaster management

a) Training Institutes

(i) National Level

1. National Center for Disaster Management,

I.P. Estate, Ring Road, New Delhi-110002

Tel. 91-11-2370-2445, 23702433,23702442 Fax: 2370-2446,23702442

2. National Civil Defense College ,

Civil Lines , Nagpur-440001 India

3. National Fire Service College,

Civil Lines, Nagpur-440001 India (Tel.91-712-0532075)

4. India Gandhi National Open University,

Maidan Garhi, Delhi .

5. Administrative Staff College of India ,

Hyderabad (Tel. 91-40-2330952)

6. National Institute for Security Forces, Hyderabad- Andhra Pradesh

(There are Defense Training, Fire Training and Police Training Institutes in many parts of the Country)

(ii) List of Natural Disaster Management Faculties in States

SI. No.	Name and Address	Telephone/ Fax Number
1.	Shri M. V. K. Bhanu Director General Assam Administrative Staff College, Jawahar Nagar, P. O. Khanpara, Guwhati-781022	(O) 263325, 261547 Fax: 0361-262361
2.	Shri P. Selvam, IAS Director AIM and DG Training (Ex Officio) Administrative Training Institute Chennai, 36 Green ways Road R. A. Puram, Chennai-600028	(O) 4937062, 4937170 Fax: 044-4937062
3.	Shri K. John Koshy Director Administrative Training Institute, Government of West Bengal Salt Lake City, Block FC, Sector-III, Bidhrnagar, Calcutta-700091.	(O) 033-3373960, 3596721 ® 2477727 Fax: 033-3373960
4.	Shri Alemtemshi Jamir, Director Administrative Training Institute, Officers, Hill, Kohima-797001 Nagaland	(O) 0370-280063, ® 241854 Fax: 0370-280067
5.	Mrs. Anita Kaul Director General Administrative Training Institute P.A. No.2, Lalitha Mahal Road, Mysore-570011	(O) 0821-520906 ® 0821-520904 Fax: 523899, 520906
6.	Shri K. J.S. Chattrath Director General-Trg Coordination, Gopabandhu Academy of Administration, Chandrashekharpur, Bhubaneswar-751023	(O) 0674-300743, 300981 ® 536438 Fax: 0674-301530
7.	Shri H. S. Anand Director, Haryana Institute of Public Administration (HIPA) complex-76, Sector-18, Gurgaon-122001	(O) 91-6340691, 6340462, 6340412, Fax: 6340413, 6348452
8.	Dr. Desh Deepak Director, Himanchal Pradesh Institute of Public Administration Fairlawans, Shimla-171012	(O) 0177- 247855, 480294, 480225 Fax: 247855
9.	Shri A. K. Pandey, IAS Director HCM Rajasthan State Institute of Public Administration, Jawaharlal Nehru Marg, Jaipur-302017	(O) 510002-8, 510556 ® 512086 Fax: 0141-515420, 70254
10.	Shri Rudra Gangadharan, IAS Principle Secretary & Director Institute of Management in Govt. (IMG), Vikas Bhavan, P. O. Thiruvanathapuram-695033	(O) 0471-306739, 304229 (R) 558176 Fax: 0471-302391
11.	Shri M. L. Koul Financial Commissioner/Director General J&K Institute of Management and Public Administration and Rural Development, (IMPA), Jammu -190001 Sub Office: 24-C/C Gandhi Nagar, Jammu-Thawi-180004.	(O) 0194-472564 Fax: 0194-472825 Srinagar 0191-474390 (Jammu Fax)
12.	Shri B. Lalhema Director Administrative Training Institute Mizoram, AIZAWL.	(O) 0389-323321 Fax: 323620

13.	Smt. Ravneet Kaur Director General Mahatama Gandhi State Institute of Public Administration, Punjab, Sector 26, Near Sant Kabir School, Chandigarh-160019	(O) 0172-792114 Fax: 0172-793931
	Mrs. Kusumjeet Sidhu Director Mahatama Gandhi State Institute of Public Administration, Punjab, Sector 26, Near Sant Kabir School, Chandigarh-160019	(O) 0172-793587 Fax: 0172-793587
14.	Shri Shankar Lal Director State Academy of Training Government of Manipur Takyelpat (Opposite to the NIC Complex) Imphal-795001.	(O) 03852-221149, 223890, 223889, 223694 ® 310737 Fax: 223893
15.	Shri G. S. Raju Director State Institute of Public Administration and Rural Development (SIPARD), A.D. Nagar, Agartalla, Tripura West -799003	(O) 0381- 374048 ® TeleFax: (0381) 230613
16.	Shri A. K. Sinha Commissioner of Training & Director Sardar Patel Institute of Public Administration, Opposite ISRO Near Bhav Nirvar Satellite Road Ahmedabad-380015(Gujarat)	(O) 079-6748722 6741878 Fax: 6749048
17.	Dr. Rakesh Sharma Director General Academy of Administration Ardwell Camp, Mallital Nainital-263001 Uttaranchal	(O) 36141 Fax: 05942-37642
18.	Shri Shankar Prasad Director General Shri Krishna Institute of Public Administration, Meurs Road , Post-Ranchi University , Ranchi-834008	(O) 0651-283804 Fax: 0651-283806
19.	Shri S. K. Goyal Director General Yeshwant Chavan Academy of Development Administration, Raj Bhavan Complex, Baner Road , Ganeshkhind, Pune-410017	(O) 5657331 Fax: (020) 5659131
20	Shri N. K. Narasimha Rao Commissioner Andhra Pradesh Academy of Rural Development, Rajendra Nagar, Hyderabad-500030	(O) 040-4015959 Fax: 040-4018656
21	Prof. A. L. Verma Director North Easter Regional Institute of Science & Technology, Nirjuli-791109 (Itanagar), Arunachal Pradesh	0360-257401-8 Fax: 0360-244307, 257696
23	Dr. Pradi Paswar Bhatacharji Vice-Chancellor, Tejpur University , Tejpur-784001 Assam	03712-67003 Fax: 03712-67008, 67006
24	Shri A. P. Srivastava Executive Director Disaster Management Institute, Paryavaran Pariser, E-5, Arera Colony, Post box No.563, Bhopal-462016	0755-566715, 561538 Fax: 0755-566653
25	Dr. P. K. John Director Fire Emergency Services, Fire Institute, St. Inez, Panji	
26	Shri Sujeet Banerjee Director General Deendayal Updhyaya State Institute of Rural Development, Bakshi-Ka-Talab, Indaurabagh, Lucknow-227202	Tel: 05212-31291

b) Other Organizations /Institutes

1. Indian Meterological Department, Masuam Bhawan, Lodi Road, New Delhi

(Tel. 91-11-24611842, Fax. 24699216, 24623220)

2.Central Water Commission, Ministry of Water Resources, R.K.Puram, New Delhi .

3. Building Material & Technology Promotion Council, Ministry of Urban Development and Poverty Alleviation, Government of India,

C-Wing, Nirman Bhawan, New Delhi-110011

Tel. 91-11-23019367 Fax No. 23010145

Website: www.bmtpc.org

4.Bureau of Indian Standards, Manak Bhawan, Bahadurshah Zafar Marg,New Delhi-110002 (Tel/Fax.91-11-23234223)

5.Central Building Research Institute, Roorkee, 247667 Uttranchal

(Tel.91-1332-272243, 272391 Fax. 272272, 272543)

6. Central Road Research Institute, Mathura Road , New Delhi

7. Council for Scientific and Industrial Research, Rafi Marg, New Delhi

8. Council for Advancement of People Action & Technology (CAPART), India Habitat Center, Lodi Road, New Delhi

9. Department of Science and Technology, Government of India, Technology Bhawan, New Mehrauli Road, New Delhi-110016

(Tel.91-11-26511439 Fax. 26863847, 26863947)

10. Centre for Earth Science Studies, Akkulam, Thiruvananthapuram,-695031 Kerala

11.National Geophysical Research Institute, Uppal Road , Hyderabad —500007

(Tel.91-40-27171124 Fax 27171618)

12. Housing and Development Corporation (HUDCO), Ministry of Urban Development and Poverty Alleviation, Government of India, India Habitat Centre, Lodi Road, New Delhi (Tel. 91-11-24615343 Fax. 24625308)

13. Human Settlement Management Institute, HUDCO, Lodi Road, New Delhi

14. Indian Society of Earthquake Technology, Roorkee

15. Indian Institutes of Technology,

- New Delhi, (Tel. 91-11-26861977, 26861696 Fax: 26862037, 2685527)
- Kanpur (Tel. 91-512-2590763, 2597283 Fax. 2590260)
- Mumbai (Tel. 91-22-25722545, 25726530 Fax. 25783480)
- Chennai: (Tel. 91-44-258002)

16. National Remote Sensing Agency, Department of Space, Government of India, Balanagar, Hyderabad-500037 Andhra Pradesh(Tel.91-40-23078360 Fax.23077210)

17. Structural Engineering Research Centre, Chennai-600113, Tamilnadu

(Tel. 91-44- 22352139, Fax. 22350973, 22350508)

18. Wadia Institute of Himalayan Geology, 33, General Mahadev Singh Road, Dehradun -48001 Uttaranchal (Tel. 91-135-2625952 Fax 2625212)

19. National Environmental Engineering Institute, Nehru Marg, Nagpur,-40020

Maharashtra (Tel. 91-712-2223893 Fax: 2222725)

(c) Universities

1. Indira Gandhi National Open University, Maidan Garhi, Delhi .

2.Department of Earthquake Engineering, University of Roorkee, Roorkee,Uttranchal.

3. Department of Earth Science, University of Roorkee, Roorkee, Uttaranchal

4. Department of Hydrology, University of Roorkee, Roorkee, Uttaranchal

back

Annexure-V

Some publications on Disaster Management in India

1. National Contingency Action Plan for Natural Calamities, Ministry of Agriculture, Government of India

2.Drought of 1987- Vol I- National Response, Vol.II -State Response, Ministry of Agriculture, Government of India

3. Trigger Mechanism, S.K.Swami, and Director (NDM), published by, Ministry of Agriculture, Government of India

4. IDNDR- Indian Experiences and initiatives, Ministry of Agriculture, Government of India

5. Natural Disasters in India ,- some recent case studies, Ministry of Agriculture, Government of India

6. Vulnerability Atlas of India -An introduction, BMTPC, Ministry of Urban Development, , Government of India

8.Orissa Super Cyclone,99- Mr.M.C.Gupta,Director, Indian Institute of Public Administration V.K.Sharma ,Professor, National Center for Disaster Management,

9. Manual on Natural Disaster Management in India , National Centre for Disaster Management,

10. Disaster Management-.V.K.Sharma (editor), National Center for Disaster Management,

11. India : IDNDR and Beyond, National Center for Disaster Management,

12.Disaster Management-lessons drawn and strategic for future, Anil Sinha,Head, National Center for Disaster Management,

13. Gujarat Earthquake –26th January 2001–L.C Gupta,M.C Gupta ,Anil Sinha, V.K.Sharma National Center for Disaster Management,

14. Guidelines for improving Earthquake Resistance of Housing, Building Material & Technology Council, Ministry of Urban Development, Government of India

15. Guidelines for improving Cyclone Resistance of Housing, Building Material & Technology Council, Ministry of Urban Development, Government of Indian

16. Guidelines for Damage Assessment and Post earthquake Action–Chamoli:

Part I– Repair and retrofitting of buildings in the Chamoli earthquake affected areas

Part II–Reconstruction and new construction of building

By Building Material & Technology Council, Ministry of Urban Development, Government of Indian

17. Guidelines for Damage Assessment of Post earthquake Action–Jabalpur

Part 1– earthen houses with clay tile roofing

Part 2–Brick Houses with clay tile roofing

Part3 –Brick houses with RC slab or store patti roofing or with RC frames

By Building Material & Technology Council, Ministry of Urban Development, Government of Indian

18. Model Agreement to sell a flat–between seller and purchaser– Indian Building Congress, Sector VI, R.K.Puram, New Delhi–110022

19. EQ News–biannual Newsletter– published by Department of Science and Technology, Government of India.

Annexure–VI

List of Experts in the field of Disaster Management

Name	Office	Tel./Fax (office)	Tel. (Residence)
Shri Anil Sinha Head	National Centre for Disaster Management, Indian Institute of Public Administration, I. P. Estate, Ring Road New Delhi–110002	Telephone: 23702445 Fax: 23702446	24610454
Shri S.K.Swami, Director	Disaster Management Division, Ministry of Home Affairs, Government of India North Block New Delhi	Telephone: 23092698 Fax: 23093750	23381206
Dr. V.K.Sharma, Professor	National Centre for Disaster Management, Indian Institute of Public Administration, I. P. Estate, Ring Road New Delhi–110002	Telephone: 23702433 Fax: 23702446	91–4455563
Professor A.S.Arya, Professor Emeritus	EE–I 72/6, Civil Lines, University of Roorkee–247667	Fax: 01332–273560	272631, 272349
Dr. R.R Kelkar Director–General	India Meteorological Department, Masuam Bhawan, Lodi Road, New Delhi–110003	24611842 Fax: 24699216 24623220	24616059
Shri S.R.Kalsi, Dy.D.G.	India Meteorological Department, Masuam Bhawan, Lodi Road, New Delhi–110003	24643128 Fax: 24699216 24623220	
Shri R.K.Bhandari, Director	Centre for Disaster Mitigation and Management, Anna University , Chennai, C–III/6, Satya Marg, Chankaya Puri, New Delhi	Mobile: 9810345123	26874034(Delhi)

Annexure–VII

Contact persons in India for Disaster Management

1.Mr. R.C. Jain, Special Secretary

Ministry of Home Affairs,

Government of India

North Block,

New Delhi-110001

(Tel. 00-91-11-23092722)

2. Mr. R.K.Singh,

Joint Secrtary,

Disaster Management Division,

Ministry of Home Affairs,

Government of India

North Block,

New Delhi-110001

(Tel. 00-91-11-23093178)

3. Mr. S.K.Swami,

Director(NDM)

Disaster Management Division,

Ministry of Home Affairs,

Government of India

North Block,

New Delhi-110001

(Tel. 00-91-11-23092698)

4. Mr. V.P.Pasrija,

Assistant Director(NDM)

Disaster Management Division,

Ministry of Home Affairs,

Government of India

North Block,

New Delhi-110001

(Tel. 00-91-11-23094612)

5. Mr. Om Prakash,

Technical Officer

Disaster Management Division,

Ministry of Home Affairs,

Government of India

North Block,

New Delhi-110001

(Tel. 00-91-11-23094612)

- Control Room of Ministry of Home Affairs

Tel. 00-91-11- 23092923, 23093054, 23092885,23017885, 23017885

Fax No. 23093750 , 23092763

- Website of Disaster Management Division

www. ndmindia. nic. In

(Please do not hesitate to ask more information about disaster management system in India – log on to website, or contact on telephone/fax)

Annexure VIII

References/sources

1. IDNDR– Indian Experiences and initiatives, Ministry of Agriculture, Government of India

2. Natural Disasters in India,– some recent case studies, Ministry of Agriculture, Government of India

3. Contingency Action Plan for natural calamities, Ministry of Agriculture, Government of India

4. Vulnerability Atlas of India –An introduction , BMTPC, Ministry of Urban Development, , Government of India

5.Orissa State Disaster Mitigation Agency (OSDMA), Government of Orissa , India

6. Gujarat State Disaster Management Agency (GSDMA), Government of Gujarat , India

7.Disaster Management in India: Lessons drawn and strategies for future, Mr.Anil Sinha, Head, National Centre for Disaster Management, Ministry of Home Affairs, Government of India,

8.Orissa Super Cyclone,99– Mr.M.C.Gupta,Director, Indian Institute of Public Administration Dr. V.K.Sharma ,Professor, National Centre for Disaster Management,

9. Manual on Natural Disaster Management in India , National Centre for Disaster Management,

10. Disaster Management– Dr.V.K.Sharma (editor) ,National Centre for Disaster Management,

11. . EQ News–biannual Newsletter(December,2000 and June,2002) published by Department of Science and Technology, Government of India .

JAI HIND

back

V.P.Pasrija,
Assistant Director
National Disaster Management Division
Ministry of Home Affairs
Government of India
Tel: +91–11–23094612
Fax: +91–11–23093750