

# Natural Disaster: Challenges and Protective Measures in India

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**Abstract**—It is really an unfortunate and undesirable situation that in our country where more than 6 crore people are affected by disasters every year. With disasters striking India with increased regularity, there should be a plan in place to tackle the disaster and reduce its impact. There is not planned information system as to what needs to be done when faced with a calamity. Understanding the different problems in the Indian context is essential to evolve a solution. A study about disasters and its management in India will prove the need for a new or a thorough overhauling of the existing system. The disaster management system should be able to minimize, control and limit the effects of disaster. The administration should be equipped to lead the disaster management activities without being left handicapped. In this context, it is necessary to understand the different issues, which confront the Indian disaster management system.

## 1. INTRODUCTION

India suffers huge losses and setbacks in development due to disasters. Our disaster response is often hampered by procedural confusion and by policies that do not facilitate effective management. Disaster is a sudden, calamitous event bringing great damage, loss, and destruction and devastation to life and property. The damage caused by disasters is immeasurable and varies with the geographical location, climate and the type of the earth surface/degree of vulnerability. This influences the mental, socio-economic, political and cultural state of the affected area. India is vulnerable, in varying degrees, to a large number of natural as well as man-made disasters. 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) is 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. Vulnerability to disasters/emergencies of Chemical, Biological, Radiological and Nuclear (CBRN) origin also exists. Heightened vulnerabilities to disaster risks can be related to expanding population, urbanization and industrialization, development within high-risk zones.

Generally, disaster has the following effects in the concerned areas;

1. It completely disrupts the normal day to day life.
2. It negatively influences the emergency systems,
3. Normal needs and processes like food, shelter, health, etc. are affected and deteriorate depending on the intensity and severity and disaster. Thus the extent of damage in a disaster depends on the impact, intensity and characteristics of the phenomenon and how people, environment and infrastructure are affected by that phenomenon. This phenomenon can be written as an equation:

$$\text{Disaster Risk} = \text{Hazard} + \text{Vulnerability.}$$

## 2. OBJECTIVES

1. Briefly study the various disasters and the problems in managing them in India, analyses the findings and suggestions of different bodies/ commissions/committees on disasters and broadly identify the various issues that confront the disaster management system in India.
2. Understand the role of law in disaster management and make a comparative study of the disaster legislations in select countries; and
3. Suggest a solution to develop an effective disaster management mechanism.

## 3. TYPES OF DISASTER

Generally, disasters are of two types –Natural and manmade. Based on the devastation, these are further classified into major/minor natural disaster and major/minor manmade disasters. Some of the disasters are listed below.

Major natural disasters Flood, Cyclone, Drought, Earthquake	Minor natural disasters Cold wave, Thunderstorms, Heat waves, Mud slides, Storm.
Major manmade disasters Setting of fires, Epidemic, Deforestations, Pollution due to prawn cultivation, Chemical pollution, Wars.	Minor manmade disasters Road/Train accident, Food poisoning, Industrial disaster/crisis, Environmental pollution,

## 4. METHODOLOGY

This study based on the available published and unpublished data and literature. Some data and relating Disaster law and acts have been taken chiefly from the books of eminent authors, yearly disaster reports, magazines and periodicals and leading newspapers have been used for supplementing information.

## 5. PARADIGM SHIFT IN DISASTER MANAGEMENT

On 23 December, 2005, the Government of India took a defining step by enacting the Disaster Management Act, 2005, which envisaged the creation of the National Disaster Management Authority (NDMA), headed by the Prime Minister, State Disaster Management Authorities (SDMAs) headed by the Chief Ministers, and District Disaster Management Authorities (DDMAs) headed by the Collector or District Magistrate or Deputy Commissioner as the case may be, to spearhead and adopt a holistic and integrated approach to DM. There will be a paradigm shift, from the erstwhile relief-centric response to a proactive prevention, mitigation and preparedness-driven approach for conserving developmental gains and also to minimize losses of life, livelihoods and property.

## 6. DISASTER MANAGEMENT MECHANISMS IN INDIA

Under the present scheme of disaster administration, natural disaster management is largely the responsibility of the state government. The state government will have to undertake the responsibility of rescue, relief and rehabilitation.

The disasters will be managed under the direct supervision of the concerned nodal Ministries or Departments.

However, the Central Government, with its resources, physical and financial, does provide the needed help and assistance to augment relief efforts. The role of Central Government is supportive in terms of supplementation of physical and financial resources.

## 7. TECHNOLOGICAL DEVELOPMENTS

Technological innovations are vital for effective disaster management, the DST; Govt. of India is taking several measures to upgrade technological inputs. The important developments include:

### 7.1 India Disaster Resource Network

This is a web enabled centralized data base which will ensure quick access to resources to minimize response time tune in emergencies. This database will be available at National, State and district level simultaneously. Police network is another important communication network to be used for disaster management. In emergency, mobile satellite based units which can be transported to disaster sited are being procured.

## 7.2 Development of GIS based National Data

### Base for Disaster Management.

The GIS is an effective tool for emergency responders to access information in terms of crucial parameters for the disaster affected areas. This includes location of public facilities, communication links, transport network etc.

### 7.3 Installation of Early Warning and Hazard Detection Equipment

Early warning system have already been installed for Cyclones and floods in the country by IMD and CWC. There is a well-established organizational set up for detecting, tackling and forecasting cyclones. There are six cyclone warning centers at Kolkata, Bhubaneswar, Vishakhapatnam, Chennai, Mumbai and Ahmedabad. Cyclone tracking is done with the help of INSAT satellite. Cyclone detection radars are located at ten centers in different coastal areas. CWC does flood forecasting. There are nearly 700 station from where hydrological and hydro meteorological data are collected. Now, govt. has also succeeded in acquiring and installing the Tsunami warning and detection system in the aftermath of Tsunami disaster of 2004.

## 8. CHALLENGES OF NATURAL DISASTER IN INDIA

We have no policy on systematic disaster Management. It is only after a disaster strikes that the wheels of the government, both at the Centre and at the states, move and that too slowly. Despite the need to build up capabilities to meet the challenges of disasters, the thrust has unfortunately been on alleviation and relief. Even the relief has not been quick and adequate, as few disasters such as Orissa super cyclone, Tsunami of 2004, Gujarat earthquake etc. experiences has shown. India's response to and tackling of this two major disasters has thrown up the following in Challenges our disaster management efforts.

### 8.1 Inadequate Early Warning System

Though, the forecasting, monitoring and warning mechanisms are beautifully articulated on paper in practice, the warnings are not early enough and they do not reach all those likely to be affected. In case of Tsunami, 2004; Bhuj earthquake etc for example, communication facilities which could have resulted in better co-ordination of warning and reduction of damage to life and property were inadequate. Tsunami of 2004, Bhuj(2001) earthquake, Orissa super cyclone, Bihar Flood 2009

### 8.2 Lack of Pre-disaster Preparedness

With disasters striking India with increased regularity, there should be a plan in place to tackle the disaster and reduce its impact. On the contrary, people are caught unaware time and again. There is not planned information system as to what

needs to be done when faced with a calamity. For example, during Tsunami, 2004, dead body laid floating in the water for many days due to the unavailability or lack of required equipment to meet the need of the time/emergency.

### **8.3 Inadequate and Slow Relief**

Relief is an important aspect of the disaster management to provide help to the affected people. The relief operations are often handled in ad hoc and haphazard manner. How efficiently to provide food, medicine, to reduce the suffering of the affected people etc. are addressed and met improperly. Even days after the Bhuj earthquake, and Tsunami, 2004,, many people could not be provided with safe drinking water, temporary shelter, and medicines. Such a scenario gives rise to law and order problem- looting of the relief materials and outbreak of the epidemic due to rotting dead bodies on the other hand.

### **8.4 Lack of Co-ordination**

Disaster management requires concerted efforts from Central Government, State Government, NGOs, International agencies and private sectors etc. Because of the lack of the co-ordination, relief material is not property distributed among the people. Even worst happens when they are mis-utilized and are not distributed uniformly.

### **8.5 Slow Rehabilitation and Reconstruction**

While immediately after a disaster strikes, there is hectic relief and rescue mission, mainly aimed at feeding the people and stalling the outbreak of an epidemic, relief and rescue can not go on endlessly and rehabilitation and reconstruction should be given proper attention. However, this is an area which is often ignored and progressed is slow once the initial attention fades away. Restoration of infrastructure, hospitals, schools, houses, and sources of living of the people needs to be given proper attention.

### **8.6 Proper Administration**

A quick assessment of the extent of the damage is necessary so that relief and rehabilitation work can be properly planned. However, it was seen that even many months after the Bhuj earthquake and Tsunami of 2004, the government was yet to finish the preliminary survey of assessing the total impact of the damage. Apart from this, poor administration frustrated the best intentions and efforts of private initiatives. After the quake, Gujarat government was too slow and indecisive on some of the best rehabilitation plans proposed by the NGOs and Corporate.

### **8.7 Poor Management of Finances for Post-disaster Relief**

Mostly relief and rehabilitation work suffers from the lack of co-ordination, proper management, and supervision at all levels and indicated the absence of adequate planning and

preparedness to meet any emergency. Consequently, the funds are mis-utilized and relief measures were tardy and inadequate, providing scope for pilferage of relief and rehabilitation remained unutilized and there is huge

Shortfall in distribution of emergency relief, shelter material cloths, house building assistance etc. There have also been reports of relief and rehabilitation funds being utilized for paying salary arrears of the state government employees.

### **8.8 No Instruction for Pre-seismic Period**

There is no instruction for the pre-seismic period. Unfortunately, in the present administrative set up, no official will visit the people during pre-seismic period to tell them about an eminent earthquake. But, during the post-seismic period, a large number of officials will visit the affected people with food, tents, medicine, cloths and compensation funding to the relatives of the dead.

## **9. FACT AND FINDINGS**

At the central or national level, Ministry of Home affairs is entrusted with the nodal responsibility of managing disaster. At the apex level, there are two cabinet committees' viz. cabinet committee on national calamity and cabinet committee on security. All the major issues concerning natural disasters are placed before cabinet committee on natural calamity.]

At the state level, there are state relief commissioners who are in charge of the relief measures in wake of natural disaster in the perspective states. The chief secretary is the overall in charge of the relief operations in the state. The relief commissioner and additional relief commissioner work under his direction and control. In addition, there are number of secretaries, head of various departments who also work under the overall direction of chief secretary. At the district level, districts are headed by District Collector or district magistrate who is responsible for the overall supervision and monitoring of relief measures and preparation of disaster management plans. At the tehsil level DSO/SDM take care of the disaster management. Despite there being a general tardiness about the manner in which we respond to disasters, there has been significance progress in this area and there have been many experiments and success stories worth emulating,

1. All the major disaster management legislations establish specialized bodies to manage disasters.
2. A special focus on pre-disaster preparations is necessary.
3. Almost all legislations mandate for evolving 'Disaster Management Plans'.
4. Disaster Management is treated as a collective effort.

As such the involvement and participation of various bodies is ensured. At the same time, the military, police, fire fighters and civil defence departments are given a major role in the management of disasters.

5. Most statutes in disaster management ensure the active participation of NGOs, civil society, community, people etc. by including certain provisions.
6. Expressly or implicitly all legislations connected the management of disasters with development activities. They envisioned a disaster management oriented development culture.
7. There were provisions in all legislations for making the necessary financial assistance to disaster management activities.
8. Penal provisions of the respective legislations make noncompliance punishable.
9. Provisions are provided for the periodic review of the disaster management mechanisms, plans etc.
10. Rehabilitation and insurance are other aspects which find prominent place in much legislation.

## 10. SOME SUGGESTIONS OF PROTECTIVE MEASURES FOR NATURAL DISASTER IN INDIA

In the view of the frequency of disaster striking India, there is a need for continued vigilance, preparedness and conscious efforts to reduce the occurrence and for mitigation of impact of natural disaster. What is required is a planned approach to disaster management; its management is a fundamental component of sustainable development because the reduction of disaster equivalent to increased development. The following suggestions can be offered for effective disaster management system in India:

**10.1** There should be a proper multi-tier organizational structure in a focused and co-ordinated manner responsible for the overall management at national, state, districts and village levels.

**10.2** The basic design of disaster management should consist of planned co-ordinated efforts in following important areas: -  
Identification and prediction-Early warning system

-Evacuation

-Relief

-Rescue

-Rehabilitation

-Compensation

-Reconstruction

-Preparedness

**10.3** There is a need to share the expertise and experiences so that states can learn from each other. There is also a need for training personnel likely to face natural disaster and those who deal with the relief operations.

**10.4** The disaster management system should be able to minimize, control and limit the effects of disaster. The administration should be equipped to lead the disaster management activities without being left handicapped. In this context, it is necessary to understand the different issues, which confront the Indian disaster management system. Understanding the different problems in the Indian context is essential to evolve a solution. A study about disasters and its management in India will prove the need for a new or a thorough overhauling of the existing system.

### 10.5 Pre-disaster Stage

1. Proper Preparedness: The prevailing post-disaster reaction should be changed into a pre-disaster pro-action.
2. Developing a 'Disaster and Area Specific approach': India is a multi-disaster prone country. Causes and effects of various disasters are different. Each disaster needs to be addressed separately. The role of district administration needs to be increased and it should spearhead disaster management activities.
3. Mapping of the whole country, especially the preparation of micro zone maps.
4. To evolve construction codes and safety guidelines: The periodic review and updating of such codes and guidelines is essential. Building laws or rules should be formulated.
5. Assessment of existing buildings/structures and their strengthening should be carried out within a timeframe.
6. While constructing public structures like schools, halls, *dharmashalas*, hospitals etc. evacuation of people and their eventual accommodation in such buildings should be anticipated. For this purpose a contingency plan should be prepared.
7. The integration of safety norms with all development and construction activities needs to be ensured.
8. Creating specialized disaster management system for certain special type of disasters like nuclear disaster, mine burst etc.
9. There is a need for maximum utilization of science and information technology in disaster management. Besides, traditional wisdom/knowledge should enrich the Codes and Disaster Management Plans.
10. Preparation of Disaster Plans needs to be carried out immediately. The disaster management plans should serve as a 'blue print' for all disaster management activities.
11. Establishment of disaster management research and training institutes.
12. Sufficient stock of relief material, equipment etc. needs to be ensured.

13. Ensuring the presence of trained manpower to give leadership for disaster management activities. In crisis situations, Army, Police, Fire-fighters, Civil Defence Personnel etc. need to play an increased role. The involvement of professionals and *Panchayati Raj* institutions should also be increased.
14. Proper utilisation of the services of philanthropic organizations: The role of NGOs is very important in disaster situations. Their potential needs to be tapped.
15. Various agencies involved in disaster management exercises need to be well coordinated.
16. International and regional co-operation needs to be increased.
17. Role of insurance agencies in disaster management needs to be given more importance. Compulsory insurance of people and buildings in highly vulnerable areas is an important option.
18. Timely, early warning of disasters.
19. Evolving a new culture of disaster management, that relates to preparedness, quick response, strategic thinking and prevention.
20. Removal of corpses: Disposal of corpses without the formality of post-mortem should be considered.
21. Removal of debris.
22. Transparency and accountability in all transactions.
23. Financial aid and assistance should be given only according to well defined parameters.
24. Legal assistance and dispute redressal.
25. Victims should be assisted in finding livelihoods.
26. Rehabilitation should be treated as an integral part of disaster management.
27. Protection of human rights. *Inter alia*, the State will have to facilitate the aforementioned 38 concerns to ensure effective management of disaster. The existing system is not effective for delivering good results. Revamping of the system is an urgent concern. The disaster management authorities should be free from political considerations and administrative bottlenecks. At the same time, they should be empowered to give necessary orders/direction and guidelines and act as a link between the Union Government, State Government and District Administration. Creation of impartial authorities, similar to Human Rights Commission or Minority Commission will be a good option. Such authorities should be given necessary power and resources to manage disasters.

#### 10.6 During and After the Disaster

1. Primary steps: collecting accurate information about the disaster and opening control rooms and initiation of effective search and rescue operations.
2. Evacuation of people.
3. Medical attention to the injured people.
4. Emergency hospitals, communication and transportation.
5. The authorities should ensure availability of:
  - a. Water and food
  - b. Sanitation and nutrition
  - c. Shelter and survival
  - d. Maintenance of law and order
  - e. Smooth administration
  - f. Re-establishment of normalcy
6. Relief distribution should be need based and discrimination free.
7. Dissemination of information.
8. Relief centres with basic necessities need to be established in case of an emergency.
9. There should be proper coordination of relief activities.
10. Reduction of all immediate threats to life.
11. Role-players and people should be alerted.

Therefore, it is necessary to create the following specialized agencies with adequate powers to manage disasters.

1. National Commission for Disaster Management
2. State Commission for Disaster Management
3. District Council for Disaster Management
4. Sub-District Forum for Disaster Management.

The study suggests changes in the management scheme of disasters. From preparedness to rehabilitation, the existing mechanism is not functioning efficiently. To incorporate the aforementioned suggestions, the existing disaster management system needs to undergo major changes. One major step, which is needed, is the passing of disaster legislation. This will spell out legal standards, procedures, rights and duties; and establish authorities for disaster management, so as to institutionalize the disaster management system.

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