

DISASTER MANAGEMENT IN INDIA: PREVENTION, MITIGATION & PREPAREDNESS

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ABSTRACT: India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena. According to the National Disaster Response Authority, 40 million hectares of land in India are flooded (12% of total area), 68% of the land is drought prone, landslides and avalanches, 58.6% of earthquakes are prone to earthquakes, tsunamis and cyclones are common in 5,700 km of coastline. Between 1970 and 2009, India experienced 371 natural disasters, resulting in 1.51,000 deaths and 1.86 billion people. Floods are the most frequent occurrence in India, with 52 per cent of them being catastrophic, followed by hurricanes (30 per cent), landslides (10 per cent), earthquakes (5 per cent) and droughts (2 per cent). 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 mitigation and aid. The basic design of disaster management should consist of planned co-ordinated efforts in the important areas like Identification and prediction, Early warning system, Evacuation, Relief, Rescue, Rehabilitation, Compensation, Reconstruction and Preparedness have been discussed. Disaster Management has to be a multi-disciplinary and pro-active approach. Besides various measures for putting in place institutional and policy framework, disaster prevention, mitigation and preparedness enunciated in this paper and initiatives being taken by the Central and State Governments, the community, civil society organisations and media also have play key role in achieving our goal of moving together for better mitigation , towards a safer India.

KeyWords: Disaster Management, Early Warning System, Mitigation, Prevention, Disaster Preparedness.

1. DEFINITION OF DISASTER

By definition, "disaster" means a disaster, an accident, a disaster, or a serious accident that has occurred in an area, affecting lives and property. It may be from natural or man-made causes, accidentally or negligently. This outbreak could result in significant loss of life or even more suffering for humans and other lives. This includes excessive damage to the environment, damage, or damage to property or property. Disaster is the nature or magnitude of the community's ability to deal with the area. Dozens of disasters occur worldwide. It is important to understand the types of disasters, their causes, features and impacts.

2. EFFECTS OF MAJOR DISASTERS

In the history, disasters have had a significant impact on the numbers, health conditions, and lifestyle of people.

- Deaths
- Injuries are serious injuries and require extensive treatment
- Increased risk for communicable infection
- Damage to health conditions
- Damage to water systems
- Lack of food
- Movements Population movements are common health problems for all disasters
- Social reactions
- Infectious diseases
- Population displacement
- Weather Exposure
- Food and nutrition
- Distribute water supply and sanitation
- Mental Health
- Destruction of Health Infrastructure

3. DISASTER REGIONS IN INDIA

Based on geographical and climatic considerations, India can be divided into 5 regions according to natural disasters;



Fig: Disaster-prone regions in India

1. The northern mountain region, including the foot mountains; The area is prone to heavy snowfall, leading to land slopes and strong cold waves, and is also vulnerable to earthquakes with subterranean volcanic activity.
2. Indo-Gangetic Plain; Heavy rains during the monsoon season flood these plains
3. Deccan Plateau; Drought prone area
4. Western Desert; Drought prone area
5. Coastal areas; Sea erosion, cyclones, and tidal waves.

Disaster Management Plan:

Basic features of the disaster management plan

- ◆ Disaster Prevention
- ◆ Disaster preparedness
- ◆ Disaster response
- ◆ Disaster mitigation
- ◆ Rehabilitation
- ◆ Reconstruction



Fig. 2: Disaster Management



Fig. 3: Disaster Management Phases

There are four basic phases in Disaster Management:

1. Disaster Response
2. Disaster Recovery
3. Disaster Mitigation
4. Disaster Preparedness

These 3 aspects of disaster management correspond to 2 stages of the disaster cycle.

1. Stage of risk reduction, before a disaster
2. The recovery phase after a disaster

4. RECENT DISASTERS AND DISASTER MANAGEMENT IN INDIA

India has traditionally been prone to natural disasters due to geo-climate change. Floods, droughts, hurricanes, earthquakes and landslides are a frequent occurrence. Approximately 60% of the terrain is subjected to earthquakes of varying intensities; More than 40 million hectares are likely to be flooded; 8% of the total area is subject to hurricanes, and 68% of the area is drought. In the decade of 1990-2000, an average of 4344 people lost their lives, and 30 million people are affected by disasters each year. The loss of private, community and public property is astronomical. Disasters affect more than six million people every year, making it unfortunate and unpleasant. The figures are shown in the figure.

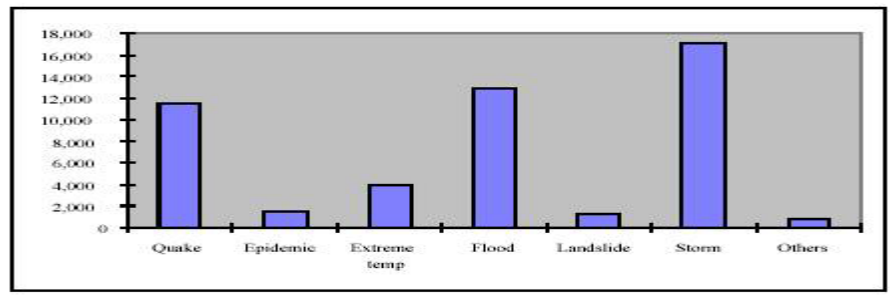


Fig. 4: Mortality due to natural hazards (1990-2000)

After a disaster, government cycles in the center and states move, and so on. There is a need to develop skills to deal with the challenges of disasters, but unfortunately it is there for relief and relief. After the Orissa Super typhoon, the 2004 tsunami and the Gujarat earthquake, relief efforts have been quick and inadequate. India's response and resolution to these two major disasters has raised the following weaknesses in our disaster recovery efforts.

4.1. Early Warning System

Forecasting, monitoring and alert systems are magnificently laid out on paper, in practical, warnings do not come early and reach all vulnerable. In the case of the tsunami, 2004; For example, the earthquake, such as the Booja earthquake, was inadequate communication, which could lead to better integration of alarms and reduction of damage to life and property.



Fig. 5: Recent Disasters in India

The super-cyclone of October 1999 in Orissa and the earthquake in Gujarat in January 2001 underscores the need for a multi-faceted effort involving various scientific, engineering, economic and social processes; The need to adopt a multi-faceted, multi-sectoral approach and integrate risk reduction into development plans and strategies.



Fig. 6. Severe floods in Kerala on 16 Aug 2018 **Fig. 7.** Cyclonic Storm Fani, Odisha on 26th, April, 2019

On 16 August 2018, severe floods affected the south Indian state Kerala, due to unusually high rainfall during the monsoon season. It was the worst flood in Kerala in nearly a century. Over 483 people died, and 140 are missing.

Extremely Severe Cyclonic Storm Fani was the strongest tropical cyclone to strike the Indian state of Odisha since the 1999 Odisha cyclone. The second named storm and the first severe cyclonic storm of the 2019 North Indian Ocean cyclone season, Fani originated from a tropical depression that formed west of Sumatra in the Indian Ocean on 26 April. Vertical wind shear at first hindered the storm's development, but conditions became more favorable for Fani on 30 April. Fani rapidly intensified into an extremely severe cyclonic storm and reached its peak intensity on 2 May with 1-minute sustained winds equivalent to a high-end Category 4 major hurricane.

4.2. No pre-disaster preparation

When disasters impact India more accurately, there must be a plan to deal with the disaster and minimize its impact. On the contrary, people are unwittingly getting caught again. There is no planned information system for what to do when faced with a disaster. During the 2004 tsunami, the body was submerged for several days due to lack of equipment or lack of equipment to meet time / emergency needs.

4.3. Inadequate and Slow Relief

Relief is a key aspect of disaster management to help victims. Relief measures are often dealt with temporarily and unnaturally. How efficiently and inappropriately met is the reduction of food, medicine and suffering of victims. Despite the days of the Booja earthquake and the 2004 tsunami, many were unable to provide safe drinking water, temporary shelter and medicine. Such a situation leads to a law and order problem - relief goods are looted and the outbreak of infections is caused by rotten bodies.

4.4. Lack of coordination

Disaster management requires the concerted efforts of the central government, state government, NGOs, international organizations and the private sector. Relief products are not distributed among the people due to lack of coordination. Worse things happen when they are misused and not evenly distributed.

4.5. Slow Rehabilitation and Reconstruction

In the immediate aftermath of a disaster, there is an exciting relief and rescue mission to feed people and prevent the outbreak of the epidemic. The organization needs proper attention to reorganize basic functions, hospitals, schools, housing and people's living resources.

5. IMPACT OF NATURAL DISASTERS IN INDIA

According to the National Disaster Response Authority, 40 million hectares of land in India are flooded (12% of total area), 68% of the land is drought prone, landslides and avalanches, 58.6% of earthquakes are prone to earthquakes, tsunamis and cyclones are common in 5,700 km of coastline. Such fragile conditions have made India one of the most dangerous countries. Between 1970 and 2009, India experienced 371 natural disasters, resulting in 1.51,000 deaths and 1.86 billion people. Floods are the most frequent occurrence in India, with 52 per cent of them being catastrophic, followed by hurricanes (30 per cent), landslides (10 per cent), earthquakes (5 per cent) and droughts (2 per cent).

5.1. The damages

In terms of damages to basic sectors, crops, crops and livelihoods, flooding is the most expensive, causing 63 percent of the damage, followed by cyclones (19 percent), earthquakes (10 percent) and drought (5 percent). In terms of human casualties, earthquakes are India's biggest disaster with 33% of accidents followed by floods (32%), cyclones (32%) and landslides (2%) . In addition, frequent disasters worsen the social and economic conditions of the people, increasing financial pressure on the Center and the state government. Natural disasters also increase the suffering of farmers and cause suicides of farmers. According to the Accidental Deaths and Suicides Report in India, approximately 2.61,779 people died due to natural disasters, with an average annual death rate of 5,236 between 1967 and 2016. 92,224 people died by lightning and 44,923 by Cold waves, 36, 631 heat strokes, 32, 213 landslides, 29,897 floods, 25,891 cyclones.

5.2. Geoclimatic conditions

In terms of the proportion of deaths from natural disasters over time, lightning strikes are the most deadly, accounting for 35 percent of total catastrophic deaths, including cold waves (17 percent), heat stroke (14 percent), landslides (12 percent), floods (11 percent), and cyclones (10 percent). Six major natural disasters in India kill 65 million people every 10 million people.

The impact of natural disasters, especially disasters, varies in India due to different geological conditions and relative socio-economic vulnerability. Punjab has the highest number of heat stroke deaths (20), Tripura (14), Haryana, Jharkhand, Andhra Pradesh (13 each) and Odisha (12). Uttanchal is the lowest among the deaths due to heat stroke. Causes of deaths due to lightning and heat waves are attributed to rising temperatures and humidity in the Indian states. Mountain states are more prone to landslides. Similarly, cold waves are more likely in central and north India, while coastal states like Andhra Pradesh, Odisha, Gujarat and West Bengal are more prone to cyclones. Many states in India are prone to flooding due to the distribution of geospatial rainfall, areas with the highest flood potential, the highest socio-economic weakness, and the lack of infrastructure in all states.

5.3. Prevention of sufferers

It is important to work to mitigate catastrophic damage on all fronts, trends indicate the need for strong and speedy political action to ensure human loss caused by thunderstorms. To mitigate deaths from natural disasters in all states, we propose some measures to help reduce the number of patients. The installation of advanced disaster warning systems, particularly in low lying areas, that are accurate in predicting rainfall in coastal areas is needed. To mitigate death due to heat wave and lightning, public measures such as planting of palm trees, campaigns for awareness on disaster impact through media during high heat and humidity months must be undertaken.

6. EARLY WARNING SYSTEM

6.1. Earthquake Forecasting

The IMD has set up a National Seismic Telemetry Network to anticipate threats from seismic disturbances. After the Gujarat quake, 10 new seismological observation equipped with latest facilities were set up and 14 of the 45 existing observatories were upgraded with state of the art digital seismograph for better monitoring of effects of earthquake in the seismic zones.



Fig.8: Disaster Management stages

6.2. Cyclone Forecasting

IMD Cyclone Warning Centers have been set up in several coastal areas. Information on the cyclone warning is provided in the central control room of the Ministry of Agriculture. In addition, high power hurricane detection radars have been installed at various locations along the coast that can detect disturbances within 400 km. Another tool used when hurricanes are on the coast of coastal radars is satellite imagery. ISRO has installed 250 storm warning receivers on the Indian coast. In the event of a crisis, these recipients switch via satellite, broadcast siren and local language alerts.

6.3. Flood Forecasting

Since the 1950s, measures have been taken to mitigate floods from 40 million hectares to 15 million hectares protected by lake construction. This has enabled the state government to undertake mitigation projects such as building sites. Floods continue to threaten as rivers flowing out of the Himalayas carry large amounts of soil.

7. DISASTER MITIGATION AND MITIGATION

Due to the misbehavior of the monsoon season, low and medium rainfall areas are often prone to drought. Experience shows that there is drought in almost every third year. However, in some states, continuous droughts that increase population risk in these areas may be years away. Local communities have adopted local conservation practices and drought based farming practices in many parts of the country. Hospital readiness is critical to any disaster response system. Every hospital must have an emergency preparedness plan to deal with mass casualties, and hospital management / physician is trained in emergency.

8. PREPAREDNESS

Creating disaster management teams and disaster management teams at all levels, including village / urban local bodies / ward levels, with the active participation of community and NGOs, will provide a comprehensive product process. Natural disasters are expected to be more efficiently managed to ensure that these risks are not turned into disasters, as mitigation and preparedness measures are mentioned in the previous section. Given the frequency of disasters affecting India, there is a need for continued vigilance, preparedness, and deliberate efforts to reduce incidents and mitigate the impact of natural disasters. What is needed is an active approach to disaster management; Increased growth reduces catastrophic equality because its management is a fundamental component of sustainable growth.

The core framework of disaster management should include coordinated efforts in key areas:

- Identification and prediction
- Early warning system
- Evacuation
- Relief
- Rescue
- Rehabilitation
- Compensation
- Reconstruction
- Preparedness

In recent years, the Government of India has made a paradigm shift in its approach to disaster management. The new approach comes from the understanding that development cannot be sustainable unless disaster mitigation is created in the development process. Disaster management occupies an important place in the policy framework of this country because the poor and the folks are the most affected by disasters.

9. CONCLUSION

In the recent past, India has made significant progress in disaster management. Bringing a new culture of preparedness, quick response, strategic thinking, and advocacy. The administrative framework makes it efficient to deal with various disasters. Disaster management is the only way to mitigate all these risks. India has managed recent hurricanes effectively and has minimized their impact. This was possible due to advance planning. Advanced planning is always required to keep emergency items in place for any disaster. There must be a multidisciplinary and proactive approach to disaster management. In addition to the various steps taken to implement the institutional and policy framework, disaster prevention, mitigation and preparedness initiatives taken by central and state governments play an important role in achieving community, civil society

organizations and the media. Our goal is to move to a safer India. Natural disasters can be reduced by setting up advanced early warning systems, which forecast the upcoming natural disasters timely. The penalty of the natural disasters can be reduced by an effective disaster management.

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