

# Natural hazards and disasters: Mitigation strategies



To know the topic **Natural hazards and disaster: Mitigation strategies**, we must first understand the meaning of natural hazards, disasters and their difference.

Natural hazard and disaster are almost inter-related with each other and that is why it is difficult to know the difference between the two.

## Natural hazard

Natural hazard is a threat or risk that takes place in nature like earthquake, tsunamis, volcanic eruptions and landslides which happens naturally and has a negative effect on people or on the environment.

## Natural disaster

A natural disaster is an unfavorable event caused from natural processes of the Earth like floods, hurricanes, tornadoes, volcanic eruptions, earthquakes, tsunamis, and other geologic processes.

Natural hazards can be classified into geophysical (earthquake, landslide, tsunami and volcanic eruptions), hydrological (avalanches and floods), climatological (extreme temperatures, drought and wildfires), climatological (extreme temperatures, drought and wildfires), meteorological (cyclones, storms) or biological (disease, epidemics).

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One natural hazard can direct to another. Example, an earthquake can cause a tsunami.

Natural disasters are the effects of natural hazards on humanity. Example, the tsunami in Indonesia caused a great loss of property and lives.

In the Indian scenario, the subcontinent is highly exposed to cyclones, droughts, earthquakes, floods, avalanches, forest fire and landslides. The government has taken proper measures for prevention and mitigation of the affected areas of disasters frequently in the Himalayan region of northern India.

Data shows us among the 35 states/Union Territories in the country, 25 places are disaster prone. Approx. 50 million people in our country affected by one or the other disaster every year including loss of property.

The natural disasters gives direct impact to the country's economy, agriculture, food security, water, sanitation, the environment and health each year.

Natural disasters not only results in loss of shelter but it also creates hardships, lack of food availability, temporary loss of livelihood and also disrupts the socio-economic activities. Though some of the losses can be covered through disaster relief and insurance.

Below are the list and description of Worst Natural Disasters of India :

### **1770 Great Bengal Famine**

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The Great Bengal Famine was a large famine in Bengal during the British rule in the period of 1769-1773. Bengal famine was caused the deaths of 10 million people in Bengal, Bihar and some parts of Odisha.

### **1839 Coringa Cyclone**

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The Coringa Cyclone was one of the 10 big disasters that shook India, struck at a tiny village of Godavari district in Andhra Pradesh. The Great Coringa Cyclone killed around 20,000 people in the ancient city of Coringa.

### **1894 Third Plague Pandemic**

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The major plague pandemic came to British India in 1896, killing more than 12 million people in India and China alone. Third Plague Pandemic was initially seen in port cities such as Bombay and Kolkata then spread to small towns and rural areas of many regions of India.

### **1979 Lahaul Valley Avalanche**

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Lahaul Spiti valley receives heavy snowfall during the winter season, causes Avalanches. The LaHaul Valley disaster in March of 1979 buried 200 people under 20 feet of snow, the only avalanche in the Himalayas and one of the 10 deadliest Avalanches in History of world.

### **1998 Malpa Landslide**

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Heavy rainfall caused, Malpa landslide was one of worst landslides in India, at village Malpa in Pithoragarh of Uttarkhand. Around 380 people were killed when massive landslides washed the entire village along with Hindu pilgrims of Kailash Mansarovar yatra.

### **1999 Odisha Cyclone**

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The 1999 Odisha cyclone also known as super cyclone 05B was the most deadliest tropical cyclone in the Indian Ocean and most destructive Indian storm since 1971. It caused almost deaths of 15,000 people and made heavy to extreme damage.

### **2001 Gujarat Earthquake**

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The massive earthquake occurred on India's 51st Republic Day on January 26, 2001 at Bhachau Taluka of Kutch District of Gujarat. Gujarat earthquake had a magnitude of between 7.6 and 7.7 and killed around 20,000 people.

### **2002 Indian Heat Wave**

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India's heat wave in 2002 at south region killed more than 1000 people, Most of the deaths occurred in state of Andhra Pradesh. The heat was so intense that birds fell from the sky, ponds and rivers dried up.

### **2004 Indian Ocean Tsunami**

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The Indian Ocean earthquake and Tsunami occurred in 2004 at the west coast of Sumatra, killing over 230,000 people in fourteen countries. Indian Ocean Tsunami was one of the deadliest natural disasters in history of India.

### **2007 Bihar Flood**

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The 2007- 2008 Bihar flood are listed as the worst hit flood in the living memory of Bihar in last 30 years. Bihar is India's most flood-prone State, a recurring disaster appears annual basis and destroys thousands of human lives apart from livestock and assets worth millions.

### **2005 Mumbai Catastrophes**

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The 2005 Maharashtra floods was occurred just one month after the June 2005 Gujarat floods, Mumbai the capital city was most badly affected and witnessed one of its worst catastrophes in the history of India, killing at least 5,000 people.

### **2010 Eastern Indian Storm**

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The Eastern Indian storm was a severe storm struck parts of eastern Indian states, spanning for 30–40 minutes. At least 91 people died in Indian states and Over 91,000 dwellings were destroyed and partially damaged.

### **2013 Maharashtra Drought**

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Maharashtra state was affected by the region's worst drought in 40 years ,worst-hit areas are Jalna, Jalgaon and Dhule are also affected by the famine. Millions of people in Maharashtra are at serious risk of hunger after two years of low rainfall in the region.

### **2013 Uttarakhand Flash Floods**

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On June 2013 Uttarakhand received heavy rainfall, massive Landslides due to the large flashfloods, it suffered maximum damage of houses and structures, killing more than 1000 people, sources claimed the death toll could be rise up to 5000. Uttarakhand Flash Floods is the most disastrous floods in the history of India.

Government has also taken various steps or strategies to reduce such disasters through mitigation.

Mitigation means actions taken to prevent or eliminate the natural disasters or hazards like flooding, earthquake, landslides, wildfires or dam failure to happen. Risks of life, property, social and economic activities are also part of it.

Strategies like

- Awareness
- Education
- Preparedness
- Prediction
- Warning systems
- Adoption of zoning
- Land-use practices
- Building codes are required
- To avoid development on landslide and flood-prone areas through planning can somehow reduce the disrupting impacts of natural disaster.

**National disaster management system in India**, has taken proper measures for prevention and mitigation of the after affects of the disasters. Long term measures have

been taken up, but it also requires proper mechanism wherein there is a pre-set assignment of roles and functions to various institutions at central, state and the district level.

## **NATIONAL DISASTER MANAGEMENT FRAMEWORK**

### **1. INSTITUTIONAL MECHANISMS**

Expected Outputs	Areas of intervention	Agencies/sectors to be involved and resource linkages
Nodal agency for disaster management at the national level with appropriate systems	(i)Constitution of National Emergency Management Authority with appropriate legal, financial and administrative powers. (ii)Roles and responsibilities of the NEMA:  -Coordinating multihazard mitigation, prevention, preparedness and response programmes.  – Policies for disaster risk reduction and mitigation  -Preparedness at all levels.  -Coordination of response  -Coordination of post disaster relief and rehabilitation.  -Amendment of existing laws, procedures, instructions.	Ministries/ Departments of Health, Water Resources, Environment and Forests, Agriculture, Railways, Atomic Energy, Defence, Chemicals, Science & Technology, Rural Development, Road Transport & Highways etc.
Creation of State Departments of Disaster Management	Departments of Relief & Rehabilitation to be redesignated as Department of Disaster Management with enhanced areas of responsibility to include mitigation, prevention and preparedness	State Governments/ UT Administration.

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Setting up State Disaster Management Authorities	(i) State Disaster Management Authority to be headed by the Chief Minister. (ii) The Authority to lay down policies and monitor mitigation, prevention and preparedness as also oversee response.	Ministers for Agriculture, Home, Disaster Management, Water Resources, Health, Road & Transport, Civil Supplies, Environment & Forests, Rural Development, Urban Development and Public Health Engineering Departments as Members.
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Source: Government of India, Disaster Management in India

**1. DISASTER MITIGATION/PREVENTION**

Disaster mitigation/prevention to be mainstreamed into the development process.	(i) Each Ministry /Department which has a role in mitigation /prevention will make appropriate outlays for schemes addressing mitigation/prevention (ii) Where there is a shelf of projects /schemes, projects / schemes contributing to mitigation to be given a priority. (iii) Wherever possible schemes/projects in areas prone to natural hazards to be so designed as to contribute to mitigation, and preparedness. (iv) Projects in vulnerable areas/areas prone to natural hazards to be designed to withstand natural hazards.	Ministries / Department of Govt. of India / State Governments /UT Administration
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Techno-legal regime	<p>(i) regular review of building codes and its dissemination</p> <p>(ii) construction in seismic zones III, IV and V to be as per BIS codes/National Building Codes. (iii) Construction in areas vulnerable to cyclones to be so designed as to withstand the wind hazard as per BIS codes/National Building Codes. (iv) Comprehensive review and compliance of – Town and Country Planning Acts -Development Control Regulations -Planning and Building Standards Regulations</p> <p>(v)Put in place appropriate technofinancial regime (vi)Capacity enhancement of Urban Local Bodies to enforce compliance of technolegal regimes</p>	<p>Bureau of Indian Standards/Ministry of urban Development State Urban Development Department / Urban Local Bodies</p> <p>State Urban Development Department / Urban Local Bodies</p> <p>State Urban Development Department / Urban Local Bodies</p> <p>State Urban Development Department / Urban Local Bodies</p> <p>State Governments</p>
Land-use Planning and Zoning regulations	<p>(i) Legal framework for Land-use planning and zoning regulations to be reviewed.</p> <p>(ii) Zoning regulations to be enforced.</p>	<p>Ministry of Urban Development Department of Land Resources[MORD] Ministry of Environment and Forests[GOI] State Governments</p>
Plan schemes for vulnerability reduction and preparedness.	State Governments. to formulate Plan Schemes and submit to Planning Commission	State Governments

Source:Government of India, Disaster Management in India

**The roles of the Administrative response** to a natural calamity are mainly concerned for the State Government. Though, the Central Government gives assistance on the relief work but their responses are determined with the existing policy of finance

and relief expenditure. They also have to keep in mind the factors like:

- The importance of a natural calamity
- The level of the relief operation required
- The requirements of the Central for expanding the financial resources from the State Government.

**The Division of Disaster Management of Ministry of Home Affairs, Government of India** is the ministry for all matters at the Centre except the Drought. The Ministry of Agriculture, Government of India, looks after the Drought Management. **The National Contingency Action Plan (NCAP)** makes possible in relief and rescue operations without delay.

**Non Governmental Organizations (NGO)** plays an important role as communication link between the Disaster Management agencies and the affected community. Many NGO's are helping in preparedness, relief and rescue, rehabilitation and reconstruction and also in monitoring and feedback.

### **New strategies for safer future**

#### **Preparedness, Mitigation And Prevention**

When there is disaster, a quick rescue and relief mission are expected. The damage can be minimized if proper preparedness levels are achieved.

Preparedness measures like community, development of advanced forecasting systems, effective communications, and sound and well networked institutional structure which involves the government organizations, academic and research institutions, the armed forces and the nongovernmental organizations.

#### **National Disaster Management Act 2005**

The Parliament of India has passed the National Disaster Management Act in November 2005, which brings a pattern in India's approach to disaster management.

The Act provides for establishment of:

- National Disaster Management Authority (NDMA)
- State Disaster Management Authority (SDMA)
- District Disaster Management Authority (DDMA)
- Constitution of Disaster Response Fund and Disaster Mitigation Fund at National, State and District levels
- Establishment of NIDM and NDRF.
- It gives penalties for obstruction, false claims, misuse etc.
- It states that there shall be no discrimination on the basis of sex, caste, community, descent or religion in providing compensation and relief.