

Disaster Management in India: An Overview

Dr. R. Vijaya Krishna

Research Fellow, Agro- Economic Research Centre, Andhra University, Visakhapatnam-530003, A.P

DOI: <https://doi.org/10.51584/IJRIAS.2026.11080194>

Received: 12 September 2026; Accepted: 17 September 2026; Published: 25 September 2026

ABSTRACT

Disasters both natural and man-made continue to be major challenges to human society, economies and governance. India, due to its vast geographical expanse, varied climate, and complex socio-economic conditions, remains one of the most disaster-prone countries in the world. While earlier decades witnessed catastrophic events such as the 1999 Odisha super cyclone, the 2001 Gujarat earthquake, and the 2004 Indian Ocean tsunami, more recent years have brought new challenges including extreme weather events linked to climate change, urban flooding, large-scale landslides, industrial accidents and biological disasters such as the COVID-19 pandemic. This paper provides an overview of disaster management in India, highlighting recent disasters, policy frameworks, institutional mechanisms and the way forward for building resilience.

Keywords: Disasters, Disaster Management in India and Institutional Mechanisms.

INTRODUCTION

The word ‘disaster’ reflects many different mental images and is used in different ways. The term is often used loosely to refer to any sudden, unexpected, or extraordinary misfortune, regardless of whether it occurs to an individual, a family, a community, a region, a nation, or the entire world. In formal Sociological terms, a disaster may be defined as “an event, concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of a society, undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfilment of all or some of the essential functions of the society is prevented”.

Earthquake, landslides, volcanic eruptions, forest fires, flood and cyclones are natural hazards that kill thousands of people and destroy habitats and property worth several billions of rupees. The time scale of disasters differs from very short duration of a few seconds for earthquakes to, a few minutes for volcanic eruption, a few hours of cyclone, a few days for flood and months or even years for drought. While natural disasters occur on all continents, the susceptibility to these disasters differs from one area to another. With the tropical climate and unstable landforms, coupled with deforestation, proliferation of unplanned growth, poor constructions which make the disaster-prone areas more vulnerable, tardy communication, poor or no budgetary allocation for disaster prevention, developing countries suffer more or less chronically by natural disasters. Though it may not be feasible to control the development of natural phenomenon, efforts, however, could be made to avoid disasters and alleviate their effects on human lives, infrastructure and property.

Types of Disasters

Natural Disasters

- Wind-related: Cyclones, storms, tornadoes, hurricanes, storm surges.
- Water-related: Floods, droughts, cloudbursts, glacial lake outburst floods (GLOFs).
- Earth-related: Earthquakes, tsunamis, landslides, avalanches, volcanic activity.
- Biological: Pandemics and epidemics such as COVID-19.

Man-Made Disasters

- Industrial and chemical accidents (e.g., Bhopal gas tragedy, Vizag LG Polymers gas leak 2020).
- Transport accidents (e.g., Odisha train accident 2023).
- Fires and urban building collapses.
- Environmental degradation (deforestation, air and water pollution).
- Nuclear and radiological accidents.
- Terrorism, insurgency, and sabotage.

Recent Major Disasters in India (2005–2025)

- Uttarakhand flash floods (2013): Thousands killed, Kedarnath town devastated.
- Jammu & Kashmir floods (2014): Massive inundation displacing millions.
- Nepal earthquake impact (2015): Shocks affected North India.
- Kerala floods (2018 & 2019): One of the worst floods in a century.
- Cyclones: Phailin (2013), Hudhud (2014), Fani (2019), Amphan (2020), Tauktae (2021), Yaas (2021).
- COVID-19 pandemic (2020–2022): A biological disaster affecting all sectors.
- Urban flooding: Chennai (2015, 2023), Bengaluru (2022).
- Odisha train accident (2023): Nearly 300 deaths.
- Himachal Pradesh floods and landslides (2023): Climate-induced extreme events.

Recent Major Disasters in India (2024-2025)

A. Punjab Floods (August 2025)

Heavy monsoon rains in upstream areas (Himachal Pradesh, Jammu & Kashmir) plus surplus water release from dams (Pong, Ranjit Sagar, Bhakra) led to severe flooding in Punjab. It affects over 1,400 villages across more than 13 districts severely affected, 2.5 lakh acres of farmland submerged, more than 3.5 million people affected and Fatalities over 55 people. This challenges the governments to provide relief, displacement and protect infrastructure damage. The floods were one of the worst in decades for Punjab.

B. Uttarakhand Flash Flood (5 August 2025, Uttarkashi)

This flash floods likely cloudburst / glacial lake outburst flood / glacier collapse triggered the flood. It causes at least 5 people died, more than 50 missing, damage to houses, hotels in tourist/hilly areas. The flash flood stresses the increasing risk in Himalayan regions from extreme weather, glacial melting, unstable terrain.

C. Uttarakhand Avalanche (Mana, Chamoli district, February 2025)

A deadly avalanche struck a BRO (Border Roads Organisation) camp at high altitude, in extreme winter conditions and causes 54 workers were buried, 46 rescued and 8 died. The avalanche challenges to rescue due to altitude, terrain, weather and emphasizes danger to workers in high mountain zones.

D. Kerala Oil Spill (May 2025)

The major reason for this is, the Liberian-flagged container ship *MSC Elsa 3* capsized in the Arabian Sea off the Kerala coast. It was carrying containers with hazardous materials plus large quantities of fuel oil. It causes for no casualties, some containers washed ashore, fuel leak, oil slicks detected and fishing restrictions imposed. Environmental and ecological risks, especially to marine life / coastal livelihoods.

E. Gujarat Factory Fire / Warehouse Explosion (April 2025, Deesa, Banaskantha)

An explosion in a warehouse handling firecracker (illegal/expired licence) involving aluminium powder, a highly reactive substance causes to kill 21 people and injured 6 members.

Other summary statistics & trends

In 2024-25, natural disasters (floods, landslides, etc.) caused about **2,936 deaths** across India. Losses include large numbers of houses damaged, large areas of cropped land affected. States most affected in fatality count are Himachal Pradesh, Madhya Pradesh, Kerala, Maharashtra and Karnataka.

Key Causes & Risk Factors

- Extreme monsoon rainfall and changing weather patterns: Cloudbursts, irregular monsoons are increasingly triggering flash floods and landslides. (Seen in Uttarakhand, Punjab)
- Glacial melt / glacier stability issues in Himalayan regions, often exacerbated by warming climate.
- Dam water release and catchment mismanagement: Poor coordination or unexpected high-water inflows lead to downstream flooding (Punjab case).
- Illegal / unsafe storage of hazardous materials: As in the firecracker warehouse explosion in Gujarat.
- Vulnerability of terrain and infrastructure in hilly / mountainous zones; poor building standards in some cases.

Response & Challenges

- Rescue operations involving local authorities, National Disaster Response Force (NDRF), state governments.
- Relief and compensation for affected people and farmers (crop loss etc.).
- Environmental cleanup efforts, particularly in oil spill situation.
- Regulatory investigations, such as licensing of factories, dam releases.

However, Delay and difficulty in accessing remote/hilly areas, missing early warning or insufficient warning systems in some events and typically, large scale displacement, loss of livelihoods and long recovery period challenging the both state government and central government.

Causes of Natural Disasters in India

Geographical factors: Himalayan tectonic activity, monsoon dependency.

Climatic factors: Monsoon variability, El Niño, La Niña.

Environmental factors: Deforestation, urbanization, poor drainage, unplanned construction.

Anthropogenic factors: Industrialization, dam construction, climate change.

Impact of Natural Disasters

- Human Impact: Loss of life, displacement, health hazards.
- Economic Impact: Damage to infrastructure, agriculture, industries, GDP slowdown.
- Environmental Impact: Soil erosion, loss of biodiversity, forest destruction.
- Social Impact: Poverty, unemployment, migration, trauma.

Disaster-Prone Regions of India

- Earthquakes: Himalayan belt, Gujarat, Maharashtra, Andamans.
- Cyclones: Eastern coast (Bay of Bengal), Gujarat coast.
- Floods: Ganga-Brahmaputra plains, coastal states.
- Droughts: Rajasthan, central & southern states.
- Landslides: Himalayan region, Western Ghats.

Statistics and Risk Profile

- 58 per cent of India's landmass is earthquake-prone.
- 12 per cent of land is flood-prone.
- 76 per cent of coastline is cyclone-prone.
- 68 per cent of cultivable land is drought-prone.
- According to UNDRR (2022), India faces average annual economic losses of \$87 billion due to disasters.

Data Collection

The study is based on the secondary data collected from various sources such as reports of National Disaster Management Authority (NDMA), Government of India, United Nations Office for Disaster Risk Reduction (UNDRR), Centre for Research on the Epidemiology of Disasters (CRED) Database, Indian Meteorological Department (IMD) Publications, World Bank & Asian Development Bank Reports on Climate and Disasters and Various Newspapers (2023-2025). Though the study has explained the national disasters up to 2024-25, Due to deficiency in data the study considered only for 2000-01 to 2017-18.

The major observations can be noticed from the following table are the highest human loss has happened in the 2013–14 with 5,677 deaths (due to Uttarakhand flash floods, Cyclone Phailin, etc.) and lowest human loss can be found in 2012–13 with 946 deaths. It is also observed the trends in the human loss from the table that in early 2000s: 800 to 2,000 deaths per year, mid-2000s to early 2010s it is frequent and peaks above 2,000 and the year 2013–14 stands out as a disaster year with around 6000 deaths per year.

Regarding cattle losses, the highest loss can be identified in 2006–07 with 4,55,619 cattle lost which a major spike for the entire period. The other peaks can also be identified in 2007–08 with 1,19,218 loss and 2009–10 with 1,28,452. The lowest cattle have seen in 2002–03 with 3,729 cattle loss. The huge fluctuations indicate regional concentration of flood/cyclone damage in agrarian states (Bihar, Assam, Odisha) and is concluded from the table that after 2010, losses reduced compared to mid-2000s.

With respect to houses damaged, the maximum damaged houses can be noticed in 2007–08 with 35.27 lakh houses damaged followed by 2005–06 with 21.20 lakh, 2006–07 with 19.34 lakh and least in 2016–17 with 5.46

lakh houses damaged. Finally, it is to be concluded from the table that very high damages in 2005–08 period because of mega floods and cyclones and post-2010, generally lower but still fluctuating around 6–13 lakh. It is also observed from the table that the cropped area affected during the period is more in 2007–08 with 85.13 lakh ha followed by 2006–07 with 70.87 lakh ha and the lowest in 2012–13 with 14.44 lakh ha. The trend shows the extreme agricultural impact between 2005 to 2008 and post 2010, cropped area affected averages 25–47 lakh ha, except 2013–14 spike with 63.75 lakh ha.

It can be concluded from the table with key observations and patterns that mid-2000s worst hit in between 2005 to 2008 with massive losses in all categories because of recurring of major floods and cyclones, 2013–14 is considered as disaster year because the maximum lives lost (Uttarakhand tragedy, Cyclone Phailin) and very high crop damage had happened.

Table - 1: Annual Damage Due to Natural Disaster in India (2001-02 to 2017-18)

Year (financial / reporting)	Lives lost (No.)	Cattle lost (No.)	Houses damaged (No.)	Cropped area affected (lakh ha)
2001-02	834	21,269	3,46,878	18.72
2002-03	898	3,729	4,62,700	21
2003-04	1,992	25,393	6,82,209	31.98
2004-05	1,995	12,389	16,03,300	32.53
2005-06	2,698	1,10,997	21,20,012	35.52
2006-07	2,402	4,55,619	19,34,680	70.87
2007-08	3,764	1,19,218	35,27,041	85.13
2008-09	3,405	53,833	16,46,905	35.56
2009-10	1,677	1,28,452	13,59,726	47.13
2010-11	2,310	48,778	13,38,619	46.25
2011-12	1,600	9,126	8,76,168	18.87
2012-13	946	24,293	6,67,319	14.44
2013-14	5,677*	1,02,998	12,10,227	63.75
2014-15	1,674	92,180	7,25,390	26.85
2015-16	1,460	59,057	13,13,371	31.09
2016-17	1,487	41,965	5,46,518	25.49
2017-18	2,057	46,488	9,15,878	47.44
2017-18 (P)	2,045@	123,014@	1,557,908@	17.09@

Source: MoSPI (EnviStats / Year-wise damage due to Natural Extreme Events in India).

* Includes persons missing; P = provisional; @ = as reported on the MoSPI table.

Contemporary Challenges

- Climate change: Intensifying floods, cyclones, heatwaves, and glacial melts.
- Urbanization: Unplanned growth causing urban flooding and building collapses.
- Population density: Increases vulnerability during evacuations.
- Technology gap: While early warning systems exist, last-mile connectivity remains weak.
- Resource limitations: Relief and rehabilitation often strain state finances.

Policy and Institutional Framework

- ✓ Disaster Management Act, 2005 – Provided the first comprehensive legal framework.
- ✓ National Disaster Management Authority (NDMA): Apex body headed by the Prime Minister.
- ✓ National Disaster Response Force (NDRF): Specialized force for rapid response.
- ✓ State Disaster Management Authorities (SDMAs) and District DM Authorities: Decentralized implementation.
- ✓ Sendai Framework for Disaster Risk Reduction (2015–2030): India is a signatory, aligning its policies with global best practices.
- ✓ National Disaster Management Plan (NDMP): Updated periodically to include emerging risks such as pandemics and climate change.

Role of Technology

- ✓ GIS and Remote Sensing: Used for hazard mapping and early warnings.
- ✓ Mobile Apps (e.g., NDMA's Disaster Alert): Disseminating warnings to citizens.
- ✓ Drones and AI: Increasingly deployed in damage assessment and relief logistics.
- ✓ Real-time data sharing: Between IMD, ISRO, CWC, and NDMA.

Community-Based Disaster Management (CBDM)

- ✓ Empowering local communities through mock drills and awareness campaigns.
- ✓ Training volunteers as first responders.
- ✓ Role of NGOs, SHGs, and private sector in relief and rehabilitation.

The Way Forward

- Shift from relief to resilience: Greater focus on preparedness, mitigation, and prevention.
- Climate-resilient infrastructure: Smart cities, green infrastructure, and flood-resilient housing.
- Integration with SDGs: Linking disaster risk reduction with poverty alleviation, health, and education.
- Regional cooperation: Sharing resources and early warning systems with SAARC and BIMSTEC nations.

- Capacity building: Strengthening local governments and institutions.
- Public-private partnerships: Engaging industry in disaster response and recovery.

CONCLUSION

India's disaster management framework has evolved significantly since the enactment of the Disaster Management Act, 2005. The establishment of NDMA, NDRF, and SDMAs has improved preparedness and response capacity. However, increasing disaster frequency and intensity—driven by climate change, urbanization, and environmental degradation—demand a paradigm shift toward resilience and sustainable development. By integrating technology, empowering communities, and aligning with global frameworks, India can build a safer, disaster-resilient future.

REFERENCES

1. National Disaster Management Authority (NDMA), Government of India (2023).
2. United Nations Office for Disaster Risk Reduction (UNDRR) Reports (2022).
3. Centre for Research on the Epidemiology of Disasters (CRED) Database.
4. Indian Meteorological Department (IMD) Publications (2022–2023).
5. World Bank & Asian Development Bank Reports on Climate and Disasters (2021–2023).
6. Various Newspapers (2023-2025).