

REPORT NO.

261



PARLIAMENT OF INDIA

RAJYA SABHA

**DEPARTMENT-RELATED PARLIAMENTARY STANDING COMMITTEE
ON HOME AFFAIRS**

TWO HUNDRED SIXTY FIRST REPORT

DISASTER MANAGEMENT

(PRESENTED TO RAJYA SABHA ON 7TH AUGUST, 2026)

(LAID ON THE TABLE OF LOK SABHA ON 7TH AUGUST, 2026)

भारतीय संसद, राज्य सभा



PARLIAMENT OF INDIA,
RAJYA SABHA

**Rajya Sabha Secretariat, New Delhi
August, 2026/ Sravana, 1948 (Saka)**

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DEPARTMENT-RELATED PARLIAMENTARY STANDING

COMMITTEE ON HOME AFFAIRS

(Constituted *w.e.f.* 26th September, 2025)

RAJYA SABHA

1. **Dr. Radha Mohan Das Agrawal** - **Chairman**
2. Shri Haris Beeran
3. Shri Samik Bhattacharya
4. Shri Tarun Chugh[†]
5. Shri Ajay Makan
6. Shri Derek O'Brien
7. Shri Sanjay Raut
8. Shri Neeraj Shekhar
9. Shri Sanjay Singh
10. Shri Sanjay Yadav

LOK SABHA

11. Dr. Kakoli Ghosh Dastidar
12. Shri Anil Yeshwant Desai
13. Shri Ashish Dubey
14. Shri Satish Kumar Gautam
15. Shri Naveen Jindal
16. Shri Saumitra Khan
17. Shri Jyotirmay Singh Mahato
18. Shri Dhairyasheel Sambhajirao Mane
19. Thiru Dayanidhi Maran
20. Shrimati Delkar Kalaben Mohanbhai
21. Shri Jai Parkash
22. Shri B Y Raghavendra
23. Shri Vishnu Dayal Ram
24. Shrimati Mala Roy
25. Shri Muhammed Hamdullah Sayeed
26. Adv. Chandra Shekhar
27. Shri Kesineni Sivanath
28. Shrimati Supriya Sule
29. Shri Krishna Prasad Tenneti
30. Shrimati Priyanka Gandhi Vadra
31. Shri Amrinder Singh Raja Warring

SECRETARIAT

1. Shri K.S. Somashekhar, Secretary
2. Shri Ajaya Kumar Mallick, Joint Secretary
3. Shri Har Parteek Arya, Director
4. Smt. Neelam Bhatt, Deputy Secretary
5. Shri Ashutosh Awasthi, Under Secretary
6. Shri Anku Sharma, Security Assistant-II
7. Shri Rohit Janghu, Security Assistant-II

[†]Shri Tarun Chugh, MP, Rajya Sabha nominated *w.e.f.* 23rd July, 2026.

PREFACE

I, the Chairman of the Department-related Parliamentary Standing Committee on Home Affairs, having been authorized by the Committee to submit the report on its behalf, do hereby present this Two Hundred Sixty First Report on “Disaster Management”.

2. The Department-related Parliamentary Standing Committee on Home Affairs selected the subject “Disaster Management” for detailed examination and held four meetings on 12th November, 13th November, 26th November, and 27th November, 2025. During these meetings, the Committee heard the views of representatives from the Ministry of Home Affairs (MHA), National Disaster Management Authority (NDMA), National Institute of Disaster Management (NIDM), National Disaster Response Force (NDRF), Directorate General (Fire Services, Civil Defence & Home Guards), India Meteorological Department (IMD), Central Water Commission (CWC), Geological Survey of India (GSI), Defence Geoinformatics Research Establishment (DGRE), National Remote Sensing Centre (NRSC), Government of Union Territory of Jammu & Kashmir and State Government of Himachal Pradesh, Uttarakhand, Kerala, Odisha and Andhra Pradesh.

3. The Committee, while preparing the report, has mainly relied upon the following documents:-

- i. Background Notes furnished and Presentations made by the representatives of MHA, NDMA, NIDM, NDRF, DG (FS, CD & HG), IMD, CWC, GSI, DGRE, NRSC and UT/State Governments.
- ii. Replies furnished by the concerned Ministries/Departments/Organisations and UT/State Governments in response to the questionnaire forwarded by the Secretariat;
- iii. Replies to the queries/comments/suggestions of the Members, raised during the Committee's meetings, as furnished by the Ministries/Departments/Organisations and UT/State Governments during various meetings of the Committee; and
- iv. Verbatim transcripts of the meetings of the Committee held on 12th November, 13th November, 26th November and 27th November, 2025.

4. For the facility of reference and convenience, observations and recommendations of the Committee have been printed in bold letters in the body of the Report. For further convenience, abbreviations used in the Report have been compiled in a table under the acronyms section.

5. The Committee considered the draft Two Hundred Sixty First Report and adopted the same in its meeting held on 5th August, 2026

5th August, 2026
14 Sravana, 1948 (Saka)
New Delhi

Dr. Radha Mohan Das Agrawal
Chairman
Department-related Parliamentary
Standing Committee on Home Affairs

ACRONYMS

AI	Artificial Intelligence
AMCDRR	Asian Ministerial Conference on Disaster Risk Reduction
BBB	Build Back Better
BMTPC	Building Materials and Technology Promotion Council
BRO	Border Roads Organisation
C-DAC	Centre for Development of Advanced Computing
CAPF	Central Armed Police Forces
CBRN	Chemical, Biological, Radiological and Nuclear
CDRI	Coalition for Disaster Resilient Infrastructure
CRZ	Coastal Regulation Zone
CWC	Central Water Commission
DDMA	District Disaster Management Authority
DGCD	Directorate General of Civil Defence
DGP	Director General of Police
DGRE	Defence Geoinformatics Research Establishment
DRR	Disaster Risk Reduction
DSS	Decision Support System
EOC	Emergency Operation Centre
EWS	Early Warning System
FC	Finance Commission
GLOF	Glacial Lake Outburst Flood
GSI	Geological Survey of India
HADR	Humanitarian Assistance and Disaster Relief
HAZMAT	Hazardous Material
HLC	High Level Committee
HPC	High Powered Committee
ICR-ER	Integrated Control Room for Emergency Response
IDRN	Indian Disaster Resource Network
IDS	Integrated Defence Staff
IHR	Indian Himalayan Region
IMCT	Inter-Ministerial Central Team
IMD	India Meteorological Department
INCOIS	Indian National Centre for Ocean Information Services
INSARAG	International Search and Rescue Advisory Group
IRDAI	Insurance Regulatory and Development Authority of India
ISRO	Indian Space Research Organisation
ITBP	Indo-Tibetan Border Police
IUIN-DRR	India Universities and Institutions Network for Disaster Risk Reduction
MAH	Major Accident Hazard
MHA	Ministry of Home Affairs
MSIHC	Manufacture, Storage and Import of Hazardous Chemicals

NCC	National Cadet Corps
NCDC	National Centre for Disease Control
NCMC	National Crisis Management Committee
NCRB	National Crime Records Bureau
NCRMP	National Cyclone Risk Mitigation Project
NCT	National Capital Territory
NDMA	National Disaster Management Authority
NDMF	National Disaster Mitigation Fund
NDMP	National Disaster Management Plan
NDRF	National Disaster Response Force
NEC	National Executive Committee
NFSC	National Fire Service College
NIDM	National Institute of Disaster Management
NPDM	National Policy on Disaster Management
NRSC	National Remote Sensing Centre
NSS	National Service Scheme
NYKS	Nehru Yuva Kendra Sangathan
ODRAF	Odisha Disaster Rapid Action Force
OSDMA	Odisha State Disaster Management Authority
PDNA	Post-Disaster Needs Assessment
PSU	Public Sector Undertaking
QUAD	Quadrilateral Security Dialogue
RTGS	Real-Time Gross Settlement
SAARC	South Asian Association for Regional Cooperation
SACHET	Satellite-based Analysis and Comprehensive Hazard Early Warning Tool
SCO	Shanghai Cooperation Organisation
SDMA	State Disaster Management Authority (or equivalent Nodal Agency)
SDMF	State Disaster Mitigation Fund
SDRF	State Disaster Response Force
SEC	State Executive Committee
SEOC	State Emergency Operation Centre
SFDRR	Sendai Framework for Disaster Risk Reduction
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
SMS	Short Message Service
TN	Tamil Nadu
UDMA	Urban Disaster Management Authority
UN	United Nations
UNDRR	United Nations Office for Disaster Risk Reduction
UNISDR	United Nations International Strategy for Disaster Reduction
UT	Union Territory
VHF	Very High Frequency
WMO	World Meteorological Organization
YAMS	Yield and Meteorological System
iGOT	Integrated Government Online Training

Chapter I: Introduction and Disaster profile

1.1 Introduction

1.1.1 India, the seventh largest country in the world by geographical area and one of the most populous nations, is characterized by remarkable diversity in its physical features, climatic conditions and socio-economic structures. The country encompasses a wide range of physiographic regions, including the Himalayan mountain ranges, Indo-Gangetic plains, arid deserts, peninsular plateau, coastal belts and island territories. Bounded by the Indian Ocean in the south, the Arabian Sea in the south-west and the Bay of Bengal in the south-east, India's geographical positioning renders it highly susceptible to a variety of natural hazards. With deep diversity of hills, plains and terrains coupled with varying agro-climatic and hydro-meteorological biosphere, India is naturally vulnerable and susceptible to natural and man-made disasters.

1.1.2 The Committee has examined the subject of disaster management in the country in the context of the increasing frequency and intensity of disasters and their significant impact on socio-economic development. This Chapter presents an overview of the concept and definition of disaster, India's disaster risk profile, and the factors that shape the country's vulnerability to disasters. It sets the context for the detailed examination of the policy, legal, institutional and operational dimensions of disaster management undertaken in the subsequent chapters of this report.

1.1.3 The Committee notes that disasters in India are not only frequent but also diverse in nature. Generally, natural disasters include floods, cyclones, droughts, earthquakes, cloud bursts, heat waves, landslides, mudslides, avalanches, forest fires, coastal erosion and inundation, tsunamis, lightning, etc. Besides, like any other country in the globe, India is also becoming vulnerable to new and emerging disasters such as Chemical, Biological, Radiological and Nuclear emergencies. Terrorism, rail/ road/ airway accidents and stampede in crowd surges are new additions in manmade disasters. The increasing complexity and inter-connected nature of disaster risks necessitate a comprehensive and integrated approach to disaster management.

1.1.4 The vulnerability of the country to disasters is further compounded by a range of socio-economic, developmental and environmental factors, including rapid urbanization, climate change, population pressures and the degradation of natural ecosystems.

1.1.5 Disasters have far-reaching consequences on human lives, livelihoods, infrastructure and the environment. They disrupt progress and destroy the hard-earned fruits of painstaking developmental efforts, often pushing nations back by several decades in their quest for progress. The management of disasters in a comprehensive and efficient manner, rather than mere response to their occurrence, has in recent times received increased attention both within India and internationally. **The Committee observes that the adverse impacts of disasters are often disproportionately borne by vulnerable sections of society, including the poor, women, children, the elderly and persons with disabilities. Effective disaster management is therefore essential not only for safeguarding lives and property but also for ensuring sustainable and inclusive development.**

1.2 Concept and Definition of Disaster

1.2.1 The understanding of what constitutes a "disaster" has evolved considerably over time, both in national legislation and in international discourse. Two definitions are of particular relevance to the framework governing disaster management in India: the statutory definition under the Disaster Management Act, 2005, and the definition adopted by the United Nations Office for Disaster Risk Reduction.

1.2.2 The Disaster Management Act, 2005 defines "disaster" as follows:

"Disaster" means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.

1.2.3 This statutory definition is broad and encompasses events arising from natural causes, man-made causes, accidents and negligence, provided they result in substantial loss or damage and exceed the coping capacity of the affected community. The expansive nature of this definition enables its application to a wide spectrum of hazards and emergencies.

1.2.4 The revised terminology of the United Nations Office for Disaster Risk Reduction (UNDRR) defines 'disaster' as:

"A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts."

1.2.5 The UNDRR further notes that the effect of a disaster can be immediate and localised but is often widespread and may persist long after the event. The effect may challenge or overwhelm the capacity of a community or society to cope using its own resources, thereby necessitating assistance from external sources, which could include neighbouring jurisdictions or those at the national or international levels. The UNDRR considers disaster to be a result of the combination of several factors, including the exposure to hazards, the conditions of vulnerability that are present, and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injuries, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation.

1.2.6 According to the revised UNDRR terminology, Disaster Management is defined as "the organization, planning and application of measures preparing for, responding to and recovering from disasters," while Disaster Risk Management is defined as "the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing

disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses."

1.2.7 Disaster Management (DM) involves a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for:

- Prevention of danger or threat of any disaster
- Mitigation or reduction of risk of any disaster or its severity or consequences
- Capacity building including research and knowledge management
- Preparedness to deal with any disaster
- Prompt response to any threatening disaster situation or disaster
- Assessing the severity or magnitude of effects of any disaster
- Evacuation, rescue and relief
- Rehabilitation, recovery and reconstruction

1.3 Disaster Profile of India

1.3.1 India's disaster risk profile reflects its multi-hazard vulnerability. The country's exposure to a diverse range of natural and man-made hazards, combined with high levels of socio-economic vulnerability, makes it one of the most disaster-prone countries in the world. The scale of this vulnerability is reflected in the following statistics. Out of 36 States and Union Territories in the country, 27 are disaster-prone. Approximately 58.6 percent of the landmass is prone to earthquakes of moderate to very high intensity. Over 40 million hectares, constituting about 12 percent of the land area, is susceptible to floods and river erosion. Nearly 5,700 kilometres of the 7,516-kilometre coastline is exposed to cyclones and tsunamis. About 68 percent of the cultivable area is prone to drought. Hilly areas are at risk from landslides and avalanches, with approximately 15 percent of the landmass being prone to landslides. A total of 5,161 Urban Local Bodies are prone to urban flooding. In addition, fire incidents, industrial accidents and other man-made disasters involving chemical, biological and radioactive materials are significant hazards that have underscored the need for strengthening mitigation, preparedness and response measures.

1.3.2 These figures underline the multi-hazard nature of disaster risks in India and highlight the need for robust and comprehensive disaster management strategies encompassing every category of hazard and every region of the country.

1.3.3 The vulnerability of India to disasters is significantly influenced by a combination of natural and socio-economic factors. Rapid urbanization, particularly in hazard-prone areas, has increased exposure to disasters. The expansion of informal settlements, inadequate infrastructure and poor urban planning have further aggravated vulnerability.

1.3.4 Environmental degradation, including deforestation, land degradation and loss of wetlands, has weakened natural defenses against disasters. Climate change has emerged as a major risk multiplier, leading to increased frequency and intensity of extreme weather events such as heat waves, heavy rainfall and cyclones. Population pressures and socio-economic inequalities further exacerbate vulnerability, particularly among marginalized communities.

1.3.5 The Committee observes that disaster risks and developmental processes are closely interlinked and thus the integration of disaster risk considerations into development planning is essential for building long-term resilience. The Committee encourages continued efforts towards risk-sensitive planning, strengthening of regulatory mechanisms and the mainstreaming of disaster risk reduction across all sectors of development. The subsequent chapters of this report examine the policy, legal, institutional and operational frameworks through which India seeks to address this challenge.

1.4 Role and Responsibility of Central and State Governments

1.4.1 In accordance with the provisions of the Disaster Management Act, 2005, the Central Government shall take all such measures as it deems necessary or expedient for the purpose of disaster management and shall coordinate the actions of all agencies involved therein.

1.4.2 As per the National Policy on Disaster Management, 2009, the basic responsibility for undertaking rescue, relief and rehabilitation measures in the event of a disaster rests with the State Government. The State Governments carry out necessary rescue and relief operations in the affected areas, which include:

- Evacuation of people to safer places
- Operation of relief camps and cattle camps
- Provision of essential commodities such as food items, drinking water purification tablets, fuel, fodder, and temporary shelter materials
- Steps to prevent the outbreak of epidemics during and after the disaster period

1.4.3 The Central Government supplements the efforts of State Governments by providing logistic and financial support, particularly in the event of calamities of severe nature. The logistic support provided by the Government of India includes:

- Deployment of aircraft, helicopters, and boats
- Mobilisation of specialist teams of the Armed Forces and Central Armed Police Forces (CAPFs)
- Deployment of requisite teams of the National Disaster Response Force (NDRF)
- Provision of relief materials and essential commodities, including medical stores
- Restoration of critical infrastructure and facilities, including communication networks
- Such other assistance as may be required by the affected States and Union Territories (UTs) to meet the situation effectively

1.4.4 The Ministry of Home Affairs (MHA) remains in constant touch with the affected States for providing assistance and ensuring effective relief and response.

1.5 Mandate of the Ministry of Home Affairs

1.5.1 The Allocation of Business Rules mandates MHA to look after the matters relating to loss of human life and property due to all natural and man-made disasters, other than drought, hailstorm, pest attack or epidemics. Accordingly, MHA is the nodal Ministry at the National level for coordination of response and relief in the wake of natural disasters like avalanche,

cyclone, cloudburst, earthquake, tsunami, flood, fire and landslide. Drought, cold wave/frost, pest attacks, hail storm are dealt with by Ministry of Agriculture & Farmers Welfare.

1.5.2 The Disaster Management Division of MHA closely monitors the disaster and disaster like situation in the country to facilitate timely interventions in the form of logistic and financial support by the Government of India to augment the resources and capacity of the affected States and UTs to deal efficiently and effectively with each disaster scenario. For this purpose, close liaison is made with the affected States/UTs on the one side and with the concerned Central line Ministries/Departments such as Health & Family Welfare, Defence, Civil Aviation, Consumer Affairs, Food and Public Distribution, Power, Telecommunication, on the other.

1.6 Paradigm Shift in Approach

1.6.1 The Ministry informs that the Government has brought about a paradigm shift in the approach to disaster management from a relief-centric model to a holistic and integrated approach covering the entire gamut of disaster management, encompassing prevention, mitigation, preparedness, response, relief, reconstruction, and rehabilitation. This approach is based on the conviction that development cannot be sustainable unless disaster mitigation is built into the development process. The measures taken by the Central and State Governments under this approach have significantly improved disaster management practices, preparedness, and response mechanisms, resulting in a notable reduction in casualties during natural calamities, including cyclones.

1.7 Evolution of Disaster Management Framework in India

1.7.1 India, through its continuous and systematic efforts, has significantly improved its preparedness to deal with natural calamities. The Government of India, recognising the importance of disaster management as a national priority, has progressively built a comprehensive legal, institutional, and policy framework over the years. The key milestones in the evolution of the disaster management framework are as follows:

Table - 1.1 Evolution of Disaster Management Framework in India

Year	Milestone
1999	Constitution of the High Powered Committee (HPC) for preparation of DM plans and mitigation mechanisms
2001	Constitution of the National Committee on Disaster Management after the Gujarat Earthquake
2002	Disaster Management division of Ministry of Agriculture was shifted to the Ministry of Home Affairs and a hierarchical structure evolved for DM at the national, state and district levels.
2004	Indian Ocean Tsunami serves as a defining catalyst for legislative action
2005	Enactment of the Disaster Management Act, 2005 through an Act of Parliament
2009	Approval of the National Policy on Disaster Management (NPDMD)
2016	Release of the National Disaster Management Plan (NDMP), aligned with the Sendai Framework

Year	Milestone
2019	Revision of the NDMP; launch of the Coalition for Disaster Resilient Infrastructure (CDRI)
2025	Enactment of the Disaster Management (Amendment) Act, 2025 to address urban disaster risks, mandate a National Disaster Database, and integrate technology-driven forecasting

1.7.2 The DM Act, 2005, as amended in 2025, together with the NPDM, 2009 and the NDMP, forms the backbone of India's disaster management framework. The progressive evolution of this framework from the constitution of the HPC in 1999 to the enactment of the DM (Amendment) Act in 2025 reflects the Government's sustained commitment to building a safe, resilient, and disaster-prepared India.

1.7.3 The measures taken by the Central and State Governments under this framework have significantly improved disaster management practices, preparedness, prevention, and response mechanisms, resulting in a notable reduction in casualties during natural calamities, including cyclones, in the country.

1.8 Structure for Disaster Management in India

1.8.1 The DM Act, 2005 provides for the effective management of disasters and for matters connected therewith or incidental thereto. It provides for the institutional mechanisms for drawing up and monitoring the implementation of the disaster management plans. The Act also ensures the measures to be taken by the various wings of the Government, both at Centre and State level, for prevention and mitigation of disasters and prompt response to any disaster situation.

1.8.2 The Act provides for setting up of a National Disaster Management Authority (NDMA) under the Chairmanship of the Prime Minister, State Disaster Management Authorities (SDMAs) under the Chairmanship of the Chief Ministers, District Disaster Management Authorities (DDMAs) under the Chairmanship of Collectors/District Magistrates/Deputy Commissioners. The Act further provides for the constitution of Executive Committees at National and State levels. Under its aegis, the National Institute of Disaster Management (NIDM) for capacity building and National Disaster Response Force (NDRF) for specialist response purposes have been set up. The Act also enables the State Governments to constitute State Disaster Response Forces (SDRFs) in the States for specialized response to the threatening disaster situation or disaster. The introduction of Urban Disaster Management Authorities (UDMAs) through the DM (Amendment) Act, 2025 further strengthens this structure by addressing the growing challenges of urban disaster risk management in State capitals and cities with Municipal Corporations. It also mandates the Ministries/Departments at Central and State level to draw up their own plans in accordance with the National Plan. The Act further contains the provisions for dedicated financial mechanisms such as creation of funds like National Disaster Response Fund, National Disaster Mitigation Fund and similar funds at the State and District levels for the purpose of Disaster Management. The Act also provides specific roles to local bodies in Disaster Management.

Chapter II: Policy, Plans, Guidelines and Legal-Institutional Framework for Disaster Management

2.1 Introduction

2.1.1 Disaster management in India is governed by a comprehensive legal, policy and institutional framework that have evolved progressively in response to the increasing frequency, intensity and complexity of disasters. This framework seeks to ensure a coordinated, integrated and multi-disciplinary approach encompassing the full spectrum of disaster management, namely prevention, mitigation, preparedness, response, recovery and reconstruction. At its foundation lies the Disaster Management Act, 2005, as amended in 2025, supported by the National Policy on Disaster Management, 2009, the National Disaster Management Plan, hazard-specific guidelines issued by the National Disaster Management Authority and institutional mechanisms functioning across multiple tiers of governance, from the national to the district level.

2.1.2 Over the decades, India's disaster management system has undergone a fundamental transformation, transitioning from a reactive, relief-centric paradigm to a proactive, risk-informed approach that prioritises disaster risk reduction, resilience building and the integration of disaster management into the broader developmental agenda. This shift has been catalysed by hard lessons drawn from successive catastrophic events, evolving global commitments and obligations under frameworks such as the Sendai Framework for Disaster Risk Reduction (2015-2030), and rapid advancements in science, technology and institutional practice.

2.1.3 The present chapter examines the key elements of this policy, legal and institutional architecture, tracing its evolution, statutory foundations, policy directions, planning instruments, guidelines and the organizational mechanisms through which disaster management is operationalised across the country.

2.2 Evolution of the Disaster Management Framework in India

2.2.1 The evolution of disaster management in India has been shaped by the interplay of international developments and domestic experiences spanning several decades. The declaration of the 1990s as the International Decade for Natural Disaster Reduction by the United Nations General Assembly marked the beginning of a more structured and conscious approach towards disaster management in India. During this period, a Disaster Management Cell was established under the Ministry of Agriculture, an institutional arrangement that reflected the then-prevailing orientation towards post-disaster relief and response rather than proactive risk reduction. The subject of disaster management was treated largely as an extension of famine and drought relief, with limited attention to prevention, mitigation or systemic preparedness.

2.2.2 The decade, however, was punctuated by a series of devastating disasters, including the Latur Earthquake of 1993, the Malpa Landslide of 1998 and the Odisha Super Cyclone of 1999, each of which exposed critical deficiencies in the country's preparedness, response capacity and institutional coordination. These events underscored the inadequacy of the existing relief-centric approach and highlighted the urgent need for a paradigm shift. Recognising the gravity of these shortcomings, the Government of India constituted a High Powered Committee in August 1999

under the chairmanship of Shri J.C. Pant, former Union Agriculture Secretary to comprehensively review existing disaster management arrangements and recommend reforms.

2.2.3 The report of the High Powered Committee, submitted in 2001, was a watershed document in the history of disaster management in India. It underscored the imperative for a holistic and multi-dimensional approach, advocating a decisive shift towards preparedness, mitigation, institutional strengthening and community participation. This Committee recommended the creation of dedicated institutional mechanisms at the national, state and district levels, the enactment of appropriate legislation and the mainstreaming of disaster risk reduction into development planning.

2.2.4 Subsequent catastrophic events, most notably the Gujarat Earthquake of 2001 and the Indian Ocean Tsunami of 2004, further reinforced the urgency of establishing a robust, legally mandated and institutionally anchored framework. The Gujarat Earthquake, which claimed over twenty thousand lives and caused unprecedented destruction, exposed the vulnerability of critical infrastructure and the absence of enforceable building codes and land-use regulations. The Indian Ocean Tsunami, which devastated coastal communities across multiple countries, highlighted the critical importance of early warning systems and regional cooperation. These cumulative experiences provided both the impetus and the political will for the enactment of comprehensive disaster management legislation.

2.2.5 This process culminated in the passage of the Disaster Management Act, 2005, which represented a paradigm shift in India's approach. The legislative framework decisively moved the focus from post-disaster relief and rehabilitation towards a comprehensive cycle of prevention, mitigation, preparedness, response and resilience building, setting the stage for the modern disaster management architecture in the country.

2.3 The Disaster Management Act, 2005

2.3.1 The Disaster Management Act, 2005 constitutes the principal legislative instrument governing disaster management in India. It provides the statutory foundation for a comprehensive legal and institutional framework operating across the national, state and district levels. The Act encompasses the entire disaster management continuum, from prevention, mitigation and preparedness through response, relief, rehabilitation and reconstruction, and establishes the legal authority, institutional structures and coordination mechanisms necessary for their effective implementation.

2.3.2 A central feature of the Act is the establishment of a three-tier institutional structure for disaster management. At the apex, the Act provides for the constitution of the National Disaster Management Authority (NDMA), chaired by the Prime Minister, as the apex body for laying down policies, plans and guidelines for disaster management. At the state level, State Disaster Management Authorities (SDMAs), chaired by the respective Chief Ministers are mandated to coordinate disaster management activities within each state. At the district level, District Disaster Management Authorities (DDMAs), co-chaired by the District Magistrate and the elected representative of the local authority, are established to ensure local-level planning, coordination and implementation. The institutional roles and functions of each of these bodies are discussed in greater detail in subsequent sections of this chapter.

2.3.3 The Act further provides for the constitution of specialised bodies and forces. The National Disaster Response Force (NDRF) is established as a dedicated, multi-disciplinary force for specialised disaster response, capable of deployment across the country at short notice. The National Institute of Disaster Management (NIDM) is designated as the premier institution for training, research, documentation and capacity development in disaster management. The Act also provides for the creation of advisory committees and the engagement of experts and consultants as may be necessary.

2.3.4 A statutory mandate for the preparation of disaster management plans at all levels, including the national, state, district and departmental levels, is a key provision of the Act. These plans are required to identify hazards and vulnerabilities, delineate response mechanisms, allocate roles and responsibilities and ensure seamless coordination among diverse stakeholders. The plans are to be reviewed and updated periodically to reflect changing risk profiles and evolving capacities.

2.3.5 It provides for the establishment of dedicated financial mechanisms in the form of the National Disaster Response Fund, the State Disaster Response Funds, the National Disaster Mitigation Fund and the State Disaster Mitigation Funds. These funds are intended to ensure the availability of financial resources for timely and effective disaster response, relief, rehabilitation and mitigation activities. The Act specifies the purposes for which these funds may be utilised and the mechanisms for their administration.

2.3.6 The legislation vests authorities at all levels with wide-ranging powers during disaster situations. These include the power to requisition resources, issue binding directions to any officer or authority, coordinate multi-agency response efforts, direct the release of funds and take such other measures as may be necessary for effective disaster management. The Act prescribes minimum standards of relief to ensure the dignity, well-being and basic needs of affected populations. It also includes provisions for capacity building, public awareness, community participation and the integration of disaster risk reduction into development planning as a central objective.

2.3.7 The Act further provides for penalties for obstruction of rescue and relief operations, false claims and misappropriation of funds, thereby establishing a framework of accountability. Importantly, the Act grants overriding effect to its provisions over other laws to the extent of any inconsistency, ensuring that disaster management imperatives prevail in times of crisis.

2.4 The Disaster Management (Amendment) Act, 2025

2.4.1 The Disaster Management (Amendment) Act, 2025 represents a significant legislative advancement aimed at modernising the disaster management framework and addressing challenges that have emerged since the enactment of the principal Act. These challenges arise principally from rapid urbanisation, the increasing frequency and severity of climate-related disasters, technological transformation and the lessons learned from disaster response operations over the preceding two decades from disaster events ranging from the Uttarakhand flash floods of 2013 and the Chennai floods of 2015, to the Kerala floods of 2018 and 2019 and multiple severe cyclone events along India's coastline.

Urban Disaster Management Authorities

2.4.2 One of the most consequential provisions of the amendment is the introduction of Urban Disaster Management Authorities (UDMAs) in state capitals and cities with Municipal Corporations. Recognising the unique and intensifying vulnerabilities of urban environments, including urban flooding, heatwaves, building collapses, infrastructure stress, chemical and industrial hazards and the challenges posed by high population density, the amendment mandates the creation of dedicated urban authorities. These Urban Disaster Management Authorities are tasked with preparing city-specific disaster management plans, conducting urban risk assessments, coordinating response mechanisms within municipal limits and ensuring that urban development processes integrate disaster risk considerations. This provision addresses a gap in the institutional architecture, which had hitherto lacked dedicated mechanisms for managing the distinct and complex risks faced by India's rapidly growing urban centres.

National Disaster Database

2.4.3 The amendment also mandates the creation of a National Disaster Database, designed to function as a centralised, integrated repository of risk assessments, hazard maps, mitigation plans, response data and real-time disaster information. This database is intended to strengthen evidence-based decision-making, facilitate resource optimisation, improve inter-agency coordination and enable longitudinal analysis of disaster trends and response effectiveness. **The Committee notes that this database, to fulfill its statutory purpose, must be systematically populated with geospatial products from the National Remote Sensing Centre (NRSC), flood forecasting data from the Central Water Commission (CWC), hazard zonation maps from the Geological Survey of India (GSI), meteorological data from the India Meteorological Department (IMD) and avalanche forecasts from the Defence Geoinformatics Research Establishment (DGRE).**

Technology and Artificial Intelligence Mandate

2.4.4 A further significant provision of the amendment is the promotion of advanced technologies for disaster management. The use of Artificial Intelligence, Machine Learning, geospatial technologies and data analytics has been encouraged, particularly for weather forecasting, flood modelling, cyclone tracking, damage assessment and early warning dissemination. Programmes such as Mission Mausam launched by the Ministry of Earth Sciences under the aegis of India Meteorological Department (IMD) exemplify this technology-forward approach, aiming to enhance forecasting accuracy, extend lead times for warnings and improve the granularity of hazard information available to decision-makers and communities. **The Committee notes that while the legislative mandate is commendable, its operationalisation requires sustained investment in scientific infrastructure, inter-agency data-sharing protocols and the technological capacity of sub-national authorities to receive, process and act upon AI-assisted forecasts.**

Financial Governance Enhancements

2.4.5 The amendment further strengthens the institutional and financial architecture by granting statutory status to the High-Level Committee, which is responsible for approving the release of financial assistance from disaster response and mitigation funds in the wake of

disasters. Previously functioning on an administrative basis, the formalisation of the High-Level Committee through legislation enhances transparency, accountability and procedural rigour in the allocation of disaster-related financial resources. The amendment also formalises the role and mandate of Inter-Ministerial Central Teams, which are deployed for on-the-ground damage and needs assessment during major disasters, thereby standardising the process of assessment and ensuring that financial assistance is calibrated to actual requirements.

2.5 State-Level Legislative Initiatives

2.5.1 Prior to the enactment of the Disaster Management Act, 2005, certain states, compelled by the severity of disasters they had experienced, had already undertaken pioneering initiatives to establish legal and institutional frameworks for disaster management at the state level. These initiatives merit mention as they laid important groundwork for the development of the national framework and demonstrated the feasibility and necessity of dedicated disaster management legislation.

2.5.2 The State of Gujarat enacted the Gujarat State Disaster Management Act, 2003 in the wake of the devastating Bhuj Earthquake of 2001. This legislation adopted a comprehensive approach encompassing prevention, mitigation, preparedness, response and recovery. It clearly delineated the roles and responsibilities of various government departments and stakeholders, established mechanisms for resource mobilisation and coordination, and provided for the creation of institutional structures at the state and district levels. The Gujarat Act served as an important reference point during the formulation of the national legislation.

2.5.3 Similarly, the State of Odisha, following the catastrophic Super Cyclone of 1999 which claimed around ten thousand lives, established the Odisha State Disaster Mitigation Authority in 1999. This Authority was entrusted with responsibilities spanning disaster mitigation, preparedness, relief and reconstruction, as well as coordination with government departments, international development agencies and non-governmental organisations. Odisha subsequently formulated a comprehensive State Disaster Management Policy in 2005, further institutionalising its approach. The Odisha experience, particularly its subsequent success in dramatically reducing cyclone-related mortality through improved preparedness and early warning systems, has been widely recognised as a model of effective state-level disaster management.

2.5.4 These state-level initiatives demonstrated that dedicated legislation and institutional mechanisms could significantly enhance disaster management outcomes. They provided valuable lessons and precedents that informed the design and provisions of the Disaster Management Act, 2005 and the broader national framework.

2.6 National Policy on Disaster Management, 2009

2.6.1 The National Policy on Disaster Management, approved by the Government in 2009, provides the framework covering all aspects of disaster management including institutional, legal, financial and coordination mechanisms at the national, state and district levels. Its stated vision is to build a safe and disaster-resilient India by developing a holistic, proactive, multi-disaster and technology-driven strategy through a culture of prevention, mitigation, preparedness and response.

2.6.2 The policy articulates several foundational principles that guide India's approach to disaster management. First, it emphasises a community-based approach, recognising that communities are invariably the first responders during any disaster and that their capacities, knowledge and participation are central to effective disaster management at every stage. The policy accordingly prioritises community mobilisation, local ownership and last-mile connectivity in all disaster management activities.

2.6.3 Second, the policy underscores the imperative of mainstreaming disaster risk reduction into development planning and practice. It recognises that disasters adversely affect the poor and marginalized most and that development processes that do not account for disaster risks can inadvertently increase vulnerability. The policy therefore mandates that all development programmes, infrastructure projects and sectoral plans incorporate disaster risk assessments and resilience measures.

2.6.4 Third, capacity development across all levels, from Central and State government institutions and urban local bodies to Panchayati Raj institutions, communities, civil society organisations and the private sector, is identified as a key priority. The policy calls for sustained investment in training, education, research, awareness generation and institutional strengthening to build a competent and responsive disaster management ecosystem.

2.6.5 Fourth, the policy also emphasises multi-sectoral synergy and convergence, recognising that effective disaster management requires coordinated action across a wide range of government departments, agencies and stakeholders. It promotes cooperation with national and international scientific, technical and humanitarian organisations and encourages the leveraging of traditional knowledge alongside modern science and technology. In this context, the Policy's emphasis on 'technology-driven strategy' implicitly encompasses the roles of IMD, CWC, GSI, DGRE and NRSC whose technical outputs are foundational to any modern, evidence-based disaster management system.

2.6.6 The National Policy on Disaster Management serves as the guiding framework for the formulation, coordination and implementation of disaster management programmes, strategies and initiatives across the country. It provides the policy basis upon which the National Disaster Management Plan (NDMP), NDMA guidelines and state and district-level plans are formulated.

Recommendation/Observation

2.6.7 The Committee notes that while the National Policy on Disaster Management was enacted in 2009, the landscape of disaster risk has changed substantially since then, with climate change accelerating the frequency and intensity of extreme weather events, rapid urbanisation creating new risk concentrations, and technological advances offering new capabilities for preparedness and response. The Committee recommends that the Ministry of Home Affairs should initiate a formal review of the National Policy on Disaster Management, 2009, with the objective of updating it to reflect post-2009 developments. It may include study analysis of climate change impacts, urbanisation risks, the role of AI and geospatial technology for weather forecasting, cyclone tracking, damage assessment, early warning dissemination, etc. and the lessons learnt from major disaster events since 2009. This review exercise should also involve extensive consultations with all the States

and Union Territories, scientific agencies and civil society for a holistic approach towards disaster management.

2.7 National Disaster Management Plan

2.7.1 The National Disaster Management Plan, first published in 2016 and subsequently revised in 2019, is the operational instrument that translates the objectives of the Disaster Management Act and the National Policy into actionable strategies, roles and responsibilities. India was among the first countries to align its national disaster management plan with the Sendai Framework for Disaster Risk Reduction (2015-2030), reflecting its commitment to global coherence in disaster risk reduction. The revised Plan is further aligned with the Sustainable Development Goals and the Paris Agreement on Climate Change, an alignment ensuring that disaster risk reduction, climate change adaptation and sustainable development are pursued in a coherent and mutually reinforcing manner.

2.7.2 The Plan provides a comprehensive framework covering all phases of disaster management, including prevention and mitigation, preparedness, response, recovery and reconstruction. It systematically defines the roles and responsibilities of each Central Ministry, Department and agency in the context of various types of disasters, ensuring clarity in the chain of command and coordination both during normal times and during disaster situations. Corresponding responsibilities are also outlined for state and district-level authorities, ensuring vertical integration of disaster management functions.

2.7.3 The Plan adopts a multi-hazard approach and addresses a wide range of natural and man-made disasters, including earthquakes, floods, cyclones, droughts, landslides, tsunamis, chemical and industrial disasters, nuclear and radiological emergencies and biological disasters. For each hazard, the Plan outlines risk assessment methodologies, prevention and mitigation strategies, preparedness measures, response protocols and recovery and reconstruction guidelines.

2.7.4 The Plan also emphasises the importance of risk assessment and risk mapping, early warning systems, resilient infrastructure development, community-based disaster management, capacity building and the use of technology and innovation. It provides for the conduct of regular mock drills, the maintenance of resource inventories and the development of standard operating procedures at all levels. The National Disaster Management Plan is a living document, subject to periodic review and updation to reflect evolving risk profiles, emerging challenges and lessons learned from disaster events.

Recommendation/Observation

2.7.5 The Committee notes that the revised National Disaster Management Plan (NDMP) was published in 2019. After the enactment of the DM Amendment Act, 2025, the operationalisation of the National Disaster Mitigation Fund (NDMF), recommendations of the Sixteenth Finance Commission with regard to disaster management and the significant evolution of AI-assisted forecasting capabilities since 2019, there is a need to expedite the further revision of NDMP to align it with the current legal and institutional context.

2.8 Guidelines Issued by the National Disaster Management Authority

2.8.1 The National Disaster Management Authority, in exercise of its mandate under the Disaster Management Act, 2005, has issued a series of detailed guidelines covering various aspects of disaster management. These guidelines serve as authoritative reference documents for Central ministries, State Governments, district authorities and other stakeholders and provide technical and operational guidance on specific hazards, thematic areas and cross-cutting concerns.

2.8.2 Hazard-specific guidelines have been issued for a wide range of disasters, including the management of earthquakes, floods, cyclones, landslides, tsunamis, urban floods, chemical disasters, nuclear and radiological emergencies, biological disasters and drought. Each set of guidelines outlines the hazard profile, vulnerability assessment, prevention and mitigation measures, preparedness requirements, response protocols and recovery strategies relevant to the specific disaster type.

2.8.3 In addition to hazard-specific guidelines, the NDMA has issued guidelines on thematic and cross-cutting subjects such as the Incident Response System, which provides a standardised framework for organising and coordinating disaster response operations; the management of dead bodies during disasters; psycho-social support and mental health services for disaster-affected populations; hospital safety; school safety; community-based disaster risk reduction; the role of Non-Governmental Organisations in disaster management; and minimum standards of relief.

Table 2.1 - List of Guidelines issued by NDMA:

Sl. No.	National Disaster Management Guidelines	Month & Year
1	Management of Earthquakes	April 2007
2	Management of Chemical (Industrial) Disasters	April 2007
3	Preparation of State Disaster Management Plans	July 2007
4	Management of Medical Preparedness and Mass Casualty Management	October 2007
5	Management of Floods	January 2008
6	Management of Cyclones	April 2008
7	Management of Biological Disasters	July 2008
8	Management of Nuclear and Radiological Emergencies	February 2009
9	Management of Landslides and Snow Avalanches	June 2009
10	Management of Chemical (Terrorism) Disaster	June 2009
11	Psycho-social support and mental health services in disasters	December 2009
12	Incident Response System	July 2010
13	Management of Tsunamis	August 2010
14	Management of the Dead in the aftermath of Disasters	August 2010
15	Management of Urban Flooding	September 2010
16	Management of Drought	September 2010
17	National Disaster Management Information and Communication System	February 2012
18	Scaling, Type of Equipment and Training of Fire Services	April 2012

Sl. No.	National Disaster Management Guidelines	Month & Year
19	Seismic Retrofitting of Deficient Buildings and Structures	June 2014
20	School Safety Policy	February 2016
21	Hospital Safety	February 2016
22	Minimum Standards of Relief	February 2016
23	Museums	May 2017
24	Cultural Heritage Sites and Precincts	September 2017
25	Boat Safety	September 2017
26	Preparation of Action Plan – Prevention and Management of Thunderstorm, Lightning, Squall, Dust, Hailstorm and Strong Wind	March 2019
27	Temporary Shelters for Disaster-Affected Families	September 2019
28	Disability Inclusive Disaster Risk Reduction	September 2019
29	Landslide Risk Management Strategy	September 2019
30	Action Plan – Prevention and Management of Heat Wave (Revised Guidelines)	October 2019
31	Management of Glacial Lake Outburst Floods (GLOFs)	October 2020
32	Simplified Guideline for Earthquake Safety of Buildings from National Building Code of India 2016	May 2021
33	Cool Roof: House Owners' Guide to Alternate Roof Cooling Solutions	May 2021
34	National Guidelines for Preparation of Action Plan – Prevention and Management of Cold Wave and Frost	October 2021
35	Updated National Guidelines for Mental Health and Psychosocial Support Services in Disasters - 2023	December 2023
36	National Guidelines on Community-Based Disaster Risk Reduction (CBDRR)	October 2024
37	National Guidelines For Establishment and Operations of Emergency Operations Center (EOC)	October 2024
38	National Guidelines on Disaster Management Exercises (DMEx)	October 2024
39	National Guidelines on International Humanitarian Assistance and Disaster Relief (HADR)	October 2024
40	Comprehensive Disaster Victim Identification and Management	January 2026

2.8.4 These guidelines draw upon national and international best practices, scientific research and the lessons learned from past disaster events. They are formulated through a consultative process involving experts, practitioners, government agencies and other stakeholders. Compliance with these guidelines is expected of all agencies and authorities involved in disaster management, and they form an integral part of the planning and operational framework at all levels.

2.9 Ten-Point Agenda on Disaster Risk Reduction

2.9.1 The Ten-Point Agenda on Disaster Risk Reduction was enunciated by the Hon'ble Prime Minister during the Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR)

organised by India in New Delhi in November 2016 in collaboration with the United Nations Office for Disaster Risk Reduction(UNDRR). The agenda presents a holistic, inclusive and forward-looking approach to disaster risk reduction, addressing a wide range of issues from community preparedness and women's empowerment to the use of technology, education, research and international cooperation.

The ten-point agenda on DRR is as under:

1. All development sectors must imbibe the principles of disaster risk management.
2. Risk coverage must include all, starting from poor households to SMEs to multi-national corporations to nation states.
3. Women's leadership and greater involvement should be central to disaster risk management.
4. Invest in risk mapping globally to improve global understanding of nature and disaster risks.
5. Leverage technology to enhance the efficiency of disaster risk management efforts.
6. Develop a network of universities to work on disaster-related issues.
7. Utilise the opportunities provided by social media and mobile technologies for disaster risk reduction.
8. Build on local capacity and initiative to enhance disaster risk reduction.
9. Make use of every opportunity to learn from disasters and, to achieve that, there must be studies on the lessons after every disaster.
10. Bring about greater cohesion in international response to disasters.

2.9.2 The Ten-Point Agenda provides practical guidance and added impetus to the implementation of the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030 adopted by 187 countries. Each of the ten points is aligned with one or more priorities for action of the Sendai Framework, thereby ensuring coherence between India's national strategy and global commitments. Importantly, the agenda is not directed solely at disaster management agencies but requires action by all parts of the Government at all levels, as well as by the private sector, civil society, academic institutions and communities. It recognises that disaster risk reduction is not the responsibility of any single agency but is a shared, whole-of-government and whole-of-society endeavour.

2.9.3 Since the enunciation of the Ten-Point Agenda, the Government has taken a number of concrete steps towards its implementation across various sectors and levels of governance. The details of the progress achieved and the specific initiatives undertaken in pursuance of the ten points are discussed in the Chapter on Disaster Risk Reduction in this report.

2.10 Contingency Planning and Preparedness Framework

2.10.1 Contingency planning constitutes a critical pillar of disaster preparedness and is explicitly mandated under the Disaster Management Act, 2005. The Act requires the preparation of disaster management plans at the national, state, district and departmental levels, ensuring a layered and comprehensive state of readiness across the governance architecture.

2.10.2 Effective contingency planning involves the systematic identification and assessment of hazards and vulnerabilities, the mapping and inventorying of available human, material and

financial resources, the clear delineation of roles and responsibilities among agencies and functionaries, the formulation of scenario-specific response strategies and the development and issuance of standard operating procedures for activation, communication and coordination during emergencies. Plans are also required to incorporate provisions for the evacuation and sheltering of affected populations, the maintenance and pre-positioning of essential supplies, the establishment of communication networks and the coordination of multi-agency operations.

2.10.3 The conduct of regular mock drills and simulation exercises forms an essential component of contingency planning. These exercises serve to test the adequacy and effectiveness of plans, identify gaps and weaknesses, build institutional familiarity with roles and procedures and enhance coordination among participating agencies. Mock drills are conducted at the national, state and district levels, often involving participation by communities, schools, hospitals and critical infrastructure operators.

2.10.4 Significant progress has been achieved in the preparation and periodic updation of disaster management plans across states and districts. The National Disaster Management Authority and the National Institute of Disaster Management have provided technical guidance and capacity building support to state and district authorities in the formulation and review of these plans.

Recommendation/Observation

2.10.5 The Committee notes that the quality and comprehensiveness of plans varies significantly across states and districts and that there remains scope for further strengthening, particularly in terms of operationalisation, regular updation and integration of emerging risks such as those arising from climate change, urbanisation and technological hazards. The Committee, therefore, recommends that NDMA should develop a standardized template and benchmarking framework for disaster management plans to ensure uniformity in quality across all states and districts. All plans may be reviewed and updated at least once every two years, incorporating the latest hazard assessments and emerging risks arising from climate change, urbanisation and technological hazards. Compliance in this regard may be monitored by NDMA to ensure accountability and timely updation across all levels.

2.10.6 The Committee also recommends that the frequency of mock drills and simulation exercises be significantly enhanced, with at least two multi-agency drills conducted annually at the state and district levels. A structured post-drill evaluation mechanism may also be initiated at all levels to systematically identify gaps and ensure that corrective actions are undertaken within a defined timeline.

2.11 Institutional Framework for Disaster Management

2.11.1 Disaster management in India is operationalised through a multi-tier, multi-stakeholder institutional framework designed to ensure coherent planning, effective coordination and responsive implementation from the national level down to the grassroots. The institutional architecture established under the Disaster Management Act, 2005, as amended, comprises apex policy-making bodies, executive committees, specialised response forces, training and research institutions and coordination mechanisms at each level of governance.

National Level Institutions

National Disaster Management Authority (NDMA)

2.11.2 The National Disaster Management Authority (NDMA), chaired by the Prime Minister, is the apex body for disaster management in the country. Its mandate includes the laying down of policies on disaster management, the approval of the National Disaster Management Plan (NDMP), the issuance of guidelines to be followed by Central ministries, State authorities and other agencies, the recommendation of provision of funds for mitigation purposes and the coordination of enforcement and implementation of policies and plans. The Authority is empowered to take such measures as it considers necessary for the prevention, mitigation and preparedness for disasters. The NDMA is supported by members appointed by the Government, who bring domain expertise across relevant disciplines.

National Crisis Management Committee (NCMC)

2.11.3 At the Centre, under the Chairmanship of the Cabinet Secretary, the NCMC is the nodal body to deal with severe disasters, which have serious or national ramifications. It oversees the command, control and coordination during severe disasters. It gives directions to the Central and State Administrations concerned for specific actions to face the crisis situation, as deemed necessary. The NCMC has now been given statutory status through a Notification dated 23rd July, 2025 issued under the Disaster Management (Amendment) Act, 2025.

National Executive Committee (NEC)

2.11.4 The National Executive Committee is constituted under Section 8(2) of the DM Act, 2005 to assist the National Authority with Home Secretary as its Chairperson, ex-officio and Secretaries of different Ministries concerned, including the Chief of Integrated Defence Staff of the Chiefs of Staff Committee as ex-officio Members. It has the responsibility to act as the coordinating and monitoring body for disaster management and to assist the National Authority in the discharge of its functions. It prepares the National Plan and oversees the implementation of measures for prevention, mitigation and preparedness. The Committee also coordinates response in the event of any threatening disaster situation or disaster and provides information to the NDMA about disaster situations.

Capacity Building and Training Institutions / Mechanisms at National Level

2.11.5 The Government of India plays a pivotal role in strengthening India's disaster management capabilities through its extensive capacity building and training initiatives. For this purpose, the Government has established various institutions at national level like NIDM, NDRF Academy, NFSC etc. for imparting training and developing the capacities of diverse range of the stakeholders including Central, State and district officials, disaster management professionals, Public Sector Undertakings, academicians and researchers etc.

2.11.6 NDRF provides structured training to SDRFs, Civil Defence, Home Guards and Fire Services, Para-Military Forces and volunteers. Similar training institutes are established at the State level for training of local officials in the States. NDRF also conducts community capacity building and public awareness programmes, mock drills, school safety programmes and hands-

on training to empower local communities. NDRF's e-content for training in English, Hindi on disaster management is available on the iGOT portal, and 11 other regional languages on the NDRF webpage.

2.11.7 The 12 modules of Civil Defence training have also been uploaded on the iGOT platform. Besides this, the Knowledge Vertical for India Universities and Institutions Network for Disaster Risk Reduction (IUIIN-DRR) are available at the URL <https://iuiin-drr.nidm.gov.in/Vertical/Index>.

2.11.8 A specific provision of funds to the tune of ₹ 6846 crore for 2021-22 to 2025-26 has been made under the Preparedness and Capacity Building Window of NDRF. Similar funding provision for ₹ 16015 crore has also been made under SDRF for the same period.

National Institute of Disaster Management (NIDM)

2.11.9 National Institute of Disaster Management (NIDM) was constituted on 30.10.2006 under the Disaster Management Act, 2005. It was re-designated from the National Centre for Disaster Management housed in Indian Institute of Public Administration on 16th October, 2003. NIDM is steadily marching towards the mission of making a disaster resilient India by developing and promoting a culture of prevention and preparedness at all levels. The institute has two campuses, one is located in Rohini, Delhi and other is the Southern campus located in Andhra Pradesh. NIDM has been entrusted with the nodal responsibility for human resource development, capacity building including training, education, research, documentation and policy planning in the field of disaster management. During the last 5 years, NIDM has conducted 378 face to face training programmes. Further, NIDM is a dedicated institute which imparts training to a diverse range of stakeholders through varied delivery modes to maximize reach and accessibility which include:

- (i) Face-to-Face Training Programs
- (ii) Webinars/Online Training Programs
- (iii) Training Modules
- (iv) Consultations/Workshops
- (v) IGOT (Disaster Management Courses have been made available on iGOT portal <https://igotkarmayogi.gov.in>).

National Fire Service College (NFSC)

2.11.10 The Officers of the Fire service are trained in the National Fire Service College, Nagpur. The college also imparts graduate courses. The College also provides trainings on Fire Ground Operations, Paramedics and real life situation for Disaster Management. The College has a panel of guest faculties from the Senior Fire Engineers/Officers of various Public and Private Sector Undertaking, State Governments, Municipal Corporations, Fire Brigades, Port Trusts, Airport Authority to impart comprehensive training on various aspects of Fire Prevention and Fire Protection. During the last year, 3589 in service fire personnel and engineering students from all over India were imparted professional training. Since inception, the college has trained 27965 trainees.

2.11.11 A Scheme for Up-gradation of the National Fire Service College, Nagpur was launched in June, 2010 and was completed at a total cost of ₹ 235.99 Crore. The overall objective of the scheme is to enhance the capacity of the college to meet the requirements of specialized professional training in all aspects namely fire prevention, fire protection and firefighting, rescue, specialized emergency response in the event of disaster and also to cater to research documentation and consultancy requirements in the field.

NDRF Academy – Nagpur

2.11.12 The Government of India has established a premier institute, the NDRF Academy at Nagpur, by merging the erstwhile National Civil Defence College (NCDC), to impart specialized training to NDRF personnel and other stakeholders. The Academy aims to train NDRF and SDRF personnel, Civil Defence and Home Guard volunteers and officials and other stakeholders including disaster response personnel of SAARC and other countries. It is designed to train approximately 5,000 response personnel through 120 courses annually.

2.11.13 Training of personnel engaged in rescue operations is a continuous process. NDRF personnel are regularly trained for upgrading their skills to effectively respond to all types of disasters, both natural and manmade, including Chemical, Biological, Radiological and Nuclear (CBRN) emergencies. Personnel are also nominated to participate in various international training courses, seminars and workshops aimed at updating their skills on global best practices, sophisticated equipment and techniques in disaster management.

2.11.14 Further, NDRF is actively engaged in Community Capacity Building and Public Awareness and Preparedness Programmes for the State Disaster Response Force (SDRF), State Police, Home Guards, Civil Defence, Fire Services, National Cadet Corps (NCC), Non-Governmental Organisations (NGOs), Nehru Yuva Kendra Sangathan (NYKS), students, volunteers and other stakeholders.

Directorate General of Civil Defence (DGCD)

2.11.15 DGCD was established in 1962 with its headquarters at New Delhi to handle all policy and planning matters related to Civil Defence, Home Guards and Fire Services including the functioning of National Fire Service College, Nagpur. The post of Director General, Civil Defence has since been re-designated as Director General (Fire Service, Civil Defence and Home Guards).

Civil Defence

2.11.16 Civil Defence includes any measures not amounting to actual combat, for affording protection to any person, property, place or thing in India or any part of the territory thereof against any hostile attack whether from air, land, sea or other places or for depriving/mitigating the effect of any such attack whether such measures are taken before, during or after the time of such attack. It also includes measures taken for disaster management.

2.11.17 Civil Defence (CD) is primarily organised on voluntary basis, except for a small nucleus of paid staff and establishment, which is augmented during emergencies. At present, total 244 Districts are categorized as Civil Defence Districts in the country.

2.11.18 The Central Government is responsible for formulating Civil Defence policy in the country and in administering the Civil Defence Act, 1968. To help the State Governments, the Central Government reimburses 50% of the expenditure as per prescribed rates, incurred by the State Governments in the form of grants-in-aid on the authorized items for raising, training and equipping of Civil Defence Services for North- Eastern States excluding Assam and 25% for other States, including Assam.

2.11.19 During its meeting with the representatives of MHA, the Committee was informed about Operation Abhyaas. In the aftermath of the Pahalgam Terrorist Attack, the Civil Defence Mock Exercise “Operation Abhyaas” was conducted on 07.05.2025 under Section 19 of the Civil Defence Rules, 1968 to augment the civil defence preparedness of the civil administration. The exercise was conducted in 400 districts including the 244 categorized Civil Defence Districts and 156 non-categorized districts across the country. Twenty-three Lakhs Warden/Volunteers & others stakeholders participated in exercise. During the exercise, air raid early warning circuits with Indian Air Force were taken and complete blackout measures were undertaken.

Fire Services

2.11.20 Ministry of Home Affairs through DG (FS, CD & HG) plays an advisory role in the matters related to fire services apart from providing financial assistance to States from time to time to upgrade fire services. In order to facilitate enactment of Fire Service Act and Rules in the States and UTs, the Ministry had prepared and circulated a “Model Bill for the Maintenance of a Fire Force for the state in 1958”. However, with the passage of time, the role of fire services has changed to broaden its ambit with emphasis on the functions like fire prevention, fire protection, fire safety awareness among the community, training of fire personnel to bridge the gap with latest available technologies, etc. Therefore, based on the extensive consultation with the stakeholders, a revised Model Bill on Maintenance of Fire and Emergency Services was prepared and was circulated to the States/ UTs on 16.09.2019 for framing/ updating their fire and emergency service Act / Rules as per their requirement. So far, 10 States have adopted the Model Bill.

Recommendation/Observation

2.11.21 The Committee takes note of the fact that a revised Model Bill on Maintenance of Fire and Emergency Services was prepared and was circulated to the States/ UTs in September, 2019 for framing/ updating their fire and emergency service Act / Rules as per their requirement, however, so far, only 10 States have adopted the Model Bill. The Committee observes that controlling and managing fire incidents especially in urban sectors sometimes become very difficult due to congested urban planning, a small fire incident and human negligence is capable of triggering a massive fire breakout and could result in huge losses of property and lives. The Committee, therefore, recommends that MHA may take proactive steps to persuade and support the remaining States and Union Territories to adopt or suitably align their existing fire services legislation with the revised Model Bill within a defined timeframe. The Committee also recommends that a time-bound monitoring and review mechanism may be established to track progress in adoption, identify bottlenecks and provide necessary technical guidance so as to ensure a

more modern, uniform and effective fire and emergency services framework across the country.

State Level Institutions

State Disaster Management Authorities (SDMA)

2.11.22 The DM Act, 2005 provides for constitution of SDMAs in all the states and UTs. All the 36 states/UTs have constituted SDMAs under the DM Act, 2005. SDMA is chaired by the Chief Minister and can have upto 8 members.

State Executive Committees (SEC)

2.11.23 The Act envisages establishment of State Executive Committee (SEC) under Section 20 of the Act, to be headed by Chief Secretary of the State Government with four other Secretaries of such departments as the State Government may think fit and the Director General of Police (DGP). It has the responsibility for implementing the National Plan and State Plan and act as the coordinating and monitoring body for management of disasters in the State.

State Disaster Response Forces (SDRF)

2.11.24 The States/UTs have also been advised to set up their own Specialist Response Force for quickly responding to disasters on the lines of National Disaster Response Force. Further, a provision has been made through an amendment in 2025 in the Disaster Management Act, 2005 enabling the State Governments to constitute the State Disaster Response Force (SDRF). As of now, 29 States/UTs have raised their SDRF. 7 States/UTs (Telangana, Goa, Delhi, Puducherry, Lakshadweep, Chandigarh & A&N Island) are yet to raise SDRF.

District Level Institutions

District Disaster Management Authority (DDMA)

2.11.25 Under the DM Act, 2005, District Disaster Management Authorities (DDMA) have been set up as planning, coordinating and implementing bodies for Disaster Management and to take all measures in the District in accordance with the guidelines laid down by the National and State Authorities. DDMA's have been constituted in all 777 districts.

Urban Disaster Management Authority (UDMA)

2.11.26 Through the Disaster Management (Amendment) Act, 2025, a provision has been made for constitution of the Urban Disaster Management Authority (UDMA) by the State Governments for their State Capitals and all cities having a Municipal Corporation (excluding NCT of Delhi and Union Territory of Chandigarh) for dealing with city specific disasters more effectively. It will address the special needs of large urban agglomerations that in many cases, span more than one district. As per information provided to the Committee, only one state, namely Karnataka has constituted UDMA for Bruhat Bengaluru Mahanagara Palike.

Recommendation/Observation

2.11.27 The Committee is of the view that the developing and promoting a culture of prevention, mitigation, preparedness and response is a pre-requisite for fulfilling mission of making the nation disaster resilient. To achieve this, setting up of Specialist Disaster Response Force is very crucial as such force plays a significant role as first responder to any disaster in the State/UT. The Committee recommends that the Ministry of Home Affairs should issue advisories to seven remaining States/UTs (Telangana, Goa, Delhi, Puducherry, Lakshadweep, Chandigarh and Andaman & Nicobar Islands) to raise their Specialist Response Force for swiftly responding in case of any disaster.

2.11.28 The Committee notes that despite the provision made under the Disaster Management (Amendment) Act, 2025, only one State has so far constituted UDMA. The Committee recommends that MHA should issue advisories to all State Governments to constitute UDMAs for their respective State Capitals and Municipal Corporation cities within a defined timeframe. NDMA should also provide necessary technical guidance and a standardized framework to States for the effective operationalisation of UDMAs, and a periodic compliance monitoring mechanism should be established to track progress across the country.

2.12 Designation of Nodal Ministries and Departments for Disaster Management

2.12.1 A significant step towards recalibrating and strengthening the institutional framework for disaster management was taken by the Ministry of Home Affairs through a notification dated 22nd September 2025. The notification formally designates specific Central Ministries and Departments as nodal agencies for various categories of disasters. The designated Ministries and Departments are assigned the responsibility of monitoring, early warning, prevention, mitigation, preparedness and capacity building with regard to disasters arising from the hazards specified against each, in collaboration with other related agencies or stakeholders in accordance with Section 36 of the Disaster Management Act, 2005.

2.12.2 This notification represents a structural shift in the disaster management framework at the national level, moving from a predominantly centralised model, in which the Disaster Management Division of the Ministry of Home Affairs functioned as the central authority for policy formulation, coordination and monitoring, to a distributed and specialised structure in which clear mandates are assigned to Ministries and Departments possessing the relevant domain expertise, technical capacity and operational infrastructure. While the Ministry of Home Affairs continues to exercise its overarching coordinating role, the notification ensures that hazard-specific responsibilities are anchored within the ministries best equipped to discharge them. The complete assignment of nodal responsibilities, as notified, is set out in the table below.

Table 2.2: Designation of Nodal Ministries/Departments for Disaster Management*

S. No.	Disaster	Nodal Ministry/Department
1	(a) Avalanche (b) Oil Spills	Ministry of Defence

S. No.	Disaster	Nodal Ministry/Department
2	Biological Disasters	Ministry of Health and Family Welfare
3	(a) Cold Wave (b) Cyclone or Tornado (c) Earthquake (d) Heat Wave (e) Lightning (f) Tsunami (g) Hail Storms (h) Heavy Rainfall	Ministry of Earth Sciences (<i>For early warning only</i>)
4	(a) Frost & Cold Wave (b) Drought (c) Hailstorm (d) Pest Attack	Ministry of Agriculture and Farmers Welfare
5	(a) Floods (b) Glacial Lake Outburst Flood	Ministry of Jal Shakti
6	Floods – Urban (<i>excluding early warning</i>)	Ministry of Housing and Urban Affairs
7	(a) Forest Fire (b) Industrial & Chemical Disasters	Ministry of Environment, Forest and Climate Change
8	Landslides	Ministry of Mines
9	Nuclear & Radiological Emergencies	Department of Atomic Energy

**Ministry of Home Affairs, Gazette Notification dated 22.09.2025*

Recommendation/Observation

2.12.3 The Committee notes that the notification dated 22nd September 2025 represent a landmark development in the evolution of India's disaster management institutional framework. The formal designation of nodal ministries for specific categories of disasters, with mandates spanning the entire disaster management spectrum, has the potential to significantly enhance specialisation, accountability and effectiveness in disaster prevention, preparedness and response. However, the Committee also notes that many of the designated ministries have historically focused on their core developmental and regulatory mandates and may require significant augmentation of institutional capacity, technical expertise and human resources to effectively fulfil their expanded disaster management responsibilities. The notification must also be supported by adequate budgetary provisions for each nodal ministry and by robust inter-ministerial coordination mechanisms, particularly for hazards that involve the mandates of multiple ministries. The Committee recommends that each designated nodal ministry prepare and operationalise a hazard-specific disaster management plan within a time-bound framework. The effectiveness of the new arrangement may be reviewed after a suitable period to identify strengths, address gaps and refine the institutional arrangements in light of operational experience.

2.13 Financial Framework for Disaster Management

2.13.1 The financial framework for disaster management in India has evolved significantly over the past three decades, moving from ad hoc, post-disaster relief allocations to a structured, institutionalised and increasingly pre-disaster risk-oriented system of financing. It represents one of the most consequential dimensions of its multi-tier governance architecture. This evolution has been shaped primarily by the recommendations of successive Finance Commissions, the provisions of the Disaster Management Act, 2005, as amended, and the policy imperatives of mainstreaming disaster risk reduction into the broader fiscal architecture of the country. Now the financial framework has expanded to cover recovery, rehabilitation, mitigation and capacity building.

Historical Evolution: From Margin Money to Mitigation Funds

2.13.2 The 2nd Finance Commission introduced 'margin money' based on average decadal relief expenditure, a purely reactive mechanism. This arrangement continued through the 8th Finance Commission, which mandated a 50 per cent Union contribution and added 'fire' as a disaster to the list of compensable disasters.

2.13.3 The 9th Finance Commission created the Calamity Relief Fund (CRF) with a 75:25 Union-State split, the first dedicated relief fund, though still purely post-disaster. The 10th Finance Commission added the National Fund of Calamity Relief (NFCR), whose entire corpus was exhausted within three years.

2.13.4 The 11th Finance Commission dissolved the NFCR and created the National Calamity Contingency Fund (NCCF) with an initial corpus of ₹500 crore, recouped through a special surcharge on central taxes. The 12th Finance Commission continued the CRF and NCCF and extended the list of notified disasters to include landslides, avalanches, cloud bursts and pest attacks. The landmark structural reform came with the 13th Finance Commission: with the Disaster Management Act, 2005 already enacted, it recommended merging the CRF into State Disaster Response Funds (SDRFs) and the NCCF into the National Disaster Response Fund (NDRF), thereby aligning the financial architecture with the statutory provisions of the DM Act for the first time. The Union : State contribution ratio was fixed at 75:25 for general category States and 90:10 for special category States. Total allocation was ₹33,581 crore; allocation was still driven entirely by past expenditure.

2.13.5 The 14th Finance Commission (2015-20) enhanced the allocation to ₹61,219 crore and allowed States to use up to 10 per cent of SDRF for locally notified disasters not on the national list, the first acknowledgement that a uniform national list cannot address all sub-national risk profiles.

2.13.6 The 15th Finance Commission (2021-26) introduced the SD MF and ND MF for the first time, shifting focus from response-only to pre-disaster risk reduction and introducing a DRI incorporating hazard, exposure and vulnerability. Total allocation was ₹1,60,153 crore (SDRMF) and ₹68,463 crore (NDRMF), a 161 per cent increase over 14th Finance Commission.

The Current Fund Architecture under the 15th Finance Commission (2021-26)

2.13.7 The financing architecture, in operation from 2021-22 to 2025-26 is based on the recommendations of the 15th Finance Commission. The Commission had adopted a new

methodology for state- wise allocations of funds, which replaces the expenditure driven methodology. The new methodology is a combination of capacity (as reflected through expenditure), risk exposure (area and population) and hazard and vulnerability (risk index).

2.13.8 In a major departure from the earlier Finance Commissions, the 15th FC had recommended two funds with the nomenclature of State Disaster Risk Management Fund (SDRMF) and National Disaster Risk Management Fund (NDRMF). SDRMF will consist of two components viz. State Disaster Response Fund (SDRF) and State Disaster Mitigation Fund (SDMF) with the allocation in the proportion of 80% and 20% respectively. Similarly, NDRMF will also have two components namely National Disaster Response Fund (NDRF) and National Disaster Mitigation Fund (NDMF) with the allocation in the same proportion of 80:20.

2.13.9 Based on the recommendations of the 15th FC, Government has made fund allocations - under SDRMF ₹ 1,60,153 Crore and under NDRMF ₹ 68,463 Crore for the period of 2021-22 to 2025-26.

2.13.10 The Commission had also recommended that, within the SDRF/NDRF allocations of 80%, there would be three sub-allocations namely, Response and Relief (40%), Recovery and Reconstruction (30%) and Preparedness and Capacity Building (10%). As such, SDRMF and NDRMF will cover the entire cycle of disaster management – prevention, preparedness, response, mitigation, recovery and reconstruction.

National Disaster Response Fund (NDRF)

2.13.11 Section 46(1) of DM Act, 2005 provides for the constitution of NDRF for meeting any threatening disaster management situation or disaster. When the available resources are inadequate in the SDRF of a State to provide relief of immediate nature, additional assistance is extended from NDRF by following the laid down procedure, which includes an assessment based on the visit of an Inter-Ministerial Central Team (IMCT) and approval by the High Level Committee (HLC), chaired by Union Home Minister. The Government has made an allocation of ₹ 54,770 crores under NDRF for the period 2021-22 to 2025-26.

2.13.12 Under the existing practice in vogue prior to 19.08.2019, IMCT used to be deputed after the receipt of Memorandum from the State Government affected by a severe disaster. This Ministry has taken a significant decision on 19.08.2019 to depute IMCT immediately in the aftermath of any natural calamity of severe nature, and before the receipt of memorandum from the State Government, which will visit the affected areas of States so as to have the first-hand assessment of the damages caused and the relief work carried out by State Administration.

State Disaster Response Fund (SDRF)

2.13.13 Section 48 (1) of Disaster Management Act, 2005 provides for constitution of State Disaster Response Fund (SDRF) by the State Governments. The Ministry of Home Affairs has issued the guidelines for the constitution and administration of SDRF and NDRF. Currently, Government has approved an allocation of ₹1,28,122.40 crore comprising of ₹98,080.80 crore as Central share and ₹30,041.60 crore as State share in the SDRF to all the States for the years 2021-22 to 2025-26. This allocation is significantly higher against the

allocation of ₹61,220 crore for the years 2015-16 to 2019-20. The Central Government contributes 75% of the SDRF allocation for general category States and 90% for North Eastern and Hill states. The financing of disaster relief has been an important aspect of federal fiscal relations.

2.13.14 NDRF now also supports Recovery & Reconstruction activities in the States based on Post Disaster Need Assessment (PDNA) as per guidelines issued by this Ministry on Constitution and Administration of Recovery and Reconstruction Funding Window under National Disaster Response Fund (NDRF). An amount of ₹ 4220.10 crore has been approved from NDRF for Recovery & Reconstruction activities in three states namely, Uttarakhand (₹ 1658 Cr.), Sikkim (₹ 555.70 Cr.) and Himachal Pradesh (₹ 2006.40 Cr.), out of which ₹ 3001.54 crore is the central share. An amount of ₹ 818.74 crore has been released to these 03 states from NDRF so far.

National Disaster Mitigation Fund (NDMF)

2.13.15 Section 47(1) of the DM Act, 2005 provides for the constitution of National Disaster Mitigation Fund (NDMF) for projects exclusively for the purpose of mitigation. Based on the recommendations of 15th FC, Government has made an allocation of ₹ 13,693 crore under NDMF for the period 2021-22 to 2025-26. The guidelines for the constitution and administration of NDMF has been issued by MHA on 28.02.2022. These guidelines have further been amended on 25.09.2024 providing therein that the Mitigation Fund can also be used for mitigation projects in respect of lightning and heatwave, besides 12 other notified disasters. A number of mitigation projects, with an allocation of ₹ 5,685 crore has been approved from NDMF and an amount of ₹ 741.8 crore (As on 31.7.2025) has been released to states for these projects.

State Disaster Mitigation Fund (SDMF)

2.13.16 Section 48(1)(c) provides for the constitution of State Disaster Mitigation Fund (SDMF) by the State Governments. The Government has made an allocation of ₹ 32,031 crore for the SDMF for the period 2021-22 to 2025 -26. The funds are to be used for those local level and community-based interventions, which reduce the risks and promote environment-friendly settlements and livelihood practices.

2.13.17 During the period from 2020-21 to 2025-26 (As on 31.07.2025), an amount of ₹ 21,918 crore has been released by Central Government under State Disaster Mitigation Fund as Central shares to the 28 States.

Release of Fund to States

2.13.18 Details of Funds released by Central Government from SDRF (excluding State share of SDRF) and NDRF to the State Governments for management of relief necessitated by notified natural disasters, during 2004-14 to 2014-25, is as given below:

Table 2.3 - Release of funds from SDRF and NDRF

(Rs in crore)

During 2005-2014 (12 th and 13 th FC period)			During 2015-2025 (As on 31.07.25) (14 th and 15 th FC period)		
Years	SDRF	NDRF	Years	SDRF	NDRF
2005-06	2623	3061	2015-16	8756	12452
2006-07	3521	1962	2016-17	8375	11441
2007-08	2843	373	2017-18	9383	4723
2008-09	3220	2280	2018-19	9658	10000
2009-10	3792	3262	2019-20	10938	18531
Sub-Total	15999	10938	Sub Total	47110	57147
2010-11	4338	4179	2020-21	17826	8257
2011-12	4279	2459	2021-22	17747	7342
2012-13	5208	2810	2022-23	16393	1525
2013-14	6034	4650	2023-24	19420	869
2014-15	5629	3461	2024-25	20264	5161
--	--	--	2025-26*	10469	1989
Sub Total	25488	17559	Sub Total	102119	25143
Grand Total	41487	28497	Grand Total	149229	82290

* as on 31st July, 2025

Implementation Review: Key Lessons from the 15th Finance Commission Period

2.13.19 The 16th Finance Commission reviewed the 15th Commission implementation drawing on State Finance Accounts, NDMIS data and consultations with MHA, NDMA and State governments. Key findings are as follows.

2.13.20 First, SDRF releases have been largely timely, with releases against allocation in the range of 95-100 per cent for most States in 2021-22 to 2024-25. In contrast, SDMF Central share releases have been approximately 80 per cent, primarily due to delays in State-level fund constitution and the late issuance of operational guidelines by NDMA. The 16th Finance Commission has identified this as a structural problem that requires resolution through upfront guideline preparation before the start of the award period.

2.13.21 Second, large accumulating unspent balances under SDRF have emerged as a significant structural concern. MHA noted that several States have maintained substantial unspent SDRF balances. This distorts funding need assessment and leads to sub-optimal releases. The 16th Finance Commission has specifically recommended capping SDRF releases when unspent balances exceed the sum of the past three years' annual SDRF allocation.

2.13.22 Third, the National Disaster Management Information System (NDMIS), operationalised by MHA, has for the first time generated granular, disaster-wise and relief-item-wise expenditure data across States. This data, showing agricultural input expenditure at 55.6 per cent of relief spending, ex-gratia payments for 23.4 per cent and infrastructure for 13 per cent - has directly informed the 16th Finance Commission's allocation methodology. However,

the NDMIS in its current form requires significant upgradation to serve as the unified disaster database envisaged under the DM(A) Act, 2025.

Sixteenth Finance Commission Recommendation

2.13.23 The 16th Finance Commission has made recommendations for 2026-27 to 2030-31 incorporating a restructured Disaster Risk Index (DRI), the largest-ever disaster financing corpus, enhanced flexibilities and compliance-linked grant eligibility. The Commission has supported the continuation of the existing framework of disaster funds, including the State Disaster Response Fund (SDRF), National Disaster Response Fund (NDRF), State Disaster Mitigation Fund (SDMF), and National Disaster Mitigation Fund (NDMF).

2.13.24 The Finance Commission has recommended the largest-ever disaster financing corpus of ₹2,83,807 crore for 2026-31. Its recommendations incorporate a restructured Disaster Risk Index, enhanced State flexibilities and compliance-linked grant eligibility. A total corpus of ₹2,04,401 crore has been proposed for State-level funds, comprising ₹1,63,521 crore for SDRF and ₹40,880 crore for SDMF. At the national level, an allocation of ₹79,406 crore has been recommended for NDRF and NDMF combined. These allocations reflect the increasing financial requirements arising from growing disaster risks and the need for comprehensive disaster management. The Commission has retained the existing sharing pattern between the Union and States, with a ratio of 75:25 for general category States and 90:10 for North-Eastern and Himalayan States. The recommended fund allocation is as follows:

Table – 2.4 Fund Allocation

Fund	Amount (₹ Crore)
SDRF	1,63,521
SDMF	40,880
State Funds (SDRF + SDMF)	2,04,401
National Funds (NDRF + NDMF)	79,406
Combined Total	2,83,807

Heatwave and Lightning: National Notification

2.13.25 The 16th FC's recommendation to add heatwave and lightning to the nationally notified list of disasters under the SDRF framework is among the most significant policy changes in the report. Heatwave mortality in India has been substantiated through NCRB data - 3,798 deaths from heat or sunstroke between 2018 and 2022 - with extreme heat events increasing in frequency over four decades. Lightning is documented as the leading cause of death from 'forces of nature' in India, accounting for 35.8 per cent of all natural hazard fatalities in 2022 alone (2,887 of 8,060 deaths). Sixteen States had already notified lightning as a State-specific disaster; eleven States had notified heatwave. National notification enables standardised relief norms, SDRF deployment and mitigation investment across all States - not merely those that have individually notified these events.

Recommendation/Observation

2.13.26 The Committee notes that 16th Finance Commission has recommended to add heatwave and lightning to the nationally notified list of disasters under the SDRF framework. This recommendation will directly respond to the needs of the States/UTs which are vulnerable to heatwave and lightening related incidents. The Committee recommends that the Ministry may take compliance with the recommendation of the 16th Finance Commission and include heatwave and lightning to the nationally notified list of disasters as it will address the inadequacy of the current framework for dealing with such disasters.

NDMIS Compliance Linkage

2.13.27 The 16th Finance Commission has emphasised the critical role of technology in enhancing disaster management capabilities. It has highlighted the importance of systems such as the National Disaster Management Information System (NDMIS), which provides real-time data on disaster expenditure and impacts.

2.13.28 The Commission has recommended the transformation of NDMIS into a comprehensive national platform that integrates data across all stages of disaster management. It has also suggested making data reporting through such systems mandatory for States to ensure transparency, accountability and evidence-based decision-making. This compliance linkage transforms NDMIS from a voluntary accounting tool into a mandatory gateway for grant eligibility - creating a powerful incentive for States to modernise their disaster data infrastructure.

Recommendations/Observation

2.13.29 The Committee notes that the 16th Finance Commission has recommended the transformation of NDMIS into a comprehensive national platform integrating data across all stages of disaster management, with mandatory data reporting by States to ensure transparency, accountability and evidence-based decision-making. The Committee considers this an important mechanism for the establishment of the National Disaster Database under the Disaster Management (Amendment) Act, 2025. The Committee recommends that NDMA should issue guidelines and a timeline for all States to ensure full compliance, along with adequate technical support and capacity building to States with digital infrastructure to facilitate seamless integration with the platform.

2.13.30 The Committee commends the 16th Finance Commission's recommendations as a comprehensive advancement in India's disaster financing architecture, combining fiscal adequacy with scientific rigour, operational accountability and innovative risk transfer mechanisms. The Committee recommends that the Ministry may expedite the implementation of these recommendations so that envisioned reforms in disaster management be translated into tangible outcomes.

2.13.31 The Committee notes that the country has developed a comprehensive framework for disaster management that integrates legal provisions, policy direction,

institutional mechanism and financial arrangements. While the existing disaster management framework provides a robust foundation, its effectiveness is constrained by uneven implementation across States, limited institutional and technical capacities at the regional levels, delays in utilization of allocated funds and coordination gaps among various stakeholders. The increasing complexity of disaster risks arising from climate change and rapid urbanization, further highlight the need for continuous strengthening of the disaster management system. The Committee recommends that the priority should be accorded to improving implementation efficiency, ensuring greater uniformity in the implementation of disaster management frameworks across States through strengthened monitoring mechanisms, periodic performance assessments, dissemination of best practices, fostering greater inter-agency coordination and ensuring the timely and effective utilization of financial resources and building long-term disaster resilience.

Chapter III - Disaster Risk Reduction

3.1 Introduction to Disaster Risk Reduction (DRR)

3.1.1 It has been informed that India's disaster management paradigm has undergone a significant transformation over the past two decades from a relief-centric approach to a comprehensive Disaster Risk Reduction (DRR) and preparedness framework. This shift has been institutionalized through the enactment of the Disaster Management Act, 2005 and further strengthened by the National Disaster Management Plan (NDMP), 2019, which emphasizes integrating risk reduction into development planning. As emphasized in national policy, sustainable development cannot be achieved unless disaster resilience is mainstreamed into all sectors.

3.1.2 However, India remains one of the most disaster-prone countries in the world due to its diverse geo-climatic and socio-economic conditions. In this regard, the Committee was informed by the Ministry of Home Affairs that approximately 60% of the landmass is prone to earthquakes, 12% is vulnerable to floods and river erosion, nearly 5,700 km of coastline is exposed to cyclones and tsunamis, and about 68% of cultivable land is susceptible to drought. These statistics highlight the scale of India's vulnerability and underline the need for a proactive, multi-hazard approach to disaster risk reduction.

3.1.3 It has been noted that the Disaster Management Act, 2005 has established a robust institutional framework for disaster management in the country. It provides for a multi-tiered structure comprising the National Disaster Management Authority (NDMA), State Disaster Management Authorities (SDMAs), and District Disaster Management Authorities (DDMAs), supported by specialized institutions such as the National Disaster Response Force (NDRF) and the National Institute of Disaster Management (NIDM). This framework ensures coordinated efforts across all levels for prevention, mitigation, preparedness, response, and recovery.

3.1.4 Further, the NDMP 2019 aligns India's disaster management strategy with global frameworks such as the Sendai Framework for Disaster Risk Reduction (2015–2030), the Sustainable Development Goals (SDGs), and the Paris Agreement on Climate Change, thereby promoting an integrated and forward-looking approach to DRR. It emphasizes mainstreaming DRR into development, strengthening institutional capacities, enhancing early warning systems, and promoting community-based resilience.

3.1.5 The Committee observes that while India has achieved notable success in reducing disaster-related mortality, particularly in cyclones, emerging challenges such as rapid urbanization, climate change, and increasing frequency of extreme weather events necessitate further strengthening of preparedness and mitigation measures.

3.2 Concept and Framework of Disaster Risk Reduction (DRR)

3.2.1 The Ministry states that the concept of Disaster Risk Reduction (DRR) represents a paradigm shift from a reactive, relief-centric approach to a proactive, risk-informed approach to

disaster management. It focuses on anticipating, preventing, and mitigating disaster risks by addressing underlying vulnerabilities, exposure, and hazard characteristics before they translate into disaster events. DRR encompasses a comprehensive range of interventions including prevention, mitigation, preparedness, capacity building, and risk-informed recovery, aimed at reducing loss of life, livelihoods, infrastructure, and economic assets.

3.2.2 Further, it has been informed that the DRR is an integral component of sustainable development and must be systematically mainstreamed across all sectors of governance, including infrastructure, urban planning, agriculture, water resources, and social welfare. The Disaster Management Act, 2005 explicitly provides for the integration of mitigation measures into development projects and mandates that all Ministries and Departments incorporate disaster risk considerations into their planning and implementation processes. This legislative framework ensures that development initiatives are resilient and do not create new risks. The transition towards DRR has been reinforced through national policies such as the National Policy on Disaster Management (2009) and the National Disaster Management Plan (NDMP), 2019, which emphasize a multi-hazard, multi-sectoral, and technology-driven approach to risk management.

3.3 Key Elements of DRR Framework

3.3.1 It has been noted that the Disaster Risk Reduction framework in India is structured around a set of interrelated core elements, which together form a comprehensive approach to managing disaster risks:

Risk Identification and Assessment:

3.3.2 Scientific and systematic identification of hazards, vulnerabilities, and exposure is the foundation of DRR. This includes hazard mapping, vulnerability assessments, and risk profiling at national, state, district, and local levels. Institutions such as IMD, CWC, GSI, and NRSC contribute to multi-hazard risk assessment through meteorological data, hydrological monitoring, geological surveys, and satellite-based mapping systems.

Prevention and Mitigation:

3.3.3 The prevention and mitigation measures include both structural and non-structural interventions. Structural measures comprise physical infrastructure such as dams, embankments, cyclone shelters, and earthquake-resistant construction. Non-structural measures include land-use zoning, enforcement of building codes, environmental regulations, and policy interventions aimed at reducing exposure and vulnerability. These measures are critical in minimizing the impact of disasters.

Preparedness:

3.3.4 Preparedness involves strengthening early warning systems, developing disaster management plans, conducting mock drills, and enhancing public awareness. National and state-level contingency plans, along with community-based preparedness initiatives, ensure that

response mechanisms are timely and effective. Early warning systems operated by agencies such as IMD, CWC, and INCOIS play a crucial role in this regard.

Capacity Development:

3.3.5 Capacity building is a key pillar of DRR, involving training of government officials, disaster response forces, local authorities, and communities. Institutions such as the National Institute of Disaster Management (NIDM) and National Disaster Response Force (NDRF) play a pivotal role in enhancing institutional and human resource capacities through training programmes, simulations, and awareness campaigns.

Response and Recovery Linkages:

3.3.6 DRR extends beyond immediate response to include recovery and reconstruction processes that contribute to long-term resilience. The principle of “Build Back Better,” as emphasised in global frameworks, ensures that post-disaster reconstruction incorporates risk reduction measures to prevent future losses.

3.4 Thematic Areas under NDMP 2019

3.4.1 The Ministry informs that the National Disaster Management Plan (NDMP), 2019 provides a comprehensive framework for DRR by identifying key thematic areas that guide policy and implementation. These include:

- Understanding disaster risk
- Inter-Agency Coordination
- Investing in DRR through structural measures
- Investing in DRR through non-structural measures
- Capacity development
- Climate change risk management

3.4.2 These thematic areas reflect a holistic approach to disaster management by integrating risk assessment, governance mechanisms, investment strategies, and climate resilience into a unified framework. The NDMP also delineates the roles and responsibilities of various Ministries, Departments, and stakeholders to ensure coordinated action across all levels of governance.

3.5 Alignment with Global Frameworks

3.5.1 It has been stated that India’s DRR framework is closely aligned with major international frameworks, particularly the Sendai Framework for Disaster Risk Reduction (2015–2030), which outlines four priority areas: understanding disaster risk, strengthening disaster risk governance, investing in resilience, and enhancing preparedness for effective response.

3.5.2 Further, the NDMP 2019 incorporates these priorities and ensures coherence with other global commitments, including the Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change. This alignment facilitates the integration of disaster risk

reduction with broader objectives of climate resilience, environmental sustainability, and inclusive development.

3.6 Need for Integrated and Inclusive DRR

3.6.1 Effective disaster risk reduction requires strong inter-sectoral coordination and inclusive participation of all stakeholders. Special attention must be given to vulnerable groups, including women, children, the elderly, and marginalized communities, who are disproportionately affected by disasters. Community-based disaster risk management is important, along with strengthening last-mile connectivity of early warning systems to ensure timely dissemination of alerts. Integration of local knowledge with scientific approaches and empowerment of Panchayati Raj Institutions and Urban Local Bodies are essential for enhancing resilience at the grassroots level.

3.6.2 Thus, the Disaster Risk Reduction framework in India represents a comprehensive, multi-dimensional, and forward-looking approach that integrates policy, institutional mechanisms, technological advancements, and community participation to effectively reduce disaster risks and build long-term resilience.

3.7 Steps Taken Towards the Implementation of the Prime Minister's Ten-Point Agenda on DRR

3.7.1 As was mentioned in Para 2.9, the Government has taken a number of concrete steps towards implementation of the Ten-Point Agenda. A number of initiatives have been taken by the Government to operationalise and implement the Prime Minister's Ten-Point Agenda on Disaster Risk Reduction across sectors and levels of governance. These measures reflect a gradual shift towards mainstreaming disaster risk reduction into development planning, strengthening institutional capacities, and leveraging technology for effective risk management.

3.7.2 With regard to mainstreaming disaster risk reduction into development, the National Disaster Management Authority (NDMA) prepared the National Disaster Management Plan (NDMP) in 2016, which was subsequently revised in 2019 in alignment with the Ten-Point Agenda. The NDMP integrates disaster risk reduction across ministries, departments, and administrative levels, and NDMA has also approved disaster management plans of multiple ministries to ensure sectoral integration. Further, efforts have been made to develop standards and guidelines, including seismic design codes and infrastructure resilience measures. The establishment of the Coalition for Disaster Resilient Infrastructure (CDRI) in 2019 is another significant step aimed at promoting resilient infrastructure globally.

3.7.3 In terms of expanding risk coverage, initiatives have been undertaken in collaboration with institutions such as the Insurance Regulatory and Development Authority of India (IRDAI), General Insurance Corporation of India (GIC Re), and other organisations to design risk insurance products. These efforts aim to enhance financial protection for households, businesses, and institutions against disaster risks.

3.7.4 Specific measures have been taken to promote women's participation and leadership in disaster management. These include incorporation of gender concerns in the NDMP, training of

women volunteers under the Aapda Mitra programme, and ensuring representation of women in cyclone shelter management committees and disaster response task forces.

3.7.5 With respect to risk mapping and scientific assessment, several initiatives have been undertaken, including the development of a Dynamic Composite Risk Atlas and Decision Support System, preparation of flood hazard atlases by the National Remote Sensing Centre (NRSC), development of vulnerability atlases by the Building Material and Technology Promotion Council (BMTPC), and creation of datasets on glacial lakes and seismic micro-zonation. These initiatives have significantly strengthened risk assessment capabilities in the country.

3.7.6 In the area of technology utilisation, the Government has strengthened early warning and communication systems through multiple initiatives. These include advanced forecasting systems by the India Meteorological Department (IMD), installation of early warning systems under the National Cyclone Risk Mitigation Project, and development of a Common Alerting Protocol-based Integrated Alert System for geo-targeted dissemination of warnings. Additionally, platforms such as the Emergency Response Support System (ERSS-112) and the National Disaster Management Information System (NDMIS) have been introduced to enhance real-time response and data management.

3.7.7 The Committee also notes that efforts have been made to strengthen knowledge and research through the establishment of the India Universities and Institutions Network for Disaster Risk Reduction (IUIIN-DRR), which promotes collaboration between academia and policy institutions.

3.7.8 With regard to the use of social media and mobile technologies, various applications such as *Damini*, *Mausam*, and *Sachet* have been developed for dissemination of early warnings, while social media platforms are being actively used for awareness generation and real-time communication during disasters.

3.7.9 At the local level, capacity building initiatives such as the Aapda Mitra Scheme have been implemented to train community volunteers in disaster response. Training programmes for officials and community representatives, along with mock drills and school safety programmes conducted by NDRF and NDMA, have contributed to strengthening grassroots preparedness. Mechanisms have been institutionalised for learning from disasters through post-disaster studies, documentation of lessons learnt, and issuance of guidelines for various hazards and thematic areas.

3.7.10 Finally, in the domain of international cooperation, India has actively engaged with regional and global organisations such as BIMSTEC, SCO, and IORA, and has also provided humanitarian assistance and disaster relief support to affected countries. Initiatives undertaken during India's G20 Presidency have further strengthened global cooperation in disaster risk reduction.

3.8 International Cooperation and Global Leadership in Disaster Risk Reduction

3.8.1 The Ministry of Home Affairs has stated that India has been increasingly recognised for its leadership role in Disaster Risk Reduction (DRR) on the global stage. This leadership is anchored in proactive domestic policies, robust institutional frameworks, technological advancements and sustained international engagement. India's approach reflects a commitment not only to strengthening its own disaster resilience but also to contributing meaningfully to global and regional efforts in disaster risk reduction.

3.8.2 The significance of India's contributions has received high-level international recognition. During the Global Conference on DRR held in Geneva from 4–6 June 2025, the Deputy Secretary General of the United Nations commended the Indian model of disaster risk reduction, particularly its allocation of substantial domestic resources for the establishment of a dedicated mitigation fund.

3.9 Regional Cooperation

3.9.1 It has been noted that the regional cooperation on disaster risk management has been actively advanced through sustained engagement under multiple regional organisations, including the Shanghai Cooperation Organisation (SCO), the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), BRICS and the Indian Ocean Rim Association (IORA). Through these platforms, the Government has conducted joint exercises, facilitated the sharing of good practices and strengthened collective capacity in the field of disaster management. The Government of India has announced the establishment of a BIMSTEC Centre of Excellence at Gandhinagar, Gujarat, with a focus on disaster management. A formal proposal in this regard has been submitted to the BIMSTEC headquarters, signalling India's commitment to building regional capacity and knowledge infrastructure.

Bilateral Agreements and Memoranda of Understanding

3.9.2 Further, India has proactively expanded its bilateral cooperation in disaster management through formal agreements with a wide range of countries and multilateral entities. India has signed Agreements, Memoranda of Understanding (MoUs) and Memoranda of Intent (MoIs) for cooperation in disaster management with Switzerland, Russia, Germany, SAARC, Japan, Tajikistan, Mongolia, Bangladesh, Italy, Turkmenistan, Maldives, Uzbekistan and the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre). Also, MoUs with several other countries including Argentina, Armenia, Brazil, Brunei, Chile, Mexico, Myanmar, Peru and Malaysia are at various stages of finalisation, reflecting the growing global interest in partnering with India on disaster management. This expanding network of bilateral partnerships facilitates the exchange of expertise, joint training, technology transfer and coordinated response during transboundary disasters.

Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR), 2016

3.9.3 It has been stated that the Government of India, in collaboration with the United Nations International Strategy for Disaster Reduction (UNISDR), hosted the Asian Ministerial

Conference on Disaster Risk Reduction (AMCDRR), 2016 in New Delhi from 3–5 November 2016. The Conference was attended by delegates from 41 Asia and Asia-Pacific countries and concluded with two landmark outcomes namely, a Political Declaration reaffirming the commitment of governments and stakeholders to disaster risk reduction and adoption of the Asia Regional Plan for the implementation of the Sendai Framework for Disaster Risk Reduction (2015–2030).

Coalition for Disaster Resilient Infrastructure (CDRI)

3.9.4 The Ministry has informed that as a flagship global initiative in disaster risk reduction, the Coalition for Disaster Resilient Infrastructure (CDRI) was launched on 23 September 2019 at the United Nations Climate Action Summit in New York. CDRI has been envisioned and established as a global network to advance the agenda of infrastructure resilience, support coordinated action among stakeholders and amplify the voices of vulnerable geographies and populations on international policy forums. CDRI operates through a fully functional Secretariat based in New Delhi.

3.9.5 Also, CDRI is a global partnership comprising national governments, United Nations agencies and programmes, multilateral development banks and financing mechanisms, the private sector, and academic and knowledge institutions. Its core objective is to promote the resilience of infrastructure systems to climate and disaster risks, thereby ensuring sustainable development. As of date, 50 countries and 8 international organisations have joined CDRI which is a testament to the initiative's growing global resonance and relevance.

3.9.6 The Government of India has sanctioned ₹480 crore as its contribution for the first five years of the Coalition (2019–20 to 2023–24), now extended until 31 March 2027 on a non-lapsable basis. Also, CDRI was accorded the status of an International Organisation by notification dated 11 January 2024, underscoring India's role in shaping the global institutional architecture for disaster resilience.

3.9.7 Other Leadership Initiatives in Disaster Risk Reduction

(a) Cooperation with UNDRR

India has forged a robust partnership with the United Nations Office for Disaster Risk Reduction (UNDRR) aimed at:

- Strengthening the capacity of Asian countries through training and institutional development programmes.
- Promoting international and regional cooperation to reinforce political commitment and facilitate knowledge sharing.
- Supporting UNDRR's mandate for monitoring and review of the Sendai Framework implementation.

- Facilitating the exchange of knowledge and experiences and fostering collaborative efforts to address critical regional challenges in disaster risk reduction.

This partnership reflects India's broader commitment to multilateral engagement and South-South cooperation in building disaster resilience.

(b) Working Group on Disaster Risk Reduction under G-20

In a landmark initiative during India's G-20 Presidency in 2023, a new Working Group on Disaster Risk Reduction was established under the G-20 framework for the first time. This represented a significant achievement in elevating DRR on the agenda of the world's major economies alongside global economic cooperation.

The Working Group was established with the objective of exchanging best practices among member countries and encouraging multi-disciplinary research in DRR. Two meetings of the Working Group were successfully held in Gandhinagar and Mumbai. Key priorities identified by the Working Group include:

- Strengthening national and global disaster response systems.
- Promoting nature-based solutions and ecosystem-based approaches to disaster risk reduction.
- Integrating DRR into investment decisions and policy frameworks.
- Developing policy guidance and facilitating the exchange of technical knowledge.
- Identifying new and innovative approaches to financing DRR, including prioritising risk reduction and resilience in financial frameworks.

The establishment of this Working Group has institutionalised disaster risk reduction as a standing concern within the G-20 architecture, ensuring sustained attention from the world's leading economies.

Significance of India's Global Engagement

3.9.8 The Committee has been informed that India's multifaceted international engagement in disaster management spanning regional cooperation frameworks, bilateral partnerships, multilateral leadership initiatives and humanitarian relief operations serves a dual purpose. It strengthens global solidarity and collective capacity to address disaster risks, while simultaneously enriching India's own disaster management ecosystem through the cross-pollination of ideas, technologies, institutional innovations and best practices. India's emergence as a credible and proactive global voice in DRR positions it as a bridge between developed and developing nations in the pursuit of a disaster-resilient and sustainable future.

Recommendation/Observation

3.9.9 The Committee notes that scientific risk assessment forms the foundation of an effective Disaster Risk Reduction (DRR) framework; however, significant gaps persist in the completion, standardization and enforceability of hazard mapping across the country. The Committee, therefore, recommends that multi-hazard risk mapping, including flood, landslide, seismic and glacial lake hazards, be completed in a time-bound manner and made statutorily enforceable across all States and Union Territories, which are susceptible to these disasters, so as to ensure its effective integration into planning and development processes.

3.9.10 The Committee further recommends that seismic microzonation and landslide susceptibility maps be mandatorily integrated into town planning regulations and building by-laws, with strict restrictions on construction and developmental activities in high-risk zones, in order to prevent the creation of new vulnerabilities. The Committee also recommends the establishment of a comprehensive national repository of hazard, vulnerability and risk data, with information at the district and sub-district levels, to facilitate evidence-based decision-making, inter-agency coordination and informed policy formulation by all stakeholders.

3.9.11 The Committee notes that, the policy framework emphasises the integration of Disaster Risk Reduction (DRR) into development planning, its implementation across sectors remains uneven and insufficiently institutionalised. The Committee, therefore, recommends that all major infrastructure and major urban development projects be subjected to a mandatory Disaster Risk Impact Assessment (DRIA) prior to approval, so as to ensure that such projects are resilient and do not create or exacerbate disaster risks.

3.9.12 The Committee further recommends that floodplain zoning and river regulation measures be uniformly implemented across all vulnerable States in order to address issues of encroachment, unplanned development and recurring flood losses. The Committee also recommends that developmental activities in ecologically fragile areas, including hilly regions and coastal zones, be strictly regulated, and that clear accountability mechanisms be instituted to fix responsibility for violations, so as to prevent environmentally unsustainable practices that aggravate disaster vulnerabilities.

3.9.13 The Committee notes that accurate forecasting and timely dissemination of warnings are critical for effective disaster risk reduction. The Committee, therefore, recommends that investment in advanced forecasting technologies be significantly enhanced, including the deployment of Artificial Intelligence and Machine Learning-based predictive models, Doppler weather radars, high-resolution numerical weather prediction systems and satellite-based monitoring technologies, so as to improve the precision and reliability of forecasts.

3.9.14 The Committee recommends that a robust post-disaster validation mechanism be initiated, whereby forecasted impacts are systematically compared with actual outcomes, and the findings are utilised to continuously refine predictive models, parameters and methodologies. The Committee also recommends that sector-specific and impact-based

forecasting systems be developed, particularly for agriculture and allied sectors, so as to provide actionable information such as crop loss projections based on wind speed, rainfall and other hazard parameters, thereby enabling vulnerable communities, especially farmers, to take timely preventive and adaptive measures.

3.9.15 The Committee recommends that a fully integrated, multi-hazard early warning system be developed at the national level, bringing together key agencies such as IMD, CWC, INCOIS, NRSC and State authorities into a single unified and interoperable platform, so as to ensure seamless data sharing, real-time coordination and timely dissemination of warnings.

3.9.16 The Committee further recommends that early warning dissemination be strengthened through hyper-local forecasting and communication mechanisms at the level of villages, urban wards and vulnerable habitations, in place of the existing district-level approach, so as to enhance the accuracy, relevance and usability of warnings for local authorities and communities.

3.9.17 The Committee notes that the disaster-related expenditure remains largely relief-centric, with comparatively lower emphasis on mitigation and risk reduction measures, which are essential for reducing long-term disaster losses. The Committee, therefore, recommends that a gradual but definitive shift be made from relief-oriented expenditure towards mitigation-focused investments, with adequate budgetary prioritisation for risk reduction, resilience-building and preventive infrastructure.

3.9.18 The Committee further recommends that a dedicated monitoring and evaluation framework be established to track the utilisation, effectiveness and outcomes of funds allocated for mitigation, so as to ensure accountability, transparency and evidence-based policy corrections.

3.9.19 The Committee also recommends that risk financing mechanisms be strengthened and expanded, including insurance coverage for households, agriculture and Micro, Small and Medium Enterprises (MSMEs), in order to enhance financial resilience and reduce the economic burden of disasters on vulnerable sections of society.

3.9.20 The Committee notes that research, innovation and knowledge-sharing are critical enablers for strengthening Disaster Risk Reduction (DRR), and that sustained institutional support is required to translate policy intent into practical outcomes. The Committee, therefore, recommends that a national network of universities and research institutions be further strengthened and expanded, so as to promote interdisciplinary research, innovation and capacity building in disaster management.

3.9.21 The Committee further recommends that indigenous technologies and capabilities be actively promoted and developed, particularly in the areas of forecasting systems, fire services equipment, and disaster response tools, with a view to reducing external dependence and enhancing self-reliance in disaster management.

3.9.22 The Committee also recommends that post-disaster studies and documentation of lessons learnt be incorporated as a standard practice, and that the findings of such studies be systematically integrated into policy formulation, planning and capacity-building initiatives, so as to ensure continuous improvement in disaster risk management systems.

Chapter IV – Risk Assessment, Mitigation Measures and Preparedness

4.1.1 India is a multi-hazard country and faces a wide spectrum of natural and human-induced disasters, including cyclones, floods, urban floods, earthquakes, tsunamis, landslides, snow avalanches, drought, cold wave, lightning, heat wave, chemical and industrial accidents, nuclear and radiological emergencies, biological disasters and forest fires. The vulnerability of different parts of the country varies according to their geo-climatic, topographic, socio-economic and infrastructural conditions, and the impact of disasters is often intensified by factors such as unplanned urbanisation, environmental degradation, encroachment into hazard-prone areas, weak compliance with safety norms, and climate variability. The need, therefore, is not merely for post-disaster response, but for a structured approach based on risk assessment, mitigation and preparedness so that loss of life, livelihoods and public infrastructure can be minimised.

4.1.2 Disaster risk reduction requires hazard-specific as well as cross-cutting measures, combining scientific assessment, preventive engineering, land-use regulation, early warning systems, community preparedness and institutional coordination. This chapter examines the major categories of disasters and the measures required for each in terms of risk identification, mitigation and preparedness. It also reflects the broader framework of disaster management in which structural and non-structural interventions, capacity building, public awareness and timely response function as complementary elements of a resilient disaster management system.

4.2 Cyclones

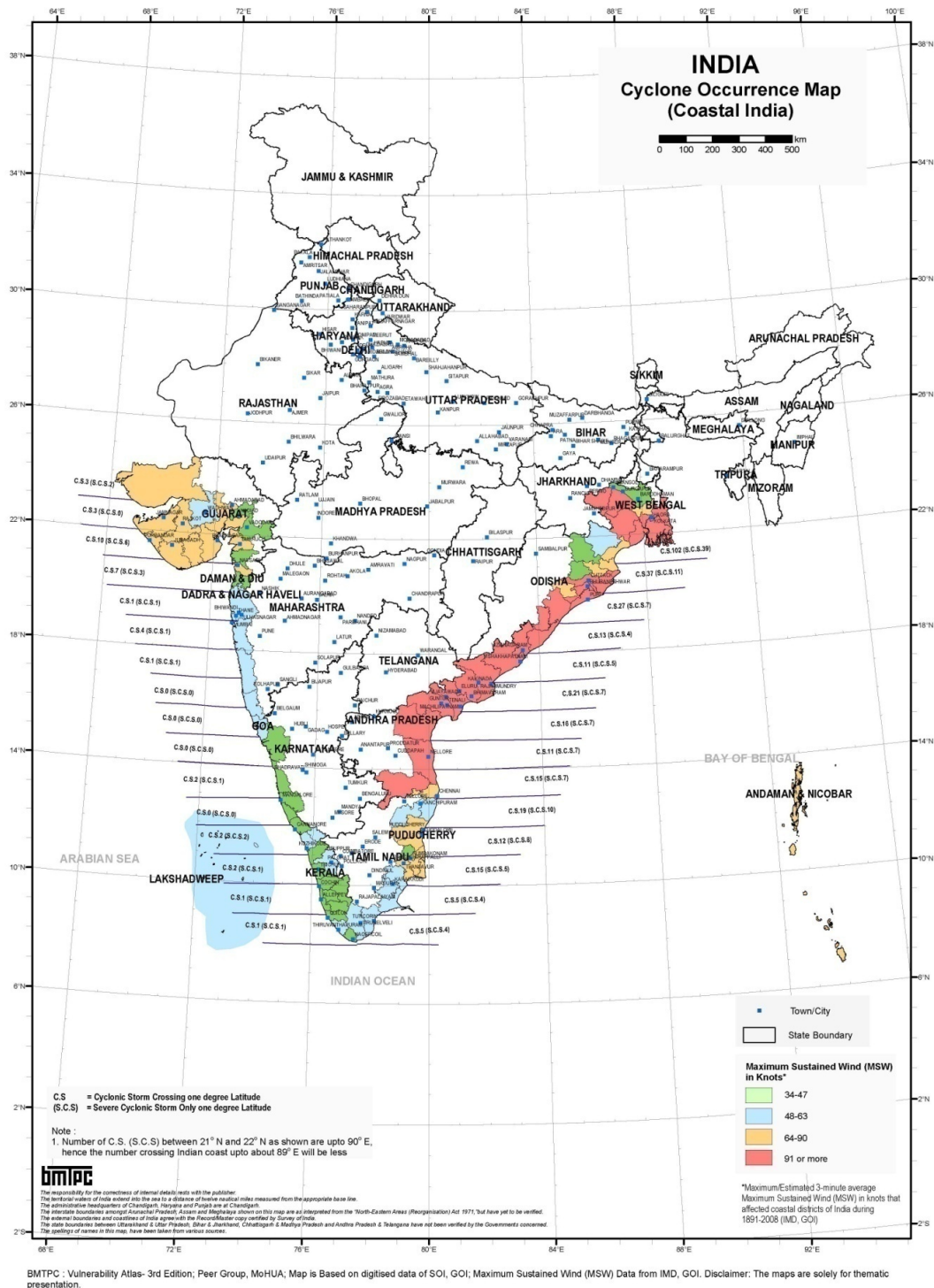
4.2.1 Cyclones remain one of the most serious and recurring natural hazards affecting India, particularly along the eastern and western coasts. The country's long coastline, high population density in coastal districts, concentration of critical infrastructure, and exposure to storm surge, high wind speeds and rainfall-related secondary impacts make cyclone risk reduction a continuing priority. The disaster management framework therefore places emphasis on scientific risk assessment, impact-based early warning, structural and non-structural mitigation, preparedness and capacity building so as to minimise loss of life, property and livelihoods.

Cyclone Risk Assessment and Vulnerability Analysis

4.2.2 The Committee was informed by the India Meteorological Department (IMD) that, as part of the transition from hazard-based forecasting to impact-based forecasting, extensive efforts have been undertaken for collection and analysis of historical meteorological data, weather hazard and impact data, socio-economic exposure data, infrastructure data and geospatial information. The IMD has prepared the *Climate Hazard and Vulnerability Atlas of India* for thirteen major meteorological hazards that cause extensive economic losses and damage to human and animal life. For visual display of climate vulnerability maps, Geographic Information System (GIS) tools have been utilised, and the Atlas provides a comprehensive spatial representation of hazard vulnerability across the country.

4.2.3 Further, the IMD has developed a GIS-based Decision Support System (DSS), which serves as a front-end platform for timely detection, monitoring and forecasting of weather

hazards. The system is supported by specialised severe weather modules to provide impact-based cyclones, heavy rainfall, thunderstorms, lightning, fog and heatwaves. The DSS integrates historical meteorological data, real-time surface and upper-air observations, radar -



Map 4.1 :- Cyclone hazard prone districts of India based on frequency of total cyclones, severe cyclones; strength of actual/estimated wind. (Source - BMTPC Vulnerability Atlas of India)

observations, satellite products and outputs from numerical weather prediction models. For impact-based forecasting and warnings, the system combines hazard information with exposure data, thereby enabling assessment of likely impacts on lives, livelihoods and infrastructure. The Committee notes that the National Disaster Management Plan, 2019 emphasises the use of risk assessment, hazard analysis, vulnerability mapping and geospatial technologies for disaster risk reduction and resilient development planning. The Plan envisages incorporation of disaster risk considerations into sectoral planning and infrastructure development so that disaster resilience becomes an integral component of development processes. The hazard and vulnerability mapping tools are increasingly being utilised by Central and State Governments for preparedness planning, mitigation measures and informed decision-making in cyclone-prone regions.

Cyclone Forecasting and Early Warning System

4.2.4 The Committee was informed by the India Meteorological Department (IMD) that India has adopted seamless forecast and warning procedures for cyclones, heavy rainfall, flash floods and other extreme weather events. The forecasting system integrates historical meteorological records, real-time surface and upper-air observations, radar observations, satellite products and outputs from a suite of numerical weather prediction models, including hyper-local, regional and global models. These systems support impact-based forecasting and risk-based warning, enabling authorities to assess likely impacts on lives, livelihoods and infrastructure and undertake timely preparedness measures.

4.2.5 The cyclone warning services in the country are coordinated by the Cyclone Warning Division (CWD) at IMD Headquarters, New Delhi, in conjunction with three Area Cyclone Warning Centres located at Chennai, Kolkata and Mumbai and four Cyclone Warning Centres located at Ahmedabad, Bhubaneswar, Thiruvananthapuram and Visakhapatnam. These centres issue four-stage warning bulletins, coastal weather advisories, sea area warnings, port warnings and fishermen warnings for their respective areas of responsibility. The IMD functions as the Regional Specialised Meteorological Centre (RSMC) for Tropical Cyclones over the North Indian Ocean region and provides cyclone advisories to member countries of the WMO/ESCAP Panel on Tropical Cyclones.

4.2.6 The IMD maintains round-the-clock monitoring of the North Indian Ocean and the country through an integrated observational network comprising satellites, Doppler Weather Radars, surface observatories, upper-air observations and numerical weather prediction systems. Meteorologists across the country participate in regular video conferences to analyse observational data and model outputs, including multi-model ensemble forecasts, for preparation of final impact-based forecasts. These forecasts are disseminated in textual and graphical formats, ensuring a unified and authoritative warning system.

4.2.7 The warning dissemination has been modernised through the use of websites, CAP-Sachet, mobile applications, SMS services, social media platforms, television, radio, community radio, Application Programming Interfaces (APIs) and other communication channels. It has been informed to the Committee that these systems are designed to strengthen last-mile connectivity and ensure timely dissemination of warnings to vulnerable communities.

Mitigation and Resilient Infrastructure

4.2.8 The Committee notes that the National Disaster Management Plan, 2019 stressed that disaster risk reduction should be mainstreamed into development planning and that all sectors of development should incorporate disaster risk management principles. The Plan envisages integration of risk assessment, hazard analysis and vulnerability reduction measures into development processes so that new infrastructure and public assets are resilient to disaster risks.

4.2.9 The Government has undertaken several initiatives to strengthen resilience against cyclone hazards and reduce disaster losses. A Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution Infrastructure in Coastal Areas has been constituted to develop practical solutions for strengthening power infrastructure in cyclone-prone regions. The Bureau of Indian Standards is also undertaking work relating to standards and design aspects of cyclone-resilient infrastructure and cyclone shelters in coastal areas. The Ministry further informed the Committee that technological preparedness is being strengthened through the use of geospatial applications, WebGIS platforms and emerging technologies such as Artificial Intelligence and Machine Learning for disaster risk reduction, mitigation planning and protection of critical infrastructure.

4.2.10 The Coalition for Disaster Resilient Infrastructure (CDRI), launched in 2019, seeks to strengthen the linkages between early warning systems and infrastructure resilience. The Coalition has initiated projects relating to power, telecommunications and transportation infrastructure and has reinforced the importance of integrating disaster risk considerations into infrastructure planning and development.

4.2.11 The Committee notes that cyclone mitigation requires both structural and non-structural measures aimed at reducing vulnerability and minimising disaster losses. The National Disaster Management Plan, 2019 emphasises a multi-dimensional approach encompassing risk assessment, resilient infrastructure, land-use planning, ecosystem-based approaches and community participation in disaster risk reduction. Further, the impact-based forecasting and risk-based warning systems developed by IMD facilitate anticipatory mitigation measures by enabling authorities to identify vulnerable locations, secure critical infrastructure, regulate coastal activities and undertake preventive actions prior to landfall of cyclonic systems.

Cyclone Preparedness

4.2.12 The Committee was informed that preparedness for cyclones in the country is built upon a comprehensive forecasting, warning dissemination and response framework developed by the India Meteorological Department (IMD) in coordination with disaster management authorities at various levels. IMD has adopted seamless forecasting and warning procedures supported by observational networks, Doppler Weather Radars, satellites and numerical weather prediction models for monitoring and forecasting cyclonic disturbances over the North Indian Ocean region.

4.2.13 Cyclone warnings are issued through a well-established institutional mechanism comprising the Cyclone Warning Division at IMD Headquarters, three Area Cyclone Warning Centres and four Cyclone Warning Centres located along the coast. These centres issue four-

stage warning bulletins, coastal weather advisories, port warnings and fishermen warnings, enabling authorities and communities to undertake advance preparedness measures before the onset of severe weather conditions.

4.2.14 The National Disaster Management Plan, 2019 also lays emphasis on preparedness measures such as contingency planning, early warning dissemination, evacuation planning, mock exercises, emergency communication systems and strengthening institutional readiness at all levels. These measures are aimed at ensuring coordinated action and minimising loss of life and property during cyclone events.

Capacity Building

4.2.15 The Ministry apprised the Committee that capacity building constitutes an integral component of disaster risk reduction and cyclone management. The India Meteorological Department regularly undertakes training and capacity-building programmes in operational meteorology, climate services, impact-based forecasting and early warning dissemination for its personnel as well as officers from stakeholder organisations, including disaster management agencies, defence services and other institutions. Training programmes conducted by IMD cover subjects such as severe weather events, hazard and vulnerability assessment, impact-based forecasting, risk-based warning systems, flood hazard modelling, geospatial applications and disaster-related decision-support tools. These initiatives are intended to enhance institutional capacities for forecasting, preparedness and response across sectors.

4.2.16 The disaster management framework established under the Disaster Management Act, 2005 provides for dedicated institutions such as the National Institute of Disaster Management (NIDM) and the National Disaster Response Force (NDRF), which support capacity development through training, research, documentation of best practices and specialised disaster response programmes. The framework also envisages strengthening capacities at the State, district and community levels to promote a culture of prevention, preparedness and resilience. Community-based disaster management and strengthening of local capacities continue to remain important elements of the national disaster management strategy. Capacity-building initiatives undertaken by various agencies have contributed significantly to improved preparedness, enhanced awareness and more effective response during cyclone events.

Institutional Coordination and Response Mechanism

4.2.17 The Committee notes that cyclone management in India operates through a well-defined institutional framework established under the Disaster Management Act, 2005. The framework comprises the National Disaster Management Authority (NDMA), State Disaster Management Authorities (SDMAs), District Disaster Management Authorities (DDMAs), the National Disaster Response Force (NDRF) and other agencies responsible for disaster preparedness, response and recovery. Cyclone forecasting and warning activities are coordinated by the Cyclone Warning Division of IMD in consultation with Area Cyclone Warning Centres, Cyclone Warning Centres and other meteorological offices. Continuous monitoring of the North Indian Ocean is undertaken through integrated observational systems and numerical weather prediction models, while forecasts are finalised through consultation and analysis of observational and model data. During cyclone emergencies, a 24×7 operational mechanism is

activated at IMD Headquarters to facilitate coordinated forecasting and warning operations. Forecasts and warnings generated by IMD are disseminated to Central Ministries, State Governments, disaster management authorities, district administrations, ports, fisheries authorities, defence services, media organisations and the general public through multiple communication channels. This integrated dissemination framework enables timely evacuation, deployment of response forces, protection of critical infrastructure and implementation of other emergency measures by concerned authorities.

4.2.18 The National Disaster Management Plan, 2019 emphasises a coordinated multi-agency approach involving all levels of government, specialised response forces, local authorities, community organisations and other stakeholders. Such coordination ensures that early warnings are translated into prompt response actions and contributes to reducing disaster losses in cyclone-prone regions.

Recommendation/Observation

4.2.19 The Committee notes that while significant improvements have been achieved in cyclone forecasting and warning systems, concerns remain regarding the availability of sector-specific impact assessments and preparedness at the local level, particularly for agriculture, fisheries and coastal livelihoods. The Committee, therefore, recommends that impact-based forecasting be further operationalised at the sectoral level, including crop-specific loss projections, infrastructure vulnerability assessment and livelihood risk advisories, so as to enable targeted preparedness measures by farmers, fishermen and local administrations. The Committee further recommends that initiatives must be taken for island territories and remote coastal regions, as well as Lakshadweep and Andaman & Nicobar Islands to have comprehensive framework encompassing dedicated evacuation, shelter and rehabilitation infrastructure, taking into account their geographical isolation and limited evacuation windows, so as to ensure effective disaster response in such vulnerable regions

4.3 Floods

4.3.1 Floods constitute one of the most recurrent and damaging natural hazards in India, affecting extensive geographical areas and large sections of the population every year. The country's vulnerability to floods arises from its diverse hydro-meteorological conditions, concentration of rainfall during the southwest monsoon, extensive river systems, sedimentation, rapid urbanisation, encroachment of floodplains and increasing frequency of extreme weather events. Ministry of Home Affairs apprised the Committee that flood management in India has progressively evolved from a relief-centric approach to a comprehensive framework encompassing hazard assessment, forecasting, early warning, mitigation, preparedness, response and recovery. The National Disaster Management Plan, 2019 laid emphasis on an integrated approach combining structural and non-structural measures, risk-informed development planning and multi-agency coordination to reduce flood risk and enhance resilience.

Flood Risk Assessment and Mapping

4.3.2 The Committee was informed that the Central Water Commission (CWC) has undertaken remote sensing-based morphological studies of major rivers including the Ganga, Brahmaputra, Kosi, Bagmati, Yamuna, Mahanadi, Krishna and Tapi rivers. These studies have been carried out using satellite imageries and GIS techniques to analyse river morphology, identify erosion-prone reaches and support flood management interventions. The studies also provide scientific inputs for planning and implementation of river training and anti-erosion measures.

4.3.3 The CWC in collaboration with the Centre for Development of Advanced Computing (C-DAC) has developed the C-FLOOD system for inundation forecasting. Basin-specific inundation forecasting models have been developed for Mahanadi, Godavari and Tapi river basins using hydrodynamic models, Digital Elevation Models (DEMs) and geospatial datasets. The system provides village-level inundation forecasts and water-level forecasts to support flood forecasting and response activities. The Committee notes that floodplain mapping and floodplain zoning constitute important non-structural measures for flood risk management. The Central Water Commission has undertaken floodplain studies and prepared technical guidelines to support States and Union Territories in regulating activities in flood-prone areas and minimising flood damages.

Flood Forecasting and Early Warning System

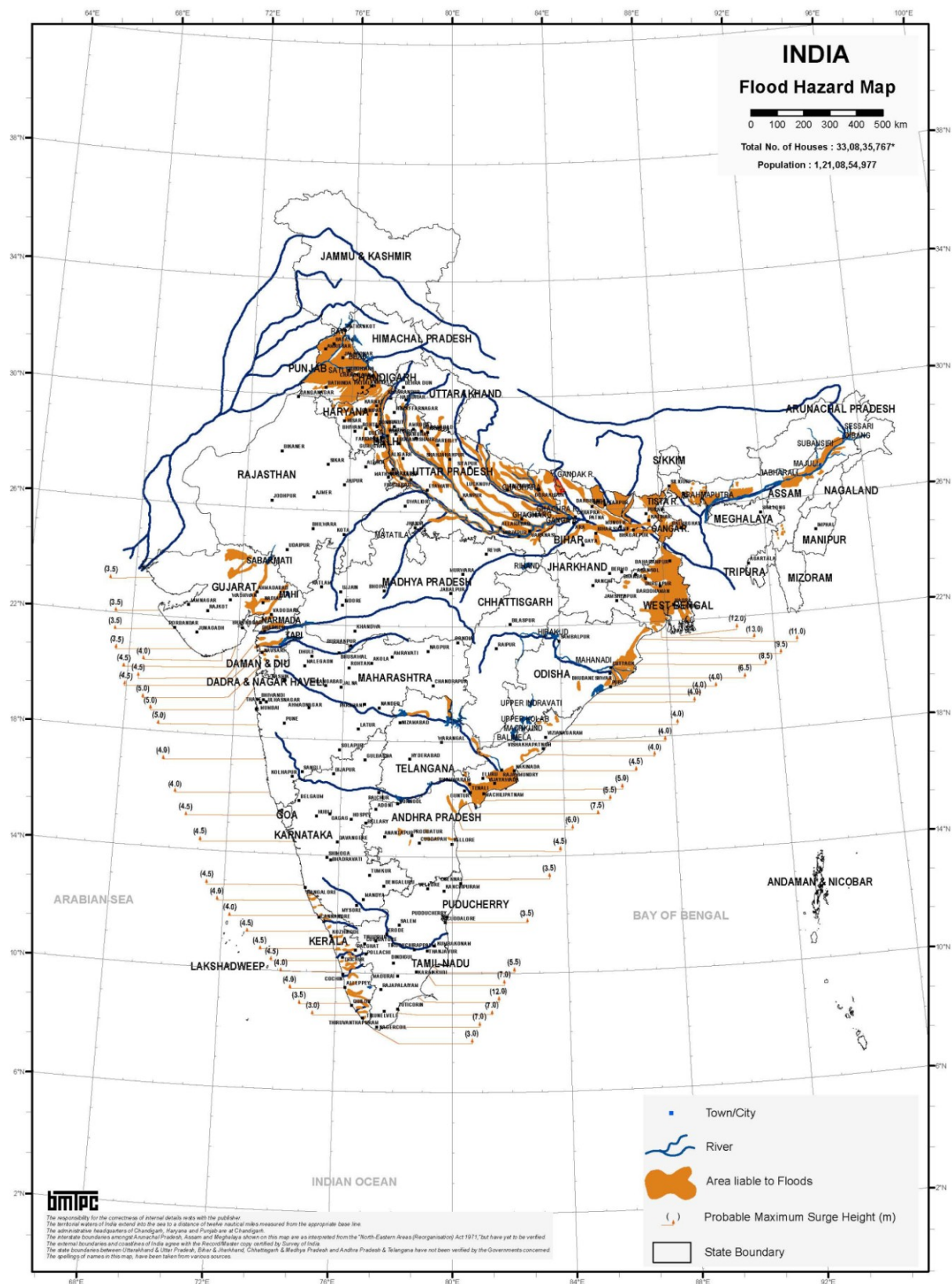
4.3.4 The Committee was informed that flood forecasting in the country is carried out by the Central Water Commission (CWC) through a network of 350 Flood Forecasting Stations, comprising 200 Level Forecast Stations and 150 Inflow Forecast Stations located across major river basins of the country. Flood forecasts are issued in coordination with the India Meteorological Department (IMD), State Governments and other concerned agencies. The CWC is issuing Advisory Flood Forecasts with a lead time of up to seven days using a pan-India hydrological modelling framework covering major river basins. The forecasting system utilises rainfall forecasts received from IMD, real-time hydro-meteorological observations, hydrological models and hydrodynamic models. Advisory Flood Forecasts are updated at regular intervals and disseminated through designated platforms. The Committee was informed that CWC is exploring the use of Artificial Intelligence (AI) and Machine Learning (ML) techniques for flood forecasting and related applications. These initiatives are being undertaken to improve forecasting capabilities and support flood management activities.

4.3.5 Flood forecasts, Advisory Flood Forecasts and flood warnings are disseminated through the Flood Forecasting Website, Advisory Flood Forecast Portal, Flood-Watch India 2.0 Mobile App, Common Alerting Protocol (CAP)-based SACHET platform, SMS, e-mail, WhatsApp and social media platforms. During severe and extreme flood situations, Orange and Red Bulletins are issued and shared with NDMA, MHA, State Governments, State Disaster Management Authorities, NDRF and other stakeholders. The Committee was informed that CWC issued more than 9,400 flood forecasts during 2025 with an accuracy exceeding 95 per cent.

Flood Plain Zoning and Prevention Measures

4.3.6 The Committee was informed that Flood Plain Zoning (FPZ) is recognised as an important non-structural measure for flood management. The objective of FPZ is to regulate land use in flood-prone areas in order to reduce flood damages. The Central Water Commission (CWC) has circulated a Model Flood Plain Zoning Bill to all States and Union Territories for adoption.

4.3.7 The CWC has prepared Technical Guidelines on Flood Plain Zoning for facilitating implementation of floodplain zoning by States and Union Territories. The Guidelines provide a framework for delineation of flood-prone areas and regulation of activities within such areas. The Committee notes that several States and Union Territories have undertaken measures relating to floodplain zoning and floodplain regulation. Capacity-building programmes and workshops are also being conducted to support implementation of Flood Plain Zoning. The Committee was informed that under the Flood Management and Border Areas Programme (FMBAP), preference is accorded to projects in States that have enacted legislation on flood Plain Zoning.



Mitigation

4.3.8 The Committee was informed that flood management measures in the country include both structural and non-structural interventions. Structural measures include construction of embankments, anti-erosion works, drainage development works, flood protection works and other flood management schemes implemented by State Governments with technical and financial support from the Union Government under the Flood Management and Border Areas Programme (FMBAP).

4.3.9 The reservoirs play an important role in flood moderation. The Central Water Commission monitors the storage position of 161 major reservoirs having a total live storage capacity of about 182 BCM. Reservoir storage provides inflow forecasts and advisories are issued regularly to support reservoir operation during flood situations. The flood forecasting, inundation forecasting and Flood Plain Zoning constitute important non-structural measures for flood management. Basin-specific inundation forecasting systems, Advisory Flood Forecasts and flood forecasting services are being utilised for flood risk management and response.

Preparedness

4.3.10 The Committee was informed that the Central Water Commission conducts pre-monsoon meetings with State Governments, India Meteorological Department (IMD), reservoir authorities and other stakeholders before the commencement of the monsoon season to review preparedness and flood management arrangements. During the monsoon season, flood monitoring and activities are carried out through the Central Flood Control Room (CFCR) at New Delhi, Regional Offices and Divisional Flood Control Rooms of CWC. Daily Flood Bulletins, Flood Situation Reports, Advisory Flood Forecasts and Special Bulletins are issued and disseminated to Central Ministries, State Governments and other stakeholders.

4.3.11 The flood forecasts and warnings are disseminated through the Flood Forecasting Website, FloodWatch India 2.0 Mobile Application, Common Alerting Protocol (CAP)-based SACHET platform, SMS, e-mail, WhatsApp and social media platforms. Preparedness measures also include monitoring of reservoir storage, coordination with reservoir authorities, operation of Flood Crisis Management Teams and regular review of flood situations during the monsoon period.

Capacity building and strengthening of expertise

4.3.12 The CWC provides technical support to States and other agencies in matters relating to flood forecasting, floodplain zoning, reservoir operation, hydrological studies and flood management. Workshops, consultations and training programmes are organised from time to time. The National Water Academy (NWA), Pune, conducted training to time for dissemination of technical knowledge and best practices relating to flood management programmes on Conventional Flood Forecasting and Effective Utilisation of Flood Forecasts during 2024–25 for officers of Central Government, State Governments, project authorities and other stakeholders. Flood forecasting, hydrological modelling and disaster preparedness are also covered under various training programmes conducted by the Central Water Commission (CWC).

4.3.13 The Committee was apprised that CWC is undertaking activities relating to Artificial Intelligence-based flood forecasting, glacial lake monitoring and remote sensing applications. Glacial lakes are monitored using satellite-based technologies and reports are shared with concerned States and agencies. In order to strengthen in-house technical expertise, officers of SWRMO have delivered training within CWC on developing and scaling up of AI-based short-range flood-forecasting model to all Flood Forecasting Stations in the country.

4.3.14 The CWC has developed in-house capacity in the field of Glacial Lake Monitoring using remote sensing technology. A Google Earth Engine based platform has been developed for analysis of Satellite imagery in an automatic manner which measures area of Glacial lakes and Water Bodies. CWC also uses Google Earth platform to map the flow path of Glacial lakes which is very useful in case of Risk mapping, GLOF Hazard etc. These Flow path maps are shared with States/UTs/Institutions/PSU etc. CWC also advises States regarding Glacial Lakes Monitoring through monthly monitoring report. CWC finalized criteria for Risk Assessment of Glacial lakes in IHR to identify the most vulnerable lakes and categorize them according to their risk score which is shared with the State Governments.

Institutional Coordination and Response Mechanism

4.3.15 The Committee was informed that flood forecasting activities are carried out by the Central Water Commission (CWC) in coordination with the India Meteorological Department (IMD), State Governments and other stakeholders. Quantitative Precipitation Forecasts, weather bulletins and other hydro-meteorological inputs received from IMD are utilised in flood forecasting and advisory services. The flood monitoring and dissemination activities are coordinated through the Central Flood Control Room (CFCR) at New Delhi, Regional Offices and Divisional Flood Control Rooms of CWC. Flood forecasts generated at forecasting stations are disseminated through the SACHET platform and other communication channels to State Governments, State Disaster Management Authorities and concerned agencies. Daily Flood Bulletins, Flood Situation Reports, Advisory Flood Forecasts and Special Orange and Red Bulletins are issued during the monsoon season and shared with NDMA, MHA, NDRF, IMD, NRSC, Railway Board, State Governments and other stakeholders. The Flood Crisis Management Teams have been constituted for coordination relating to reservoir operation during the monsoon period. Pre-monsoon meetings and consultations are held with State Governments, IMD, project authorities and other stakeholders to review flood preparedness and reservoir management arrangements.

Recommendation/Observation

4.3.16 The Committee notes that recurrent flooding in several parts of the country is aggravated by encroachment of floodplains, unregulated riverbed activities and lack of basin-level planning, leading to avoidable loss of life and property. The Committee, therefore, recommends that a comprehensive national framework be developed for monitoring and removal of encroachments in riverbeds and floodplains, supported by periodic mapping of encroached areas, so as to ensure accountability and prevent further violations.

4.3.17 The Committee further recommends that river basin-level flood management plans be prepared and implemented, integrating reservoir operations, upstream-downstream coordination and inter-state consultation mechanisms, particularly in the context of dam water releases, so as to prevent sudden flooding and downstream impacts. The Committee also recommends that clear protocols be established for dam operations, including mandatory prior information sharing among affected States, to ensure coordinated decision-making and minimise disaster risks arising from unregulated water releases.

4.3.18 The Committee notes that urban flooding has emerged as a major challenge due to unplanned urbanisation, inadequate drainage systems and encroachment of natural water bodies, affecting a large number of Urban Local Bodies across the country. The Committee, therefore, recommends that urban flood management should be incorporated as a core function of Urban Local Bodies, with mandatory preparation and periodic updating of city-level flood management plans which may include drainage master plans and emergency response protocols.

4.3.19 The Committee further recommends that storm-water drainage systems, wetlands, lakes and natural drainage channels be restored and maintained on a priority basis, and that encroachments on such systems be identified and removed in a time-bound manner, so as to restore natural water flow and reduce flood risk. The Committee also recommends that urban infrastructure planning pertaining to roads, housing and drainage systems, be aligned with natural topography and hydrological patterns to prevent waterlogging and urban flood situations.

4.4 Earthquakes

4.4.1 Earthquakes constitute one of the most serious natural hazards affecting India due to the country's extensive seismic vulnerability and the potential for sudden and widespread damage to life, property and critical infrastructure. Approximately 59 per cent of the country's landmass is prone to earthquakes of varying intensities and several densely populated urban centres, including those located in the Himalayan region, North-Eastern States and parts of northern and western India, fall within moderate to very high seismic risk zones.

Seismic Risk Assessment and Monitoring

4.4.2 Earthquake monitoring in the country is undertaken by the National Centre for Seismology (NCS) under the Ministry of Earth Sciences through the National Seismological Network (NSN). The network has expanded significantly in recent years, with the number of seismic observatories increasing from 80 in 2014 to 168 by February 2025, and subsequently reaching around 170 observatories across the country. The NSN continuously monitors seismic activity on a 24x7 basis and provides real-time earthquake information to Government agencies, State authorities and the public.

4.4.3 The seismic data from observatories are transmitted in real time to the Earthquake Monitoring Centre at New Delhi through telemetry systems and are processed for rapid estimation of earthquake parameters, generation of ShakeMaps and dissemination of information through websites, mobile applications and communication networks. The

BhooKamp mobile application has also been developed by NCS for providing real-time earthquake information to users.

4.4.4 Seismic hazard assessment in the country is supported through Seismic Microzonation studies undertaken by NCS and other scientific agencies. Seismic microzonation is a process of classifying a region into zones having similar earthquake-related ground response characteristics and is regarded as an important tool for earthquake preparedness and mitigation. Such studies have been completed for cities including Delhi, Bhubaneswar, Chennai, Coimbatore and Mangalore, while similar studies have also been undertaken for cities such as Guwahati, Kolkata, Bengaluru, Gangtok and Jabalpur. These studies support safer urban planning, infrastructure design and earthquake risk mitigation. The Committee notes that the Government is supporting detailed seismic hazard assessment, fault mapping, crustal deformation studies, paleoseismology research and earthquake precursor studies through the Ministry of Earth Sciences and associated scientific institutions.

Mitigation and Earthquake Safety

4.4.5 The Committee was informed that earthquake risk mitigation in India is primarily focused on promoting earthquake-resistant construction, strengthening structural safety and integrating seismic considerations into development planning. The National Disaster Management Authority has issued several guidelines relating to earthquake safety, including the National Disaster Management Guidelines on Management of Earthquakes, Guidelines on Seismic Retrofitting of Deficient Buildings and Structures, Home Owner's Guide for Earthquake and Cyclone Safety and Simplified Guidelines for Earthquake Safety based on the National Building Code, 2016.

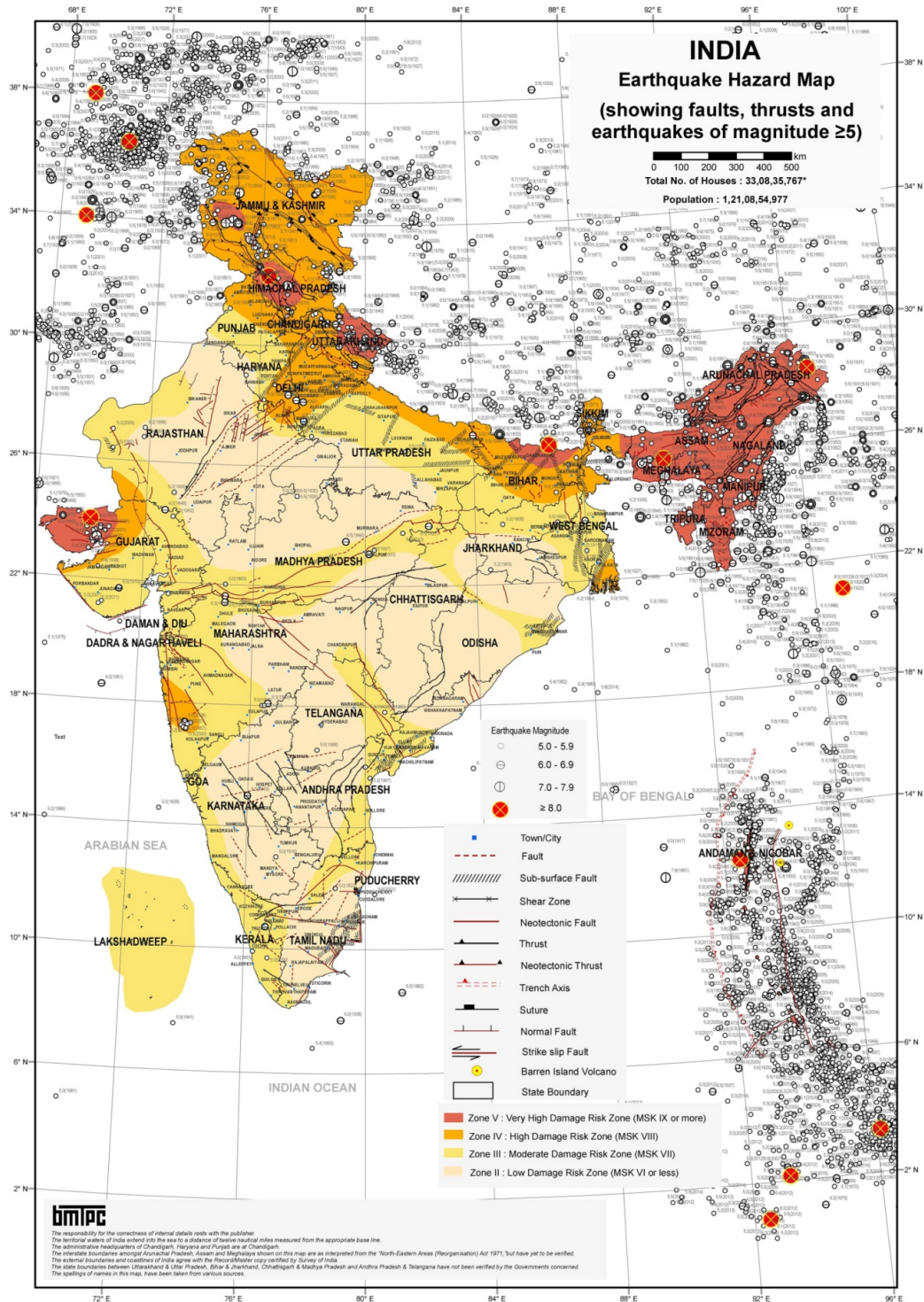
4.4.6 The Committee notes that seismic microzonation studies are increasingly being utilised to support safe land-use planning, infrastructure design and risk-informed urban development. These studies provide local-level information on ground shaking characteristics and support mitigation planning in vulnerable urban centres.

4.4.7 NDMA has undertaken Earthquake Disaster Risk Indexing (EDRI) for Indian cities to assess hazard, vulnerability and exposure. The first phase of the project covered 50 cities and a subsequent phase is planned to cover additional cities. The exercise is intended to support prioritisation of earthquake risk reduction measures and strengthen urban resilience.

Preparedness and Capacity Building

4.4.8 The Committee notes that preparedness for earthquakes depends largely on awareness, training, mock exercises and institutional readiness, as earthquakes provide little or no warning before occurrence. In this regard, NDMA, NIDM and NDRF regularly conduct awareness campaigns, mock drills and capacity-building programmes across the country. The NDRF conducts Community Awareness Programmes, School Safety Programmes and Mock Exercises in collaboration with State Governments and other stakeholders. During the last five years, NDRF conducted 955 Familiarisation Exercises (FAMEx) among communities and 6,225 School Safety Programmes in disaster-vulnerable schools across the country. The National Centre for Seismology organises training courses, awareness programmes and technical training

in seismology and allied subjects for scientists, station operators and personnel from various Government organisations. These initiatives contribute to strengthening technical capacity for earthquake monitoring and disaster preparedness.



Map 4.3 :- Earthquake Hazard Map (Source:- BMTPC Vulnerability Atlas of India)

Early Warning and Response Mechanism

4.4.9 The Committee was informed by representatives of State Governments that research and development activities relating to Earthquake Early Warning (EEW) systems are underway, particularly in the Himalayan region. A dedicated real-time seismic network for EEW has been initiated and prototype algorithms for rapid detection of seismic waves, magnitude estimation and shaking prediction are being developed and tested.

4.4.10 The Committee notes that earthquake response in the country is supported through the institutional framework established under the Disaster Management Act, 2005, comprising NDMA, SDMA, NDRF and district-level authorities. NDRF has been mandated to provide specialised response during disasters including earthquakes and undertakes search and rescue operations, evacuation, medical assistance and coordination with other response agencies. The Committee further notes that continuous monitoring through the National Seismological Network, dissemination of real-time earthquake information, strengthening of technical capacities and development of earthquake early warning capabilities are contributing to a more robust national framework for earthquake preparedness and response.

Recommendation/Observation

4.4.11 The Committee notes that a large proportion of the country lies in moderate to high seismic zones, and that structural vulnerability of buildings remains a major risk factor, particularly in urban and densely populated areas. The Committee, therefore, recommends that strict enforcement of earthquake-resistant building codes be ensured across all States/Union Territories, and that compliance mechanisms be strengthened through periodic inspections and certification systems, so as to prevent unsafe construction practices.

4.4.12 The Committee notes that earthquakes constitute one of the most serious natural hazards affecting the country due to its extensive seismic vulnerability. Hazard mapping and land-use planning is vital to minimize the loss of life, property and critical infrastructure, in the event of an earthquake. The Committee recommends that roadmap for earthquake management must give impetus to preparation and regular updation of seismic hazard maps, expansion of seismic monitoring networks and earthquake observation stations, restrict construction in high-risk seismic zones and promotion of safe urban planning based on scientific risk assessments. The Committee also recommends that provisions should be made for sufficient financial support for scientific research on earthquake prediction, risk assessment and resilient construction technologies.

4.4.13 The earthquake mitigation and management require coordination efforts among government organisations, local authorities, emergency services and public. The Committee is of the view that inter agency coordination be strengthened by adopting measures which may include regular earthquake drills in offices, schools, hospitals and public institutions, development of evacuation plans and identification of safe assembly areas, stocking emergency shelters with food, water, medicines and essential supplies, organizing awareness campaigns on earthquake safety and preparedness, equipping

disaster response agencies with modern rescue equipment and communication systems and developing policies that promote resilient development and rapid post disaster recovery.

4.4.14 The Committee is of the view that retrofitting existing critical infrastructure is essential to reduce potential impacts of earthquake and ensure continuity of essential services. The Committee recommends that a time-bound programme for retrofitting of critical infrastructure, including schools, hospital, power plants, water supply systems, communication facilities and emergency response centres, be undertaken, with clear prioritisation of high-risk regions, since they are vital during and after seismic events and also to minimise potential losses during seismic events. The Committee observes that by adopting a systematic and phased retrofitting strategy, the government agencies and infrastructure owners can significantly reduce the risk of structural failure, protect human lives, minimize economic losses and maintain the uninterrupted operation of critical services during an event of earthquake. The Committee also recommends that unsafe and structurally deficient buildings in high-risk zones be identified and appropriate action should be taken, including retrofitting or demolition, to reduce disaster vulnerability.

4.5 Tsunami

4.5.1 Tsunamis, though relatively infrequent, pose a high-impact disaster risk to India's coastal regions and island territories. The 2004 Indian Ocean tsunami highlighted the vulnerability of coastal communities, infrastructure and ecosystems to such events. India's eastern coastline along the Bay of Bengal, as well as parts of the western coast and island regions such as the Andaman & Nicobar Islands and Lakshadweep, remain exposed to tsunami risk due to their proximity to seismic zones and undersea tectonic activity.

Risk Assessment

4.5.2 Risk assessment for tsunamis is based on seismic activity in ocean basins, coastal vulnerability, elevation profiles, and exposure of coastal populations and infrastructure. The Indian coastline, particularly the eastern coast, is vulnerable to tsunamis generated by undersea earthquakes in the Indian Ocean region. The disaster management framework recognises coastal hazards as a major area of concern, with long coastlines and densely populated coastal districts increasing exposure to such risks. Island territories are particularly vulnerable due to their geographical isolation, limited evacuation options and dependence on coastal infrastructure. Scientific monitoring of seismic activity and ocean behaviour forms the basis of tsunami risk assessment, enabling identification of high-risk zones and supporting preparedness planning.

Mitigation and Preparedness

4.5.3 Mitigation of tsunami risk focuses on reducing exposure and strengthening coastal resilience. Coastal hazard zonation and regulation of construction in vulnerable coastal areas are critical measures to minimise damage. Land-use planning plays an important role in ensuring that critical infrastructure and settlements are not located in high-risk coastal zones. Natural barriers such as mangroves, coastal vegetation and sand dunes act as effective buffers against

tsunami waves and are increasingly recognised as part of ecosystem-based mitigation strategies. These measures not only reduce wave energy but also contribute to long-term coastal stability. Structural measures such as seawalls and coastal embankments may be considered in specific high-risk areas; however, they are generally adopted selectively due to environmental and economic considerations. The broader disaster management framework emphasises integrating mitigation measures into development planning to ensure resilience of coastal infrastructure and communities.

4.5.4 Preparedness for tsunamis is centred on early warning systems, evacuation planning and community awareness. India has established a robust tsunami early warning system that integrates seismic monitoring, ocean observations and modelling to provide timely alerts. The Indian Tsunami Early Warning Centre, operated by Indian National Centre for Ocean Information Services (INCOIS), issues rapid bulletins and advisories to national and state authorities. These warnings are disseminated through multiple communication channels including SMS alerts, siren systems, websites, mobile applications and coordination with disaster management authorities.

4.5.5 Preparedness measures also include identification of evacuation routes, installation of signage in coastal areas, development of evacuation plans and regular community drills. Awareness programmes ensure that coastal populations understand warning signals and appropriate response actions. Regular mock exercises conducted by disaster response agencies, including multi-agency drills in coastal states, play an important role in strengthening preparedness and ensuring coordination among stakeholders.

Capacity Building and Response Mechanism

4.5.6 Capacity building for tsunami management involves strengthening institutional coordination, technical capabilities and community awareness. Training programmes, mock drills and awareness campaigns help build the capacity of coastal communities and local administrations to respond effectively to tsunami warnings. At the operational level, response requires rapid evacuation of coastal populations, deployment of rescue and relief teams, and coordination among multiple agencies including disaster management authorities, coastal administrations and emergency services.

4.5.7 The disaster management framework emphasises coordinated action across national, state and district levels, supported by early warning systems and preparedness mechanisms. The integration of scientific monitoring, warning dissemination, community preparedness and institutional coordination forms the basis of effective tsunami risk management in the country.

Recommendation/Observation

4.5.8 The Committee notes with appreciation the establishment of a robust Tsunami Early Warning System by the Indian National Centre for Ocean Information Services (INCOIS), integrating seismic monitoring, ocean observations and advanced modelling for timely dissemination of warnings. However, the Committee is of the considered view that the effectiveness of any warning system ultimately depends on its successful transmission to the last mile and the preparedness of vulnerable communities to respond promptly. The

Committee, therefore, recommends that the Government strengthen the last-mile connectivity of tsunami warning dissemination by expanding multilingual alert systems, enhancing the coverage of coastal siren networks, integrating warnings with all major mobile communication platforms, and conducting periodic community-based evacuation drills in every tsunami-prone coastal district and island territory. Special emphasis should be placed on sensitising fishermen, tourists, school children and other vulnerable groups through sustained awareness campaigns and mandatory mock exercises.

4.5.9 The Committee observes that unplanned coastal development and degradation of natural coastal ecosystems significantly increase the vulnerability of coastal populations to tsunami impacts. While appreciating the ongoing efforts towards coastal hazard zonation and land-use planning, the Committee recommends that all major infrastructure projects and urban development plans in tsunami-prone areas be subjected to comprehensive tsunami risk assessments before approval. The Committee further recommends large-scale restoration and conservation of mangroves, coastal vegetation, coral reefs and sand dunes as cost-effective, sustainable and environmentally sound natural buffers against tsunami waves. Such ecosystem-based mitigation measures should be integrated with Coastal Regulation Zone (CRZ) planning and supported through dedicated financial assistance to coastal States and Union Territories.

4.6 Landslides & Avalanches

4.6.1 Landslides constitute one of the major natural hazards affecting the country, particularly in the Himalayan region, North-Eastern States and the Western Ghats. Snow avalanches are confined primarily to the higher reaches of the Himalayas but pose significant risks to human settlements, strategic infrastructure, transport corridors and defence establishments. The Committee notes that both hazards require specialised approaches to risk assessment, monitoring, forecasting, mitigation and preparedness owing to the complex terrain and climatic conditions in which they occur.

Risk Assessment and Hazard Mapping

4.6.2 The Committee was informed that the Geological Survey of India (GSI) has undertaken National Landslide Susceptibility Mapping (NLSM) covering approximately 4.3 lakh sq. km. of landslide-prone terrain spread across 19 States and Union Territories. The programme has covered 181 landslide-prone districts and has resulted in the preparation of susceptibility maps, development of a national landslide inventory containing more than one lakh landslide records and identification of over 7,000 landslide hotspots requiring mitigation measures. The Geological Survey of India carried out susceptibility assessment using geological, geomorphological, hydrological and land-use parameters supported by remote sensing, GIS-based analysis and field investigations. Multi-scale mapping at macro, meso and micro levels is undertaken to support infrastructure planning, disaster risk reduction and land-use management in vulnerable regions. With regard to avalanches, the hazard assessment is undertaken by the Defence Geoinformatics Research Establishment (DGRE) through field observations, snowpack studies, meteorological observations, terrain analysis and remote sensing techniques. Avalanche hazard maps are prepared using Digital Elevation Models (DEMs), snow and weather data and

avalanche dynamics models for identification of avalanche-prone slopes and vulnerable locations.

Forecasting and Early Warning Systems

4.6.3 The Committee was informed that the National Landslide Forecasting Centre (NLFC) has been established for operational landslide forecasting and warning services. The forecasting framework integrates rainfall information, landslide susceptibility maps, satellite observations and field-based data to generate district-level landslide forecasts. Forecast bulletins are issued for multiple landslide-prone districts and are disseminated to stakeholders for preparedness and response measures. Avalanche forecasting and warning services are provided by DGRE through a network of observatories and Automatic Weather Stations established across avalanche-prone regions. Daily Avalanche Warning Bulletins are issued for vulnerable sectors and classify avalanche danger levels into Green, Yellow, Orange, Red and Black categories. The warnings are disseminated through SACHET, Army communication networks, e-mail services and district authorities to facilitate timely preparedness measures.

4.6.4 The Committee notes that DGRE maintains an extensive observation network comprising manual observatories, Automatic Weather Stations and specialised snow and weather monitoring systems in Jammu & Kashmir, Ladakh, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh. These observations support avalanche forecasting and hazard assessment activities on a continuous basis.

Mitigation Measures

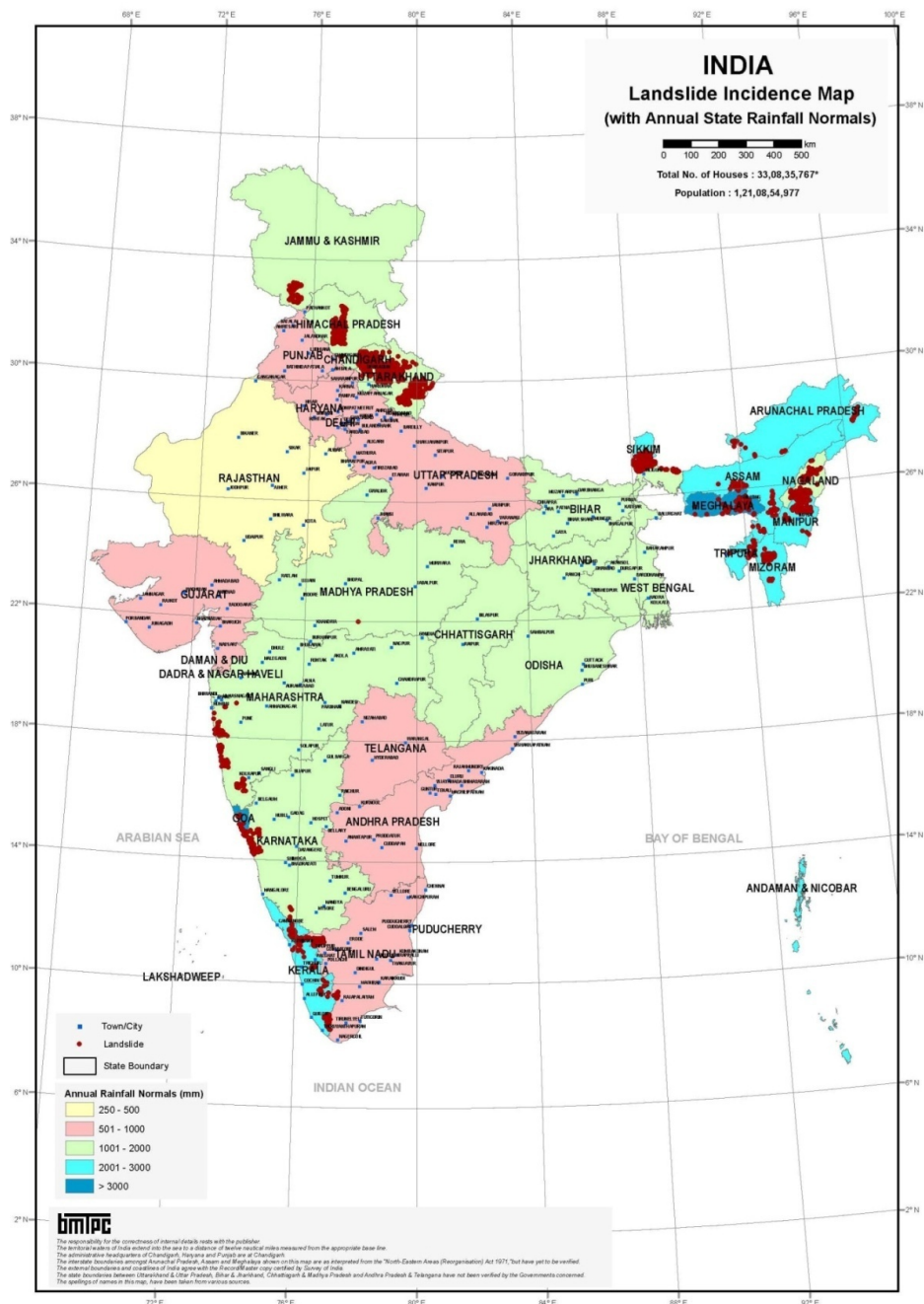
4.6.5 The Committee was informed that landslide mitigation measures include slope stabilisation works, drainage correction, retaining structures, rock bolting, erosion control measures and other engineering interventions based on site-specific geotechnical investigations. Scientific investigations undertaken by GSI provide recommendations for stabilisation of vulnerable slopes and mitigation of identified landslide hazards. The Committee notes that landslide susceptibility maps and hazard zonation studies are intended to support safer infrastructure development, route alignment, settlement planning and regulation of development activities in vulnerable hill regions.

4.6.6 In avalanche-prone areas, mitigation measures include installation of snow bridges, snow nets, snow galleries, snow sheds, deflection walls, guide walls, catch dams and avalanche mounds for protection of critical infrastructure and transport corridors. DGRE also undertakes consultancy and technical assessments for planning and implementation of avalanche mitigation measures in vulnerable sectors.

Preparedness and Capacity Building

4.6.7 The Committee was informed that preparedness for landslides includes dissemination of forecasts and warnings, community awareness, identification of vulnerable locations and coordination among scientific agencies, State Governments and district administrations. Efforts are also being undertaken to improve forecast accuracy and expand the coverage of landslide forecasting services in vulnerable regions.

4.6.8 DGRE conducts avalanche awareness programmes, user interaction exercises, safety audits and specialised training programmes for personnel of the Indian Army, Border Roads Organisation, Indo-Tibetan Border Police, National Disaster Response Force and State Disaster Response Forces. During recent years, several Capacity Enhancement Programmes have been conducted and a large number of personnel have been trained in avalanche forecasting, safety and response procedures. The scientific institutions continue to promote the use of advanced technologies, including remote sensing, GIS platforms, avalanche dynamics models and decision-support systems for strengthening preparedness and risk reduction efforts.



Map 4.4 :- Landslide Incidence Map(Source:- BMTPC Vulnerability Atlas of India)

Institutional Coordination and Response Mechanism

4.6.9 Landslide and avalanche management involves coordinated action among multiple agencies including GSI, DGRE, IMD, NDMA, State Disaster Management Authorities and district administrations. Data sharing, hazard assessment, forecasting, warning dissemination and preparedness activities are undertaken through collaborative institutional arrangements. The Committee was informed that post-disaster response includes rapid assessment of affected areas, search and rescue operations, evacuation of vulnerable populations, restoration of connectivity and technical evaluation of residual risks. DGRE and GSI also provide technical support for hazard assessment and recommendations relating to stabilisation and reconstruction in affected areas. Continuous strengthening of hazard mapping, forecasting capabilities, monitoring infrastructure, scientific research and institutional coordination remains important for reducing losses arising from landslides and snow avalanches in vulnerable regions of the country.

Recommendation/Observation

4.6.10 The Committee notes that landslides in hilly regions are increasingly linked to unregulated construction, slope destabilisation and environmental degradation, leading to recurring disasters and loss of life. The Committee recommends that landslide prone areas should be identified through hazard mapping and construction in high risk areas be avoided. The Committee also recommends that clear regulatory guidelines be framed for land-use planning and building codes and enforced to restrict construction and developmental activities in highly vulnerable slope areas, particularly in hill districts and tourist zones.

4.6.11 The Committee also notes that deforestation and uncontrolled excavation on hill side also lead to slope destabilisation and landslides. The Committee is of the view that slope stability can be improved by planting deep rooted vegetation to hold soil in hilly regions, at the same time construction of retaining walls and rock barriers can also improve the slope stability, therefore, thrust may be given to such activities. The Committee also feels that measures must be taken to regulate mining, quarrying and construction activities in vulnerable areas to reduce the likelihood of landslides which could result in severe damage.

4.6.12 The Committee recommends that infrastructure projects in hilly regions be subject to mandatory geotechnical and environmental assessments, with strict monitoring of compliance during execution, so as to prevent slope de-stabilization and associated risks. The Committee also recommends that priority be given to implementation of site-specific slope stabilization and drainage measures in identified landslide hotspots to reduce immediate risk in vulnerable areas.

4.7 Heat Waves

4.7.1 Heat waves have emerged as a major and increasingly frequent hazard in India, particularly affecting large parts of northern, central and north-western regions. Rising temperatures, changing climate patterns, increasing urbanisation and the urban heat island effect

have significantly amplified heat stress, making heat waves a growing public health concern. The impact is particularly severe on vulnerable populations such as the elderly, children, outdoor workers and economically weaker sections.

Risk Assessment

4.7.2 Heat wave risk in India is characterised by prolonged periods of abnormally high temperatures, often exceeding 40°C in several parts of the country. The frequency, intensity and duration of heat waves have shown an increasing trend due to climate variability and urbanisation. The most affected regions fall within the Core Heat Wave Zone, comprising north-western, central and parts of eastern India. A large population is exposed to moderate to high heat wave risk. Urban areas are particularly vulnerable due to the urban heat island effect, caused by dense built-up areas, reduced vegetation and heat-retaining surfaces, leading to higher local temperatures and increased health risks. Risk assessment is further supported by heat index mapping, which combines temperature and humidity parameters to identify high-risk zones and guide targeted interventions.

Mitigation

4.7.3 Mitigation measures for heat waves focus on reducing exposure and improving adaptive capacity, particularly in urban areas. Key interventions include increasing green cover through plantation drives, development of urban parks and promotion of climate-sensitive urban planning. Measures such as cool roofing and reflective surface programmes have been implemented to reduce indoor temperatures, especially in vulnerable settlements. Expansion of shaded spaces, water bodies and improved ventilation also contributes to lowering heat stress. Provision of drinking water facilities in public places, particularly in heat-prone districts, has been prioritised to reduce dehydration and heat-related illnesses. These interventions form part of broader efforts to integrate climate resilience into development planning.

Preparedness

4.7.4 Preparedness for heat waves is primarily operationalised through Heat Action Plans (HAPs) at State and city levels. These plans provide a framework for early warning dissemination, inter-agency coordination, public awareness and emergency response. The Indian Meteorological Department (IMD) has established a multi-layer early warning system, including seasonal forecasts, extended forecasts, short-range forecasts and daily alerts. Warnings are issued in a colour-coded format (Yellow, Orange and Red) and disseminated through multiple communication channels.

4.7.5 Public awareness campaigns emphasise preventive measures such as maintaining hydration, avoiding outdoor exposure during peak heat hours and recognising symptoms of heat-related illnesses. Preparedness measures also include regulation of working hours, establishment of cooling centres and ensuring uninterrupted supply of water and electricity in affected areas.

Capacity Building and Response Mechanism

4.7.6 Capacity building for heat wave management involves strengthening institutional coordination, health system preparedness and community-level awareness. Training programmes are conducted for officials, healthcare workers and local bodies to improve response capabilities. Response mechanisms include deployment of medical teams, establishment of heat stroke treatment facilities and setting up temporary medical camps in severely affected areas. Special attention is given to vulnerable groups through targeted interventions under Heat Action Plans. Institutional coordination among agencies such as IMD, NDMA, State Governments and health departments ensures timely response and effective implementation of mitigation and preparedness measures. The use of systems such as the Common Alerting Protocol further strengthens last-mile dissemination of warnings.

Recommendation/Observation

4.7.7 The Committee notes that heat waves are emerging as a major public health hazard, particularly affecting vulnerable populations in urban and semi-urban areas. The Committee, therefore, recommends that Heat Action Plans be strengthened and uniformly implemented across all heat-prone States and cities, with clear delineation of roles and responsibilities of departments concerned.

4.7.8 The Committee further recommends that urban planning incorporate heat-resilient measures, including increased green cover, cool roofing, shaded public spaces and improved water access, so as to reduce heat stress and protect vulnerable populations. The Committee also recommends that health systems be strengthened for heat wave response, including availability of cooling centres, medical preparedness and targeted awareness campaigns.

4.8 Chemical & Industrial Disasters

4.8.1 Chemical and industrial disasters constitute a critical category of man-made hazards, characterised by their low frequency but high impact nature, often resulting in significant loss of life, environmental damage and long-term public health consequences. Incidents such as the Bhopal Gas Tragedy (1984) and the Visakhapatnam gas leak (2020) have underscored the need for robust regulatory frameworks, risk assessment mechanisms and preparedness systems in industrial operations.

4.8.2 India has a large and expanding industrial base, including petrochemical complexes, refineries, fertiliser plants and hazardous chemical industries. The presence of such installations, particularly in densely populated regions, increases the risk of chemical accidents, necessitating systematic identification and management of hazardous industrial clusters. The disaster management framework provides for mapping of such vulnerable industrial zones and integration of risk considerations into planning processes.

Risk Assessment

4.8.3 Risk assessment for chemical and industrial disasters involves identification of hazardous industries, assessment of potential accident scenarios and evaluation of exposure of nearby populations and ecosystems. Industrial accidents such as chemical leaks, explosions and fires can have cascading impacts, including toxic exposure, environmental contamination and disruption of essential services.

4.8.4 The regulatory framework mandates identification of Major Accident Hazard (MAH) units and preparation of risk inventories at national and state levels. Industrial clusters handling hazardous chemicals, particularly in regions such as coastal industrial belts and urban-industrial zones, are recognised as high-risk areas requiring continuous monitoring and regulation. The increasing scale of industrialisation, proximity of industries to urban settlements and transportation of hazardous chemicals further amplify risks, making comprehensive risk assessment and monitoring essential components of disaster management planning.

Mitigation and Preparedness

4.8.5 Mitigation measures for chemical and industrial disasters are primarily regulatory and technological in nature. The framework includes enforcement of safety standards under the Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules and Chemical Accidents (Emergency Planning, Preparedness and Response) Rules 1996, which mandate compliance by industrial units handling hazardous substances.

4.8.6 Industrial establishments are required to implement Safety Management Systems, maintain updated safety protocols and ensure adherence to operational standards to minimise accident risks. Land-use planning measures, including maintaining buffer zones between industrial units and residential areas, are also emphasised to reduce exposure. Further, industries are mandated to prepare and regularly update On-site and Off-site Emergency Plans, which outline procedures for accident containment, evacuation and coordination with district authorities. Continuous monitoring, inspection and enforcement by regulatory authorities play a key role in ensuring compliance and reducing risks.

4.8.7 Preparedness for chemical and industrial disasters involves strengthening institutional coordination, emergency planning and response mechanisms. Regular mock drills and joint exercises are conducted involving industrial units, district administration and emergency services to test response systems and improve coordination.

4.8.8 State Disaster Management Plans incorporate Emergency Support Functions (ESFs) for handling hazardous material incidents, including specialised response teams, medical preparedness and communication systems. Early warning and information dissemination mechanisms are also established to alert communities in case of industrial accidents. Preparedness measures further include stockpiling of emergency equipment such as neutralising agents, personal protective equipment and decontamination facilities, along with clearly defined evacuation protocols for populations residing in proximity to hazardous industries.

Capacity Building and Response Mechanism

4.8.9 Capacity building for chemical disaster management involves training of industrial personnel, emergency responders and local authorities in handling hazardous materials and responding to industrial accidents. Specialised training programmes and awareness initiatives are conducted to enhance preparedness at all levels.

4.8.10 Response mechanisms involve rapid containment of the incident, evacuation of affected populations, medical treatment of exposed individuals and environmental remediation. Coordination among multiple agencies, including disaster management authorities, fire services, health departments and industrial management, is essential for effective response.

4.8.11 The institutional framework emphasises a coordinated and multi-agency approach, supported by regulatory compliance, technical capacity and community awareness, to minimise the impact of chemical and industrial disasters.

Recommendation/Observation

4.8.12 The Committee notes that chemical and industrial disasters, though infrequent, have the potential for large-scale human and environmental impact, particularly in densely populated industrial regions. The Committee, therefore, recommends that strict enforcement of safety regulations and periodic safety audits of hazardous industries be ensured, with clear accountability for non-compliance.

4.8.13 The Committee further recommends that on-site and off-site emergency plans be regularly updated and tested through mock drills, involving district authorities and local communities, so as to ensure preparedness for industrial accidents. The Committee also recommends that buffer zones between hazardous industries and residential areas be strictly maintained, and that land-use planning be aligned with industrial risk considerations, to minimise exposure of populations to industrial hazards.

4.8.14 The Committee notes that the transportation of hazardous materials poses significant risks to public safety, human health and the environment, particularly along densely populated and high-traffic corridors, and that existing mechanisms for monitoring, regulation and emergency response during transit require further strengthening. The Committee, therefore, recommends that a comprehensive regulatory and monitoring framework be established for the safe transportation of hazardous materials, including mandatory GPS tracking of transport vehicles, route risk assessment and real-time monitoring systems, so as to ensure safe and secure movement. The Committee further recommends that district administrations and emergency services be equipped with specialised response protocols, equipment and trained hazardous material (HAZMAT) response teams along major transport corridors to effectively manage incidents involving chemical spills or leaks. The Committee also recommends that standardised emergency response guidelines be issued for accidents involving hazardous materials during transportation, with clearly defined roles and responsibilities for all concerned agencies to ensure timely response, effective containment and minimisation of potential damage.

Chapter V – Response, Relief and Rehabilitation

5.1 Overview of Response Mechanism

5.1.1 The Committee, in its examination of the disaster response architecture in the country, noted that the Ministry of Home Affairs functions as the nodal Ministry for coordinating response and relief measures. The Ministry apprised the Committee that response operations are undertaken through a multi-tiered institutional framework comprising the National Disaster Response Force (NDRF), State Disaster Response Forces (SDRFs), district administrations and other line departments.

5.1.2 The Committee was further informed that Emergency Operation Centres (EOCs) operate at the State and district levels on a 24×7 basis to ensure real-time monitoring and coordination. It was also indicated that pre-positioning of response teams, advance advisories and activation of control rooms form an integral part of preparedness prior to disaster events.

5.1.3 In this regard, the Committee observed that in certain States, the response framework is supported by a well-established institutional structure comprising the State Disaster Management Authority, State Emergency Operation Centre (SEOC), District Emergency Operation Centres (DEOCs) and coordinated deployment of SDRF, NDRF and other agencies.

5.2 National Disaster Response Force (NDRF)

5.2.1 It was informed that the National Disaster Response Force (NDRF) was constituted in 2006 under Section 44 of the Disaster Management Act, 2005, for the purpose of specialised response to natural and man-made disasters, including Chemical, Biological, Radiological and Nuclear (CBRN) disasters. The Force was raised with battalions drawn from various Central Armed Police Forces (CAPFs). The Committee was also informed that, at present, the NDRF comprises 16 battalions and 28 Regional Response Centres (RRCs), with each battalion consisting of 1,149 personnel. These battalions are deployed strategically across the country based on the vulnerability profile of regions, so as to provide immediate response. The location of the 16 NDRF battalions is as follows:

Table 5.1 Number and Location of NDRF Battalion

Sl. No.	Name of NDRF Battalion	Place and State of Location
1.	1 Bn NDRF	Guwahati (Assam)
2.	2 Bn NDRF	Kolkata (West Bengal)
3.	3 Bn NDRF	Mundali (Odisha)
4.	4 Bn NDRF	Arakkonam (Tamil Nadu)
5.	5 Bn NDRF	Pune (Maharashtra)
6.	6 Bn NDRF	Vadodara (Gujarat)
7.	7 Bn NDRF	Bhatinda (Punjab)
8.	8 Bn NDRF	Ghaziabad (Uttar Pradesh)
9.	9 Bn NDRF	Bihta Patna (Bihar)
10.	10 Bn NDRF	Krishna (Karnataka)
11.	11 Bn NDRF	Varanasi (Uttar Pradesh)
12.	12 Bn NDRF	Itanagar (Arunachal Pradesh)
13.	13 Bn NDRF	Jammu & Kashmir
14.	14 Bn NDRF	Himachal Pradesh

Sl. No.	Name of NDRF Battalion	Place and State of Location
15.	15 Bn NDRF	Uttarakhand
16.	16 Bn NDRF	NCT of Delhi

5.2.2 The Committee noted that NDRF has been mandated to respond to all natural and man-made disasters in the country and abroad, except fire. The mandate, functions and responsibilities of the NDRF, as under:

a) Disaster Response

- i. Providing specialised response for rescue and relief in case of disasters-natural and manmade.
- ii. Deploying/ Pre-positioning in case of impending disasters.
- iii. Assistance to civil authorities in distribution of relief material during/after disaster.
- iv. Co-ordination with other agencies engaged in rescue/relief work

b) Capacity Building

- i. Training of State Disaster Response Forces (SDRFs), police, civil defence, Home Guards, and community volunteers.
- ii. Promoting disaster preparedness at the community level through Community Awareness Programs (CAPs), School Safety Programs (SSPs), Mock Exercises (MEx) with stakeholders.

c) International Humanitarian Assistance

- i. Rendering assistance to affected countries during major disasters as directed by the Government of India.
- ii. Participating in United Nations INSARAG activities and other international disaster management forums.

Functions & Responsibilities of NDRF:

a) Response

- i. Search, rescue, and evacuation operations during natural & man-made disasters (floods, cyclones, earthquakes, landslides, CBRN etc.).
- ii. Assistance to States/ Districts during disaster in providing immediate medical care, psychological support, and relief.
- iii. Provide specialized assistance during mega events and mass gatherings (e.g., Kumbh Mela, Amarnath Yatra, G20 Summit) to prevent disaster-like incidents.

b) Preparedness

- i. Imparting training to SDRFs, Civil Defence, Home Guards, and local volunteers.
- ii. Conducting mock exercises and joint drills with SDRFs, Armed Forces, and local administration.
- iii. Training and sensitization of district authorities, schools, NGOs, volunteers and communities.

c) Mitigation and Capacity Building

- i. Conducting community outreach programs to inculcate a culture of disaster resilience & adaptation.
- ii. Technical advice to States and Union Territories in strengthening disaster preparedness.

d) Coordination

- i. Coordinating with Early Warning Agencies (IMD/ CWC/GSI/ INCOIS etc.), NDMAs, SDMAAs, SDRFs, State Governments, and other stakeholders for effective response.
- ii. Coordinate with IDS/ Airforce for airlift in case of contingency.

e) International Cooperation

- i. Participation in Humanitarian Assistance and Disaster Relief (HADR) operations in affected countries (e.g., Nepal Earthquake 2015, Turkey Earthquake 2023, Myanmar Ops - 2025).
- ii. Representation at global forums like UN INSARAG, SAARC Disaster Management Centre, and ASEAN initiatives, QUAD, SCO, BIMSTEC etc.

Operational Achievements (2021–2025)

5.2.3 The Committee was informed that besides responding to disasters, NDRF battalions are instrumental in capacity building of the States/UTs and stakeholders falling under the Area of Responsibility (AOR) of the respective battalion. The NDRF also provides training to the personnel of State Disaster Response Forces (SDRFs) and other stakeholders. Based on early warnings and in coordination with State/UT authorities, the NDRF pre-positions its teams equipped with all necessary equipment.

5.2.4 The Committee noted that during the period from 01.04.2021 to 31.03.2025, the NDRF rescued 24,847 persons, evacuated 1,61,353 persons, recovered 2,703 dead bodies and rescued 5,204 livestock across various types of disaster incidents. The event-wise details of operational achievements are given in the following table:

Table 5.2 Event wise summary of Operational Achievement of NDRF(01.04.2021 to 31.03.2025)

Sl. No.	TYPE OF INCIDENTS	ACHIEVEMENTS			
		RESCUED	EVACUATED	DEAD BODIES	LIVESTOCK
1	FLOODS/MONSOON	22068	128651	209	5009
2	DROWNING CASES	53	6	1205	1
3	LANDSLIDE	25	16881	375	1
4	TRAIN ACCIDENTS	45	22	137	0
5	CSSR/BUILDING COLLAPSE	126	155	261	19
6	BOAT CAPSIZE	177	0	88	14
7	BOREWELL INCIDENTS	15	0	16	0
8	MELA/FESTIVAL	396	3637	22	10
9	FIRE INCIDENTS	1	0	34	0
10	VEHICLE INCIDENTS	27	55	155	0
11	CBRN INCIDENTS	7	1	13	1
12	CYCLONES	1689	11821	8	97
13	EARTHQUAKE	2	0	94	0
14	NATIONAL/ SPORTS/ VVIP VISIT/ PARLIAMENT	88	2	0	0
15	ANY OTHER INCIDENTS	128	122	86	52
	TOTAL	24847	161353	2703	5204

5.2.5 The Committee observed that floods and monsoon-related incidents accounted for the largest share of NDRF operations, with 22,068 persons rescued and 1,28,651 persons evacuated during the period under review. Cyclone-related operations also involved significant mobilisation, with 1,689 persons rescued and 11,821 persons evacuated. The NDRF was also deployed during non-disaster events such as festivals, mass gatherings and VVIP visits, indicating the expanding scope of its operational engagement.

5.2.6 **Pre-positioning of NDRF:** It has been stated that since Monsoon is an annual phenomenon in the country, which brings prosperity as well as devastation in form of floods. NDRF, in coordination with State Authorities shortlists the locations, which are most vulnerable to the floods and accordingly as a pre-emptive measure, NDRF teams equipped with flood

rescue equipment, along with other necessary equipment are pre-positioned. This is part of annual strategy to deal with floods. During South-west Monsoon 2025, 105 NDRF teams have been pre-positioned. Further, whenever any early warning alert is received, for example, in case of Cyclone, requisite NDRF teams are pre-positioned in consultation with the State Government concerned.

Recommendation/Observation

5.2.7 The Committee notes that the National Disaster Response Force (NDRF), though highly specialized, may face capacity constraints in responding to multiple simultaneous disasters across the country, and that State Disaster Response Forces (SDRFs) have not been established in all States/UTs. The Committee, therefore, recommends that the strength, geographical distribution and specialised capabilities of NDRF be periodically reviewed and augmented, particularly in disaster-prone regions, so as to ensure timely and effective response.

5.2.8 The Committee recommends that all States and Union Territories be mandated to establish and operationalise SDRFs in a time-bound manner, and necessary financial and technical support be extended by the Central Government for the same.

5.2.9 The Committee feels coordination between National Disaster Response Force and the State Disaster Response Force is essential for effective disaster management in the country as SDRF is the first responder in case of disaster and NDRF provides specialized support during major disasters. The Committee recommends that greater emphasis be placed on joint training, mock drills and interoperability between NDRF and SDRF units, so that coordinated response among all these forces be enhanced during rescue activities and management of disasters. The Committee also recommends that Standard Operating Procedures (SOPs) and common communication platforms should be used to minimise the procedural and communication gaps.

5.3 International Disaster Response Operations

5.3.1 It was stated that embodying the ethos of "Vasudhaiva Kutumbakam" (*the world is one family*), India has consistently extended immediate assistance to countries affected by major disasters. Over the past decade, India's international disaster response operations have earned widespread appreciation and exemplified its commitment to humanitarian solidarity.

(a) Operation Maitri Nepal Earthquake (2015)

A devastating earthquake of 7.8 magnitude struck Nepal on 25 April 2015, causing widespread destruction and loss of life. India responded swiftly:

- 16 NDRF teams comprising over 700 trained rescue personnel were deployed to Nepal.
- 11 injured persons were rescued from the rubble.
- 6 medical camps were established, providing treatment to 1,219 persons.

- 1,176.571 tonnes of relief material were dispatched.

Operation Maitri was one of the largest cross-border disaster relief operations undertaken by India and was widely recognised for its speed and scale.

(b) Operation Dost Turkey–Syria Earthquake (2023)

A 7.8 magnitude earthquake struck Turkey and Syria on 6 February 2023, resulting in catastrophic damage. India promptly deployed:

- Three NDRF teams comprising 152 rescue personnel to Turkey.
- 2 live persons were rescued from collapsed structures.
- Collapsed Structure Search and Rescue (CSSR) operations were conducted successfully, demonstrating India's specialised capabilities.

(c) Operation Brahma Myanmar Earthquake (2025)

A massive earthquake struck Myanmar in March 2025. The Government of India immediately extended assistance by:

- Deploying NDRF and Army medical teams to the affected region.
- Delivering hundreds of tonnes of relief supplies.

Operation Brahma served as a true testament to India's human-centric global development approach and its readiness to stand with affected nations in times of crisis.

5.4 Disaster preparedness and response functions

5.4.1 It has been submitted that Ministry of Home Affairs closely monitors the disaster and disaster like situations to facilitate timely interventions in the form of logistic and financial support to augment the resources of the affected States and UTs to deal effectively with each disaster situation. For this purpose, close liaison is made with the affected States on the one side and the Central Line-Ministries concerned, such as Ministries of Health & Family Welfare, Defence, Power, Civil Aviation, Food and Public Distribution etc. on the other. Considering the significance of timely response in wake of any emergency to deal effectively with emergency situation, MHA has also created a WhatsApp Group. Officers from Ministries/ Departments of Central Government concerned, States/UTs, Early Warning agencies, Response Forces are the members of the group. This group proved to be of very helpful in timely issuing of early warning/ alerts and coordinating the rescue and relief efforts to deal with any emergency situation.

5.5 Integrated Control Room for Emergency Response (ICR-ER)

5.5.1 Integrated Control Room for Emergency Response "ICR-ER" has been set up by the Ministry as a centre to deal with all emergencies, including disasters and disaster like situations.

It's a state-of-the-art, disaster-resilient infrastructure which monitors all the situations 24x7, where States and UTs may require assistance from central agencies viz. NDRF, CAPF, Army, Air Force, Navy and various other departments like CWC, IMD, GSI etc. It is round the clock manned by trained officers and personnel from different CAPF under supervision of a Dy. Inspector General. Domain experts from IMD, CWC, ISRO, Ministry of Statistics and Programme Implementations are attached with ICR-ER for data analysis. The key functions of ICR-ER include: -

- (a) monitoring situation in real time through National Database for Emergency Management (NDEM) 5.0, media or any other source;
- (b) analysis of data received from Early Warning agencies;
- (c) coordination of disaster response for relief assistance in association with agencies concerned; and
- (d) decision support to decision-makers and disaster management officials at all levels by providing real-time information and visualization of data.

5.5.2 Essentially, the ICR-ER is a crucial hub for disaster management in India, leveraging technology and coordination to minimize the impact of emergencies and natural disasters.

5.6 Forecasting

5.6.1 Forecasting is prerequisite for taking preparedness measures to respond to disaster. It is the most important element of disaster management. Government of India (GoI) has designated the following offices as the nodal agencies for early warning of different natural hazards:

Table 5.3 – Designated Nodal agencies for Early Warning of natural hazards

Disaster	Nodal Agency/Department	Ministry
Cyclone	India Meteorological Department (IMD)	Earth Sciences
Thunderstorm& lightening	India Meteorological Department (IMD)	Earth Sciences
Cold/ Heat Wave	India Meteorological Department (IMD)	Earth Sciences
Tsunami	Indian National Centre for Oceanic Information Services (INCOIS)	Earth Sciences
Earthquake (No early warning)	National Centre for Seismology (NCS)	Earth Sciences
Floods	Central Water Commission (CWC)	Water Resources
Landslides	Geological Survey of India (GSI)	Mines
Avalanche	Defence Geoinformatics Resource Establishment (DGRE)	Defence

5.6.2 It has been informed that India is global frontrunner in adoption of emerging technologies which has made disaster management in India more proactive, data-driven, and community-inclusive. Continued investment in technology and capacity-building will further strengthen India's disaster resilience. Besides above, satellite imagery provided by ISRO through the Bhuvan Portal is also used by various agencies for the purpose of forecasting and early warning. Further it has been informed that on 30th July 2025, India achieved another

milestone as the NASA-ISRO Synthetic Aperture Radar (NISAR) (world's first Earth observation satellite to carry dual-frequency synthetic aperture radars) was launched. NISAR will deliver high-resolution, all-weather, day-and-night imagery of Earth's land and ice surfaces, to support applications in disaster management, climate monitoring, glacier tracking.

5.7 Early Warning and Risk Communication

5.7.1 The Ministry has stated that early warning and risk communication are vital components of disaster management, playing a critical role in minimizing the impacts of disasters by enabling timely, informed, and proactive responses. An effective early warning system (EWS) encompasses the prediction, detection, monitoring, and communication of potential hazards to at-risk communities well in advance of an event. By issuing timely alerts, early warning systems serve as a catalyst for preparedness measures, emergency response actions, and evacuation planning. Various Central Agencies have been Designated for Natural Hazard-Specific Early Warnings. India made substantial progress in early warning dissemination for hydro-meteorological hazards such as cyclones, floods and heat waves. India Meteorological Department (IMD) and Central Water Commission (CWC) now issues regular and accurate weather forecast and warning bulletins including floods and cyclones, 7 days in advance for all affected/potentially affected States/Union Territories through the following Apps:-

- 'Damini' app which broadcasts alerts/warnings regarding lightning strike about 40 minutes in advance.
- 'Mausam' app provides information about atmospheric conditions for a specific place and time.
- 'Meghdoot' app which provides crop advisories to farmers based on weather information.
- 'Sachet' app which provides weather forecast as well as disaster alerts.
- The 'FloodWatch' App delivers flood status and forecast to the public in real time.
- 'POCKET' App provides Bhuvan Map and satellite data with visual and voice navigation facility.
- 'Van Agni' App gives current forest fire status information to field staff.
- 'SAMUDRA' App gives ocean information to fishermen.
- 'Bhooskhalan' App is the nodal agency for landslide study, which enriches the national landslide catalogue.
- 'India Quake' App broadcasts earthquake parameters automatically.
- Devadoot module is used for real time monitoring of response of teams during disasters of NDRF.

5.7.2 The Committee was informed that a comprehensive Common Alerting Protocol (CAP) based Integrated Alert System (SACHET) has been undertaken by NDMA in association with Centre for "Development of Telematics" (CDOT) on PAN INDIA basis, at a total project cost of Rs. 355 crore in March, 2021. The project facilitates dissemination of alerts and early warning about impending hazards to people, in vernacular languages, in affected areas of the country using diverse media like SMS, cell broadcast, Radio, TV, Mobile application, social media, satellite terminals etc. More than 8000 crore SMS alerts have been disseminated so far using CAP.

5.7.3 The Government has further approved a project with a total outlay of Rs. 99.82 Crore for Pan India, end-to-end secure and fool proof Disaster Grade Indigenous Cell Broadcast Solution (CBS) for Indian telecom network, for faster and reliable alert to the citizen. CBS aims to improve faster dissemination of alert/ early warning messages on their mobile handset which, in turn, will help in taking appropriate preparedness action to save human lives and livestock during natural disasters across the country, including in remote part of the Country.

5.7.4 In order to implement 'Single Distress Number for all emergencies across the country', the project 'Extension of Emergency Response Support System (ERSS) (*Dial 112*)' for Disaster emergencies has been implemented. Presently ERSS Dial 112 is designed to address all emergency signals pertaining to Woman safety, Child protection, Police, Fire and Medical assistance received from citizens through voice call, SMS, email, panic SOS, ERSS web portal etc. The current scope of ERSS has been extended to include Disaster related emergencies. The Project has been implemented and is operational in 35 States/UTs and is currently being implemented in the State of Telangana.

5.7.5 Further Early Warning systems have been established in the coastal States under NCRMP, which has proved very helpful in disseminating warnings to the coastal community during recent cyclones.

5.7.6 The significant reduction in cyclone and heatwave mortality that have been achieved over the past few years is a testimony to the effectiveness of early warning efforts that are based on community and local empowerment. While in super cyclone of Odisha in 1999, 10,000 precious lives were lost, in cyclones of similar intensity, casualties are now in single digit, even zero in Biparjoy in Gujarat.

Recommendation/Observation

5.7.7 The Committee notes that mechanisms such as the Integrated Control Room for Emergency Response (ICR-ER) and Emergency Response Support System(ERSS) (Dial 112) have significantly improved coordination; however, there is a need to further strengthen real-time data integration, decision support systems and inter-agency communication. The Committee, therefore, recommends that all emergency response platforms be fully integrated with real-time data from Central and State agencies, and that decision-support systems should be strengthened using advanced data analytics and visualisation tools, so as to facilitate timely and informed decision-making during disasters. The Committee further recommends that standard operating procedures should be established for seamless coordination between emergency response systems and field-level agencies, including district administrations and response forces.

5.8 Annual conference of Relief Commissioners/Secretaries

5.8.1 The Ministry informs that an Annual Conference of Relief Commissioners/ Secretaries to the Department of Disaster Management of States/UTs is organized by MHA before the onset of south west monsoon to review the status of preparedness for ensuing Monsoon and to discuss other Disaster Management related issues. The representatives of various Central Ministries, Organizations rendering Emergency Support Functions, besides representatives of Central

Armed Police Forces also participate in the conference. Moreover, from the year 2024, this Ministry has initiated a combined conference of Relief Commissioners (RCs) and State Disaster Response Force (SDRF), with a view to bring synergy and ensuring better coordinated preparedness efforts as well as to take Relief Commissioners/Secretaries on board for strengthening of SDRFs, Civil Defence, Home Guards and Fire Services of States/UTs.

5.9 India Disaster Resource Network (IDRN)

5.9.1 The Ministry has informed that India Disaster Resource Network (IDRN) is a nationwide electronic inventory of resources that enlists equipment and human resources, collated from districts, states and national level line departments and agencies. IDRN is a web-based platform, for managing the inventory of equipment, skilled human resources and critical supplies for emergency response. Primary focus of IDRN portal is to enable the decision makers to ascertain the availability of equipment and human resources required, in their vicinity, to combat any emergency situation.

5.9.2 This database also enables them to assess the level of preparedness for specific disasters and availability of equipment with their location, which can easily be detected and utilized by the needy States/Union Territories/Stakeholders at the time of disasters, to facilitate a quick response. The District Collector/Magistrate is the authorized officer for facilitating data collection and updation from the district level. The details of IDRN are available on <https://idrn.nidm.gov.in>. A total of 450936 no. of records have been updated in IDRN web portal by the districts since 01.06.2016 till 08.07.2025.

Recommendation/Observation

5.9.3 The Committee notes that India Disaster Resource Network (IDRN) is a nationwide electronic inventory of disaster response equipment, skilled personnel and emergency supplies managed by the National Institute of Disaster Management under the Ministry of Home Affairs. The Committee recommends that to improve the reach of IDRN, the emphasis should be laid on technological upgrades and stronger coordination among government agencies, local communities, and emergency responders. Further the network system should have real-time resource updating as outdated data can hamper the disaster response activities. The Committee therefore recommends that mandatory monthly or quarterly updates of resources should be done by districts, States and national level line departments and agencies. It also recommends that network should be connected directly with police emergency systems, fire departments, hospitals, medical facilities and ambulance services for stronger integration with emergency services.

5.10 Participation of Local Communities in Disaster Management:

5.10.1 It has been informed that in India, local communities are central to effective disaster management due to their proximity to disaster-prone areas and their ability to respond swiftly during emergencies. Recognizing this, national and state policies, including the Disaster Management Act, 2005, emphasize community-based disaster risk management (CBDRM) as a key strategy. Preparedness of local communities for disaster management in India include capacity building and training, Village Disaster Management Plans (VDMPs), Mock Drills and

Awareness Campaigns and use of Local Knowledge, etc. Roles of local communities in disaster management include risk assessment, early warning dissemination, first responders, support to vulnerable groups, monitoring and feedback etc.

5.10.2 Aapda Mitra Scheme : Government conceptualized and implemented Aapda Mitra Scheme. This Scheme was launched during the 17th Formation Day of NDMA on 28.09.2021. Aapda Mitra Scheme has been implemented with a total cost of Rs.369.40 crore in 350 highly vulnerable districts prone to floods, landslides, cyclone and earthquakes by training 1,00,000 community volunteers. All trained volunteers have been provided an Emergency Responder Kit (ERK) including an insurance covering death/ permanent disablement/ hospitalization. Further, each selected district is provided with an Emergency Essential Resource Reserve (EERR) containing essential search and rescue equipment and medical first aid kits.

5.10.3 Yuva Aapda Mitra Scheme (YAMS) : The Committee has been informed by the Ministry that with the successful implementation of Aapda Mitra Scheme, Central Government has launched “Yuva Aapda Mitra Scheme” (YAMS) in the year 2024 to train 2,37,326 volunteers from National Cadet Core (NCC), National Service Scheme (NSS), Nehru Yuva Kendra Sangathan (NYKS) and Bharat Scouts & Guides (BS&G) in disaster response, covering 315 Districts in the country which are prone to landslide, cyclone, earthquake, and floods. Under YAMS also, the Emergency Responder Kit (ERK) and insurance is to be provided to Yuva Aapda Mitra volunteers after completion of training. So far, 1,016 Master Trainer and 1,850 Volunteers have been trained under the scheme.

5.10.4 Aapda Mitra Volunteers have been actively involved in over 88 disaster response operations including recent disasters viz Wayanad landslides in Kerala (2024), flash floods in Himachal Pradesh (2024), Tamil Nadu floods (2023), Cyclone Michaung (2023), the Balasore train accident in Odisha, and Cyclone Biparjoy and rendered their services in disaster response, rescue, relief, and other social services. In these emergencies, more than 2,953 volunteers helped their communities, and successfully evacuated or rescued approximately 78,019 individuals and saved 129 lives. Besides, NDRF also conducts community capacity building and public awareness programme, mock drills, school safety programmes and hands-on training to empower local communities.

Recommendation/Observation

5.10.5 The Committee notes that local communities play a crucial role in disaster response and recovery; however, there is scope for further integration of their participation and enhancement of their capacities. The Committee, therefore, recommends that community-based disaster response mechanisms, including schemes such as Aapda Mitra and Yuva Aapda Mitra, be expanded and strengthened, with adequate training, equipment and institutional support. The Committee further recommends that Village Disaster Management Plans (VDMPs) and local-level preparedness plans be regularly updated and integrated with district and state plans, so as to ensure effective grassroots-level response.

5.11 Relief and Rehabilitation

5.11.1 It has been informed that as per the National Disaster Management Plan 2019, recovery has been defined as the process of restoring or improving livelihoods, health and economic, physical, social, cultural and environmental assets, systems and activities of a disaster-affected community, in alignment with the principles of sustainable development and the “Build Back Better” approach, so as to reduce future disaster risk. The task of rehabilitation and reconstruction begins soon after the emergency phase ends and is based on pre-existing strategies and policies that ensure clear institutional responsibilities and enable public participation. The focus of recovery is on restoring livelihoods and facilitating a transition towards sustainable development that reduces disaster risk. Recovery is conceived as an integral part of the overall development process at national, regional and local levels, and is influenced by the prevailing socio-economic conditions and vulnerabilities of the affected communities.

5.11.2 Recovery processes aim not only to restore normalcy but also to strengthen the capacity of governments and communities to cope with future disasters. The principle of “Build Back Better” emphasises the opportunity to rebuild in a manner that reduces existing development deficits and enhances resilience, rather than merely restoring pre-disaster conditions. Globally, post-disaster recovery, rehabilitation and reconstruction have increasingly been viewed as opportunities to integrate disaster risk reduction into development planning. The Sendai Framework for Disaster Risk Reduction also underscores the importance of preparedness for recovery and reconstruction, with a focus on resilience building and long-term risk reduction.

5.11.3 Reconstruction and rehabilitation plans are designed taking into account worst-case scenarios, where the capacity of State and District administrations may be overwhelmed and require support from the Central Government. The framework for recovery involves coordinated efforts of multiple stakeholders, including government agencies, development partners and civil society organisations. These agencies are required to monitor response activities, assess the extent and severity of damage, identify unmet needs and formulate comprehensive recovery plans for restoring essential services and rebuilding affected areas.

Recommendation/Observation

5.11.4 The Committee recommends that minimum standards of relief be periodically reviewed and updated, taking into account emerging needs and best practices, and that strict compliance be ensured across all States and Union Territories. The Committee further recommends that special provisions for vulnerable groups be incorporated through targeted interventions, including dedicated facilities in relief camps, livelihood support and social protection measures.

5.12 Recovery Process

5.12.1 Effective post-disaster recovery generally encompasses three broad aspects as per National Disaster Management Plan 2019:

- i. Physical aspects of recovery include restoration and reconstruction of damaged community infrastructure, critical infrastructure, private houses and cultural heritage assets;
- ii. Economic aspects of recovery include restoration of livelihoods, productive activities and market services; and
- iii. Social aspects of recovery include social and psychological well-being of individuals, families and communities.

The key interventions under recovery programmes may be broadly classified into four categories, namely physical, economic, social and cross-cutting sectors.

5.12.2 After a disaster, a Post-Disaster Needs Assessment (PDNA) is undertaken as a government-led exercise, either by the State Government or jointly by the Central and State Governments, depending on the scale of the disaster. The PDNA also provides a platform for international assistance where required and forms a credible basis for recovery and reconstruction planning, incorporating disaster risk reduction measures. The PDNA typically comprises three components, namely:

- i. Damage and Loss Assessment (DALA), which is quantitative in nature and estimates the value of damages and economic losses, including their impact on growth, fiscal balances and livelihoods;
- ii. Human Recovery Needs Assessment (HRNA), which focuses on the social impact of disasters and analyses their effects on community life, social structures and institutions; and
- iii. Recovery Framework, which consolidates sectoral recommendations and outlines short, medium and long-term recovery priorities, including financing strategies and integration of the “Build Back Better” approach.

5.12.3 Recovery is widely recognised as the most complex phase of disaster management, involving multiple stakeholders and having long-term implications for social and economic development. It requires coordinated action across sectors and institutions to address the diverse needs of affected communities. An inclusive and comprehensive recovery framework facilitates structured implementation, ensures adherence to the “Build Back Better” principle and supports sustainable development outcomes.

5.12.4 The recovery process is not linear and consists of multiple inter-related activities, including damage and needs assessment, development of a recovery framework, ensuring socially inclusive recovery, integration of climate change adaptation, debris clearance and safe disposal, restoration of utilities and communication networks, re-establishment of transport linkages, provision of temporary housing, environmental assessments and reconstruction of affected areas.

5.12.5 The key interventions under recovery programmes may further be grouped under four broad heads, namely physical recovery, integration of disaster risk reduction into development initiatives, financial management, and economic impact analysis.

Table 5-4: Major Steps of the Recovery Process and the Key Processes Involved

	Major steps	Process
1	Post-Disaster Needs Assessment and Credible Damage Assessment	• Preliminary assessment reports • Compilation and transmittal of damage and loss data • Disaster damage assessments led by government and assisted by humanitarian response agencies, and the initial damage surveys leading to a comprehensive assessment • Quantitative and qualitative baseline for damage, loss, and needs across sectors, blocks (taluka) and districts • Results monitoring and evaluation plan for recovery program • Select the most appropriate and achievable processes and methodology for conducting early and credible damage and needs assessments
2	Developing a vision for Build-Back Better (BBB)	• High level meetings as well as broad-based, wider consultations with experts, civil society, and key stake holders • Build consensus among the range of stakeholders within and outside government
3	Ensure coherence of BBB with the development programs and goals	• Discussions at top level to align the recovery vision with the government's broader, longer term development goals and growth and poverty reduction strategies
4	Incorporating resilience and BBB in recovery vision	• Disaster resistant physical recovery • Options for fast economic recovery • Gender and equity concerns • Vulnerability reduction • Natural resource conservation and environmental protection • Social recovery
5	Balancing recovery across sectors	• Balance public and private sectors BBB programs • Promote norms for non-discriminatory and equitable asset disbursement among individuals and communities • Prioritise infrastructure reconstruction • Address the recovery of the lives and livelihoods of disaster-affected communities • • Show sensitivity to the needs of the affected population with regard to public expectations from recovery
6	Prioritising sectors for recovery	• Determine relative importance of various sectors such as housing, water and sanitation, governance, transport, power, communications infrastructure, environment, livelihoods, tourism, social protection, health, and education.

Recommendation/Observation

5.12.6 The Committee notes that Post-Disaster Needs Assessment (PDNA) is a critical tool for recovery planning; however, concerns remain regarding timeliness, standardisation and alignment of PDNA outcomes with actual financial assistance and reconstruction efforts. The Committee, therefore, recommends that PDNA processes should be standardised across States with clearly defined timelines, methodologies and sectoral templates, so as to ensure consistency and credibility of damage and loss assessments. The Committee further recommends that financial assistance for recovery and reconstruction should be more closely aligned with PDNA findings, with appropriate justification in cases of deviation, and to enhance transparency and trust among stakeholders.

5.13 Early, Mid and Long-term Recovery

5.13.1 It has been noted that the National Disaster Management Plan 2019 emphasises that recovery programmes, coupled with heightened public awareness and engagement following a disaster, provide a valuable opportunity to develop and implement disaster risk reduction measures. Recovery is an important component of risk reduction strategy, and when implemented systematically, it prevents affected communities from slipping into further poverty and deprivation. While the Disaster Management Act, 2005 mandates rehabilitation and reconstruction activities, the National Policy on Disaster Management, 2009 recognises recovery as a key element of the disaster management continuum, linking it to physical, social and economic aspects within the broader framework of safe development. Disaster recovery programmes generally proceed in three distinct stages to facilitate a sequenced, prioritised and flexible multi-sectoral approach, namely early, mid-term and long-term recovery.

- Early Recovery (within 18 months): Focuses on restoration of basic services and livelihoods, including cash-for-work programmes, resumption of markets, restoration of social services and provision of transitional and temporary shelters.
- Mid-Term Recovery (within 5 years): Involves recovery planning for assets and livelihoods, along with reconstruction of housing, infrastructure, public buildings and cultural heritage assets.
- Long-Term Recovery (within 10 years): Integrated with development planning and includes infrastructure strengthening, environmental management and urban and regional planning.

5.13.2 The recovery framework is supported by several key provisions. These include establishment of clear institutional arrangements at national, state, district and local levels; strong coordination among stakeholders including government, private sector and civil society; and leveraging public-private partnerships for effective implementation. The framework also emphasises the use of information and communication technology for dissemination and coordination, development of decision support systems including management information systems and spatial data tools, and pooling of professional expertise. Further, it underscores the importance of community participation, ensuring inclusiveness, gender equity and stakeholder engagement in planning and implementation. Monitoring and evaluation mechanisms, including technical and social audits, are essential to ensure transparency, accountability and effectiveness of recovery programmes.

Recommendation/Observation

5.13.3 The Committee notes that while the principle of “Build Back Better” is recognised in policy, its implementation on the ground lacks measurable benchmarks. The Committee, therefore, recommends that clear operational guidelines and sector-specific standards should be developed for implementing the “Build Back Better” approach with tangible results, particularly in housing, infrastructure and livelihood restoration, so as to ensure resilience in reconstruction efforts. The Committee further recommends that monitoring mechanisms should also be established to assess the extent to which reconstruction projects adhere to resilience and sustainability standards, and it should be reviewed periodically by higher authorities.

5.14 Reconstruction

5.14.1 It has been informed that as per NDMP 2019, long-term recovery efforts must focus on redeveloping and restoring the socio-economic viability of disaster-affected areas. The reconstruction phase requires a substantial commitment of time and resources by the Central and State Governments, as well as other stakeholders. It is important to note that much of this commitment extends beyond the scope of traditional emergency management programmes. Further, the reconstruction challenge is often associated with catastrophic events that cause widespread damage over large geographical areas and affect significant populations. Accordingly, reconstruction efforts are long-term in nature and require coordinated planning and implementation. Reconstruction efforts include the rebuilding of public infrastructure and social services damaged by disasters, restoration of adequate housing to replace that which has been destroyed, revival of livelihoods and employment opportunities, and restoration of the economic base of the affected regions.

5.15 Rehabilitation

5.15.1 It has been informed that the NDMP, 2019 states that rehabilitation, which is an integral component of disaster recovery, may be defined as a dynamic and intermediate strategy involving institutional strengthening, reconstruction and improvement of infrastructure and services, aimed at supporting the initiatives and actions of affected populations in the political, economic and social domains, while reinforcing the principles of sustainable development. Rehabilitation packages generally include reconstruction of damaged infrastructure, along with measures to address disaster-induced psychological, economic and social impacts.

5.15.2 Rehabilitation broadly encompasses physical, social, economic and psychological dimensions. Physical rehabilitation includes reconstruction of infrastructure such as houses, roads, railways, communication networks, water supply and electricity systems. It also involves long-term measures such as watershed management, irrigation, social forestry, crop stabilisation, alternative cropping practices, environmental protection and employment generation. Rehabilitation of agriculture, artisan activities and animal husbandry, along with provision of subsidies, land for relocation, adherence to land-use planning and strengthening of existing structures, also form part of physical rehabilitation.

5.15.3 Relocation forms a sensitive component of rehabilitation and should be guided by need-based considerations, with active consultation of affected communities. Efforts should be made to avoid secondary displacement and to ensure that relocation, where unavoidable, is undertaken in a socially inclusive and gender-sensitive manner. The process should ensure transparency in land acquisition and allocation, provide adequate grievance redressal mechanisms, and, as far as possible, locate relocated communities close to their sources of livelihood. Provision of livelihood support measures for relocated populations is also essential.

5.15.4 Social rehabilitation is equally important and focuses on vulnerable groups such as artisans, elderly persons, orphans, women-headed households and children, who require special support in the aftermath of disasters. Rehabilitation measures should facilitate re-socialisation and adjustment in changed social conditions. Restoration of educational activities is a critical component, including counselling for teachers and students, provision of learning materials, strengthening of school systems and establishment of local education committees to ensure continuity of education.

5.15.5 Special attention is required for the rehabilitation of elderly persons, women, children and persons with disabilities. Measures may include counselling support, family-based or community-based care arrangements, skill development and livelihood training for women, strengthening of health, nutrition and hygiene services, activation of anganwadis and community centres, and promotion of self-help groups and vocational training initiatives.

5.15.6 Economic rehabilitation focuses on restoration of livelihoods, ensuring continuity of businesses, trade and commerce, and creation of employment opportunities. It requires assessment of existing livelihood systems, risks, vulnerabilities and access to markets, along with targeted support for affected populations, particularly farmers, artisans, women-headed households and other vulnerable sections.

5.15.7 Psychological rehabilitation is a critical dimension of recovery, as the trauma associated with disasters often persists long after physical reconstruction. Counselling, trauma care, psycho-therapeutic interventions and community-based support systems are essential to address mental health concerns and facilitate long-term recovery.

5.16 Role and Responsibility of Central Government/ State Governments

5.16.1 The Ministry stated that in accordance with the provisions of the Disaster Management Act, 2005, the Central Government will take all such measures, as it deems necessary or expedient, for the purpose of disaster management and will coordinate actions of all the agencies. As per the National Policy on Disaster Management, 2009, the primary responsibility for disaster management rests with the States. The Central Government supplements the efforts of the State Governments for undertaking rescue, relief and rehabilitation measures in the event of a disaster by providing logistic and financial support in case of calamities of severe nature. The logistic support includes deployment of aircrafts, boats, NDRF, special teams of Armed Forces, and Central Armed Police Forces, arrangements for relief materials and essential commodities including medical stores, restoration of critical infrastructure facilities including communication network and such other assistance as may be required by the affected States/UTs to meet the situation effectively.

5.16.2 Thus, the primary responsibility of undertaking rescue, relief and rehabilitation measures in the event of a natural disaster rests with the concerned State Government. The Central Government, wherever required, supplements the efforts of the State Governments by providing logistics and financial support in cases of natural disasters of severe nature and beyond coping capacity of the State resources.

5.16.3 The State Governments concerned have been taking necessary rescue & relief operations in the affected areas which include evacuation of people to safer places, operation of relief camps, cattle camps and providing essential commodities viz. cooked food, rice/ rice bran, chura, wheat, salt, baby food, kerosene oil, matchboxes, candles, halogen tablet, fodder, house building material, i.e., Polythene sheets, etc. They are also taking necessary steps to prevent outbreak of any epidemic during floods/ post flood period.

5.16.4 In order to assess ground-level realities, the Committee sought inputs from various States and organisations during its meetings. The Committee also undertook a study visit to the State of Tamil Nadu to obtain first-hand information on the functioning of the disaster response mechanism at the ground level.

5.17 State-wise Response, Relief and Rehabilitation

Uttarakhand

5.17.1 The Committee, during its interaction with the representatives of the Government of Uttarakhand, noted that the State is highly vulnerable to multiple hazards including landslides, flash floods, cloudbursts, avalanches, earthquakes and Glacial Lake Outburst Floods (GLOFs), owing to its fragile Himalayan terrain and extreme climatic variability. The Committee observed that recurring disasters have resulted in significant loss of life, infrastructure damage and displacement, thereby placing sustained pressure on the State's response, relief and rehabilitation systems.

5.17.2 The Committee noted that Uttarakhand has developed a structured disaster response mechanism comprising a State Emergency Operation Centre (SEOC), District Emergency Operation Centres (DEOCs) and a well-trained State Disaster Response Force (SDRF), supported by NDRF, Army, ITBP and other agencies. The Committee observed that the State in its replies apprised the Committee that SDRF has developed specialised capabilities in high-altitude rescue, deep-water operations and collapsed structure search and rescue, and operates under a coordinated multi-agency framework. The State further apprised that response time has been reduced significantly from about 25 minutes to approximately 12 minutes, indicating improved operational efficiency.

5.17.3 The Committee was apprised that pre-positioning of resources, deployment of helicopters, use of satellite communication systems and maintenance of district-level resource inventories have strengthened response operations. The use of drones, GIS-based tools and real-time monitoring systems has also enhanced situational awareness and search and rescue efforts in inaccessible areas. However, the Committee observed that difficult terrain, road blockages due to landslides, extreme weather conditions and limited last-mile connectivity continue to hinder timely response, particularly in remote and high-altitude regions. It was also noted that

the challenges in real-time communication and evacuation of stranded populations affect the effectiveness of response operations during major disasters.

5.17.4 The Committee appreciated the use of drones, GIS tools, satellite phones and helicopter-based rescue operations, particularly in recent disaster events, which have significantly enhanced situational awareness, search and rescue operations, and rapid evacuation in inaccessible areas.

5.17.5 The Committee noted that Uttarakhand has established a structured relief framework, including pre-identified evacuation protocols, stockpiling of essential supplies and deployment of relief infrastructure across districts and approximately 3,069 temporary shelters have been identified across the State to accommodate disaster-affected populations, along with ongoing efforts to develop permanent shelters under externally aided projects. Further the relief operations are supported by pre-positioned food supplies, medical assistance, communication systems and community-level volunteers, ensuring immediate assistance during disasters. The role of community-based mechanisms, including trained volunteers such as Aapda Mitra, was appreciated in facilitating evacuation, first response and relief distribution at the grassroots level.

5.17.6 The Committee noted that Government of Uttarakhand has adopted a structured approach towards post-disaster rehabilitation and recovery, incorporating the principle of “Build Back Better” (BBB) in reconstruction of infrastructure damaged during major disasters such as the Kedarnath floods, Chamoli avalanche and Joshimath subsidence.

5.17.7 The Committee noted that reconstruction efforts are guided by hazard zonation, geotechnical assessments, GIS-based planning and compliance with national building codes, ensuring resilience in rebuilt infrastructure. Measures such as slope stabilisation, river channelisation, drainage correction and retrofitting of critical infrastructure have been undertaken to reduce future risk.

5.17.8 It was informed that progress has been made in glacial lake risk mitigation, landslide stabilisation and ecosystem-based interventions, including bio-engineering and afforestation measures, which contribute to long-term recovery and resilience. **The Committee observed that rehabilitation efforts face several constraints, including limited accessibility to affected areas, delays in project approvals, funding constraints and technical capacity gaps. It was also noted that limited availability of real-time data and advanced monitoring systems, particularly in high-altitude regions, affects planning and execution of long-term rehabilitation measures. The Committee further observed that rigid funding norms, underutilization of allocated funds and lack of flexibility in financial mechanisms hinder timely implementation of rehabilitation and mitigation projects, especially for large-scale disasters.**

Odisha

5.17.9 The Committee, during its interaction with the representatives of the Government of Odisha, noted that the State is highly vulnerable to multiple hazards, particularly cyclones, floods, storm surges, lightning and heat waves, owing to its long coastline of about 573 km and its location in a very high cyclone-risk zone. The Committee observed that Odisha has

historically faced frequent and severe disasters, including major cyclonic events such as the Super Cyclone (1999), Phailin (2013), Fani (2019) and subsequent cyclones, which have shaped its disaster management framework into a proactive and institutionalised system.

5.17.10 It was noted that Odisha has developed a robust institutional and operational framework anchored around the Odisha State Disaster Management Authority (OSDMA), State Emergency Operation Centre (SEOC), District Emergency Operation Centres (DEOCs) and a well-defined multi-tier coordination system involving line departments and response agencies. It was conveyed that Emergency Operation Centres function on a 24×7 basis and are supported by redundant communication systems, satellite connectivity and real-time coordination mechanisms.

5.17.11 The Committee further noted that the State has established a comprehensive early warning dissemination system, particularly in coastal districts, integrating multiple communication technologies such as satellite-based communication systems, digital mobile radio, alert siren towers and Common Alert Protocol (CAP) based messaging. It was observed that over 120 alert siren towers and extensive last-mile connectivity infrastructure have been deployed to ensure timely dissemination of warnings to vulnerable populations, including fishermen and coastal communities.

5.17.12 It was stated that Odisha has institutionalised large-scale pre-emptive evacuation as a core strategy for disaster response. It was noted that evacuation planning is supported by hazard mapping, identification of vulnerable populations and pre-positioning of response resources, which has significantly reduced loss of life during cyclones. The State has developed a strong shelter-based response system, with over 900 multipurpose cyclone and flood shelters equipped with trained community-level task forces and emergency equipment, enabling safe evacuation and temporary accommodation of affected populations.

5.17.13 The Committee appreciated the establishment of the Odisha Disaster Rapid Action Force (ODRAF), which is one of the earliest State-level specialised response forces in the country, with trained personnel, standardised equipment and defined skill matrices. The Committee also noted that response operations are supported by SDRF, Fire Services, Civil Defence volunteers and community-based mechanisms, ensuring a multi-layered response framework.

5.17.14 It was stated that Odisha has made significant progress in community-based disaster management, with large-scale training of volunteers, preparation of Village Disaster Management Plans (VDMPs) and active involvement of local institutions. It was noted that thousands of trained volunteers and community task forces play a critical role in early warning dissemination, evacuation and relief operations, thereby strengthening last-mile response capacity.

5.17.15 It was noted that the State has adopted technology-driven approaches for disaster management, including integration of GIS-based systems, hydrological data, automated weather stations and real-time monitoring platforms. Further, efforts are underway to develop unified command and control systems and integrate emerging technologies such as artificial intelligence and data analytics for improved forecasting and decision-making.

5.17.16 The Committee, while examining relief measures, noted that streamlined mechanisms for relief distribution and financial assistance, including digital platforms for processing ex-gratia payments and direct benefit transfers have been established. The Committee appreciated the commitment to time-bound disbursement of relief funds, which enhances transparency and efficiency in relief operations. It was mentioned that several mitigation and resilience-building measures, including construction of cyclone shelters, coastal protection works, mangrove restoration and strengthening of embankments have been undertaken. It was observed that ecosystem-based approaches, such as mangrove plantation and watershed management, are being integrated with structural measures to enhance long-term resilience. It was observed that despite significant progress, certain challenges persist. It was noted that last-mile connectivity gaps remain in remote and network-deficient areas, particularly affecting timely dissemination of warnings to vulnerable populations such as fishermen at sea and residents of isolated habitations. The Committee further observed that enforcement of cyclone-resilient building codes and Coastal Regulation Zone (CRZ) norms remains inconsistent, especially in non-engineered constructions, which continue to be highly vulnerable to disasters.

5.17.17 The Committee also noted that emerging risks such as coastal erosion, lightning, urban flooding and climate-induced hazards pose new challenges for the State's disaster management framework. It was further observed that while technological systems are expanding, their accessibility, utilisation at the grassroots level remain uneven, particularly among non-smartphone users and economically vulnerable populations.

5.17.18 **The Committee is of the view that Odisha represents a best-practice model in disaster preparedness and response, particularly in cyclone risk management and community-based evacuation. However, sustained efforts are required to address emerging multi-hazard risks, strengthen last-mile connectivity, ensure strict enforcement of resilient construction norms and enhance integration of advanced technologies with grassroots-level systems, so as to further improve the effectiveness of response, relief and rehabilitation in the State.**

Himachal Pradesh

5.17.19 The Committee, during its interaction with the representatives of the Government of Himachal Pradesh, noted that the State is highly vulnerable to multiple hazards, including landslides, cloudbursts, flash floods, earthquakes, avalanches and glacial lake outburst floods (GLOFs), owing to its fragile Himalayan terrain and unstable geology. The Committee observed that the increasing frequency of such events has resulted in recurring disruption of connectivity, damage to infrastructure and displacement of populations, thereby placing considerable pressure on response, relief and rehabilitation systems in the State.

5.17.20 It was informed that the State has established a structured response mechanism comprising a State Emergency Operation Centre, 12 District Emergency Operation Centres and about 356 Response Centres, functioning round-the-clock to ensure coordination and communication during disasters. The Committee noted that pre-season preparedness measures, mock drills and standard operating procedures enable timely activation of response systems. However, the Committee observed that difficult terrain, road blockages due to landslides and

weak last-mile connectivity significantly delay response operations, particularly in remote and high-altitude regions, thereby affecting timely rescue and evacuation efforts.

5.17.21 The response operations are carried out by SDRF in coordination with NDRF, Army, ITBP and BRO. While trained personnel and specialised mountain rescue capabilities are available, the Committee observed that limited technical manpower, logistical constraints and challenges in accessing affected areas reduce the speed and effectiveness of search and rescue operations. The Committee appreciated the use of drones, GIS and remote sensing tools for real-time damage assessment and delivery of essential supplies in inaccessible areas, which have enhanced response efficiency in recent disaster events.

5.17.22 Further the evacuation protocols and contingency plans are in place, and relief camps are established in public buildings such as schools and community centres. **However, the Committee observed that limited availability of suitable non-forest land, terrain constraints and scattered settlements pose significant challenges in setting up adequate and safe relief infrastructure. It was noted that disruptions in communication and transport networks affect timely delivery of relief materials in remote areas, impacting affected populations.**

5.17.23 The Committee appreciated the role of community-based mechanisms in supporting response and relief operations. It was noted that a large number of trained volunteers, Panchayat-level response centres and local institutions assist in early warning dissemination, evacuation and immediate relief. However, the Committee was of the view that sustained training, availability of equipment and strengthening of grassroots-level capacity are essential for improving last-mile response and relief delivery.

5.17.24 The Committee, while examining the rehabilitation and recovery initiatives taken by the State Government, noted that the State faces significant constraints in post-disaster rehabilitation due to limited availability of non-forest land and regulatory restrictions under the Forest (Conservation) Act, which affect relocation of affected populations and reconstruction of infrastructure. The Committee observed that these constraints delay long-term rehabilitation and increase vulnerability of affected communities.

5.17.25 The State has undertaken several rehabilitation and mitigation measures, including slope stabilisation works, retrofitting of critical infrastructure and landslide risk reduction projects. However, the Committee observed that delays in funding approvals, gaps in technical capacity and inadequate monitoring systems affect timely implementation of such measures, thereby impacting long-term recovery and resilience.

5.17.26 **The Committee observed that recent extreme weather events have exposed gaps in financial preparedness and response capacity. It was noted that delays in fund utilisation, technical deficiencies in project proposals and limited availability of skilled manpower affect both immediate relief and long-term rehabilitation efforts. The Committee was of the view that flexible, risk-based funding mechanisms and faster approvals are essential for strengthening disaster response and recovery in the State.**

5.17.27 **It was further observed that while inter-agency coordination mechanisms are in place, challenges remain in real-time information sharing, resource deployment and**

unified command during complex disaster situations. The Committee was of the view that strengthening coordination between State, district and field-level agencies is critical for improving overall effectiveness of response, relief and rehabilitation.

Andhra Pradesh

5.17.28 During the meeting with the representatives of Government of Andhra Pradesh, it was noted that the State faces significant multi-hazard vulnerability, with 44 per cent of its area prone to cyclones, about 34.2 lakh people across 190 mandals exposed to cyclone risk, and nearly 55.8 lakh people in 131 mandals vulnerable to floods and river erosion. Further, 68 per cent of the State's area is drought-prone, covering 454 mandals, reflecting a complex risk profile across coastal and inland regions.

5.17.29 The Committee was apprised that Andhra Pradesh has developed a robust and technology-driven disaster response framework anchored around the Real Time Governance Society (RTGS) and the AWARE (Advanced Warning and Advisory for Resilient Ecosystem) platform, which integrates real-time inputs from IMD, INCOIS, IITM and other agencies. The State has deployed an extensive sensor network comprising 2,817 Automatic Weather Stations and rain gauges, along with reservoir sensors and lightning detection systems, enabling granular monitoring and forecast driven decision making. It was further informed that during recent events such as Cyclone *Montha*, the platform enabled effective reservoir management and coordinated field-level response.

5.17.30 The State has adopted a multi-channel early warning dissemination system, including automated WhatsApp alerts, IVRS calls, CAP-based messaging, public address systems and pilot alert broadcasting systems across all 26 districts, ensuring outreach up to village-level functionaries. **The Committee, however, observed that challenges persist in last-mile connectivity, particularly for fishermen at sea and in remote coastal and tribal areas, where limitations of mobile networks necessitate reliance on VHF systems, siren towers and community-based dissemination mechanisms.**

5.17.31 The Committee observed that response operations are supported by the Andhra Pradesh State Disaster Response Force (APSDRF), with a sanctioned strength of 600 personnel (479 currently in position), strategically deployed across multiple locations and equipped with rescue boats, specialised vehicles and communication systems. The Committee further noted the use of emerging technologies, including deployment of over 680 drones during recent disasters for real-time monitoring, damage assessment and delivery of essential supplies in inaccessible areas, along with GIS-based mapping and AI-driven analytics for improved response coordination.

5.17.32 The Committee noted that with respect to relief measures, the State Government has established structured protocols for evacuation, shelter management and relief distribution. Pre-identified cyclone shelters, mapped evacuation routes and advance stockpiling of essential supplies enable timely relocation of affected populations. The Committee appreciated the role of over 27,000 Village Organisation Assistants and about 4,050 Aapda Mitra volunteers in supporting evacuation, warning dissemination and relief operations.

5.17.33 For rehabilitation and recovery, the State has undertaken several resilience-building initiatives, including construction of 219 multipurpose cyclone shelters, mangrove plantation across more than 700 hectares, and coastal protection works in erosion-prone areas such as Kakinada, Visakhapatnam and Srikakulam. Urban flood mitigation measures, including stormwater drainage improvements in cities like Vijayawada and Visakhapatnam. **However, the Committee expressed concern over the dilapidated condition of over 1,000 older cyclone shelters, absence of dedicated maintenance funding under mitigation schemes, persistent urban flooding due to drainage bottlenecks and encroachments, and degradation of mangrove ecosystems, which continue to affect long-term resilience.**

5.17.34 The inter-agency coordination has been strengthened through integrated platforms such as RTGS, AWARE, but faces challenges due to fragmented information flows, delays in data consolidation and difficulties in resource deployment during simultaneous multi-hazard events. The Committee was of the view that strengthening unified command systems, improving real-time data integration and enhancing coordination between State, district and field-level agencies are essential for improving response effectiveness.

Kerala

5.17.35 The Committee, during its interaction with the representatives of the Government of Kerala, noted that the State is highly vulnerable to multiple hazards including floods, landslides, coastal erosion, lightning and cyclonic events. It observed that Kerala's unique geographical setting characterised by a narrow coastal belt, dense river network, ecologically fragile Western Ghats and high population density results in overlapping hazard exposures, particularly during intense monsoon periods. It was further noted that approximately 14.5% of the State is flood-prone, 14.4% is landslide-prone and more than half of the coastline is vulnerable to coastal hazards.

5.17.36 The State Government of Kerala has developed a decentralised and dynamic disaster management framework, wherein Disaster Management Plans are prepared at State, District and Local Self Government (LSG) levels. The Committee was apprised that these plans are reviewed after every major disaster and updated annually through the "Orange Book", which serves as a dynamic operational document integrating response strategies, financial provisions and departmental responsibilities. All LSGs have prepared their own Disaster Management Plans, supported by dedicated working groups and assured funding through the Five-Year Plan mechanism.

5.17.37 The disaster risk reduction has been systematically integrated into development planning in the State. The State's planning framework incorporates risk-informed spatial master plans, climate adaptation strategies and statutory integration of hazard information into land-use planning. The Committee was informed that Local Action Plans on Climate Change have been prepared in select districts and that risk-informed master plans have been finalised for urban centres such as Alappuzha, Chengannur and Mananthavady.

5.17.38 The State Government has institutionalised grassroots disaster governance through statutory LSG-level disaster management committees, supported by community networks such as Kudumbashree and fisher cooperatives. It was observed that these institutions

play a critical role in preparedness, early warning dissemination, evacuation and relief operations. The presence of structured community participation mechanisms, including trained volunteers and ward-level committees, conduct pre-monsoon preparedness activities and awareness campaigns.

5.17.39 The Committee appreciated the State's advanced early warning and monitoring systems, particularly the Kerala Warning, Crisis and Hazard Management (KaWaCHaM) system, which integrates multi-hazard alerts including floods, landslides, storms and tsunamis. It was observed that the system combines satellite data, weather models, siren networks and mobile-based alerts to enable real-time decision-making. A network of 126 sirens, satellite communication systems and location-based alert mechanisms ensures redundancy in communication.

5.17.40 The State has deployed advanced technologies such as GIS-based hazard mapping, remote sensing, flood modelling and landslide early warning systems. It was noted that pilot projects in districts such as Wayanad and Kannur are testing AI-based forecasting tools and real-time monitoring systems, although full-scale operationalisation is still evolving.

5.17.41 The Government of Kerala has established a robust Emergency Operation Centre (EOC) system at State and district levels, supported by trained personnel comprising hazard analysts, GIS specialists and technical experts. It was observed that the EOCs provide continuous monitoring of weather, river levels, reservoir status and seismic activity, and issue regular advisories to departments and the public.

5.17.42 The Committee also examined the State's response capacity and noted that search and rescue operations are supported by pre-positioned equipment such as inflatable boats, satellite phones and rescue tools, with mobilisation timelines of under two hours in most districts. The State Disaster Response Force (SDRF), though limited in strength, is supported by joint training with NDRF and is undergoing gradual capacity enhancement.

5.17.43 The Committee appreciated the strong role of community volunteers in disaster response, including Aapda Mitra volunteers and large-scale voluntarism networks, which significantly augment State capacity during emergencies. It was noted that over 4,500 trained volunteers are actively engaged in first response, particularly during floods and landslides.

5.17.44 The State has developed structured relief and anticipatory financing mechanisms, including pre-monsoon allocation of funds to District Disaster Management Authorities and Local Self Governments for preparedness activities such as camp maintenance, debris clearance and emergency procurement. The Committee appreciated that such anticipatory financing enhances preparedness and enables timely response during disasters.

5.17.45 The State has undertaken several mitigation and resilience-building measures, including coastal protection works, mangrove restoration, flood management infrastructure and urban drainage improvements. It was noted that both structural measures such as seawalls, pump stations and retention basins, and nature-based solutions such as mangrove restoration and dune stabilisation are being pursued.

5.17.46 The initiatives such as relocation schemes for vulnerable coastal populations, urban flood mitigation projects and integration of climate projections into planning processes, reflect a comprehensive approach towards long-term resilience. However, the Committee observed certain challenges in the State's disaster management framework. It was observed that enforcement of building regulations, land-use planning norms and coastal regulation provisions remains uneven, particularly at the local level. The gaps persist in last-mile dissemination of early warnings in landslide-prone and remote areas, and that public awareness regarding multi-hazard warning systems requires further strengthening. The technological limitations remain in areas such as hyper-local weather prediction, landslide early warning accuracy and real-time flood inundation modelling. The high population density, environmental degradation and urban encroachment in ecologically sensitive areas continue to exacerbate disaster risks in the State.

5.17.47 The Committee is of the view that Kerala has developed a comprehensive and decentralised disaster management model with strong integration of community participation, technology and anticipatory planning. However, sustained efforts are required to strengthen enforcement of risk-informed development norms, enhance technological capabilities for forecasting and modelling, and improve last-mile connectivity and public awareness, so as to further improve the effectiveness of response, relief and rehabilitation in the State.

Union Territory of Jammu & Kashmir

5.17.48 The Committee noted that the Union Territory of Jammu & Kashmir is highly vulnerable to multiple hazards including floods, landslides, earthquakes, avalanches and Glacial Lake Outburst Floods (GLOFs), owing to its fragile Himalayan ecology, complex terrain and climatic variability. The Kashmir Valley is particularly prone to floods, the Chenab Valley to landslides and the Jammu region falls in high seismic zones.

5.17.49 The Committee observed that the Union Territory has developed a structured disaster management framework, with the Disaster Management Plan initially notified in 2017 and subsequently revised in 2023 to align with the UT governance structure and the National Disaster Management Plan. District Disaster Management Plans have been prepared for all 20 districts, ensuring complete coverage.

5.17.50 The institutional mechanisms have been strengthened post-reorganisation through the reconstitution of the Disaster Management Authority and improved coordination between UT, divisional and district-level authorities. However, initial challenges relating to role clarity, inter-departmental coordination and data sharing were observed, particularly in the transition phase. The disaster risk reduction measures are being increasingly integrated into infrastructure development, including slope stabilisation, drainage systems, embankments and geotechnical interventions in road projects such as the Jammu–Srinagar corridor, as well as in tourism and hydropower projects. However, such integration remains uneven and project-specific rather than systemic.

5.17.51 The Committee appreciated the efforts towards strengthening early warning systems through the adoption of Common Alerting Protocol (CAP), integration of alerts from multiple agencies such as IMD, CWC and DGRE, and the use of platforms like SACHET and

5.17.52 Decision Support Systems. Emergency Operation Centres at UT and district levels provide real-time coordination and dissemination of alerts. However, the Committee noted that last-mile connectivity remains a challenge in remote and mountainous districts such as Kishtwar, Kupwara and Bandipora due to terrain and communication limitations. The absence of a fully integrated real-time multi-hazard warning platform and community-based alert systems was also observed.

5.17.53 The response capacity in the UT is supported by SDRF battalions, NDRF deployment and coordination with the Army and other central agencies, particularly for mountain search and rescue, avalanche response and high-altitude logistics. Pre-positioning of resources and seasonal preparedness measures, including winter stocking in snow-bound areas, were also observed to be in place.

5.17.54 The community-based disaster preparedness has been strengthened through programmes such as Aapda Mitra and Aapda Sakhi, along with the constitution of Panchayat and Block-level Disaster Management Committees. Training programmes, mock drills and awareness campaigns have been conducted across districts to enhance local preparedness. The mitigation measures such as slope stabilisation, flood protection works, embankments and soil conservation interventions have been undertaken in vulnerable districts such as Ramban, Baramulla and Uri. Further, monitoring of glacial lakes and implementation of GLOF mitigation frameworks through dedicated committees and scientific studies important steps towards long-term risk reduction.

5.17.55 The urban flood management measures, including de-siltation of drains, strengthening of embankments and flood channel improvements, are being undertaken in cities such as Srinagar and Jammu. However, issues relating to encroachment of floodplains, inadequate drainage infrastructure and enforcement gaps persist. The Committee noted that regulatory frameworks for earthquake-resistant construction and floodplain zoning are in place; however, enforcement remains inconsistent, particularly in peri-urban and rural areas. Similarly, while funds such as SDRF, CAMPA and mitigation programmes are being utilised for resilience-building, challenges in timely fund utilisation, technical capacity and monitoring were observed.

5.17.56 The Committee is of the view that while Jammu & Kashmir has made significant progress in strengthening disaster management systems, there is a need for greater emphasis on last-mile connectivity, enforcement of land-use regulations, integration of disaster risk reduction into all development sectors and strengthening of technological and institutional capacities to enhance the effectiveness of response, relief and rehabilitation across the Union Territory.

Tamil Nadu

5.17.57 During the visit of the Committee to the State, representatives of the State Government of Tamil Nadu and District Administrations made a presentation before the Committee on various aspects of disaster management and mitigation and preparedness mechanism in place to deal with disaster. The Committee noted that Tamil Nadu is exposed to multiple hazards including cyclones, floods, storm surges, landslides and forest fires, owing to its long coastline and the presence of ecologically fragile hill regions along the Western Ghats.

The State has developed a structured disaster management framework supported by the State Disaster Management Authority, State Emergency Operation Centre and well-established inter-departmental coordination mechanisms.

5.17.58 It was observed that the State has put in place advanced early warning and monitoring systems, which includes the use of meteorological models, real-time data from Automatic Rain Gauges, Automatic Weather Stations and water level monitoring systems, along with integrated decision support platforms such as the Chennai Real Time Flood Forecasting System. Communication systems such as TN ALERT and TN SMART 2.0 are in use for dissemination of warnings and coordination of response.

5.17.59 The Committee appreciated the strong preparedness and response capacity of the State, which comprises deployment of disaster response forces, trained volunteers from NSS, NCC, Bharat Scouts and Guides, and Aapda Mitra, as well as pre-identification of evacuation shelters and relief infrastructure. There is availability of multi-purpose shelters, resilient housing initiatives and arrangements for medical and emergency response during disasters.

5.17.60 There is provision of well-defined disaster management frameworks at major pilgrimage centres, including constitution of Temple Disaster Management Committees, deployment of fire and rescue personnel, CCTV-based surveillance, crowd management protocols, and Standard Operating Procedures for various contingencies such as fire, stampede and structural safety. Medical facilities, emergency response systems and trained volunteers for managing large congregations, particularly during peak festival periods are also available.

5.17.61 The Committee was informed that district administrations have undertaken detailed vulnerability assessments, identification of disaster-prone locations, mapping of evacuation routes and pre-positioning of relief resources. These initiatives are supported by regular mock drills and inter-agency coordination mechanisms, relief preparedness, identification of camps and essential supplies. The State has adopted the “Build Back Better” approach and integrated disaster risk reduction into development planning. It was observed that improved preparedness and institutional response have contributed to reduction in losses during recent extreme rainfall events, despite increasing intensity of disasters.

5.17.62 The challenges remain in ensuring last-mile dissemination of early warnings in remote and hilly areas, strengthening preparedness for emerging risks such as landslides and forest fires, and enhancing coordination among multiple departments during large-scale emergencies. Issues relating to disaster response financing and flexibility in utilisation of funds were also highlighted during the discussions.

5.17.63 The Committee is of the view that Tamil Nadu presents a robust model of disaster preparedness, particularly in early warning systems, institutional coordination and management of large gatherings. However, further strengthening of last-mile connectivity, integration of multi-hazard risk assessments in hill regions, and greater flexibility in disaster financing mechanisms are required to enhance the effectiveness of response, relief and rehabilitation in the State.

Recommendation/Observation

5.17.64 The Committee has observed that State of Odisha has taken notable initiatives for cyclone preparedness and mass evacuation, similarly State of Kerala has attained success in flood warning dissemination and decentralization of local governance. State of Tamil Nadu has adopted the “Build Back Better” approach and integrated disaster risk reduction into development planning. The Committee is of the view that improved preparedness measures and institutional response is an effective mechanism to minimise losses during event of any disaster. The Committee recommends that best practices adopted and response mechanism incorporated by all the States should be complied and documented in a comprehensive manner and should be made available as guidelines to other States/UTs which are vulnerable to similar kind of disasters.

5.17.65 The Committee is of the view that the full spectrum of disaster management needs a coordinated, integrated and multi-disciplinary approach encompassing prevention, mitigation, preparedness, response, recovery and reconstruction. The disasters in the country are not only frequent but also diverse in nature. This necessitate the vulnerable States/Union Territories to keep reviewing and updating their mitigation, preparedness, response and recovery measures to be one step ahead to deal with any event of disaster. Further, sustained efforts are required to address emerging multi-hazard risks, strengthen last-mile connectivity and enhance integration of advanced technologies with grassroots-level systems, so as to further improve the effectiveness of response, relief and rehabilitation measures.

Bihar

5.17.66 The Committee noted from the documents furnished by the State Government of Bihar that the State is highly vulnerable to multiple hazards, particularly floods, earthquakes, lightning, heatwaves and cold waves. The Committee observed that recurrent flooding in the Kosi, Gandak, Bagmati, Kamla and Mahananda river basins continues to affect large parts of the State, while a significant portion of Bihar falls within high seismic risk zones.

5.17.67 The Committee noted that the State has undertaken measures to strengthen disaster response and resilience through hazard mapping, flood modelling, seismic safety initiatives and integration of disaster risk considerations into development planning. The State, *vide* its replies to a questionnaire, apprised the Committee that early warning and risk communication systems have been strengthened through GIS-based flood monitoring, hydrological modelling platforms and the Common Alerting Protocol (CAP) for dissemination of warnings. The Committee also took note of the efforts taken to strengthen district and Panchayat-level disaster management plans, volunteer networks and community preparedness mechanisms.

5.17.68 The Committee was also informed that Emergency Operation Centres, evacuation protocols, monsoon preparedness measures and search and rescue arrangements have enhanced the State's disaster response capacity. The Committee took note of the use of emerging technologies such as GIS, drones, remote sensing and AI-based monitoring systems for disaster management.

5.17.69 The Committee observed that recurrent floods, urban waterlogging, inadequate drainage infrastructure and limited adoption of earthquake-resistant construction continue to pose significant challenges. A large number of buildings in high seismic risk areas remain non-engineered and vulnerable to disasters. The Committee was of the view that Bihar requires sustained investment in flood mitigation, resilient infrastructure, urban drainage systems and earthquake-resistant construction, along with strengthening of community preparedness and local response capacities, to improve the effectiveness of response, relief and rehabilitation across the State.

Uttar Pradesh

5.17.70 The Committee also received the written replies and other documents by the State Government of Uttar Pradesh. The State is vulnerable to multiple hazards *i.e.* floods, heatwaves, droughts, lightning, cold waves, industrial accidents and earthquakes, owing to its vast geographical expanse, dense population and diverse climatic conditions.

5.17.71 The Committee observed that floods remain a major concern, particularly in districts located along the Ganga, Yamuna, Ghaghara, Rapti and Sharda river systems. Rapid urbanisation, waterlogging and extreme weather events have further increased disaster risks in urban areas. The State, in its replies, apprised the Committee that institutional mechanisms such as the State Disaster Management Authority, Emergency Operation Centres, SDRF deployment, pre-positioning of rescue equipment, relief shelters and mock drills have been established to strengthen disaster response.

5.17.72 It was further noted that the State has adopted flood forecasting systems, weather alerts, GIS-based mapping and digital platforms to improve response coordination and dissemination of early warnings. Community awareness programmes, volunteer engagement and emergency relief measures have also contributed to strengthening disaster response and relief operations.

5.17.73 It was observed that the scale and population density of the State continue to pose challenges in ensuring timely evacuation, effective relief distribution and inter-agency coordination during major disasters. Issues relating to urban flooding, drainage congestion, encroachment of floodplains and gaps in enforcement of safety regulations also remain areas of concern. **The Committee was of the view that greater emphasis is required on integrated flood management, urban resilience, strengthening local response capacities and improving last-mile delivery of warnings and relief measures to enhance the effectiveness of disaster response, relief and rehabilitation across the State.**

Assam

5.17.74 The Committee noted from the written replies and background material furnished by the Government of Assam that the State remains highly vulnerable to floods, river erosion, landslides and earthquakes due to its riverine terrain and geographical conditions. Annual flooding of the Brahmaputra and Barak river systems continues to affect large populations, infrastructure and agricultural areas across the State.

5.17.75 The Committee observed that the State has strengthened its disaster response framework through the Assam State Disaster Management Authority (ASDMA), Emergency

Operation Centres and district-level preparedness mechanisms. The State, in its replies, apprised the Committee that annual flood preparedness measures, including pre-positioning of relief materials, evacuation planning and deployment of SDRF and other response agencies, are undertaken before the monsoon season. The Committee also noted the use of flood forecasting systems, weather alerts, satellite-based monitoring, GIS mapping and drones to support early warning dissemination and response coordination. Efforts made towards community participation through awareness programmes, volunteer engagement and capacity-building initiatives in vulnerable districts. It further noted that relief operations are supported through advance planning and coordinated deployment of resources during flood emergencies.

5.17.76 The Committee observed that recurring floods and river erosion continue to cause large-scale displacement, damage to infrastructure and loss of livelihoods. Breaches in embankments, prolonged inundation and difficult accessibility in riverine areas often impede timely relief and rehabilitation efforts. The Committee also noted emerging concerns relating to urban flooding, inadequate drainage systems and limitations in local-level response infrastructure.

5.17.77 The Committee was of the view that Assam requires sustained focus on long-term flood and erosion management, strengthening of resilient infrastructure, improvement of drainage and embankment systems, and enhancement of local response and rehabilitation capacities to improve the effectiveness of disaster response, relief and recovery across the State.

RECOMMENDATIONS AT A GLANCE

Chapter II: Policy, Plans, Guidelines and Legal-Institutional Framework for Disaster Management

National Policy on Disaster Management, 2009

The Committee notes that while the National Policy on Disaster Management was enacted in 2009, the landscape of disaster risk has changed substantially since then with climate change accelerating the frequency and intensity of extreme weather events, rapid urbanisation creating new risk concentrations, and technological advances offering new capabilities for preparedness and response. The Committee recommends that the Ministry of Home Affairs should initiate a formal review of the National Policy on Disaster Management, 2009, with the objective of updating it to reflect post-2009 developments. It may include study analysis of climate change impacts, urbanisation risks, the role of AI and geospatial technology for weather forecasting, cyclone tracking, damage assessment, early warning dissemination, etc. and the lessons learnt from major disaster events since 2009. This review exercise should also involve extensive consultations with all the States and Union Territories, scientific agencies and civil society for a holistic approach towards disaster management.

(Para 2.6.7)

National Disaster Management Plan

The Committee notes that the revised National Disaster Management Plan (NDMP) was published in 2019. After the enactment of the DM Amendment Act, 2025, the operationalisation of the National Disaster Mitigation Fund (NDMF), recommendations of the Sixteenth Finance Commission with regard to disaster management and the significant evolution of AI-assisted forecasting capabilities since 2019, there is a need to expedite the further revision of NDMP to align it with the current legal and institutional context.

(Para 2.7.5)

Contingency Planning and Preparedness Framework

The Committee notes that the quality and comprehensiveness of plans varies significantly across states and districts and that there remains scope for further strengthening, particularly in terms of operationalisation, regular updation and integration of emerging risks such as those arising from climate change, urbanisation and technological hazards. The Committee, therefore, recommends that NDMA should develop a standardized template and benchmarking framework for disaster management plans to ensure uniformity in quality across all states and districts. All plans may be reviewed and updated at least once every two years, incorporating the latest hazard assessments and emerging risks arising from climate change, urbanisation and technological hazards. Compliance in this regard may be monitored by NDMA to ensure accountability and timely updation across all levels.

(Para 2.10.5)

The Committee also recommends that the frequency of mock drills and simulation exercises be significantly enhanced, with at least two multi-agency drills conducted annually at the state and district levels. A structured post-drill evaluation mechanism may also be initiated at all levels to systematically identify gaps and ensure that corrective actions are undertaken within a defined timeline.

(Para 2.10.6)

Fire Services

The Committee takes note of the fact that a revised Model Bill on Maintenance of Fire and Emergency Services was prepared and was circulated to the States/ UTs in September, 2019 for framing/ updating their fire and emergency service Act / Rules as per their requirement, however, so far, only 10 States have adopted the Model Bill. The Committee observes that controlling and managing fire incidents especially in urban sectors sometimes become very difficult due to congested urban planning, a small fire incident and human negligence is capable of triggering a massive fire breakout and could result in huge losses of property and lives. The Committee, therefore, recommends that MHA may take proactive steps to persuade and support the remaining States and Union Territories to adopt or suitably align their existing fire services legislation with the revised Model Bill within a defined timeframe. The Committee also recommends that a time-bound monitoring and review mechanism may be established to track progress in adoption, identify bottlenecks and provide necessary technical guidance so as to ensure a more modern, uniform and effective fire and emergency services framework across the country.

(Para 2.11.21)

Urban Disaster Management Authority (UDMA)

The Committee is of the view that the developing and promoting a culture of prevention, mitigation, preparedness and response is a pre-requisite for fulfilling mission of making the nation disaster resilient. To achieve this, setting up of Specialist Disaster Response Force is very crucial as such force plays a significant role as first responder to any disaster in the State/UT. The Committee recommends that the Ministry of Home Affairs should issue advisories to seven remaining States/UTs (Telangana, Goa, Delhi, Puducherry, Lakshadweep, Chandigarh and Andaman & Nicobar Islands) to raise their Specialist Response Force for swiftly responding in case of any disaster.

(Para 2.11.27)

The Committee notes that despite the provision made under the Disaster Management (Amendment) Act, 2025, only one State has so far constituted UDMA. The Committee recommends that MHA should issue advisories to all State Governments to constitute UDMA for their respective State Capitals and Municipal Corporation cities within a defined timeframe. NDMA should also provide necessary technical guidance and a standardized framework to States for the effective operationalisation of UDMA, and a periodic compliance monitoring mechanism should be established to track progress across the country.

(Para 2.11.28)

Designation of Nodal Ministries and Departments for Disaster Management

The Committee notes that the notification dated 22nd September 2025 represent a landmark development in the evolution of India's disaster management institutional framework. The formal designation of nodal ministries for specific categories of disasters, with mandates spanning the entire disaster management spectrum, has the potential to significantly enhance specialisation, accountability and effectiveness in disaster prevention, preparedness and response. However, the Committee also notes that many of the designated ministries have historically focused on their core developmental and regulatory mandates and may require significant augmentation of institutional capacity, technical expertise and human resources to effectively fulfil their expanded disaster management responsibilities. The notification must also be supported by adequate budgetary provisions for each nodal ministry and by robust inter-ministerial coordination mechanisms, particularly for hazards that involve the mandates of multiple ministries. The Committee recommends that each designated nodal ministry prepare and operationalise a hazard-specific disaster management plan within a time-bound framework. The effectiveness of the new arrangement may be reviewed after a suitable period to identify strengths, address gaps and refine the institutional arrangements in light of operational experience.

(Para 2.12.3)

Heatwave and Lightning: National Notification

The Committee notes that 16th Finance Commission has recommended to add heatwave and lightning to the nationally notified list of disasters under the SDRF framework. This recommendation will directly respond to the needs of the States/UTs which are vulnerable to heatwave and lightening related incidents. The Committee recommends that the Ministry may take compliance with the recommendation of the 16th Finance Commission and include heatwave and lightning to the nationally notified list of disasters as it will address the inadequacy of the current framework for dealing with such disasters.

(Para 2.13.26)

NDMIS Compliance Linkage

The Committee notes that the 16th Finance Commission has recommended the transformation of NDMIS into a comprehensive national platform integrating data across all stages of disaster management, with mandatory data reporting by States to ensure transparency, accountability and evidence-based decision-making. The Committee considers this an important mechanism for the establishment of the National Disaster Database under the Disaster Management (Amendment) Act, 2025. The Committee recommends that NDMA should issue guidelines and a timeline for all States to ensure full compliance, along with adequate technical support and capacity building to States with digital infrastructure to facilitate seamless integration with the platform.

(Para 2.13.29)

The Committee commends the 16th Finance Commission's recommendations as a comprehensive advancement in India's disaster financing architecture, combining fiscal adequacy with scientific rigour, operational accountability and innovative risk transfer mechanisms. The Committee recommends that the Ministry may expedite the implementation of these recommendations so that envisioned reforms in disaster management be translated into tangible outcomes.

(Para 2.13.30)

The Committee notes that the country has developed a comprehensive framework for disaster management that integrates legal provisions, policy direction, institutional mechanism and financial arrangements. While the existing disaster management framework provides a robust foundation, its effectiveness is constrained by uneven implementation across States, limited institutional and technical capacities at the regional levels, delays in utilization of allocated funds and coordination gaps among various stakeholders. The increasing complexity of disaster risks arising from climate change and rapid urbanization, further highlight the need for continuous strengthening of the disaster management system. The Committee recommends that the priority should be accorded to improving implementation efficiency, ensuring greater uniformity in the implementation of disaster management frameworks across States through strengthened monitoring mechanisms, periodic performance assessments, dissemination of best practices, fostering greater inter-agency coordination and ensuring the timely and effective utilization of financial resources and building long-term disaster resilience.

(Para 2.13.31)

Chapter III - Disaster Risk Reduction

The Committee notes that scientific risk assessment forms the foundation of an effective Disaster Risk Reduction (DRR) framework; however, significant gaps persist in the completion, standardization and enforceability of hazard mapping across the country. The Committee, therefore, recommends that multi-hazard risk mapping, including flood, landslide, seismic and glacial lake hazards, be completed in a time-bound manner and made statutorily enforceable across all States and Union Territories, which are susceptible to these disasters, so as to ensure its effective integration into planning and development processes.

(Para 3.9.9)

The Committee further recommends that seismic microzonation and landslide susceptibility maps be mandatorily integrated into town planning regulations and building by-laws, with strict restrictions on construction and developmental activities in high-risk zones, in order to prevent the creation of new vulnerabilities. The Committee also recommends the establishment of a comprehensive national repository of hazard, vulnerability and risk data, with information at the district and sub-district levels, to facilitate evidence-based decision-making, inter-agency coordination and informed policy formulation by all stakeholders.

(Para 3.9.10)

The Committee notes that, the policy framework emphasises the integration of Disaster Risk Reduction (DRR) into development planning, its implementation across sectors remains uneven and insufficiently institutionalised. The Committee, therefore, recommends that all major infrastructure and major urban development projects be subjected to a mandatory Disaster Risk Impact Assessment (DRIA) prior to approval, so as to ensure that such projects are resilient and do not create or exacerbate disaster risks.

(Para 3.9.11)

The Committee further recommends that floodplain zoning and river regulation measures be uniformly implemented across all vulnerable States in order to address issues of encroachment, unplanned development and recurring flood losses. The Committee also recommends that developmental activities in ecologically fragile areas, including hilly regions and coastal zones, be strictly regulated, and that clear accountability mechanisms be instituted to fix responsibility for violations, so as to prevent environmentally unsustainable practices that aggravate disaster vulnerabilities.

(Para 3.9.12)

The Committee notes that accurate forecasting and timely dissemination of warnings are critical for effective disaster risk reduction. The Committee, therefore, recommends that investment in advanced forecasting technologies be significantly enhanced, including the deployment of Artificial Intelligence and Machine Learning-based predictive models, Doppler weather radars, high-resolution numerical weather prediction systems and satellite-based monitoring technologies, so as to improve the precision and reliability of forecasts.

(Para 3.9.13)

The Committee recommends that a robust post-disaster validation mechanism be initiated, whereby forecasted impacts are systematically compared with actual outcomes, and the findings are utilised to continuously refine predictive models, parameters and methodologies. The Committee also recommends that sector-specific and impact-based forecasting systems be developed, particularly for agriculture and allied sectors, so as to provide actionable information such as crop loss projections based on wind speed, rainfall and other hazard parameters, thereby enabling vulnerable communities, especially farmers, to take timely preventive and adaptive measures.

(Para 3.9.14)

The Committee recommends that a fully integrated, multi-hazard early warning system be developed at the national level, bringing together key agencies such as IMD, CWC, INCOIS, NRSC and State authorities into a single unified and interoperable platform, so as to ensure seamless data sharing, real-time coordination and timely dissemination of warnings.

(Para 3.9.15)

The Committee further recommends that early warning dissemination be strengthened through hyper-local forecasting and communication mechanisms at the level of villages, urban wards and vulnerable habitations, in place of the existing district-level

approach, so as to enhance the accuracy, relevance and usability of warnings for local authorities and communities.

(Para 3.9.16)

The Committee notes that the disaster-related expenditure remains largely relief-centric, with comparatively lower emphasis on mitigation and risk reduction measures, which are essential for reducing long-term disaster losses. The Committee, therefore, recommends that a gradual but definitive shift be made from relief-oriented expenditure towards mitigation-focused investments, with adequate budgetary prioritisation for risk reduction, resilience-building and preventive infrastructure.

(Para 3.9.17)

The Committee further recommends that a dedicated monitoring and evaluation framework be established to track the utilisation, effectiveness and outcomes of funds allocated for mitigation, so as to ensure accountability, transparency and evidence-based policy corrections.

(Para 3.9.18)

The Committee also recommends that risk financing mechanisms be strengthened and expanded, including insurance coverage for households, agriculture and Micro, Small and Medium Enterprises (MSMEs), in order to enhance financial resilience and reduce the economic burden of disasters on vulnerable sections of society.

(Para 3.9.19)

The Committee notes that research, innovation and knowledge-sharing are critical enablers for strengthening Disaster Risk Reduction (DRR), and that sustained institutional support is required to translate policy intent into practical outcomes. The Committee, therefore, recommends that a national network of universities and research institutions be further strengthened and expanded, so as to promote interdisciplinary research, innovation and capacity building in disaster management.

(Para 3.9.20)

The Committee further recommends that indigenous technologies and capabilities be actively promoted and developed, particularly in the areas of forecasting systems, fire services equipment, and disaster response tools, with a view to reducing external dependence and enhancing self-reliance in disaster management.

(Para 3.9.21)

The Committee also recommends that post-disaster studies and documentation of lessons learnt be incorporated as a standard practice, and that the findings of such studies be systematically integrated into policy formulation, planning and capacity-building initiatives, so as to ensure continuous improvement in disaster risk management systems.

(Para 3.9.22)

Chapter IV – Risk Assessment, Mitigation Measures and Preparedness

Cyclones

The Committee notes that while significant improvements have been achieved in cyclone forecasting and warning systems, concerns remain regarding the availability of

sector-specific impact assessments and preparedness at the local level, particularly for agriculture, fisheries and coastal livelihoods. The Committee, therefore, recommends that impact-based forecasting be further operationalised at the sectoral level, including crop-specific loss projections, infrastructure vulnerability assessment and livelihood risk advisories, so as to enable targeted preparedness measures by farmers, fishermen and local administrations. The Committee further recommends that initiatives must be taken for island territories and remote coastal regions, as well as Lakshadweep and Andaman & Nicobar Islands to have comprehensive framework encompassing dedicated evacuation, shelter and rehabilitation infrastructure, taking into account their geographical isolation and limited evacuation windows, so as to ensure effective disaster response in such vulnerable regions

(Para 4.2.19)

Floods

The Committee notes that recurrent flooding in several parts of the country is aggravated by encroachment of floodplains, unregulated riverbed activities and lack of basin-level planning, leading to avoidable loss of life and property. The Committee, therefore, recommends that a comprehensive national framework be developed for monitoring and removal of encroachments in riverbeds and floodplains, supported by periodic mapping of encroached areas, so as to ensure accountability and prevent further violations.

(Para 4.3.16)

The Committee further recommends that river basin-level flood management plans be prepared and implemented, integrating reservoir operations, upstream-downstream coordination and inter-state consultation mechanisms, particularly in the context of dam water releases, so as to prevent sudden flooding and downstream impacts. The Committee also recommends that clear protocols be established for dam operations, including mandatory prior information sharing among affected States, to ensure coordinated decision-making and minimise disaster risks arising from unregulated water releases.

(Para 4.3.17)

The Committee notes that urban flooding has emerged as a major challenge due to unplanned urbanisation, inadequate drainage systems and encroachment of natural water bodies, affecting a large number of Urban Local Bodies across the country. The Committee, therefore, recommends that urban flood management should be incorporated as a core function of Urban Local Bodies, with mandatory preparation and periodic updating of city-level flood management plans which may include drainage master plans and emergency response protocols.

(Para 4.3.18)

The Committee further recommends that storm-water drainage systems, wetlands, lakes and natural drainage channels be restored and maintained on a priority basis, and that encroachments on such systems be identified and removed in a time-bound manner, so as to restore natural water flow and reduce flood risk. The Committee also recommends that urban infrastructure planning pertaining to roads, housing and drainage systems, be

aligned with natural topography and hydrological patterns to prevent waterlogging and urban flood situations.

(Para 4.3.19)

Earthquakes

The Committee notes that a large proportion of the country lies in moderate to high seismic zones, and that structural vulnerability of buildings remains a major risk factor, particularly in urban and densely populated areas. The Committee, therefore, recommends that strict enforcement of earthquake-resistant building codes be ensured across all States/Union Territories, and that compliance mechanisms be strengthened through periodic inspections and certification systems, so as to prevent unsafe construction practices.

(Para 4.4.11)

The Committee notes that earthquakes constitute one of the most serious natural hazards affecting the country due to its extensive seismic vulnerability. Hazard mapping and land-use planning is vital to minimize the loss of life, property and critical infrastructure, in the event of an earthquake. The Committee recommends that roadmap for earthquake management must give impetus to preparation and regular updation of seismic hazard maps, expansion of seismic monitoring networks and earthquake observation stations, restrict construction in high-risk seismic zones and promotion of safe urban planning based on scientific risk assessments. The Committee also recommends that provisions should be made for sufficient financial support for scientific research on earthquake prediction, risk assessment and resilient construction technologies.

(Para 4.4.12)

The earthquake mitigation and management require coordination efforts among government organisations, local authorities, emergency services and public. The Committee is of the view that inter agency coordination be strengthened by adopting measures which may include regular earthquake drills in offices, schools, hospitals and public institutions, development of evacuation plans and identification of safe assembly areas, stocking emergency shelters with food, water, medicines and essential supplies, organizing awareness campaigns on earthquake safety and preparedness, equipping disaster response agencies with modern rescue equipment and communication systems and developing policies that promote resilient development and rapid post disaster recovery.

(Para 4.4.13)

The Committee is of the view that retrofitting existing critical infrastructure is essential to reduce potential impacts of earthquake and ensure continuity of essential services. The Committee recommends that a time-bound programme for retrofitting of critical infrastructure, including schools, hospital, power plants, water supply systems, communication facilities and emergency response centres, be undertaken, with clear prioritisation of high-risk regions, since they are vital during and after seismic events and also to minimise potential losses during seismic events. The Committee observes that by adopting a systematic and phased retrofitting strategy, the government agencies and infrastructure owners can significantly reduce the risk of structural failure, protect

human lives, minimize economic losses and maintain the uninterrupted operation of critical services during an event of earthquake. The Committee also recommends that unsafe and structurally deficient buildings in high-risk zones be identified and appropriate action should be taken, including retrofitting or demolition, to reduce disaster vulnerability.

(Para 4.4.14)

Tsunami

The Committee notes with appreciation the establishment of a robust Tsunami Early Warning System by the Indian National Centre for Ocean Information Services (INCOIS), integrating seismic monitoring, ocean observations and advanced modelling for timely dissemination of warnings. However, the Committee is of the considered view that the effectiveness of any warning system ultimately depends on its successful transmission to the last mile and the preparedness of vulnerable communities to respond promptly. The Committee, therefore, recommends that the Government strengthen the last-mile connectivity of tsunami warning dissemination by expanding multilingual alert systems, enhancing the coverage of coastal siren networks, integrating warnings with all major mobile communication platforms, and conducting periodic community-based evacuation drills in every tsunami-prone coastal district and island territory. Special emphasis should be placed on sensitising fishermen, tourists, school children and other vulnerable groups through sustained awareness campaigns and mandatory mock exercises.

(Para 4.5.8)

The Committee observes that unplanned coastal development and degradation of natural coastal ecosystems significantly increase the vulnerability of coastal populations to tsunami impacts. While appreciating the ongoing efforts towards coastal hazard zonation and land-use planning, the Committee recommends that all major infrastructure projects and urban development plans in tsunami-prone areas be subjected to comprehensive tsunami risk assessments before approval. The Committee further recommends large-scale restoration and conservation of mangroves, coastal vegetation, coral reefs and sand dunes as cost-effective, sustainable and environmentally sound natural buffers against tsunami waves. Such ecosystem-based mitigation measures should be integrated with Coastal Regulation Zone (CRZ) planning and supported through dedicated financial assistance to coastal States and Union Territories.

(Para 4.5.9)

Landslides & Snow Avalanches

The Committee notes that landslides in hilly regions are increasingly linked to unregulated construction, slope destabilisation and environmental degradation, leading to recurring disasters and loss of life. The Committee recommends that landslide prone areas should be identified through hazard mapping and construction in high risk areas be avoided. The Committee also recommends that clear regulatory guidelines be framed for land-use planning and building codes and enforced to restrict construction and developmental activities in highly vulnerable slope areas, particularly in hill districts and tourist zones.

(Para 4.6.10)

The Committee also notes that deforestation and uncontrolled excavation on hill side also lead to slope destabilisation and landslides. The Committee is of the view that slope stability can be improved by planting deep rooted vegetation to hold soil in hilly regions, at the same time construction of retaining walls and rock barriers can also improve the slope stability, therefore, thrust may be given to such activities. The Committee also feels that measures must be taken to regulate mining, quarrying and construction activities in vulnerable areas to reduce the likelihood of landslides which could result in severe damage.

(Para 4.6.11)

The Committee recommends that infrastructure projects in hilly regions be subject to mandatory geotechnical and environmental assessments, with strict monitoring of compliance during execution, so as to prevent slope de-stabilization and associated risks. The Committee also recommends that priority be given to implementation of site-specific slope stabilization and drainage measures in identified landslide hotspots to reduce immediate risk in vulnerable areas.

(Para 4.6.12)

Heat Waves

The Committee notes that heat waves are emerging as a major public health hazard, particularly affecting vulnerable populations in urban and semi-urban areas. The Committee, therefore, recommends that Heat Action Plans be strengthened and uniformly implemented across all heat-prone States and cities, with clear delineation of roles and responsibilities of departments concerned.

(Para 4.7.7)

The Committee further recommends that urban planning incorporate heat-resilient measures, including increased green cover, cool roofing, shaded public spaces and improved water access, so as to reduce heat stress and protect vulnerable populations. The Committee also recommends that health systems be strengthened for heat wave response, including availability of cooling centres, medical preparedness and targeted awareness campaigns.

(Para 4.7.8)

Chemical & Industrial Disasters

The Committee notes that chemical and industrial disasters, though infrequent, have the potential for large-scale human and environmental impact, particularly in densely populated industrial regions. The Committee, therefore, recommends that strict enforcement of safety regulations and periodic safety audits of hazardous industries be ensured, with clear accountability for non-compliance.

(Para 4.8.12)

The Committee further recommends that on-site and off-site emergency plans be regularly updated and tested through mock drills, involving district authorities and local communities, so as to ensure preparedness for industrial accidents. The Committee also recommends that buffer zones between hazardous industries and residential areas be strictly maintained, and that land-use planning be aligned with industrial risk considerations, to minimise exposure of populations to industrial hazards.

(Para 4.8.13)

The Committee notes that the transportation of hazardous materials poses significant risks to public safety, human health and the environment, particularly along densely populated and high-traffic corridors, and that existing mechanisms for monitoring, regulation and emergency response during transit require further strengthening. The Committee, therefore, recommends that a comprehensive regulatory and monitoring framework be established for the safe transportation of hazardous materials, including mandatory GPS tracking of transport vehicles, route risk assessment and real-time monitoring systems, so as to ensure safe and secure movement. The Committee further recommends that district administrations and emergency services be equipped with specialised response protocols, equipment and trained hazardous material (HAZMAT) response teams along major transport corridors to effectively manage incidents involving chemical spills or leaks. The Committee also recommends that standardised emergency response guidelines be issued for accidents involving hazardous materials during transportation, with clearly defined roles and responsibilities for all concerned agencies to ensure timely response, effective containment and minimisation of potential damage.

(Para 4.8.14)

Chapter V – Response, Relief and Rehabilitation

National Disaster Response Force (NDRF)

The Committee notes that the National Disaster Response Force (NDRF), though highly specialized, may face capacity constraints in responding to multiple simultaneous disasters across the country, and that State Disaster Response Forces (SDRFs) have not been established in all States/UTs. The Committee, therefore, recommends that the strength, geographical distribution and specialised capabilities of NDRF be periodically reviewed and augmented, particularly in disaster-prone regions, so as to ensure timely and effective response.

(Para 5.2.7)

The Committee recommends that all States and Union Territories be mandated to establish and operationalise SDRFs in a time-bound manner, and necessary financial and technical support be extended by the Central Government for the same.

(Para 5.2.8)

The Committee feels coordination between National Disaster Response Force and the State Disaster Response Force is essential for effective disaster management in the country as SDRF is the first responder in case of disaster and NDRF provides specialized

support during major disasters. The Committee recommends that greater emphasis be placed on joint training, mock drills and interoperability between NDRF and SDRF units, so that coordinated response among all these forces be enhanced during rescue activities and management of disasters. The Committee also recommends that Standard Operating Procedures (SOPs) and common communication platforms should be used to minimise the procedural and communication gaps.

(Para 5.2.9)

Early Warning and Risk Communication

The Committee notes that mechanisms such as the Integrated Control Room for Emergency Response (ICR-ER) and Emergency Response Support System (ERSS) (Dial 112) have significantly improved coordination; however, there is a need to further strengthen real-time data integration, decision support systems and inter-agency communication. The Committee, therefore, recommends that all emergency response platforms be fully integrated with real-time data from Central and State agencies, and that decision-support systems should be strengthened using advanced data analytics and visualisation tools, so as to facilitate timely and informed decision-making during disasters. The Committee further recommends that standard operating procedures should be established for seamless coordination between emergency response systems and field-level agencies, including district administrations and response forces.

(Para 5.7.7)

India Disaster Resource Network (IDRN)

The Committee notes that India Disaster Resource Network (IDRN) is a nation-wide electronic inventory of disaster response equipment, skilled personnel and emergency supplies managed by the National Institute of Disaster Management under the Ministry of Home Affairs. The Committee recommends that to improve the reach of IDRN, the emphasis should be laid on technological upgrades and stronger coordination among government agencies, local communities, and emergency responders. Further the network system should have real-time resource updating as outdated data can hamper the disaster response activities. The Committee therefore recommends that mandatory monthly or quarterly updates of resources should be done by districts, States and national level line departments and agencies. It also recommends that network should be connected directly with police emergency systems, fire departments, hospitals, medical facilities and ambulance services for stronger integration with emergency services.

(Para 5.9.3)

Participation of Local Communities in Disaster Management

The Committee notes that local communities play a crucial role in disaster response and recovery; however, there is scope for further integration of their participation and enhancement of their capacities. The Committee, therefore, recommends that community-based disaster response mechanisms, including schemes such as Aapda Mitra and Yuva Aapda Mitra, be expanded and strengthened, with adequate training, equipment and institutional support. The Committee further recommends that Village Disaster

Management Plans (VDMPs) and local-level preparedness plans be regularly updated and integrated with district and state plans, so as to ensure effective grassroots-level response.
(Para 5.10.5)

Relief and Rehabilitation

The Committee recommends that minimum standards of relief be periodically reviewed and updated, taking into account emerging needs and best practices, and that strict compliance be ensured across all States and Union Territories. The Committee further recommends that special provisions for vulnerable groups be incorporated through targeted interventions, including dedicated facilities in relief camps, livelihood support and social protection measures.

(Para 5.11.4)

Recovery Process

The Committee notes that Post-Disaster Needs Assessment (PDNA) is a critical tool for recovery planning; however, concerns remain regarding timeliness, standardisation and alignment of PDNA outcomes with actual financial assistance and reconstruction efforts. The Committee, therefore, recommends that PDNA processes should be standardised across States with clearly defined timelines, methodologies and sectoral templates, so as to ensure consistency and credibility of damage and loss assessments. The Committee further recommends that financial assistance for recovery and reconstruction should be more closely aligned with PDNA findings, with appropriate justification in cases of deviation, and to enhance transparency and trust among stakeholders.

(Para 5.12.6)

Early, Mid and Long-term Recovery

The Committee notes that while the principle of “Build Back Better” is recognised in policy, its implementation on the ground lacks measurable benchmarks. The Committee, therefore, recommends that clear operational guidelines and sector-specific standards should be developed for implementing the “Build Back Better” approach with tangible results, particularly in housing, infrastructure and livelihood restoration, so as to ensure resilience in reconstruction efforts. The Committee further recommends that monitoring mechanisms should also be established to assess the extent to which reconstruction projects adhere to resilience and sustainability standards, and it should be reviewed periodically by higher authorities.

(Para 5.13.3)

State-wise Response, Relief and Rehabilitation

The Committee has observed that State of Odisha has taken notable initiatives for cyclone preparedness and mass evacuation, similarly State of Kerala has attained success in flood warning dissemination and decentralization of local governance. State of Tamil Nadu has adopted the “Build Back Better” approach and integrated disaster risk reduction into development planning. The Committee is of the view that improved preparedness measures and institutional response is an effective mechanism to minimise

losses during event of any disaster. The Committee recommends that best practices adopted and response mechanism incorporated by all the States should be complied and documented in a comprehensive manner and should be made available as guidelines to other States/UTs which are vulnerable to similar kind of disasters.

(Para 5.17.64)

The Committee is of the view that the full spectrum of disaster management needs a coordinated, integrated and multi-disciplinary approach encompassing prevention, mitigation, preparedness, response, recovery and reconstruction. The disasters in the country are not only frequent but also diverse in nature. This necessitate the vulnerable States/Union Territories to keep reviewing and updating their mitigation, preparedness, response and recovery measures to be one step ahead to deal with any event of disaster. Further, sustained efforts are required to address emerging multi-hazard risks, strengthen last-mile connectivity and enhance integration of advanced technologies with grassroots-level systems, so as to further improve the effectiveness of response, relief and rehabilitation measures.

(Para 5.17.65)
