

Figure 1-1: Disaster Management Cycle

### 1.14.1 National Level

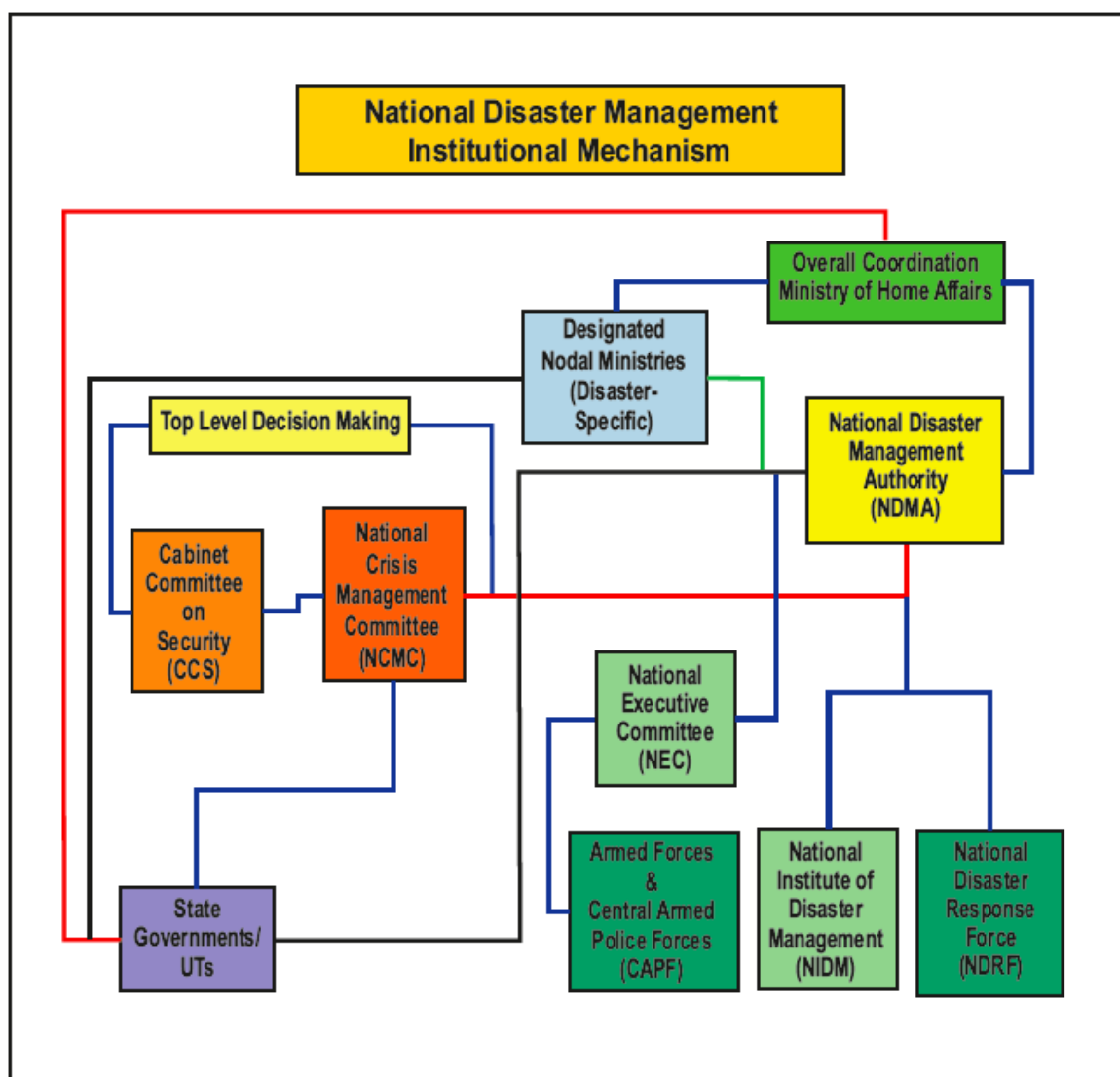
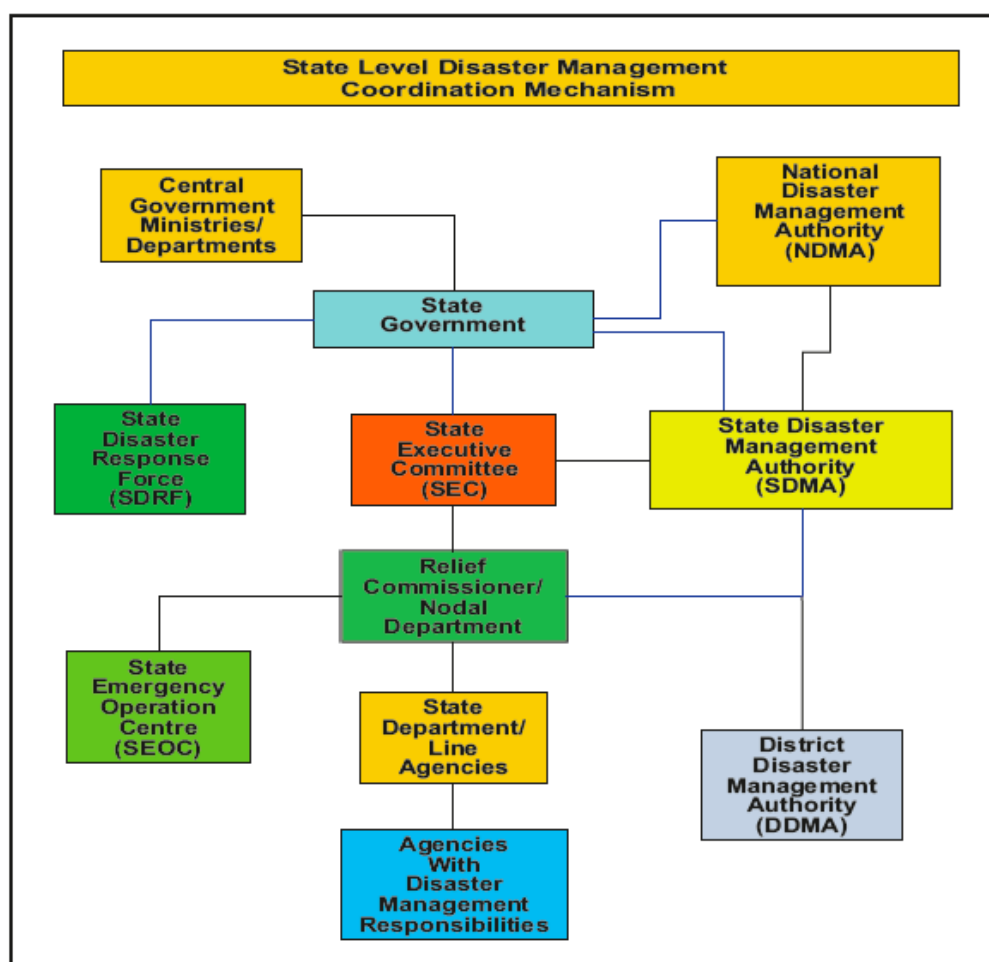


Figure 1-3: National-level disaster management - basic institutional framework

## 1.14.2 State Level



**Figure 1-4: State-level disaster management - basic institutional framework**

**Note:** The figure represents merely the institutional pathways for coordination, decision-making and communication for disaster management and does not imply any chain of command.

Time frames envisaged in the NDMP			
Short-Term (T1)	T1 (2022)		
Medium-Term (T2)	T1/T2	T2 (2027)	
Long-Term (T3)	T1/T2/T3	T2/T3	T3 (2030)

**Figure 1-2: Time Frames—Short, Medium and Long Term**

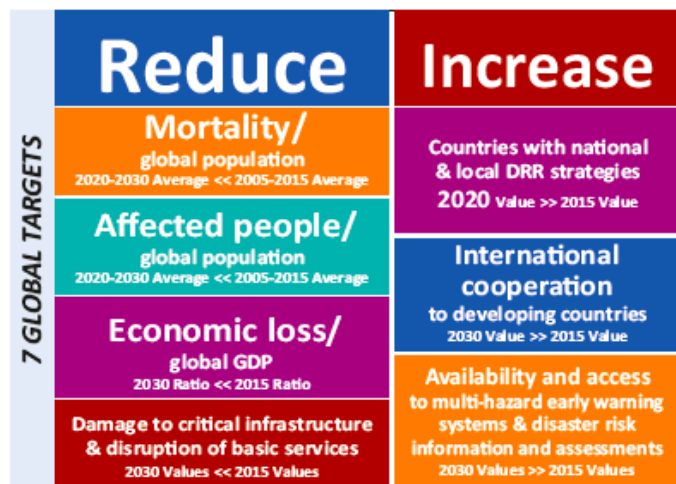
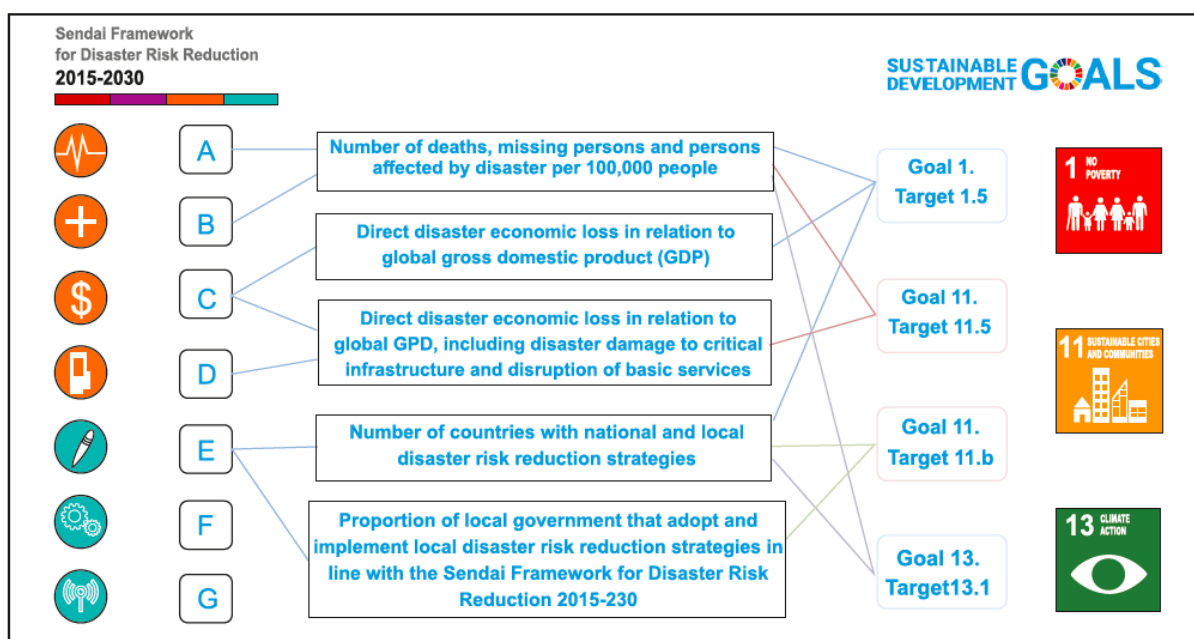


Figure 3-1: Sendai Framework for Disaster Risk Reduction - 7 Global Targets

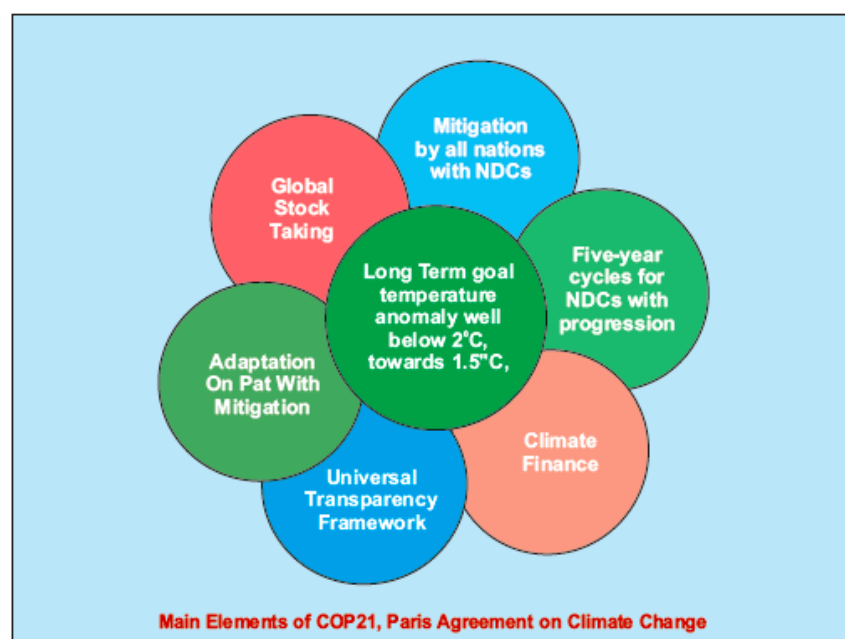


Figure 3-2: Seventeen Sustainable Development Goals Source: UNDP<sup>41</sup>



**Figure 3-3: Coherence and mutual reinforcement of SDGs and Sendai Framework**

Source: preventionweb.net<sup>42</sup>



**Figure 3-4: Main elements of the COP21, Paris Agreement on Climate Change**

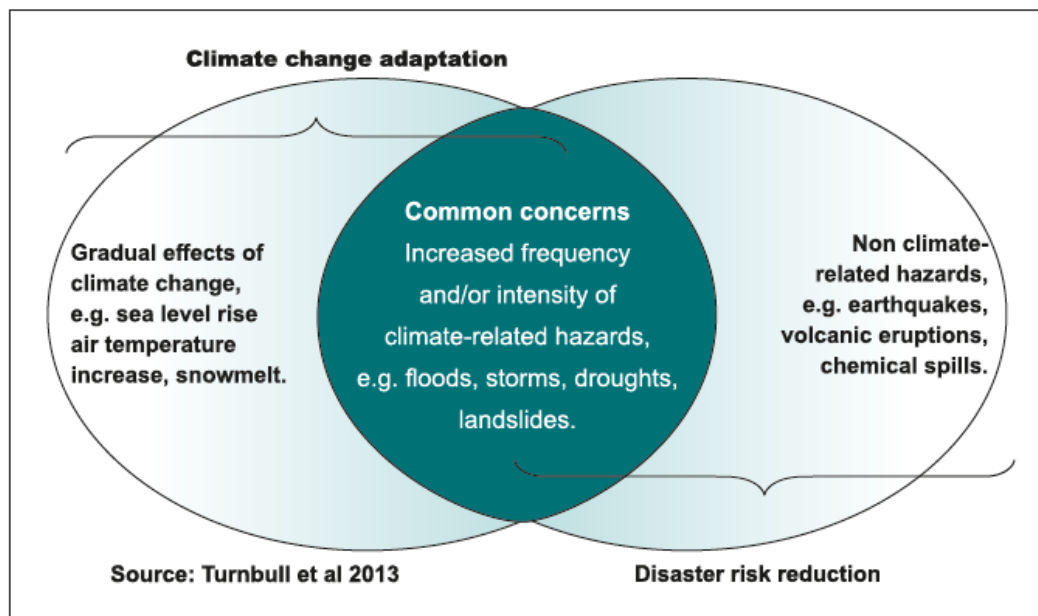


Figure 3-5: Common concerns of climate change adaptation and disaster risk reduction

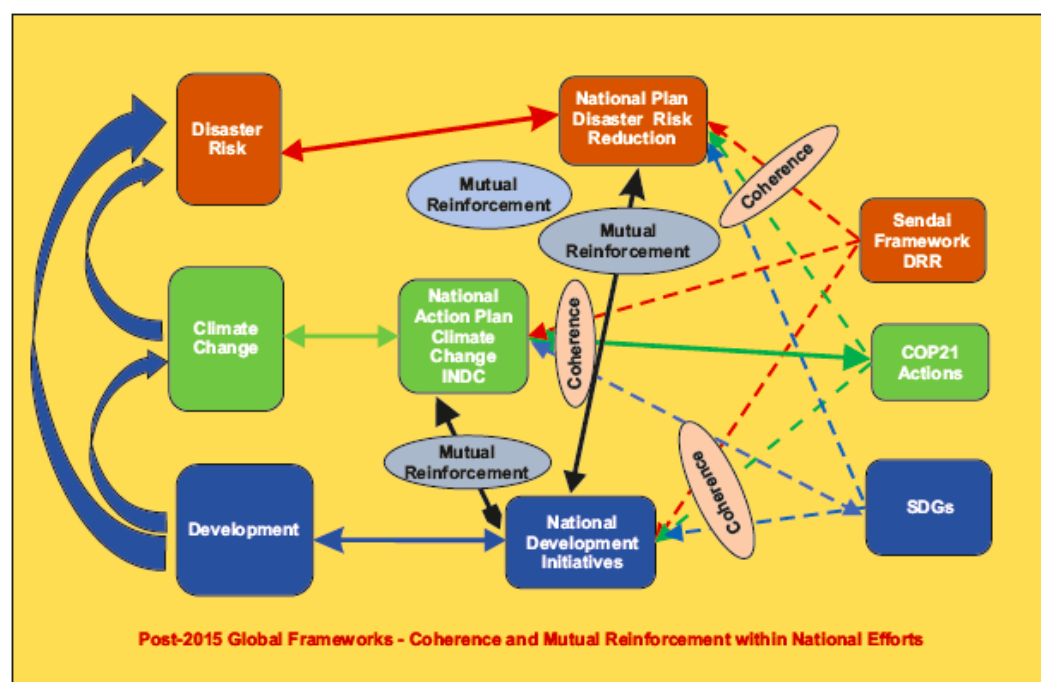


Figure 3-6: Post-2015 Global Frameworks—Coherence and Mutual Reinforcement within National Efforts

**Table 1-3: Nodal Ministry for Management/ Mitigation of Different Disasters**

SN	Disaster	Nodal Ministry/ Department
1.	Accident – Air (Civil Aviation)	Min. of Civil Aviation (MOCA)
2.	Accidents – Rail	Min. of Railways (MOR)
3.	Accidents – Road	Min. of Road Transport and Highways (MORTH)
4.	Avalanche	Min. of Defence (MOD) – Border Road Organization (BRO)
5.	Biological Emergencies	Min. of Health and Family Welfare (MHFW)
6.	Cold-Wave	Min. of Agriculture and Farmers Welfare (MAFW)
7.	Cyclone/ Tornado	Min. of Earth Sciences (MOES)
8.	Drought	Min. of Agriculture and Farmers Welfare (MAFW)
9.	Earthquake	Min. of Earth Sciences (MOES)
10.	Flood	Min. of Jal Shakti (MOJS)
11.	Floods – Urban	Min. of Housing and Urban Affairs (MHUA)
12.	Forest Fire	Min. of Environment, Forests, and Climate Change (MEFCC)
13.	Frost	Min. of Agriculture and Farmers Welfare (MAFW)
14.	Hailstorm	Min. of Agriculture and Farmers Welfare (MAFW)
15.	Industrial and Chemical	Min. of Environment, Forests and Climate Change (MEFCC)
16.	Landslides	Min. of Mines (MOM)
17.	Nuclear and Radiological	Dept. of Atomic Energy (DAE)
18.	Oil Spills	Min. of Defence (MOD) – Indian Coast Guard (ICG)
19.	Pest Attack	Min. of Agriculture and Farmers Welfare (MAFW)
20.	Tsunami	Min. of Earth Sciences (MOES)

**Table 3-1: India's national initiatives relevant for DRR across the three Global Frameworks**

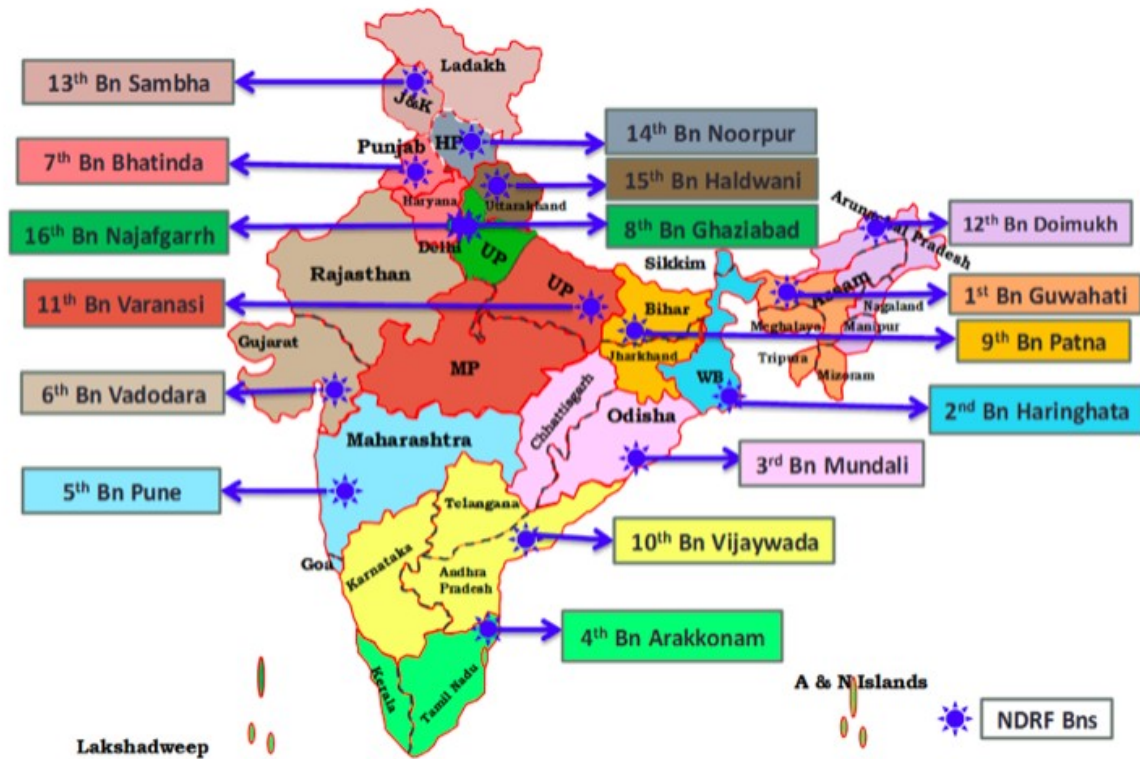
	Sendai – Global Targets	Sustainable Development Goals	COP21 – Paris Agreement on Climate Change	National Initiatives Relevant to DRR
1	Substantially reduce global disaster mortality by 2030 (2020-2030 compared to 2005-2015)	SDG 1, 2, 11, 13	<ul style="list-style-type: none"> <li>• Changes in the pattern of extreme events require enhanced disaster resilience and adaptation</li> <li>• Addressing GACC risks is crucial for eliminating poverty and reducing economic losses from disasters</li> </ul>	Multiple schemes and initiatives for DRR, economic development, GACC mitigation and adaptation.
2	Substantially reduce the number of disaster-affected people by 2030 (2020-2030)	SDG 1, 11, 13	Stresses the need for accelerated action to build resilience through risk-sensitive planning and implementation of DRR	<ul style="list-style-type: none"> <li>• Allocation of resources and funds for disaster prevention and to develop capacities for DRR</li> <li>• Strengthening of the DRR at all levels</li> </ul>



























	Sendai – Global Targets	Sustainable Development Goals	COP21 – Paris Agreement on Climate Change	National Initiatives Relevant to DRR
	compared to 2005-2015)			<ul style="list-style-type: none"> <li>• Promoting disaster-resilient development</li> <li>• Mainstreaming DRR and adaptation to GACC in development</li> </ul>
3	Substantially reduce direct disaster economic loss	SDG 1, 11	The Paris Agreement aims to hold global average temperature increase to well below 2°C above pre-industrial levels and to pursue efforts to limit it to 1.5°C, recognizing that this would significantly reduce the risks and impacts of climate change	National commitment to DRR evident from the PM Ten Point Agenda for DRR National commitments for mitigation of and adaptation to GACC as per Intended Nationally Determined Contributions (INDC)
4	Substantially reduce damage to critical infrastructure and disruption of basic services (health, education, etc.)	SDG 1, 4, 9, 11,	Global adaptation goals for enhancing adaptive capacity, strengthening resilience and reducing vulnerability to ensure adequate adaptation response in the context of the global temperature goal	Enhance the resilience of national health systems by integrating DRR into primary, secondary and tertiary health care, and by promoting and enhancing training capacities in the field of disaster medicine. The substantial reduction of disaster damage to critical infrastructure and disruption of basic services is essential to ensure healthy lives and promote well-being.

5	Substantially increase disaster risk reduction strategies	SDG 1, 3, 6, 11, 13,	Addressing GACC risks that are crucial for reducing economic losses from disasters along with a well-integrated approach to adaptation, sustainable development, environmental management and disaster risk reduction	<ul style="list-style-type: none"> <li>• NAPCC for mitigation of and adaptation to GACC</li> <li>• National Mission on Sustainable Agriculture (NMSA)</li> <li>• National Initiative on Climate Resilient Agriculture (NICRA)</li> </ul>
6	Substantially increase international cooperation to complement national actions	Close international cooperation to achieve SDGs	Firm commitments by countries to the global response to GACC based on INDCs and international cooperation for	India is a pro-active member in the implementation of the Post-2015 and other global frameworks
5	Substantially increase disaster risk reduction strategies	SDG 1, 3, 6, 11, 13,	Addressing GACC risks that are crucial for reducing economic losses from disasters along with a well-integrated approach to adaptation, sustainable development, environmental management and disaster risk reduction	<ul style="list-style-type: none"> <li>• NAPCC for mitigation of and adaptation to GACC</li> <li>• National Mission on Sustainable Agriculture (NMSA)</li> <li>• National Initiative on Climate Resilient Agriculture (NICRA)</li> </ul>
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## LOCATION OF NDRF BNs



Map showing NDRF Bns locations and their respective area of responsibility

S No.	Title	Release Date	Download
1	National Guidelines For Preparation of Action plan – Prevention and Management of Cold Wave and Frost 2021 <b>NEW</b>	Oct 2021	<a href="#">Download(7 MB)</a> 
2	Simplified Guideline for Earthquake Safety of Building from National Building Code of India 2016	May 2021	<a href="#">Download(10 MB)</a> 
3	Cool Roof : House Owners’ Guide to alternate roof cooling solutions	May 2021	<a href="#">Download(8.30 MB)</a> 
4	Guidelines on Management of Glacial Lake Outburst Floods (GLOFs)	Oct 2020	<a href="#">Download(11.21 MB)</a> 
4.a	Compendium of Task Force Report on NDMA Guidelines on Management of Glacial Lake Outburst Floods (GLOFs)	Oct 2020	<a href="#">Download(12.70 MB)</a> 
4.b	Summary for Policy Makers on NDMA Guidelines on Management of GLOFs	Oct 2020	<a href="#">Download(04.01 MB)</a> 
5	Guidelines for Preparation of Action Plan - Prevention and Management of Heat Wave	Oct 2019	<a href="#">Download(45.74 MB)</a> 
6	Landslide Risk Management Strategy	Sept 2019	<a href="#">Download(12.48 MB)</a> 
7	Guidelines on Disability Inclusive Disaster Risk Reduction	Sept 2019	<a href="#">Download(64.63 MB)</a> 
8	Guidelines on Temporary Shelters for Disaster-Affected Families	Sept 2019	<a href="#">Download(09.86 MB)</a> 
9	Guidelines on Prevention & Management of Thunderstorm & Lightning/Squall/Dust/Hailstorm & Strong Winds	March 2019	<a href="#">Download(09.55 MB)</a> 
10	Guidelines on Boat Safety	Sept 2017	<a href="#">Download(04.40 MB)</a> 
11	Guidelines on Cultural Heritage Sites and Precincts	Sept 2017	<a href="#">Download(21.45 MB)</a> 
12	Guidelines on Museums	May 2017	<a href="#">Download(02.12 MB)</a> 
13	Guidelines on Minimum Standards of Relief	Feb 2016	<a href="#">Download(03.00 MB)</a> 
14	Guidelines on Hospital Safety	Feb 2016	<a href="#">Download(03.22 MB)</a> 
15	Guidelines on School Safety Policy	Feb 2016	<a href="#">Download(02.50 MB)</a> 
16	Guidelines on Seismic Retrofitting of Deficient Buildings and Structures.	June 2014	<a href="#">Download(01.25 MB)</a> 
17	Guidelines on Scaling, Type of Equipment and Training of Fire Services	April 2012	<a href="#">Download(02.61 MB)</a> 
18	Guidelines on National Disaster Management Information and Communication System	Feb 2012	<a href="#">Download(06.00 MB)</a> 
19	Guidelines on Management of Drought	Sept 2010	<a href="#">Download(01.40 MB)</a> 
20	Guidelines on Management of Urban Flooding	Sept 2010	<a href="#">Download(14.35 MB)</a> 
21	Guidelines on Management of Dead in the Aftermath of Disaster	Aug 2010	<a href="#">Download(01.40 MB)</a> 
22	Guidelines on Management of Tsunamis	Aug 2010	<a href="#">Download(01.40 MB)</a> 
23	Guidelines on Incident Response System	July 2010	<a href="#">Download(08.97 MB)</a> 
24	Guidelines on Psycho-Social Support and Mental Health Services in Disasters	Dec 2009	<a href="#">Download(0748 KB)</a> 
25	Guidelines on Management of Landslides and Snow Avalanches	June 2009	<a href="#">Download(03.39 MB)</a> 
26	Guidelines on Management of Nuclear and Radiological Emergencies	Feb 2009	<a href="#">Download(01.65 MB)</a> 
27	Guidelines on Management of Biological Disasters	July 2008	<a href="#">Download(03.23 MB)</a> 
28	Guidelines on Management of Cyclones	April 2008	<a href="#">Download(04.52 MB)</a> 
29	Guidelines on Management of Floods	Jan 2008	<a href="#">Download(05.84 MB)</a> 
30	Guidelines on Medical Preparedness and Mass Casualty Management	Oct 2007	<a href="#">Download(60.24 MB)</a> 
31	Guidelines on Preparation of State Disaster Management Plans	July 2007	<a href="#">Download(05.84 MB)</a> 
32	Guidelines on Chemical Disasters	April 2007	<a href="#">Download(01.67 MB)</a> 
33	Guidelines on Management of Earthquakes	April 2007	<a href="#">Download(03.16 MB)</a> 

**Table 2-1: India - General profile**

	Feature	Description
1	Area	32.87 lakh (3.3 million) sq.km
2	Location	Situated in southern Asia, the Indian peninsula is separated from mainland Asia by the Himalayas; Lying entirely in the northern hemisphere, India lies between latitudes 8°4' N and 37°6' N; longitudes 68°7'E and 97° 25'E
3	Borders/ Neighbouring Countries	North: China, Bhutan and Nepal; Himalayan mountain ranges Northwest: Afghanistan and Pakistan South: Sri Lanka and Maldives; Indian Ocean, Palk Strait and the Gulf of Mannar East: Myanmar and Bangladesh; Bay of Bengal West: Arabian Sea
4	Major Rivers	Twelve with total catchment area of 252.8 million hectares
5	Forest	692,027 sq.km (21.5 percent of the total geographical area)
6	Coastline	7,517 km (the mainland, Lakshadweep Islands, and the Andaman and Nicobar Islands)
7	Desert	442,289 sq.km
8	Population	1.2 billion; Male: 51.5%; Female: 48.5% (Census 2011)
9	States*	28
10	Union Territories*	9
11	Sex Ratio	940 females per 1,000 males (Census 2011)
12	Population Density	382 persons per sq.km (Census 2011)
13	Annual exponential population growth rate	1.64 per cent in 2001-2011 (Census 2011)
14	Population share	Rural: 69%; Urban: 31% (Census 2011)
15	Climate	Tropical monsoon; tropical climate marked by relatively high summer temperatures and dry winters. Main seasons: a) Winter (Dec.-Feb.) b) Summer (Mar.-Jun.) c) South-West monsoon (Jun.-Sep.) and d) Post monsoon (Oct.-Nov.)

(\*) Note: From October 31, 2019<sup>5</sup>

Based on GOI website: <https://www.india.gov.in/india-glance/profile>

### 2.2.1 Multi-Hazard Vulnerability

As per the definition adopted by UNISDR, hazard is a dangerous phenomenon, substance, human activity, or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. India, due to its, physiographic and climatic conditions is one of the most disaster-prone areas of the World. Nearly 59 per cent of the landmass is prone to earthquakes of moderate to very high intensity. More than 40 million hectares (12 per cent of land) is prone to floods and river erosion. Of the nearly 7,500 km long coastline, close to 5,700 km is prone to cyclones and tsunamis. Nearly 68% of the cultivable area is vulnerable to drought. Large tracts in hilly regions are at risk from landslides and some are prone to snow avalanches. Vulnerability to disasters/emergencies of CBRN origin also exists. Heightened vulnerabilities to disaster risks can be related to expanding population, urbanisation, and industrialisation, development within high-risk zones, environmental degradation, and climate change.

## 2.3 Regions/Areas Involving Multiple States Requiring Special Attention

While suggesting a holistic approach to DM, the High Power Committee<sup>24</sup> discussed three cases that merit special consideration on the geo-physical considerations: a) Himalayan region b) Coastal tracts, and c) Riverine areas. From the point of view of administrative and logistical perspectives, the North-East Region also requires specialized approach. Similarly, the Union Territories, remote Islands and offshore marine assets need to be treated differently given the specific administrative and logistical challenges. Therefore, there are six special categories:

- 1) Himalayan Region spanning more than one State
- 2) Coastal Tracts covering more than one State and UTs
- 3) Riverine Areas spread over one or more States
- 4) North East Region consisting of all eight States
- 5) Union Territories, Islands and Marine Assets located in one or more State and UTs
- 6) Arid and Semi-Arid Regions



## 1.3 Main Pillars of the NDMP

The NDMP, in a sense, can be said to have five main pillars:

- I. Conforming to the national legal mandates – the DM Act 2005 and the NPDM 2009
- II. Participating proactively to realise the global goals as per agreements to which India is a signatory – Sendai Framework for Disaster Risk Reduction (SFDRR), Sustainable Development Goals (SDGs) and Paris Agreement on Climate Change – consistent with the international consensus for achieving mutual reinforcement and coherence of these frameworks
- III. Prime Minister's Ten Point Agenda for DRR articulating contemporary national priorities
- IV. Social inclusion as a ubiquitous and cross-cutting principle
- V. Mainstreaming DRR as an integral feature

## 1.6 Prime Minister's Ten-Point Agenda for Disaster Risk Reduction

The Prime Minister, Shri Narendra Modi, enunciated a Ten-Point Agenda in his inaugural speech at the Asian Ministerial Conference on Disaster Risk Reduction 2016, held in New Delhi during November 2016 (AMCDRR), which has also been incorporated in the NDMP. The ten key elements consist of the following:

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

## 1.11 Objectives

Along with the mandate given in the DM Act 2005 and the NPDM 2009, the national plan has incorporated the national commitments in the domain of DRR associated with the three major post-2015 global frameworks and the PM's Ten Point Agenda. Accordingly, the broad objectives of the NDMP are:

1. Improve the understanding of disaster risk, hazards, and vulnerabilities
2. Strengthen disaster risk governance at all levels from local to centre
3. Invest in disaster risk reduction for resilience through structural, non-structural and financial measures, as well as comprehensive capacity development
4. Enhance disaster preparedness for effective response
5. Promote "Build Back Better" in recovery, rehabilitation and reconstruction
6. Prevent disasters and achieve substantial reduction of disaster risk and losses in lives, livelihoods, health, and assets (economic, physical, social, cultural and environmental)
7. Increase resilience, prevent the emergence of new disaster risks, reduce the existing risks and manage the residual risks
8. Promote the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures to prevent and reduce hazard exposure and vulnerabilities to disaster
9. Empower both local authorities and communities as partners to reduce and manage disaster risks
10. Strengthen scientific and technical capabilities in all aspects of disaster management
11. Capacity development at all levels to effectively respond to multiple hazards and for community-based disaster management
12. Provide clarity on roles and responsibilities of various Ministries and Departments involved in different aspects of disaster management
13. Promote the culture of disaster risk prevention and mitigation at all levels
14. Facilitate the mainstreaming of disaster management concerns into the developmental planning and processes
15. Ensuring DRR is socially inclusive, gender sensitive and empowering
16. Build and strengthen the resilience of poor communities to prevent disasters aggravating poverty and to protect livelihoods
17. Enhanced mainstreaming of disaster risk reduction and climate adaptation strategies within the agriculture sector including sustainable farming
18. Special focus on disaster risk reduction measures for agriculture and livestock
19. Promoting resilient health systems to develop the capacities and resilience of communities to cope and recover from disaster impacts
20. Enhance the resilience of health systems by integrating DRR into all levels of health care
21. Promote disaster-resilient schools, colleges and other educational facilities
22. Promote women's leadership and active participation in disaster risk reduction
23. Strengthen efforts to mainstream DRR into water management and reduce the likely impacts of water-related hazards
24. Strengthening and promoting the resilience of new and existing critical infrastructure
25. Integration of disaster risk reduction considerations and measures into financial and fiscal instruments
26. Mainstreaming DRR into development and implementation of all projects and schemes (rural and urban)
27. Strengthen disaster risk modelling, assessment, mapping, monitoring and multi-hazard early warning systems
28. Promote comprehensive surveys on multi-hazard disaster risks and the development of regional disaster risk assessments and maps, including climate change scenarios
29. Implementation of ecosystem-based approaches regarding shared resources, such as within river basins, mountainous regions and coastlines
30. Effective use of science, technology and traditional knowledge in all aspects of DRR



**Table 1-2: Key National-Level Decision-Making Bodies for Disaster Management**

	Name	Composition	Vital role
1	<b>Cabinet Committee on Security (CCS)</b>	Prime Minister, Minister of Defence, Minister of Finance, Minister of Home Affairs, and Minister of External Affairs	<ul style="list-style-type: none"> <li>• Evaluation from a national security perspective, if an incident has potentially security implications</li> <li>• Oversee all aspects of preparedness, mitigation and management of Chemical, Biological, Radiological and Nuclear (CBRN) emergencies and of disasters with security implications</li> <li>• Review risks of CBRN emergencies from time to time, giving directions for measures considered necessary for disaster prevention, mitigation, preparedness and effective response</li> </ul>
2	<b>National Crisis Management Committee (NCMC)</b>	<ul style="list-style-type: none"> <li>• Cabinet Secretary (Chairperson)</li> <li>• Secretaries of Ministries/ Departments and agencies with specific DM responsibilities</li> </ul>	<ul style="list-style-type: none"> <li>• Oversee the Command, Control and Coordination of the disaster response</li> <li>• Give direction to the Crisis Management Group as deemed necessary</li> <li>• Give direction for specific actions to face crisis situations</li> </ul>
3	<b>National Disaster Management Authority (NDMA)</b>	<ul style="list-style-type: none"> <li>• Prime Minister (Chairperson)</li> <li>• Members (not exceeding nine, nominated by the Chairperson)</li> </ul>	<ul style="list-style-type: none"> <li>• Lay down policies, plans and guidelines for disaster management</li> <li>• Coordinate their enforcement and implementation throughout the country</li> <li>• Approve the NDMP and the DM plans of the respective Ministries and Departments of Government of India</li> <li>• Lay down guidelines for disaster management to be followed by the different Central Ministries, Departments and the State Governments</li> </ul>
4	<b>National Executive Committee (NEC)</b>	<ul style="list-style-type: none"> <li>• Union Home Secretary (Chairperson)</li> <li>• Secretaries to the GOI in the Ministries/ Departments of</li> </ul>	<ul style="list-style-type: none"> <li>• To assist the NDMA in the discharge of its functions</li> <li>• Preparation of the National Plan</li> <li>• Coordinate and monitor the implementation of the National Policy</li> </ul>

	Name	Composition	Vital role
		<p>Agriculture, Atomic Energy, Defence, Drinking Water and sanitation, Environment, Forests and Climate Change Finance (Expenditure), Health and Family Welfare, Power, Rural Development, Science and Technology, Space, Telecommunications, Urban Development, Water Resources, River Development and Ganga Rejuvenation, The Chief of the Integrated Defense Staff of the Chiefs of Staff Committee, ex officio as members.</p> <ul style="list-style-type: none"> <li>Secretaries in the Ministry of External Affairs, Earth Sciences, Human Resource Development, Mines, Shipping, Road Transport and Highways, Chairman, Central Water Commission and Secretary, NDMA are special invitees to the meetings of the NEC.</li> </ul>	<ul style="list-style-type: none"> <li>Monitor the implementation of the National Plan and the plans prepared by the Ministries or Departments of the Government of India</li> <li>Direct any department or agency of the Govt. to make available to the NDMA or SDMA's such men, material or resources as are available with it for emergency response, rescue and relief</li> <li>Ensure compliance of the directions issued by the Central Government</li> <li>Coordinate response in the event of any threatening disaster situation or disaster</li> <li>Direct the relevant Ministries/ Departments of the GOI, the State Governments and the SDMA's regarding measures to be taken in response to any specific threatening disaster situation or disaster.</li> <li>Coordinate with relevant Central Ministries/ Departments/ Agencies which are expected to assist the affected State as per protocols and Standard Operating Procedures (SOPs)</li> <li>Coordinate with the Armed Forces, Central Armed Police Forces<sup>4</sup> (CAPF), the National Disaster Response Force (NDRF) and other uniformed services which comprise the GOI's response to aid the State authorities</li> <li>Coordinate with all relevant specialized scientific institutions/ agencies responsible for providing early warning and monitoring</li> <li>Coordinate with SDRF, civil defense volunteers, home guards and fire services, through the relevant administrative departments of the State Governments</li> </ul>
5	National Disaster Response Force (NDRF)	Specially trained force headed by a Director General Structured like paramilitary forces for rapid deployment	Assist the relevant State Government/District Administration in the event of an imminent hazard event or in its aftermath
6	National Institute of Disaster Management (NIDM)	Union Home Minister; Vice Chairman, NDMA; Members including Secretaries of various nodal Ministries and Departments of Government of India and State Governments and	<ul style="list-style-type: none"> <li>Human resource development and capacity building for disaster management within the broad policies and guidelines laid down by the NDMA</li> <li>Design, develop and implement training programmes</li> <li>Undertake research</li> </ul>
	Name	Composition	Vital role
		heads of national levels scientific, research and technical organizations, besides eminent scholars, scientists and practitioners.	<ul style="list-style-type: none"> <li>Formulate and implement a comprehensive human resource development plan</li> <li>Provide assistance in national policy formulation, assist other research and training institutes, state governments and other organizations for successfully discharging their responsibilities</li> <li>Develop educational materials for dissemination</li> <li>Promote awareness generation</li> </ul>

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## 2.3 Regions/Areas Involving Multiple States Requiring Special Attention

While suggesting a holistic approach to DM, the High Power Committee<sup>24</sup> discussed three cases that merit special consideration on the geo-physical considerations: a) Himalayan region b) Coastal tracts, and c) Riverine areas. From the point of view of administrative and logistical perspectives, the North-East Region also requires specialized approach. Similarly, the Union Territories, remote Islands and offshore marine assets need to be treated differently given the specific administrative and logistical challenges. Therefore, there are six special categories:

- 1) Himalayan Region spanning more than one State
- 2) Coastal Tracts covering more than one State and UTs
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## 1.3 Main Pillars of the NDMP

The NDMP, in a sense, can be said to have five main pillars:

- I. Conforming to the national legal mandates – the DM Act 2005 and the NPDM 2009
- II. Participating proactively to realise the global goals as per agreements to which India is a signatory – Sendai Framework for Disaster Risk Reduction (SFDRR), Sustainable Development Goals (SDGs) and Paris Agreement on Climate Change – consistent with the international consensus for achieving mutual reinforcement and coherence of these frameworks
- III. Prime Minister's Ten Point Agenda for DRR articulating contemporary national priorities
- IV. Social inclusion as a ubiquitous and cross-cutting principle
- V. Mainstreaming DRR as an integral feature

## 1.6 Prime Minister's Ten-Point Agenda for Disaster Risk Reduction

The Prime Minister, Shri Narendra Modi, enunciated a Ten-Point Agenda in his inaugural speech at the Asian Ministerial Conference on Disaster Risk Reduction 2016, held in New Delhi during November 2016 (AMCDRR), which has also been incorporated in the NDMP. The ten key elements consist of the following:

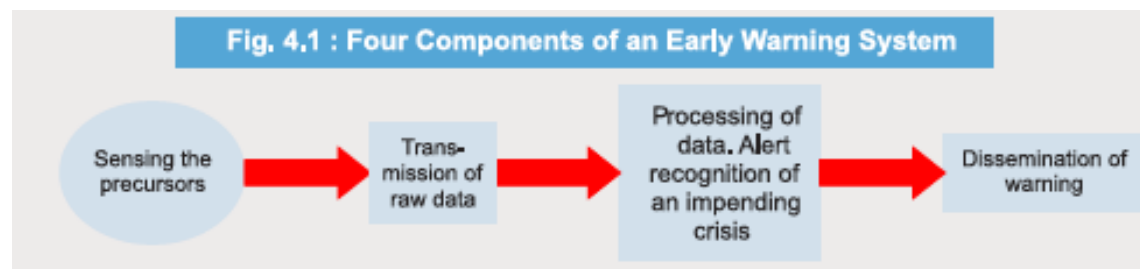
1. All development sectors must imbibe the principles of disaster risk management
2. Risk coverage must include all, starting from poor households to SMEs to multi-national corporations to nation states
3. Women's leadership and greater involvement should be central to disaster risk management
4. Invest 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

## 1.11 Objectives

Along with the mandate given in the DM Act 2005 and the NPDM 2009, the national plan has incorporated the national commitments in the domain of DRR associated with the three major post-2015 global frameworks and the PM's Ten Point Agenda. Accordingly, the broad objectives of the NDMP are:

1. Improve the understanding of disaster risk, hazards, and vulnerabilities
2. Strengthen disaster risk governance at all levels from local to centre
3. Invest in disaster risk reduction for resilience through structural, non-structural and financial measures, as well as comprehensive capacity development
4. Enhance disaster preparedness for effective response
5. Promote "Build Back Better" in recovery, rehabilitation and reconstruction
6. Prevent disasters and achieve substantial reduction of disaster risk and losses in lives, livelihoods, health, and assets (economic, physical, social, cultural and environmental)
7. Increase resilience, prevent the emergence of new disaster risks, reduce the existing risks and manage the residual risks
8. Promote the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures to prevent and reduce hazard exposure and vulnerabilities to disaster
9. Empower both local authorities and communities as partners to reduce and manage disaster risks
10. Strengthen scientific and technical capabilities in all aspects of disaster management
11. Capacity development at all levels to effectively respond to multiple hazards and for community-based disaster management
12. Provide clarity on roles and responsibilities of various Ministries and Departments involved in different aspects of disaster management
13. Promote the culture of disaster risk prevention and mitigation at all levels
14. Facilitate the mainstreaming of disaster management concerns into the developmental planning and processes
15. Ensuring DRR is socially inclusive, gender sensitive and empowering
16. Build and strengthen the resilience of poor communities to prevent disasters aggravating poverty and to protect livelihoods
17. Enhanced mainstreaming of disaster risk reduction and climate adaptation strategies within the agriculture sector including sustainable farming
18. Special focus on disaster risk reduction measures for agriculture and livestock
19. Promoting resilient health systems to develop the capacities and resilience of communities to cope and recover from disaster impacts
20. Enhance the resilience of health systems by integrating DRR into all levels of health care
21. Promote disaster-resilient schools, colleges and other educational facilities
22. Promote women's leadership and active participation in disaster risk reduction
23. Strengthen efforts to mainstream DRR into water management and reduce the likely impacts of water-related hazards
24. Strengthening and promoting the resilience of new and existing critical infrastructure
25. Integration of disaster risk reduction considerations and measures into financial and fiscal instruments
26. Mainstreaming DRR into development and implementation of all projects and schemes (rural and urban)
27. Strengthen disaster risk modelling, assessment, mapping, monitoring and multi-hazard early warning systems
28. Promote comprehensive surveys on multi-hazard disaster risks and the development of regional disaster risk assessments and maps, including climate change scenarios
29. Implementation of ecosystem-based approaches regarding shared resources, such as within river basins, mountainous regions and coastlines
30. Effective use of science, technology and traditional knowledge in all aspects of DRR





## 1. Early Warning of Cyclone

1.1 The cyclone warning system comprises of 557 surface observatories, 38 Radiosonde stations (is a battery-powered **telemetry** instrument package carried into the atmosphere usually by a **weather balloon** that measures various **atmospheric parameters** and transmits them by radio to a ground receiver.) and 65 Pilot Balloon stations. 10 cyclone detection S-band radars along the entire coastline of India including 3 Doppler S-Band radars in the east coast have also been installed. A satellite based Cyclone Warning Dissemination System (CWDS) has been operational since 1985. Under the system, 250 receiver antennas with audio warning receiver sets are placed in the coastal offices of the State Governments and other disaster management officials. The Area Cyclone Warning Centres of IMD have facility to uplink direct to the INSAT/ Satellites. Cyclone warnings and messages in the regional language and English are broadcast by selectively activating the receivers in the field without losing any time.

1.2 After the Orissa Super Cyclone, advanced Doppler radars have been installed at three locations on the eastern coast which has made the tracking of cyclones more accurate, but such systems are not available in the west coast which makes weather prediction fairly primitive as was demonstrated during the unprecedented rainfall in Mumbai last year. There is need to improve the design of tide-gauge to capture storm surges and augmentation of their network along east and west coasts of India. Cyclone modeling should be done for all coastal areas prone to cyclone so that accurate and focused forecasts can be made about the level and extent of tide surge and inundation on the basis of which effective steps can be taken for evacuating people likely to be affected. Sometimes, generalized forecasts create unnecessary panic among the community and the administration ends up evacuating people from large tracts, which remain unaffected. Moreover, there is need to improve the system for rapid and prompt dissemination of early warning, to the community.

## 2. Early Warning of Floods

2.1 The Central Water Commission has established Flood Forecasting Centres (FFCs) in all major river catchments of India. A good network of stream flow measurement stations and rain gauges, supported by wireless network have been established. At present, the flood forecasting and warning network of CWC covers 62 major inter-state river basins with 132 water level forecasting stations and 25 inflow forecasting stations. Hydrological and hydro- meteorological data from nearly 700 stations in these river catchments are being collected and analyzed, and flood forecasting and warning messages are issued, generally 24 to 48 hours in advance. In case of large flood events, advisory forecasts are issued

72 hours in advance or more with details on extent and areas of impact. The FFCs are supported by the Flood Meteorological Offices (FMOs) operated by India Meteorological Department. Quantitative precipitation forecasts based on the latest meteorological situation are provided by the FMOs to the FFCs. With the availability of satellite data, monitoring of major floods have been taken up by the National Remote Sensing Agency, Hyderabad. The flood inundation maps are provided to CWC and concerned State Government agencies.

2.2 The flood warning system in the country is reasonably accurate in normal times, but such warnings have been found to falter badly during times of heavy rainfall largely due to the absence of adequate number and proper maintenance of rain gauge stations and lack of timely transmission of data from the existing stations. Often, there is lack of coordination among departments in transmitting such information. For example, hydel power stations do not issue timely warnings to the irrigation and flood control departments regarding releases from dams and irrigation departments, which in turn, do not warn transport and railway authorities, as was demonstrated by the tragic submergence of a train in Andhra Pradesh, leading to a large number of casualties.

### 3. Early Warning of Drought

3.1 The prediction and early warning of drought is mainly based on three kinds of rainfall predictions.

**Long range rainfall prediction:** Longs range forecasts for the country as a whole are being provided by India Meteorological Department since the year 1875. Use of parametric and power regression models and dynamic stochastic transfer models since 1989 has made these forecasts fairly accurate. The seasonal total rainfall for the entire country is predicted in the forecast.

**Medium range rainfall prediction:** National Centre for Medium Range Weather Forecasting provides in advance weather forecast at every 1 deg. x 1 deg. grid. At present, the centre issues weekly forecast to 76 agro-meteorological advisory service units (AAS). Out of these, 42 units are given 3-day forecast.

**Short range rainfall predictions:** India Meteorological Department, based on Indian National Satellite (INSAT) data supported with weather and Agromet observations, issues Farmer's Weather Bulletins twice a day. These forecasts are valid for 24 to 72 hours.

3.2 Forecasting of drought and its impact on agriculture needs to be further streamlined. Efforts being made in various institutions in the country should be integrated to devise models for drought prediction based on the experience of occurrence of drought conditions in the past few decades. Rigorous monitoring of drought conditions may be carried out at village level using a network of automatic weather stations and satellite data.

### 4. Seismic Monitoring

4.1 The India Meteorological Department (IMD) maintains round-the-clock watch of seismic activity in the country. The operational task of the department is to determine the earthquake parameters immediately after the occurrence of an earthquake anywhere in the country and disseminate the information to all concerned agencies. On the basis of trigger information received on line from the field observatories, the Central Receiving Station ascertains the occurrence of an earthquake in and around the country and collects the waveform and phase data



from the field stations. After computer processing of the data received, a Preliminary Earthquake Report (PER) is generated giving details of the time of origin, location (latitude and longitude) and magnitude of the event. The PER is disseminated immediately, within 20-30 minutes depending upon the location and magnitude, to all the concerned state and central government agencies responsible for carrying out relief and rehabilitation measures. The information is also transmitted to other concerned agencies including public information channels, press, media etc.

The existing regional seismological network is broadly capable of locating earthquakes of various magnitudes, as per details given below:

- i) M: 3.5 and above in Peninsular region.
- ii) M:4.0 and above in the extra-Peninsular region and
- iii) M:5.0 and above in the border regions

To achieve the objective of locating earthquakes of magnitude 3.0 and above uniformly over the entire country, an optimum network design has been worked out, which consists of a total of 177 seismological observatories throughout the country. IMD is now believed to be in the process of upgrading its seismological network in a phased manner to meet these objectives. The ongoing upgradation plans include a 20-station telemetry system for Northeast India and a 40-station regional seismological network as part of an optimum network plan for the country as a whole. The upgradation plan needs to be taken up and implemented on priority basis.

## 5. Tsunami Early Warning

1. Shore-based tide gauges
2. Pressure sensors on the ocean bottom to detect tsunamis
3. Deep-ocean Assessment and Reporting of Tsunamis (officially abbreviated and trademarked as DART) system is a component of an enhanced tsunami warning system.
4. duration and frequency content of t-wave energy (which is earthquake energy trapped in the ocean SOFAR channel) is indicative of an earthquake's tsunami potential.

5.1 In the aftermath of the Great Sumatra earthquake of 26th December, 2004, Government of India has initiated actions for setting up an Early Warning System for Tsunamis and, Storm Surges in the Indian Ocean. The system is expected to be functional by September, 2007 and will help in providing advance warnings of Tsunamis and Storm Surges in the region. The Department of Ocean Development (DOD), Department of Science & Technology (DST), India Meteorological Department (IMD), Department of Space (DOS), and CSIR laboratories are the major agencies involved in this endeavor. An operational centre has been established by the DOD at Indian National Centre for Ocean Information Services (INCOIS), at Hyderabad on a 24X7 basis.

5.2 As part of the Tsunami Early Warning System, a 17 station Real Time Seismic Monitoring Network (RTSMN) is being set up by the Department of Science & Technology (DST). The seismological network is expected to be operational by July/August, 2006. Data from the Broadband seismic field stations will be transmitted in real time through V-SAT communication facilities to the Central Receiving Station (CRS) of IMD at New Delhi for processing and interpretation.

## 6. Early Warning of Landslides

6.1 At present, no early warning system for landslides is available in the country although landslides are monitored along important highways. There is need to step up R&D activities on prediction and forecasting of landslides, especially for early warning against reactivation of old landslides, repetitive landslides, those occurring in the areas known to be hazardous and areas close to dense human settlements.

### Automatic Position Reporting System (APRS)

It is an amateur radio based automatic position reporting system for tracking digital communications. The system uses amateur radio to transmit position reports, weather reports, and messages and data between users. It is helpful in the event of a slow ham radio service.

### Community Radio

Though radio has been with us for innumerable decades, providing information and entertainment, community radio is a development that has assumed importance only in the last few decades. Community radio is distinguished by three essential principles: non-profit making, community ownership/management, and community participation. It is characterized by its limited local reach, low-power transmission, and programming content that reflects the educational, developmental and cultural needs of the specific community it serves.

### Geographic Information System (GIS)

GIS entails analysis that combines relational databases with spatial interpretation and outputs often in the form of maps. A more elaborate definition is that of computer programmes for capturing, storing, checking, integrating, analyzing and displaying data about the earth that is spatially referenced. GIS is increasingly being utilized for hazard and vulnerability mapping and analysis, as well as for application of disaster risk management measure. GIS software uses geography and computer-generated maps as an interface for integrating and accessing massive amounts of location-based information. GIS can be used for scientific investigations, resource management, disaster and development planning.

### GIS map

### Ham Radio

Amateur (Ham) Radio is emerging as a significant communication tool that facilitates direct two-way contact with people. In the event of a disaster, normal communication system frequently gets overloaded, damaged and completely System (GIS) combines relational interpretation and outputs maps. A more elaborate computer programmes for integrating, analyzing the earth that is spatially increasingly being utilized for mapping and analysis, as disaster risk management uses geography and as an interface for massive amounts of GIS can be used for resource management, planning.

## **Resource coordination Netwrks for DM**

IDRN : IDRN is a nation-wide electronic inventory of resources that enlists equipment and human resources, collated from districts, states and national level line departments and agencies.

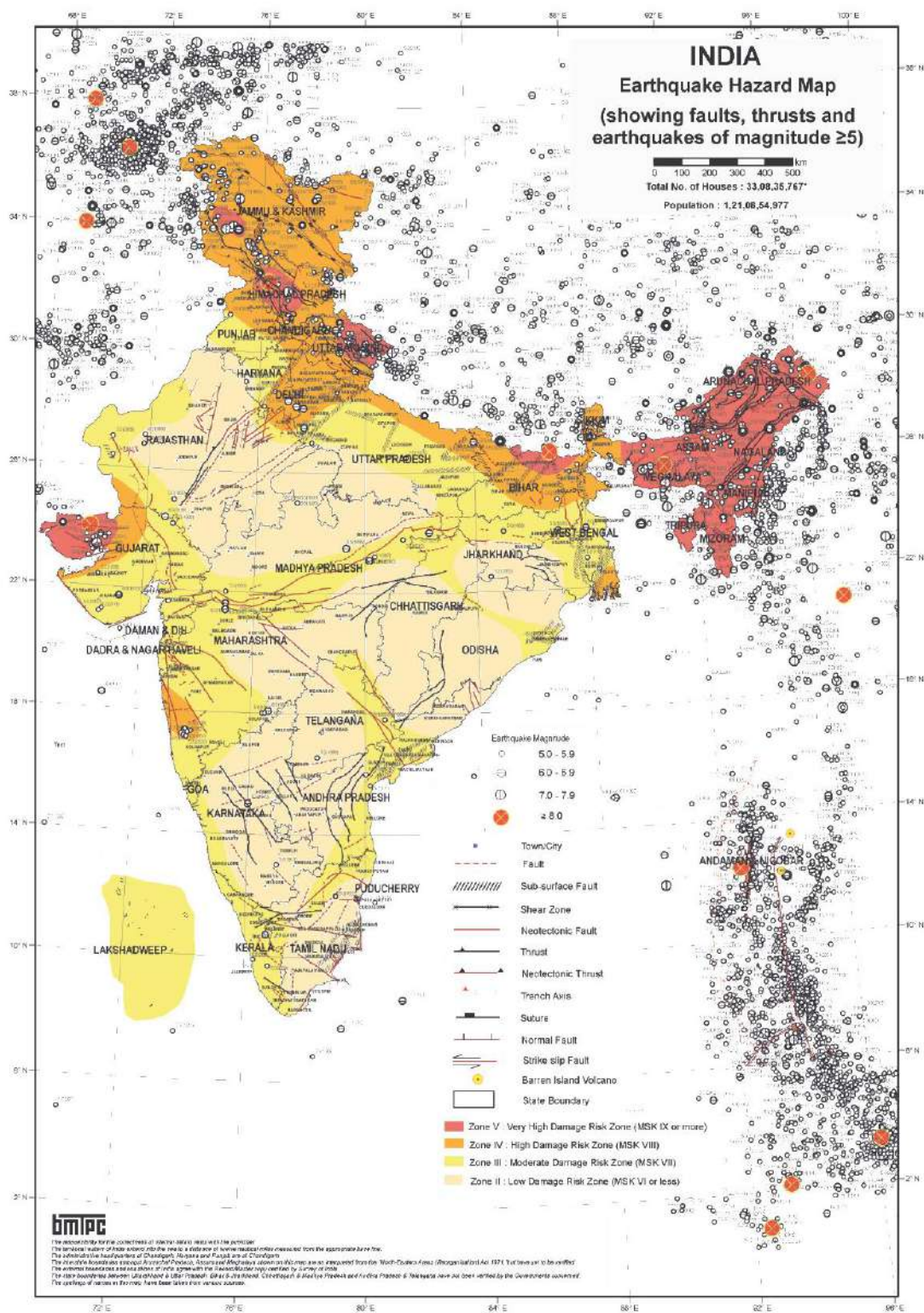
IDKN under SAARCIndia Disaster Knowledge Network (IDKN) is a Web Portal, that offers a broad array of resources and services, such as knowledge collaboration, Networking, Maps, Emergency contact information system and several other valuable information related to Natural disasters. IDKN is an essential tool to share information for Managing disasters.

CDRN ( corporate disaster resource network) : It is a web based supply chain management system that helps Relief agencies, Response agencies and Local governments access and feed in real time information on products and services required for emergency humanitarian relief. It thereby enables an efficient logistics, administrative and financialresources based emergency preparedness, response and rehabilitation.

National Disaster Communication Network (NDCN) During disaster, the existing terrestrial communication networks are prone to failure. To address this risk, NDMA decided to set up the National Disaster Communication Network (NDCN).NDCN was planned as a network of networks by providing appropriate connectivity to the existing communication networks viz. NICNET, State Wide Area Networks (SWANs) and POLNET, etc., to various Emergency Operation Centres. For this an additional overlay network segment utilizing satellite communication will be established as VSAT network of NDMA. This VSAT Network will consists of a HUB and VSATs distributed all over the country. In Addition to the Emergency operation centres at National, State and District Levels, NDCN will be equipped with mobile/transportable communication systems to establish graded communication capability at the disaster sites.

# Earthquake Hazard Map

(<http://www.bmtpc.org/DataFiles/CMS/file/VAI2019/eq.html>, accessed Oct 15, 2019)

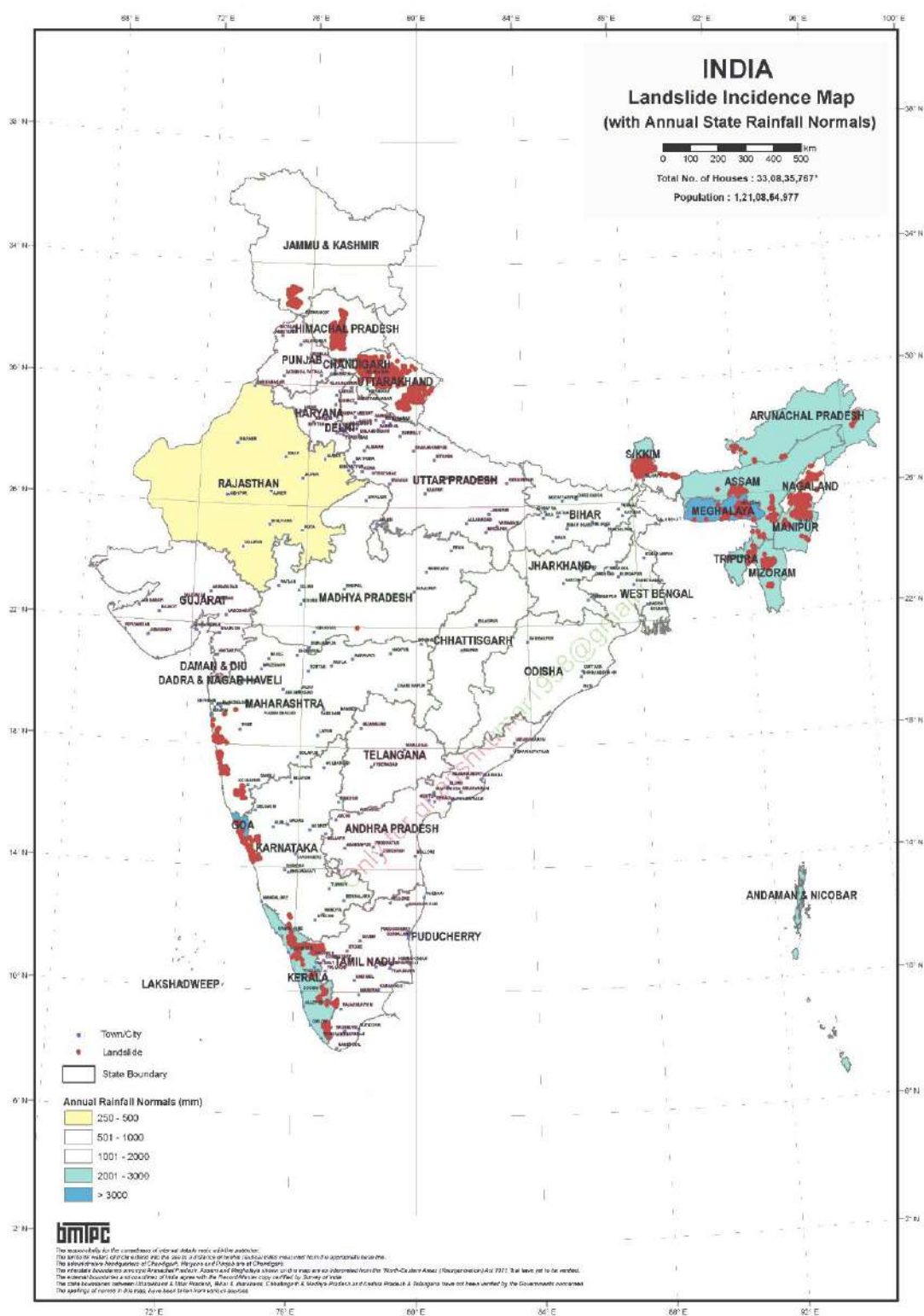


BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GSI, Map is Based on digitised data of SGI, Seismic Zones of India Map IS 1803 (Part I), 2002, BIS, Earthquake Epicentre from IMD, Seismotectonic Atlas of India and its Environs, GSI, House Population as per Census 2011. \*Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



## Landslide Incidence Map

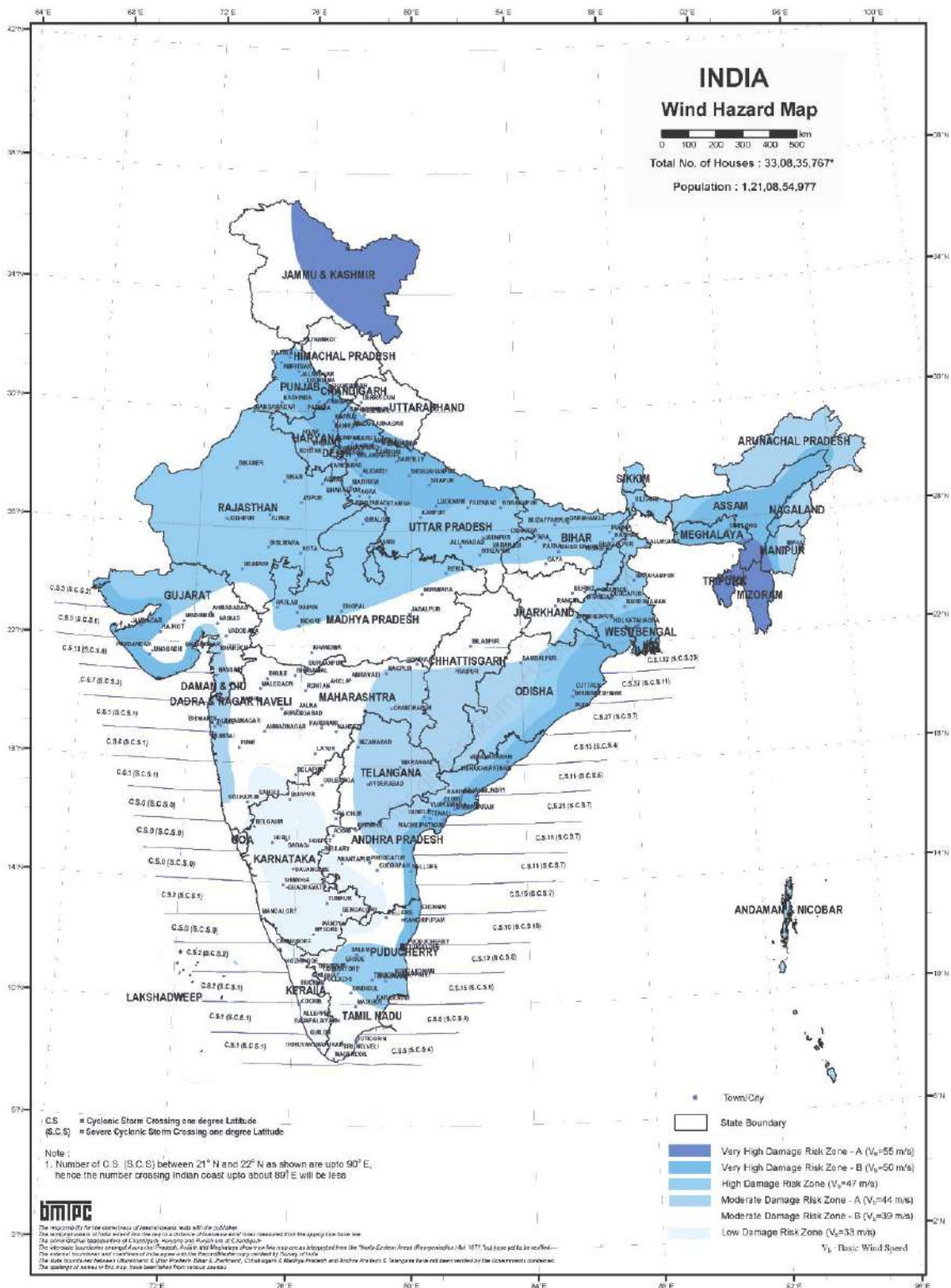
(<http://www.bmtpc.org/DataFiles/CMS/file/VAI2019/landslide.html> , accessed Oct 15, 2019)



\* Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

## Wind Hazard Map

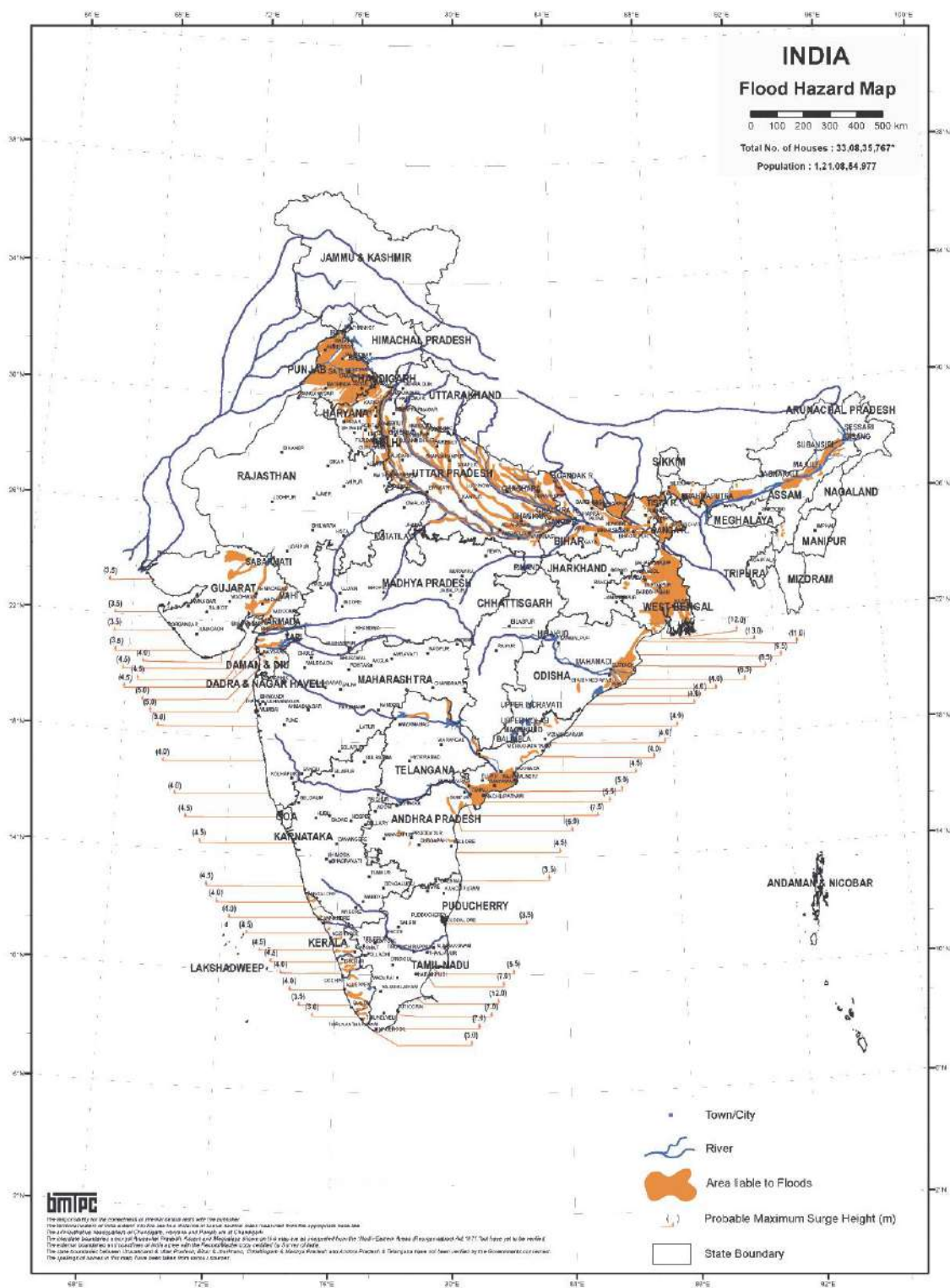
(<http://www.bmtpc.org/DataFiles/CMS/file/VAI2019/wind.html>, accessed Oct 15, 2019)



BMTPC : Vulnerability Atlas-3rd Edition; Peer Group, MoHUA. Map is Based on digitised data of SGI, GOI. Basic Wind Speed Map National Building Code/2016. Cyclone Data, 1991-2015, IMD, GOI. Houses/Population as per Census 2011. \*Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

## Flood Hazard Map

(<http://www.bmtpc.org/DataFiles/CMS/file/VAI2019/flood.html>, accessed Oct 15, 2019)



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987); Task Force Report (2004); C.W.C., G.O.I. Houses/Population as per Census 2011; \* Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



## Thunderstorm Incidence Map

(<http://www.bmtpc.org/DataFiles/CMS/file/VAI2019/th.html>, accessed Oct 15, 2019)



BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Thunderstorm data from IMD. Disclaimer: The maps are solely for thematic presentation.



#### Prevention

The outright avoidance of adverse impacts of hazards and related disasters.

#### Mitigation

The lessening or limitation of the adverse impacts of hazards and related disasters.

#### Preparedness

The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions.

#### Response

The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

#### Recovery

The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.

#### Resilience

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.