

*Draft for Comments*

# **Disaster Score Card for States and Union Territories of India**

## **Volume-I REPORT**

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# DISASTER SCORE CARD FOR STATES AND UNION TERRITORIES

## VOLUME- I

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## INTRODUCTION

During the past decade and half (2002-2017) disaster management system of India has undergone a paradigm shift from humanitarian relief and rehabilitation of the victims to holistic management of disasters that include pre-disaster prevention, mitigation and preparedness as well as post-disaster response, recovery and reconstruction. This shift was ushered through the Disaster Management Act 2005, institutionalized with the setting up of the disaster management authorities at national, state and district levels, guided by the National Policy on Disaster Management 2009, and operationalized through a series of guidelines, plans, procedures, programmes and projects at national, state and local levels.

The cumulative impacts of all these initiatives are clearly visible in advanced early warning of hydro-meteorological disasters, coordinated response to actual and impending disasters, drastic reduction in human and animal mortalities in disasters, and general increase in education and awareness about disasters at all levels. The impacts are not so visible in comprehensive assessment of hazards, vulnerabilities and risks of disasters at different levels, prevention of creation of new risks and mitigation of the existing risks of disasters, and mainstreaming disaster risk reduction across different sectors of development.

The progress achieved has also not been uniform throughout the country. A few States that encountered mega disasters have learnt from the catastrophes and developed systems and processes to deal with the disasters, but a few States that faced major disasters have not been so proactive in transforming the challenges into opportunities. Many States are in the process of improving their systems of disaster management, but the majority of States have remained largely complacent, irrespective of whether they faced major or minor disasters. Even the States that have done relatively better have not done so uniformly in every aspect of disaster risk management - performance has been typically better in post-disaster response-relief-reconstruction than in pre-disaster prevention-mitigation-preparedness.

At the national level, Government of India had been reviewing biennial progress of the implementation of the Hyogo Framework of Action and would be doing similar exercise for the successor Sendai Framework for Disaster Risk Reduction, but such reviews do not always address the national priorities of disaster management as enshrined in our national legislations, policies and programmes, nor do these cover the relative progress achieved at the sub-national level. Finance Commission has been reviewing the financial needs of the States for disaster response and relief on a five-yearly basis, but this does not involve performance review of the States. To a limited extent Comptroller and Auditor General conducted performance audit of a few State governments, but typically these are limited to government expenditure. Standing Committee of Parliament has been reviewing management of specific aspects and events of disasters, but these are not systematic reviews of progress of the entire gamut of disaster risk management.

In the federal system of governance of India the State governments have the primary responsibilities of disaster management while the Central government plays largely a supporting role. State governments, district administration and the local authorities have been

dealing with disasters on a daily basis, but as yet no scientific system or tool is available to the State governments and their agencies either to benchmark the performance or to measure the progress achieved on different aspects and issues of disaster management on a scientific basis. Sometimes legislative scrutiny, financial audit, media analysis, and academic research have been helpful in identifying the constraints and challenges, but such exercises have focused more on management of specific events of disasters than on the entire cycle of disaster risk management.

Increasingly the tools of benchmarking and indicators are being adopted for performance evaluation of public policies and programmes. There are no reason why similar tools should not be developed for performance audit of disaster risk management in our country. Such tools would be useful to identify the strong and weak areas in the system and facilitate corrective action for improving the system. This will be further useful to assess the relative performance of the States and encourage cross learning across States and sectors. Therefore, in order to assist the State governments to benchmark the performance on different aspects of disaster risk management and to measure the progress achieved in building disaster resilience of the rural and urban communities, the Ministry of Home Affairs, with support from the United Nations Development Programme and in consultation with the State governments, has proposed to develop a system of Disaster Score Card for the country.

The proposal assumes significance in the context of *Sendai Framework for Disaster Risk Reduction* that would drive the agenda of disaster risk management for the next decade and half. The Framework has for the first time ever adopted a set of seven global targets of disaster risk reduction and stipulated that a set of indicators shall be developed for measuring the progress achieved on the targets as well as the priorities of action under the framework. This provides an excellent opportunity for developing Indian Disaster Score Card that is aligned with the global process and at the same time rooted in the Indian system and creating unique value addition that would facilitate preparation of national report card on the basis of Disaster Score Cards of the States. India would probably be the first country to take such an initiative and therefore success of the initiative may well set a standard for many countries, particularly the large federal countries.

## **Objectives**

The proposed Disaster Score Card (DSC) has the following three overarching objectives:

- a) To develop benchmarks for various activities to be taken up for disaster risk management, namely risk assessment, risk prevention, risk mitigation and risk governance; and disaster preparedness, disaster response, disaster recovery and disaster reconstruction;
- b) To quantify the risks of disasters of the States and Union Territories of India on the basis of uniform datasets on common set of indicators on disaster risks, and generate scorecards on Disaster Risk Index;
- c) To quantify the level of resilience achieved by the States and Union Territories of India on the basis of uniform datasets on common set of indicators on disaster resilience and generate scorecards on Disaster Resilience Index.

## Scope

The scope of DSC shall be determined by the following four considerations.

- a) DSC is not intended to be a mechanism to reward the performing States or to penalize the non-performing States. This is designed to be a facilitating tool to identify the strong and weak areas of disaster risk management in each State and Union Territory of the country. However, the State governments would be free to use the scorecard to support their proposals for disaster mitigation and preparedness.
- b) DSC shall provide a framework of benchmarks and indicators on the basis of data that are presently available on a uniform format on a pan-India scale. The data inventory on hazards, vulnerabilities and exposures as also various activities undertaken by the States as per the provisions of disaster management act, policy, guidelines etc. shall be mapped and a final set of indicators shall be prepared. The scope of the benchmarks and indicators shall be dynamic. These will be enlarged as the database improves progressively. Therefore, DSC shall be a continuing initiative, revised and upgraded on an annual or biennial basis, on the basis of changing scenario of data collection, collation and analysis.
- c) DSC shall be a quantitative analysis of risks and resilience to the extent the qualitative aspects of risk reduction are amenable to quantification through indicators. However, there will be many qualitative aspects of disaster risk reduction that may not be easily captured in data. To that extent the scorecard shall remain incomplete evaluation of risks and resilience of the States in the same manner as the school scorecards are inaccurate appreciation of the total abilities of the students that are not measured by system of evaluation. However qualitative aspects of disaster risks and resilience shall be analyzed in a follow up report on Disaster Risks and Resilience in India.
- d) DSC would be an all-India initiative and therefore this will be developed, managed and operated by the Central government, in collaboration with concerned specialized agencies, and in consultation with the State governments. This will not preclude any State to develop its state-specific indicator on the basis of advanced database that may be available for the State.

## Process

Disaster Score Card has been developed through a consultative process involving various stakeholders. This process of consultation has taken place at three levels: Advisory Committee, Working Groups and Regional Consultation Workshops.

### Advisory Committee

An Advisory Committee on Disaster Score Card was constituted under the chairmanship of Joint Secretary (DM) with representative from NDMA, five State Governments (Andhra Pradesh, Assam, Himachal Pradesh, Maharashtra and Odisha) and experts on the subject, to be nominated by the Committee, as and when required. Emergency Analyst, UNDP is the Member Secretary of the Committee. The Advisory Committee held two meetings, and considered the broad purpose and objectives of the study and the methodology to be adopted

for the development of Disaster Score Card. A Lead Consultant was engaged for conducting the study.

### **Expert Working Group**

An Expert Working Group comprising of representatives of NDMA, NIDM, various technical agencies of Government of India, two academic institutions and a few State Governments/ UTs, besides 4 individual experts were constituted to consider various technical issues related to the development of Disaster Score Card. The technical agencies included Indian Meteorological Department, Geological Survey of India, Central Water Commission, Indian National Centre for Oceanic Information Services, Snow and Avalanche Study Establishment, Building Materials and Technology Promotion Council, Registrar General of India, Central Statistical Organization, National Informatics Centre, and National Sample Survey Organization. The two academic institutions were Indian Statistical Institute and Indian Institute of Human Settlement.

The Working Group constituted four sub-committees which held several sessions to discuss issues related to collection and compilation of data, adoption of methodology for development of indexes, selection of indicators, and determination of weights on indicators

### **Regional Consultation Workshops**

Five Regional Consultation Workshops were organized in all the five regions of the country during February-March 2017 to explain the objectives, scope, approach and methodology for the development of Disaster Score Card, obtain comments and feedback thereon, and clarify queries and doubts on a set of Questionnaire that was developed for collection of data from the States and Union Territories, mainly related to disaster risk resilience.

Inputs received through the prolonged period of consultations have shaped the various aspects of methodology adopted for the study, such as selection of indicators and sub-indicators on disaster risks and resilience, collection of data on indicators, and determination of weights on indicators.

# METHODOLOGY

Indicators and scorecards are important tools for measuring progress of any programme, project or activity. There have been several attempts to measure the performance of the States of India on different fields such as economic development<sup>1</sup>, human development<sup>2</sup>, health, education, infrastructure<sup>3</sup>, ease of doing business<sup>4</sup>, economic freedom<sup>5</sup>, clean city<sup>6</sup> etc.

Globally there had been efforts by a few think tanks and academic institutions to rank countries in terms of disaster risk and climate vulnerabilities<sup>7</sup>, but there have not been any initiatives to develop any composite Disaster Score Card that would factor both disaster risks and resilience. There has not been any effort to develop benchmarks and indicators of risks and resilience at the sub-national levels.

Development of the Disaster Score Card for a vast and complex country like India with layers of hazards, vulnerabilities and risks, and myriad web of initiatives for resilience at various levels is by no means an easy and simple task. The enormity and size of India have continental dimensions. 19 States of India are larger in population than 88 countries of the world.<sup>8</sup> Uttar Pradesh with population of 199 million is larger than Brazil, the fifth largest country of the world. The States of India present a wide range of geographical variations in terms of climate, hydrology, topography, vegetation and settlement pattern which make a kaleidoscope of almost every possible hazard of nature. These are compounded by manmade hazards and layers of vulnerabilities at physical, social, economic, environmental levels.

Like most of the countries around the world India is yet to develop a sound and robust database on hazards, vulnerabilities, risks and resilience and therefore ‘ideal’ theoretical

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<sup>1</sup> Reserve Bank of India publishes its annual *Handbook of Statistics on Indian Economy* which measures performance of States in terms of basic indicators of economic development, such as GDP, per capita income, rate of economic growth etc.

<sup>2</sup> In a joint initiative of the Planning Commission and UNDP, Human Development Reports of several Indian States have been prepared. These have been compiled in *Human Development in India: Analysis to Action, 2012*. Relative performance of States on various indicators of human development has been studied. M.H.Suryanarayana, Ankush Agarwal and K. Seeta Prabhu, *Inequality Adjusted Human Development Index for India's States*, UNDP, 2011.

<sup>3</sup> Planning Commission had been publishing data on various indicators of development such as health, education, and infrastructure, and comparing performance of States on the basis of these indicators. *Refining State Level Comparisons in India*, Planning Commission Working Paper Series 2012, *Data Book on Indicators of Development, 2014*

<sup>4</sup> The World Bank has been publishing its annual report on *Doing Business in India* which ranks major industrial and commercial cities of India in terms of their competitiveness in terms of doing business.

<sup>5</sup> Bibek Debroy, Lavesh Bhandari and S. Anklesari Aiyar, *Economic Freedom of the States of India, 2013*

<sup>6</sup> Ministry of Urban Development, Swachh Survekshan,

[http://www.swachhbharaturban.gov.in/writereaddata/Swachh\\_Survekshan\\_2017\\_Result.pdf](http://www.swachhbharaturban.gov.in/writereaddata/Swachh_Survekshan_2017_Result.pdf)

<sup>7</sup> Some of these initiatives include *Global Climate Risk Index* of Germanwatch, *Climate Change Vulnerability Index* of Maplecroft, *World Risk Report* of Institute for Environment and Human Security, and TERI study on *Climate Change and Sustainable Development*.

<sup>8</sup> Uttarakhand with 10.11 million people ranks 19<sup>th</sup> among Indian States, but it is more populous than Hungary which ranks 88 among the countries of the world

framework on indicators is severely challenged by the lack of data at the State level for measuring the progress on indicators.

## Survey of literature

Most of the growing volume of literature on disaster risks and resilience indicators is focused on communities as it is easier to collect data at community level through participatory and ethnographic research.<sup>9</sup> Based on community level studies and field testing of methodologies various community-based risk and resilience frameworks have been developed.<sup>10</sup>

The call of *Hyogo Framework of Action 2005-2015* to develop ‘generic, realistic and measurable indicators’ to assess the progress in implementation of the framework encouraged several organizations and think tanks to develop indicators on disaster risks and resilience at the national level. The Inter-American Development Bank was the first to develop composite indicators on disaster risks and risk management for 12 Latin American and Caribbean countries<sup>11</sup>. These include Disaster Deficit Index, Local Disaster Index, Prevalent Vulnerability Index and Risk Management Index. *Disaster Deficit Index* was designed to measure country risk from a macroeconomic and financial perspective according to possible catastrophic events. *Local Disaster Index* was meant to identify the social and environmental risks resulting from more recurrent disaster events at sub-national levels. *Prevalent Vulnerability Index* was made up of a series of indicators that characterize prevalent vulnerability conditions reflected in exposure in prone areas, socioeconomic weaknesses and lack of social resilience in general. *Risk Management Index* brings together a group of indicators that measure a country’s risk management performance. These indexes remained largely theoretical constructs and were not adopted by the national governments.

The Fritz Institute of the Centre for Hazard Research and Policy Development, University of Louisville developed Disaster Preparedness Index (DPi) based on various parameters like risk zoning, early warning, response time for evacuation, equipment and training for search and rescue and pre-disaster recovery plan.<sup>12</sup> The Benfield Hazard Research Centre developed Indicators for Disaster Risk Reduction based on mainstreaming DRR in various aspects of development.<sup>13</sup> Both remained academic exercises without any application in the specific contexts of countries.

After prolonged consultations at various levels UNISDR developed a set of 22 indicators on 5 Priorities of Action of the Hyogo Framework on which countries had to make self-assessment

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<sup>9</sup> A systematic review of literature on community resilience is available in Abbas Ostadtaghizadeh et. al *Community Disaster Resilience: A Systematic Review on Assessment Models and Tools*, PLOS Currents: Disasters, April 2015. <http://currents.plos.org/disasters>

<sup>10</sup> These include *Resilience Capacity Index (RCI)* of the Network for Building Resilient Regions, University of California, Berkeley; *Baseline Resilience Indicators for Communities (BRIC)*, developed by Hazards and Vulnerability research Institute, University of South Carolina; *PEOPLES Resilience Framework (PRF)* developed by Multi-disciplinary Centre for Earthquake Engineering Research, University of Buffalo; *Community Based Resilience Analysis (CoBRA)* of UNDP Drylands Development Centre etc.

<sup>11</sup> *Indicators of Disaster Risks and Disaster Risk Management*, Main Technical Report, Inter-American Development Bank, 2005.

<sup>12</sup> *Indicator Issues and Proposed Framework for Disaster Preparedness Index (DPi)*, The Fritz Institute, Centre for Hazard Research and Policy Development, University of Louisville, 2006

<sup>13</sup> *An Operational Framework for Mainstreaming Disaster Risk Reduction*, Benfield Hazard Research Centre, University College of London, 2005,

of progress biennially on a scale of 1 to 5<sup>14</sup>. This quantitative measurement of country's progress was supplemented by qualitative analysis of achievements, challenges and constraints. While this provided fairly good overview of the areas of strengths and weaknesses, this did not give any realistic idea of the actual progress as countries tended to over assess their progress that were not supported by the realities on the ground.<sup>15</sup> This is acknowledged by the biennial UN Global Assessment Report (GAR) on disaster risk reduction that goes beyond the official country progress reports to assess both risks and resilience.

Various risk modelling tools have been deployed to capture the dynamics of evolving situations and scenarios of possible development. These include GEM<sup>16</sup>, CAPRA<sup>17</sup>, GFM<sup>18</sup>, INFORM<sup>19</sup> etc., but similar tools on disaster resilience on a global scale is yet to be developed. Spanish non-profit organisation DARA developed Risk Reduction Index (RRI) for 7 Central American and Caribbean countries<sup>20</sup>, but the methodology adopted for rating resilience through a set of questionnaires to 'key informants' may not be the ideal for replication.

Applying a mix of tools, indicators and proxy indicators on which global database is available on a fairly large number of countries various think tanks have been quantifying the risks and resilience of countries and ranking them globally. A few such initiatives include the works of UNU-EHS<sup>21</sup>, Germanwatch<sup>22</sup>, Maplecroft<sup>23</sup> and TERI<sup>24</sup>

While disaster risk and resilience indicators have been developed at global and national levels similar initiative are missing at the sub-national level. BNPB, the Indonesian national authority on disaster management, is probably the only national disaster management agency that has indexed disaster risks of the provinces and districts by mapping the hazards, vulnerabilities and exposures<sup>25</sup>, but these are not very comprehensive as various aspects and dimensions of hazards and vulnerabilities are not included in the analysis. Moreover, the

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<sup>14</sup> *Indicators of Progress: Guidance on Measuring the Reduction of Disaster Risks and the Implementation of the Hyogo Framework of Action*, UNISDR, 2009

<sup>15</sup> Global Network of Civil Society Organizations for Disaster Reduction (GNDR) published its biennial *Views from the Frontline* that challenged the claims of progress made by the countries.

<sup>16</sup> *Global Earthquake Model* (GEM) developed by the Global Science Forum of the OECD through a public-private partnership provides open source risk assessment software for calculating and communicating earthquake risks. Efforts are on to develop Global Flood Model and Global Tropical Cyclone Model.

<sup>17</sup> *Central American Probabilistic Risk Assessment Platform* (CAPRA) was set up by the World Bank to consolidate hazard and risk assessment methodologies in Central American countries.

<sup>18</sup> *Global Focus Model* (GFM) is a tool developed by the UNOCHA to produce an annual Humanitarian Risk Index based on hazards, vulnerabilities and capacities of every country.

<sup>19</sup> *Index for Risk Management* (INFORM) is a composite indicator that identifies countries at risk of humanitarian crisis and disaster that would overwhelm national response capacity.

<sup>20</sup> *Risk Reduction Index: Analysis of the Capacities and Conditions for Disaster Risk Reduction*, DARA, 2011

<sup>21</sup> Institute for Environment and Human Security of UN University based in Bonn Germany has been publishing its annual World Risk Report since 2011 that ranks countries in a composite index of various climatic and non-climatic risks.

<sup>22</sup> Germanwatch, a non-profit think tank based in Germany, has been publishing its annual global Climate Risk Index since 2006.

<sup>23</sup> Maplecroft, a global risk and strategic consulting firm based in UK, has been ranking countries annually on Climate Change Vulnerability Index (CCVI) since 2010.

<sup>24</sup> The Energy and Resources Institute (TERI) published its Global Sustainable Development report 2015 on the theme of Climate Change and Sustainable Development that ranked countries in Climate Risks and Climate Adaptive Capacity.

<sup>25</sup> BNPB, Disaster Risk Index of Indonesia, 2013

initiative does not cover disaster resilience probably due to the difficulties and complexities of the tasks involved.

In the backdrop of this global overview of literature on disaster risk and resilience indicators, the initiative of the Government of India to develop Disaster Scorecard to capture both risk and resilience would be novel and unique.

## Approach

In order to be both locally relevant and globally significant, Disaster Score Card of India is rooted in India's legal-institutional-policy framework on disaster management, while simultaneously aligned with the global frameworks. It factors the systems, policies, plans, guidelines and processes that the country has adopted for dealing with disasters. The indicators are carefully selected taking into consideration the mandates of Disaster Management Act 2005, the formulations of National Policy on Disaster Management<sup>26</sup>, the prescriptions of National Guidelines on Disaster Management<sup>27</sup> and the activities proposed under the National Plan on Disaster Management<sup>28</sup>. A matrix of activities expected to be performed at State level under these national frameworks have been compiled, and the same is annexed-I.

Disaster Scorecard is also aligned with the global framework on disaster risk reduction, as formalized in three international instruments adopted in 2015. These are: (a) Sendai Framework for Disaster Risk Reduction 2015-2030; (b) Transforming Our World: the 2030 Agenda for Sustainable Development; and (c) Paris Agreement on Climate Change. India has not only endorsed and adopted these instruments it has taken a prominent role in shaping them. India has further taken a leadership role in championing the implementation of the Sendai Framework in the Asia-Pacific region by deciding to host the first Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) in November 2016.

Sendai Framework has enlarged the scope of disaster risk reduction in many respects. First, it has included man-made disasters related to environmental, technological and biological hazards in the existing framework of disaster risk reduction that covered mainly the natural hazards. This has brought international discourse on disaster management closer to India's Disaster Management Act which covers both natural and manmade disasters. Second, it has adopted seven global targets of disaster reduction and resilience that can be achieved through appropriate national targets and indicators. Third, it has defined responsibilities at various levels for the implementation of its four Priorities for Actions: (a) understanding disaster risks; (b) strengthening disaster risk governance; (c) investing in disaster risk reduction for resilience; and (d) enhancing disaster preparedness and 'building back better'. Under each of these priorities several activities to be taken up at 'national and local' and 'global and regional' have been prescribed. The Sendai Framework mandated an open-ended inter-governmental expert working group to develop indicators on the global targets as well as the priorities of action of the framework. The working group has recommended a set of 38 indicators for measuring the progress achieved by countries in achieving the 7 global targets, as annexed-II. The indicators that is relevant for the States of India is factored in Disaster Score Card.

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<sup>26</sup> National Policy on Disaster Management, NDMA, 2016.

<sup>27</sup> National Disaster Management Guidelines: Action Points for Implementation by States/ UTS, NDMA, 2012

<sup>28</sup> National Plan on Disaster Management, NDMA< 2016

2030 Agenda for Sustainable Development<sup>29</sup> include 17 Sustainable Development Goals and 169 targets. An Inter-Agency Expert Group on Sustainable Goals and Indicators has proposed a set of 222 indicators for measuring the progress in achieving the targets. At least 9 of these goals and the related targets have elements of disaster risk reduction embedded into them. These are detailed in Annexure-III. Disaster Score Card factors these goals, targets and indicators to the extent feasible. This would ensure that the sectoral issues of disaster risk management are built into the proposed score card.

The Paris Agreement on Climate Change has called for enhanced ‘understanding, action and support’ for ‘averting, minimizing and addressing loss and damage’ associated with climate related disasters. 8 specific action areas have been prescribed that include: (a) early warning systems; (b) emergency preparedness; (c) slow onset events; (d) events that may involve irreversible and permanent loss and damage; (e) comprehensive risk assessment and management; (f) risk insurance facilities, climate risk pooling and other insurance solutions; (g) non-economic losses; (h) resilience of communities, livelihoods and ecosystems.<sup>30</sup> These action areas are also factored to the extent relevant in the contexts of Indian States.

## **Methodology**

Methodology of Disaster Score Card has been developed through an extensive review of literature, consideration of various national and global frameworks of disaster management and prolonged period of consultations with experts and State Governments.

A general consensus was developed that Disaster Score Card shall be developed through two different but interrelated scorecards – disaster risk scorecards and disaster resilience scorecards. These are worked out on the basis of two different sets of indexes: Disaster Risk Index (DRisI) and Disaster Resilience Index (DResI). DRisI shall capture the risks of disasters at the level of census districts,<sup>31</sup> which would be further aggregated at the level of States and UTs. In the absence of any data on resilience at district level, DResI shall measure the level of resilience to disasters only at the level of States and UT.

### **A. Disaster Risk Index (DRisI)**

The methodology of Disaster Risk Index has several components. These are explained in sequential manner for better appreciation.

#### **a) What constitutes risks of disasters**

A general consensus was developed on what constitutes risks of disasters. This is presented in the following equation

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<sup>29</sup> Transforming Our World: the 2030 Agenda for Sustainable Development, UN General Assembly Resolution NO A/RES/70/1

<sup>30</sup> Paris Agreement, Conference of the Parties Twenty-first session Paris, UN Framework Convention on Climate Change, FCCC/CP/2015/L.9/Rev.1 2015

<sup>31</sup>Census 2011 was conducted on 640 districts of the country. Thereafter more than 60 districts have been created by way of bifurcation of one district or merger of parts of two more districts. Database on the newly created districts in terms even of basis demographic and other data are not clear. Therefore it has been decided to restrict the study to 640 census districts of the country.

$$R = \{(h \times v) \times e\} \div c$$

when ‘*R*’ denotes risks of disasters; ‘*h*’ the hazards or the potentials of a physical event that may cause loss of life or property; ‘*v*’ the vulnerabilities or the factors or processes - physical, social, economic, and environmental - which increase susceptibility of an area or a community to impact of hazards; ‘*e*’ exposures of vulnerable population and assets to hazards; and ‘*c*’ or capacities or resources available within a community, society or organization that can reduce the level of risk, or the effects of disasters.

This equation is aligned with globally accepted definition of risks of disasters.

### b) Selection of indicators on hazards, vulnerabilities and exposures

It was agreed that indicators on hazards, vulnerabilities and exposures shall be selected based on their importance as well as availability of data in uniform format throughout the country. Robust data sets on some of the indicators, such as lightning, coastal erosion, fire, industrial hazards etc are not available, but considering their importance these were selected and available datasets were used to the best possible extent.

The final list indicators selected for hazards, vulnerabilities and exposures are as follows:

**Table-1.1: Indicators selected for Disaster Risk Index**

	<b>Hazards</b>	<b>Vulnerabilities</b>	<b>Exposures</b>
1.	Earthquake	Unsafe buildings	Population
2.	Cyclone	Social Infrastructure	GDP
3.	Flood	Physical Infrastructure	
4.	Drought	Net cropped area	
5.	Landslide	Livestock population	
6.	Tsunami	Industries	
7.	Avalanche	Vulnerable women	
8.	Heat Wave	Vulnerable children	
9.	Cold Wave	Disabled people	
10.	Coastal Erosion	Aged people	
11.	Coastal Erosion	Rural/Urban poor	
12.	Forest Fire	Deforestation	
13.	Fire	Depletion of Mangrove	
14.	Industrial Hazards	Water stress	

### c) Parameters on indicators and weights on parameters

Each of these 14 hazards, 14 vulnerabilities and 2 exposures have several parameters. Based on the availability of datasets throughout the country on uniform formats the following parameters were selected for development of indexes on the hazards, vulnerabilities and exposures.

Not all the parameters of hazards, vulnerabilities and exposures are equally important. Based on the importance of the parameters as advised by the experts and agreed during consultation workshops the following weights have been given on the parameters.

**Table-1.2: Parameters and Weights on Hazards**

	<b>Hazards</b>	<b>Parameters on hazards</b>	<b>Weights on parameters</b>
1.	Earthquake	Seismic hazard zonation: Zone-V, IV, III and II.	Zone-V: 10, Zone-IV: 6, Zone-III: 4, Zone-II: 2
2.	Landslide	Landslide hazard zonation: Zone- IV, III, II and I	Zone-IV: 10, Zone-III: 8, Zone-II: 4, Zone-I: 0
3.	Flood	a) CWC data on flood prone areas in States b) Flood Vulnerability Index of NRSC c) Flood prone cities with population above 100,000+ and million+ population	a) 80% b) 20% c) 20% (10% each)
4.	Drought	a) Moisture Index b) Unirrigated cropped area c) Drought Prone Area d) Number of drought years	Equal weights
5.	Cyclone	a) Number of cyclones b) Number of severe cyclones c) Probable maximum wind speed d) Probable maximum precipitation e) Probable maximum rainfall	a) b) Equal weights of 15% for (a) and (c) to (e) 25% weights for (b)
6.	Tsunami	a) Length of coastline b) Population living within ½ km of coasts c) Average height of tsunami wave	a) 25% b) 25% c) 50%
7.	Avalanche	Avalanche hazard zonation: Zone- V, IV, III, II and I	Zone-IV: 10, Zone-III: 8, Zone-II: 4, Zone-I: 0
8.	Heat Wave	a) Average Heat Index based on NOAA methodology b) No of days with heat index	Equal weights

		<p>above 54</p> <p>c) No of heat wave (temperature above 40°C for 5+ days)</p> <p>d) Longest duration of heat wave</p>	
9.	Cold Wave		
10	Coastal Erosion	<p>a) Length of coastline</p> <p>b) Coastal length (km) under erosion</p> <p>c) Coastal area (sq. km) under erosion</p>	Equal weights
11	Lightning	Normalized annual average lightning mortality in districts	Mortality Index scaled 0 to 10
12	Forest Fire	<p>Forest fire zonation in very dense, dense and open forests</p> <p>a) High risk zone</p> <p>b) Moderate risk zone</p> <p>c) No risk zone</p>	Values of 10, 5 and 0 for three risk zones with weights 50%, 30% and 20% on three types of forests
13	Fire	<p>Normalized fire index of districts based on average annual</p> <p>a) Number of accidents of fire</p> <p>b) Number of deaths</p> <p>c) Number of injuries</p>	Equal weights
14	Industrial Hazards	<p>a) MAH industries</p> <p>b) MPI industries</p> <p>c) CEPI index</p>	<p>a) 50%</p> <p>b) 25%</p> <p>c) 25%</p>

Similarly, the following parameters were selected for vulnerabilities:

**Table-1.3: Parameters and Weights on Vulnerabilities**

	<b>Vulnerabilities</b>	<b>Parameters on vulnerabilities</b>	<b>Weights on parameters</b>
1.	Unsafe buildings	Number of buildings constructed with predominant materials used for construction of roofs and walls and classified as Very High, High, Moderate, Low and Very Low risks in earthquake, landslide, flood and cyclone	VH:10, H:8, M: 6, L:4, VL: 2, as classified by Committee of Experts
2.	Social Infrastructure	Number of educational and health institutions in the district	<p>a) 40% weights on primary educational institutions</p> <p>b) 10% weights on higher educational institutions</p> <p>c) 25% weights on</p>

			primary health institutions d) 25% weights on hospitals
3.	Physical Infrastructure	a) Length of roadways b) Length of railways c) Number of airports and seaports d) Number of large dams and reservoirs e) Number of hydel, thermal and nuclear power stations	Equal weights of each indicator and further equal weights on sub-indicators within each indicator
4.	Net cropped area	a) Cropped area b) Irrigated area	a) 80% b) 20%
5.	Livestock population	Number of livestock in district a) Bovine animals b) Other animals	a) 80% b) 20%
6.	Industries	a) Number of MSME in districts b) Number of industrial clusters c) Number of SEZ	a) 40% b) 20% c) 20%
7.	Vulnerable women	a) Sex ratio b) Illiteracy c) MMR d) WHH e) WPR f) VAW	Equal weights
8.	Vulnerable children	a) Age group 0-6 and 7-18 b) Non-school going children c) Working children d) IMR	Equal weights
9.	Disabled people	Types of disability a) Visual b) Physical c) Mental	Equal weights
10.	Aged people	a) Age group 60+ b) Age group 80+ c) Dependency Ratio	Equal weights
11.	Rural/Urban poor	a) BPL population (rural and urban) b) Homeless population	Equal weights on both with further equal weights on rural and urban BPL and Homeless
12.	Deforestation	Change of forests cover (positive, negative, overall) during 2001-2015 a) Dense forests	Equal weights

		b) Open Forests	
13	Depletion of Mangrove	Change of mangrove cover (positive, negative, overall) during 2001-2015 a) Dense mangrove b) Open mangrove	Equal weights
14	Water stress	a) Terrestrial water as captured in moisture index b) Surface water as captured in area under irrigation c) Sub-surface area as reflected CWGB data on	Equal weights

For exposures two selected parameters are (a) population and (b) GDP. Both are given equal weights of 50%.

#### d) Hazard, Vulnerability and Exposure index

Based on these parameters and weights on parameters hazard index, vulnerability index and hazard index has been worked out for each of 14 hazards, 14 vulnerabilities and 2 hazards for each of 640 census districts of the country. The statistical tables of these indexes are provided in Statistical Appendix-I of this report.

#### e) Hazard specific vulnerabilities

Every indicator of vulnerability is not relevant for every hazard. For example, vulnerable building and infrastructure are extremely relevant for earthquake and landslide, but these are not relevant for drought. Therefore, depending on their relevance hazard-vulnerability matrix has been developed and hazard specific vulnerabilities have been factored for measuring risks.

**Table-1.4: Hazard-Vulnerability Matrix on Risks of Disasters**

HAZARD MATRIX	VULNERABILITY MATRIX													
	Built Environment			Production System			Vulnerable socio-economic conditions					Vulnerable environment		
	Buildings	Social Infrastructure	Physical Infrastructure	Agriculture	Livestock	Industries	Poverty	Women	Children	Disabled	Elderly	Forest cover	Mangrove cover	Water Stress
Earthquake	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Landslide	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Tsunami	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Drought				✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Flood	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Cyclone	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Heat Wave							✓	✓	✓	✓	✓	✓		
Cold Wave							✓	✓	✓	✓	✓			

Avalanche	√	√	√				√	√	√	√	√	√		
Lightning							√	√	√	√	√			
Coastal erosion	√	√	√	√			√	√	√	√	√		√	
Forest Fire	√	√	√	√	√		√	√	√	√	√	√	√	√
Fire	√	√			√	√	√	√	√	√	√			√
Industrial Hazard						√	√	√	√	√	√			√

√ denotes the vulnerabilities in horizontal matrix that are relevant to the hazards in vertical matrix

#### f) Relative weights on indicators on hazards and vulnerabilities

Every hazard and every indicator on vulnerability do not create the same magnitude of risks. For example, an earthquake would create much more intense risks of disasters than landslide or forest fire. Similarly, every vulnerable condition may not create the same level of risks of disasters. For example, vulnerable physical conditions of houses and infrastructure may cause more deaths, injuries and economic losses than vulnerable human conditions of poverty or gender discriminations. In the absence of any robust time series data sets on disasters and its impacts, existing datasets of disaster damage and losses have been used to develop relative weights on hazards and vulnerabilities for measuring composite risks of disasters. These have been further refined based on the feedbacks received during the process of consultations.

#### g) Relative weights on hazards, vulnerabilities and exposures

Equal weights on hazards, vulnerabilities and exposures magnify the risk level of districts with high density of population and GDP. Since hazards are the primary triggers of risks of disasters it was decided that relative weights of H, V and E shall be given in the ratio of 4:2:1.

#### h) Measuring composite Disaster Risk Index

Based on hazard, vulnerability and exposure index; hazard specific vulnerabilities; relative weights on indicators on hazards, vulnerabilities and exposures; and relative weights on hazard, vulnerability and exposure, a composite Disaster Risk Index has been developed for each of 640 census districts of the country. Districts have been ranked at national and state levels according to their risk scores. The statistical tables on Disaster Risk Index are provided in Part-2 of the report. Disaster Risk Index of districts have been aggregated at the State level, as shown in Table-

### B. Disaster Resilience Index

UNISDR has defined resilience as ‘*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*’, but there is no consensus among experts regarding what constitutes such abilities.

Broadly, there are three layers of resilience: first the societal layer which include capacities of individuals, families, neighborhood, communities and the culture that have developed through experiences and wisdom over generations; second, is the layer of government which consists of institutions, systems, regulations, processes, programmes, and activities which support and strengthen societal layer; and the third layer is the support system when the capacity of the government is overwhelmed by the magnitude of the disasters. In the context

of large federal country like India the support system is very crucial for the constituent States and UTs.

In this study we are essentially looking at the second layer - the systems, institutions, processes, programmes and activities of the state governments and UT Administration in building resilience as per the national and global frameworks of disaster risk management. The study does not examine resilience at level of society not does it look at the support system of central government or regional and international organizations.

There is hardly any database on the initiatives of the States/UTs in building resilience to disasters. Therefore, this database had to be got constructed on the basis of information collected from the State Governments and UT Administration through comprehensive set of questions on different aspects of disaster risk management.

Developing questionnaire on resilience required selection of issues on which questions shall be framed. A clear consensus emerged during the process of consultations in expert working groups and regional workshops that there are seven pillars of resilience on which the questionnaire may be structured. These are: (a) Risk Assessment; (b) Risk Prevention and Mitigation; (c) Risk Governance; (d) Disaster Preparedness; (e) Disaster Response; (f) Disaster Relief and Rehabilitation; and (g) Disaster Reconstruction. These are very well aligned with the national and global frameworks on disaster risk management. There was further consensus that the catalogue of activities to be performed at the State level under national and global frameworks on disaster risk management (as detailed in Annexure I and III) should form the basis of questions on seven pillars of resilience.

Accordingly, the seven pillars of resilience were accepted as the seven aggregate indicators of Disaster Resilience Index. Each of these aggregate indicators was further disaggregated in ten indicators, making a total of 70 indicators on disaster risk resilience at the level of the States and UTs.

**Table-1.5: Indicators of Disaster Resilience Index**

<b>Aggregate Indicator</b>	<b>Indicators</b>
1. Risk Assessment	<ol style="list-style-type: none"> <li>1. Hazard Vulnerability Risk Assessment</li> <li>2. Digital Risk Mapping in Public Domain</li> <li>3. Real Time Data on Risks and Disasters</li> <li>4. Micro Zonation of Earthquake Risks</li> <li>5. Flood Risk Assessment</li> <li>6. Drought Risk Assessment</li> <li>7. Dissemination of Risk Information to People</li> <li>8. Assessing Traditional and Local Knowledge</li> <li>9. Assessing Patterns of Emerging Risks</li> <li>10. Developing Database on Disasters</li> </ol>
2. Risk Prevention & Mitigation	<ol style="list-style-type: none"> <li>1. Disaster Risk Mitigation Projects</li> <li>2. Mainstreaming DRR in Development</li> <li>3. State and Disaster Risk Mitigation Fund</li> <li>4. Safety standards for construction/ land use plans</li> <li>5. Safety audit/ retrofitting of life line structures</li> <li>6. Construction of cyclone/ flood shelters</li> <li>7. Eco System Approach for Disaster Risk reduction</li> <li>8. Social Safety Net for Poor and Vulnerable</li> <li>9. Mitigating risks of heritage</li> <li>10. Integration of climate change adaptation with</li> </ol>

	DRR
3. Risk Governance	<ol style="list-style-type: none"> <li>1. Institutional mechanisms for risk governance</li> <li>2. Disaster Management Policy and Plans</li> <li>3. Disaster Management Manuals and Procedures</li> <li>4. Decentralisation and Devolution of Functions</li> <li>5. Community Involvement and Participation</li> <li>6. Multi-Stakeholder Platform</li> <li>7. Training and Capacity Development</li> <li>8. Enforcement and Compliance</li> <li>9. Transparency and Accountability</li> <li>10. Monitoring and Evaluation System</li> </ol>
4. Disaster Preparedness	<ol style="list-style-type: none"> <li>1. End-to-End Early Warning Systems</li> <li>2. Emergency Operation Centres</li> <li>3. Disaster Communication System</li> <li>4. Emergency Medical Preparedness</li> <li>5. Scenario Building, Simulation and Mock Drills</li> <li>6. Contingency Plans, SOPs, Manuals</li> <li>7. Community Based Disaster Preparedness</li> <li>8. Awareness Generation</li> <li>9. Resource Inventory</li> <li>10. Media Partnership</li> </ol>
5. Disaster Response	<ol style="list-style-type: none"> <li>1. State agencies for disaster response</li> <li>2. Incident Response System</li> <li>3. Coordination with GOI, NDRF, Armed Forces</li> <li>4. Evacuation, Search and Rescue</li> <li>5. Emergency Medical Response</li> <li>6. Emergency Support Functions</li> <li>7. Protection of Women and Children</li> <li>8. Disposal of dead bodies</li> <li>9. Disposal of Animal Carcasses</li> <li>10. Disposal of Debris</li> </ol>
6. Disaster Relief & Rehabilitation	<ol style="list-style-type: none"> <li>1. Minimum Standard of Relief</li> <li>2. Ex-gratia Relief</li> <li>3. Relief Logistics and Supply Chain Management</li> <li>4. Food and Essential Supplies</li> <li>5. Drinking Water, Dewatering and Sanitation</li> <li>6. Health and Mental Health Care</li> <li>7. Management of Relief Camps</li> <li>8. Veterinary Care</li> <li>9. Relief Employment</li> <li>10. Temporary and Intermediary Shelters</li> </ol>
7. Disaster Reconstruction	<ol style="list-style-type: none"> <li>1. Damage and Loss Assessment</li> <li>2. Post Disaster Need Assessment</li> <li>3. Financing Reconstruction</li> <li>4. Institutional mechanisms for reconstruction</li> <li>5. Building Back Better</li> <li>6. Reconstruction of houses</li> <li>7. Reconstruction of infrastructure</li> <li>8. Regeneration of ecology and environment</li> <li>9. Livelihood Reconstruction</li> <li>10. Learning from reconstruction and recovery</li> </ol>

As the seven aggregate indicators are not equally important resilience to disasters it was imperative that relative weights on these indicators are decided through a consultative

process. A consensus emerged on the following relative weights on seven aggregate indicators.

**Table-1.6: Weights on Indicators on Disaster Resilience**

No	Aggregate Indicators	Weights
1.	Risk Assessment Risk Assessment	10%
2.	Risk Prevention & Mitigation	20%
3.	Risk Governance	20%
4.	Disaster Preparedness	20%
5.	Disaster Response	10%
6.	Disaster Relief & Rehabilitation	15%
7.	Disaster Reconstruction	5%

### **Benchmarks for resilience**

It was necessary to set up benchmarks or standards to be achieved over a period of time on each of the indicators so that the actual conditions can be compared with the ideal situations on a temporal scale. There are national and international standards of disaster resistant technologies and practices especially in construction related activities. New ISO standard for emergency management has also been developed<sup>32</sup>, but there no commonly accepted standards or benchmarks on most of the indicators of disaster management.

Therefore, consensus was developed through process of consultations on what the benchmarks should be on each of the indicators in accordance with national vision of building a disaster resilient India. The following benchmarks were agreed.

**Table-1.7: Benchmarks on Indicators of Disaster Resilience**

	Indicator	Benchmarks
1	<b>Risk Assessment</b>	State/ State/ UT has conducted Hazard Vulnerability Risk Assessment (HVRA) in high resolution, digitised the risk maps, and made these available, along with real time data in public domain for information and use of all stakeholders conducted Hazard Vulnerability Risk Assessment (HVRA) in high resolution, digitised the risk maps, and made these available, along with real time data in public domain for information and use of all stakeholders
2	<b>Risk Prevention &amp; Mitigation</b>	State/ UT has developed action plan for mitigating the risks of disasters and allocated resources for implementation of the plan in a phased manner. State/UT has further mainstreamed Disaster Risk Reduction in all programmes, activities and projects across all development sectors and at all levels.
3	<b>Risk Governance</b>	State/UT has activated disaster management institutions, developed and updated DM Plans at all levels, allocated resources for the implementation of the plans in an inclusive, participatory and non-discriminatory manner and set up a strong

<sup>32</sup> ISO 223201-2011: Societal Security and Emergency Management

		and effective monitoring and evaluation framework.
4	<b>Disaster Preparedness</b>	State/UT h State/UT has an End-to End Early Warning System, well-equipped and functioning Emergency Operation Centre, SOPs and Contingency Plan and trained personnel to respond effectively to disasters as an End-to End Early Warning System, well-equipped and functioning Emergency Operation Centre, SOPs and Contingency Plan and trained personnel to respond effectively to disasters.
5	<b>Disaster Response</b>	State/UT has a well-coordinated mechanism to respond, along with the communities, to events of disaster, evacuate people to safe places, search and rescue the affected and provide them emergency health care to minimize loss of lives.
6	<b>Disaster Relief &amp; Rehabilitation</b>	State/ UT has established a system for providing immediate relief to the affected people, including food, clothing, shelter, medical care etc. and extending necessary assistance for their rehabilitation, socially and economically.
7	<b>Disaster Reconstruction</b>	State/UT seizes every disaster as an opportunity to build back better the houses, infrastructure, livelihood and environment of affected communities

### Questionnaire

Based on these benchmarks a set of 172 questions were framed around these 7 x 10 indicators. The questions were framed in a manner that can elicit basic information in binary format and further probing questions were asked to obtain detailed information to be supported by means of verification. The questions were revised and refined based on the inputs received during the process of consultations. The final Questionnaire on Disaster Resilience is annexed- IV. Norms were developed for evaluation of responses to be received from the States/ UTs on the Questionnaire in quantitative terms. The same is annexed-V.

The Questionnaire was circulated to the States/ UTs along with a guidance note for their response.

## TECHNICAL NOTE ON DATA

Collection, compilation, collation, validation and analysis of data on 30 indicators of hazards, vulnerabilities and exposures involving 640 census districts of the country and 70 indicators on resilience from 29 States and 7 Union Territories was the most difficult task for the development of Disaster Score Card. Only a fraction of the data was available in public domain and therefore these had to be collected from the concerned agencies of multiple departments of Central and State governments.

While data on hazards, vulnerabilities and exposures were mainly collected from various scientific, technical and other specialized agencies of Government of India, data on resilience had to be collected through Questionnaire from the State governments and UT Administration.

### DATA ON HAZARDS

#### a) **Earthquake**

Earthquake Hazard Zoning Atlas of India (2016) prepared by Building Materials & Technology Promotion Council (BMTPC) has been taken as the basis for compilation of district and state level data on earthquake hazard. In this atlas district wise areas falling in four seismic zones - Zone-V (Very High Risk), Zone-IV (High Risk), Zone-III (Moderate Risk) and Zone-II (Low Risk) – has been mapped on the basis of IS 1893 (Part-1): 2002.<sup>33</sup>

On our request National Centre for Seismology, Ministry of Earth Sciences calculated the percentage of geographical area of the district falling in each zone. Based on the frequency and intensity of earthquakes, and in consultation with experts, following values in a scale of 0 to 10 have been adopted for various seismic zones and accordingly hazard index of districts have been worked out:

Zone-V: 10, Zone-IV: 6, Zone-III: 4, Zone-II: 2

#### b) **Landslide**

Landslide Hazard Zonation Atlas of India (2003) prepared jointly by BMTPC and Centre for Disaster Mitigation and Management, Anna University Chennai<sup>34</sup> is the only pan India study on landslides till date which maps and classifies landslide prone areas in district level. In this atlas entire landmass of India has been classified in four landslide hazard zones: Zone-IV (Very High), Zone-III (High), Zone-II (Moderate to Low) and Zone-I (Unlikely). Catalogue

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<sup>33</sup> Earthquake Hazard Zoning Atlas of India (2016), Building Materials & Technology Promotion Council, Ministry of Housing & Urban Poverty Alleviation, Government of India and National Disaster Management Authority.

<sup>34</sup> Landslide Hazard Zonation Atlas of India (2003) Building Materials & Technology Promotion Council, Ministry of Housing & Urban Poverty Alleviation, Government of India and Centre for Disaster Mitigation and Management, Anna University Chennai

of landslides in the country since 2000 has been collected. This broadly confirms the landslide zonation of 2003 atlas.

Area falling in each zone has been calculated district-wise and % are falling in each zone has been worked out, on our request by Dr. G P Ganapathy who was involved with the development of 2003 atlas. Based on this area analysis, and in consultation with experts, we have worked out landslide hazard index of each district on the basis of following values ascribed to each zone in the scale of 0 to 10: Zone-IV: 10, Zone-III: 8, Zone-II: 4, Zone-I: 0

### c) **Flood**

Comprehensive flood hazard zonation for the entire country on a uniform format has not been undertaken as yet. Central Water Commission (CWC) which is the nodal agency for flood risk assessment has mapped the flood prone area based on occurrences of flood since 1950. The assessment is based entirely on riverine flood and does not include coastal flood, flash flood etc. Based on this assessment, Vulnerability Atlas of India (2006) has worked out the % of flood prone area in each district.<sup>35</sup> However no hazard zonation has been done to determine the level of flood hazards in different parts of the district. In the absence of time series data on different parameters of flood at district and State levels, reliance has been placed on the Vulnerability Atlas for measuring the flood prone area in the districts and CWC data on actually flooded area during 1950-2016 for measuring the flood prone area in the States.

National Remote Sensing Centre (NRSC) has worked out flood zonation of districts in four States – Assam, Bihar, Odisha and Uttar Pradesh, based on satellite imageries of flood affected areas during 1998-2015.<sup>36</sup> This is an extremely useful data, but in the absence of comparable data from other States, this could not be adopted for development of flood hazard index of the districts throughout the country.

NRSC has separately developed potential Flood Vulnerability Index (FVI) for the entire country based on long-term daily rainfall data, runoff potential, slopes, drainage density, etc.<sup>37</sup> FVI has classified entire country in five flood zones – very high, high, moderate, less and very less. On our request NRSC has worked out the percentage of area in each district falling in each zone. No other pan India database on flood on uniform format is available.

Since floods in India are mostly riverine and CWC database, as adopted in Vulnerability Atlas of India, has longer time span, 60% weights have been given on this data and 20% weights given on NRSC Flood Vulnerability Index. Values of 10, 8, 6, 4 and 2 have been on five flood zones of NRSC.

Urban flood has become a recurrent major hazard in the country. Cities with population of (a) 1 million and above and (b) between 100,000 and 1 million located in flood prone area in each district, as shown in Vulnerability Atlas of India, have been identified. 20% weights have been given on flood prone cities in each of these two categories.

### d) **Drought**

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<sup>35</sup> Vulnerability Atlas of India (2006), Building Materials & Technology Promotion Council, Ministry of Housing & Urban Poverty Alleviation, Government of India

<sup>36</sup> <http://bhuvan-noeda.nrsc.gov.in/disaster/disaster/disaster.php#>

<sup>37</sup> <http://bhuvan-noeda.nrsc.gov.in/governance/rail#>

Drought hazard zonation of districts has not been done by any agency. In the absence of such zonation, parameters of drought have been captured in four indicators: (a) moisture index, (b) cropped area not irrigated, (c) drought prone area, and (d) number of drought years. Equal weights of 25% have been given on each indicator.

District wise data on Moisture Index has been made available by Central Research Institute for Dryland Agriculture. Data on cropped area of districts that are not irrigated have been collected from Directorate of Economics and Statistics, Ministry of Agriculture, Cooperation and Farmers Welfare, Government of India. Data on drought prone area in districts has been collected from the data base on erstwhile Drought Prone Area Programme maintained by Department of Land Resources, Ministry of Rural Development, Government of India. Number of droughts declared in each district has been compiled from Farmers Portal maintained by Ministry of Agriculture, Cooperation and Farmers Welfare.<sup>38</sup>

#### e) **Cyclone**

Parameters of cyclone have been captured in six indicators: (a) total number of cyclones, (b) number of severe cyclones, (c) possible maximum wind speed, (d) possible maximum storm surge, (e) possible maximum precipitation, (f) whether located in flood zone, as adopted by the Expert Committee on Cyclones constituted by National Disaster Management Authority.

<sup>39</sup> The data base on number of cyclones and severe cyclones have been updated.

Equal weight of 15% has been given on indicator (a) and indicators (c) to (f), while 25% weights have been given on indicator (b) for calculating cyclone hazard index.

#### f) **Tsunami**

Parameters of tsunami are captured in three indicators: (a) total length of coastline, (b) population living within ½ km of the coast, and (c) average height of tsunami wave. Length of coastline has been calculated from Survey of India base map of India. Population living within ½ km of the coast has been calculated from Census 2011 population data of coastal districts. Data on average probable maximum height of tsunami wave in each coastal district has been provided by India National Centre on Oceanic Information Services.

25% weights have been given on indicators (a) and (b) and 50% weights are given on parameter (c).

#### g) **Avalanche**

For the purpose of this study Snow and Avalanche Study Establishment of DRDO did the hazard zonation of avalanche. Avalanche prone districts have been classified in five zones: Zone-V (Very High Risk), Zone-IV (High Risk), Zone-III (Moderate Risk), Zone-II (Low Risk) and Zone-I (No Risk). Area falling in each zone has been calculated district-wise and % area falling in each zone has been worked out

Based on this area analysis, avalanche hazard index of relevant districts has been worked with following values:

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<sup>38</sup> <http://farmer.gov.in/Drought/Droughtreport.aspx>

<sup>39</sup> Cyclone Hazard Prone Districts of India; A Report (2010), India Meteorological Department.

Zone-V: 10, Zone-IV: 8, Zone-III: 6, Zone-II: 4, Zone-I: 0

#### h) **Heat Wave**

Daily temperature and humidity data from 481 Surface Stations and 675 Automated Weather Stations of India Meteorology Department throughout country for last 16 years (2001-2016) have been collected from Indian Institute of Tropical Meteorology (IITM) Pune. The data has been processed to develop heat wave hazard index through a complex methodological process. First, the weather stations have been matched with districts, and district without weather stations have been linked with nearest stations in consultation with the scientists of IITM. Second, average heat index of districts has been worked out based on the methodology adopted by National Oceanic and Atmospheric Administration (NOAA) USA<sup>40</sup> and endorsed by NDMA India.<sup>41</sup> Third, district-wise annual average of number of days with heat index above been 54 have been calculated. Third, number of heat waves (temperature above 40°C or more for Plains and at least 30°C or more for hilly regions continuously for 5+ days) have been worked out.<sup>42</sup> Finally, longest duration of heat wave in each district has been worked out. All four parameters have been given equal weights to calculate the heat wave hazard index of the districts in a scale of 0 to 10 s in other indexes.

#### i) **Cold Wave**

Cold Wave Hazard Index has been worked out following IMD Weather Forecast Circular No. 5/2015 (3.7) which defines a day cold when goes below 4°C in plain areas and below - 4°C in hilly areas. Percentage of days with cold wave conditions in three different temperature brackets in each district have been worked out with equal weights on all three conditions, as shown in Table-2.9.

#### j) **Coastal Erosion**

Parameters of coastal erosion are captured in three indicators: (a) total length of coastline, (b) coast line changes, and (c) coastal area changes, the last two again sub-divided in three indicators: erosion, accretion and stable. Only erosion has been considered as stability and accretion do not create risks of disasters. The data on coastline changes and costal area changes have been compiled from Shoreline Change Atlas of Indian Coast, prepared by Space Application Centre Ahmedabad and Directorate of Coastal Erosion, Central Water Commission, Ministry of Water Resources, Government of India.<sup>43</sup>

Equal weights of 33.33% is given on all three indicators.

#### k) **Lightning**

Lightning accounts for large mortalities during disasters in a number of States in India, but there has neither been any scientific study on lightning covering the entire country. Only available pan India indicator on landslide is number deaths due to lightning in the States,

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<sup>40</sup> [http://www.nws.noaa.gov/om/heat/heat\\_index.shtml](http://www.nws.noaa.gov/om/heat/heat_index.shtml)

<sup>41</sup> Guidelines on Preparation of Action Plan – Prevention and Management of Heat Waves (2016), National Disaster Management Authority.

<sup>42</sup> Based on IMD Forecasting Circular No.5/2015 (3.7)

<sup>43</sup> Shoreline Change Atlas of Indian Coast (2014), Space Application Centre Ahmedabad and Directorate of Coastal Erosion, Central Water Commission, Ministry of Water Resources.

which has been compiled by National Crime Bureau every year since 2001 in their annual publication titled Accidental Deaths and Suicides in India.<sup>44</sup>

In the absence of any other database State level lightning mortality data has been normalized at district level according to population and annual averages have been worked out. Lightning mortality index in a scale of 0 to 10 has been worked out on the basis of this annual average.

#### l) **Forest Fire**

The study on 'Vulnerability of India's Forests to Fire' published by Forest Survey of India (FSI) is the basis of data on forest fire.<sup>45</sup> The study has classified districts in terms of three types of forest fire - high, moderate and no risk. This has been supplemented with data on types of forests in the districts – very dense, dense and open forests - as brought out in the annual India State of Forest Report.<sup>46</sup>

In terms of ecological value 'very dense' forests are given weights of 50%, 'dense' forests 30% and 'open' forests 20%. Value of 10 is ascribed on 'high' risk zones, 5 on 'moderate' risk zones and 0 on no risk zones. This implies that districts in no risk zone gets a score of 0 irrespective of size or type of forest cover, while high and moderate risk zone districts get score in proportion to area of different types of forests and types of risks

#### m) **Fire**

Directorate General of NDRF and Civil Defence had commissioned a study on fire hazard and risk analysis in the country for revamping fire services in the States.<sup>47</sup> The study did not cover risks of fire in the districts, nor did it compile data on fire in the districts.

In the absence of any district level database on fire, reliance has been placed on NCRB State-level database on (a) number of cases of fire accidents registered, (b) number of injuries and (c) number of deaths during 2001-2015.<sup>48</sup> Data has been normalized at district level based on its population. Fire hazard index has been worked on the basis of equal weights of 33.33% on these three indicators.

#### n) **Industrial Hazards**

Development of industrial hazard index has been challenging as no database on industrial hazards has been maintained by any agency. Ministry of Environment, Forests and Climate Change - the nodal ministry on industrial hazards - provided data on district wise location of Maximum Hazard Industries (MHI). Central Pollution Control Board (CPCB) provided data on district wise location of 17 categories of Maximum Polluting Industries (MPI) This

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<sup>44</sup> Accidental Deaths and Suicides in India (2001) to (2015), National Crime Record Bureau, Ministry of Home Affairs, Government of India.

<sup>45</sup> Vulnerability of India's Forests to Fire (2012), Forest Survey of India, Ministry of environment and Forests, government of India

<sup>46</sup> India State of Forest Report (2015), Forest Survey of India, Ministry of environment and Forests, government of India.

<sup>47</sup> Fire Hazard and Risk Analysis in the Country for Revamping Fire Services in the Country (2011), RMSI Private Limited.

<sup>48</sup> Accidental Deaths and Suicides in India (2015), National Crime Record Bureau, Ministry of Home Affairs, Government of India.

include pharmaceuticals, cement, caustic (chemical), copper, distillery, dye & dye intermediates, fertilizer, iron and steel, refinery, pesticide, petrochemicals, pulp and paper, sugar, power plants, aluminium, zinc and tannery.

No nation-wide data on the level of potential and actual hazards of these industries is available. However, CPCB conducted a study to develop Comprehensive Environmental Pollution Index (CEPI) for 88 selected industrial clusters in the country. CEPI measures the level of air, water and soil pollution in and around the clusters. Although pollution does not directly lead to disasters it definitely contributes to the process of creation of hazards that may eventually lead to disasters.

IN the absence of any other database MHI, MPI and CEPI have been factored in the ratio of 50:25:25 for the calculation of industrial hazard index of districts and States. For CEPI following values have been ascribed:

Dangerous level of pollution: 10, critical level of pollution: 8, high level of pollution: 6, moderate level of pollution: 4 and low level of pollution: 2.

## DATA ON VULNERABILITES

### a) Buildings

A Committee of Experts constituted by BMTPC had worked out vulnerability of buildings based on prominent materials used for construction of walls and roofs. This is summarized in the Table below:

**Table-1.8: Vulnerability of buildings based on prominent materials used for construction of walls and roofs**

		Earthquake Zone				Landslide Zone				Cyclone Zone				Flood Zone			
		V	IV	III	II	V	IV	III	II	V	IV	III	II	V	IV	III	II
	<b>WALL</b>																
1.	Grass/Thatch/Bamboo	M	VL	VL	VL	M	VL	VL	VL	VH	H	M	L	VH	VH	M	M
2.	Plastic/Polythene	M	VL	VL	VL	M	VL	VL	VL	VH	H	M	L	VH	VH	M	M
3.	Mud and Un-burnt Bricks	VH	H	M	L	VH	H	M	L	VH	H	M	L	VH	VH	M	M
4.	Wood	M	L	VL	VL	M	L	VL	VL	VH	H	M	L	H	M	L	VL
5.	Stone Packed with Mortar	H	M	L	VL	H	M	L	VL	H	M	L	VL	M	L	VL	VL
6.	Stone not Packed with Mortar	VH	H	M	L	VH	H	M	L	H	M	L	VL	H	M	L	VL
7.	GI/Metal/Asbestos	M	VL	VL	VL	M	VL	VL	VL	VH	H	M	L	VH	VH	M	M
8.	Burnt Brick	H	M	L	VL	H	M	L	VL	H	M	L	VL	M	L	VL	VL
9.	Concrete	M	L	VL	VL	M	L	VL	VL	L	VL	VL	VL	L	VL	VL	VL
10.	Any Other Materials	M	VL	VL	VL	M	VL	VL	VL	VH	H	M	L	VH	VH	M	M
	<b>ROOF</b>																
1.	Grass/Thatch/Bamboo/Wood/Mud, etc.	M	M	L	VL	M	M	L	VL	VH	VH	H	M	VH	VH	M	M
2.	Plastic/Polythene	M	M	L	VL	M	M	L	VL	VH	VH	H	M	VH	VH	M	M
3.	Handmade Tiles	H	M	L	VL	H	M	L	VL	H	M	L	VL	H	M	L	VL
4.	Machine made Tiles	H	M	L	VL	H	M	L	VL	H	M	L	VL	H	M	L	VL
5.	Burnt Brick	H	M	L	VL	H	M	L	VL	L	VL	VL	VL	H	M	L	VL
6.	Stone/Slate	H	M	L	VL	H	M	L	VL	H	M	L	VL	H	M	L	VL
7.	G.I./Metal/Asbestos sheets	M	M	L	VL	M	M	L	VL	VH	VH	H	M	VH	VH	M	M
8.	Concrete	M	L	VL	VL	M	L	VL	VL	L	VL	VL	VL	L	VL	VL	VL
9.	Any Other Material	M	M	L	VL	M	M	L	VL	VH	VH	H	M	VH	VH	M	M

Legend of hazard zones: Zone V: Very High Damage Risk Zone, Zone IV: High Damage Risk Zone, Zone III: Moderate Damage Risk Zone, Zone II: Low Damage Risk Zone, Zone I: No Risk Zone

Legend of vulnerable buildings: VH= Very High (damage potential 100%); H= High (50%); M=Medium (25%); L= Low (10%); VL= Very Low (5%)

Number of buildings in each district by use of prominent materials used for construction of walls and roofs have been compiled from the data base of Census 2011. This includes residential as well as commercial, institutional, community and religious buildings as well. This data has been correlated with levels of hazards in the district that have the potentiality of causing damages to buildings. These hazards include earthquake, landslide, cyclone and flood.

Based on this database vulnerability index of buildings have been worked out, as explained in the statistical note on methodology.

#### **b) Agriculture**

Crop Vulnerability Index has been worked out on the basis of two indicators – cropped area and irrigated area. District-wise data on area under crops and area under irrigation have been collected from Directorate of Economics and Statistics, Ministry of Agriculture, Cooperation and Farmers Welfare, Government of India.

Standing crops as well as irrigation networks are vulnerable to hazards of nature, but susceptibility of damage is higher for crops than irrigation. Moreover, irrigation network surviving impacts of disaster can support revival of agriculture. Considering the relative importance of crop and irrigation 80% weights have been given on area under crops and 20% on irrigated area.

#### **c) Livestock**

Livestock data has been compiled from Livestock Census 2012.<sup>49</sup> Livestock Vulnerability Index has been worked out on the basis on two indicators – number of bovine animals and other animals – with 75:25 weights between the two, considering importance of bovines for life and economy.

#### **d) Industries**

District-wise data on industries have been collected from multiple sources on three indicators – number of MSME, number of industrial clusters and number of Special Economic Zones (SEZ). Data on micro, small and medium enterprise has been collected from the database of Development Commissioner (MSME)<sup>50</sup>, while data on Industrial Clusters and Special Economic Zones in districts have been collected from Ministry of Industrial Policy and Promotion.

Industrial vulnerability index has been worked out on the basis of differential weights of 40% on MSME, 40% on Industrial Clusters and 20% on SEZ

#### **e) Physical Infrastructure**

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<sup>49</sup> Livestock Census (2012), Volumes I to IV, Department of Animal Husbandry, Ministry of Agriculture, Cooperation and Farmers Welfare, Government of India.

<sup>50</sup> Entrepreneurs Memorandum – Part II - Data on MSME Sector (2015), Development Commissioner (MSME), Ministry of Micro, Small and Medium Enterprises, Government of India.

District-wise data on six types of physical infrastructure – roadways, railways, airports, sea ports, dams and reservoirs, and power plants - have been collected from multiple sources. Total length of roadways and railways in each district have been compiled by NRSC on our request using remote sensing and GIS tools. Data on airports in districts have been collected from Airport Authority of India, while data on sea ports have been compiled from Basic Port Statistics of India.<sup>51</sup> Data on dams and reservoirs are drawn from the National Register on Large Dams.<sup>52</sup> District-wise data on hydel power stations are compiled from the WRIS database <sup>53</sup>, while data on thermal and nuclear power projects in districts have been collected from Ministry of Power and Department of Atomic Energy respectively.

Equal weights have been given on each of these six indicators, with sub-indicators within some of the indicators also given equal weights for calculating physical vulnerability index.

#### **f) Social Infrastructure**

Social infrastructure data has been limited to health and educational institutions in the districts as these are considered critical life line infrastructure in any major disaster. Data on number of such institutions in districts have been compiled from village and town amenities database of Census 2011.

Social vulnerability index has been worked out with equal weights on these two indicators. However, sub-sets within the two broad indicators are given different weights. In education, school education (columns 3 to 5 of Table 3.6) gets 40% weights and higher education and polytechnics together (columns 6 to 10) 10% weights. In health, primary health care (columns 11 to 13) and hospitals (column 14) carry 25% weights each.

#### **g) Poverty**

There is no district-wise national database on population living below poverty line. Districts have their own database on BPL population based on local surveys that are not considered reliable. Socio Economic and Caste Census 2011 did count number of households based on monthly income of highest earning household member <sup>54</sup> but this cannot be accepted as a robust database on poverty for two reasons: first, the data excluded income from other sources and from other members of households, and second, the survey excluded urban households.

In the absence of any national database on poverty, estimate of erstwhile Planning Commission on number and percentage of people living below poverty line in States and UTs in rural and urban areas <sup>55</sup> was adopted as the basis for calculating BPL population in districts in the same ratio. As this does not capture intra-state variation in poverty; Census 2011 data on district-wise population of homeless has been adopted additionally. Both these indicators – BPL and Homeless Population – have two sub-indicators for rural and urban areas. Equal weights of 25% have been given on each of these four sub-indicators for working out poverty vulnerability index.

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<sup>51</sup> Basic Port Statistics of India (2015), Ministry of Transport and Highways, Government of India.

<sup>52</sup> National Register of Large Dams (2017), Ministry of Water Resources, Government of India

<sup>53</sup> [http://www.india-wris.nrsc.gov.in/wrpinfo/index.php?title=Hydro\\_Electric\\_Project](http://www.india-wris.nrsc.gov.in/wrpinfo/index.php?title=Hydro_Electric_Project)

<sup>54</sup> <http://secc.gov.in/categorywiseIncomeSlabReport?reportType=All%20Category#>

<sup>55</sup> Press Note on Poverty Estimates (2013), Planning Commission, Government of India.

#### **h) Women**

Gender Vulnerability Index is worked out on the basis of eight indicators - sex ratio (women per 1000 men), illiteracy (%), women headed households (%), women not employed (%), MMR (maternal mortality rate per 100,000 child births) and crime against women (cases registered per 100,000 women). District-wise data on first four indicators were compiled from Census 2011. In the absence of district-wise data on MMR latest state-wise data from Ministry of Health and Family Welfare<sup>56</sup> has been adopted for calculating district-wise data in the same ratio.

Equal weights have been given on each of these six indicators.

#### **i) Children**

Child vulnerability index has been worked out on the basis of four indicators – age group of children, children not going to school, children working, and IMR. District-wise data on first three indicators have been compiled from Census 2011. In the absence of any credible district-wise data on IMR latest state-wise data on IMR from Ministry of Health and Family Welfare<sup>57</sup> has been adopted for calculating district-wise data in the same ratio.

Each indicator has been given equal weights of 25%, while two sub-indicators on age group of children – 0 to 6 and 7 to 18 – have been given differential weights in 60:40 ratio as younger children are more vulnerable during disasters.

#### **j) Disability**

Disability vulnerability index has been worked out on the basis of three indicators – visual, physical and mental disability. The data on all these indicators has been compiled from Census 2011. Each indicator is given equal weights of 33.3%

#### **k) Elderly**

Elderly vulnerability index has been worked out on the basis of three indicators – population in 60+ age group, population in 80+ age group and dependency ratio (ratio of population in 60+ age group over working population in 19-59 age group). District-wise data on all three indicators have been compiled from Census 2011. Each indicator is given equal weights of 33.3%.

#### **l) Depletion of Forest Cover**

Changes in forest cover in the districts between 2000 and 2015 have been captured on two indices – dense forests and open forests. District-wise database on these two reference years has been collected from India State of Forest Reports.<sup>58</sup> Positive, negative and overall changes have been calculated to determine net depletion, if any. Equal weights have given on both the indicators for calculating the index.

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<sup>56</sup> Family Welfare Statistics in India (2015), Ministry of Health and Family Welfare, Government of India

<sup>57</sup> Family Welfare Statistics in India (2015), Ministry of Health and Family Welfare, Government of India

<sup>58</sup> India State of Forest Report (2000 and 2015), Forest Survey of India, Ministry of environment and Forests, Government of India.

### **m) Depletion of Mangrove Cover**

Changes in mangrove cover in the districts between 2000 and 2015 have been captured on two indices – dense and open mangroves. District-wise database on these two reference years has been collected from India State of Forest Reports.<sup>59</sup> Positive, negative and overall changes have been calculated to determine net depletion, if any. Equal weights have given for calculating the index.

### **n) Water Stress**

Extent of water stress in districts are captured in three indicators – terrestrial, surface and sub-surface water. Stress on terrestrial and surface water sources are captured in Moisture Index and Cropped Area not Irrigated used in calculating drought hazard index and agricultural vulnerability index. Stress on sub-surface water has been compiled from the district database on ground water made available by Central Ground Water Board.

Equal weights of 33.3% are given on each indicator for calculating water stress index. Indicator on sub-surface water has four sub-indicators – over-exploited, critical, sub-critical and safe. Weights of 50% are given on over-exploited, 30% on critical, and 20% on sub-critical components. Safe water zones are not calculated in our indexes.

## **DATA ON EXPOSURE**

Data on exposures has been collected on two indicators in each district: exposure of population and exposure of economy as reflected in district GDP. While data on exposure of population is compiled easily from Census 2011, exposure of district GDP is not available so easily.

State GDP is estimated by the Directorate of Economics and Statistics (DES) in the States, but these are adopted by Central Statistical Organization (CSO) only after verification. District GDP estimates are prepared by the DES but these are not subjected to further scrutiny by CSO. Only 11 out of 36 States/ UTs prepare GDP estimates for districts. These are Andhra Pradesh, Bihar, Karnataka, Kerala, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal. But none of the States prepare the estimates regularly and for some of the States the data is as old as 2009-2010. This poses problems on multiple counts. First, for the States that have never estimated district GDP some broad approximation of such data has be got constructed for the purpose of the study, even though it may not be accurate. Second, for the States that have old district GDP estimation, the data has not only to be got updated for the current year, but such data has also to be got constructed for the census districts that were created subsequent to last estimation.

The following methodology was adopted for quick construction of data on district GDP in the States. First, data on current State GDP is collected from CSO. CSO has released State GDP estimates of 2016-2017 at current prices (base year 2011-12) for 17 States/ UTs. For the year 2015-2016 such data is available for all States/ UTs except West Bengal as the State GDP of West Bengal at 2011-12 price has not been adopted ever since the new series was started. In

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<sup>59</sup> India State of Forest Report (2000 and 2015), Forest Survey of India, Ministry of environment and Forests, Government of India.

this scenario there was no other alternative but to work with the State GDP estimate prepared by the West Bengal State DES for the year 2015-2016, and State GDP estimates adopted by the CSO for the remaining States/ UTs.

Second, for the States that have never prepared district GDP data was constructed on the basis of state per capita GDP multiplied by district population. For the States that prepared district GDP the data was updated by working out district share of State GDP as per latest estimate and apportioning current State GDP in the same ratio to the districts. For the newly created districts the share was apportioned on the basis of per capita population.

Exposure index has been worked out by estimating density of population and per capita income in district and assigning equal weights on both the indicators in a scale of 10.

### **DATA ON RESILIENCE**

Data on resilience remained the most challenging as no such data is available from any source. The data had got to be created through collection of information from the States and Union Territories on various aspects of resilience. Such information was collected on the basis of a Questionnaire comprising of 172 questions on 70 indicators on resilience. The questionnaire was circulated to the States/ UTs by the Ministry of Home Affairs during February 2017 and States took considerable time to submit their responses.

Most of the States do not seem to have responded to the questionnaire with due care and diligence. Many States failed to collect necessary information from concerned departments and agencies of the government and left many questions blank or answered partly or in a roundabout manner that was difficult to be evaluated in quantitative terms for the purpose of developing the score card. Some States claimed achievements that were not supported by evidences. Some of the incomplete and inadequate responses were returned to the States for carrying out necessary revisions but barring two States no such revisions were carried out.

Therefore, there was no other alternative but to supplement information collected through the Questionnaire with information available from various other documents of the State Government and their agencies, including the documents referred in responses to the questions. It seems that these were not considered by the States while framing their responses. The idea was mainly to give credit to the States for the works done but not reflected in their response, probably due to oversight or lack of institutional memory or inadequate appreciation of the questions.

The questions were broken into components and norms were developed for evaluating resilience on each component in quantitative terms based on information collected from response to the Questionnaire and other sources. Values of 50 were assigned to a set of 10 indicators under each of 7 aggregate indicators making a total value of 350. Scores obtained by the States/UTs were rescaled as per weights given on aggregate indicators as explained in the chapter on methodology. This was further rescaled to: (a) 10 to measure 'capacity' for working out Disaster Risk Index and (b) 100 to measure 'resilience' for working out Disaster Resilience Index.

## STATISTICAL NOTE ON METHODOLOGY

The complex methodology for working out the hazard, vulnerability and exposure indexes and composite risk and resilience index has been given practical shape through the application of various statistical tools and techniques.

### HAZARD INDEX

#### a) Earthquake (Table-2.1)

Earthquake Hazard Index has been calculated as the weighted average of the prescribed values of the seismic hazard zones, where the weights are the percentage of area falling within a particular zone. Here  $X_1= 0$ ,  $X_2= 4$ ,  $X_3= 6$ ,  $X_4= 8$ ,  $X_5= 10$  is the intensity of the  $i$ -th hazard zone,  $w_i$ 's are percentage of area of district in the  $i$ -th hazard zone,  $i = 1, \dots, 5$ .

#### b) Landslide (Table-2.2)

Landslide Hazard Index has been calculated as the weighted average of the prescribed values of the landslide hazard zones, where the weights are the percentage of area falling within a particular zone. Here  $X_1= 0$ ,  $X_2= 4$ ,  $X_3= 6$ ,  $X_4= 8$ ,  $X_5= 10$  is the intensity of the  $i$ -th hazard zone,  $w_i$ 's are percentage of area of district in the  $i$ -th hazard zone.

#### c) Flood (Table-2.3)

The index has been calculated as the weighted average of the three prescribed indicators which are the values of the percentage of flood prone are according to the mapping by BMTPC(2006), standardized by formula (I) and NRSC(2017), standardized by formula (II) where  $w$ 's denote the percentage of flood area in the risk zone and  $Y$ 's denote the pre-specified score of the zones, as well as total number of Flood prone cities in the district with population greater than 1 Million and 10 Million, standardized by formula (III), where the weights had been pre-specified as 60%, 20% and 20%.

#### d) Drought (Table-2.4)

Drought Hazard Index has been calculated as the average of the normalised scores of the parameters. For (a), Negative of the moisture index has been normalised to a range of 0 to 10 according to formula (I) such that the higher the value of this normalised value, the more intense the hazard. For (b) the percentages have been divided by 100 to normalise from 0 to 10. (c) and (d) has been normalised through dividing by the maximum value and multiplying by 10 to put on scale of 0 to

10. Then a simple average of all these parameters had been taken since equal weights had been pre-specified.

**e) Cyclone (Table-2.5)**

For calculating Cyclone Hazard Index parameters (a), (b), (c), (d), (e), as shown in the table have been normalized by dividing by the maximum value and multiplying by 10 to get on scale of 0 to 10 according to formula (I). For (f) an ad hoc score has been developed which follows the following properties: (i) Score (yes) > Score (no) (ii) The mean of all scores =  $(0+10)/2 = 5$ . Out of several possible choices, the middle point has been chosen which gives the values: Score (yes) = 5.85, Score (no) = 2.49. The score has been assigned corresponding to the responses Yes and No. Then a weighted average of all these parameters had been taken where the weights had been pre specified.

**f) Tsunami (Table-2.6)**

For Tsunami Hazard Index 3 parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10 according to formula (I). Then a weighted average of all these parameters had been taken where the weights had been pre specified.

**g) Avalanche (Table-2.7)**

Avalanche Hazard Index has been calculated as the weighted average of the prescribed values of the seismic hazard zones, where the weights are the percentage of area falling within a particular zone. Here  $X_1=0$ ,  $X_2=4$ ,  $X_3=6$ ,  $X_4=8$ ,  $X_5=10$  is the intensity of the i-th hazard zone,  $w_i$ 's are percentage of area of district in the i-th hazard zone.

**h) Heat Wave (Table-2.8)**

The first 3 parameters (annual average of the number of hot days, number of heat waves and length of longest heat wave) have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10 according to formula (I). The average heat index during the heat waves is normalised according to formula (II). Then a simple average of all these parameters had been taken to get the index since equal weights had been pre specified. Since there were extensive cases of missing data for several districts due to non existence of weather stations etc, the missing values have been imputed with data from the geographically closest district in order to compute the index.

**i) Cold Wave (Table-2.9)**

All 3 parameters (the proportion out of total days in the three zones on basis of severity of cold day) have been normalized by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10. Then a simple average of all these parameters had been taken to get the index since equal weights had been pre specified. Since there were extensive cases of missing data for several districts due to non-existence of weather stations etc., the missing values have been imputed with data from the geographically closest district in order to compute the index.

**j) Coastal Erosion (Table-2.10)**

For Coastal Erosion Hazard Index 3 parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10. Then a simple average of all these parameters had been taken since equal weights had been pre specified.

**k) Lightning (Table-2.11)**

The average annual deaths has been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10. Since, the data has been compiled at the state level, an assumption has been made that the incidence is equally likely across all districts, hence the districts with more population would be at a higher risk.

**l) Forest Fire (Table-2.12)**

We obtain a multiplier which has been defined as the weighted average of proportions of “very dense”, “dense” and “open” forest cover in the district (area of forest category in district divided by total forest cover in district) where the weights had been pre specified. The multiplier is strictly between 0 and 1. Then this multiplier is multiplied to the pre-assigned score associated with the risk category of the district to get the hazard index.

**m) Fire (Table-2.13)**

All 3 parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10. Then a simple average of all these parameters had been taken since equal weights had been pre specified. Since, the data has been compiled at the state level, an assumption has been made that the incidence is equally likely across all districts, hence the districts with more population would be at a higher risk.

#### **a) Industrial Hazards (Table-2.14)**

The first 2 parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10. The CEPI has been rescaled on a scale of 10, which is 10 for CEPI>80, 8 for CEPI>70, 6 for CEPI>60, 4 for CEPI>50, 2 for CEPI<50. Then a weighted average of all these parameters had been taken where the weights had been pre specified as 50%:25%:25%.

### **VULNERABILITY INDEX**

#### **a) Buildings-Walls (Table-3.1)**

In order to capture the effect each particular hazard has on each particular type of roof, the following coding has been used: X: {VH = 10, H = 8, M = 6, L = 4, VL = 2} and each hazard index has been categorized according to 5 risk zones A weighted average of these has been taken where the weights are proportion of a particular roof type in all houses of the district.

#### **b) Buildings-Roofs (Table-3.2)**

In order to capture the effect each particular hazard has on each particular type of wall, the following coding has been used: X: {VH = 10, H = 8, M = 6, L = 4, VL = 2} and each hazard index has been categorized according to 5 risk zones A weighted average of these has been taken where the weights are proportion of a particular wall type in all houses of the district.

#### **c) Agriculture and Livestock (Table-3.3)**

For agriculture, the net non-irrigated cropped area (total cropped area–irrigated area) and irrigated area has been normalized by dividing by the total area of the district and multiplying by 10 to put on scale of 0 to 10. Then a weighted average of all these parameters had been taken where the weights had been pre specified as 80% on former and 20% on latter. ( $X_c$  : Cropped area,  $X_i$  : Irrigated area,  $X_t$  : Total area)

For livestock, the number of bovine animals and other animals has been normalized by dividing by the total number of the district and multiplying by 10 to put on scale of 0 to 10. Then a weighted average of all these parameters had been taken where the weights had been pre specified as 75% on former and 25% on latter. ( $X_b$  : No. of bovine animals,  $X_o$  : No. of other animals,  $X_t$  : Total No. of animals)

#### **d) Industries (Table-3.4)**

The total number of industries, industrial clusters and SEZs have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10. Then a weighted average of all these parameters had been taken where the weights had been pre specified as 40%:40%:20%.

**e) Physical Infrastructure (Table-3.5)**

All parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10. Then a simple average of groups of these parameters ( Road & Rail Connectivity, Sea and Air Connectivity, Dams & Reservoirs and Power Plants ) had been taken since equal weights had been pre specified. Within each group, simple average of each of the parameter in the group has been taken.

**f) Social Infrastructure (Table-3.6)**

All parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10. Then a simple average of groups of sub-groups of these parameters (Educational Institutions and Health Institutions) had been taken since equal weights had been pre specified. Within each group, simple average of each of the sub-group of parameters in the group has been taken. Within each sub-group, simple average of each of the parameter in the sub-group has been taken.

**g) Poverty (Table-3.7)**

All parameters (rural and urban BPL and Homeless population) have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10. Then a simple average of all these parameters had been taken, since equal weights had been pre specified

**h) Women (Table-3.8)**

All parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10 according to Formula (I). Then a simple average of all these parameters had been taken, since equal weights had been pre specified

**i) Children (Table-3.9)**

All parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10 according to Formula (I). Then a simple average of groups of these parameters had been taken since equal weights had been pre specified. Within each group, weighted average of each of the parameter in the group has been taken where the weights had been pre specified. This has been done twice, once using absolute numbers and once using percentages. Then a geometric mean of both these indexes have been taken to obtain final index

**j) Disability (Table-3.10)**

All parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10 according to Formula (I). Then a simple average of all these parameters had been taken since equal weights had been pre specified. This has been done twice, once using absolute numbers and once using percentages. Then a geometric mean of both these indexes have been taken to represent final index.

**k) Elderly (Table-3.11)**

All parameters have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10 according to Formula (I). Then a simple average of all these parameters had been taken since equal weights had been pre specified. This has been done twice, once using absolute numbers and once using percentages. Then a geometric mean of both these indexes has been taken to represent final index.

**l) Depleting Forest Cover (Table-3.12)**

All parameters of change (dense & open) have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10 according to Formula (I). Then a simple average of all these parameters had been taken, since equal weights had been pre specified.

### **m) Depleting Mangroves (Table-3.13)**

All parameters of change (dense & open) have been normalised by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10 according to Formula (I). Then a simple average of all these parameters had been taken, since equal weights had been pre specified.

### **n) Water Stress (Table-3.14)**

All parameters of change have been on scale of 0 to 10 according to Formula (I), (II) and (III). Then a simple average of all these parameters had been taken, since equal weights had been pre specified.

## **EXPOSURE INDEX**

Two parameters are considered for calculating Exposure Index These are: (a) population density ( $\rho$ ), and (b) per capita GDP ( $GDP$ ) of a district. Both have been normalized by dividing by the maximum value and multiplying by 10 to put on scale of 0 to 10 according to Formula (IE) below. Then a simple average of these parameters had been taken, since equal weights have been given on both the parameters.

## **DISASTER RISK INDEX**

Disaster Risk Index is calculated in two stages: (a) calculating the multiplier of hazards, vulnerabilities and risks; and (b) discounting the multiplier with capacities.

### **a) Calculating $H \times V \times E$**

The calculation has been done as  $(H \times V) \times E$  since hazard specific vulnerabilities have to be first calculated before the parameters of exposures are added.  $(H \times V)$  has been computed using the formula  $(IHV)$  where  $w_j$  is the weight of the j-th hazard,  $I_j$  is the index of the j-th hazard,  $w_i$  is the weight of the i-th vulnerability,  $I_i$  is the index of the i-th vulnerability and  $\delta_{ij}$  is the indicator function which returns 1 if the i-th indicator is relevant to the j-th hazard and returns 0 otherwise. All the weights used in the formula had been pre-specified for all hazards and all vulnerabilities.

is calculated as the geometric mean of the so obtained and .

Here are relative importance parameters of the Hazards, Vulnerabilities, and Exposures in the ratio of 4:2:1 to best reflect the relative contribution of h, v and e for creating risks of disasters. Accordingly the values adopted are .

#### **b) Discounting risks by capacities**

Risks of disasters are defined by where C is the capacity to deal with disasters. In the absence of any datasets on capacities, Disaster Resilience Index has been taken as the proxy indicator of capacities. Now the measure may take any values between 0 to infinity, hence it has been normalised by dividing by a base shifter (chosen as 50 here) added to the maximum value and then multiplying by 100 to put on scale of 0 to 100.

### **DISASTER RESILIENCE INDEX**

Disaster resilience index is calculated by adding the scores obtained by States/ UTs on each of seven aggregate indicators on the basis of quantitative norms for evaluation and assigning weights on the scores as explained in methodology of the study. Scores obtained by the States/UTs were rescaled to

- (a) 10 to calculate ‘capacity’ for working out Disaster Risk Index and
- (b) 100 to calculate ‘resilience’ for working out Disaster Resilience Index.

### **RANKING**

On the basis of the relative values of hazard, vulnerability, exposure and risk indexes States have been ranked in decreasing order (higher value of an index receiving higher ranks). Districts have been ranked both at the national and State levels.

## **DISASTER RISK INDEX**

Based on the data collected, collated, compiled and validated on multiple parameters of hazards, vulnerabilities and exposures, three separate indexes – hazard index, vulnerability index and exposure index - have been developed in a scale of 0 to 10 for each of 14 hazards, 14 vulnerabilities and 2 exposures in each of 640 census districts of the country. These are presented in thirty separate tables in Statistical Appendices in Volume II and III of this report.

### **Hazard Index**

Hazard Index of 640 census districts of the country for each of 14 selected hazards and the composite hazard index of the districts are provided in Tables 3.1 to 3.15 of Statistical Appendix-A. The aggregate hazard index of States/ UTs for the selected hazards and the weighted composite hazard index is shown in the Table below.

**Table- 1.9: Composite Hazard Index of States/ UTs (scale of 10)**

	STATES / UNION TERRITORIES	Earthquake	Landslide	Flood	Drought	Cyclone	Tsunami	Avalanche	Heat Wave	Cold Wave	Coastal Erosion	Lightning	Forest Fire	Fire	Industrial Hazards	Composite Hazard Index	Rank
	Weights for Hazard Index (%)	15%	7%	15%	15%	15%	3%	3%	6%	3%	3%	6%	3%	3%	3%		
1	ANDHRA PRADESH	2.67	1.65	4.49	6.80	6.34	5.29	-	5.77	0.00	3.68	2.34	2.04	1.89	1.29	4.25	2
2	ARUNACHAL PRADESH	10.00	6.70	1.38	1.82	-	-	-	1.65	0.58	-	0.01	2.92	0.01	0.50	2.76	18
3	ASSAM	10.00	1.29	3.84	3.03	-	-	-	2.96	0.96	-	0.28	1.95	0.07	0.59	3.03	9
4	BIHAR	6.35	0.21	6.04	4.05	-	-	-	4.64	3.27	-	0.84	0.49	0.20	0.55	3.13	7
5	CHATTISGARH	2.31	2.37	1.50	4.56	-	-	-	3.20	0.83	-	3.49	2.37	0.62	0.86	2.25	26
6	GOA	4.00	3.04	1.70	2.29	2.37	1.18	-	1.52	0.00	0.29	0.04	0.59	0.31	1.02	1.96	29
7	GUJARAT	5.39	0.41	3.18	4.63	4.90	2.78	-	3.07	0.70	3.88	0.67	0.65	1.37	1.73	3.66	5
8	HARYANA	4.56	0.25	4.16	2.77	-	-	-	3.56	3.75	-	0.11	0.08	0.23	0.92	2.26	24
9	HIMACHAL PRADESH	7.41	7.55	2.55	3.80	-	-	2.26	1.15	6.59	-	0.09	0.71	0.08	0.82	3.03	9
10	JAMMU & KASHMIR	6.39	5.30	1.40	2.77	-	-	1.51	0.31	7.59	-	0.04	0.25	0.03	0.57	2.26	25
11	JHARKHAND	3.20	1.90	1.58	5.98	-	-	-	4.89	1.47	-	1.43	1.44	0.17	0.94	2.46	22
12	KARNATAKA	2.27	1.46	1.59	7.05	2.72	1.71	-	2.21	0.13	0.79	1.08	0.95	0.69	1.00	2.78	17
13	KERALA	3.96	4.22	3.88	3.96	2.54	3.49	-	2.64	0.34	1.43	0.76	0.73	0.29	0.88	2.97	11
14	MADHYA PRADESH	2.72	0.98	1.90	5.30	-	-	-	3.99	3.74	-	2.04	1.77	0.74	0.76	2.81	15
15	MAHARASHTRA	3.21	1.65	1.83	7.23	3.22	3.90	-	4.07	0.78	2.25	2.51	1.30	2.90	1.63	4.07	3
16	MANIPUR	10.00	7.57	1.10	3.09	-	-	-	1.34	2.50	-	0.01	2.03	0.00	0.51	2.96	12
17	MEGHALAYA	10.00	5.11	1.62	1.30	-	-	-	1.73	2.32	-	0.14	2.64	0.03	0.56	2.65	20
18	MIZORAM	10.00	8.15	1.99	2.49	-	-	-	2.45	0.36	-	0.01	2.33	0.01	0.50	3.06	8
19	NAGALAND	10.00	7.41	0.56	2.92	-	-	-	1.63	0.19	-	0.01	2.67	0.00	0.51	2.82	14
20	ODISHA	2.28	1.96	2.73	4.34	6.87	3.49	-	6.95	1.10	1.44	2.71	0.99	0.21	0.76	3.80	4
21	PUNJAB	5.02	0.16	6.67	1.95	-	-	-	4.23	3.80	-	0.97	0.28	0.24	1.05	2.67	19
22	RAJASTHAN	2.69	0.51	1.65	6.67	-	-	-	3.46	4.33	-	0.59	0.09	0.36	0.90	2.29	23
23	SIKKIM	6.00	7.78	1.77	1.88	-	-	-	1.64	0.08	-	0.11	0.16	0.02	0.52	2.12	27
24	TAMIL NADU	2.56	0.67	1.89	3.66	5.77	5.45	-	6.13	0.31	2.13	0.79	0.39	0.89	1.10	2.84	13
25	TELANGANA	2.59	1.20	1.57	5.85	-	-	-	3.17	0.06	-	2.95	1.26	2.45	1.76	2.00	28
26	TRIPURA	10.00	3.54	2.46	3.16	-	-	-	1.92	0.09	-	0.58	2.64	0.08	0.61	2.81	15
27	UTTAR PRADESH	4.20	0.12	4.76	3.83	-	-	-	6.16	3.13	-	0.80	0.48	0.26	0.88	2.62	21
28	UTTARAKHAND	7.64	7.74	1.11	5.74	-	-	1.79	2.28	4.09	-	0.08	1.94	0.11	0.87	3.38	6
29	WEST BENGAL	4.61	0.22	6.43	3.10	8.88	1.98	-	5.43	0.11	0.98	2.17	0.43	0.70	1.17	4.31	1
	<b>UNION TERRITORIES</b>																
1	ANDAMAN & NICOBAR ISLANDS	10.00	0.00	0.11	2.85	3.06	7.67	-	2.40	0.00	9.91					3.15	1
2	CHANDIGARH	6.00	0.00	1.53	1.52	-	-	-	1.45	0.05	-	0.03	0.92	0.08	0.54	1.50	7
3	DADRA & NAGAR HAVELI	4.00	1.95	0.89	2.71	2.58	-	-	2.29	0.00	-	0.04	0.56	0.29	0.50	1.85	4
4	DAMAN & DIU	4.00	0.00	1.3	4.35	3.45	0.98	-	1.79	0.1	0.09	0.14	0.48	0.13	0.50	2.16	2

			2						1								
5	DELHI	6.00	0.00	2.7 4	1.60	-	-	-	3.13	1.0 2	-	0.02	0.50	0.07	0.50	1.85	5
6	LAKSHADEEP	4.00	0.00	0.0 0	2.86	2.36	1.35	-	1.60	0.0 0	0.40	0.02	0.00	0.67	0.77	1.58	6
7	PONDICHERRY	2.16	0.04	1.2 4	2.35	4.08	3.99	-	5.66	0.1 0	0.16	0.00	0.53	0.01	0.50	1.99	3

Hazard Indexes have been worked out on a scale of 0-10 on ascending order as per the intensity of hazards. Brief explanatory notes on these indexes are given below:

*Earthquake:* Earthquake hazard zonation has been worked out on the basis of a number of parameters, such as magnitude, intensity, seismic coefficients, and maximum expected ground acceleration. As per this zonation, 11.66 per cent of the total geographical area of the country are in very high risk seismic Zone-V. Seven North Eastern States of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura and the Union Territory of Andaman & Nicobar Islands fall exclusively in very high risk seismic Zone-V. Other States having share of Zone-V include Uttarakhand (41 per cent), Himachal Pradesh (35.20 per cent), Gujarat (18.84 per cent), Bihar (15.44 per cent), Jammu & Kashmir (9.7 per cent), West Bengal (2.88 per cent) and Punjab (0.91 per cent).

Areas in High Risk Seismic Zone-IV (13.69 per cent of total geographical area of the country) are spread out in the Himalayan States of Sikkim (100 per cent), Jammu & Kashmir (90.3 per cent), Himachal Pradesh (64.80 per cent) and Uttarakhand (59 per cent) and the Indo-Gangetic plain States of Bihar (65.12 per cent), Punjab (50.79 per cent), Haryana (37.06 per cent), West Bengal (31.31 per cent), Uttar Pradesh (30.74 per cent) and the Union Territories of Delhi and Chandigarh, both falling exclusively in Zone-IV. Four other States have parts of land in Zone-IV: Gujarat (15.41 per cent), Maharashtra (4.80 per cent), Jharkhand (3.80 per cent), and Rajasthan (3.65 per cent). Rest of the land mass of the country fall in Moderate Risk Zone-III (31.46 per cent) and Low Risk Zone-II (43.19 per cent).

Index value of 10 for areas falling in Zone-V, 6 for Zone-IV, 4 for Zone-III and 2 for Zone-II have been assigned for computing Earthquake Hazard Index. Seven North Eastern States and Andaman & Nicobar Islands have the highest Earthquake Hazard Index of 10, followed by Uttarakhand (7.64), Himachal Pradesh (7.41), Jammu & Kashmir (6.39), Bihar (6.35), and Sikkim (6.0).

*Landslide:* Landslide Hazard Zonation of India has been prepared on the basis of six parameters: slope, land use, rainfall, geology, geomorphology and tectonics. As per this zonation, 67 per cent of the geographical area of the country are landslide free Zone-I, and 23 per cent are in moderate hazard Zone-II where landslide is not likely to cause any damage to life and property. It is the 8.5 per cent area in Zone-III and 1.65 per cent area in Zone-IV that are areas of concern. These areas are almost entirely located in 11 Himalayan States (Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and seven North Eastern States) and 2 Western Ghat States (Kerala and Goa). Together these States account for 88.6 and 98.7 per cent of the total area under landslide Zone IV and V of the entire country. Index value of 10 has been assigned for landslide Zone-IV, 8 for Zone-III, and 4 for Zone-II. Mizoram has the highest Landslide Hazard Index of 8.15, followed by Sikkim 7.78, Uttarakhand 7.74, Himachal Pradesh 7.55, Nagaland 7.41, and Arunachal Pradesh 6.70. Western Ghat States of Kerala and Goa has much lower index of 4.22 and 3.04 respectively.

*Flood:* Flood Vulnerability Index has been worked out on the basis of three parameters: Flood Prone Area (areas actually flooded during 1950 to 2016), Flood Vulnerable Area (areas vulnerable to flood) and Flood Prone Cities (metropolitan and large cities in flood prone areas) with weights of 60%, 20% and 20% respectively, as explained in the section on methodology. Punjab has the highest Flood Hazard Index of 6.67, followed by West Bengal (6.43), Bihar (6.04), Uttar Pradesh (4.76), Andhra Pradesh (4.49), Haryana (4.12), Kerala (3.88), Assam (3.84), Gujarat (3.38) and Odisha (2.73). The data on actual area flooded since 1950 has given higher flood hazard index for States like Punjab, Haryana, Uttar Pradesh and West Bengal as these States were having maximum incidence of flood in the earlier decades. A number of dams constructed in major Indo-Gangetic rivers have mitigated the hazards of flood in the States in the recent decades. If the data input is changed to 'areas actually flooded during 1980 to 2016' flood hazard index of Assam and Bihar would shoot up. No district wise data on actual area flooded since 2005 is available with the CWC, nor have the State Governments provided such data, despite requests. Hence data on district-wise flooded area is based on Vulnerability Atlas of 2006.

*Drought:* Drought Vulnerability Index has been worked out on the basis of four parameters: moisture index, cropped area not irrigated, drought prone area and number of drought years, with equal weights of 25% on each. Based on these parameters Maharashtra has the highest Drought Hazard Index of 7.23, followed by Karnataka (7.05), Andhra Pradesh (6.80), Rajasthan (6.67), Jharkhand (5.98) and Telangana (5.85).

*Cyclone:* Cyclone Hazard Index has been worked out for 100 cyclone prone districts (73 coastal and 27 non-coastal districts) in 9 States and 5 Union Territories on the basis of six parameters: number of cyclones, number of super cyclones, possible maximum wind speed, possible maximum storm surge, possible maximum precipitation and whether located in flood zone. 25% weights are given on number of super cyclones and 15% on remaining parameters. West Bengal has the highest Cyclone Hazard Index of 8.88, followed by Odisha (6.87), Andhra Pradesh (6.34), Tamil Nadu (5.77), Gujarat (4.90), Puducherry (4.08), Daman & Diu (3.45), Maharashtra (3.22), Andaman & Nicobar Islands (3.06), Karnataka (2.72) and Kerala (2.54).

*Tsunami:* Tsunami Hazard Index has been worked out for 73 coastal districts in 9 States and 4 Union Territories on the basis of six parameters: length of coastline, population living within ½ km of coastline and average height of coastline. 50% weights are given on average height of tsunami wave and 25% on remaining two parameters. Andaman & Nicobar Islands has the highest Tsunami Hazard Index of 7.67, followed by Tamil Nadu (5.45), Andhra Pradesh (5.29), Puducherry (3.99), Maharashtra (3.90), Odisha and Kerala (3.49), Gujarat (2.78) and West Bengal (1.98).

*Avalanche:* Avalanche Hazard Index has been worked out for 41 avalanche prone districts in the States of Himachal Pradesh, Jammu & Kashmir and Uttarakhand on the basis of avalanche hazard zonation of SASE. Himachal Pradesh has the highest Avalanche Hazard Index of 2.26, followed by Uttarakhand (1.79) and Jammu & Kashmir (1.51).

*Heat Wave:* Heat Wave Index has been worked out on four parameters: (a) average heat index of districts on the basis of temperature and humidity as per NOAA methodology; (b) number of districts with average heat index above 54; (c) number of heat waves in the districts (temperature above 40°C or more in the plains and 30° or more in the hills continuously for 5+ days; (d) longest duration of heat wave in the districts. Equal weights are assigned on all four parameters. Odisha has the highest heat wave index of 6.95, followed by Uttar Pradesh (6.16), Tamil Nadu (6.13), Andhra Pradesh (5.77), Puducherry (5.66), West Bengal (5.43), Jharkhand (4.89), Bihar (4.64), Punjab (4.23)

*Cold Wave:* Cold Wave Index has been worked out following IMD definition of cold wave when temperature goes below 4°C in plain areas and below - 4°C in hilly areas. Jammu and Kashmir has the highest cold wave index of 7.59, followed by Himachal Pradesh (6.59), Uttarakhand (5.09), Rajasthan (4.33).

*Coastal Erosion:* Coastal Erosion Index has been worked out for 73 coastal districts in 9 States and 4 Union Territories on the basis of three parameters: length of coastline, erosion in coastline and erosion of coastal area, with equal weights on each. Andaman & Nicobar Islands has the highest Coastal Erosion Index of 9.91, followed by Gujarat (3.88), Andhra Pradesh (3.68), Maharashtra (2.25), Tamil Nadu (2.13), Odisha (1.44), Kerala (1.43) and West Bengal (0.98).

*Lightning:* Only pan-India data available on lightning is State-wise mortalities due to this hazard. This data has been normalized with reference to population to generate district-wise data. Chhattisgarh has the highest Lightning Hazard Index of 3.49, followed by Telangana (2.95), Odisha (2.71), Maharashtra (2.51), Andhra Pradesh (2.34), West Bengal (2.17), Madhya Pradesh (2.04) and Jharkhand (1.43).

*Forest Fire:* Forest Fire Index has been worked out on the basis of fire hazard zonation in different types of forests in the country, as carried out by Forest Survey of India. Arunachal Pradesh has the highest Forest Fire Index of 2.92, followed by Nagaland (2.67), Meghalaya (2.64), Tripura (2.64), Chhattisgarh (2.37), Mizoram (2.33), Manipur (2.03), Assam (1.95), Uttarakhand (1.94).

*Fire:* Fire Hazard Index has been worked out on the basis of three indicators: number of cases of fire registered, number of persons injured and number of deaths, with equal weights on each. District wise data has been generated on a pro-rata basis through normalization with reference to population of the districts. Maharashtra has the highest Fire Hazard Index of 2.90 followed by Telangana (2.45), Andhra Pradesh (1.89), Gujarat (1.37), Tamil Nadu (0.89), Madhya Pradesh (0.74), West Bengal (0.70), Karnataka (0.69).

*Industrial Hazards:* Industrial Hazard Index has been worked out on the basis of three indicators: number of Maximum Accident Hazard Industries, number of Maximum Polluting Industries and Comprehensive Environmental Pollution Index, with weights of 50 percent on the first and 25 percent on the remaining two indicators. Telangana has the highest Industrial Hazard Index of 1.76, followed by Gujarat (1.73), Maharashtra (1.63), Andhra Pradesh (1.29), West Bengal (1.17), Tamil Nadu (1.10), Punjab (1.10).

**Composite Hazard Index:** Composite Hazard Index has been worked out, aggregating all the indexes with weights of 15% on four major hazards of earthquake, flood, drought and cyclone), 7% on landslides, 6% on heat wave and lightning and 3% on the remaining hazards. West Bengal has the highest Composite Hazard Index of 4.31, followed by Andhra Pradesh (4.25), Maharashtra (4.07), Odisha (3.80), Gujarat (3.66), Uttarakhand (3.38), Bihar (3.13), Mizoram (3.06), Assam and Himachal Pradesh (3.03), Kerala (2.97), Manipur (2.96), Tamil Nadu (2.84), Nagaland (2.82), Tripura (2.81).

## Vulnerability Index

Vulnerability Index of 640 census districts of the country for each of 14 selected indicators on vulnerabilities, covering built environment (houses and infrastructure, both physical and social), production system (agriculture, animal husbandry, and industries), human vulnerabilities (poverty, gender, children, disability and aged) and environmental vulnerabilities (forest cover, mangrove cover and water stress). The composite vulnerability indexes of the districts are provided in Tables 4.1 to 4.15 of Statistical Appendix-II. The aggregate hazard index of States/ UTs for the selected hazards and the weighted composite hazard index is shown in the Table below.

**Table- 1.10: Composite Vulnerability Index of States and Union Territories**

	STATES / UNION TERRITORIES	Buildings: Walls	Buildings: Roofs	Agriculture & Livestock		Industries	Physical Infrastructure	Social Infrastructure	Poverty	Women	Children	Disability	Elderly People	Depletion of Forest Cover	Depletion of Mangrove	Water Stress	Composite Vulnerability Index	Rank	
		15%	10%	6%	6%	5%	5%	10%	8%	8%	6%	6%	5%	5%					
	<b>Weights (%)</b>																		
1	ANDHRA PRADESH	3.0 4	2.6 7	2.9 6	3.4 1	2.6 4	5.2 7	2.2 7	1.3 3	5.3 8	3.8 3	3.5 6	3.4 0	0.31	0.86	4.8 9	3.03	10	
2	ARUNACHAL PRADESH	4.6 8	4.2 7	0.1 5	2.1 2	0.0 0	0.5 4	0.1 2	0.0 6	4.4 6	2.3 6	0.4 2	1.3 1	2.39		2.0 5	1.67	22	
3	ASSAM	3.9 1	3.4 2	2.0 6	3.3 9	0.3 5	2.2 3	1.5 6	0.8 8	6.2 9	4.0 3	1.9 1	2.2 0	1.80		2.8 8	2.53	13	
4	BIHAR	2.3 4	2.4 3	2.8 4	4.4 1	0.3 8	2.5 8	3.2 7	3.1 5	6.5 6	5.3 5	4.1 8	3.5 3	0.25		3.7 0	3.15	9	
5	CHATTISGARH	2.5 7	1.8 0	2.6 5	3.4 3	0.5 3	2.0 4	1.8 0	1.1 6	4.8 0	3.5 2	2.8 3	2.5 0	0.73		4.7 8	2.39	16	
6	GOA	3.1 5	2.4 2	0.9 1	2.1 5	0.2 8	0.7 6	0.1 0	0.0 6	3.5 1	1.1 3	0.5 2	2.7 5	0.00	0.00	2.4 0	1.38	28	
7	GUJARAT	2.6 0	2.1 6	4.5 2	4.3 7	6.2 8	8.3 1	2.5 4	3.1 1	5.4 6	4.0 1	3.5 1	2.9 7	2.15	0.08	5.5 0	3.82	5	
8	HARYANA	2.0 1	1.9 8	2.1 4	3.1 5	2.4 6	2.0 6	1.3 4	1.0 9	5.8 3	2.9 9	2.1 4	2.7 6	2.15		4.6 7	2.46	14	
9	HIMACHAL PRADESH	5.8 4	3.6 4	0.4 5	2.4 5	0.3 7	2.7 4	1.1 9	0.1 0	3.5 0	2.1 4	1.1 9	2.7 8	0.56		3.9 7	2.02	21	
10	JAMMU & KASHMIR	4.7 8	3.8 6	0.4 4	2.4 0	0.2 5	2.1 7	0.8 4	0.4 0	5.5 5	2.3 0	1.7 0	2.2 2	0.47		3.0 7	2.06	20	
11	JHARKHAND	2.4 4	1.8 1	0.9 8	3.2 9	0.5 3	2.5 2	2.1 2	1.3 2	5.3 8	3.1 4	2.7 5	2.4 6	2.45		4.4 0	2.34	17	
12	KARNATAKA	2.3 3	1.9 2	4.3 8	3.7 4	4.5 6	7.4 9	4.4 9	2.4 2	4.9 3	3.6 6	3.6 1	3.5 0	2.32	0.42	5.4 4	3.60	6	
13	KERALA	3.3 1	2.7 2	2.1 4	2.2 1	2.2 3	4.8 6	1.9 2	3 3	2.9 5	1.4 8	3.3 5	4.1 0	0.00	0.00	3.1 3	2.26	18	
14	MADHYA PRADESH	2.0 2	1.4 8	6.2 3	5.1 0	1.9 4	5.3 7	3.5 1	4.1 4	7.1 2	5.0 6	3.9 9	3.2 4	0.76		5.2 8	3.86	4	
15	MAHARASHTRA	2.3 7	2.1 3	7.5 1	4.5 3	6.4 1	9.4 4	6.7 8	4.9 7	6.2 8	3.8 7	4.9 2	4.4 3	0.74	0.00	6.0 9	4.75	2	
16	MANIPUR	6.1 1	4.2 2	0.3 4	2.0 3	0.0 4	0.3 5	0.1 6	0.1 5	3.5 2	1.2 1	0.8 1	1.8 2	0.34		3.1 2	1.62	25	
17	MEGHALAYA	5.0 2	4.0 1	0.4 0	2.0 8	0.0 3	0.7 2	0.2 6	0.0 5	3.4 6	3.1 0	0.5 5	1.3 6	0.62		0.6 3	1.53	26	
18	MIZORAM	5.7 9	4.3 9	0.2 6	1.3 8	0.0 1	0.1 4	0.1 7	0.0 2	3.1 8	2.4 2	0.3 9	1.6 5	0.16		2.3 0	1.47	27	
19	NAGALAND	5.2	4.3	0.7	1.8	0.0	0.2	0.4	0.0	3.8	1.4	0.3	1.4	2.31		2.9	1.67	23	

		1	9	3	0	7	4	0	5	8	3	9	4			7		
20	ODISHA	2.6 5	2.6 1	2.1 3	3.5 0	1.1 6	4.5 1	2.6 1	1.4 4	5.5 7	4.0 6	3.6 6	3.2 6	0.46	0.42	4.0 6	2.80	11
21	PUNJAB	2.0 0	2.3 9	2.0 7	3.1 4	2.2 1	2.3 2	2.1 1	1.0 0	5.2 8	2.5 0	2.3 0	3.2 6	2.49		4.0 4	2.45	15
22	RAJASTHAN	2.0 3	1.4 4	7.1 8	5.6 2	2.4 1	5.1 8	6.7 8	3.6 5	7.4 8	4.7 9	4.3 1	3.0 6	2.16		7.9 1	4.34	3
23	SIKKIM	3.2 2	3.6 7	0.1 9	2.0 2	0.0 0	0.2 5	0.1 7	0.0 1	4.4 8	1.5 9	0.2 8	1.6 3	0.00		1.8 0	1.33	29
24	TAMIL NADU	2.3 3	1.9 3	2.3 3	3.3 1	7.8 7	9.2 9	4.7 9	1.5 3	4.2 5	2.7 5	3.3 8	3.9 2	0.38	0.14	5.1 6	3.34	8
25	TELANGANA	2.1 1	1.6 9	2.3 7	3.3 5	2.8 3	2.7 3	1.5 4	1.5 6	4.9 9	3.2 4	3.0 3	3.0 9	2.37		4.9 6	2.63	12
26	TRIPURA	5.3 3	3.9 3	0.3 9	2.0 3	0.0 1	0.5 9	0.2 1	0.0 9	3.8 5	1.8 3	0.7 8	2.0 2	0.89		2.1 0	1.64	24
27	UTTAR PRADESH	1.8 1	1.9 5	6.5 2	7.2 6	5.3 6	6.6 9	6.9 6	9.9 1	8.3 9	7.2 8	5.2 2	4.6 2	0.40		3.9 7	5.41	1
28	UTTARAKHAND	5.3 1	3.3 6	0.5 1	2.4 9	0.3 0	2.0 0	1.2 5	0.2 9	4.6 3	2.6 4	1.2 8	2.5 9	0.42		3.8 3	2.07	19
29	WEST BENGAL	2.4 0	3.1 2	2.9 1	4.1 6	2.4 7	4.1 0	4.4 6	3.5 7	6.7 3	3.9 0	4.4 0	3.5 4	0.00	0.89	3.1 0	3.40	7
	<b>UNION TERRITORIES</b>																	
1	ANDAMAN & NICOBAR ISLANDS	5.9 1	3.3 8	0.0 8	1.7 8	0.0 0	0.9 0	0.0 3	0.0 0	3.5 7	1.6 6	0.2 7	1.7 0	2.64	3.81	2.7 1	1.85	1
2	CHANDIGARH	2.0 2	1.6 4	0.0 0	2.4 6	0.0 1	0.1 2	0.0 7	0.1 1	4.0 7	1.7 9	0.4 1	1.5 3	0.00		4.9 8	1.00	6
3	DADRA & NAGAR HAVELI	3.0 8	3.1 4	1.0 3	2.4 4	0.0 1	0.0 1	0.0 1	0.0 3	4.0 2	2.0 1	0.1 6	1.0 1	2.58		3.1 3	1.09	5
4	DAMAN & DIU	2.7 3	2.3 6	0.8 5	2.0 6	0.0 0	0.1 5	0.0 1	0.0 1	5.9 7	2.1 0	0.1 8	1.3 6	0.00	0.58	5.5 7	1.26	4
5	DELHI	2.0 5	1.5 8	0.0 0	2.2 5	1.0 9	0.7 2	0.0 8	0.9 9	5.2 9	1.8 8	1.6 8	1.9 3	0.00		6.7 0	1.46	2
6	LAKSHADEEP	2.6 9	1.4 7	1.8 8	1.1 8	0.0 0	0.3 2	0.0 1	0.0 0	1.8 7	1.5 5	0.1 5	2.0 0	2.58		3.7 1	0.99	7
7	PONDICHERRY	2.7 0	1.8 2	0.3 9	2.0 3	3.6 1	0.2 1	0.1 5	0.0 4	2.8 3	1.1 4	0.6 0	2.4 7	0.00	1.20	4.1 7	1.17	3

Vulnerability indexes have also been worked out in a scale of 0-10, in an ascending order depending on the depth of vulnerabilities. Brief explanatory notes on the indexes are given below:

**Buildings: Walls:** Vulnerability of buildings, including residential, commercial, institutional and religious buildings, have been analyzed using available census data on prominent materials used for construction of walls and roofs. For construction of walls census provides data on number of buildings constructed using eleven types of prominent materials: grass, thatch and bamboo; plastic and polythene; mud and unburnt bricks; wood; stone packed with mortar; stone not packed with mortar; GI and metal asbestos; burnt bricks; concrete; and any other materials. An Expert Committee has classified the vulnerability of such buildings in five categories (very high, high, medium, low and very low risk) for four natural hazards (earthquake, landslides, flood and cyclone). Based on this classification, vulnerability score of buildings in Himalayan States is much higher than in plain areas, largely due to the vulnerability of such buildings in high intensity earthquakes and landslides. Manipur has the highest vulnerability index of building walls (6.11) followed by Himachal Pradesh (5.84), Mizoram (5.79), Tripura (5.33), Uttarakhand (5.31), Nagaland (5.21), Meghalaya (5.02), Jammu & Kashmir (4.78), Arunachal Pradesh (4.68).

**Buildings: Roofs:** For construction of roofs census provides data on number of buildings constructed using ten types of prominent materials: grass, thatch and bamboo, wood and mud; plastic and polythene; hand-made tiles; machine made tiles; stone slates; GI and metal asbestos; burnt bricks; concrete; and any other materials. The Expert Committee has similarly classified vulnerability of such buildings in earthquake, landslides, flood and cyclone. Here again, vulnerability quotient of buildings in North Eastern and other Himalayan States are higher than other States. Mizoram and Nagaland have the highest

vulnerability index of building roofs (4.39) followed by Arunachal Pradesh and Manipur (4.22), Meghalaya (4.01), Tripura (3.93), Jammu & Kashmir (3.86), Sikkim (3.67), Himachal Pradesh (3.64), Assam (3.42), Uttarakhand (3.36).

*Agriculture and Livestock:* Crop Vulnerability Index has been worked out on two basic indicators: cropped area as percentage of total area and irrigated area as percentage of cropped area, with equal weightage to each. Livestock Vulnerability Index is again worked out with two indicators, number of bovine and other animals, with 75:25 weights. These two indexes have been worked out separately for each district as detailed in Table-4.3 and clubbed as Agriculture and Vulnerability Index. Maharashtra scores highest in this index (4.12), followed by Gujarat (3.99), Assam (3.72), Madhya Pradesh (3.65), Karnataka (3.58), Chhattisgarh (3.56), Bihar (3.49), West Bengal (3.45), Haryana (3.44), Rajasthan (3.43).

*Industries:* Industrial Vulnerability Index has been worked out on three indicators: number of MSME, number of industrial clusters and number of Special Economic Zones, with 40:40:20 weights. Gujarat has the highest Industrial Vulnerability Index (0.83), followed by Tamil Nadu (0.82), Telangana (0.60), Andhra Pradesh (0.59), Maharashtra (0.57), West Bengal (0.46).

*Physical Infrastructure:* Physical Infrastructure Index is worked out on the basis of six indicators: length of roadways and railways and number of airports, sea ports, dams and reservoirs, and power plants in the districts, with equal weights on each. Andhra Pradesh scores highest in this index (1.41), followed by Maharashtra (1.30), Kerala (1.18), Telangana (1.17), Gujarat (1.13), Tamil Nadu (0.93), Goa (0.88), Karnataka (0.86), West Bengal (0.84).

*Social Infrastructure:* Social Infrastructure is worked out on educational and health infrastructure in the districts, with equal weights on both. West Bengal scores highest in this index (2.10), followed by Rajasthan (1.92), Maharashtra (1.71), Andhra Pradesh (1.64), Telangana (1.48), Karnataka (1.34), Tamil Nadu (1.17).

*Poverty:* Rural and urban poverty estimate of erstwhile Planning Commission has been taken as the basis for working out the Poverty Index. West Bengal has the highest index of 2.17, followed by Uttar Pradesh (2.01), Maharashtra (1.81), Bihar (1.73), Telangana (1.66), Rajasthan (1.49), Andhra Pradesh and Gujarat (1.38).

*Women:* Gender Vulnerability Index has been worked out on the basis of eight indicators: sex ratio, rate of illiteracy, women headed households, women not employed, maternal maternity rate, and crime against women, with equal weights on each. Uttar Pradesh has the highest index (8.39), followed by Rajasthan (7.48), Madhya Pradesh (7.12), West Bengal (6.73), Bihar (6.56), Maharashtra (6.28), Haryana (5.83), Odisha (5.57), Punjab (5.28),

*Children:* Child Vulnerability Index has been worked out on the basis of four indicators: age group of children, children not going to school, children wring, and infant mortality ratio, with equal weights on each. Uttar Pradesh has the highest Child Vulnerability Index (4.61), followed by Bihar (4.54), Rajasthan (4.49), Madhya Pradesh (4.48), Andhra Pradesh (4.37), Assam (4.27), Odisha (4.21), Chhattisgarh (4.00).

*Disability:* Disability Vulnerability Index has been worked out on the basis of three indicators: visual, physical and mental disability, with equal weights on each. Andhra Pradesh has the highest Disability Vulnerability Index (3.74), followed by Kerala (3.57), West Bengal (3.51), Telangana (3.50), Maharashtra (2.89), Rajasthan (2.76), Gujarat (2.48), Chhattisgarh (2.38), Karnataka and Odisha (2.34).

*Elderly People:* Elderly Vulnerability Index has been worked out on the basis of three indicators: population in 60+ age group, population in 80+ age group and dependency ratio, with equal weights on each. Kerala has the highest Elderly Vulnerability Index (5.08), followed by Maharashtra (4.18), Andhra Pradesh (4.01), Telangana (3.78), Tamil Nadu (3.73), Punjab (3.66), West Bengal (3.59), Karnataka (3.43), Goa (3.30).

*Depletion of Forest Cover:* Changes in forest cover in both dense and open forests during 2000-2015 have been captured in this index. Chhattisgarh scores highest (5.44), followed by Jharkhand, Nagaland and Telangana (5.42), Manipur (5.39), Arunachal Pradesh (5.36), Haryana (5.34), Gujarat (5.32), Rajasthan (5.33), Karnataka and Uttar Pradesh (5.31), Assam (5.30).

*Depletion of Mangrove:* Changes in mangrove cover in both dense and open forests during 2000-2015 have been captured in this index. Karnataka has the highest score of 4.30, followed by Kerala (4.27), Andhra Pradesh (4.21), Odisha and Tamil Nadu (4.17), West Bengal (4.08), Goa (3.97), Gujarat (3.80).

*Water Stress:* Water stress is captured on three basic indicators: terrestrial, surface and sub-surface water, with equal weights on each. Rajasthan has the highest water stress index of 6.06, followed by Maharashtra (5.83), Jharkhand (5.66), Karnataka (5.58), Chhattisgarh (5.47), Telangana (5.42), Himachal Pradesh (5.39), Tamil Nadu (5.32).

*Composite Vulnerability Index:* Composite Vulnerability Index has been worked out, aggregating all the indexes with weights of 15% on buildings, 10% each on cropped area and poverty, 8% each on vulnerable women and children, 6% each livestock, industries, disabled and aged people, and 5% each on the remaining vulnerabilities. Uttar Pradesh has the highest Composite Vulnerability Index of 5.41, followed by Maharashtra (4.75), Rajasthan (4.34), Madhya Pradesh (3.86), Gujarat (3.82), Karnataka (3.60), West Bengal (3.40), Tamil Nadu (3.34), Bihar (3.15), Andhra Pradesh (3.03).

## **Exposure Index**

Exposures of districts to the hazards have been measured on the basis of two indicators – density of population and per capita GDP, with equal weights. District wise exposure index is provided in Table 5.1 of Appendix-B in Volume-III, while State/UT wise exposure index is summed up in the Table below. Maharashtra has the highest Exposure Index of 5.67, followed by Uttar Pradesh (5.09), West Bengal (4.62), Tamil Nadu (4.47), Gujarat (4.04), Karnataka (4.02), Bihar (7.31), Rajasthan (3.28), Kerala (3.19), Jharkhand (2.08). Among the

Union Territories, Delhi has the highest exposure index of (4.07), followed by Chandigarh (0.91) and Puducherry (0.74).

**Table 1:11: Composite Exposure Index of States/ UTs (scale of 10)**

	State/UTs	Population	GDP (2015-16) (Rs. Cr.)	Population Density (sq. km)	GDP Per Capita (Rs.)	Level of exposure (scale of 10)			Rank
						Population	GDP	Composite Exposure Index	
	<b>STATES</b>								
1	Andhra Pradesh	49386799	609934	308	10816 3	0.820	5.51 8	3.169	10
2	Arunachal Pradesh	1383727	20294	17	12246 6	0.032	1.00 7	0.519	27
3	Assam	31205576	226276	397	60526	0.741	3.36 1	2.051	17
4	Bihar	104099452	381501	1,102	31454	2.256	4.36 4	3.310	7
5	Chhattisgarh	25545198	260776	189	84767	0.462	3.60 8	2.035	18
6	Goa	1458545	54275	394	32705 9	0.159	1.64 6	0.903	22
7	Gujarat	60439692	1033791	308	14150 4	0.907	7.18 4	4.045	5
8	Haryana	25351462	485184	573	16203 4	0.802	4.92 1	2.862	13
9	Himachal Pradesh	6864602	112852	123	13437 6	0.193	2.37 4	1.283	21
10	Jammu & Kashmir	12541302	119093	124	74653	0.262	2.43 8	1.350	20
11	Jharkhand	32988134	231294	414	59628	0.777	3.39 8	2.087	16
12	Karnataka	61095297	1016910	319	14290 6	0.928	7.12 5	4.026	6
13	Kerala	33406061	556616	859	14719 0	1.127	5.27 1	3.199	9
14	Madhya Pradesh	72626809	543975	236	62334	0.870	5.04 0	2.955	12
15	Maharashtra	112374333	2001223	365	14739 9	1.347	9.99 5	5.671	1
16	Manipur	2855794	19233	122	55603	0.127	0.98 0	0.553	25
17	Meghalaya	2966889	25767	132	70693	0.132	1.13 4	0.633	24
18	Mizoram	1097206	15339	52	11452 4	0.050	0.87 5	0.463	29
19	Nagaland	1978502	19816	119	83621	0.102	0.99 5	0.548	26
20	Odisha	41974218	341887	269	68293	0.707	4.13 1	2.419	15
21	Punjab	27743338	391543	550	11926 1	0.822	4.42 1	2.622	14
22	Rajasthan	68548437	672707	201	82325	0.779	5.79 5	3.287	8
23	Sikkim	610577	16954	86	23395 4	0.048	0.92 0	0.484	28
24	Tamil Nadu	72147030	1161963	555	13783 7	1.330	7.61 6	4.473	4
25	Telangana	35193978	567588	306	13795 5	0.691	5.32 3	3.007	11
26	Tripura	3673917	34184	350	93045	0.239	1.30 6	0.772	23
27	Uttar Pradesh	199812341	1120836	828	46299	2.707	7.48	5.093	2

							0		
28	Uttarakhand	10086292	176171	189	146826	0.290	2.966	1.628	19
29	West Bengal	91276115	1039924	1,029	113931	2.037	7.205	4.621	3
	<b>UNION TERRITORIES</b>								
1	Andaman & Nicobar Islands	380581	5932	46	124361	0.028	0.544	0.286	4
2	Chandigarh	1055450	29049	9,252	229976	0.657	1.204	0.931	2
3	Dadra & Nagar Haveli	343709	2440	698	70990	0.103	0.349	0.226	5
4	Daman & Diu	243247	1059	2,169	43536	0.154	0.230	0.192	6
5	Delhi	16787941	551963	11,297	273618	2.899	5.249	4.074	1
6	Lakshadweep	64473	407	2,013	63127	0.078	0.143	0.110	7
7	Puducherry	1247953	24701	2,598	157871	0.375	1.110	0.743	3

### Capacity Index

In the absence of any nation-wide data on capacities Disaster Resilience Index of the States/ UTs – as presented in Statistical Index – II of this report - has been taken as proxy indicator on capacities for the districts within the States. As explained, this reflects the capacity of the State Governments and UT Administration for disaster risk management, measured on a set of 70 indicators.

### Disaster Risk Index

Hazard, vulnerability and exposure indexes have been compounded and further discounted by capacities for calculating the overall Disaster Risk Index applying the basic equation of  $\{(h \times v) \times e\} \div c$ . The resultant Disaster Risk Index of each district is presented in Table-5.4 in Statistical Appendix-II of the report. Disaster Risk Index of States and UTs is presented in the Table below.

**Table-1.12: Disaster Risk Index of States and Union Territories**

	STATES / UNION TERRITORIES	Hazard	Vulnerability	Exposure	Hazard* Vulnerability * Exposure	Capacity	Risk	Disaster Risk Index	Rank
		(Scale of 10)						(Scale of 100)	
	1	2	3	4	5	6	7	8	9
1	Andhra Pradesh	4.25	3.03	3.17	1.97	3.70	2.76	27.58	8
2	Arunachal Pradesh	2.76	1.67	0.52	1.17	2.26	1.56	15.63	21
3	Assam	3.03	2.53	2.05	2.14	4.19	2.87	28.75	7
4	Bihar	3.13	3.15	3.31	1.80	4.12	2.50	24.99	10
5	Chhattisgarh	2.25	2.39	2.03	1.13	2.34	1.42	14.20	26
6	Goa	1.96	1.38	0.90	1.06	2.56	1.03	10.35	29
7	Gujarat	3.66	3.82	4.05	2.10	4.93	2.7	27.44	9

							4		
8	Haryana	2.26	2.46	2.86	1.17	3.46	1.48	14.76	23
9	Himachal Pradesh	3.03	2.02	1.28	1.21	3.97	1.56	15.63	22
10	Jammu and Kashmir	2.26	2.06	1.35	1.15	2.73	1.46	14.56	25
11	Jharkhand	2.46	2.34	2.09	1.20	1.71	1.70	17.03	16
12	Karnataka	2.78	3.60	4.03	2.11	3.29	2.98	29.82	6
13	Kerala	2.97	2.26	3.20	1.14	4.19	1.37	13.75	27
14	Madhya Pradesh	2.81	3.86	2.96	2.16	3.10	3.08	30.79	4
15	Maharashtra	4.07	4.75	5.67	5.69	4.43	5.48	54.75	1
16	Manipur	2.96	1.62	0.55	1.18	2.10	1.61	16.11	17
17	Meghalaya	2.65	1.53	0.63	1.20	3.00	1.59	15.88	20
18	Mizoram	3.06	1.47	0.46	1.16	2.96	1.47	14.71	24
19	Nagaland	2.82	1.67	0.55	1.18	2.12	1.59	15.92	19
20	Odisha	3.80	2.80	2.42	1.63	4.17	2.27	22.68	11
21	Punjab	2.67	2.45	2.62	1.46	3.06	2.13	21.29	13
22	Rajasthan	2.29	4.34	3.29	2.22	3.91	3.00	30.04	5
23	Sikkim	2.12	1.33	0.48	1.07	3.23	1.11	11.11	28
24	Tamil Nadu	2.84	3.34	4.47	1.64	4.63	2.24	22.36	12
25	Telangana	2.00	2.63	3.01	1.30	3.04	1.82	18.25	14
26	Tripura	2.81	1.64	0.77	1.23	4.08	1.60	15.99	18
27	Uttar Pradesh	2.62	5.41	5.09	3.29	3.03	4.22	42.24	3
28	Uttarakhand	3.38	2.07	1.63	1.32	3.65	1.82	18.16	15
29	West Bengal	4.31	3.40	4.62	4.81	3.64	5.18	51.78	2
<b>UNION TERRITORIES</b>									
1	Andaman and Nicobar Islands	3.15	1.85	0.29	1.11	2.81	1.32	13.23	2
2	Chandigarh	1.50	1.00	0.93	1.07	3.06	1.09	10.94	3
3	Dadra and Nagar Haveli	1.85	1.09	0.23	1.06	2.20	0.99	9.91	6
4	Daman and Diu	2.16	1.26	0.19	1.06	1.89	1.02	10.20	5
5	Delhi	1.85	1.46	4.07	1.16	3.57	1.44	14.43	1
6	Lakshadweep	1.58	0.99	0.11	1.06	1.86	0.97	9.72	7
7	Puducherry	1.99	1.17	0.74	1.06	2.85	1.04	10.41	4

Maharashtra has the highest Disaster Risk Index of 54.75 in a scale of 100, followed by West Bengal (51.78), Uttar Pradesh (42.24), Madhya Pradesh (30.79), Rajasthan (30.04), Karnataka (29.82), Assam (28.75), Andhra Pradesh (27.58), Gujarat (27.44), and Bihar (24.99).

It would be useful to read the Disaster Risk Index of States/ UTs in conjunction with that of Hazard, Vulnerability and Capacity Index of the States/ UTs. Some of the States with high index of hazards like Andhra Pradesh, Himachal Pradesh, Uttarakhand and North Eastern States have relatively low risk index as the level of vulnerabilities in these States are comparatively low. States like Gujarat, Tamil Nadu, Assam, Tripura, Himachal Pradesh have higher index of capacity which have discounted the net risk of disasters in these States. States like Uttar Pradesh, Madhya Pradesh, Rajasthan have high risk index despite having lower hazard index due to high vulnerability and low capacity index.

Wealth of data presented in two Statistical Appendices can be used to determine the inter se position of districts in the country and within each State in respect of each hazard, vulnerability, exposure and risks. Various permutations and combination of data can be used to compute risks of individual hazard such as earthquake, flood, drought, landslide etc. or a group of hazards like geological hazards, hydro-meteorological hazards, climate related hazards etc. List of multi-hazard districts of the country in terms of level of risks in respect in each district. Similarly, regional pattern of disaster risks can be worked out to highlight levels of risks in various regions of the country and within different regions in large States.

First 20 districts in risk index in respect of 5 major disasters are shown in descending order in the table 6.6

The data can be visualized in GIS platform to generate hazard, vulnerability, exposure and risk maps of States/ UTs, districts and regions on each indicator. Risks can be measured, compared and ranked in dashboards. This can be powerful tool to policy makers, administrators, practitioners and researchers.

National Remote Sensing Centre (NRSC) of Indian Space Research Organization has agreed to host the data in their Bhuvan Portal for visualization of the data through interactive maps and dashboards.

## DISASTER RESILIENCE INDEX

Disaster Resilience Index is based on the information collected from the States/ UTs on 7x10 indicators through Questionnaire comprising of 172 questions. The Questionnaire was developed through a process of consultation with experts and the State Governments. The responses received from the States/UTs have been reviewed and evaluated on the basis of quantitative norms of evaluation developed in consultation with experts, as explained in the methodology of the study.

Resilience Index is a combination of 7 aggregate indicators of disaster resilience. These are: Risk Assessment, Risk Prevention and Mitigation, Risk Governance, Disaster Preparedness, Disaster Response, Disaster Relief & Rehabilitation, and Disaster Reconstruction. Each aggregate indicator has 10 sub-indicators. The performances of the State Governments and UT administration have been evaluated on each aggregate indicator in a scale of 50, as per the norms of evaluation (Annexure-IV), on the basis of their response to the Questionnaire (Annexure-III), along with supporting documents and resources available in public domain.

In this report the focus is on quantitative measurement of progress achieved in building resilience to disasters in States and UTs across various aggregate and sub-indicators. A more qualitative assessment shall be made in the successive report on 'Disaster Risks and Resilience in States and UTs of India.

### **Risk Assessment**

Risk assessment is one of the critical areas of disaster management that have shown very slow progress with an average score of 14.1 in a scale of 50. Most of the States have not conducted comprehensive state specific assessment of hazards, vulnerabilities and exposures of the changing dynamics and complexities of disasters. Risk assessment is based on very coarse scale, mainly drawing from the Vulnerability Atlas of India, without in-depth study and analysis of multi-hazards and vulnerabilities at the local levels.

Himachal Pradesh is the only State of India that has got comprehensive risk assessment done through a professional agency on multiple parameters of hazards, vulnerabilities and exposures, and have placed the entire assessment report and metadata in public domain, along with an interactive portal that enables users to access risk information and further generate their own hazard, vulnerability and risk maps at state, district and block levels. Gujarat had got comprehensive risk assessment done a decade back but has neither updated the assessment nor made it available in public domain for the use of stakeholders.

Assam and Tripura have made use of the resources and facilities of Space Application Centers.

**Table-1:13: Disaster Resilience Index of States and UTs: Risk Assessment**

STATES	Hazard Vulnerability Risk Assessment	Digital Risk Mapping in Public Domain	Real Time Data on Risks and Disasters	Micro Zonation of Earthquake Risks	Flood Risk Assessment	Drought Risk Assessment	Dissemination of Risk Information to People	Assessing Traditional and Local Knowledge	Assessing Patterns of Emerging Risks	Developing Database on Disasters	Others	Total
Values	10	5	5	3	3	5	3	3	3	5	5	50
Andhra Pradesh	5.5	2.5	3	0	2.5	3	1.5	1	1	1	1	22
Arunachal Pradesh	2.5	1	0	0	1.5	0.5	0.5	0	0.5	0.5	0	7
Assam	6	3.5	2.5	2	2.5	2	2	1	1	0.5	2	25
Bihar	5	2	2	0	2.5	1	1	1	1	0.5	1	17
Chhattisgarh	2.5	0	0	0	1.5	2	1	0	0.5	0.5	0	8
Goa	2.5	0	0	0	1.5	1	1	1	1	1	0	9
Gujarat	7.5	2.5	2	2.5	2	3	1.5	0.5	1.5	1	0	24
Haryana	3.5	0	1.5	0	2	1	2	0	1	1	0	12
Himachal Pradesh	8	4	1.5	1	2	2	1.5	1	1	2.5	1	25.5
Jammu & Kashmir	2.5	0	0	0	2	1.5	1	1	0.5	0.5	0	9
Jharkhand	2.5	0	0	0	0	1	1	1	0.5	0.5	0	6.5
Karnataka	4.5	2.5	3	0	2	3.5	1.5	0.5	1	0.5	1	20
Kerala	4.5	1.5	1.5	0.5	2	1.5	2	0.5	1	1	0	16
Madhya Pradesh	2.5	0	0	1	1.5	2	1	0.5	0.5	0.5	0	9.5
Maharashtra	5	0	1	0	2.5	2.5	2	1	1.5	1	0	16.5
Manipur	2.5	0	0	0	2	1.5	1	0	0.5	0.5	0	8
Meghalaya	3.5	0	0	0	0	1.5	1	0.5	1	0.5	1	9
Mizoram	3.5	0	0	0	1.5	0.5	1	0	0.5	1	0	8
Nagaland	2.5	0	0	0.5	0	0.5	1	0.5	0.5	1	0	6.5
Odisha	6	1.5	0	0	2.5	2	2	1.5	1	1.5	0	18
Punjab	2.5	0	0	0	2	1.5	1	0	1	1	0	9
Rajasthan	4	1	2	0	1.5	3	1.5	1	1	2	0	17
Sikkim	4.5	2.5	2	0	1.5	0.5	1.5	1	1	1	0	15.5
Tamil Nadu	4	2	2	1	2	3.5	2	1	2	1.5	1	22
Telangana	4	0	0	0	1.5	2.5	1.5	1	1	1	0	12.5
Tripura	5	2.5	2	1	2	1.5	1	1.5	1.5	1.5	2	21.5
Uttar Pradesh	2.5	1	0.5	0	1	1	1	1	0	1	0	9
Uttarakhand	5.5	2	0	1	2	0.5	1	1	1.5	1	1.5	17
West Bengal	3	1	0	1.5	1	0.5	1	0	1	1.5	0	10.5
<b>UNION TERRITORIES</b>												
Andaman & Nicobar Islands	3.5	0	0	0	0	0	1	1	1	1	1	8.5
Chandigarh	4	1	1	0	0	0	2	0	0	2	0	10
Dadra and Nagar Haveli	3.5	0	0	1	0	1	1	0	0	1	0	7.5

Daman and Diu	3	0	0	0	0.5	1	1	0	0.5	1	0	7
Delhi	4	1	1	3	2	2	2	0	1	1	0	17
Lakshadweep	2.5	0	0	0	1	0	1	0	1	1	0	6.5
Puducherry	2	0	0.5	0	1	1	2	0	1	1	1	9.5

Himachal Pradesh scores highest in risk assessment (25.5 in a scale of 50), followed by Assam (25), Gujarat (24), Tamil Nadu and Andhra Pradesh (22), Tripura (21.5), Karnataka (20), Odisha (18.0), Bihar (17.0), Kerala (16.0).

### Risk Prevention and Mitigation

Risk prevention and mitigation registers least progress with average score of 12.2 in a scale of 50. Most of the States have scored poorly on almost every parameter of risk prevention and mitigation. Only a couple of States have constituted State and District Disaster Mitigation Funds mandated under Disaster Management Act. In most of the States investments on disaster risk prevention and mitigation have been limited to a few central sector and externally aided schemes. The provision of 'flexi fund' in centrally sponsored schemes have not been availed by the States. The statutory mandates for integration and mainstreaming of disaster risk reduction in development have been reiterated in every State and District Disaster Management Plan, but actual implementation of the measures for integration and mainstreaming have hardly ever taken place.

**Table-1:14: Disaster Resilience Index of States and UTs: Risk Prevention and Mitigation**

STATES	Disaster Risk Mitigation Projects	Mainstreaming DRR in Development	State and District Disaster Risk Mitigation Fund	Safety standards for construction/ land use plans	Safety audit/ retrofitting of life line structures	Construction of cyclone/ flood shelters	Eco System Approach for DRR	Social Safety Net for Poor and Vulnerable	Mitigating risks of heritage	Integration of climate change adaptation with DRR	Others	Total
Values	8	3	3	7	8	3	3	5	2	3	5	50
Andhra Pradesh	2	1	0	3	0	2	0.5	2.5	0	0.5	0.5	12
Arunachal Pradesh	2	0	0	2	1.5	0	0	2.5	0	0	0	8
Assam	3	1	0	3	3	0	0	2.5	0	1	0	13.5
Bihar	4	2	1.5	4	1.5	1	1	3	0	1	1	20
Chhattisgarh	0	0	0	2	0.5	0	0	3	0	0.5	0	6
Goa	2	0	0	3	1.5	1	1	2	0	0	0	10.5
Gujarat	4.5	1	2	4.5	4	1.5	1	2	1	1	0	22.5
Haryana	2	0	1	4	3	0	0.5	3	0	0	0.5	14
Himachal Pradesh	2	1	0	3	1	0	0	3	0	1	2	13
Jammu & Kashmir	1	0	1.5	3	1	0	0	2.5	0	0	0	9
Jharkhand	0	0	0	2	0	0	0	2.5	0	0	0	4.5
Karnataka	2	1	0	3	0	1	1	2.5	0	0	0	10.5
Kerala	4	1	1	4	2	2	0	2.5	0	1	1.5	19
Madhya Pradesh	1	0	0	3	1	0	0	2.5	0	0.5	1	9

Maharashtra	3	1	1.5	3	2	1	0	2.5	0	1	0.5	15.5
Manipur	0	0	0	2	0	0	0	2.5	0	0	0	4.5
Meghalaya	2	0	0	2	1.5	0	1	2.5	0	1	0	10
Mizoram	2	0	0	3	1.5	0	1	2.5	0	0	0	10
Nagaland	0	0	0	2	0	0	0	2.5	0	0	0	4.5
Odisha	4	1	0	3	0	2	1	2.5	0	1	0	14.5
Punjab	2	0	0	2	0	0.5	0	3.5	0	0.5	0	8.5
Rajasthan	3	0	2	3	0	0	1	3	0	1	1	14
Sikkim	2.5	0	0	2	2	0	1	2.5	1	1	2	14
Tamil Nadu	3	1.5	0	4	1.5	2	2	4	1	2	2.5	23.5
Telangana	2	0	0	3	0	0	0	3	0	0.5	2	10.5
Tripura	2	0	0.5	2	3.5	1	0.5	3	1	1.5	1	16
Uttar Pradesh	2	0	1.5	3	2	1	0	2.5	0	0.5	0	12.5
Uttarakhand	1	0	0	4	3.5	0	0	2.5	0	1	0	12
West Bengal	2.5	0	0	5	1.5	2.5	0	3.5	0	0	0	15
<b>UNION TERRITORIES</b>												
Andaman & Nicobar Islands	0	0	0	3	1	0	0.5	2	0	0	0.5	7
Chandigarh	0	0	0	3.5	1	0	0	3	0	0	0	7.5
Dadra and Nagar Haveli	0	0	0	3	0	0	0	2	0	0	0	5
Daman and Diu	0	0	0	3	0	0	0	2	0	0	0	5
Delhi	1.5	0	0	3	3	0	0	2.5	0.5	0	0	10.5
Lakshadweep	0	0	0	3	0	0	0.5	2	0	0	0	5.5
Puducherry	2	0	0	3	0	0.5	0	2	0	0	0.5	8

Only a handful of States have allocated State budgetary resources for risk prevention and mitigation. Tamil Nadu tops the list with a score of 23.5 in a scale of 50, followed by Gujarat (22.5), Bihar (20.0), Kerala (19.0), Tripura (16.0), Maharashtra (15.5), and West Bengal (15.0).

### Risk Governance

Among all the seven aggregate indicators of resilience, risk governance registers maximum progress with average score of 19.29 in a scale of 50. Most of this progress is seen in setting up institutional mechanisms for risk governance than on the quality of such governance.

Every State has set up the State and Disaster Management Authorities as mandated by the Disaster Management Act, with the sole exception of Gujarat that had its SDMA already constituted and fully functional under the Gujarat State DM Act. Odisha had also its OSDMA, registered under Societies Act, which continues to function and remain more active than the statutory SDMA. In most of the States SDMAs function more like a committee that meets occasionally than as a statutory authority with regular office, establishment and work plan. Almost every State and district in the country has formulated State and District Disaster Management Plans, but very few States revise and update these plans regularly as provided in the Act. Very few States have developed mechanisms for implementation of the plans with road maps, resource allocation and monitoring systems.

Risk governance has been compartmentalized in most of the States within Revenue and Relief Departments, with very little involvement and participation of other departments and agencies of the State Government and district administration for the holistic management of risks of disasters. ‘Whole-of-government’ and ‘all-of-society’ approach of disaster risk management, highlighted so prominently in the Sendai Framework, are yet to be institutionalized and practiced in the States. Participation of most of the Departments and agencies of the government in disaster management are typically limited to the phase of post-disaster response and relief. Barring a couple of States, State Government Departments have not been able to develop sectoral disaster management plans and integrating such plans with development plans, despite clear mandates of Disaster Management Act.

**Table-1:15: Disaster Resilience Index of States and UTs: Risk Governance**

STATES	Institutional Mechanisms for Risk Governance	Disaster Management Policy and Plans	Disaster Management Manuals and Procedures	Decentralization and Devolution of Functions	Training and Capacity Development	Multi-Stakeholder Platform	Community Involvement and Participation	Enforcement and Compliance	Monitoring and Evaluation System	Transparency and Accountability	Others	Total
Values	6	10	2	2	10	2	5	4	2	2	5	50
Andhra Pradesh	3	3.5	0.5	1	5	0	3	1	0.5	1	0	18.5
Arunachal Pradesh	1.5	4	1	0.5	4	0	1	0	0	0.5	0	12.5
Assam	5.5	5.5	2	1.5	6.5	1	3	0	0	1	1	27
Bihar	5	5.5	1	1	5.5	1.5	2.5	0.5	0.5	1	0	24
Chhattisgarh	2	5	0.5	0.5	3.5	0	2	0	0	0.5	0	14
Goa	2	3	0.5	0.5	2.5	0	2	0	0	1	0	11.5
Gujarat	3.5	6.5	1	1.5	6.5	0.5	3.5	2	0.5	0.5	0	26.5
Haryana	3	6	1	0.5	6.5	0	2	0	0	1	0	20
Himachal Pradesh	4	9	2	0.5	5	2.5	2	0	0	1	0	26
Jammu & Kashmir	2.5	4.5	0	0.5	5	0	1	0	0	0.5	0	14
Jharkhand	1	3	0	0.5	4	0	1	0	0	0.5	0	10
Karnataka	2	6	1	0.5	4.5	0	2	0	0	1	0	17
Kerala	4	5.5	1.5	1.5	3	0	3	1	0.5	1	0	21
Madhya Pradesh	2.5	5	1	1	6.5	0	2	0.5	0.5	1	0	20
Maharashtra	3	7	1	1.5	6.5	1	3	1	0	1	0	25
Manipur	0.5	3	0.5	0.5	3	0	2	0	0.5	0.5	0	10.5
Meghalaya	3.5	6	1	1	4	0	2	0	0	1	0	18.5
Mizoram	4	6	1	1	4	0	2.5	0	0.5	1	0	20
Nagaland	4.5	3	1	1	2	0	2	0	0.5	0.5	0	14.5
Odisha	4	8	2	1	4.5	0	3	2	0.5	1	0	26
Punjab	3	2	2	1	5	0	2	0	0	1	0	16
Rajasthan	5	6	1	1	7	1.5	2	0	0.5	1	0	25
Sikkim	3	4	1	1.5	4.5	1	3	0	0	1	0	19

Tamil Nadu	2	4	1	1	5.5	0.5	3	0	0.5	1	1	19.5
Telangana	3.5	3	1	1	5.5	0	2	0	1	1	0	18
Tripura	3	8.5	2	1	5.5	1	3	2	0	1	0	27
Uttar Pradesh	3.5	4	1	0.5	5	0	2	0	0	0.5	0	16.5
Uttarakhand	3	5	2	1	5.5	0	2	0	0.5	1	0.5	20.5
West Bengal	4.5	5.5	1	1.5	6	0	1	0	0.5	1	0.5	21.5
<b>UNION TERRITORIES</b>												
Andaman & Nicobar Islands	3	4	3	1	2.5	0	2	0	1	0	0	16.5
Chandigarh	1	4	0	0	1.5	0	2	0	1	0	0	9.5
Dadra and Nagar Haveli	1	3	0	0	2	0	1	0	0.5	0	0	7.5
Daman and Diu	1.5	3	1	0	1	0	1	0	0.5	0	0	8
Delhi	1.5	4	1	0.5	4.5	0	1	1	0.5	0.5	0.5	15
Lakshadweep	2	3.5	0	1	1	0	2	1	1	0	0	11.5
Puducherry	2	2	0.5	0	1.5	0	2	0	0.5	0	0	10.5

Assam and Tripura have registered highest score of 27.0 each, followed by Gujarat (26.5), Himachal Pradesh and Odisha (26.0), Maharashtra and Rajasthan (25.0), Bihar (24.0),

### Disaster Preparedness

Disaster preparedness registers an average score of 19.20 in a scale of 50. Here again institutions and systems are being developed but the standards and processes are yet to be fully in place in most of the States. Considering very high level of residual risks of disasters in most of the States (risks that are neither prevented nor mitigated nor transferred) the level of disaster preparedness requires considerable improvements.

**Table-1:16: Disaster Resilience Index of States and UTs: Disaster Preparedness**

STATES	End-to-End Early Warning System	Emergency Operation Centre	Disaster Communication System	Emergency Medical Preparedness	Scenario Building, Simulation and Mock Drills	Contingency Plans, SOPs, Manuals	Community Based Disaster Preparedness	Awareness Generation	Resource Inventory	Media Partnership	Others	Total
Values	5	5	5	5	5	5	5	5	3	2	5	50
Andhra Pradesh	2	2	3	2	2.5	2	2	2	1	1	0	19.5
Arunachal Pradesh	1	2	1	0.5	1	1	1	2	2	0	0	11.5
Assam	3	3	2	2	3.5	3	3	2	1	0.5	0	23
Bihar	3	3	2	1.5	2.5	2.5	2	2	1	0	0	19.5
Chhattisgarh	2	2	2	1.5	1.5	1	1	2	1	0		14
Goa	2	1	2	2	1.5	1	1	2	1	0	0	13.5
Gujarat	2.5	3	2.5	3	3.5	3.5	3	3	2	1	0	27
Haryana	2	2	2	2	2	2	1.5	2	2	1	1	19.5
Himachal Pradesh	3	3	2	2	2	3	2	2	2	1	1	23
Jammu & Kashmir	2	1	1	2.5	1	1	1	1	1	0.5	0	12
Jharkhand	1	0	1	1.5	1	0	1	2	0	0	0	7.5

Karnataka	2.5	3	2	2	2	1	2	2	1.5	0	0	18
Kerala	2	3	3	2.5	2	3	3	3	2	1	0	24.5
Madhya Pradesh	1.5	2	2	2	1.5	2	2	2	1.5	0	0	16.5
Maharashtra	3.5	3.5	3	2.5	3	3	3	3	3	0	0	27.5
Manipur	2	2	2	1	1	1	1	1	0	0	0	11
Meghalaya	2	2	2	1	1.5	2	2	2	2	0	0	16.5
Mizoram	2	2	2	1	1.5	2	2	2	2	0	0	16.5
Nagaland	1	1	2	1	1	1	1	2	0.5	0	0	10.5
Odisha	3	2	2	1.5	2	3	3	3	1.5	1	0	22
Punjab	2	2	2	2	2	2	2	3	1	0	0	18
Rajasthan	2.5	2	2	2	2	2	2	2	1	1	0	18.5
Sikkim	1.5	1.5	2	1	1.5	2	2	2	2	0.5	0	16
Tamil Nadu	3.5	3	2	2.5	2.5	2	3	3	2	1	0	24.5
Telangana	1.5	1	1	2	2	1	2	2	0.5	0	0	13
Tripura	3	3	2	1.5	2	3	2	3	2	1	0	22.5
Uttar Pradesh	2	2	2	1.5	1.5	2	1	2	1.5	1	0	16.5
Uttarakhand	2.5	2.5	2	2	1.5	2	2	2	2	1	0	19.5
West Bengal	2	3.5	3	1.5	1	3	2	2	1	0.5	0	19.5
<b>UNION TERRITORIES</b>												
Andaman & Nicobar Islands	2.5	3.5	2	1.5	2	3	2	1	1	1	1	20.5
Chandigarh	3	4	2	3.5	3.5	2	2	2	1.5	1	0	24.5
Dadra and Nagar Haveli	1	2	2	3	1	2	2	2	2	0	0	17
Daman and Diu	1.5	0	1	3	1	1	1.5	1.5	0	0.5	0	11
Delhi	2	4	2	5	4	2	2	2	1.5	0.5	0	25
Lakshadweep	2	0	1	1.5	1	1	2	1	0	0	0	9.5
Puducherry	2.5	3.5	2	3	3	2	1	2	1	1	0	21

Maharashtra tops in Disaster preparedness with a score of 27.5 in a scale of 50, followed by Gujarat (27.0), Tamil Nadu and Kerala (24.5), Himachal Pradesh (23.0), Tripura (22.5), Odisha (22.0).

### Disaster Response

The average score in disaster response among 29 States is 19.18 in a scale of 50, leaving enormous scope for improvements on almost every aspect of disaster response.

**Table-1:17: Disaster Resilience Index of States and UTs: Disaster Response**

STATES	State Agencies for Disaster Response	Incident Response System	Coordination with GOI, NDRF, Armed Forces	Evacuation, Search and Rescue	Emergency Medical Response	Emergency Support Functions	Protection of Women and Children	Disposal of dead bodies	Disposal of Animal Carcasses	Disposal of Debris	Others	Total
Values	10	4	2	7	5	5	5	3	2	2	5	50
Andhra Pradesh	5.5	1	1	3	2.5	2.5	2.5	2	1	1	0	22
Arunachal Pradesh	3	0.5	1.5	1.5	1	1.5	3	1	1	1	0	15

Assam	5	2	1.5	3	2	2	2	1.5	1	1	0	21
Bihar	6	1	1	3	2	2	2	1	1	0	0	19
Chhattisgarh	3.5	0	1	1.5	1	1.5	2	1	1	0	0	12.5
Goa	1.5	0	1	3	2	2	3.5	2	1	0.5	0	16.5
Gujarat	7	2	1	4	3	3	2	1	1	1	0	25
Haryana	3	2	1	3	2	2	2.5	2	1	1	1	20.5
Himachal Pradesh	2	1	1	3	1	2	3	2	1	1	0	17
Jammu & Kashmir	6.5	0.5	1.5	2	2	2	3	1.5	1	1	0	21
Jharkhand	1	0.5	0	1.5	1	1	2	1	1	0	0	9
Karnataka	3	2	1	3	2	2	2.5	2	1	1	0	19.5
Kerala	4	2	1	3	2.5	3	3.5	2	1	0	0	22
Madhya Pradesh	5.5	2	1	3	2	2	2	2	1	0	0	20.5
Maharashtra	5.5	2	1.5	4	3	3	2.5	2	1	1	0	25.5
Manipur	3	1	1	1.5	2	2	3	1	1	0	0	15.5
Meghalaya	4.5	1	1	1.5	2	2	3	1	1	1	0	18
Mizoram	4.5	1	1	1.5	2	2	3	1	1	0	0	17
Nagaland	2.5	2	1	1.5	1	2	3	1	1	0	0	15
Odisha	6	1.5	1	3.5	2	2	2	1	1	1	1	22
Punjab	4	1.5	1	3.5	2.5	2.5	2.5	2	1	1	0	21.5
Rajasthan	5	1	1	3.5	2	2	2	1.5	1	1	0	20
Sikkim	4	1	1	1.5	1.5	2	3	1	1	1	0	17
Tamil Nadu	4.5	2	1	4	3	3	3	2	1	1	0	24.5
Telangana	3	2	1	3	2.5	2.5	2.5	2	1	1	0	20.5
Tripura	4	1	1	2	2	2	3	1	1	1	0	18
Uttar Pradesh	3	1.5	1	3	1.5	2	2	1.5				15.5
Uttarakhand	6	3	1.5	3	1.5	2	2.5	1.5	1	1	0	23
West Bengal	7	2	1.5	3.5	2	2	3	1	1	1	0	24
<b>UNION TERRITORIES</b>												
Andaman & Nicobar Islands	2	3	1	3	1	2	2	1	1	1	0	17
Chandigarh	4	0	2	3	3	2	3	1	1	1	0	20
Dadra and Nagar Haveli	2	1	1	2	1	2	2	1	1	1	0	14
Daman and Diu	2	0	1	2	2	2	2	1	1	0	0	13
Delhi	2	2	2	4	2.5	2.5	3	2	2	2	0	24
Lakshadweep	2	0	1	2	2	2	3	1	1	0	0	14
Puducherry	3	1	1	3	2	2	2	2	1	1	0	18

Almost every State has constituted State Disaster Response Force (SDRF) by designating some units of State Armed Force, but in most of the States the Quick Response Teams of this specialized force are yet to be fully equipped and trained. Standard Operating Procedures for evacuation, search and rescue operations are yet to be fully developed in most of the States. None of the States has operationalized the Incident Response System. The emergency support functions in disaster response and the departments and agencies responsible for the performance of the functions are identified but the process and timeline to be followed are not well laid down in most of the States. Sporadic initiatives have been taken by some States to train medical and para-medical staff in emergency medical

response, but no systematic efforts have been made by the States to implement the national guidelines on emergency medical preparedness and mass casualty management.

Maharashtra tops in disaster response with a score of 25.5, followed by Gujarat (25.0), Tamil Nadu (24.5), West Bengal (24.0), Uttarakhand (23.0), Andhra Pradesh, Kerala and Odisha (22.0).

### Relief and Rehabilitation

Every State has well established Relief and Rehabilitation Department which follows the financial norms prescribed by the Government of India under State Disaster Response Fund. Some States provide additional relief on a case-to-case basis. A few States have well codified Relief Manual, but in most States operational norms for disbursement of relief and for restoration of critical facilities are not well defined. Critical issues like relief logistics, supply chain management, management of relief camps, arrangements for temporary and permanent shelters etc. are not addressed systematically.

**Table-1:18: Disaster Resilience Index of States and UTs: Disaster Relief and Rehabilitation**

STATES	Minimum Standard of Relief	Ex-gratia Relief	Relief Logistics and Supply Chain Management	Food and Essential Supplies	Drinking Water, Dewatering and Sanitation	Health and Mental Health Care	Management of Relief Camps	Veterinary Care	Relief Employment	Temporary and Intermediary Shelters	Others	Total
Values	2	1	7	7	7	7	5	3	3	3	5	50
Andhra Pradesh	1	0	2.5	3	4.5	4.5	2	1	1	1	0	20.5
Arunachal Pradesh	1	1	1.5	2.5	3	2.5	2	1	0.5	0	0	15
Assam	1	1	2	3	3.5	3.5	2	1	1	1.5	0	19.5
Bihar	1	0.5	3	3.5	3.5	3.5	3.5	1	1	1.5	0	22
Chhattisgarh	1	0	2	3	3	2.5	1	1	1.5	0.5	0	15.5
Goa	1	0	2.5	3	4.5	3.5	2	1	0	0	0	17.5
Gujarat	1	0.5	2.5	4	4	3	2	2	1	2	0	22
Haryana	1	0	2.5	3	4	3.5	2	1	1	1	0	19
Himachal Pradesh	1	0	2	3	4	3	2	1	1	1	0	18
Jammu & Kashmir	1	0	2	3	4	4	2	1	1	1.5	0	19.5
Jharkhand	1	0	1.5	2.5	2.5	3	1	1	1.5	0.5	0	14.5
Karnataka	1	0	2	3	3	4	2	1	1.5	0.5	0	18
Kerala	1	0	2.5	3	6	4.5	2	2	1	0.5	0	22.5
Madhya Pradesh	1.5	1.5	2	3	3	3	2	1	1	0.5	0	18.5
Maharashtra	1	0	2.5	3.5	5	4.5	2.5	1.5	1.5	0.5	0	22.5
Manipur	1	0	1.5	3	4	2.5	2	1	1	0.5	0	16.5
Meghalaya	1	0	2	3	4	3.5	2	1	1	0.5	0	18
Mizoram	1	0	2	3	4	3	2	1	0	0.5	0	16.5
Nagaland	1	0	1.5	2.5	4	2.5	1	1	0	0.5	0	14
Odisha	1	0.5	3	3.5	4	3.5	2.5	1	1.5	1.5	0	22

Punjab	1	1	2.5	3.5	5	3.5	2	1	1	1	0	21.5
Rajasthan	1	0	4	3.5	4.5	3.5	3	2	2	1	0	24.5
Sikkim	1	0.5	2	2.5	4	2.5	1	1	1	1	0	16.5
Tamil Nadu	1	0	4	4	5	4.5	3	1.5	1.5	1.5	0	26
Telangana	1	0	2	3	5	4	2	1	1	1	0	20
Tripura	1	0.5	3	3	3.5	3	2	1	1	1	0	19
Uttar Pradesh	2	0	3	3	4	3	2	1	1	1	0	20
Uttarakhand	1	0.5	2	3	4	3	2	1	1	1	1	19.5
West Bengal	1	0	2	3	3.5	3	2	1	2	1	0	18.5
<b>UNION TERRITORIES</b>												
Andaman & Nicobar Islands	1	0.5	1	3	2	2.5	2	1	1	0	0	14
Chandigarh	1	0	2	3	7	5	2	2	0	1	0	23
Dadra and Nagar Haveli	1	0	1	3	3	4	3	2	0	0	0	17
Daman and Diu	1	0	1	3	5	2	2	1	0	0	0	15
Delhi	1	0	2	3.5	4.5	3.5	2	2	0	2	0	20.5
Lakshadweep	1	0	1	3	2.5	2	1	0	0	0	0	10.5
Puducherry	1	0	2	3	4	3	3	2	1	1	0	20

Tamil Nadu scores maximum in disaster relief and rehabilitation, with a score of 26.0 in a scale of 50, followed by Rajasthan (24.5), Maharashtra and Kerala (22.5), Bihar and Gujarat (22.0). Average score of 29 States is 19.20.

### Reconstruction

Issues of disaster reconstruction and of 'building back better' to make the reconstructed assets and livelihoods resistant to disasters are not addressed in any State except after major and catastrophic disasters. Only a few States in India – Andhra Pradesh, Bihar, Gujarat, Jammu & Kashmir, Kerala, Maharashtra, Odisha, Uttarakhand and West Bengal – have had the experience of post-disaster reconstruction, but not every State has done equally well in implementing such reconstruction projects and in learning lessons learnt from the projects.

**Table-1:19: Disaster Resilience Index of States and UTs: Disaster Reconstruction**

STATES	Damage and Loss Assessment	Post Disaster Need Assessment	Financing Reconstruction	Institutional mechanisms for reconstruction	Building Back Better	Reconstruction of houses	Reconstruction of infrastructure	Livelihood Reconstruction	Regeneration of ecology and environment	Learning from reconstruction and recovery	Others	Total
Values	5	5	5	5	5	5	5	5	3	2	5	50
Andhra Pradesh	2.5	1	3	2	2.5	2	3	3	1	0.5	0	20.5
Arunachal Pradesh	2	0.5	1	0.5	1	1.5	1	1	0	0	0	8.5
Assam	2.5	1	2	1	1	1.5	2	2.5	0.5	0.5	0	14.5
Bihar	2.5	1	3	1.5	2.5	2.5	2	2.5	1	1	0	19.5
Chhattisgarh	1.5	0.5	2	0.5	1	1.5	1	2	0	0	0	10

Goa	2	0.5	1	0.5	1	2	2	1	0	0	0	10
Gujarat	3	2	2	2	3	3	3	3	1	2	1	25
Haryana	2	0.5	1	0.5	1	1.5	2	1	0	0	0	9.5
Himachal Pradesh	2	1	1	0.5	1	1.5	2	1	0	0	0	10
Jammu & Kashmir	1.5	0.5	3	2	2	2	1	1	0.5	0.5	0	14
Jharkhand	1.5	0.5	1	0.5	1	1.5	1	1	0	0	0	8
Karnataka	2.5	1	2	0.5	1	1.5	2	2	0	1	0	13.5
Kerala	2.5	1	3	1.5	2	2	2	2	1	0.5	0	17.5
Madhya Pradesh	2	0.5	2	0.5	1.5	1.5	2	2	0	0	0	12
Maharashtra	2.5	1	3	2	2.5	2	3	1	1	1	0	19
Manipur	1.5	0.5	2	0.5	1	1.5	1	1	0	0	0	9
Meghalaya	2	1	1	0.5	1	2.5	2	1	0	1	0	12
Mizoram	2	1	1	0.5	1	1.5	2	1	0	0	0	10
Nagaland	1.5	0.5	1	0.5	1	2	1	1	0	0	0	8.5
Odisha	2.5	1	3	2	2.5	3	2	3	1	1	0	21
Punjab	2	1	1	0.5	1	2	2	1	0	0	0	10.5
Rajasthan	2	1	2	0.5	1	1.5	2	3	0	0	0	13
Sikkim	1.5	0.5	2	1	2.5	1.5	1	1	0.5	0.5	0	12
Tamil Nadu	2.5	1	3	1.5	2.5	3	3	3	1	1.5	0	22
Telangana	2	1	2	0.5	1	1.5	2	2	0	0	0	12
Tripura	2	1	1	0.5	1	1.5	2	1	0	0	0	10
Uttar Pradesh	2	1	2	0.5	1	1.5	2	2	0	0	0	12
Uttarakhand	2	1	3	2	2.5	3	2	2	0.5	0.5	0	18.5
West Bengal	2	1.5	2	2	2	2	2	2	2	0	0	17.5
<b>UNION TERRITORIES</b>												
Andaman & Nicobar Islands	1	1	0	1	2	2	2	1	1	1	0	12
Chandigarh	1	1	0	2	3	2	2	0	0	0	0	11
Dadra and Nagar Haveli	1	0	0	1	2	2	2	0	0	0	0	8
Daman and Diu	1	0	0	1	2	2	2	0	0	0	0	8
Delhi	2	1	1	2	3	2	2	0	0	0	0	13
Lakshadweep	1	0	0	1	2	2	1	0	0	0	0	7
Puducherry	1	1	1	1	2	2	1	0.5	1	1	0	11.5

The States and UTs have been assessed on their progress on various aspects of reconstruction post-disasters – small, medium or large. Gujarat scores the highest with a score of 25 in a scale of 50, followed by Tamil Nadu (22.0), Odisha (21.0), Andhra Pradesh (20.5), Bihar (19.5), Uttarakhand (18.5), Kerala and West Bengal (17.5). The average all-India score on disaster reconstruction is very low at 13.77.

It may be observed that Union Territories, despite being administered directly by the Government of India, have not done better than the States on any of the indicators of disaster resilience. Overall performance of the UTs in disaster management have been rather poor. This may be ascribed to several factors: (a) Disaster Management Act has neither prescribed any special institutional mechanisms for the UTs nor made it very specific that the same mechanisms as in the States shall be applicable ipso facto the UTs; (b) Finance Commission allocations under SDRF are not available to the UTs; (c) Most of the UTs are

located remotely, which make it difficult for the administration to access technical and other resources available to the mainstream States. However, despite these limitations some of the UTs like Delhi, Puducherry and Andaman and Nicobar Islands have made significant progress post enactment of Disaster Management Act 2005.

### Disaster Resilience Index

The scorecards of the States/ UTs on 7 indicators of disaster resilience – risk assessment, risk prevention and mitigation, risk governance, disaster preparedness, disaster response, disaster relief and rehabilitation and disaster reconstruction - have been further aggregated with weights, as explained in the chapter on methodology, to calculate Disaster Resilience Index in a scale of 100 as discussed. The same is presented in the table below.

**Table-1.20: Disaster Resilience Index of States and Union Territories (Scale of 100)**

	STATES / UNION TERRITORIES	Risk Assessment	Risk Prevention & Mitigation	Risk Governance	Disaster Preparedness	Disaster Response	Disaster Relief & Rehabilitation	Disaster Reconstruction	Disaster Resilience Index	Rank
1	2	3	4	5	6	7	8	9	10	11
	<b>STATES</b>									
1	ANDHRA PRADESH	44.0	24.0	37.0	39.0	44.0	41.0	41.0	37.0	11
2	ARUNACHAL PRADESH	14.0	16.0	25.0	23.0	30.0	30.0	17.0	22.6	26
3	ASSAM	50.0	27.0	54.0	46.0	42.0	39.0	29.0	41.9	4
4	BIHAR	34.0	40.0	48.0	39.0	38.0	44.0	39.0	41.2	7
5	CHATTISGARH	16.0	12.0	28.0	28.0	25.0	31.0	20.0	23.4	25
6	GOA	18.0	21.0	23.0	27.0	33.0	35.0	20.0	25.6	24
7	GUJARAT	48.0	45.0	53.0	54.0	50.0	44.0	50.0	49.3	1
1	HARYANA	24.0	28.0	40.0	39.0	41.0	38.0	19.0	34.6	14
9	HIMACHAL PRADESH	51.0	26.0	52.0	46.0	34.0	36.0	20.0	39.7	9
1	JAMMU & KASHMIR	18.0	18.0	28.0	24.0	42.0	39.0	28.0	27.3	23
1	JHARKHAND	13.0	9.0	20.0	15.0	18.0	29.0	16.0	17.1	29
1	KARNATAKA	40.0	21.0	34.0	36.0	39.0	36.0	27.0	32.9	15
1	KERALA	32.0	38.0	42.0	49.0	44.0	45.0	35.0	41.9	5
1	MADHYA PRADESH	19.0	18.0	40.0	33.0	41.0	37.0	24.0	31.0	17
1	MAHARASHTRA	33.0	31.0	50.0	55.0	51.0	45.0	38.0	44.3	3
1	MANIPUR	16.0	9.0	21.0	22.0	31.0	33.0	18.0	21.0	28
1	MEGHALAYA	18.0	20.0	37.0	33.0	36.0	36.0	24.0	30.0	21
1	MIZORAM	16.0	20.0	40.0	33.0	34.0	33.0	20.0	29.6	22

8										
1										
9	NAGALAND	13.0	9.0	29.0	21.0	30.0	28.0	17.0	21.2	27
2										
0	ODISHA	36.0	29.0	52.0	44.0	44.0	44.0	42.0	41.7	6
2										
1	PUNJAB	18.0	17.0	32.0	36.0	43.0	43.0	21.0	30.6	18
2										
2	RAJASTHAN	34.0	28.0	50.0	37.0	40.0	49.0	26.0	39.1	10
2										
3	SIKKIM	31.0	28.0	38.0	32.0	34.0	33.0	24.0	32.3	16
2										
4	TAMIL NADU	44.0	47.0	39.0	49.0	49.0	52.0	44.0	46.3	2
2										
5	TELANGANA	25.0	21.0	36.0	26.0	41.0	40.0	24.0	30.4	19
2										
6	TRIPURA	43.0	32.0	54.0	45.0	36.0	38.0	20.0	40.8	8
2										
7	UTTAR PRADESH	18.0	25.0	33.0	33.0	31.0	40.0	24.0	30.3	20
2										
8	UTTARAKHAND	34.0	24.0	41.0	39.0	46.0	39.0	37.0	36.5	12
2										
9	WEST BENGAL	21.0	30.0	43.0	39.0	46.0	37.0	35.0	36.4	13
	STATE AVERAGE	27.1	24.0	37.0	35.7	38.7	38.6	26.5	33.6	
	<b>UNION TERRITORIES</b>									
	ANDAMAN & NICOBAR ISLANDS	17.0	14.0	33.0	41.0	34.0	28.0	24.0	28.1	4
2	CHANDIGARH	20.0	15.0	19.0	49.0	40.0	46.0	22.0	30.6	2
3	DADRA & NAGAR HAVELI	15.0	10.0	15.0	34.0	28.0	34.0	16.0	22.0	5
4	DAMAN & DIU	14.0	10.0	16.0	22.0	26.0	30.0	16.0	18.9	7
5	DELHI	34.0	21.0	29.0	50.0	48.0	41.0	26.0	35.7	1
6	LAKSHADWEEP	13.0	11.0	23.0	19.0	28.0	21.0	14.0	18.6	6
7	PONDICHERRY	19.0	16.0	21.0	42.0	36.0	40.0	23.0	28.5	3
	UT AVERAGE	18.8	13.8	22.3	36.7	34.3	34.3	20.1	26.0	
	NATIONAL AVERAGE	25.7	21.7	34.6	35.6	37.2	37.4	25.3	32.1	

Gujarat tops the list of States in disaster risk resilience with overall Disaster Risk Resilience Index of 49.3 in a scale of 100 followed by Tamil Nadu (46.3), Maharashtra (44.3), Assam and Kerala (41.9), Odisha (41.7), Bihar (41.2) and Tripura (40.8). Among the Union Territories Delhi tops with a score of 35.7.

The national average score of disaster resilience is 32.17, with State average of 33.6 and UT average of 32.1. 13 States (Arunachal Pradesh, Chhattisgarh, Goa, Jammu & Kashmir, Jharkhand, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Telangana, and Uttar Pradesh) and 6 Union Territories (Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Lakshadweep, and Puducherry) score less than national average. None of the States has scored the level of 50% in disaster resilience.

The study shows that level of resilience to disasters in States and Union Territories is low and requires considerable improvements. Most of the existing level of resilience has been developed during the past decade and half and it may be expected impacts of these initiatives would be felt in the years ahead.

However, as already explained in the section on methodology, this index captures the progress achieved by the State Governments and Union Territory Administrations in the implementation of national and global frameworks for building resilience to disasters. It neither factors the inherent societal or community resilience nor does it reflect on the national capacity for resilience. The national level capacities on disaster management, developed over the years, provide tremendous support to the States/ UTs, particularly during major disasters. These have not been measured in this study.

## Annexure- I

### MATRIX OF ACTIVITIES TO BE TAKEN UP AT STATE LEVEL UNDER NATIONAL FRAMEWORKS ON DISASTER MANAGEMENT

#### A. Disaster Management Act 2005

	<b>State Government</b>	
1.	Establishing State Disaster Management Authority	Section 14
2.	Holding meetings of the State Authority	Section 15
3.	Appointing officers and other employees of State Authority	Section 16
4.	Constituting State Executive Committee	Section 20
5.	Constitute District Disaster Management Authority	Section 25
6.	Appointing officers and other employees of District Authority	Section 29
<b>State Disaster Management Authority</b>		
1.	Constituting advisory committee of State Authority	Section 17
2.	Laying down State Disaster Management Policy	Section 18 (2)(a)
3.	Approving State Disaster Management Plan	Section 18 (2)(b)
4.	Approving Departmental Disaster Management Plans	Section 18 (2)(c)
5.	Laying down guidelines for integrating DM in development plans and projects	Section 18 (2)(d)
6.	Coordinating implementation of State Plan	Section 18 (2)(e)
7.	Provisioning funds for mitigation and preparedness	Section 18 (2)(f)
8.	Reviewing departmental development plans to ensure that DM is integrated therein	Section 18 (2)(g)
9.	Reviewing measures taken by departments for mitigation, capacity building and preparedness and issuing guidelines as necessary	Section 18 (2)(h)
10.	Laying down guidelines for minimum standard of relief	Section 19
<b>State Executive Committee</b>		
1.	Constituting sub-committees of State Executive Committee	Section 21
2.	Coordinate and monitor implementation of National Policy, National Plan and State Plan	Section 22 (2)(a)

3.	Examine vulnerability of different parts of the State to different forms of disasters and specify measures to be taken for their prevention or mitigation;	Section 22 (2)(b)
4.	Monitor the implementation of disaster management plans prepared by the departments of the Government of the State and District Authorities;	Section 22 (2)(c)
5.	Monitor the implementation of the guidelines laid down by the State Authority for integrating of measures for prevention of disasters and mitigation by the departments in their development plans and projects;	Section 22 (2)(d)
6.	Evaluate preparedness at all governmental or non-governmental levels to respond to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness;	Section 22 (2)(e)
7.	Coordinate response in the event of any threatening disaster situation or disaster;	Section 22 (2)(f)
8.	Give directions to any Department of the Government of the State or any other authority or body in the State regarding actions to be taken in response to any threatening disaster situation or disaster;	Section 22 (2)(g)
9.	Promote general education, awareness and community training in regard to the forms of disasters to which different parts of the State are vulnerable and the measures that may be taken by such community to prevent the disaster, mitigate and respond to such disaster	Section 22 (2)(h)
10.	Advise, assist and coordinate activities of the Departments, District Authorities, statutory bodies and other governmental and non-governmental organizations engaged in disaster management;	Section 22 (2)(i)
11.	Provide necessary technical assistance or give advice to District Authorities and local authorities for carrying out their functions effectively;	Section 22 (2)(j)
12.	Advise the State Government regarding all financial matters in relation to disaster management;	Section 22 (2)(k)
13.	Examine the construction, in any local area in the State and, if it is of the opinion that the standards laid for such construction for the prevention of disaster is not being or has not been followed, may direct the District Authority or the local authority, as the case may be, to take such action as may be necessary to secure compliance of such standards;	Section 22 (2)(l)
14.	Provide information to the National Authority relating to different aspects of disaster management;	Section 22 (2)(m)
15.	Lay down, review and update State level response plans and guidelines and ensure that the district level plans are prepared, reviewed and updated;	Section 22 (2)(n)
16.	Ensure that communication systems are in order and the disaster management drills are carried out periodically;	Section 22 (2)(o)
17.	Perform such other functions as may be assigned to it by the State Authority or as it may consider necessary.	Section 22 (2)(p)
<b>Departments of State Government</b>		
1.	Take measures necessary for prevention of disasters, mitigation, preparedness and capacity-building in accordance with the guidelines laid down by the National Authority and the State Authority;	Section 39 (a)
2.	Integrate into its development plans and projects, the measures for prevention of disaster and mitigation;	Section 39 (b)
3.	Allocate funds for prevention of disaster, mitigation, capacity-building and preparedness;	Section 39 (c)
4.	Respond effectively and promptly to any threatening disaster situation or disaster in accordance with the State Plan, and in accordance with the guidelines or directions of the National Executive Committee and the State Executive Committee;	Section 39 (d)
5.	Review the enactments administered by it, its policies, rules and	Section 39 (e)

	regulations with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness;	
6.	Provide assistance, as required, by the National Executive Committee, the State Executive Committee and District Authorities, for- (i) Drawing up mitigation, preparedness and response plans, capacity-building, data collection and identification and training of personnel in relation to disaster management; (ii) Assessing the damage from any disaster; (iii) Carrying out rehabilitation and reconstruction;	Section 39 (f)
7.	Make provision for resources in consultation with the State Authority for the implementation of the District Plan by its authorities at the district level;	Section 39 (g)
8.	Make available its resources to the National Executive Committee or the State Executive Committee or the District Authorities for the purposes of responding promptly and effectively to any disaster in the State, including measures for- (i) Providing emergency communication with a vulnerable or affected area; (ii) Transporting personnel and relief goods to and from the affected area; (iii) Providing evacuation, rescue, temporary shelter or other immediate relief; (iv) Carrying out evacuation of persons or live-stock from an area of any threatening disaster situation or disaster; (v) Setting up temporary bridges, jetties and landing places; (vi) Providing drinking water, essential provisions, healthcare and services in an affected area;	Section 39 (h)
9.	Such other actions as may be necessary for disaster management.	Section 39 (i)
<b>District Disaster Management Authority</b>		
1.	Constituting advisory and other committees of District Authority	Section 28
2.	Prepare a disaster management plan including district response plan for the district;	Section 30 (2) (i)
3.	Coordinate and monitor the implementation of the National Policy, State Policy, National Plan, State Plan and District Plan;	Section 30 (2) (ii)
4.	Ensure that the areas in the district vulnerable to disasters are identified and measures for the prevention of disasters and the mitigation of its effects are undertaken by the departments of the Government at the district level as well as by the local authorities;	Section 30 (2) (iii)
5.	Ensure that the guidelines for prevention of disasters, mitigation of its effects, preparedness and response measures as laid down by the National Authority and the State Authority are followed by all departments of the Government at the district level and the local authorities in the district;	Section 30 (2) (iv)
6.	Give directions to different authorities at the district level and local authorities to take such other measures for the prevention or mitigation of disasters as may be necessary;	Section 30 (2) (v)
7.	Lay down guidelines for prevention of disaster management plans by the department of the Government at the districts level and local authorities in the district;	Section 30 (2) (vi)
8.	Monitor the implementation of disaster management plans prepared by the Departments of the Government at the district level;	Section 30 (2) (vii)
9.	Lay down guidelines to be followed by the Departments of the Government at the district level for purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefor;	Section 30 (2) (viii)
10.	Monitor the implementation of measures referred to in clause (viii);	Section 30 (2) (ix)

11.	Review the state of capabilities for responding to any disaster or threatening disaster situation in the district and give directions to the relevant departments or authorities at the district level for their up gradation as may be necessary;	Section 30 (2) (x)
12.	Review the preparedness measures and give directions to the concerned departments at the district level or other concerned authorities where necessary for bringing the preparedness measures to the levels required for responding effectively to any disaster or threatening disaster situation;	Section 30 (2) (xi)
13.	Organize and coordinate specialized training programmes for different levels of officers, employees and voluntary rescue workers in the district;	Section 30 (2) (xii)
14.	Facilitate community training and awareness programmes for prevention of disaster or mitigation with the support of local authorities, governmental and non-governmental organizations;	Section 30 (2) (xiii)
15.	Set up, maintain, review and upgrade the mechanism for early warnings and dissemination of proper information to public;	Section 30 (2) (xiv)
16.	Prepare, review and update district level response plan and guidelines;	Section 30 (2) (xv)
17.	Coordinate response to any threatening disaster situation or disaster;	Section 30 (2) (xvi)
18.	Ensure that the Departments of the Government at the district level and the local authorities prepare their response plans in accordance with the district response plan;	Section 30 (2) (xvii)
19.	Lay down guidelines for, or give direction to, the concerned Department of the Government at the district level or any other authorities within the local limits of the district to take measures to respond effectively to any threatening disaster situation or disaster;	Section 30 (2) (xviii)
20.	Advise, assist and coordinate the activities of the Departments of the Government at the district level, statutory bodies and other governmental and non-governmental organizations in the district engaged in the disaster management;	Section 30 (2) (xix)
21.	Coordinate with, and give guidelines to, local authorities in the district to ensure that measures for the prevention or mitigation of threatening disaster situation or disaster in the district are carried out promptly and effectively;	Section 30 (2) (xx)
22.	Provide necessary technical assistance or give advise to the local authorities in the district for carrying out their functions;	Section 30 (2) (xxi)
23.	Review development plans prepared by the Departments of the Government at the district level, statutory authorities or local authorities with a view to make necessary provisions therein for prevention of disaster or mitigation;	Section 30 (2) (xxii)
24.	Examine the construction in any area in the district and, if it is of the opinion that the standards for the prevention of disaster or mitigation laid down for such construction is not being or has not been followed, may direct the concerned authority to take such action as may be necessary to secure compliance of such standards;	Section 30 (2) (xxiii)
25.	Identify buildings and places which could, in the event of any threatening disaster situation or disaster, be used as relief centers or camps and make arrangements for water supply and sanitation in such buildings or places;	Section 30 (2) (xxiv)
26.	Establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice;	Section 30 (2) (xxv)
27.	Provide information to the State Authority relating to different aspects of disaster management;	Section 30 (2) (xxvi)
28.	Encourage the involvement of non-governmental organizations and voluntary social-welfare institutions working at the grassroots level in the district for disaster management;	Section 30 (2) (xxvii)
29.	Ensure communication systems are in order, and disaster management	Section 30 (2)

	drills are carried out periodically;	(xxviii)
30.	Perform such other functions as the State Government or State Authority may assign to it or as it deems necessary for disaster management in the District.	Section 30 (2) (xxix)

## B. National Policy on Disaster Management Policy 2009

	Themes	Activities at State level	Para
1	<b>Institutional and legal arrangements</b>	<b>State Governments:</b> The primary responsibility for disaster management rests with the States. The institutional mechanism put in place at the Centre, State and District levels will help the States manage disasters in an effective manner.	3.3.6
		<b>District Administration:</b> At the District level, DDMA's will act as the District planning, coordinating and implementing body for disaster management and will take all measures for the purposes of disaster management in the District in accordance with the guidelines laid down by NDMA and SDMA.	3.3.8
		<b>Management of Disasters impacting more than one State:</b> At times, the impact of disasters occurring in one State may spread over to the areas of other States. Similarly, preventive measures in respect of certain disasters, such as floods, etc., may be required to be taken in one State, though the impact of their occurrence may affect another. The administrative hierarchy of the country is organised into National, State and District level administrations. This presents some difficulties in respect of disasters impacting more than one State. Management of such situations calls for a coordinated approach, which can respond to a range of issues quite different from those that normally present themselves, before, during and after the event. NDMA will encourage identification of such situations and promote the establishment of mechanisms on the lines of Mutual Aid Agreement for coordinated strategies for dealing with them by the States, Central Ministries and Departments and other agencies concerned.	3.3.9
		<b>State Police Forces and Fire Services:</b> The State Police Forces and the Fire Services are crucial immediate responders to disasters. The Police Forces will be trained and the Fire Services upgraded to acquire multi-hazard rescue capability.	3.4.3
		<b>Civil Defence and Home Guards:</b> The mandate of the Civil Defence and the Home Guards will be redefined to assign an effective role in the field of disaster management. They will be deployed for community preparedness and public awareness. A culture of voluntary reporting to duty stations in the event of any disaster will be promoted.	3.4.4
		<b>State Disaster Response Force:</b> States will be encouraged to create response capabilities from within their existing resources. To start with, each State may aim at equipping and training one battalion equivalent force. They will also include women members for looking after the needs of women and children. NDRF battalions and their training institutions will	3.4.5
		2	<b>Financial Arrangements</b>
<b>Mitigation Projects:</b> The guidelines on various disasters will form the basis for the formulation of plans for mitigation projects at the National, State and District level. State Governments will identify Mitigation Projects for implementation.	4.4.3		
3	<b>Disaster</b>	<b>Risk Assessment and Vulnerability Mapping:</b> DM authorities at the	5.1.2

<b>Prevention and Mitigation</b>	State and District levels need to carry out risk and vulnerability assessment of all disaster prone areas. Hazard zonation mapping and vulnerability analysis based on GIS and remote sensing data, needs to mandatorily include a ground check component. Hazard and Consequence Mapping on GIS platforms will be prepared for all chemical accident prone districts	
	<b>Increasing Trend of Disasters in Urban Areas:</b> State Governments/UTs concerned should accord priority for improving urban drainage systems with special focus on non-obstruction of natural drainage systems. Urban mapping of infrastructure of spatial resolution will be taken up for development of Decision Support System (DSS) for management of urban risks.	5.1.4
	<b>Critical Infrastructure:</b> It is of utmost importance that critical infrastructure like dams, roads, bridges, flyovers, railway lines, power stations, water storage towers, irrigation canals, delta water distribution networks, river and coastal embankments, ports and other civic utilities are constantly monitored for safety standards in consonance with worldwide safety benchmarks and strengthened where deficient. The building standards for critical infrastructure need to be aligned to the safety norms and Departments/Authorities concerned would ensure the requisite actions and measures to ensure this.	5.1.5
	<b>Environmentally Sustainable Development:</b> Environmental considerations and developmental efforts, need to go hand in hand for ensuring sustainability. Restoration of ecological balance in Himalayan regions and raising coastal shelter belt plantations need to be incorporated wherever necessary in DM plans. Eco systems of forests, islands, coastal areas, rivers; and the agricultural, urban and industrial environment are also to be considered for restoration of ecological balances and sustainable development. Zonal regulations must ensure the preservation of natural habitats.	5.1.6
	<b>Climate Change Adaptation:</b> Synergies in our approach and strategies for climate change adaptation and disaster risk reduction shall be encouraged and promoted.	5.1.7
	<b>Communications and Information Technology Support:</b> Efforts should be made for setting up IT infrastructures consisting of required IT processes, architecture and skills for quick upgradation and updation of data sets from the PRIs or the ULBs.	5.2.5
	<b>Strengthening of the Emergency Operations Centres:</b> The establishment of Emergency Operations Centres at the State, Metro and District level and equipping them with contemporary technologies and communication facilities and their periodic upgradation, will be accorded priority. For last mile connectivity and control of the operations at the disaster hit areas, availability of portable platforms will be catered for. The integration of Ham radios and such other innovative facilities, into the DM communication system, will be advantageous.	<b>5.2.7</b>
	<b>Medical Preparedness and Mass Casualty Management:</b> The surge and casualty handling capacity of all hospitals at the time of disasters, will be worked out and recorded through a consultative process, by all the States/UTs in the pre-disaster phase. The State and District authorities will be encouraged to formulate appropriate procedures for treatment of casualties by private hospitals during disasters. These plans will also address post-disaster disease surveillance systems, networking with hospitals, referral institutions and accessing services and facilities such as availability of ambulances and blood banks.	5.2.8
	<b>Exercises, Simulations and Mock Drills:</b> State and District authorities will be encouraged to generate a culture of preparedness and quick response. Gradually State Governments will be encouraged to plan a series of exercises for various types of disasters in collaboration with NDMA to enhance the response level of various stakeholders	5.2.10

		<p><b>Community Based Disaster Preparedness:</b> During any disaster, communities are not only the first to be affected but also the first responders. Community participation ensures local ownership, addresses local needs, and promotes volunteerism and mutual help to prevent and minimise damage. Therefore, the efforts of the States/UTs, in this regard need to be encourage. Community plans will be dovetailed into the Panchayat, Block and District plans.</p>	5.3.1
		<p><b>Stakeholders' Participation:</b> The participation of civil society stakeholders will be coordinated by the SDMAs and DDMA's. Civil Defence, NCC, NYKS, NSS and local Non-Governmental Organisations (NGOs) will be encouraged to empower the community and generate awareness through their respective institutional mechanisms. Efforts to promote voluntary involvement will be actively encouraged.</p>	5.3.3
		<p><b>Corporate Social Responsibility and Public-Private Partnership:</b> SDMA's need to network with the corporate entities to strengthen and formalise their role in the DM process for ensuring safety of the communities.</p>	5.3.4
		<p><b>Media Partnership:</b> The media plays a critical role in information and knowledge dissemination in all phases of DM. The versatile potential of both electronic and print media needs to be fully utilised. Effective partnership with the media will be worked out in the field of community awareness, early warning and dissemination, and education regarding various disasters.</p>	5.3.5
4	<b>Techno-Legal Regime</b>	<p><b>Techno-Legal Regime:</b> The relevant Acts, Rules and Regulations warranting amendments need to be identified and brought in conformity with the DM Act in a phased manner by the State governments and other agencies concerned.</p>	6.1.1
		<p><b>Revision of Municipal Regulations:</b> Municipal regulations such as development control regulations, building bye-laws and structural safety features will be reviewed periodically to identify safety gaps from seismic, flood, landslide and other disasters and suitable modifications will be made to align them to the revised building codes of the Bureau of Indian Standards (BIS).</p>	6.2.1
		<p><b>Land Use Planning:</b> A review of master plans and their compliance, on priority, will be essential and regarded as the paramount responsibility of the States/UTs. At the macro-level, there is a need for preparation of land use planning based on the inventory database of various uses. As far as urban settlements are concerned, the future land use is to be assessed keeping in view the anticipated intensity of development.</p>	6.3.1
		<p><b>Safe Construction Practices:</b> The design and specification of houses being constructed, under the Indira Awas Yojana (IAY) and other government welfare and development schemes, will also be re-examined to ensure hazard safety. Building codes will be updated every five years as a mandatory requirement and also put in the public domain. Observance of the National Building Code should be made mandatory in all the State/ Municipal building bye-laws.</p>	6.4.1
		<p><b>Enforcement:</b> After having put the techno-legal and compliance system in place, the States/UTs will also ensure their enforcement by establishing an effective mechanism, under the provisions of the Act.</p>	6.6.1
5	<b>Response</b>	<p><b>Role of State, District and Local Authorities:</b> It is the primary responsibility of the State Governments/SDMAs to monitor and assess any developing situation and keep the NDMA and NEC apprised of the same. They will also be responsible to constantly evaluate their own capabilities to handle that situation and project the anticipated requirements for the Central resources well in time. Inter-state assistance and cooperation will be encouraged. The States/ UTs will also be responsible to develop their own response potential progressively and complete the process at the earliest. This will</p>	7.4.1

		comprise training and equipping of State response forces, community preparedness, training and creation of response caches at the District level. District level preparations will provide the cutting edge to all response activities. Local authorities, PRIs and ULBs will play a significant role in the entire process, particularly in response and rescue operations, relief and rehabilitation, awareness generation and disaster preparedness, restoration of livelihood options and coordination with NGOs and civil society.	
		<b>Standard Operating Procedures:</b> State Governments, District Authorities and other stakeholders will prepare SOPs in consonance with the National and State Plans. SOPs will be prescribed for activities like search and rescue, medical assistance and casualty management, evacuation, restoration of essential services and communication at disaster sites, etc. The other important activities are provision of food, drinking water, sanitation, clothing and management of relief camps.	7.5.1
		<b>Animal Care:</b> Animals both domestic and wild are exposed to the effects of natural and man-made disasters. It is necessary to devise appropriate measures to protect animals and find means to shelter and feed them during disasters and their aftermath, through a community effort, to the extent possible.	7.10.1
6	<b>Relief and Rehabilitation</b>	<b>Setting up of Temporary Relief Camps:</b> DDMA's, especially in recurring disaster prone areas, may identify locations for setting up temporary camps. Agencies to supply the necessary stores will be identified in the pre-disaster phase. The use of premises of educational institutions for setting up relief camps needs to be discouraged. The temporary relief camps will have adequate provision of drinking water and bathing, sanitation and essential health care facilities. Wherever feasible, special task forces from amongst the disaster affected families will be set up to explore the possibility of providing food through community kitchens, and provision of education through the restoration of schools and anganwadis. Efficient governance systems like entitlement cards, laminated identification cards etc., will be developed as a part of uniform humanitarian governance practices through the respective DDMA's.	8.2.1
		<b>Management of Relief Supplies:</b> Ensuring minimum standards of relief and speedy management of supplies are important features of relief operations. SOPs will be put in place for ensuring the procurement, packaging, transportation, storage and distribution of relief items, which needs to be carried out in an organised manner. The affected community and local authorities need to work in tandem in managing the relief camps. Guidelines will be evolved to manage the donations received in cash or kind to ensure transparency and accountability.	8.3.1
		<b>Review of Standards of Relief:</b> In most States, existing standards of relief need to be reviewed to address the contemporary needs of communities affected by disasters. The SDMA's may review the Relief Codes/manuals and prepare DM Codes for prescribing the norms, standards and criteria for the provision of relief in conformity with the guidelines of NDMA.	8.4.1
		<b>Temporary Livelihood Options and Socio-Economic Rehabilitation:</b> In the aftermath of any major disaster, generally a demand always arises to generate temporary livelihood options for the affected community and the State Governments should recognise this aspect in their DM planning process. Any such option must ensure that the assets, infrastructure and amenities created are hazard resistant, durable, sustainable, and cost-efficient.	8.5.1
		<b>Provision of Intermediate Shelters:</b> In the case of devastating disasters, where extreme weather conditions can be life-threatening or when the period of stay in temporary shelters is likely to be long and uncertain, construction of intermediate shelters with suitable sanitary	8.6.1

		facilities will be undertaken to ensure a reasonable quality of life to the affected people. The design of such shelters will be eco-friendly and in consonance with local culture. It would be desirable for SDMAs to plan during periods of normalcy, the layout of intermediate shelters which is cost-effective and as per local needs with multi-use potential.	
7	<b>Reconstruction and Recovery</b>	<b>Speedy Reconstruction:</b> Essential services, social infrastructure and intermediate shelters/camps will be established in the shortest possible time. For permanent reconstruction, ideally, the work including the construction of houses must be completed within two to three years. Central Ministries/Departments concerned and the State Governments should create dedicated project teams to speed up the reconstruction process.	9.3.1
		<b>Livelihood Restoration:</b> State governments will have to lay emphasis on the restoration of permanent livelihood of those affected by disasters and special attention to the needs of women-headed households, artisans, farmers and people belonging to marginalised and vulnerable sections.	9.5.1
8	<b>Capacity Development</b>	<b>Institutional Capacity Development:</b> There are a number of renowned institutes in various States, which are imparting training in DM. These will be strengthened with financial assistance and such efforts will be replicated by States/UTs. Also, the DM cells in all Administrative Training Institutes, Police Academies, State Institutes of Rural Development, will contribute most significantly in developing DM related skills. The capacity of existing institutes needs to be upgraded in accordance with Regional and Local requirements.	10.3.1
		<b>Training of Communities:</b> Building the capacity of communities, as they are the first responders to disasters, is a significant part of the capacity development process. It will include awareness, sensitisation, orientation and developing skills of communities and community leaders. The overall responsibility to give impetus to leadership and motivation will rest with local authorities, PRIs and ULBs under the overall guidance of State and District authorities.	10.4.1
		<b>DM Education in Schools:</b> State Governments will ensure the inclusion of disaster management curriculum through State School Boards. The education content will inculcate skill based training, psychological resilience and qualities of leadership. The role of the NCC and Boy Scouts may also be included in schools and colleges for disaster management related work.	10.6.1
		<b>Training of Artisans:</b> The upgradation of the skills of artisans is another crucial component of the capacity building process. The States will be encouraged to promote this activity vigorously.	10.7.1
		<b>Training of Other Groups:</b> Other professional groups such as paramedics, social workers, plumbers, sanitary fitters and safety auditors also play a very important role in community based DM. These groups will also be provided training through suitable programmes.	10.8.1
		<b>Licensing and Certification:</b> The State Governments will develop a scheme to ensure that only adequately qualified professionals practise within its territory. The State Governments will also enforce their own registration benchmarks to uphold desirable standards commensurate with their risk profile.	10.9.1

## C. National Plan and Guidelines on Disaster Management

### I. Flood Risk Mitigation

	<b>Activities</b>	<b>Responsibilities of State Governments</b>	<b>Agencies responsible</b>
<b>Understanding Disaster Risk</b>			
1.	Observation, Networks, Information Systems, Monitoring and Forecasting	<ul style="list-style-type: none"> <li>• Support and cooperate with central agencies</li> <li>• Sponsor state-specific efforts;</li> <li>• Support local efforts</li> </ul>	Irrigation Dept., WRD, SDMA, DDMA, Panchayats, ULBs
2.	Zoning, Mapping, and classification of flood prone areas	<ul style="list-style-type: none"> <li>• Support and cooperate with central agencies</li> <li>• Sponsor state-specific efforts;</li> <li>• Support local efforts</li> </ul>	Irrigation Dept., WRD, SDMA, DDMA, Panchayats, ULBs
3.	Studies and monitoring of rivers flowing from neighbouring countries	<ul style="list-style-type: none"> <li>• Support and cooperate with central agencies</li> <li>• Carry out state-specific efforts</li> <li>• Sponsor state-specific efforts;</li> <li>• Support local efforts</li> </ul>	Irrigation Dept., WRD, SDMA
4.	Research and Development	<ul style="list-style-type: none"> <li>• Support and cooperate with central agencies</li> <li>• Sponsor/ carry out state-specific efforts;</li> <li>• Support local efforts</li> </ul>	Irrigation Dept., WRD, SDMA, relevant state level technical institutions
5.	Hazard Risk Vulnerability Assessment	Undertake HRVA as part of preparing and periodic revision of DM plans	SDMA, CoR, Irrigation Dept., Revenue Dept.
6.	Monitoring, Forecasting and Warning Systems	Support, cooperation for data collection and updates	SDMA, Irrigation Dept., WRD, relevant state level technical institutions
7.	Dissemination of warnings, data and information	<ul style="list-style-type: none"> <li>• Inter-state data and information sharing where applicable</li> <li>• Coordination and cooperation with the central agencies</li> <li>• Ensure facilities and infrastructure for the implementation of adequate access to communities at risk</li> <li>• Dissemination of warnings to all, down to the last mile – remote rural or urban;</li> <li>• Regular updates to people in areas at risk</li> <li>• Warnings using all types of options, types of technologies, and media</li> <li>• Monitoring compliance by various network operators and service providers.</li> </ul>	SDMA, CoR, Irrigation Dept., Revenue Dept. WRD, DDMA, Panchayats, ULBs
<b>Inter-Agency Coordination</b>			
1.	Overall disaster governance	Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks	SDMA, CoR, Revenue Dept., Irrigation Dept., DDMA, Panchayats, ULBs

2.	Response	Organising the immediate response and seeking assistance of central agencies	SDMA, CoR, Revenue Dept., Irrigation Dept., DDMA, Panchayats, ULBs
3.	Warnings, information, Data	Dissemination of warnings to all, down to the last mile – remote, rural or urban; Regular updates to people in areas at risk	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
4.	Non-structural measures	Adapting the norms/ codes as per State's requirement, enforcement, monitoring	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
<b>Investing in DRR–Structural Measures</b>			
1.	Flood control measures such as construction of embankments and levees	<ul style="list-style-type: none"> <li>• Identification safe buildings and sites to serve as temporary shelters for people and livestock evacuated from localities at risk</li> <li>• Construction of multi-purpose shelters in Coastal villages/ habitations prone to frequent cyclone</li> <li>• Proper maintenance of drainage systems and flood embankments</li> </ul>	State, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
2.	Social Housing Schemes	Ensure that flood -resistant features are incorporated in the planning and execution of social housing schemes in flood prone areas	State, SDMA, CoR, Revenue Dept., DRD, UDD, PRD, DDMA, Panchayats, ULBs,
3.	Multi-purpose Flood Shelters	Ensure availability of shelters, undertake proper maintenance, and make arrangements to support the people shifted to temporary shelters	State/UT, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
4.	Waterways and drainage systems for roads highways, and expressways	Coordination and cooperation with the central agencies and ensure proper alignment and design in all state projects	State, SDMA, CoR, Revenue Dept., PWD, DDMA, Panchayats, ULBs
5.	Enhancing the safety of dams and reservoirs	<ul style="list-style-type: none"> <li>• Carry out measures to increase safety, reduce risks from flooding</li> <li>• Undertake pre- and post-monsoon inspections of dams and reservoirs</li> <li>• Monitor the implementation of safety enhancements in accordance with norms</li> </ul>	State, SDMA, CoR, Revenue Dept., Irrigation Dept., WRD
6.	Desilting/ dredging of rivers to improve flow; drainage improvement; floodwater diversion through existing new channels	Implementation as per norms	Irrigation Dept., WRD, SDMA, DDMA, Panchayats, ULBs
7.	Hazard resistant construction, strengthening, and retrofitting of all lifeline structures and critical	Collaboration with technical agencies and implementation	State, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, all relevant

	infrastructure		Departments/Agencies.
<b>Investing in DRR–Non-Structural Measures</b>			
1.	<ul style="list-style-type: none"> <li>Regulation and enforcement of laws, norms, regulations, guidelines</li> <li>Regulation of Reservoirs Integrated Water Resource Management (IWRM)</li> </ul>	<ul style="list-style-type: none"> <li>Implementing land-use regulation for low lying areas as per flood control norms</li> <li>Regulation of inhabitation of low-lying areas along the rivers, nallas and drains</li> <li>Implementing flood management action plan</li> <li>Review and modification of operation manuals for all major dams/ reservoirs</li> <li>Support and cooperate with central agencies; Sponsor state-specific efforts; support local efforts; Cooperate with central efforts</li> <li>Prevention and removal of encroachment into the waterways and natural drainage systems</li> </ul>	Irrigation Dept., WRD, SDMA, CoR, Revenue Dept.
2.	Regulations to promote flood resilient buildings and infrastructure	<ul style="list-style-type: none"> <li>Revise and implement the relevant rules in flood prone areas</li> </ul>	State, SDMA, CoR, Revenue Dept., Local Bodies
3.	<ul style="list-style-type: none"> <li>Wetland conservation and restoration</li> <li>Catchment Area Treatment/ Afforestation</li> </ul>	<ul style="list-style-type: none"> <li>Discourage reclamation of wetlands, natural depressions</li> <li>Action plan managing wetlands and natural drainage systems for flood moderation</li> <li>Implementation of watershed management including catchment area treatment and afforestation programmes</li> </ul>	State, SDMA, CoR, Revenue Dept., Local Bodies
4.	Public Private Partnerships	Promote private participation in disaster management facilities	State, SDMA, CoR, Revenue Dept., DDMA
<b>Capacity Development</b>			
1.	Training	Training and orientation programs for state govt. staff, , professionals for veterinary care and support to disaster-affected animals	SDMA, ATIs, Engineering Training Institutes, SIRD, Police Training Academies
		Incorporating disaster response, search and rescue in the training programs of youth such as village volunteers, and for protection of disaster-affected animals.	SDMA, SIDM, ATI DDMA, Panchayats, ULBs
2.	Curriculum Development	Update curriculum for undergraduate engineering courses to include	Professional Bodies/ Councils

		topics relevant for flood hazard mitigation	
		Introduction of Crisis Management, emergency medical response/recovery and trauma management at Diploma/UG/PG levels for Health Professionals	Health Department of State Governments
		Improving curriculum periodically using new technologies	State Boards of Education
3.	Awareness Generation	<ul style="list-style-type: none"> <li>• Carry out mass media campaigns</li> <li>• Promote culture of disaster risk prevention, mitigation, and better risk management</li> <li>• Promote attitude and behaviour change in the awareness campaigns/ IEC</li> <li>• Promote use of insurance/ risk transfer</li> <li>• Promote Community Radio</li> <li>• Strengthening network of civil society organizations for awareness generation about DRR and DM</li> <li>• Information on care and protection of disaster-affected animals</li> </ul>	State, SDMA, CoR, Revenue Dept., WRD, Irrigation Dept., SIDM, SDRF, Fire and Emergency Services, Civil defence, Police, DMA, Panchayats, ULBs
4.	Mock Drills/ Exercises	Joint planning and execution of emergency drills	
5.	Vocational Training and Skill Development	<ul style="list-style-type: none"> <li>• Conduct training programmes</li> <li>• Develop a team of Trainer-of-Trainers for different trades relevant to flood-resistant construction</li> </ul>	State, SDMA, CoR, Revenue Dept., State level skill development agencies
6.	Empowering women, marginalised, and persons with disabilities	Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of disaster management at the state, district, and local levels	State/UT, SDMA, CoR, Revenue Dept., SIDM, ATI, and other state-level institutions, DDMA, Panchayats, ULBs
7.	Community-Based Disaster Management	<ul style="list-style-type: none"> <li>• Strengthen ability of communities to manage and cope with disasters based on a multi-hazard approach</li> <li>• Strengthen ability of communities to manage and cope with disasters based on a multi-hazard approach</li> <li>• Training for panchayat, SHG, NCC, NSS, Youth, local community organizations</li> </ul>	State Govt., SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs

## 1. Earthquake Risk Mitigation

	Activities	Responsibilities of State Governments	Agencies responsible
<b>Understanding Risk</b>			
1.	<ul style="list-style-type: none"> <li>Earthquake Monitoring Services</li> <li>National Seismological Network</li> <li>Real Time Seismic Monitoring Network (RTSMN)</li> </ul>	Share information widely	State/UT, SDMA, CoR, Revenue Dept.
2.	Earthquake Hazard and Risk Assessment (EHRA)		
3.	Scientific Seismic Zonation	Ensuring implementation, enforcement, compliance and monitoring; awareness creation	State/UT, SDMA, CoR, Revenue Dept., UDD, PWD, ULB, DDMA
4.	Seismic Micro-zonation	Carry out needs assessment from end-users, conduct micro-zonation studies, prioritize important urban areas for micro-zonation, do professional review before adoption	State/UT, SDMA, CoR, Revenue Dept., Technical organizations/agencies
5.	Hazard Risk Vulnerability Assessment	Undertake HRVA as part of preparing and periodic revision of DM plans	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
<b>Inter-Agency Coordination</b>			
1.	Overall disaster governance	Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
2.	Response	Organising the immediate response and seeking assistance of central agencies	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
3.	Non-structural measures	Adapting the norms/ codes as per State's requirement, enforcement, monitoring	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
<b>Investing in DRR–Structural Measures</b>			
1.	Social Housing Schemes	<ul style="list-style-type: none"> <li>Ensure that earthquake resistant features are incorporated in planning and execution of social housing schemes</li> <li>Ensure compliance with relevant building codes</li> </ul>	State/UT, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, DRD, UDD, PRD
2.	Strengthening and seismic retrofitting of prioritized lifeline structures and buildings	Implementation strengthening and seismic retrofitting as per recommendations of safety audits in all govt. departments, agencies,	State/UT, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs

		public utilities, schools, colleges, community halls, etc.	
3.	Hazard resistant construction, strengthening, and retrofitting of all lifeline structures and critical infrastructure	Collaboration with technical agencies and implementation	State/UT, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, PWD, all relevant Departments/ Agencies
<b>Investing in DRR–Non-Structural Measures</b>			
1.	Regulations and model codes for town planning, civil works and public infrastructure	<ul style="list-style-type: none"> <li>• Adopt suitable byelaws for rural and urban areas, put model codes into practice and ensure proper compliance</li> <li>• Ensure strict compliance with code implementation through relevant Departments and agencies</li> </ul>	State/UT, SDMA, CoR , Revenue Dept., UDD, DRD, PWD, All other relevant departments, DDMA, Panchayats, ULBs
2.	Structural safety audit of lifeline structures and buildings. Prioritization of lifeline structures and buildings for strengthening and seismic retrofitting	<ul style="list-style-type: none"> <li>• Carry out safety audit of lifeline buildings and critical infrastructure</li> <li>• Ensure implementation, monitoring, enforcement and proper compliance within state by public, private and individuals</li> </ul>	SDMA, CoR, Revenue Dept., UDD, PWD, DDMA, Panchayats, ULBs
3.	Licensing and certification of professionals	Implement licensing of engineers through appropriate legal framework and institutional mechanism	Relevant Departments
4.	Public Private Partnerships	Promote private participation in disaster management facilities	State/UT, SDMA, CoR, Revenue Dept., DDMA
<b>Capacity Development</b>			
1.	Training	Contribute to the national effort to build the requisite number of trained personnel to handle seismic safety in India Trainings in search and rescue	SDMA, CoR, Revenue Dept., Education Dept., ATIs
2.	Capacity Development	DM related aspects to be included in undergraduate and professional courses	SDMA, CoR, Revenue Dept., Health Dept., Education Dept.
3.	Awareness Generation	<ul style="list-style-type: none"> <li>• Carry out mass media campaigns</li> <li>• Promote culture of disaster risk prevention, mitigation, and better risk management</li> <li>• Promote attitude and behaviour change in the awareness campaigns/ IEC</li> <li>• Promote use of insurance/ risk transfer</li> <li>• Promote Community Radio</li> <li>• Strengthening network of civil</li> </ul>	State/ UT, SDMA, CoR, Revenue Dept., SIDM, ATI Relevant State Govt. Dept., SDRF, Fire and Emergency Services, Civil defence, Police,

		society organizations for awareness generation	
4.	Mock Drills/ Exercises	Joint planning and execution of emergency drills	
5.	Documentation and Dissemination	Popularization and distribution of documentation in local languages	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, ATIs
6.	Empowering women, marginalised, and persons with disabilities	Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of disaster management at the state, district, and local levels	State/UT, SDMA, CoR, Revenue Dept., SIDM, ATI, and other state-level institutions, DDMA, Panchayats, ULBs
7.	Community-Based Disaster Management	<ul style="list-style-type: none"> <li>• Manage and cope with disasters based on a multi-hazard approach</li> <li>• Strengthen ability of communities to manage and cope with disasters based on a multi-hazard approach</li> <li>• Training for panchayat, SHG, NCC, NSS, Youth, local community organizations</li> </ul>	State Govt., SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs

## 2. Landslide and Snow Avalanche Risk Mitigation

	Activities	Responsibilities of State Governments	Agencies responsible
<b>Understanding Risk</b>			
1.	Hazard Zoning, mapping, geological, and geotechnical Investigations in regions prone to landslides and snow avalanches	Support to and cooperation with central agencies	State, SDMA, CoR, Revenue Dept., State DGM, SRSC
2.	Research and Development	Support to and cooperation with central agencies	State, SDMA, CoR, Revenue Dept., State DGM, SRSC
3.	Hazard Risk Vulnerability Assessment	Undertake HRVA as part of preparing and periodic revision of DM plans	State, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
4.	Dissemination of warnings	<ul style="list-style-type: none"> <li>• Ensure facilities and infrastructure for the implementation of adequate access to communities at risk</li> <li>• Dissemination of warnings to all, down to the last mile – remote, rural or urban; Regular updates to people in areas at risk</li> </ul>	State, SDMA, CoR, Revenue Dept., PWD, DDMA, Panchayats, ULBs
5.	Monitoring, Warning Systems, and Dissemination	Support and collaboration in implementation	State, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs

<b>Inter-Agency Coordination</b>			
1.	Overall disaster governance	Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
2.	Response	Organising the immediate response and seeking assistance of central agencies	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
3.	Warnings, Information, Data	Dissemination of warnings to all, down to the last mile – remote, rural or urban; Regular updates to people in areas at risk	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
4.	Non-structural measures	Adapting the norms/ codes as per State's requirement, enforcement, monitoring	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
<b>Investing in DRR–Structural Measures</b>			
1.	Protection of Human Settlements	Improving infrastructure, roads, and land stabilization work	State/UT, SDMA, State DGM, PWD
2.	Protection of Heritage Structures	Support and collaboration	State, SDMA, State DGM, SRSC, DDMA, Panchayats, ULBs
3.	Multi-Hazard Shelters	<ul style="list-style-type: none"> <li>• Identification of safe buildings and sites to serve as temporary shelters for people and livestock evacuated from localities at risk</li> <li>• Construction of multi-purpose shelters in high risk areas at safe sites away from hazard-prone locations</li> <li>• Proper maintenance of roads in risk-prone areas</li> </ul>	State, SDMA, DDMA, Panchayats, ULBs,
<b>Investing in DRR–Non-Structural Measures</b>			
1.	Site selection for Human Settlements in Landslide and Snow Avalanche Prone Areas	<ul style="list-style-type: none"> <li>• Adopt suitable byelaws for rural and urban areas</li> <li>• Enforce model codes into practice and ensure proper compliance</li> <li>• Ensure proper compliance</li> </ul>	State, SDMA, State DGM, DDMA, Local Authorities
2.	Regulations and building codes	Ensure implementation and adherence to codes and guidelines	State, SDMA, UDD, DDMA, Local Authorities
3.	Licensing and certification of professionals	Implement licensing of engineers through appropriate legal framework and institutional mechanism	Relevant Departments
4.	Public Private Partnerships	Promote private participation in disaster management facilities	State, SDMA, DDMA
<b>Capacity Development</b>			
1.	Training	<ul style="list-style-type: none"> <li>• Support and collaboration to national agencies</li> <li>• Training and skill upgrades for search and rescue</li> </ul>	State, State DGM, SRSC, ATIs, SIDM

		<ul style="list-style-type: none"> <li>• Conduct regular training programmes for professionals including those for care and protection of disaster affected animals</li> </ul>	
2.	Curriculum Development	Include information on landslides and snow avalanches in the curriculum	State, SDMA, Education Dept.
3.	Awareness Generation	<ul style="list-style-type: none"> <li>• Carry out mass media campaigns</li> <li>• Promote culture of disaster risk prevention, mitigation, and better risk management</li> <li>• Promote attitude and behaviour change in the awareness campaigns/ IEC</li> <li>• Promote use of insurance/ risk transfer</li> <li>• Promote community radio</li> <li>• Inform people about care and protection of disaster-affected animals</li> </ul>	State, SDMA, SDRF, Fire and Emergency Services, Information Dept., DDMA, Panchayats, ULBs, Civil Defence, Police
4.	Mock Drills/ Exercises	Joint planning and execution of emergency drills	State, SDMA, SDRF, Fire and Emergency Services, Civil Defence, Police, DDMA, Panchayats, ULBs.
5.	Documentation	Constitute multi-institutional and multi-disciplinary teams for carrying out post landslide field investigations, document the lessons learnt and disseminate	State, SDMA, SIDM, ATI, other academic institutions, DDMA, Panchayats, ULBs.
6.	Empowering women, marginalised, and persons with disabilities	Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of disaster management at the state, district, and local levels	State, SDMA, SIDM, ATI, other academic institutions, DDMA, Panchayats, ULBs.
7.	Community-Based Disaster Management	<ul style="list-style-type: none"> <li>• Strengthen ability of communities to manage and cope with disasters based on a multi-hazard approach</li> <li>• Training for panchayat, SHG, NCC, NSS, Youth, local community organizations</li> </ul>	State, SDMA, DDMA, Panchayats, ULBs

### 3. Drought Risk Mitigation

	Activities	Responsibilities of State Governments	Agencies responsible
1.	Vulnerability Maps	<ul style="list-style-type: none"> <li>• Annually, after the end of the South-West monsoon, carry out comprehensive assessment of</li> </ul>	State, SDMA, CoR, Revenue Dept., SDMC, SAUs in collaboration

		<p>water availability for drinking and irrigation in all the dryland farming/drought-prone areas in the state to demarcate blocks and preferably villages</p> <ul style="list-style-type: none"> <li>• Prepare maps of areas likely to face water deficit before onset of next monsoon (demarcate blocks and preferably villages)</li> <li>• Undertake village-wise assessment of water storage in the vulnerable blocks</li> </ul>	with central agencies
2.	Assessment, Monitoring and Early Warning	<ul style="list-style-type: none"> <li>• Coordinate with central agencies in the compilation, for refining forecast accuracy for the region, and analysis of all the drought, water deficit, and crop related data</li> <li>• Ensure functioning of DMC under control of SDMA/ CoR with requisite facilities and staff</li> <li>• Separately, at the end of SW and NE monsoon, as applicable, prepare and update a robust database of micro-level details on rainfall, reservoir/ lake water levels, surface water/ ground water, soil moisture, sowing/ crop conditions and socio-economic factors</li> <li>• Separately, at the end of SW and NE monsoon, prepare crop advisory for blocks that are likely to face water deficit</li> <li>• Separately, at the end of SW and NE monsoons, prepare comprehensive water conservation, re-distribution, and management plan for the areas in the state that are likely to experience water deficit</li> </ul>	State, SDMC, SDMA, CoR, Revenue Dept., Agricultural Dept., Irrigation Dept., Water Supply Dept., SAUs in collaboration with central agencies
3.	Drought Declaration	<ul style="list-style-type: none"> <li>• Monitor key indicators for drought declaration with the support of relevant Central/ State agencies/ Departments</li> <li>• State Govt. to issue a formal declaration of drought affected areas after which Collector will notify the district and talukas affected and initiate drought response measures</li> </ul>	State, SDMA, Revenue Dept., CoR, SDMC, SAU, Agricultural Dept., Irrigation Dept., WRD., Rev. Dep., DDMA, District Collector
4.	Hazard Risk Vulnerability Assessment	<ul style="list-style-type: none"> <li>• Undertake HRVA as part of preparation/revision of DM plans including change in</li> </ul>	State/ UT, SDMA, DDMA, SAU, Agriculture Dept.,

		vulnerability and risk considering climate change scenarios <ul style="list-style-type: none"> <li>Estimate vulnerability of crops to rainfall uncertainties</li> </ul>	Panchayats, ULBs
5.	Research	Conduct research through the university system to cope with water deficit, to manage crops with less water, improve water conservation programs, enhance the productivity of dryland/ rainfed farming	State, SAUs in collaboration with CRIDA, NRAA
<b>Inter-Agency Coordination</b>			
1.	Overall disaster governance	Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks	SDMA, CoR, Revenue Dept., Agriculture Dept., DRD, PRD, DDMA, Panchayats, ULBs
2.	Response	Organising the immediate response and seeking assistance of central agencies	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
3.	Warnings, Information, Data	Dissemination of warnings to all, down to the last mile – remote, rural or urban; Regular updates to people in areas at risk	SDMC, SDMA, CoR, Revenue Dept., Agriculture Dept., Irrigation Dept., WRD, DDMA, Panchayats, ULBs
4.	Non-structural measures	Adapting the norms/ codes as per State's requirement, enforcement, monitoring	SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs
<b>Investing in DRR–Structural Measures</b>			
1.	Storage Facilities	<ul style="list-style-type: none"> <li>Drinking water storage and distribution facilities</li> <li>Fodder storage facilities to maintain fodder banks</li> <li>Rain water harvesting systems – individual and community</li> </ul>	State, SDMA, CoR, Revenue Dept., DDMA, Forest Dept., Water Supply Dept., Panchayats, ULBs, WRD, DRD, PRD, Revenue Dept., other relevant departments
2.	Water Conservation Structures	<ul style="list-style-type: none"> <li>Water harvesting and storage structures</li> <li>Check dams, reservoirs with excess capacity</li> <li>Groundwater recharge augmentation systems</li> </ul>	State/UT, SDMA, CoR, Revenue Dept, DDMA, Panchayats, ULBs, WRD, DRD, PRD, AHD, Revenue Dept., Irrigation Dept., other relevant departments.
3.	Social Housing Schemes	Ensure rainwater harvesting and storage in the social housing schemes especially in drought-prone areas	State/UT, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, WRD, DRD, PRD, AHD, Revenue Dept., Irrigation Dept., other relevant departments.

Investing in DRR–Non-Structural Measures			
1.	Mitigation Measures	<ul style="list-style-type: none"> <li>• Coordinate the efforts of the central agencies in implementing mitigation measures</li> <li>• Promote private participation in disaster management facilities</li> <li>• Improve the implementation of watershed development programmes</li> <li>• Risk management for dryland/ rainfed farmers through agricultural extension, and financial institutions based on assessments at the end of monsoon (SW or NE as applicable)</li> <li>• Drought-Proofing</li> </ul>	State/UT,SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, WRD, DRD, PRD, AHD, Revenue Dept., Irrigation Dept., SAU, Forest/ Environment Dept., Other relevant departments
2.	Promote water conservation, harvesting, efficient irrigation, afforestation Prioritization of lifeline structures and buildings for strengthening and seismic retrofitting	<ul style="list-style-type: none"> <li>• Promote water efficient irrigation systems (sprinklers, drip, etc.)</li> <li>• Promote protective irrigation through micro irrigation systems</li> <li>• Provide advice to farmers to cope with drought, crop management under drought conditions, and efficient water management</li> <li>• Training in water and soil moisture conservation</li> <li>• Promote village-level information systems for natural resource management</li> <li>• Afforestation and other options</li> </ul>	State, SDMA, COR, Revenue Dept., DDMA, Panchayats, ULBs, WRD, DRD, PRD, AHD, Revenue Dept., Irrigation Dept., SAU, Forest Dept.
3.	Agricultural credits, agricultural inputs, finance, marketing, and crop insurance	<ul style="list-style-type: none"> <li>• Need-based credit</li> <li>• Promote financial inclusion</li> <li>• Monitor the availability of credit and other financial support from banks and other financial institutions to farmers in drought-prone areas</li> <li>• Ensure the insurance programmes reach the target audiences (especially dryland/ rainfed farmers) and dependent agricultural labor</li> <li>• Marketing support</li> <li>• Ensuring availability of quality agricultural inputs</li> </ul>	State/UT, DMC, Agriculture Dept., State Rural Coop. Banks, Rural Banks, NABARD, SLBC, DDMA
4.	Reducing climate change impact	Implement various water and soil conservation programmes taking into account climate change impacts	State/UT,SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, WRD, DRD, PRD, Revenue Dept.,

			Irrigation Dept., SAU, Forest Dept.
<b>Capacity Development</b>			
1.	Training and Capacity Building	<ul style="list-style-type: none"> <li>• Formulate and implement national training and capacity building programme for drought management, especially, better water conservation, integrated water management (surface and ground water), and cropping systems</li> <li>• Implement different training programmes for officials at various levels, elected representatives, community leaders, civil society organizations, animal welfare organizations</li> <li>• Ensure availability of qualified and experienced trainers conversant with drought mitigation and management techniques (crop, animal care, integrated water resources – surface and ground water)</li> <li>• Professionals for veterinary care and support to drought-affected animals</li> </ul>	State/UT, SDMA, ATI, SIDM, SDMC, DDMA, Panchayats, ULBs
2.	Curriculum Development	Include basic aspects of disaster management including drought in graduate and post-graduate courses in agriculture and veterinary courses offered by state institutions	State, SAU, Education Dept.
		Include drought mitigation in secondary and higher secondary school curriculum	State, SBSE
3.	Awareness Generation	<ul style="list-style-type: none"> <li>• Carry out mass media campaigns</li> <li>• Promote culture of disaster risk prevention, mitigation, and better risk management covering crop and water management (including conservation of surface and ground water)</li> <li>• Promote attitude and behaviour change in the awareness campaigns/IEC</li> <li>• Promote use of insurance/ risk transfer</li> <li>• Promote community radio Inform people about care and protection of disaster-affected animals</li> </ul>	State, SDMA, CoR, Revenue Dept., all other relevant line departments, DDMA, Panchayats, ULBs, SAU
4.	Empowering women, marginalised, and persons with disabilities	Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of	State, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs,

		disaster management at the state, district, and local levels	Agriculture Dept. AHD, WRD, DRD, PRD, Irrigation Dept., SAU, Forest/ Environment Dept., DSJE, other departments
5.	Drought Management Plans	Ensure development of state, district, block, taluka and village drought management plans	State, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, Agriculture Dept., AHD, WRD, DRD, PRD, Irrigation Dept., SAU, Forest/ Environment Dept.
6.	Mainstreaming drought management in development plans	All state govt. departments/ agencies will mainstream disaster management efforts in their developmental plans	State/UT, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, Agriculture Dept., AHD, WRD, DRD, PRD, Irrigation Dept.

#### 4. Chemical (Industrial) Disasters

	Activities	Responsibilities of State Governments	Agencies responsible
<b>Understanding Risk</b>			
1.	Information Systems and Research	Support and coordination with Central Government	State, SDMA, Industries Dept., SPCB and other relevant departments
2.	Zoning/ Mapping	Industrial zones on basis of hazard potential and effective disaster management for worst case scenarios Carry out the mapping and related studies in collaboration with central agencies, technical organisations.	State, SDMA, Industries Dept., SPCB and other relevant departments
3.	Monitoring	Ensuring implementation, enforcement, compliance and monitoring; awareness creation.	State, SDMA, Industries Dept., SPCB and other relevant departments
4.	Hazard Risk Vulnerability Assessment	Undertake HRVA as part of preparing and periodic revision of DM plans	State, SDMA, DDMA, Panchayats, ULBs and other relevant departments
<b>Inter-Agency Coordination</b>			
1.	Overall disaster governance	Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks	SDMA, CoR, Revenue Dept., Industries Dept., SPCB, DDMA, Panchayats, ULBs
2.	Response	Organising the immediate response and seeking assistance of central agencies	SDMA, CoR, Revenue Dept., Industries Dept., SPCB, DDMA, Panchayats, ULBs

3.	Warnings, Information, Data	Dissemination of warnings to all, down to the last mile – remote, rural or urban; Regular updates to people in areas at risk	SDMA, CoR, Revenue Dept., Industries Dept., SPCB, DDMA, Panchayats, ULBs
4.	Non-structural measures	Adapting the norms/ codes as per State's requirement, enforcement, monitoring	SDMA, CoR, Revenue Dept., Industries Dept., SPCB, DDMA, Panchayats, ULBs
<b>Investing in DRR–Structural Measures</b>			
1.	<ul style="list-style-type: none"> <li>Shelters, evacuation, and support facilities</li> <li>Multiple routes for reliable access and escape</li> <li>Decontamination facilities</li> </ul>	<ul style="list-style-type: none"> <li>Identification of shelters with basic facilities like drinking water and first aid for chemical exposure</li> <li>Ensuring water storage facilities and sources for water for accident containment and fire fighting operations</li> <li>Providing wide roads and multiple routes in the industrial area to allow quick access by first responders and to ensure escape pathways</li> <li>Establish decontamination facilities for off-site emergencies of MAH units</li> </ul>	State/UT, SDMA, Industries Dept., DDMA, Panchayats, ULBs, Industries, Industrial Associations
<b>Investing in DRR–Non-Structural Measures</b>			
1.	<ul style="list-style-type: none"> <li>Laws, Regulations, Techno-Legal regimes</li> <li>Enforcement, Compliance and Monitoring</li> <li>Institutional Arrangements</li> </ul>	<ul style="list-style-type: none"> <li>Formulate rules, norms, and laws such as factories rules consistent with that of ensuring greater safety in hazardous industries and to reduce likelihood of disasters</li> <li>Empower factory inspectorates to take legal actions for noncompliance of MSIHC Rules</li> <li>Review rules to grant compensation to chemical accident victims to improve them in favour of victims</li> <li>Amend land use norms to ensure greater safety and to ensure buffer zones without human settlements in close proximity of hazardous industries</li> <li>Strengthen the conduct of safety audits and enforcement of disaster prevention norms.</li> </ul>	State/UT, SDMA, DDMA, SPCB, Forest/ Environment Dept. Industries Dept., Other relevant depts, Panchayats, ULBs, Industries Associations
2.	Public Private Partnerships	Promote private participation in off-site disaster management facilities Provide legal support for Mutual Assistance Groups among industries within clusters	State/UT, SDMA, DDMA, Industries Associations

		Encourage private participation in enhancing off-site disaster response and mitigation	
<b>Capacity Development</b>			
1.	Training	Training and orientation programs for state govt. staff, and other direct stakeholders	SDMA, State ATIs, SPCB, Industries Dept., DDMA, Panchayats, ULBs, Industries, Associations
2.	Curriculum Development	Incorporating disaster response, search and rescue in the training programs of youth such as village volunteers, civil society, village/ward level leaders	SDMA, SIDM, ATI DDMA, Panchayats, ULBs
		Add more specializations and electives on HAZCHEM and chemical disaster management	Professional Bodies and Councils in States
		Implement the recommendations of reviews in all educational institutions in the state/UT	State, Health Dept.
		Introducing basic DM concepts and precautions related to HAZCHEM	State Education Boards
3.	Awareness Generation	<ul style="list-style-type: none"> <li>• Carry out mass media campaigns</li> <li>• Promote culture of disaster risk prevention, mitigation, and better risk management</li> <li>• Promote attitude and behaviour change in the awareness campaigns/ IEC</li> <li>• Promote use of insurance/ risk transfer</li> <li>• Strengthening network of civil society organizations for awareness generation about DRR and DM</li> <li>• Focus on safety and compliance with SOP at workplace for workers</li> <li>• Information on safety, care and protection of disaster-affected animals</li> </ul>	State/UT, SDMA, SDRF, Fire and Emergency Services, Industries Dept., Civil Defence, Police, DDMA, Panchayats, ULBs
4.	Mock Drills/ Exercises	Joint planning and execution of emergency drills	State, SDMA, Industries Dept., SDRF, Fire and Emergency Services, Civil Defence, Police, DDMA, Panchayats, ULBs, Industries Associations
5.	Empowering women, marginalised, and persons with disabilities	Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of	State, SDMA, SIDM, ATI, and other state-level institutions, DDMA,

		disaster management at the state, district, and local levels	Panchayats, ULBs
6.	Community-Based Disaster Management	<ul style="list-style-type: none"> <li>Strengthen ability of communities to manage and cope with disasters based on a multi-hazard approach</li> <li>Training for panchayat, SHG, NCC, NSS, Youth, local community organizations</li> </ul>	States/UTs, SDMA, DDMA, Panchayats, ULBs

## Preparedness and Response

	Activities	Responsibilities of State Governments	Agencies responsible
1.	Early Warning, Maps, Satellite inputs, Information Dissemination	<ul style="list-style-type: none"> <li>To disseminate early warning signals to the district administration, local authorities, and the public at large in the areas likely to be affected by a disaster so as to reduce loss of life and property</li> <li>Dissemination of warnings and information up to the last mile</li> <li>Ensure appropriate compilation/analysis of received data</li> <li>Use of satellite imageries and other scientific methods for risk assessment and forecasting</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, all other relevant Departments/ Agencies
2.	Evacuation of People and Animals	<ul style="list-style-type: none"> <li>Quick assessment of evacuation needs such as the number of people and animals to be evacuated and mode of evacuation</li> <li>Mobilize transport and resources for evacuation</li> <li>Identify and prepare sites for temporary relocation of affected people and animals</li> <li>Identify requirements of resources for evacuation such as helicopters, aircrafts, high speed boats and ships to be provided to the affected state government</li> <li>Request for central resources, if needed</li> <li>Coordinate with central agencies to mobilise required resources</li> <li>Monitor the situation</li> <li>Earmark resources/ units/ battalions of SDRF for quick deployment</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, FES, DDMA, all other relevant Departments/ Agencies, SDRF, Civil Defence

		<ul style="list-style-type: none"> <li>• Prepare handbook/manuals and SOP for evacuation of people and animals</li> <li>• Undertake review and revise DMPs and SOPs after each major incident</li> <li>• Prepare evacuation plan taking into account local conditions and periodically update it</li> <li>• Undertake mock/simulation drills</li> <li>• Prepare operational checklists</li> <li>• Prepare list of agencies/ organizations who could assist in evacuation</li> <li>• Web-based resource inventory and its regular updates</li> </ul>	
3.	Search and Rescue of People and Animals	<ul style="list-style-type: none"> <li>• Various positions of IRTs (State, District, Sub-division and Tehsil) are trained and activated for response at their respective administrative jurisdiction</li> <li>• SDRF teams are trained, equipped and ready to move at a short notice to the affected areas</li> <li>• Strategic stationing of state of the art equipment for search, rescue and response with dedicated trained manpower</li> <li>• MoU is in place with suppliers for blankets, tarpaulins, tents, boats, inflatable lights, torches, ropes, etc. with a condition that they will be supplied quickly at short notice (usually within 24 hours)</li> <li>• Nodal officer selected for coordination is in regular touch with MHA/NDMA for additional requirements (including help from other Central Ministries)</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, SDRF, FES, DDMA, all other relevant Departments/ Agencies, Civil Defence
4.	Medical Care	<ul style="list-style-type: none"> <li>• Health and Family Welfare Dept. Works with the logistic section of the state level IRT to provide effective services (Medical Unit) to the field level IRTs for response.</li> <li>• District wise repository of hospitals (both Government and Private), availability of beds, doctors, paramedics and other trained staff available along with other infrastructure details and</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, SDRF, FES, DDMA, Health Dept., all other relevant departments, Civil Defence

		<p>update it on a regular basis</p> <ul style="list-style-type: none"> <li>• Include the hospital wise information in the DM Plans at local levels</li> <li>• Tie-up with the companies for easy availability of common medicines during the emergency situations</li> <li>• Hygienic conditions are prevalent at all times in various facilities established as well as hospitals to curb the spread of Diseases</li> <li>• Establishment of sound protocols for coordination between state's health Dept. and the central agencies</li> <li>• Ensure strict compliance with minimum standards of relief as per Section 12 of DM Act 2005</li> </ul>	
5.	Drinking Water/ Dewatering Pumps/ Sanitation Facilities/ Public Health	<ul style="list-style-type: none"> <li>• Ensure strict compliance with minimum standards of relief as per Section 12 of DM Act 2005</li> <li>• Provide disaster-affected areas with clean drinking water and to prevent the spread of water borne diseases</li> <li>• Provide emergency water supplies when there is scarcity of potable water</li> <li>• Respond to the public health needs so as to prevent and mitigate a sudden outbreak of epidemic, water and food contamination as well as other public health-related problems in the aftermath of a disaster</li> <li>• Dept. of Water Resources and Drinking Water and Sanitation works with the logistic section of the state level IRT to provide effective services to the field level IRTs</li> <li>• Necessary arrangements are made for supplying drinking water through tankers</li> <li>• Necessary arrangements are made for supplying chlorine tablets</li> <li>• MoU is in place with vehicle manufacturers for vehicle mounted RO Systems with integrated power source and</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, WRD, Water Supply and Sanitation Dept., Health Dept. all other relevant Departments/ Agencies, Civil Defence

		<p>pouch facility with a condition that system should be in place usually within 6 hours of placing order</p> <ul style="list-style-type: none"> <li>• MoU is in place with companies for providing vehicle mounted heavy duty dewatering pumps with a condition to make them available usually within 6 hours of request</li> <li>• Availability of hygienic portable toilets and bleaching powder through pre- disaster agreements/ contracts with suppliers</li> </ul>	
6.	Food& Essential Supplies	<ul style="list-style-type: none"> <li>• Dept. of Food and Civil Supply works with the logistic section of the state level IRT to provide effective services to the field level IRTs for response</li> <li>• Agreements/MoUs with organisations, trusts, and firms for setting up community kitchens in the affected areas</li> <li>• Depending upon the requirement, coordinate with the relevant Central Ministry to make sure that the supplies reach the site on time</li> <li>• Deploy a dedicated team at the local level to receive the supplies, maintain log (manual or computerized), and distribute them at required locations</li> <li>• Food godowns have sufficient food materials and not situated at vulnerable location</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, Food and Civil Supply Dept., all other relevant Departments, Civil Defence
7.	Communication	<ul style="list-style-type: none"> <li>• Failsafe communication plan is prepared with all early warning agencies</li> <li>• Logistic section of the state level IRT coordinates with central agencies to provide effective communication support to the field level IRTs for response.</li> <li>• State and district EOCs are equipped with satellite phones/ VHF/ HF as a backup to the landline</li> <li>• All communication equipment, especially the satellite phones are in good working condition</li> </ul>	State/UT, SDMA, Revenue Dept., COR, SEOC, DDMA, Information Dept., all other relevant departments

		<p>24x7 on all days through regular testing</p> <ul style="list-style-type: none"> <li>• Plans for communication including telephone and HAM is prepared for smooth coordination with the field level IRTs</li> <li>• Establish protocols and responsibilities for coordinating with central agencies and various service providers</li> <li>• Prepare, update and maintain a District wise list of HAM Operators who could be contacted and deployed at the site of emergency</li> <li>• Have binding agreements with telecom service providers to restore damaged facilities and set up temporary facilities on emergency basis</li> <li>• Ensure Inter-Operability among different telecom service providers</li> </ul>	
8.	Housing and Temporary Shelters	<ul style="list-style-type: none"> <li>• Ensure strict compliance with minimum standards of relief as per Section 12 of DM Act 2005</li> <li>• Logistic section of the state level IRT must coordinate with Railways to provide effective services to the field level IRTs for response</li> <li>• Alternate places for establishment of facilities as mentioned in the IRS guidelines such as relief camp, base, camp etc. are identified in advance and included in the local DM Plan</li> <li>• Identify shelter suppliers for supply of tents/ shelters up to the village level and enter into an MoU for supply at short notice (usually less than 24 hours) as per requirement</li> <li>• Stockpile tents, tarpaulins and temporary shelter material in regional warehouses/ stores/ ERCs</li> <li>• Depending upon the requirement, coordinate with the relevant Central Ministry to make sure that the tents/ shelters</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA,UDD., all other relevant Departments

		<p>reach the site on time</p> <ul style="list-style-type: none"> <li>• Deploy a dedicated team at the local level to receive the tents/ shelters</li> <li>• Maintain logs (manual or computerized) of all material movements and details of distribution to required locations</li> </ul>	
9.	Power	<ul style="list-style-type: none"> <li>• Electricity Board and Power Distribution Companies work with the logistic section of the state level IRT to provide effective services to the field level IRTs for response</li> <li>• Pre-disaster arrangements for quick restoration of power supply with alternate mechanisms to critical facilities usually within 6 to 12 hours of placement of order</li> <li>• Pre-disaster agreements with central and neighbouring state governments for technical support in restoration of power supply and infrastructure</li> <li>• Mobile power supply units or other arrangements with power generation companies for quick deployment at the site during emergency</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, Electricity Board, Power Distribution Companies, all other relevant Departments
10.	Fuel	<ul style="list-style-type: none"> <li>• Logistic section of the state level IRT to coordinate with the relevant departments/ agencies to provide effective services (Ground Support Unit) to the field level IRTs for response</li> <li>• Assess and indicate clear requirement of fuel to the Central Ministry and coordinate the delivery of fuel through local arrangements.</li> <li>• Ensure sufficient availability of tankers/ other vehicles for local transportation through the relevant Dept.</li> <li>• Establish mechanism for stocking the fuel at strategic locations with relevant agencies</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, Civil Supply Dept., all other relevant Departments
11.	Transportation	<ul style="list-style-type: none"> <li>• Dept. of Transport works with the logistic section of the state level IRT to provide effective</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, Transport Dept.,

		<p>services (Ground Support Unit) to the field level IRTs for response</p> <ul style="list-style-type: none"> <li>• Requirement of transport for the sending the relief material, responders are arranged</li> <li>• Need of the transport of various activated section of the IRT as per Incident Action Plan is fulfilled</li> <li>• Indian Railway works with the logistic section of the state level IRT to provide effective services (Ground Support Unit)</li> <li>• Restoration of railway tracks and functioning of railway at the earliest</li> <li>• Coordinate with Central Govt. For transportation of relief materials</li> <li>• Within and near Airports: AAI works with the logistic section of the state level IRT to provide effective services (Ground Support Unit) and also provide Nodal Officer for coordination of the relief operations</li> <li>• Restoration of Airport at the earliest involving specialised response force of the central government</li> <li>• Coordination with state and district administration to provide air support</li> <li>• Cater to the needs of transporting affected people if required</li> </ul>	<p>Forest/ Environment Dept., PWD, Railways, Airport Officer, all other relevant Departments</p>
12.	Relief Logistics and Supply Chain Management	<ul style="list-style-type: none"> <li>• Establish a mobilisation centre at the airport/railway station for the movement of relief supplies within the state</li> <li>• Deploy special transport mechanism for the movement of relief supplies within the state</li> <li>• Make arrangements to receive and distribute relief and emergency supplies received from different parts of the country</li> <li>• Coordinate transportation (air, rail, road, water) with Central ministries/ departments/ agencies</li> </ul>	<p>State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, all other relevant Departments/ Agencies</p>

		<ul style="list-style-type: none"> <li>• Arrange alternative means of transportation to send relief supplies to the affected locations if normal transport cannot reach</li> </ul>	
13.	Disposal of animal carcasses	<ul style="list-style-type: none"> <li>• Equip and train the staff in carcass removal/ disposal at pre-identified sites to ensure that no other health hazard is created both for the staff as well as general public</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, Forest/ Environment Dept., Agriculture Dept., AHD, Animal Welfare Organizations
14.	Fodder for livestock in scarcity-hit areas	<ul style="list-style-type: none"> <li>• Mobilize fodder and cattle feed to meet shortages, as in drought or scarcity conditions</li> <li>• Transport fodder from storage facilities or collection centres to the scarcity-hit areas</li> <li>• Organize collection centres for fodder and cattle feed</li> <li>• Enlist PSUs and private agencies for providing fodder and other support</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, Forest/ Environment Dept., Agriculture Dept., AHD, Animal Welfare Organizations
15.	Rehabilitation and Ensuring Safety of Livestock and Other Animals, Veterinary Care	<ul style="list-style-type: none"> <li>• Include provisions for evacuation, safety, and rehabilitation of animals in SDMP</li> <li>• Set up of livestock camps/ shelters for animals in distress due to disasters, including drought</li> <li>• Organize proper care of animals in the camps/ shelters</li> <li>• Ensure proper management and running of livestock camps/ shelters</li> <li>• Proper rehabilitation of animals</li> <li>• Provide veterinary care to disaster-affected livestock, including in drought-hit areas</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, Forest/ Environment Dept., Agriculture Dept., AHD, Animal Welfare Organizations
16.	Data Collection and Management	<ul style="list-style-type: none"> <li>• Representative of SDMA works with the planning section at state level for making of IAP and dissemination of information.</li> <li>• Creation of a cell at the District level (preferably as part of DEOC) and place dedicated resources to collect/ update data on all essential services (as per the template given in the IRS guidelines) which will help during the response phase for</li> </ul>	State/UT, Revenue Dept./ SEOC/ CoR, SDMA, DDMA, Bureau of Economics and Statistics, all other relevant Departments

		effective reporting an compilation.	
17.	Relief Employment	<ul style="list-style-type: none"> <li>• Provide opportunities for unskilled work in public works for people seeking work in drought affected areas as a relief measure</li> <li>• Ensure quick and prompt payment of wages</li> <li>• Carry out health check-up of those seeking work</li> <li>• Draw from various funds including Disaster Response Fund to implement the employment schemes</li> </ul>	State/UT, Revenue Dept./ CoR, SDMA, DDMA
18.	Media Relations	<ul style="list-style-type: none"> <li>• Dept. of Information and Public Relations works with the Command staff as Information and media officer of the state level IRT to provide effective services</li> <li>• Ethical guidelines for coverage of disaster is prepared and shared with all media agencies</li> <li>• Plan is prepared for providing/ broadcasting warnings, do's and don'ts etc. to media and ensure its dissemination</li> </ul>	State/UT, SDMA, Revenue Dept., CoR, SEOC, DDMA, Information Dept., all other relevant Departments

## Risk Governance

	Activities	Responsibilities of State Governments	Agencies responsible
1.	<ul style="list-style-type: none"> <li>• Mainstream and integrate disaster risk reduction within and across all sectors</li> <li>• Institutional Strengthening</li> </ul>	<ul style="list-style-type: none"> <li>• Promote the coherence and development of relevant laws, regulations, and public policies</li> <li>• Adopt and implement disaster risk reduction strategies and plans, across different levels and timescale</li> <li>• Carry out assessment of the technical, financial and administrative capacity for disaster risk management at all levels within the state</li> <li>• Make institutions efficient and responsive</li> <li>• Improve work culture</li> <li>• Develop mechanisms, and processes to ensure transparency and</li> </ul>	State/UT,SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, all departments involved in disaster management

		<p>accountability</p> <ul style="list-style-type: none"> <li>• Enhance relevant mechanisms and initiatives for transparency</li> <li>• Strengthen/ establish coordination and convergence mechanisms at state, district, and local levels</li> <li>• Carry out assessment of the technical, financial and administrative disaster risk management capacity at state, district, and local levels</li> <li>• Promote necessary mechanisms and incentives to ensure high levels of compliance with the safety-enhancing provisions</li> <li>• Make institutions efficient and responsive;</li> <li>• Improve work culture</li> <li>• Develop mechanisms, and processes to ensure transparency and accountability</li> </ul>	
2.	Capacity Development	<ul style="list-style-type: none"> <li>• Implementation in state ministries, departments, and agencies</li> <li>• Involving communities, panchayats, municipalities, urban local bodies, etc., elected representatives, civil society organizations, private sector, and educational institutions;</li> <li>• Develop capabilities at state, district, block, and local levels to understand disaster risk, develop DM plans, implement relevant policies, laws, and ensure compliance with risk reduction safety standards</li> </ul>	State/UT,SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, All departments involved in disaster management
3.	Promote Participatory Approaches	<ul style="list-style-type: none"> <li>• Empower local authorities</li> <li>• Implement participatory approaches in disaster management based on a multi-hazard approach, with emphasis on hazards more frequent in the region/ location</li> <li>• Establish and strengthen government coordination forums composed of relevant stakeholders</li> <li>• Promote for participation of individuals, households, communities, and businesses</li> </ul>	State/UT,SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, All departments involved in disaster management, especially DRD and UDD

		in all aspects of disaster management	
4.	Work with elected representatives	<ul style="list-style-type: none"> <li>• Sensitize the political leadership</li> <li>• Involve the political leadership at state, district, block, and local levels in discussions on disaster management</li> </ul>	State/UT, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, All departments involved in disaster management, especially DRD and UDD
5.	Grievance redress mechanism	Ensuring the functioning of a sound grievance redress mechanism in all the ministries/ agencies involved in disaster response	State/UT, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs, all departments involved in disaster response
6.	Promote quality standards, such as certifications and awards for disaster risk management	<ul style="list-style-type: none"> <li>• Ensure implementation of standards</li> <li>• Develop suitable bye-laws specifically for urban and rural areas</li> <li>• Monitor compliance</li> </ul>	State/UT, SDMA, CoR, Revenue Dept., DDMA, Panchayats, ULBs

## NATIONAL AND LOCAL LEVEL ACTIVITIES PRESCRIBED UNDER GLOBAL FRAMEWORKS ON DISASTER MANAGEMENT

### A. Sendai Framework for Disaster Risk Reduction 2015-2030

#### Priority of Action-1: Understanding Risks

(a) Promote the collection, analysis, management and use of relevant data and practical information. Ensure its dissemination, taking into account the needs of different categories of users, as appropriate;

(b) Encourage the use of and strengthening of baseline and periodically assess disaster risks, vulnerability, capacity, exposure, hazard characteristics and their possible sequential effects at the relevant social and spatial scale on ecosystems in line with national circumstances;

(c) Develop, update periodically and disseminate, as appropriate, location - based disaster risk information, including risk maps, to decision makers, the general public and communities at risk to disaster in an appropriate format by using, as applicable, geospatial information technology;

(d) Systematically evaluate, record, share and publicly account for disaster losses and understand the economic, social, health, education, environmental and cultural heritage impacts, as appropriate, in the context of event -specific hazard-exposure and vulnerability information;

(e) Make non-sensitive hazard exposure, vulnerability, risk, disasters and loss disaggregated information freely available and accessible, as appropriate;

(f) Promote real-time access to reliable data, make use of space and in situ information, including geographic information systems (GIS), and use information and communications technology innovations to enhance measurement tools and the collection, analysis and dissemination of data;

(g) Build the knowledge of government officials at all levels, civil society, communities and volunteers, as well as the private sector, through sharing experiences, lessons learned, good practices and training and education on disaster risk reduction, including the use of existing training and education mechanisms and peer learning;

(h) Promote and improve dialogue and cooperation among scientific and technological communities, other relevant stakeholders and policymakers in order to facilitate a science-policy interface for effective decision -making in disaster risk management;

(i) Ensure the use of traditional, indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment and the development and implementation of policies, strategies, plans and programmes of specific sectors, with a cross-sectoral approach, which should be tailored to localities and to the context;

(j) Strengthen technical and scientific capacity to capitalize on and consolidate existing

knowledge, and to develop and apply methodologies and models to assess disaster risks, vulnerabilities and exposure to all hazards;

(k) Promote investments in innovation and technology development in long - term, multi-hazard and solution-driven research in disaster risk management to address gaps, obstacles, interdependencies and social, economic, educational and environmental challenges and disaster risks;

(l) Promote the incorporation of disaster risk knowledge, including disaster prevention, mitigation, preparedness, response, recovery and rehabilitation, in formal and non-formal education, as well as in civic education at all levels, as well as in professional education and training;

(m) Promote national strategies to strengthen public education and awareness in disaster risk reduction, including disaster risk information and knowledge, through campaigns, social media and community mobilization, taking into account specific audiences and their needs;

(n) Apply risk information in all its dimensions of vulnerability, capacity and exposure of persons, communities, countries and assets, as well as hazard characteristics, to develop and implement disaster risk reduction policies;

(o) Enhance collaboration among people at the local level to disseminate disaster risk information through the involvement of community-based organizations and non-governmental organizations.

#### **Priority of Action-2: Strengthening disaster risk governance to manage disaster risk**

(a) Mainstream and integrate disaster risk reduction within and across all sectors. Review and promote the coherence and further development , as appropriate, of national and local frameworks of laws, regulations and public policies, which, by defining roles and responsibilities, guide the public and private sectors to: (i) address disaster risk in publically owned, managed or regulated services and infrastructures; (ii) promote and provide incentives, as relevant, for actions by persons, households, communities and businesses; (iii) enhance relevant mechanisms and initiatives for disaster risk transparency, which may include financial incentives, public awareness-raising and training initiatives, reporting requirements and legal and administrative measures; and (iv) put in place coordination and organizational structures;

(b) Adopt and implement national and local disaster risk reduction strategies and plans, across different timescales with targets, indicators and time frames, aimed at preventing the creation of risk, the reduction of existing risk and the strengthening of economic, social, health and environmental resilience;

(c) Carry out an assessment of the technical, financial and administrative disaster risk management capacity to deal with the identified risks at local and national level;

(d) Encourage the establishment of necessary mechanisms and incentives to ensure high levels of compliance with existing safety-enhancing provisions of sectoral laws and regulations, including those addressing land use and urban planning, building codes, environmental and resource management and health and safety standards, and update them, where needed, to ensure an adequate focus on disaster risk management;

(e) Develop and strengthen, as appropriate, mechanisms to follow -up, periodically assess and publicly report on progress on national and local plans. Promote public scrutiny and encourage institutional debates, including by parliamentarians and other relevant officials, on progress reports

of local and national plans for disaster risk reduction;

(f) Assign, as appropriate, clear roles and tasks to community representatives within disaster risk management institutions and processes and decision-making through relevant legal frameworks. Undertake comprehensive public and community consultations during the development of such laws and regulations to support their implementation;

(g) Establish and strengthen government coordination forums composed of relevant stakeholders at national and local levels, such as national and local platforms for disaster risk reduction, and a designated national focal point for implementing the post-2015 framework. It is necessary for such mechanisms to have a strong foundation in national institutional frameworks with clearly assigned responsibilities and authority to, inter alia, identify sectoral and multisectoral disaster risk, build awareness and knowledge of disaster risk through sharing and dissemination of non-sensitive disaster risk information and data, contribute to and coordinate reports on local and national disaster risk, coordinate public awareness campaigns on disaster risk, facilitate and support local multi-sectoral cooperation (e.g. among local governments), contribute to the determination of and reporting on national and local disaster risk management plans and all policies relevant for disaster risk management. These responsibilities should be established through laws, regulations, standards and procedures;

(h) Empower local authorities, as appropriate, through regulatory and financial means to work and coordinate with civil society, communities and indigenous peoples and migrants in disaster risk management at the local level;

(i) Encourage parliamentarians to support the implementation of disaster risk reduction through developing new or amending relevant legislation and setting budget allocations;

(j) Promote the development of quality standards, such as certifications and awards for disaster risk management, with the participation of the private sector, civil society, professional associations, scientific organizations and the United Nations;

(k) Formulate public policies, where applicable, aimed at addressing the issues of prevention or relocation, where possible, of human settlements in disaster risk zones, subject to national law and legal systems.

### **Priority of Action-3: Investing in disaster risk reduction for resilience**

(a) Allocate the necessary resources, including finance and logistics, as appropriate, at all levels of administration for the development and the implementation of disaster risk reduction strategies policies, plans, laws and regulations in all relevant sectors;

(b) Promote mechanisms for disaster risk transfer and insurance, risk sharing and retention and financial protection, as appropriate, for both public and private investment in order to reduce the financial impact of disasters on governments and societies, in urban and rural areas;

(c) Strengthen, as appropriate, disaster resilient public and private investments, particularly through: structural, non-structural and functional disaster risk prevention and reduction measures in critical facilities, in particular schools and hospitals and physical infrastructures; building better from the start to withstand hazards through proper design and construction, including the use of the principles of universal design and the standardization of building materials; retrofitting and rebuilding; nurturing a culture of maintenance; and taking into account economic, social, structural, technological and environmental impact assessments;

(d) Protect or support the protection of cultural and collecting institutions and other sites of historical, cultural heritage and religious interest;

(e) Promote the disaster risk resilience of work places through structural and non-structural measures;

(f) Promote the mainstreaming of disaster risk assessments into land -use policy development and implementation, including urban planning, land degradation assessments and informal and non-permanent housing, and the use of guidelines and follow-up tools informed by anticipated demographic and environmental changes;

(g) Promote the mainstreaming of disaster risk assessment, mapping and management into rural development planning and management of, inter alia, mountains, rivers, coastal flood plain areas, drylands, wetlands and all other areas prone to droughts and flooding, including through the identification of areas that are safe for human settlement and at the same time preserving ecosystem functions that help reduce risks;

(h) Encourage the revision of existing or the development of new building codes, standards, rehabilitation and reconstruction practices at the national or local levels, as appropriate, with the aim of making them more applicable in the local context, particularly in informal and marginal human settlements, and reinforce the capacity to implement, survey and enforce such codes, through an appropriate approach, with a view to fostering disaster -resistant structures;

(i) Enhance the resilience of national health systems, including by integrating disaster risk management into primary, secondary and tertiary health care, especially at the local level; developing the capacity of health workers in understanding disaster risk and applying and implementing disaster risk reduction approaches in health work; and promoting and enhancing the training capacities in the field of disaster medicine; and supporting and training community health groups in disaster risk reduction approaches in health programmes, in collaboration with other sectors, as well as in the implementation of the International Health Regulations (2005) of the World Health Organization;

(j) Strengthen the design and implementation of inclusive policies and social safety-net mechanisms, including through community involvement, integrated with livelihood enhancement programmes, and access to basic health care services, including maternal, newborn and child health, sexual and reproductive health, food security and nutrition, housing and education, towards the eradication of poverty, to find durable solutions in the post-disaster phase and to empower and assist people disproportionately affected by disasters;

(k) People with life threatening and chronic disease, due to their particular needs, should be included in the design of policies and plans to manage their risks before, during and after disasters, including having access to life -saving services;

(l) Encourage the adoption of policies and programmes addressing disaster-induced human mobility to strengthen the resilience of affected people and that of host communities as per national laws and circumstances;

(m) Promote, as appropriate, the integration of disaster risk reduction considerations and measures in financial and fiscal instruments;

(n) Strengthen the sustainable use and management of ecosystems and implement integrated environmental and natural resource management approaches that incorporate disaster risk reduction;

(o) Increase business resilience and protection of livelihoods and productive assets throughout the supply chains. Ensure continuity of services and integrate disaster risk management into business models and practices;

(p) Strengthen the protection of livelihoods and productive assets, including livestock, working animals, tools and seeds;

(q) Promote and integrate disaster risk management approaches throughout the tourism industry, given the often heavy reliance on tourism as a key economic driver.

**Priority of Action-4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction**

(a) Prepare or review and periodically update disaster preparedness and contingency policies, plans and programmes with the involvement of the relevant institutions, considering climate change scenarios and their impact on disaster risk, and facilitating, as appropriate, the participation of all sectors and relevant stakeholders;

(b) Invest in, develop, maintain and strengthen people -centred multi-hazard, multisectoral forecasting and early warning systems, disaster risk and emergency communications mechanisms, social technologies and hazard -monitoring telecommunications systems. Develop such systems through a participatory process. Tailor them to the needs of users, including social and cultural requirements, in particular gender. Promote the application of simple and low -cost early warning equipment and facilities and broaden release channels for natural disaster early warning information;

(c) Promote the resilience of new and existing critical infrastructure, including water, transportation and telecommunications infrastructure, educational facilities, hospitals and other health facilities, to ensure that they remain safe, effective and operational during and after disasters in order to provide live -saving and essential services;

(d) Establish community centres for the promotion of public awareness and the stockpiling of necessary materials to implement rescue and relief activities;

(e) Adopt public policies and actions that support the role of public service workers to establish or strengthen coordination and funding mechanisms and procedures for relief assistance and to plan and prepare for post -disaster recovery and reconstruction;

(f) Train the existing workforce and voluntary workers in disaster response and strengthen technical and logistical capacities to ensure better response in emergencies;

(g) Ensure the continuity of operations and planning, including social and economic recovery, and the provision of basic services in the post -disaster phase;

(h) Promote regular disaster preparedness, response and recovery exercises, including evacuation drills, training and the establishment of area -based support systems, with a view to ensuring rapid and effective response to disasters and related displacement, including access to safe shelter, essential food and non -food relief supplies, as appropriate to local needs;

(i) Promote the cooperation of diverse institutions, multiple authorities and related stakeholders at all levels, including affected communities and business, in view of the complex and costly nature of post -disaster reconstruction, under the coordination of national authorities;

(j) Promote the incorporation of disaster risk management into post-disaster recovery and rehabilitation processes, facilitate the link between relief, rehabilitation and development. Use

opportunities during the recovery phase to develop capacities that reduce disaster risk in the short, medium and long term, including through the development of measures such as land use planning, structural standards improvement and the sharing of expertise, knowledge, post-disaster reviews and lessons learned. Integrate post-disaster reconstruction into the economic and social sustainable development of affected areas. This should also apply to temporary settlements for persons displaced by disaster;

(k) Develop guidance for preparedness for disaster reconstruction, such as on land use planning and structural standards improvement, including by learning from the recovery and reconstruction programmes over the decade since the adoption of the Hyogo Framework for Action, and exchanging experiences, knowledge and lessons learned;

(l) Consider the relocation of public facilities and infrastructures to areas outside the risk range, wherever possible, in the post-disaster reconstruction process, in consultation with the people concerned, as appropriate;

(m) Strengthen the capacity of local authorities to evacuate persons living in disaster-prone areas;

(n) Establish a mechanism of case registry and a database of mortality caused by disaster in order to improve the prevention of morbidity and mortality;

(o) Enhance recovery schemes to provide psychosocial support and mental health services for all people in need;

(p) Review and strengthen, as appropriate, national laws and procedures on international cooperation, based on the guidelines for the domestic facilitation and regulation of international disaster relief and initial recovery assistance.

## B. Sustainable Development Goals and Targets with embedded elements of disaster risks and resilience

Sustainable Development Goals	Sustainable Development Targets
<b>Goal 1.</b> End poverty in all its forms everywhere	<b>Target 1.5</b> By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.
<b>Goal 2.</b> End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	<b>Target 2.1</b> By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round. <b>Target 2.4</b> By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.
	<b>Target 3.6</b> By 2020, halve the number of global deaths

<p><b>Goal 3.</b> Ensure healthy lives and promote well-being for all at all ages</p>	<p>and injuries from road traffic accidents  <b>Target 3d</b> Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.</p>
<p><b>Goal 4.</b> Ensure inclusive and equitable quality education and promote life-long learning opportunities for all</p>	<p><b>Target 4a</b> Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all</p>
<p><b>Goal 9.</b> Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</p>	<p><b>Target 9.1</b> Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all</p>
<p><b>Goal 11.</b> Make cities and human settlements inclusive, safe, resilient and sustainable</p>	<p><b>Target 11.2</b> By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons  <b>Target 11.5</b> By 2030, significantly reduce the number of deaths and the number of people affected and decrease by [x] per cent the economic losses relative to gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.  <b>Target 11b</b> By 2020, increase by [x] per cent the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, develop and implement, in line with the forthcoming Hyogo Framework, holistic disaster risk management at all levels</p>
<p><b>Goal 13.</b> Take urgent action to combat climate change and its impacts.</p>	<p><b>Target 13.1</b> Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.  <b>Target 13.3</b> Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning  <b>Target 13b</b> Promote mechanisms for raising capacities for effective climate change related planning and management, in least development countries, including focusing on women, youth, local and marginalised communities.</p>
<p><b>Goal 14.</b> Conserve and sustainably use the oceans, seas and marine resources for sustainable development</p>	<p><b>Target 14.2</b> By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.</p>
<p><b>Goal 15.</b> Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat</p>	<p><b>Target 15.3</b> By 2020, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation-neutral world.</p>

desertification, and halt and reverse land degradation and halt biodiversity loss	
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### **C. Disaster Risk Reduction in Paris Agreement on Climate Change**

Article 8 of the Paris Climate Agreement outlined eight specific action areas for enhancing ‘understanding, action and support’ for disaster reduction. These are:

- (a) Early warning systems;
- (b) Emergency preparedness;
- (c) Slow onset events;
- (d) Events that may involve irreversible and permanent loss and damage;
- (e) Comprehensive risk assessment and management;
- (f) Risk insurance facilities, climate risk pooling and other insurance solutions;
- (g) Non-economic losses; and
- (h) Resilience of communities, livelihoods and ecosystems.

**MINISTRY OF HOME AFFAIRS  
DISASTER MANAGEMENT DIVISION**

**UNDP-MHA Project on  
Development of Disaster Score Card**

**QUESTIONNAIRE FOR DATA COLLECTION FROM STATES/ UTS**

**PART-1: RISK ASSESSMENT**

[Mandates: DM Act: Sections 22 (2)(b), 23 (4)(a), 30 (3)(iii), 31 (3)(a); National DM Policy: Para 5.1.2; National DM Plan: Para 3.2.1, 3.3.1, 3.4.1, 3.5.1, 3.6.1, 3.7.1, 3.8.1, 3.10.1, 3.11.1, Sendai Framework: Priority-1: Understanding Risks, Para 24]

**1.1 Hazard Vulnerability Risk Assessment**

1. Has the State Government undertaken Hazard Vulnerability Risk Assessment (HVRA) of the State as part of preparation of State, District and Departmental Disaster Management Plans? Yes/ No
2. If yes, name the agency that prepared the HVRA study and the year when the study was undertaken.
3. Is the HVRA available online in public domain? Yes/ No
4. If yes, mention the URL.

**1.2 Digital Risk Mapping in Public Domain**

5. Are hazard-wise district-wise risk maps of the State available online in digital format?  
Yes/ No
6. If yes, mention the URL.
7. What is the resolution of the maps? What is the lowest administrative unit for which the map is available?

### **1.3 Real Time Data on Risks and Disasters**

8. Is disaster risk related data such as earthquake, tsunami, flood cyclone etc available to the stakeholders on a real time basis? Yes/ No
9. If yes, please provide a link to the database.

### **1.4 Micro Zonation of Earthquake Risks**

10. How many cities and towns of the State/ UT have micro-zonation of earthquake? Give details. (Give URL if the study report is available online).
11. If it is not available online, give a brief resume mentioning inter alia the names of the cities, year the study was undertaken and the agency that did the study.

### **1.5 Flood Risk Assessment**

12. Has the State/ UT undertaken any study for assessing risks of flood, particularly for urban flood? Yes/No.
13. If yes, give the URL if the study report if is available online.
14. If it is not available online, give a brief resume mentioning inter alia the year the study was undertaken and the agency that did it.

### **1.6 Drought Risk Assessment**

15. Have the State/ UT undertaken any special study for assessing the risks of drought? Yes/No.
16. If yes, give the URL if the study report if is available online.

17. If it is not available online, give a brief resume mentioning inter alia the year the study was undertaken and the agency that did it.
18. What are the key indicators monitored by the State/ UT for declaring drought? How are data on the indicators collected?

### **1.7 Dissemination of Risk Information to People**

19. Give a brief resume of the steps taken by the State/ UT for the dissemination of risk assessment to the general public, particularly at the community level.

### **1.8 Assessing Traditional and Local Knowledge**

20. Does the State make use of traditional, indigenous and local knowledge for risk assessment? Yes/No.
21. If yes explain the process for using such knowledge, such as documentation, analysis and integration of such knowledge with scientific knowledge of risk assessment.

### **1.9 Assessing Patterns of Emerging Risks**

22. What are the emerging risks of disasters (such as climate change, urban risks, technological risks)? Have these risks been assessed in the State. Give details.

### **1.10 Developing Database on Disasters**

23. Has the State/ UT developed any database on any aspect of disasters, such as risks or events of disasters or damage and loss due to disasters or impacts thereof?
24. If yes, enclose a copy of the same or give the URL if it is available online.

### **Others**

25. If the State/ UT has undertaken any other initiative for risk assessment that are not covered by the questions above, give a brief resume of the same.

## **PART-2: RISK PREVENTION AND MITIGATION**

[Mandates: DM Act: Sections 18 (2)(d),(f),(g),(h), 22 (2)(e), 23 (4)(b),(c), 30 (3)(iv),(v),(vi),(viii),(xx),(xxii), 31 (3)(b); National DM Policy: Para 4.4.2, 4.4.3, 5.1.4 to 5.1.7, 6.1.1 to 6.4.1; National DM Plan: Para 3.2.3, 3.2.4, 3.3.3, 3.3.4, 3.4.3, 3.4.4, 3.5.3, 3.5.4, 3.6.3, 3.6.4, 3.7.3, 3.7.4, 3.8.3, 3.8.4, 3.10.3, 3.10.4, 3.11.3, 3.11.4, 3.12, Sendai Framework: Priority-3: Investing in disaster risk reduction for resilience, Para 29]

### **2.1 Disaster Risk Mitigation Projects**

1. Has the State Govt/UT Adm. implemented any State/UT specific disaster risk mitigation project after 2005? Yes/No.
2. If yes, provide complete details as per Schedule-A attached with the questionnaire.

### **2.2 Mainstreaming DRR in Development**

3. Has the SDMA/ State Govt/UT Adm. issued any general or sector-specific guidelines for integration and mainstreaming of disaster risk reduction in development? Yes/ No.
4. If yes, attach copies of these guidelines

### **2.3 State and Disaster Risk Mitigation Fund**

5. Has the State Government constituted the State Disaster Mitigation Fund and District Mitigation Fund as mandated by the DM Act? Yes/No.
6. If yes, provide complete details as per Schedule-B attached with the questionnaire.
7. Has the State/ UT made use of flexi-funds under centrally sponsored programmes for disaster risk management? If so, give details.

### **2.4 Safety standards for constructions and land use**

8. Has the State Govt/ UT Adm./ Municipal Bodies incorporated the BIS standards/ National Building Codes regarding earthquake and other hazard resistant construction of houses and infrastructures in relevant codes and bye laws? Yes/No.

9. If yes, provide details as per Schedule-C attached with the questionnaire.
10. Has the State Govt/ UT Adm. amended the Town Planning / Urban Development Acts and Regulations to conform to ecologically sensitive and disaster reducing land use standards? Yes/No.
11. If yes, provide details as per Schedule-C attached with the questionnaire.

### **2.5 Safety audit/ retrofitting of life line infrastructure/ buildings**

12. Has the State Govt./UT Adm. conducted safety audit of life line structures/ critical infrastructures? Yes/No.
13. If yes, give total number of such buildings audited as per use of the buildings.
14. Are earthquake/ other hazard resistant designs and specifications incorporated in the type design of school buildings, dispensaries and social housing schemes for economically weaker sections? Yes/ No.
15. If yes, enclose copies of relevant notifications.
16. Has the State Govt./UT Adm. retrofitted/ strengthened some of these structures? Yes/No.
17. If yes, provide details as per Schedule-D attached with the questionnaire.

### **2.6 Construction of cyclone/ flood shelters**

18. What are the assessed needs of cyclone/ flood shelters in the State/UT? How many such shelters have been constructed so far?

### **2.7 Eco System Approach for Disaster Risk reduction**

19. Do the State Govt/ UT Adm. have any plan/guideline/scheme for eco systems approach (integrated environmental and natural resource management) for disaster risk reduction? Yes/No.

20. If yes, enclose copy of relevant plan/guideline/scheme.

21. What is the total length of coastline in the State/UT? What is the length of coastline that had natural protection of bio-shield like mangroves? Assess the extent of damage, restoration, and regeneration of such bio-shields in the State/UT (Please refer to the sources on the basis of which such assessments are made).

### **2.8 Social Safety Net for Poor and Vulnerable**

22. What social safety nets are available in the State/UT for protecting vulnerable groups of people like children, aged, disabled, destitute etc from the adverse impacts of disasters?

23. Give a brief resume of the plan/schemes/programmes implemented by the State/ UT to protect the poor, particularly for the restoration of their livelihood during or after disasters.

24. Do the State Govt/ UT Adm. have any plan/guideline/scheme for protecting the animals and livestock from the risks of disasters? Yes/No.

25. If yes, enclose copy of plan/guideline/scheme.

### **2.9 Mitigation of risks of heritage**

26. Do the State Govt/ UT Adm. have any plan/guideline/scheme for protecting the monuments, heritage buildings, museums etc. from disasters? Yes/No.

27. If yes, enclose copy of plan/guideline/scheme.

### **2.10 Integration of climate change adaptation with DRR**

28. Have the State Govt./UT Adm. taken any steps or measures for integrating disaster risk reduction with climate change adaptation? Yes/No.

29. If yes, give a brief narrative of such integration.

## **Others**

30. What has been the overall impact of disaster risk reduction initiatives in the State in terms of number of deaths, affected and economic losses in disasters? Please provide details as per Schedule-E attached with the questionnaire.
  
31. Is the State Govt./UT Adm. promoting mechanisms for risk transfer such insurance/micro-insurance etc. If so, give details.
  
32. If the State/ UT Adm. have implemented any other measures for risk prevention and mitigation (other than those already mentioned in the response to the questionnaire), please provide details. (Use separate sheet if required).
- 33.

## **PART-3: RISK GOVERNANCE**

[Mandates: DM Act: Sections 14-18, 20-34, 38, 41, 48; National DM Policy: Para 3.3.6 to 3.3.8, 3.4.3 to 3.4.6, 5.3.1 to 5.3.5; National DM Plan: Para 5.1 to 5.3; Sendai Framework: Priority-2: Strengthening Disaster Risk Governance, Para 26, 27]

### **3.1 Institutional mechanisms for risk governance**

1. Mention date-month-year of constitution of SDMA, SEC and DDMA

2. How many times SDMA has met year-wise since its constitution?

Year	No. of Meetings	Year	No. of Meetings
------	-----------------	------	-----------------

3. Has the SDMA constituted its Advisory Committee? Yes/ No

4. Does SDMA have its dedicated staff? Yes/ No

5. If yes, give details.

6. How many times the SEC has met year-wise since its constitution?

Year	No. of Meetings	Year	No. of Meetings
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7. Has the SEC constituted its Sub-Committees? Yes/ No

### **3.2 Disaster Management Policy and Plans**

8. Has the SDMA laid down State Disaster Management Policy? Yes/No

9. If yes, attach a copy of the Policy document.

10. How many guidelines have been laid down by the SDMA? Give details along with copies or URL if these are available on line.

11. Does the State/UT have a State Disaster Management Plan? Yes/ No

12. If yes, when was the Plan prepared and revised/ updated? Give URL of the plan.

13. How many Departments are there in the State Government?

14. How many Departments have prepared Departmental Disaster Management Plan?

Name of Department    Year of Preparation of First Plan    Year of Revision

15. How many districts are there in the State/ UT? How many districts have prepared District Disaster Management Plans? Give details.

Name of District    Year of Preparation of First Plan    Year of Revision

### **3.3 Disaster Management Manuals and Procedures**

16. Has the State/ UT developed Manuals and Standard Operating Procedures, such as Relief Manual, SOP for Disaster Response, SOP for Emergency Operating Procedures etc? Give complete details of all the Manuals and SOPs along with URL.

### **3.4 Decentralisation and Devolution of Functions**

17. How are the Municipalities and Panchayats involved with disaster risk management in the State/UT? Has the State Govt./UT Adm. devolved any functions or resources to these self-governing institutions for disaster management? If so, give details.

### **3.5 Training and Capacity Development**

18. Has the State/UT set up any Institute/Centre/Cell for training and capacity development of the functionaries of the government, its agencies and other stakeholders? Provide details as per Schedule-F.

19. Is disaster management included in the entry/induction level training curriculum of State Administrative Services and in sectoral training programmes of all relevant development departments? If so, give details.

20. Has the State Govt./UT Adm. introduced Disaster Management in the curriculum of school education in the schools? Yes/No.

21. If yes, give the year of introduction of the curriculum, the class/level where such curriculum has been introduced. Further mention if text books have been developed in local language has been developed for this purpose.

22. Is disaster risk management included in the curriculum of higher education in the State/UT? If so, give details of the streams/subjects of higher/ technical education where such inclusions have taken place.

### **3.6 Multi-Stakeholder Platform**

23. Does the State/UT have multi-stakeholder coordination forum like State Platform for Disaster Risk Reduction? If so, give details, such as composition of the forum, date of constitution, and number of meetings it had so far.

24. Is there any mechanism for private sector engagement for disaster risk management in the State/ UT? If so, give details.

### **3.7 Community Involvement and Participation**

25. Has the State/ UT developed any mechanism for the involvement and participation of the communities, civil society, NGOs, volunteers etc in disaster management? If so, give details.

### **3.8 Enforcement and Compliance**

26. Has the State/UT or its agencies devised any mechanisms or incentives to ensure high levels of compliance with the safety-enhancing codes and regulations, such as building codes and zoning regulations? Yes/No.

27. If yes, give details of such incentives.

28. Has the State/UT evaluated the effectiveness of enforcement of the safety-enhancing codes and regulations, such as building codes and zoning regulations? Yes/No.

29. If yes, enclose a copy of the evaluation report.

### **3.9 Monitoring and Evaluation**

30. Has the CAG or Parliamentary Committee conducted any Performance Audit/ Review of the functioning of disaster management system of the State? Yes/No.

31. If yes, what were the main findings? Give citations of the report such as name of Committee, title of the report, year of publication etc. Provide link to the URL if it is available online.

### **3.10 Transparency and Accountability**

32. What are the mechanisms, and processes developed by the State/UT to ensure transparency and accountability in the delivery of relief and other disaster management services to the people affected by disasters? Give details.

### **Others**

33. Mention any other initiative taken by the State Govt./UT Adm. for improving the system of risk governance.

## **PART-4: DISASTER PREPAREDNESS**

[Mandates: DM Act: Sections 18(2)(f)(h), 22(2)(f)(p), 23(4)(d), 30(2)(xi)(xii)(xiii) (xxv)(xxviii), 31(3)(c), 38(2)(h)(i); National DM Policy: Para 5.2.5 to 5.3.2, 3.4.3 to 3.4.6, 5.3.1 to 5.3.5; National DM Plan: Para 4.9, 7.1 to 7.7; Sendai Framework: Priority-4: Enhancing Disaster Preparedness for Effective Response, Para 32,33]

### **4.1 End-to-End Early Warning Systems**

1. While central agencies like IMD, CWC, GSI, INCOIS etc are responsible for early warning of most of the major hazards, it is the responsibility of the State Govt./UT Adm. to ensure that such warnings are communicated to the people, down to the last mile in urban and rural areas by every possible means. Give a brief resume of the technical, administrative and logistic arrangements made by the State government for dissemination of early warning of various types of hazards in the State.
2. Has any general or specific guideline or SOP been issued for dissemination of early warnings of various types of hazards to the people in the State? Yes/No.
3. If yes, enclose a copy of the guidelines.

### **4.2 Emergency Operation Centres**

4. Has the State Govt./UT Adm. set up Emergency Operation Centres at the State, Metro and District levels equipped with modern communication and other facilities? If so give details of these facilities as per Schedule G.
5. Has any Standard Operating Procedure been developed for the operation and management of Emergency Operation Centres? Yes/No.
6. If yes, enclose a copy of the same.

### **4.3 Disaster Communication System**

7. Information and Communication Technology (ICT) plays important role in disaster risk management – before, during and after disasters. Give a brief resume on the initiatives taken by the State/ UT for the application of ICT for disaster management.

#### **4.4 Emergency Medical Preparedness**

8. How many government hospitals are in operation at the state and district level in the State/UT? How many of them have developed Emergency Medical Preparedness as per the guidelines of NDMA? Provide URL for accessing the plans.
9. What steps have been taken for training and capacity building of the medical and para-medical staff of the hospitals for emergency medical preparedness, including trauma management and triage? Give details.
10. Has the State developed any post-disaster disease surveillance system? If so, give details.

#### **4.5 Scenario Building, Simulation and Mock Drills**

11. Have the State/ UT developed worst case scenarios/ simulations of various possible disasters in the State? Yes/No.
12. If yes, give the type of hazards for which scenarios have been developed. Enclose copies of the same if these are available.
13. How many mock drills have been conducted by the SDMA/ DDMA in the State annually since 2006? Give details.

#### **4.6 Contingency Plans, SOPs, Manuals**

14. Give a complete list of Contingency Plans, Standard Operating Procedures and Manuals on various aspects of disaster management developed by the State Government/ SDMA.

#### **4.7 Community Based Disaster Preparedness**

15. What measures have been taken for strengthening community based disaster preparedness in the State? Give details.

#### **4.8 Awareness Generation**

16. What measures have been taken for raising awareness of the common people about the measures to be taken for disaster preparedness? Give details.

#### **4.9 Resource Inventory**

17. Has the State prepared inventory of material and human resources available with various public and private entities that can be made use for managing disasters? Yes/No.
  
18. Are these inventories registered with India Disaster Resource Network (IDRN)? Give the district-wise dates of last updates of IDRN.

#### **4.10 Media Partnership**

19. Media can play important role in dissemination of information and knowledge in all phases of disaster management. Both the national policy and nation plan have highlighted the critical role of print and electronic media in disaster management. Has the State Govt./District Adm. developed any guidelines or strategy for media partnership? Give details.

#### **Others**

20. Mention any other initiative taken by the State Govt./UT Adm. for strengthening disaster preparedness in the State.

## **PART-5: DISASTER RESPONSE**

[Mandates: DM Act: Sections: 22(2)(g)(h)(o), 23(4)(f), 24(e)(f)(g)(k), 30(2)(xi)(xv)(xvi)(xvii)(xviii), 31(3)(d), 34, 36(c)(f)(g), 38(2)(j); National DM Policy: Para 7.4.1 to 7.11.1; National DM Plan: Para 4.9; Sendai Framework: Priority-4: Enhancing Disaster Preparedness for Effective Response, Para 32,33]

### **4.1 State Agencies for Disaster Response**

1. Has the State constituted a specialized State Disaster Response Force? Yes/No.
2. If yes, give details such as year of constitution, strength of the force, equipments provided and arrangements made for training.
3. Is disaster management included in the training curriculum of State Police at all levels? Yes/No.
4. If so, give details
5. Has the Fire Services been upgraded to acquire multi-hazard rescue capability? Yes/No.
6. If so, give details.
7. Civil Defence Act was amended in 2009 to enable the provisions of the Act to be applied during disasters. This requires expansion of the network of civil defence to all districts and reorientation and training of the civil defence volunteers. What actions have been taken in the State to reorient the civil defence for this new role?

### **4.2 Incident Response System**

8. Govt. of India had decided in 2002 to introduce Incident Command System for responding to disaster situations and trained a large number of administrators of State Govt./UT Adm. on different facets of incident management. National Policy on Disaster Management 2009 endorsed the system and National Guidelines on Incident Response System was issued in 2010 for adapting the system in the context of our administrative system. What steps have been taken by the State Govt./UT Adm. to introduce the system in the State? What is the current status of implementation of the guidelines in terms of training and actual practice during emergency situations?

### **4.3 Coordination with GOI, NDRF, Armed Forces**

9. Catastrophic or major disasters may overwhelm the capacity of the State Govt./UT Adm. to respond effectively, requiring assistance of Central Govt. and its agencies like the NDRF and the Armed Force. Quick responses of central agencies are effective if there are institutionalised mechanisms for liaison and coordination, such as civil-military liaison conference. Has any such mechanism been established in the State/UT? If so, give details.

### **4.4 Evacuation, Search and Rescue**

10. Disaster mortalities can be reduced considerably if contingency plans are in place regarding quick assessment of evacuation needs, identification of temporary shelters, determination of evacuation routes, mobilization of transportation arrangements, preparation of checklists etc. Is such contingency plan for evacuation available? Yes/No.
11. If yes, enclose copy of the Contingency Plan.
12. Searching and rescuing people marooned in flooded areas or trapped in collapsed structures or debris is a specialized jobs requiring equipments, training, drills etc. To what extent are the concerned agencies of the State equipped and trained to handle such operations? Give details.

### **4.5 Emergency Medical Response**

13. Immediate impact of disasters is the surge of persons of different age group inflicted with severe and minor injuries for treatment in hospitals. Many such injuries may require medical attention even before hospitalization. This requires operational readiness of medical response teams, availability of ambulance, heli-ambulance and other logistic arrangements. What is the status of such operational readiness of medical response? Give an account of the achievements and challenges.

### **4.6 Emergency Support Functions**

14. Disaster response is not the job of responders alone. It requires performance of Emergency Support Functions (ESF) by the line departments and agencies, such as restoration of electricity, water supply and sanitation system, telecommunication, road and transportation network, supply chain of food and other essential items etc. Has the State Govt./UT Adm. prepared check lists of ESF, identified primary and secondary agencies and functionaries for the performance of these functions, outlined the process and timeline to be followed and provided resources for the same? Have the agencies made pre-arrangements for advance procurement of materials needed for such functions? Give details.

#### **4.7 Protection of vulnerable women and children**

15. Vulnerable women and children often become victims of trafficking and sexual abuse after disasters. Is a surveillance system in place in the State/ UT for preventing such abuses and protecting the vulnerable? If so give details.

#### **4.8 Disposal of dead bodies**

16. In the event of mass casualties in disasters proper collection, preservation, storage, identification and disposal of dead bodies according to the religious customs and rites of the deceased are ethical as well as legal issues. Has the State Govt./UT Adm. issued any guidelines to be followed in this regard? Yes/No.

17. If yes, enclose a copy of the guidelines.

#### **4.9 Disposal of Animal Carcasses**

18. Proper removal and disposal of animal carcasses at pre-identified sites is important to ensure that no health hazards are created to the staff as well as general public. Has the State Govt./UT Adm. issued any guidelines to be followed in this regard? Yes/No.

19. If yes, enclose a copy of the guidelines.

#### **4.10 Disposal of Debris**

20. Major disasters like earthquakes and cyclones may cause widespread destruction of built up structures like houses and infrastructure as well as natural assets like trees and plantations. Removal and disposal of construction debris and fallen trees can be problematic in many urban areas where open sites are not available so easily unless these are pre-identified. Much of these materials can be also be recycled. Does the State Govt./UT Adm. or the municipal authorities have any plan for management of the debris? Yes/No.

21. If yes, enclose a copy of the guidelines.

#### **Others**

22. Mention any other initiative taken by the State Govt./UT Adm. for effective response to disasters in the State.

## **PART-6: DISASTER RELIEF AND REHABILITATION**

[Mandates: DM Act: Sections 19, 24(d)(f), 30(2)(xxiv), 38(2)(j), 41(d); National DM Policy: Para 8.2.1 to 8.6.1; National DM Plan: Para 6.1 to 6.4, 6.7; Sendai Framework: Priority-4: Build Back Better in Recovery and Rehabilitation, Para 32,33]

### **6.1 Minimum Standard of Relief**

1. Has the State Disaster Management Authority laid down guidelines for providing standards of relief to persons affected by disasters in the State, as provided in section 19 of Disaster Management Act? Yes/No.
2. If yes, enclose a copy of the guidelines.

### **6.2 Ex-gratia Relief**

3. Government of India has fixed norms of ex-gratia relief under State Disaster Response Fund and National Disaster Response Fund. Do the State Government/ UT Adm. provide additional ex-gratia relief over and above such norms? If so give details.

### **6.3 Relief Logistics and Supply Chain Management**

4. Timely procurement, packaging, transportation, storage and distribution of relief materials immediately as the need arises make it imperative that there are well laid down operating procedures and manuals on relief logistics and supply chain management. Do the State Govt./UT Adm. have such SOP/ Manuals. Yes/No.
5. If yes, enclose a copy of SOP/Manual or give link to the online resource.
6. Major disasters attract humanitarian assistance, often in kind, from all over the world, Receiving, sorting, transporting and distributing these materials to the neediest in a transparent manner is quite challenging. Has the State Govt./UT Adm. evolved any guidelines to deal with such situations? Yes/No.
7. If yes, enclose a copy of the guidelines.

### **6.4 Food and Essential Supplies**

8. Supply of food including cooked food and other essential items to the affected people is one of the major functions of disaster relief. This involves procurement, storage,

transportation and distribution of food in a transparent and accountable manner. This further involves pre-agreements/ MoUs with organisations, trusts and firms for setting up community kitchens in the affected areas. Describe the policies and practices followed in this regard, with special reference to any innovative practice introduced for better delivery of services.

### **6.5 Drinking Water, Dewatering and Sanitation**

9. Supply of clean drinking water to disaster affected areas is extremely important to prevent water borne diseases. Every State/ UT faces its own challenge. Describe the minimum standards of the State for supply of drinking water to people affected by disasters and assess the compliance of the standards.
10. Providing sanitation facilities to men and women, particularly those in relief camps, is another important aspect of public health. Describe the minimum standards adopted by the State for providing sanitation services to people affected by disasters and assess the compliance of the standards.
11. Dewatering of flooded areas in urban pockets that have no outlets can be critical for public health as well as safety of lives and structures. Do the State/ UT face such situations? How does it address the problem?

### **6.6 Health and Mental Health Care**

12. Health care of disaster affected pregnant and lactating mothers, neo-natal, aged and those suffering from chronic diseases should receive priority in health care as they suffer from double jeopardy. Do the State Govt./UT Adm. provide special dispensation for such people? If so give details.
13. Mental health care of the affected people suffering from Post Traumatic Stress Disorder (PTSD) is crucial at the initial stage for diagnosis and treatment. Have the State Govt./UT Adm. made arrangements for expert psycho-social counselling of such people? If so give details.

### **6.7 Management of Relief Camps**

14. Provision of basic shelter, food, water and health care does not solve the problems of people in temporary relief camps, as there are many other issues, such as privacy, safety, security, gender based violence etc. that should also be addressed. These issues can be attended only if there are proper guidelines for management of relief camps. Have the State Govt./UT Adm. developed such guidelines? Yes/No.

15. If yes, enclose a copy of the guidelines on the management of the relief camps.

### **6.8 Veterinary Care**

16. Veterinary care for disaster affected livestock and animals, including wild animals and arrangements for their evacuation, shelter, fodder / feed etc. are important for rehabilitation of animals. Do the State Govt./UT Adm. have any plan or guidelines for animal care during disasters. Yes/ No.

17. If yes, enclose a copy of the plan/guidelines.

### **6.9 Relief Employment**

18. People affected by disasters often lose their livelihood. Relief employment under MNREGA is one of the several avenues for providing alternate source of livelihood to the affected people. What are the alternative avenues developed by the State Govt./UT Adm. for providing relief employment to the people? How many man days of relief employment have been provided in the State since 2006 under different schemes/ programmes? Give details.

### **6.10 Temporary and Intermediary Shelters**

19. In case of devastating disasters when the period of stay in temporary shelters is likely to be long and uncertain, or where extreme weather conditions can be life-threatening, construction of intermediary shelters shall become necessary. Did the State Govt./UT Adm. have to construct such intermediary shelters anytime in the past? Give year-wise details from 2006 onwards. Based on the experiences gained, has any general or specific guidelines been issued for future? If so give details.

### **Others**

20. Mention any other initiative taken by the State Govt./UT Adm. for relief and rehabilitation of people affected by disasters in the State.

## **PART-7: DISASTER RECONSTRUCTION**

[Mandates: DM Act: 38(2)(k), 39(f)(iii), 41(d); National DM Policy: Para 9.1.1.to 9.5.1; National DM Plan: Para 6.5 to 6.6; Sendai Framework: Priority-4: Build Back Better in Reconstruction, Para 32,33]

### **7.1 Damage and Loss Assessment**

1. How are the damage and losses in disasters assessed in the State/ UT?
2. Are there any guidelines or manual for damage and loss assessment in disasters? Yes/No.
3. If yes, enclose a copy of the guidelines.

### **7.2 Post Disaster Need Assessment**

4. How are the needs for post disaster recovery and reconstruction assessed in the State/ UT?
5. Are there any guidelines or manual for such Post Disaster Need Assessment? Yes/No.
6. If yes, so enclose a copy of the guidelines.
7. Do the State/ UT have a policy or framework for post-disaster recovery and reconstruction? Yes/No.
8. If yes, enclose a copy of the framework.

### **7.3 Financing Reconstruction**

9. Post disaster reconstruction is not permissible under the norms of SDRF/NDRF. How such reconstructions are financed in the State/ UT? How many such reconstruction projects have been implemented in the State since 2006? Give details stating inter alia the costs incurred on each reconstruction project, period of implementation of the projects and the sources for mobilization of the fund.

#### **7.4 Institutional Mechanisms for Reconstruction**

10. How is reconstruction projects implemented in the State/UT? Give a brief description of the institutional mechanism(s) adopted in the State for the implementation of such projects.

#### **7.5 Building Back Better**

11. Do the State/ UT consistently follow the principle 'Build Back Better' in post-disaster construction projects? Give examples of practical application of the principles in past reconstruction projects.
12. How have the reconstructed towns and villages behaved in repeat occurrences of disasters? Give examples from the reconstruction experiences of the past.

#### **7.6 Reconstruction of Houses**

13. What strategies are followed for reconstruction of damaged houses? Are the houses reconstructed by the agencies of the government or by the owners themselves? How it is ensured that owners reconstruct their houses as per disaster resistant designs and technology?
14. What material and financial supports are provided by the government to facilitate reconstruction of houses damaged in disasters?
15. Are the reconstructed houses insured? Are these registered jointly in the name of present owner and spouse?

#### **7.7 Reconstruction of Infrastructure**

16. What is the strategic approach of the State Govt./UT Adm. for reconstruction of damaged physical and social infrastructure? Are these reconstructed as per original plan and design or redesigned to provide additional elements of safety and resilience? Give examples from the reconstruction experiences of the past..

#### **7.8 Livelihood Reconstruction**

17. Disasters impact on the livelihood of people such as farmers, artisans, women headed households, and people belonging to marginalised and vulnerable sections. What

strategic approach is followed for reconstruction of damaged livelihoods? Give examples from the reconstruction experiences of the past.

### **7.9 Regeneration of Ecology and Environment**

18. Disasters cause considerable damages to ecology and environment. How such damaged environment have been restored during past 10 years. Give examples.

### **7.10 Learning from Reconstruction and Recovery**

19. What are the main lessons learnt from the experiences of reconstruction in the past? Have these been documented? Have these lessons been incorporated in the policies or guidelines? If so give details.

### **Others**

20. Mention any other initiative/ good practice of the State Govt./UT Adm. for disaster recovery and reconstruction.

**Details of Disaster Risk Mitigation Projects  
Implemented by the State Government/ UT Administration since 2006**

(Risks shall include all natural and human induced risks of disasters, such as earthquake, cyclone, flood, landside, drought, tsunami, industrial and chemical disasters etc.)

(Use additional sheets as required)

No.	Name of project	Date of start	Date of completion	Total investment	Source of funding	Executing Department/ Agency	Specific Risks for mitigation	Structural Measures	Non-structural measures	Areas/ population covered (%)	Expected outcome	Results achieved	Overall impact
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													

15.													
16.													
17.													
18.													
19.													
20.													

### Details of State Disaster Mitigation Fund and District Disaster Mitigation Fund

(Use additional sheets as required)

<b>State Disaster Mitigation Fund</b>				
Date of Notification	Year wise deposits	Source of fund	Year-wise expenditure	Risk-wise expenditure
	2006-2007		2006-2007	Earthquake
	2007-2008		2007-2008	Flood
	2008-2009		2008-2009	Cyclone
	2009-2010		2009-2010	Landslide
	2010-2011		2010-2011	Drought
	2011-2012		2011-2012	Tsunami
	2012-2013		2012-2013	Industrial
	2013-2014		2013-2014	Chemical
	2014-2015		2014-2015	Others
	2015-2016		2015-2016	Others
	2016-2017		2016-2017	Others
<b>District Disaster Mitigation Fund</b>				
Date of Notification	Year wise deposits (all districts)	Source of fund	Year-wise expenditure (all districts)	Risk-wise expenditure (all districts)
	2006-2007		2006-2007	Earthquake
	2007-2008		2007-2008	Flood
	2008-2009		2008-2009	Cyclone
	2009-2010		2009-2010	Landslide
	2010-2011		2010-2011	Drought
	2011-2012		2011-2012	Tsunami
	2012-2013		2012-2013	Industrial
	2013-2014		2013-2014	Chemical
	2014-2015		2014-2015	Others

	2015-2016		2015-2016	Others
	2016-2017		2016-2017	Others

### Status of Risk Resistant land Use and Construction Practices

<b>Risk Resistant land Use Regulations</b>
Has the State/UT Town Planning Act/ Regulations been amended to conform to risk reducing land use standards? Give details.
Has the State/UT Urban Development Act been amended to conform to conform to risk reducing land use standards? Give details.
Give an overview of the status of implementation/ enforcement of these laws/ regulations in major cities and towns. (Use separate sheet if required).
<b>Risk Resistant Construction Practices</b>
Has the State Municipal Laws/Bye Laws of the Municipal bodies been amended to conform to BIS/NBC standards of construction? Give details.
Give an overview of the status of implementation/ enforcement of these laws/ regulations in major cities and towns. (Use separate sheet if required).

### Safety Audit and Retrofitting of Lifeline Structures/ Critical Infrastructures

No	Lifeline structures/ critical infrastructures	Safety Audit conducted (No. of structures)	Rapid Visual Screening conducted (No. of structures)	Seismic retrofitting completed (No. of structures)	Other types of strengthening/ retrofitting completed (No. of structures)
1.	State Hospitals				
2.	District Hospitals				
3.	Primary health Centres				
4.	State Emergency Operation Centres				
5.	State Secretariat				
6.	State Police Headquarter				
7.	Office of District Magistrate				
8.	District Emergency Operation Centre				
9.	District Police Headquarter				
10.	Schools				
11.	Community Halls				

12.	Cinema Halls/ Theatres				
13.	Bridges				
14.	Dams/ reservoirs				
15.	Power Transmission Towers				
16.	Hydro-electric power stations				
17.	Other lifeline structures				

**Trends of Disaster Damage and Losses in States/UTs**

Year	People killed	People with major injuries	People with minor injuries	Houses fully damaged	Houses partly damaged	Animals perished	Crop lost Crores	Loss of infrastructure ( Crores)				Industry and trade Crores	Total Loss Crores
								Roads	Power	PHE	Others		
1990													
1991													
1992													
1993													
1994													
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2009													
2010													
2011													
2012													
2013													
2014													
2015													
2016													

### Training and Capacity Development on Disaster Management

1. Name of the Institute/ Centre –
2. Year it was set up -
3. Number of faculty members (as on 1-1-2017) -
4. Number of supporting staff (as on 1-1-2017) –
5. Number of Training Modules developed –
6. Details of financial/physical progress – (to be furnished in the table given below)
7. Any other details -

Year	Number of training programmes conducted	Number of persons trained	Funds allocated by MHA/NIDM Lakhs	MHA/NIDM Funds utilised Lakhs	Funds allocated by Thirteenth Finance Commission	TFC Funds utilized Lakhs
2005						
2006						
2007						
2008						
2009						
2010						
2011						
2012						
2013						
2014						
2015						
2016						

### Emergency Operation Centres in the State/ Union Territory

No.	Type of EOC (State/Metro/Dist.)	Controlling Department (Revenue/DM/Police)	Does it operate 24x7? (Yes/ No)	Total Floor Area (Sq. ft.)	Details of Communication Systems/ Equipments (Take separate sheet, if needed)	Details of Staff Deployed	Does it have space for ESF agencies?
1.	State EOC						
2.	Metro EOC <sup>60</sup>						
3.	Metro EOC						
4.	Metro EOC						
5.	Metro EOC						
6.	District EOC <sup>61</sup>						
7.	District EOC						
8.	District EOC						
9.	District EOC						
10.	District EOC						
11.	District EOC						
12.	District EOC						
13.	District EOC						
14.	District EOC						
15.	District EOC						
16.	District EOC						
17.	District EOC						
18.	District EOC						
19.	District EOC						

<sup>60</sup> Metro EOC is an EOC set up at a metro city with population of more than 10 lakhs each. Mention separately for each metro city.

<sup>61</sup> Mention separately for each district of the State/ UT.

## NORMS FOR EVALUATION OF RESPONSES TO QUESTIONNAIRE ON DISASTER RESILIENCE

### 1. RISK ASSESSMENT (Weights 10%)

Indicators/ Questions		Aggregate Points	Criteria for evaluation	Points to be allocated
<b>1.1 Hazard Vulnerability Risk Assessment</b>		<b>10</b>		
<b>1</b>	Has the State Government undertaken Hazard Vulnerability Risk Assessment (HVRA) of the State as part of preparation of State, District and Departmental Disaster Management Plans? Yes/ No	1	1. Yes 2. No  [Note: If response is NO, scores for remaining questions are also 0]	1 0
<b>2</b>	If yes, name the agency that prepared the HRVA study and the year when the study was undertaken.	2	1a. When no specialized agency is engaged 1b. When specialized agency is engaged but they do not have capability for multi-hazard risk assessment 1c. When specialized agency has proven capacity for multi-hazard risk assessment 2. When risk assessment has been periodically updated/ revised 3 When risk assessment has been done one time	0 0.5 1 1 0.5
<b>3</b>	Is the HRVA available online in public domain? Yes/ No	1	1. Yes 2. No	1 0
<b>4</b>	If yes, mention the URL.  (Evaluation of quality of risk assessment)	6	Evaluation of assessment: 1a. When risk assessment has been made on the basis of comprehensive analysis of State specific hazards, vulnerabilities, exposures and capacities 1b. When risk assessment is not comprehensive	2 to 4 0.5 to 1.5

			2. When risks of different districts and regions are quantified on the basis of available data 3. When Average Annual Loss (AAL) and Probable Maximum Loss (PML) is quantified	1 1
<b>1.2 Digital Risk Mapping in Public Domain</b>		<b>5</b>		
<b>5</b>	Are hazard-wise district-wise risk maps of the State available online in digital format? Yes/ No	2	1. When online digital risk maps are not available 2. When such maps are available for all hazards and districts 2. When such maps are available partially	0 2 0.5 to 1.5
<b>6</b>	If yes, mention the URL.			
<b>7</b>	What is the resolution of the maps? What is the lowest administrative unit for which the map is available?	3	1. Resolution is 10,000 or below for entire State/UT 2. Resolution is in different scales not exceeding 50,000 2. Resolution exceeds 50,000 or higher scale	3 2 1
<b>1.3 Real Time Data on Risks and Disasters</b>		<b>5</b>		
<b>8</b>	Is disaster risk related data such as earthquake, tsunami, flood cyclone etc available to the stakeholders on a real time basis? Yes/ No	1	1. Yes 2. No	1 0
<b>9</b>	If yes, please provide a link to the database. (Assessment of quality of database)	4	1. When real time data base has been set up by the State/UT through its own initiative, depending on number of hazards covered 2. When real time database is hyperlinked to national database, depending on number of hazards covered	2 to 4 0.5 to 1.5
<b>1.4 Micro Zonation of Earthquake Risks</b>		<b>3</b>		
<b>10</b>	How many cities and towns of the State/ UT have micro-zonation of earthquake? Give details. (Give URL if the study report is available online).	3	1. When seismic micro-zonation has been completed for all million+ and capital cities in hazard zone V, IV and III. 2. When such micro-zonation has been completed only partially 3. When no such micro-zonation has been done	3 0.5 to 2.5 0
<b>11</b>	If it is not available online, give a brief resume mentioning inter alia the names of the cities, year the study was undertaken and the agency that did the study.			

<b>1.5 Flood Risk Assessment</b>		<b>3</b>		
<b>12</b>	Has the State/ UT undertaken any study for assessing risks of flood, particularly for urban flood? Yes/No.	1	1. Yes 2. No	1 0
<b>13</b>	If yes, give the URL if the study report if is available online.	2	1. When comprehensive flood risk assessment has been made for the entire State/UT taking into account hazards, vulnerabilities, exposures and capacities 2. When flood risks of major flood prone cities/ towns have been undertaken 3. When no such flood risk assessments have been done	1
<b>14</b>	If it is not available online, give a brief resume mentioning inter alia the year the study was undertaken and the agency that did it.			0.5 to 1 0
<b>1.6 Drought Risk Assessment</b>		<b>5</b>		
<b>15</b>	Have the State/ UT undertaken any special study for assessing the risks of drought? Yes/No.	1	1. Yes 2. No	1 0
<b>16</b>	If yes, give the URL of the study report if it is available online.	2	1. When comprehensive drought risk assessment has been made for the State/UT 2. When risk assessment is further downscaled for the districts and blocks 3. When no such drought risk assessment has been done	1
<b>17</b>	If it is not available online, give a brief resume mentioning inter alia the year the study was undertaken and the agency that did it.			0.5 to 1 0
<b>18</b>	What are the key indicators monitored by the State/ UT for declaring drought? How are data on the indicators collected?	2	1. When State/ UT has developed policy framework for declaration of drought 2. When the policy framework for drought declaration has incorporated guidelines of National Drought Manual 3. When droughts are declared on the basis of traditional method of girdwari (crop inspection).	1 1 0.5

<b>1.7 Dissemination of Risk Information to People</b>		<b>3</b>		
<b>19</b>	Give a brief resume of the steps taken by the State/ UT for the dissemination of risk assessment to the general public, particularly at the community level.	3	1. When risk communication is based entirely on public announcements through conventional means including radio and television 2. When modern means of communication, such as ham radio, VSAT, internet, mobile telephony, Satellite Phones etc. are employed for last mile communication	0.5 to 1.5  0.5 to 1.5
<b>1.8 Assessing Traditional and Local Knowledge</b>		<b>3</b>		
<b>20</b>	Does the State make use of traditional, indigenous and local knowledge for risk assessment? Yes/No.	3	1. When traditional and local knowledge of risks of disasters in the State have been documented. 2. When efforts have been made to integrate traditional knowledge with modern scientific knowledge.	0.5 to 1  0.5 to 1
<b>21</b>	If yes explain the process for using such knowledge, such as documentation, analysis and integration of such knowledge with scientific knowledge of risk assessment.		3. When institutional mechanism has been developed for using traditional and local knowledge for risk assessment	0.5 to 1
<b>1.9 Assessing Patterns of Emerging Risks</b>		<b>3</b>		
<b>22</b>	What are the emerging risks of disasters (such as climate change, urban risks, technological risks etc.)? Have these risks been assessed in the State. Give details.	3	1a. When special study has been undertaken to assess pattern of emerging risks of disasters in the State 1b. When such study has been made as part of Hazard Vulnerability Risk Assessment (HRVA). 1c. When no such study has been undertaken. 2a. When such assessments are comprehensive covering all emerging risks, such as climate change, urban, environmental and technological risks. 2b. When such assessments are not so comprehensive	1 0.5 0  1.5 to 2 0.5 to 1
<b>1.10 Developing Database on Disasters</b>		<b>5</b>		

23	Has the State/ UT developed any database on any aspect of disasters, such as risks or events of disasters or damage and loss due to disasters or impacts thereof?	5	1. When the State/ UT developed database on disasters, which is regularly updated.	0.5 to 1
24	If yes, enclose a copy of the same or give the URL if it is available online.		2. When disaster database covers both historical and current disasters, both large and small	0.5 to 1
			3. When disaster database provides disaggregated information (hazard-wise, district-wise) on damages to human life, animals, crops, houses, infrastructure, environment etc.	0.5 to 2
			4. When economic losses due to disasters are quantified and its impact on macro-economic situation are assessed.	0.5 to 1
<b>Others</b>		<b>5</b>		
25	If the State/ UT has undertaken any other initiative for risk assessment that are not covered by the questions above, give a brief resume of the same.	5	1. All other measures adopted (or not adopted) by the State for risk assessment that are not covered by the 24 questions above shall be assessed on a scale of 0-5	0 to 5

## 2. RISK PREVENTION & MITIGATION (Weights 20%)

Indicators/ Questions		Aggregate Points	Criteria for evaluation	Points to be allocated
<b>2.1 Disaster Risk Mitigation Projects</b>		<b>8</b>		
<b>1</b>	Has the State Govt/UT Adm. implemented any State/UT specific disaster risk mitigation project after 2005? Yes/No.	8	1. No 2. Yes. If it is Central Sector Scheme (funded 100% by Government of India) 3. Yes. If it is Centrally Sponsored Scheme (funded on sharing basis) 4. Yes. If it is State Sector scheme (funded out of State Government/ UT budget) <ol style="list-style-type: none"> <li>Number of such schemes</li> <li>Total investment on such schemes</li> </ol> (Note: Based on responses received scores shall be normalised in a scale of 0.5 to 3 )	0
<b>2</b>	If yes, provide complete details as per Schedule-A attached with the questionnaire.			0.5 to 3 0.5 to 3
<b>2.2 Mainstreaming DRR in Development</b>		<b>3</b>		
<b>3</b>	Has the SDMA/ State Govt/UT Adm. issued any general or sector-specific guidelines for integration and mainstreaming of disaster risk reduction in development? Yes/ No.	3	1. When no such guidelines have been issued 2. When guidelines are general 3. When guidelines are sector specific (Note: Based on responses received scores shall be normalised in a scale of 0.5 to 2 )	0
<b>4</b>	If yes, attach copies of these guidelines			1 0.5 to 2
<b>2.3 State and Disaster Risk Mitigation Fund</b>		<b>3</b>		
<b>5</b>	Has the State Government constituted the State Disaster Mitigation Fund and District Mitigation Fund as mandated by the DM Act? Yes/No.	1	1. When no such fund has been constituted 2. When both State and District Mitigation Funds have been constituted 3. When only State Fund has been constituted 4. When only District Fund has been	0 1 0.5 0.5

			constituted	
6	If yes, provide complete details as per Schedule-B attached with the questionnaire.	1	1. Quantum of such funds allocated during 2006 and 2015 a. State Fund b. District Fund	0.5 to 1 0.5 to 1
7	Has the State/ UT made use of flexi-funds under centrally sponsored programmes for disaster risk management? If so, give details.	1	1. If no 2. If yes, depending on the responses received	0 0.5 to 1
<b>2.4 Safety standards for constructions and land use</b>		<b>7</b>		
8	Has the State Govt/ UT Adm./ Municipal Bodies incorporated the BIS standards/ National Building Codes regarding earthquake and other hazard resistant construction of houses and infrastructures in relevant codes and bye laws? Yes/No.	5	1. If neither BIS nor NBC standards incorporated in Building Bye Laws 2. If both BIS and NBC standards are incorporated in Building Bye Laws of all municipal and other local bodies throughout the State 3. If these are incorporated partially depending on the extent to which these are incorporated	0 5 0.5 to 4.5
9	If yes, provide details as per Schedule-C attached with the questionnaire.			
10	Has the State Govt/ UT Adm. amended the Town Planning / Urban Development Acts and Regulations to conform to ecologically sensitive and disaster reducing land use standards? Yes/No.	2	1. If neither Town Planning nor Development Act has been amended. 2. If Town Planning Act has been amended, depending on nature of amendments 3. If Development Act has been amended, depending on nature of such amendments	0 0.5 to 1 0.5 to 1
11	If yes, provide details as per Schedule-C attached with the questionnaire.			

<b>2.5</b>	<b>Safety audit/ retrofitting of life line infrastructure/ buildings</b>			
<b>8</b>				
<b>12</b>	Has the State Govt./UT Adm. conducted safety audit of life line structures/ critical infrastructures? Yes/No.	2	1. If no such audit has been conducted. 2. If such audits have been conducted, depending on number of buildings audited	0 0.5 to 2
<b>13</b>	If yes, give total number of such buildings audited as per use of the buildings.			
<b>14</b>	Are earthquake/ other hazard resistant designs and specifications incorporated in the type design of school buildings, dispensaries and social housing schemes for economically weaker sections? Yes/ No.	3	1. If no such hazard resistant type designs developed 2. If hazard resistant type designs developed for schools 3. If hazard resistant type designs developed for dispensaries 4. If n hazard resistant type designs developed for social housing schemes	0 1 1 1
<b>15</b>	If yes, enclose copies of relevant notifications.			
<b>16</b>	Has the State Govt./UT Adm. retrofitted/ strengthened some of these structures? Yes/No.	3	1. If no such retrofitting has been done 2. If such retrofitting works have been conducted, depending on the number of such buildings retrofitted	0 0.5 to 3
<b>17</b>	If yes, provide details as per Schedule-D attached with the questionnaire.			
<b>2.6</b>	<b>Construction of cyclone/ flood shelters</b>	<b>3</b>		

<b>18</b>	What are the assessed needs of cyclone/ flood shelters in the State/UT? How many such shelters have been constructed so far?	3	<ol style="list-style-type: none"> <li>1. Has there been any study to assess the needs for such shelters. If no.</li> <li>2. Has there been any study to assess the needs for such shelters. If yes.</li> <li>3. Extent to which such needs have been met</li> </ol> (Note: for non-coastal States/ UTs assessment shall be made for flood shelters only)	0  1  0.5 to 2
<b>2.7 Eco System Approach for Disaster Risk reduction</b>		<b>3</b>		
<b>19</b>	Do the State Govt/ UT Adm. have any plan/guideline/scheme for eco systems approach (integrated environmental and natural resource management) for disaster risk reduction? Yes/No.	2	<ol style="list-style-type: none"> <li>1. If no such plan/guideline/schemes have been developed</li> <li>2. If such plan/guideline/scheme have been developed, depending on the nature of such plan/guideline/scheme</li> </ol> (Note: for non coastal States this will be evaluated on the basis of total score of 3)	0  0.5 to 1.5
<b>20</b>	If yes, enclose copy of relevant plan/guideline/scheme.			
<b>21</b>	What is the total length of coastline in the State/UT? What is the length of coastline that had natural protection of bio-shield like mangroves? Assess the extent of damage, restoration, and regeneration of such bio-shields in the State/UT (Please refer to the sources on the basis of which such assessments are made).	1	<ol style="list-style-type: none"> <li>1. Depending on the extent of restoration/ regeneration of bio-shield</li> </ol>	0.5 to 1
<b>2.8 Social Safety Net for Poor and Vulnerable</b>		<b>5</b>		
<b>22</b>	What social safety nets are available in the State/UT for protecting vulnerable groups of people like children, aged, disabled, destitute etc from the adverse impacts of disasters?	4	<ol style="list-style-type: none"> <li>1. When State/ UT is using existing schemes for protecting vulnerable groups, depending on how such schemes are being used.</li> <li>2. When State/ UT have developed special schemes for protecting vulnerable groups in disasters, depending on how such schemes are being used.</li> </ol>	0.5 to 2  0.5 to 2
<b>23</b>	Give a brief resume of the plan/schemes/programmes implemented by the State/ UT to protect the poor, particularly for the			

	restoration of their livelihood during or after disasters.			
<b>24</b>	Do the State Govt/ UT Adm. have any plan/guideline/scheme for protecting the animals and livestock from the risks of disasters? Yes/No.	<b>1</b>	1. If no such plan/guidelines/scheme is available 2. If such plan/guidelines/scheme is available, depending on its nature	0 0.5 to 1
<b>25</b>	If yes, enclose copy of plan/guideline/scheme.			
<b>2.9 Mitigation of risks of heritage</b>		<b>2</b>		
<b>26</b>	Do the State Govt/ UT Adm. have any plan/guideline/scheme for protecting the monuments, heritage buildings, museums etc. from disasters? Yes/No.	<b>2</b>	1. If no such plan/guidelines/scheme is available 2. If such plan/guidelines/scheme is available, depending on its nature	0 0.5 to 2
<b>27</b>	If yes, enclose copy of plan/guideline/scheme.			
<b>2.10 Integration of climate change adaptation with DRR</b>		<b>3</b>		
<b>28</b>	Have the State Govt./UT Adm. taken any steps or measures for integrating disaster risk reduction with climate change adaptation? Yes/No.	<b>3</b>	1. If no such steps/measures have been taken 2. If such steps/ measures have been taken, depending on its nature	0 0.5 to 3
<b>29</b>	If yes, give a brief narrative of such integration.			

<b>Others</b>		<b>5</b>		
<b>30</b>	What has been the overall impact of disaster risk reduction initiatives in the State in terms of number of deaths, affected and economic losses in disasters? Please provide details as per Schedule-E attached with the questionnaire.	1	1. Overall impact in reducing risks of disasters, based on data provided for past 25 years	0 to 1
<b>31</b>	Is the State Govt./UT Adm. promoting mechanisms for risk transfer such insurance/ micro-insurance etc. If so, give details.	2	1. If no such mechanisms are promoted. 2. If such mechanisms are promoted, depending on the nature and coverage of the mechanisms	0 0.5 to 2
<b>32</b>	If the State/ UT Adm. have implemented any other measures for risk prevention and mitigation (other than those already mentioned in the response to the questionnaire), please provide details. (Use separate sheet if required).	2	1. All other measures for risk prevention and mitigation that are not covered by the questions above	0.5 to 2

**3. RISK GOVERNANCE (Weights 20%)**

Indicators/ Questions		Aggregate Points	Criteria for evaluation	Points to be allocated
<b>3.1 Institutional mechanisms for risk governance</b>		<b>6</b>		
<b>1</b>	Mention date-month-year of constitution of SDMA, SEC and DDMA's	1	1. If these bodies have not been constituted 2. If constituted within 6 months of the coming into force of the DM Act 3. If constituted after 6 months of the coming into force of the DM Act	0 1 0.5
<b>2</b>	How many times SDMA has met year-wise since its constitution?	1	1. If it has never met 2. If it has met at least once in a year on an average 3. If it has met less than once in a year on an average	0 1 0.5
	Year    No. of Meetings    Year    No. of Meetings			
<b>3</b>	Has the SDMA constituted its Advisory Committee? Yes/ No	0.5	1. No 2. Yes	0 0.5
<b>4</b>	Does SDMA have its dedicated staff? Yes/ No	2	1. If SDMA does not have any dedicated staff of its own 2. When SDMA has its dedicated staff, depending on the strength of such staff	0 0.5 to 2
<b>5</b>	If yes, give details.			
<b>6</b>	How many times the SEC has met year-wise since its constitution?	1	4. If it has never met 5. If it has met at least once in a year on an	0 1

			average 6. If it has met less than once in a year on an average	0.5
	Year No. of Meetings Year No. of Meetings			
7	Has the SEC constituted its Sub-Committees? Yes/No	0.5	3. No 4. Yes	0 0.5
<b>3.2 Disaster Management Policy and Plans</b>		<b>10</b>		
8	Has the SDMA laid down State Disaster Management Policy? Yes/No	1	1. When no such policy has been laid down 2. When such State Policy on Disaster Management has been developed, depending on the type and status of such Policy	0 0.5 to 1
9	If yes, attach a copy of the Policy document.			
10	How many guidelines have been laid down by the SDMA? Give details along with copies or URL if these are available on line.	1	1. When no such guidelines have been laid down 2. When such guidelines have been developed, depending on the number and nature of such guidelines	0 0.5 to 1
11	Does the State/UT have a State Disaster Management Plan? Yes/ No	2	1. If the State/ UT does not have a DM Plan 2. If the State has a DM Plan 3. If the State DM Plan has been revised	0 1 0.5 to 1
12	If yes, when was the Plan prepared and revised/			

	updated? Give URL of the plan.		depending on the number of times the Plan has been revised a. Once b. More than once	
<b>13</b>	How many Departments are there in the State Government?	3	1. When none of the Departments has prepared their DM Plans	0
<b>14</b>	How many Departments have prepared Departmental Disaster Management Plan?		2. When less than one third of the Departments have prepared their DM Plans	0.5
	Name of Department Year of Preparation of First Plan Year of Revision		3. When more than one third of the Departments have prepared their DM Plans	1
			4. When all the Departments have prepared their DM Plans	2
			5. When none of the Departments has revised their DM Plans	0
			6. When less than half of the Departments have revised their DM Plans	0.5
			7. When more than half of the Departments have prepared their DM Plans	1
<b>15</b>	How many districts are there in the State/ UT? How many districts have prepared District Disaster Management Plans? Give details.	3	1. When none of the Districts has prepared their DM Plans	0
	Name of District Year of Preparation of First Plan Year of Revision		2. When less than one third of the Districts have prepared their DM Plans	0.5
			3. When more than one third but less than 100% of the Districts have prepared their DM Plans	1
			4. When all the districts have prepared their DM Plans	2
			8. When none of the districts has revised their	0

			DM Plans 9. When less than half of the Districts have revised their DM Plans 10. When more than half of the Districts have prepared their DM Plans	0.5 1
<b>3.3 Disaster Management Manuals and Procedures</b>		<b>2</b>		
<b>16</b>	Has the State/ UT developed Manuals and Standard Operating Procedures, such as Relief Manual, SOP for Disaster Response, SOP for Emergency Operating Procedures etc? Give complete details of all the Manuals and SOPs along with URL.	2	1. If not a single Manual/ SOP has been developed 2. If such Manuals/ SOPs have been developed, depending on the number and nature of such Manuals/ SOPs	0 0.5 to 2
<b>3.4 Decentralisation and Devolution of Functions</b>		<b>2</b>		
<b>17</b>	How are the Municipalities and Panchayats involved with disaster risk management in the State/UT? Has the State Govt./UT Adm. devolved any functions or resources to these self-governing institutions for disaster management? If so, give details.	2	1. When the State/UT has not devolved any function or resources to the urban and rural local bodies for disaster management 2. When the State/UT has devolved only some functions of disaster management 3. When the State/UT has devolved both functions and resources for disaster management	
<b>3.5 Training and Capacity Development</b>		<b>10</b>		
<b>18</b>	Has the State/UT set up any Institute/Centre/Cell for training and capacity development of the functionaries of the government, its agencies and other stakeholders? Provide details as per Schedule-F.	5	1. If no such facility for training and capacity development of government functionaries are available 2. When such facilities are available, works done during 2005-15 a. No. of training programmes conducted b. No. of persons trained	0 0.5 to 1.5 0.5 to 1.5

			<ul style="list-style-type: none"> <li>c. % of MHA/NIDM/TFC funds utilized for training</li> <li>d. Number of training faculty engaged</li> </ul>	<p>0.5 to 1</p> <p>0.5 to 1</p>
<b>19</b>	Is disaster management included in the entry/induction level training curriculum of State Administrative Services and in sectoral training programmes of all relevant development departments? If so, give details.	2	<ul style="list-style-type: none"> <li>1. If disaster management is not included in the training curriculum</li> <li>2. If it is included in both induction and in service training programmes of administrative service personnel</li> <li>3. If it is included in training programmes of sectoral officers, depending on the number of sectors covered in such programmes.</li> </ul>	<p>0</p> <p>0.5 to 1</p> <p>0.5 to 1</p>
<b>20</b>	Has the State Govt./UT Adm. introduced Disaster Management in the curriculum of school education in the schools? Yes/No.	1.5	<ul style="list-style-type: none"> <li>1. If it is not included in the curriculum of school education</li> <li>2. If included actual progress, depending on <ul style="list-style-type: none"> <li>a. year of introduction,</li> <li>b. level of curriculum, and</li> <li>c. development of text books in local language</li> </ul> </li> </ul>	<p>0</p> <p>0.5 to 1.5</p>
<b>21</b>	If yes, give the year of introduction of the curriculum, the class/level where such curriculum has been introduced. Further mention if text books have been developed in local language for this purpose.			
<b>22</b>	Is disaster risk management included in the curriculum of higher education in the State/UT? If so, give details of the streams/subjects of higher/technical education where such inclusions have taken place.	1.5	<ul style="list-style-type: none"> <li>1. If it is not included in the curriculum of higher education</li> <li>2. If it is included in general stream of graduate education</li> <li>3. If it is included in engineering education</li> <li>4. If it is included in medical education</li> </ul>	<p>0</p> <p>0.5</p> <p>0.5</p> <p>0.5</p>

<b>3.6</b>	<b>Multi-Stakeholder Platform</b>	<b>2</b>		
<b>23</b>	Does the State/UT have multi-stakeholder coordination forum like State Platform for Disaster Risk Reduction? If so, give details, such as composition of the forum, date of constitution, and number of meetings it had so far.	1	<ol style="list-style-type: none"> <li>1. If no such multi-stakeholder platform has been set up</li> <li>2. If such platform has been set, depending on its activities</li> </ol>	<p>0</p> <p>0.5 to 1</p>
<b>24</b>	Is there any mechanism for private sector engagement for disaster risk management in the State/ UT? If so, give details.	1	<ol style="list-style-type: none"> <li>1. If no such mechanism is available</li> <li>2. If such mechanism is available, depending on its effectiveness</li> </ol>	<p>0</p> <p>0.5 to 1</p>
<b>3.7</b>	<b>Community Involvement and Participation</b>	<b>5</b>		
<b>25</b>	Has the State/ UT developed any mechanism for the involvement and participation of the communities, civil society, NGOs, volunteers etc in disaster management? If so, give details.	5	<ol style="list-style-type: none"> <li>1. Mechanism for preparation of Community Based Disaster Management Plans and its effectiveness <ol style="list-style-type: none"> <li>a. Are local level DM plans prepared?</li> <li>b. Are local level DM plans funded and implemented?</li> <li>c. Are local level DM Plans monitored?</li> </ol> </li> <li>2. System for involvement of civil society/ NGOs in disaster management <ol style="list-style-type: none"> <li>a. Are there guidelines for NGO involvements</li> <li>b. Is GO-NGO coordination mechanism available?</li> </ol> </li> <li>3. System for involvement of volunteers in disaster management</li> </ol>	<p>0 to 3</p> <p>0 to 1</p> <p>0 to 1</p>

			<ul style="list-style-type: none"> <li>a. Are there guidelines for involving volunteers in disaster management?</li> <li>b. How are such involvements coordinated?</li> </ul>	
<b>3.8 Enforcement and Compliance</b>		<b>4</b>		
<b>26</b>	Has the State/UT or its agencies devised any mechanisms or incentives to ensure high levels of compliance with the safety-enhancing codes and regulations, such as building codes and zoning regulations? Yes/No.	2	<ul style="list-style-type: none"> <li>1. If no such incentives are available</li> <li>2. Nature of such incentives <ul style="list-style-type: none"> <li>a. Rewards such as property tax concessions</li> <li>b. Punishments, such as penalties, demolitions etc</li> </ul> </li> <li>3. Effectiveness of such incentives</li> </ul>	<p>0</p> <p>0.5 to 1</p> <p>0.5 to 1</p>
<b>27</b>	If yes, give details of such incentives.			
<b>28</b>	Has the State/UT evaluated the effectiveness of enforcement of the safety-enhancing codes and regulations, such as building codes and zoning regulations? Yes/No.	2	<ul style="list-style-type: none"> <li>1. If no such evaluation has been conducted</li> <li>2. When evaluations of both building codes and zoning regulations have been conducted</li> <li>3. When findings of evaluations have been considered for improving the system</li> </ul>	<p>0</p> <p>0.5 to 1</p> <p>0.5 to 1</p>
<b>29</b>	If yes, enclose a copy of the evaluation report.			
<b>3.9 Monitoring and Evaluation</b>		<b>2</b>		
<b>30</b>	Has the CAG or Parliamentary Committee conducted any Performance Audit/ Review of the functioning of disaster management system of the State? Yes/No.	2	<ul style="list-style-type: none"> <li>1. When no such monitoring and evaluation system of disaster management is in place</li> <li>2. When such system is in place, results of performance appraisal</li> </ul>	<p>0</p> <p>0.5 to 2</p>

<b>31</b>	If yes, what were the main findings? Give citations of the report such as name of Committee, title of the report, year of publication etc. Provide link to the URL if it is available online.			
<b>3.10 Transparency and Accountability</b>		<b>2</b>		
<b>32</b>	What are the mechanisms, and processes developed by the State/UT to ensure transparency and accountability in the delivery of relief and other disaster management services to the people affected by disasters? Give details.	2	<ol style="list-style-type: none"> <li>1. Is any system in place for ensuring transparency and accountability of disaster management</li> <li>2. Effectiveness of the system, as borne out from the response from the State</li> </ol>	<p>0.5 to 1</p> <p>0.5 to 1</p>
<b>Others</b>		<b>5</b>		
<b>33</b>	Mention any other initiative taken by the State Govt/UT Adm. for improving the system of risk governance.	5	<ol style="list-style-type: none"> <li>1. Assessment of the innovation and effectiveness of the initiatives.</li> </ol>	

**4. DISASTER PREPAREDNESS (Weights 20%)**

Indicators/ Questions		Aggregate Points	Criteria for evaluation	Points to be allocated
<b>4.1 End-to-End Early Warning Systems</b>		<b>5</b>		
<b>1</b>	While central agencies like IMD, CWC, GSI, INCOIS etc are responsible for early warning of most of the major hazards, it is the responsibility of the State Govt./UT Adm. to ensure that such warnings are communicated to the people, down to the last mile in urban and rural areas by every possible means. Give a brief resume of the technical, administrative and logistic arrangements made by the State government for dissemination of early warning of various types of hazards in the State.	4	1. Arrangement for dissemination of Early Warning of disasters to the last mile <ol style="list-style-type: none"> <li>a. Technical arrangements</li> <li>b. Logistic arrangements</li> <li>c. Administrative arrangements</li> </ol>	0 to 2 0 to 1 0 to 1
<b>2</b>	Has any general or specific guideline or SOP been issued for dissemination of early warnings of various types of hazards to the people in the State? Yes/No.	1	1. When no such guidelines have been issued 2. When guidelines have been issued, depending on the comprehensiveness of the guidelines	0 0.5 to 1
<b>3</b>	If yes, enclose a copy of the guidelines.			
<b>4.2 Emergency Operation Centres</b>		<b>5</b>		
<b>4</b>	Has the State Govt./UT Adm. set up Emergency Operation Centre at the State, Metro and District levels equipped with modern communication and	4	1. When EOCs have not been set up 2. When EOC has been set up only at the State Level	0 1 1 to 3

	other facilities? If so, give details of these facilities as per Schedule G.		<ol style="list-style-type: none"> <li>3. When EOCs have been set up at State, District and Metro levels</li> <li>4. When EOCs are equipped with modern and communication facilities, depending on the nature of these facilities.</li> </ol>	0.5 to 2
5	Has any Standard Operating Procedure been developed for the operation and management of Emergency Operation Centres? Yes/No.	1	<ol style="list-style-type: none"> <li>1. When no such guidelines have been issued</li> <li>2. When guidelines have been issued, depending on the comprehensiveness of the guidelines</li> </ol>	0 0.5 to 1
6	If yes, enclose a copy of the same.			
<b>4.3 Disaster Communication System</b>		<b>5</b>		
7	Information and Communication Technology (ICT) plays important role in disaster risk management – before, during and after disasters. Give a brief resume on the initiatives taken by the State/ UT for the application of ICT for disaster management.	5	<ol style="list-style-type: none"> <li>1. When there are no such initiatives</li> <li>2. ICT initiatives pre disaster, depending on the nature of such initiatives</li> <li>3. ICT initiatives during disasters, depending on the nature of such initiatives</li> <li>4. ICT initiatives post disasters, depending on the nature of such initiatives</li> </ol>	0 0.5 to 2 0.5 to 2 0.5 to 1
<b>4.4 Emergency Medical Preparedness</b>		<b>5</b>		
8	How many government hospitals are in operation at the state and district level in the State/UT? How many of them have developed Emergency Medical	2	<ol style="list-style-type: none"> <li>1. When none of the hospitals has disaster medical preparedness plan developed</li> <li>2. When some of the hospitals have such plans,</li> </ol>	0

	Preparedness as per the guidelines of NDMA? Provide URL for accessing the plans.		depending on the number of hospitals having disaster medical preparedness plan and comprehensiveness of such plans	0.5 to 2
9	What steps have been taken for training and capacity building of the medical and para-medical staff of the hospitals for emergency medical preparedness, including trauma management and triage? Give details.	2	1. When no such steps have been taken 2. When some steps have been taken for training medical and para-medical staff, depending on the nature, duration and coverage of such training	0 0.5 to 2
10	Has the State developed any post-disaster disease surveillance system? If so, give details.	1	1. If no 2. If yes, depending on the scope of such system	0 0.5 to 1
	<b>4.5 Scenario Building, Simulation and Mock Drills</b>	<b>5</b>		
11	Have the State/ UT developed worst case scenarios/ simulations of various possible disasters in the State? Yes/No.	2	1. If no such scenarios/ simulations of probable disasters have been developed 2. If such scenarios/simulations have been developed, depending on the nature and scope of such exercises	0 0.5 to 2
12	If yes, give the type of hazards for which scenarios have been developed. Enclose copies of the same if these are available.			
13	How many mock drills have been conducted by the SDMA/ DDMA in the State annually since 2006? Give	3	1. Number of such mock drills conducted in the state since 2006.	0.5 To 3

	details.		(Note: Annual average normalised according to area and population of the State)	
<b>4.6</b>	<b>Contingency Plans, SOPs, Manuals</b>	<b>5</b>		
<b>14</b>	Give a complete list of Contingency Plans, Standard Operating Procedures and Manuals on various aspects of disaster management developed by the State Government/ SDMA.	5	<ol style="list-style-type: none"> <li>1. If not a single Manual/ SOP has been developed</li> <li>2. If such Contingency Plans/Manuals/ SOPs have been developed, depending on the number and nature of such Contingency Plans/Manuals/ SOPs</li> </ol>	<p style="text-align: center;">0 0.5 to 5</p>
<b>4.7</b>	<b>Community Based Disaster Preparedness</b>	<b>5</b>		
<b>15</b>	What measures have been taken for strengthening community based disaster preparedness in the State? Give details.	5	<ol style="list-style-type: none"> <li>1. When no mechanism is in place for preparation of Community Based Disaster Preparedness Plan</li> <li>2. When mechanism for CBDP exists: <ol style="list-style-type: none"> <li>a. Are there guidelines for CBDP?</li> <li>b. Is this institutionalised?</li> <li>c. Is this funded?</li> <li>d. Does it cover the entire State?</li> <li>e. Are local level DM drills organised?</li> </ol> </li> </ol>	<p style="text-align: center;">0 0.5 to 5</p>
<b>4.8</b>	<b>Awareness Generation</b>	<b>5</b>		
<b>16</b>	What measures have been taken for raising awareness of the common people about the measures to be taken for disaster preparedness? Give details.	5	<ol style="list-style-type: none"> <li>1. Is there any policy or plan for raising awareness of common people on disaster preparedness?</li> <li>2. What are the strategic interventions for awareness generation? <ol style="list-style-type: none"> <li>a. Campaigns</li> </ol> </li> </ol>	<p style="text-align: center;">1 0.5 to 4</p>

			<ul style="list-style-type: none"> <li>b. Drills</li> <li>c. Observation of DRR day</li> <li>d. Other measures</li> </ul>	
<b>4.9 Resource Inventory</b>		<b>3</b>		
<b>17</b>	Has the State prepared inventory of material and human resources available with various public and private entities that can be made use for managing disasters? Yes/No.	3	<ul style="list-style-type: none"> <li>1. When no such inventory has been made</li> <li>2. % of districts registered with IDRN</li> <li>3. Status of updating of inventories</li> </ul>	<p>0</p> <p>0.5 to 1</p> <p>0.5 to 2</p>
<b>18</b>	Are these inventories registered with India Disaster Resource Network (IDRN)? Give the district-wise dates of last updates of IDRN.			
<b>4.10 Media Partnership</b>		<b>2</b>		
<b>19</b>	Media can play important role in dissemination of information and knowledge in all phases of disaster management. Both the national policy and nation plan have highlighted the critical role of print and electronic media in disaster management. Has the State Govt./District Adm. developed any guidelines or strategy for media partnership? Give details.	2	<ul style="list-style-type: none"> <li>1. When no such guidelines or strategy is in place.</li> <li>2. When there are strategies for media partnership, its effectiveness in terms of <ul style="list-style-type: none"> <li>a. Communicating risks for pre-disaster mitigation and preparedness</li> <li>b. Communicating correct information about disaster loss and response</li> <li>c. Raising awareness for mobilization of resources for humanitarian response</li> </ul> </li> </ul>	<p>0</p> <p>0.5 to 2</p>
<b>Others</b>		<b>5</b>		

<b>20</b>	Mention any other initiative taken by the State Govt./UT Adm. for strengthening disaster preparedness in the State.	5	1. Any innovative measures taken by the State Govt./UT Adm. for strengthening disaster preparedness in the State, depending on the effectiveness of such innovation	0.5 to 5
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**5. DISASTER RESPONSE (Weights 10%)**

Indicators/ Questions		Aggregate Points	Criteria for evaluation	Points to be allocated
<b>5.1 State Agencies for Disaster Response</b>		<b>10</b>		
<b>1</b>	Has the State constituted a specialized State Disaster Response Force? Yes/No.	4	1. When no such specialized State Disaster Response Force has been constituted. 2. When SDRF has been constituted, its profile in terms of <ol style="list-style-type: none"> <li>Year of constitution</li> <li>Strength</li> <li>Equipment</li> <li>Training</li> </ol>	0
<b>2</b>	If yes, give details such as year of constitution, strength of the force, equipments provided and arrangements made for training.			0.5 to 4
<b>3</b>	Is disaster management included in the training curriculum of State Police at all levels? Yes/No.	2	1. When disaster management is not included in the training curriculum of State Police 2. When disaster management is included in the training curriculum: <ol style="list-style-type: none"> <li>Type: (induction, in service)</li> <li>Level: (higher, middle, lower)</li> </ol>	0
<b>4</b>	If so, give details			0.5 to 2

<b>5</b>	Has the Fire Services been upgraded to acquire multi-hazard rescue capability? Yes/No.	2	1. When no such upgrading has taken place 2. When fire services has been upgraded as multi-hazard rescue team, whether a. Fire fighters have been trained/retrained b. Fire services have been equipped to discharge new role	0  0.5 to 2
<b>6</b>	If so, give details.			
<b>7</b>	Civil Defence Act was amended in 2009 to enable the provisions of the Act to be applied during disasters. This requires expansion of the network of civil defence to all districts and reorientation and training of the civil defence volunteers. What actions have been taken in the State to reorient the civil defence for this new role?	2	1. Has the Civil Defence expanded to every district? 2. Has Civil Defence been trained to discharge new role	0.5 to 1  0.5 to 1
<b>5.2 Incident Response System</b>		<b>4</b>		
<b>8</b>	Govt. of India had decided in 2002 to introduce Incident Command System for responding to disaster situations and trained a large number of administrators of State Govt./UT Adm. on different facets of incident management. National Policy on Disaster Management 2009 endorsed the system and National Guidelines on Incident Response System was issued in 2010 for adapting the system in the context of our administrative system. What steps have been taken by the State Govt./UT Adm. to introduce the system in the State? What is the current status of implementation of the guidelines in terms of training and actual practice during emergency situations?	4	1. When IRS is not introduced/ practised in the State 2. When IRS has been introduced, the current status in terms: a. Notifications/ Guidelines issued for introduction of IRS b. Number of trained IRS teams available in the State. c. Number of districts where IRS teams are available d. Number of occasions IRS has been practised for dealing with emergency situations	0  0.5 to 1 0.5 to 1 0.5 to 1 0.5 to 1
<b>5.3 Coordination with GOI, NDRF Armed, Forces</b>		<b>2</b>		

9	Catastrophic or major disasters may overwhelm the capacity of the State Govt./UT Adm. to respond effectively, requiring assistance of Central Govt. and its agencies like the NDRF and the Armed Force. Quick responses of central agencies are effective if there are institutionalised mechanisms for liaison and coordination, such as civil-military liaison conference. Has any such mechanism been established in the State/UT? If so, give details.	2	<ol style="list-style-type: none"> <li>1. When no such institutionalised mechanisms for liaison and coordination has been set up</li> <li>2. When mechanisms have been set up, its effectiveness in terms of <ol style="list-style-type: none"> <li>a. Regular meetings</li> <li>b. Actual operations</li> </ol> </li> </ol>	0 0.5 to 2
<b>5.4 Evacuation, Search and Rescue</b>		<b>7</b>		
10	Disaster mortalities can be reduced considerably if contingency plans are in place regarding quick assessment of evacuation needs, identification of temporary shelters, determination of evacuation routes, mobilization of transportation arrangements; preparation of check lists etc Is such contingency plan for evacuation available? Yes/No.	4	<ol style="list-style-type: none"> <li>1. When no such contingency plan is in place</li> <li>2. When contingency plan is available, whether the plan takes into account the following: <ol style="list-style-type: none"> <li>a. Needs of evacuation in different disaster situations</li> <li>b. Evacuation routes</li> <li>c. Identification of temporary shelters</li> <li>d. Other check list of activities</li> </ol> </li> </ol>	0 0.5 to 1 0.5 to 1 0.5 to 1 0.5 to 1
11	If yes, enclose copy of the Contingency Plan.			
12	Searching and rescuing people marooned in flooded areas or trapped in collapsed structures or debris is a specialized jobs requiring equipments, training, drills etc. To what extent are the concerned agencies of the State equipped and trained to handle such operations? Give details.	3	<p>The extent to which SDRF and/or other agencies responsible for search and rescue have capacity to handle such operations in terms</p> <ol style="list-style-type: none"> <li>a. Personnel</li> <li>b. Training</li> <li>c. Equipments</li> </ol>	0.5 to 1 0.5 to 1 0.5 to 1
<b>5.5 Emergency Medical Response</b>		<b>5</b>		

13	Immediate impact of disasters is the surge of persons of different age group inflicted with severe and minor injuries for treatment in hospitals. Many such injuries may require medical attention even before hospitalization. This requires operational readiness of medical response teams, availability of ambulance, heli-ambulance and other logistic arrangements. What is the status of such operational readiness of medical response? Give an account of the achievements and challenges.	5	Effectiveness of emergency medical response in terms of: a. Emergency medical response plan of State/district/hospitals b. Availability of trained doctors and para-medical staff c. Well equipped trauma centres d. Ambulance/ heli-ambulance e. Other logistic arrangements	0.5 to 1 0.5 to 1 0.5 to 1 0.5 to 1 0.5 to 1
<b>5.6 Emergency Support Functions</b>		<b>5</b>		
14	Disaster response is not the job of responders alone. It requires performance of Emergency Support Functions (ESF) by the line departments and agencies, such as restoration of electricity, water supply and sanitation system, telecommunication, road and transportation network, supply chain of food and other essential items etc. Has the State Govt./UT Adm. prepared check lists of ESF, identified primary and secondary agencies and functionaries for the performance of these functions, outlined the process and timeline to be followed and provided resources for the same? Have the agencies made pre-arrangements for advance procurement of materials needed for such functions? Give details.	5	Pre-arrangements for the performance of Emergency Support Functions post-disasters: a. Preparation of check lists of activities of Emergency Support Functions b. Identification of primary and secondary agencies responsible for performance of these functions c. Process to be followed for performance of these functions d. Timeline for performance of these functions e. Operational agencies of the agencies for performance of these functions	0.5 to 1 0.5 to 1 0.5 to 1 0.5 to 1 0.5 to 1
<b>5.7 Protection of vulnerable women and children</b>		<b>5</b>		

15	Vulnerable women and children often become victims of trafficking and sexual abuse after disasters. Is a surveillance system in place in the State/ UT for preventing such abuses and protecting the vulnerable? If so give details.	5	<ol style="list-style-type: none"> <li>1. When no such surveillance system is in place</li> <li>2. When there is a surveillance system, how effective is this system in terms of: <ol style="list-style-type: none"> <li>a. Whether institutional arrangements are available for surveillance</li> <li>b. Whether system is in place for identification of vulnerable women and children who need protection post disasters</li> <li>c. Whether there is system for rescuing trafficked women and children</li> <li>d. Whether there are arrangements for rehabilitation of trafficked women and children.</li> <li>e. How many vulnerable women and children have been protected from trafficking post disasters in the State.</li> </ol> </li> </ol>	<p>0</p> <p>0.5 to 1</p>
<b>5.8 Disposal of dead bodies</b>		<b>3</b>		
16	In the event of mass casualties in disasters proper collection, preservation, storage, identification and disposal of dead bodies according to the religious customs and rites of the deceased are ethical as well as legal issues. Has the State Govt./UT Adm. issued any guidelines to be followed in this regard? Yes/No.	3	<ol style="list-style-type: none"> <li>1. When there are no such guidelines</li> <li>2. When the guidelines are there, do these cover issues like: <ol style="list-style-type: none"> <li>a. Identification of dead bodies</li> <li>b. Preservation of DNA of unclaimed bodies</li> <li>c. Mass funeral, following religious rites</li> </ol> </li> </ol>	<p>0</p> <p>0.5 to 1</p> <p>0.5 to 1</p> <p>0.5 to 1</p>
17	If yes, enclose a copy of the guidelines.			
<b>5.9 Disposal of Animal Carcasses</b>		<b>2</b>		

18	Proper removal and disposal of animal carcasses at pre-identified sites is important to ensure that no health hazards are created to the staff as well as general public. Has the State Govt./UT Adm. issued any guidelines to be followed in this regard? Yes/No.	2	<ol style="list-style-type: none"> <li>1. When no such guidelines have been issued.</li> <li>2. When the guidelines are there, do these cover issues like: <ol style="list-style-type: none"> <li>a. There are pre-identified sites for disposal of animal carcasses</li> <li>b. There are arrangements for protecting</li> </ol> </li> </ol>	<p>0</p> <p>0.5 to 1</p> <p>0.5 to 1</p>
19	If yes, enclose a copy of the guidelines.			
<b>5.10 Disposal of Debris</b>		<b>2</b>		
20	Major disasters like earthquakes and cyclones may cause widespread destruction of built up structures like houses and infrastructure as well as natural assets like trees and plantations. Removal and disposal of construction debris and fallen trees can be problematic in many urban areas where open sites are not available so easily unless these are pre-identified. Much of these materials can be also be recycled. Does the State Govt./UT Adm. or the municipal authorities have any plan for management of the debris? Yes/No.	2	<ol style="list-style-type: none"> <li>1. When there is no such plan</li> <li>3. When there are plans, does this cover issues like: <ol style="list-style-type: none"> <li>a. There are pre-identified sites for disposal of debris</li> <li>b. There are arrangements for recycling debris</li> </ol> </li> </ol>	<p>0</p> <p>0.5 to 1</p> <p>0.5 to 1</p>
21	If yes, enclose a copy of the guidelines.			
<b>Others</b>		<b>5</b>		

22.	Mention any other initiative taken by the State Govt./UT Adm. for effective response to disasters in the State.	5	1. Any innovative measures taken by the State Govt./UT Adm. for strengthening disaster response in the State, depending on the effectiveness of such innovation.	0.5 to 5
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**6. DISASTER RELIEF & REHABILITATION (Weights 15%)**

Indicators/ Questions		Aggregate Points	Criteria for evaluation	Points to be allocated
<b>6.1 Minimum Standard of Relief</b>		<b>2</b>		
<b>1</b>	Has the State Disaster Management Authority laid down guidelines for providing standards of relief to persons affected by disasters in the State, as provided in section 19 of Disaster Management Act? Yes/No.	2	1. When no such guidelines have been issued 2. When guideline endorses norms prescribed by NDMA/SDRF/NDRF 3. When guideline prescribes higher standards of relief	0
<b>2</b>	If yes, enclose a copy of the guidelines.			1
<b>6.2 Ex-gratia Relief</b>		<b>1</b>		
<b>3</b>	Government of India has fixed norms of ex-gratia relief under State Disaster Response Fund and National Disaster Response Fund. Do the State Government/ UT Adm. provide additional ex-gratia relief over and above such norms? If so give details.	1	1. When State Government/ UT Adm. provide additional ex-gratia relief over and above SDRF/NDRF norms.	1
<b>6.3 Relief Logistics and Supply Chain Management</b>		<b>7</b>		
<b>4</b>	Timely procurement, packaging, transportation, storage and distribution of relief materials immediately as the need arises make it imperative that there are well laid down operating procedures and manuals on relief logistics and supply chain management. Do the State Govt./UT Adm. have such SOP/ Manuals. Yes/No.	4	1. When no such Manual/ SOP is available	0
			2. When Manual/SOP is in place	1
			3. Whether Manual/SOP covers issues like	
			a. Stockpiling of essential relief materials	0.5
		b. Pre-tendering for supply of essential relief materials	0.5	
		c. Packaging of relief materials for easy	0.5	

			distribution	
			d. Decentralised storage/ transportation of relief materials	0.5
			e. Procedure for distribution of relief materials	0.5
<b>5</b>	If yes, enclose a copy of SOP/Manual or give link to the online resource.			
<b>6</b>	Major disasters attract humanitarian assistance, often in kind, from all over the world, Receiving, sorting, transporting and distributing these materials to the neediest in a transparent manner is quite challenging. Has the State Govt./UT Adm. evolved any guidelines to deal with such situations? Yes/No.	3	1. When no such guidelines have been developed	0
			2. When guidelines are available, whether it covers issues like	1
			a. Receiving/ sorting/ repackaging relief materials	0.5
			b. Norms for fair distribution of relief materials	0.5
			c. Transparency in distribution of relief materials	0.5
			d. Involvement of NGOs in such operations	0.5
<b>7</b>	If yes, enclose a copy of the guidelines.			
<b>6.4 Food and Essential Supplies</b>		<b>7</b>		
<b>8</b>	Supply of food including cooked food and other essential items to the affected people is one of the major functions of disaster relief. This involves procurement, storage, transportation and distribution of food in a transparent and accountable manner. This further involves pre-agreements/ MoUs with	7	1. Whether Relief Manual/ SOP/ practices of the State/ UT covers issues like the following:	
			a. Minimum standards of food/ cooked food to be provided to the victims	0.5 to 1
			b. Special needs of children, pregnant and lactating mothers	0.5 to 1

	organisations, trusts and firms for setting up community kitchens in the affected areas. Describe the policies and practices followed in this regard, with special reference to any innovative practice introduced for better delivery of services.		<ul style="list-style-type: none"> <li>c. Special needs of old, sick etc.</li> <li>d. Pre-agreements/ MOUs etc with NGOs for setting up community kitchens</li> <li>e. Arrangements for dry food when cooked food cannot be served</li> <li>f. Involvement of the victims for deciding choice of foods</li> <li>g. System for feedback and monitoring for continuous improvement</li> </ul>	<p>0.5 to 1</p>
<b>6.5 Drinking Water, Dewatering and Sanitation</b>		<b>7</b>		
<b>9</b>	Supply of clean drinking water to disaster affected areas is extremely important to prevent water borne diseases. Every State/ UT faces its own challenge. Describe the minimum standards of the State for supply of drinking water to people affected by disasters and assess the compliance of the standards.	3	<ol style="list-style-type: none"> <li>1. Alternate arrangements for supply of drinking water when normal arrangements are disrupted in disaster <ul style="list-style-type: none"> <li>a. Water trains</li> <li>b. Water tankers</li> <li>c. Packaged water</li> <li>d. Other innovative measures</li> </ul> </li> <li>2. Mechanisms to ensure that water is free from impurities and safe to drink <ul style="list-style-type: none"> <li>a. Mechanical/ electrical water purifiers</li> <li>b. Chlorination</li> <li>c. Other innovative measures</li> </ul> </li> </ol>	<p>0.5 to 1.5</p> <p>0.5 to 1.5</p>
<b>10</b>	Providing sanitation facilities to men and women, particularly those in relief camps, is another important aspect of public health. Describe the minimum standards adopted by the State for providing sanitation services to people affected by disasters and assess the compliance of the standards.	3	<ol style="list-style-type: none"> <li>1. Minimum standards of sanitation in relief camps <ul style="list-style-type: none"> <li>a. Adequate number of toilets</li> <li>b. Separate toilets for men and women</li> <li>c. Provision of water</li> <li>d. Arrangements for regular cleanliness</li> </ul> </li> </ol>	<p>0.5</p> <p>0.5</p> <p>0.5</p> <p>0.5</p>

			<ul style="list-style-type: none"> <li>e. Provision for sanitary napkins for girls/women</li> <li>f. Arrangements for solid waste management</li> </ul>	<p>0.5</p> <p>0.5</p>
<b>11</b>	Dewatering of flooded areas in urban pockets that have no outlets can be critical for public health as well as safety of lives and structures. Do the State/ UT face such situations? How does it address the problem?	1	1. Mechanisms for dewatering of flooded areas, particularly in cities	0.5 to 1
<b>6.6 Health and Mental Health Care</b>		<b>7</b>		
<b>12</b>	Health care of disaster affected pregnant and lactating mothers, neo-natal, aged and those suffering from chronic diseases should receive priority in health care as they suffer from double jeopardy. Do the State Govt./UT Adm. provide special dispensation for such people? If so give details.	5	<ul style="list-style-type: none"> <li>1. Health care arrangements for disaster affected people, particularly for <ul style="list-style-type: none"> <li>a. Pregnant and lactating mothers</li> <li>b. Neo-natal children</li> <li>c. Senior and very senior citizens</li> <li>d. Persons suffering from chronic diseases</li> </ul> </li> </ul>	<p>0.5 to 1</p> <p>0.5 to 1</p> <p>0.5 to 1</p> <p>0.5 to 1</p>
<b>13</b>	Mental health care of the affected people suffering from Post Traumatic Stress Disorder (PTSD) is crucial at the initial stage for diagnosis and treatment. Have the State Govt./UT Adm. made arrangements for expert psycho-social counselling of such people? If so give details.	2	<ul style="list-style-type: none"> <li>1. Availability of facilities for psycho-social counselling for PTSD: <ul style="list-style-type: none"> <li>a. Are these facilities available to disaster affected as part of relief and rehabilitation measures?</li> <li>b. Is there regular tie up with mental hospitals in the State and outside?</li> </ul> </li> </ul>	<p>0.5 to 1</p> <p>0.5 to 1</p>

<b>6.7 Management of Relief Camps</b>		<b>5</b>		
<b>14</b>	Provision of basic shelter, food, water and health care does not solve the problems of people in temporary relief camps, as there are many other issues, such as privacy, safety, security, gender based violence etc. that should also be addressed. These issues can be attended only if there are proper guidelines for management of relief camps. Have the State Govt./UT Adm. developed such guidelines? Yes/No.	5	<ol style="list-style-type: none"> <li>1. When there are no such guidelines</li> <li>2. When guidelines have been issued, whether the following issues are covered? <ol style="list-style-type: none"> <li>a. Safety and security of camp dwellers</li> <li>b. Privacy of dwellers, particularly women dwellers</li> <li>c. Mechanism for redressing grievances</li> <li>d. Participatory management of camps</li> <li>e. Supervision and monitoring arrangements</li> </ol> </li> </ol>	<p>0.5 to 1</p>
<b>15</b>	If yes, enclose a copy of the guidelines on the management of the relief camps.			
<b>6.8 Veterinary Care</b>		<b>3</b>		
<b>16</b>	Veterinary care for disaster affected livestock and animals, including wild animals and arrangements for their evacuation, shelter, fodder / feed etc. are important for rehabilitation of animals. Do the State Govt./UT Adm. have any plan or guidelines for animal care during disasters. Yes/ No.	3	<ol style="list-style-type: none"> <li>1. When no such guidelines are available</li> <li>2. When guidelines are available, whether the following aspects are covered <ol style="list-style-type: none"> <li>a. Evacuation and rescue of domestic animals and pets</li> <li>b. Arrangements for fodder and feeds</li> <li>c. Rescue, rehabilitation and safe passage of wild animals</li> </ol> </li> </ol>	<p>0.5 to 1</p> <p>0.5 to 1</p> <p>0.5 to 1</p>

<b>17</b>	If yes, enclose a copy of the plan/guidelines.			
<b>6.9 Relief Employment</b>		<b>3</b>		
<b>18</b>	People affected by disasters often lose their livelihood. Relief employment under MNREGA is one of the several avenues for providing alternate source of livelihood to the affected people. What are the alternative avenues developed by the State Govt./UT Adm. for providing relief employment to the people? How many man days of relief employment have been provided in the State since 2006 under different schemes/ programmes? Give details.	3	<ol style="list-style-type: none"> <li>1. Alternate livelihood arrangements for disaster affected people <ol style="list-style-type: none"> <li>a. MNREGA</li> <li>b. Other schemes</li> </ol> </li> <li>2. Man days of relief employment generated</li> </ol>	<p style="text-align: right;">0.5 to 2</p> <p style="text-align: right;">0.5 to 1</p>
<b>6.10 Temporary and Intermediary Shelters</b>		<b>3</b>		
<b>19</b>	In case of devastating disasters when the period of stay in temporary shelters is likely to be long and uncertain, or where extreme weather conditions can be life-threatening, construction of intermediary shelters shall become necessary. Did the State Govt./UT Adm. have to construct such intermediary shelters anytime in the past? Give year-wise details from 2006 onwards. Based on the experiences gained, has any general or specific guidelines been issued for future? If so give details.	3	<ol style="list-style-type: none"> <li>1. Guidelines on temporary or intermediate shelters issued, if any</li> <li>2. Experiences and practices</li> <li>3. Innovations carried out, if any</li> </ol>	<p style="text-align: right;">0.5 to 1</p> <p style="text-align: right;">0.5 to 1</p> <p style="text-align: right;">0.5 to 1</p>
<b>Others</b>		<b>5</b>		

<b>20</b>	Mention any other initiative taken by the State Govt./UT Adm. for relief and rehabilitation of people affected by disasters in the State.	5	2. Any innovative measures taken by the State Govt./UT Adm. for strengthening disaster relief and rehabilitation in the State, depending on the effectiveness of such innovation.	0.5 to 5
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**7. DISASTER RECONSTRUCTION (Weights 5%)**

Indicators/ Questions		Aggregate Points	Criteria for evaluation	Points to be allocated
<b>7.1 Damage and Loss Assessment</b>		<b>5</b>		
<b>1</b>	How are the damage and losses in disasters assessed in the State/ UT?	5	1. When structured guidelines for assessment of are available, depending on the comprehensiveness of the guidelines  2. How assessments are made of damages and losses of the following due to disasters: <ol style="list-style-type: none"> <li>Human and animal lives</li> <li>Houses and infrastructure</li> <li>Production and services</li> <li>Livelihood</li> <li>Environmental assets</li> <li>Cultural assets</li> <li>Macro-economic losses</li> <li>Other socio-economic losses</li> </ol>	0.5 to 1
<b>2</b>	Are there any guidelines or manual for damage and loss assessment in disasters? Yes/No.			0.5 to 4
<b>3</b>	If yes, enclose a copy of the guidelines.			
<b>7.2 Post Disaster Need Assessment</b>		<b>5</b>		
<b>4</b>	How are the needs for post disaster recovery and reconstruction assessed in the State/ UT?	3	1. When structured guidelines for assessing needs of post-disaster recovery and reconstruction are available, depending on the comprehensiveness of the guidelines.  2. When no such guidelines are available, how are such assessments made, depending on the quality of such assessments.	0.5 to 1
<b>5</b>	Are there any guidelines or manual for such Post Disaster Need Assessment? Yes/No.			0.5 to 2



	State/UT? Give a brief description of the institutional mechanism(s) adopted in the State for the implementation of such projects.		<p>post-disaster reconstruction</p> <ol style="list-style-type: none"> <li>a. When dedicated institution has been created for planning, coordination and monitoring of reconstruction</li> <li>b. When dedicated institution has been created for implementation as well</li> <li>c. When reconstruction is got done through line departments</li> <li>d. When no such mechanism is available</li> </ol>	
<b>7.5 Building Back Better</b>		<b>5</b>		
<b>11</b>	Do the State/ UT consistently follow the principle 'Build Back Better' in post-disaster construction projects? Give examples of practical application of the principles in past reconstruction projects.	3	<ol style="list-style-type: none"> <li>1. When principle of build back better is followed consistently in all reconstruction projects and across all sectors as a matter of State Policy.</li> <li>2. When it is followed only in major projects of reconstruction</li> <li>3. When it is not followed at all</li> </ol>	<p>1.5 to 3</p> <p>0.5 to 1</p> <p>0</p>
<b>12</b>	How have the reconstructed towns and villages behaved in repeat occurrences of disasters? Give examples from the reconstruction experiences of the past.	2	<ol style="list-style-type: none"> <li>1. Evaluation of reconstruction projects of the State, based on the materials made available by the State Govt./UT Adm.</li> </ol>	0 to 2
<b>7.6 Reconstruction of Houses</b>		<b>5</b>		
<b>13</b>	What strategies are followed for reconstruction of damaged houses? Are the houses reconstructed by the agencies of the government or by the owners themselves? How it is ensured that owners reconstruct	2	<ol style="list-style-type: none"> <li>1. When there are no strategies for reconstruction of damaged houses.</li> <li>2. When well defined strategies for reconstruction of damaged houses are</li> </ol>	<p>0</p> <p>0.5 to 1</p>

	their houses as per disaster resistant designs and technology?		available. 3. When such strategies are followed: a. In all reconstruction projects. b. In some reconstruction projects	0.5 to 1
<b>14</b>	What material and financial supports are provided by the government to facilitate reconstruction of houses damaged in disasters?	2	1. When support is provided by the government for reconstruction of damaged houses only as per SDRF norms 2. When additional support is provided by government in terms of a. Finance b. Materials c. Technical standards of design and specification	0.5 0.5 to 2
<b>15</b>	Are the reconstructed houses insured? Are these registered jointly in the name of present owner and spouse?	1	1. When there is no such insurance 2. When houses are insured only in major reconstruction projects 3. When houses are insured only in major reconstruction projects	0 0.5 1
<b>7.7</b>	<b>Reconstruction of Infrastructure</b>	<b>5</b>		
<b>16</b>	What is the strategic approach of the State Govt./UT Adm. for reconstruction of damaged physical and social infrastructure? Are these reconstructed as per original plan and design or redesigned to provide additional elements of safety and resilience? Give examples from the reconstruction experiences of the past..	5	1. When there are no strategies for reconstruction of damaged infrastructure 2. When well defined strategies for reconstruction of damaged infrastructure are available. a. What are the additional elements of safety and resilience that are built in	0 0.5 to 1 0.5 to 3

			reconstruction projects? b. What are the demonstrated effectiveness of such projects?	0.5 to 2
<b>7.8</b>	<b>Livelihood Reconstruction</b>	<b>5</b>		
<b>17</b>	Disasters impact on the livelihood of people such as farmers, artisans, women headed households, and people belonging to marginalised and vulnerable sections. What strategic approach is followed for reconstruction of damaged livelihoods? Give examples from the reconstruction experiences of the past.	5	<ol style="list-style-type: none"> <li>1. When there are no strategies for reconstruction of livelihoods of affected people and communities.</li> <li>2. When strategic approach has been developed, the effectiveness of the approach in reconstructing livelihoods of affected people in terms of: <ol style="list-style-type: none"> <li>a. Reviving damaged livelihoods</li> <li>b. Creating alternate livelihoods</li> <li>c. Developing skills for alternate livelihoods</li> <li>d. Providing input and marketing support</li> <li>e. Providing credit support</li> </ol> </li> </ol>	<p>0</p> <p>0.5 to 1</p>
<b>7.9</b>	<b>Regeneration of Ecology and Environment</b>	<b>3</b>		
<b>18</b>	Disasters cause considerable damages to ecology and environment. How such damaged environment have been restored during past 10 years. Give examples.	3	<ol style="list-style-type: none"> <li>1. When there has not been any effort to repair and restore ecology and environment damaged due to disasters during past 10 years?</li> <li>2. When there have been efforts in this direction, effectiveness of the initiatives in terms of <ol style="list-style-type: none"> <li>a. Restoration of damaged forests and mangroves</li> <li>b. Restoration of soil</li> </ol> </li> </ol>	<p>0.5 to 1</p> <p>0.5 to 1</p>

			c. Restoration of dried/ contaminated water bodies	0.5 to 1
<b>7.10 Learning from Reconstruction and Recovery</b>		<b>2</b>		
<b>19</b>	What are the main lessons learnt from the experiences of reconstruction in the past? Have these been documented? Have these lessons been incorporated in the policies or guidelines? If so give details.	2	<ol style="list-style-type: none"> <li>1. Have the lessons learnt from recovery and reconstruction projects been documented systematically?</li> <li>2. Have these lessons been incorporated in the policies or guidelines?</li> </ol>	0.5 to 1  0.5 to 1
<b>Others</b>		<b>5</b>		
<b>20</b>	Mention any other initiative/ good practice of the State Govt./UT Adm. for disaster recovery and reconstruction.	5	<ol style="list-style-type: none"> <li>3. Any innovative measures taken by the State Govt./UT Adm. for post-disaster recovery and reconstruction in the State, depending on the effectiveness of such innovation.</li> </ol>	0.5 to 5

