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Annexure

Abbreviations	
AAI	Airports Authority India
ADWR	Airborne Doppler Weather Radar
AGD	Agriculture Department
AH&VS	Animal Husbandry & Veterinary Services
ALTM	Airborne Laser Terrain Mapping
AMCDRR	Asian Ministerial Conference on Disaster Risk Reduction
ANM	Auxiliary Nurse Midwife
AR5	IPCC's Fifth Assessment Report
ARG	Automatic Rain Gauge
ARHD	Archaeology Department
ASHA	Accredited Social Health Activist
ASI	Archaeological Survey of India
ASSOCHAM	Associated Chambers of Commerce and Industry of India
ATI	Administrative Training Institute
AWS	Automatic Weather Stations
AYUSH	Ministry of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy
BAI	Builders Association of India
BBB	Build Back Better
BIS	Bureau of Indian Standards
BMTPC	Building Materials and Technology Promotion Council
BPHE	Biological and Public Health Emergencies
BRO	Border Road Organisation
BSF	Border Security Force
CADA	Coastal Area Development Authority
CAPF	Central Armed Police Forces
CARA	Central Adoption Resource Authority
CBRI	Central Building Research Institute, Roorkee
CBRN	Chemical, Biological, Radiological and Nuclear
CBSE	Central Board of Secondary Education
CCA	Climate Change Adaptation
CCM	Climate Change Mitigation
CD	Civil Defence
CDMM	Centre for Disaster Mitigation and Management, Vellore
CDRC	Central Drought Relief Commissioner
CEDMM	Centre of Excellence in Disaster Mitigation and Management/ IIT- Roorkee
C&ID	Commerce & Industries Department
CFI	Construction Federation of India
CIDC	Construction Industry Development Council
CII	Confederation of Indian Industry
CIMFR	Central Institute of Mining & Fuel Research
CISF	Central Industrial Security Force
CMG	Crisis Management Group
COVID-19	Coronavirus Disease
CoA	Council of Architecture
COP	Conference of the Parties

COR	Commissioner of Relief
CRIDA	Central Research Institute for Dry land Agriculture
CRPF	Central Reserve Police Force
CRRI	Central Road Research Institute
CRZ	Coastal Regulation Zone
CSIR	Council of Scientific and Industrial Research
CSO	Central Statistics Office
CSS	Centrally Sponsored Schemes
CUD	Culture Department
CWC	Central Water Commission
CWPRS	Central Water and Power Research Station
CWWG	Crop Weather Watch Group
CZMA	Coastal Zone Management Authority
DEOC	District Emergency Operation Center
Dept.	Department
DFIN	Finance Department
DFRI	Disaster Risk Financing Instruments
DGM	Directorates of Geology and Mining
DISCOM	Power Distribution of Companies
DMC	Drought Monitoring Cell
DMP	Disaster Management Plan
DMPSS	Disaster Management Policies for the State of Sikkim 2007
DOS	Department of Space
DOT	Department of Telecommunications
DRD	Department of Rural Development
DRDO	Defence Research and Development Organisation
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSJE	Social Justice and Empowerment Department
DSS	Decision Support System
DTRL	Defence Research and Development Organisation
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSJE	Social Justice and Empowerment Department
DSS	Decision Support System
DTRL	Defense Terrain Research Laboratory
DWR	Doppler Weather Radar
EFC	Expenditure Finance Committee
EFD	Forest and Environment Department
EHRA	Earthquake Hazard and Risk Assessment
EIA	Environment Impact Assessment
EOC	Emergency Operations Centre
EREC	Earthquake Risk Evaluation Centre
EWS	Early Warning System
F &ES	Fire and Emergency Services
FAO	Food and Agriculture Organisation

FC	Finance Commission
FCI	Food Corporation of India
FCSD	Food and Civil Supply Department
FC-XIII	Thirteenth (13th) Finance Commission
FC-XIV	Fourteenth (14th) Finance Commission
F&ED	Forest & Environment Department
FICCI	Federation Indian Chambers of Commerce and Industry
FIHD	Department of Fisheries (or relevant dept.)
FRED	Finance Revenue & Expenditure Department
FRI	Forest Research Institute
FSI	Forest Survey of India
GACC	Global Anthropogenic Climate Change
GAR	Global Assessment Report
GDP	Gross Domestic Product
GLOF	Glacial Lake Outburst Flood
GIS	Geographic Information System
GVK	Gram Vikas Kendra
GOI	Government of India
GRM	Grievance Redress Mechanism
GSI	Geological Survey of India
HAP	Heat (Wave) Action Plan
HAZCHEM	Hazardous Chemicals
HAZMAT	Hazardous Materials
HEOC	Health Emergency Operation Centre
HD	Horticulture Department
HF	High Frequency
HFA	Hyogo Framework for Action
HFWD	Health & Family Welfare Department
HLC	High Level Committee
HRD	Human Resource Development
HRVA	Hazard Risk Vulnerability Assessment
HRVCA	Hazard Risk, Vulnerability and Capacity Assessment
IAEA	International Atomic Energy Agency
IAF	Indian Air Force
IAP	Incident Action Plan
IBA	Important Bird Areas
IBTA	Industry/ Business/ Trade Associations
ICAR	Indian Council of Agricultural Research
ICDS	Integrated Child Development Services
ICR-ER	Integrated Control Room for Emergency Response
ICT	Information Communication Technology
IDRN	Indian Disaster Resource Network
IDS	Integrated Defense Staff
IDSP	Integrated Disease Surveillance Programme
IEC	Information Education Communication
IERMON	Indian Environmental Radiation Monitoring Network

IHR	Indian Himalayan Region
IIA	Indian Institute of Architects
IIE	Indian Institute of Entrepreneurship
IIT	Indian Institute of Technology
IMD	Indian Meteorological Department
INCOIS	Indian National Centre for Ocean Information Services
IND	Improvised Nuclear Device
INDC	Intended Nationally Determined Contributions
INDD	Industries Department
INSARAG	International Search and Rescue Advisory Group
IPCC	Inter- Governmental Panel on Climate Change
IPRD	Information and Public Relations Department
IRC	Indian Roads Congress
IRD	Irrigation Department
IRDA	Insurance Regulatory and Development Authority
IRS	Incident Response System
IRT	Incident Response Team
ISO	International Organisation for Standardisation
ISRO	Indian Space Research Organisation
ITBP	Indian Tibetan Border Police
IWRM	Integrated Water Resources Management
JJ Act	Juvenile Justice Act 2000
JJB	Juvenile Justice Board
LBSNAA	Lal Bahadur Shastri National Academy of Administration
LR & DMD	Land Revenue and Disaster Management Department
LSA	Landslide and Snow Avalanches
M&E	Monitoring and Evaluation
MAFW	Ministry of Agriculture and farmers Welfare
MAH	Major Accident Hazard
MAI	Moisture Adequate Index
MANAGE	National Institute of Agricultural Extension Management
MCA	Ministry of Corporate Affairs
MCAFPD	Ministry of Consumer Affairs, Food and Public Distribution
MCF	Ministry of Chemicals and Fertilizers
MCM	Million Cubic Metres
MCOAL	Ministry of Coal
MCOM	Ministry of Communications
MDWS	Ministry of Drinking Water and Sanitation
MEA	Ministry of External Affairs
MEITY	Ministry of Electronics and Information Technology
MFAHD	Ministry of Fisheries, Animal Husbandry and Dairying
MFIN	Ministry of Finance
MFPI	Ministry of Food Processing Industries
MHA	Ministry of Home Affairs
MHFW	Ministry of Health and Family Welfare
MHIPE	Ministry of Heavy Industries and Public Enterprises

MHRD	Ministry of Human Resource Development
MHRVA	The Multi Hazard Risk and Vulnerability Assessment
MHUA	Ministry of Housing and Urban Affairs
MLBE	Ministry of Labour and Employment
MMSME	Ministry of Micro, Small and Medium Enterprises
MNCFC	Mahalanobis National Crop Forecast Centre
MNRE	Ministry of New and Renewable Energy
MOCA	Ministry of Civil Aviation
MOCI	Ministry of Commerce and Industry
MOCU	Ministry of Culture
MOD	Ministry of Defence
MOEFCC	Ministry of Environment, Forest and Climate Change
MOES	Ministry of Earth and Sciences
MOIB	Ministry of Information and Broadcasting
MOJS	Ministry of Jal Shak
MOLJ	Ministry of Law and Justice
MOM	Ministry of Mines
MOPA	Ministry of Parliamentary Affairs
MOPR	Ministry of Panchayati Raj
MOR	Ministry of Railways
MORD	Ministry of Rural Development
MOSH	Ministry of Shipping
MOSPI	Ministry of Statistics and Programme Implementation
MOST	Ministry of Science and Technology
MoU	Memorandum of Understanding
MPFI	Ministry of Food Processing Industries
MPNG	Ministry of Petroleum, Public Grievances and Pensions
MPPGP	Ministry of Personnel, Public Grievances and Pensions
MPWR	Ministry of Power
MRTH	Ministry of Road Transport and Highways
MSDE	Ministry of Skill Development and Entrepreneurship
MSIHC	Manufacture Storage and Import of Hazardous Chemicals
MSJE	Ministry of Social Justice and Empowerment
MSTL	Ministry of Steel
MTEX	Ministry of Textiles
MTOU	Ministry of Tourism
MTRA	Ministry of Tribal Affairs
MWCD	Ministry of Women and Child Development
MYAS	Ministry of Youth Affairs and Sports
NABARD	National Bank for Agriculture and Rural Development
NAC	National Academy of Construction
NAPCC	National Action Plan on Climate Change
NBCC	National Buildings Construction Corporation
NCC	National Cadet Crops
NCDC	National Centre for Disease Control
NCERT	National Council of Educational Research and Training

NCMC	National Crisis Management Committee
NCMRWF	National Centre of Medium Range Weather Forecasting
NCPCR	National Commission for Protection of Child Rights
NDC	Nationally Determined Contributions
NDMA	National Disaster Management Authority
NDMP	National Disaster Management Plan
NDRF	National Disaster Response Force
NDVI	Normalised Differential Vegetation Index
NEC	Nation Executive Committee
NER	North Eastern Region
NERC	National Emergency Response System
NGO	Non- Governmental Organisations
NHAI	National Highways Authority of India
NHWIS	National Hazardous Waste Information System
NICMAR	National Institute of Construction Management and Research
NIDM	National Institute of Disaster Management
NIESBUD	National Institute for Entrepreneurship and Small Business Development
NIO	North Indian Ocean
NIRD	National Institute of Rural Development
NISA	National Institute of Security Academy
NITI	National Institution for Transforming India
NITTR	National Institute of Technical Teachers Training and Research
NLRTI	National Level Research and Technical Institutions
NLSDA	National Level Skill Development Agencies
NPDM	National Policy on Disaster Management
NRAA	National Rain-fed Area Authority
NRE	Nuclear and /or Radiological Emergency
NRSC	National Remote Sensing Centre
NSDA	National Skill Development Agency
NSDC	National Skill Development Corporation
NSG	National Skill Guard
NSS	National Service Scheme
NWDA	National Water Development Agency
NYKS	Nehru Yuva Kendra Sangathan
ODR	Owner Driven Reconstruction
O&M	Operation and Maintenance
OHSAS	Occupation and Health Safety Assessment Series
PED	Power /Energy Department
PESA	Panchayat Extension in Schedule Areas
PG	Post Graduate
PPP	Public Private Partnership
PRI	Panchayati Raj Institutions (District, Block and Village Levels)
PSS	Persons with Special Abilities
R&D	Research and Development
RDD	Rural Development Department
RDD	Radiological Dispersal Device

RDSO	Research Designs and Standards Organisation
RMI	Risk Management and Insurance
RO	Reverse Osmosis
RSMC	Regional Specialised Meteorological Centre
RTSMN	Real-time Seismic Monitoring Network
SAARC	South Asian Association for Regional Cooperation
SARA	Psycho- Social Support and Mental Health Services
SARS	Severe Acute Respiratory Syndrome
SASE	Snow and Avalanche Study Establishment
SAU	State Agricultural University
SBSE	State Board of Secondary Education
SCPS	State Child Protection Society
SCR-ER	State Control Room for Emergency Response
SC & ST	Schedules Castes and Scheduled Tribes
SDG	Sustainable Development Goals
SDMA	State Disaster Management Authority
SDMC	State Drought Monitoring Cell
SDMP	State Disaster Management Plan
SDRF	State Disaster Management Response Force
SDRN	State Disaster Resource Network
SEB	State Electricity Board
SEC	State Executive Committee
SEOC	State Emergency Operation Cell
SERC	Structural Engineering Research Centre
SESC	State Executive Sub-Committee
SFAC	Standing Fire Advisory Council
SFC	Standing Finance Committee
SFDRR	Sendai Framework for Disaster Risk Reduction
SHG	Self Help Group
SIDM	State Institute of Disaster Management
SIHFW	State Institute if Health and Family Welfare
SIRD	State Institute of Rural Development
SJ &WD	Social Justice and Welfare Department
SLBC	State Level Bankers Committee
SLRTI	State-Level Research and Technical Institutions
SLSDA	State Level Skill Development Agencies
SME	Small and Medium Enterprises
SOGs	Standard Operating Guidelines
SOPs	Standard Operating Procedure
SPCB	State Pollution Control Board
SPWD	State Public Works Department
SREX	IPCC Special Report on Mapping the Risks of Extreme Events to Advance Climate Change Adaptation
SRSAC	State Remote Sensing Application Centre
SSB	Sashastra Seema Bal
T1	Short Term, ending 2022

T2	Medium Term, ending 2027
T3	Long Term, ending 2030
TAA	Thematic Area for Action
TCWC	Tropical Cyclone Warning Centre
TOD	Tourism Department
ToT	Training of Trainers
TRAD	Transport Department
UDD	Urban Development Department
UFDM	Urban Flood Disaster Management
UGC	University Grants Commission
ULB	Urban Local Bodies (Municipal Corporation, Municipalities, Nagarpalika)
UN	United nations
UNCRPD	UN Convention on the Rights if Persons with Disabilities
UNDP	United Nation Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction Now UN office for DRR
USDDM	Urban Storm Drainage Design Manual
VHF	Very High Frequency
WAP	Wildlife Action Plan
WCD	Women and Children Department
WCDRR	World Conference on Disaster Risk Reduction 2015
WCTN	Wind Chill Effective Minimum Temperature
WIHG	Wadia Institute of Himalayan Geology
WMO	World Meteorological Organisation
WSD	Water and Sanitation Department

Executive Summary

Background

The Disaster Management Act, 2005 (DM Act 2005) lays down institutional and coordination mechanism for effective Disaster Management (DM) at the national, state, district and local levels. As mandated by this Act, the Government of India created a multi-tiered institutional system consisting of the National Disaster Management Authority (NDMA) headed by the Prime Minister, the State Disaster Management Authorities (SDMA) headed by the respective Chief Ministers and the District Disaster Management Authorities (DDMA) headed by the District Collectors/ District Magistrate and co-chaired by Chairpersons of the local bodies. Thus, as per this law, the State Government of Sikkim created Sikkim State Disaster Management Authority, SSDMA headed by the Hon'ble Chief Minister of Sikkim as the Chairman. The State Government also constituted State Executive Committee, SEC headed by the Chief Secretary as the Chairman. The Land Revenue & Disaster Management Department is a State Nodal Department, for coordination of disaster management in the State.

The institutional arrangements have been set up consistent with the paradigm shift from the relief-centric approach of the past to a proactive, holistic and integrated approach for Disaster Risk Reduction (DRR) by way of strengthening disaster preparedness, mitigation, and emergency response. The State Executive Committee, SEC prepared a State Disaster Management Plan, SDMP for the State of Sikkim in accordance with the guidelines laid down by the National Authority.

The State Disaster Management Plan (SDMP) provides a framework and direction to the government agencies for all phases of disaster management cycle. The SDMP is a "dynamic document" in the sense that it will be periodically improved keeping up with the emerging global best practices and knowledge base in disaster management. It is in accordance with the provisions of the DM Act 2005, the guidelines provided in the National Policy on Disaster Management (NPDM) 2009, and the established national practices. The SDMP recognizes the need to minimize, if not eliminate, any ambiguity in the responsibility framework. SDMP specifies who is responsible for what at different stages of managing disasters. SDMP is meant to be implemented in a flexible and scalable manner in all phases of disaster management: a) Mitigation (prevention and risk reduction), b) Preparedness, c) Response and d) Recovery (immediate restoration and build-back better). The names of departments of the State having specific roles and responsibilies are mentioned in the Plan, in the spirit of the DM Act 2005 and the exigencies of humanitarian response, every department and agency is expected to contribute to DM going beyond their normal rules of business.

Main Pillars of SDMP

The SDMP, in a sense, has been prepared integrating the principles of the five main pillars, namely:

I. Conforming to the national legal mandates—the DM Act 2005 and the NPDM 2009

II. Participating proactively in realizing the global goals as per agreements to which India is signatory—Sendai Framework for DRR, Sustainable Development Goals (SDGs) and Conference of Paris (COP21) Paris Agreement on Climate Change

III. Prime Minister's Ten Point Agenda for DRR articulating contemporary national priories

IV. Social inclusion as a ubiquitous and cross-cutting principle

V. Mainstreaming DRR as an integral feature

SDMP is aligned with the Sendai Framework and incorporating the Ten Point Agenda on DRR, enunciated by Prime Minister during Asian Ministerial Conference on DRR (AMCDRR) in November 2016 in New Delhi.

Vision

"Make Sikkim disaster resilient, achieve substantial disaster risk reduction, and significantly decrease the losses of life, livelihoods, and assets – economic, physical, social, cultural, and environmental – by maximizing the ability to cope with disasters at all levels of administration as well as among communities".

The following overview in general has been drawn to help understand the major structural composition of the SDMP.

Multi-Hazard Vulnerability

Sikkim, is a landlocked State perched in the Greater Himalayas and is one of the most disaster-prone states in the country due to its physiographic location and its distinct climatic conditions. The SDMP covers disaster management cycle for all types of hazards—natural and human-induced. The things that point towards heightened vulnerabilities to disaster risks can be related to increasing population, urbanisation, industrialisation, development within high-risk zones, environmental degradation, and climate change. Besides the natural factors and anthropogenic climate change, various human activities could also be responsible for aggravated impacts and increased frequency of disasters.

Building Resilience

The role of the State Authority is to ensure that the State departments or any authority or body in the state initiates action in response to any threatening disaster situation or disaster in the State. The state departments have the responsibility to play a pro -active role in disaster situations. In the domains of DM planning, preparedness, and capacity building, the state departments or any authority or body in the state will constantly work to upgrade DM systems and practices. Thus, in a pursuit to greater preparedness to disaster priorities of the Sendai Framework and those related to DRR in SDGs and Paris Agreement have been integrated into the planning framework for Disaster Risk Reduction under the following Thematic Areas for Disaster Risk Reduction:

1. Understanding Risk
2. Inter-Agency Coordination
3. Investing in DRR – Structural Measures
4. Investing in DRR – Non-Structural Measures
5. Capacity Development and
6. Climate Change Risk Management

In addition to the above, SDMP has also integrated the specific cross-cutting themes laid down in the National Disaster Management Plan, 2019:

a) Coherence and Mutual Reinforcement for DRR of the Post-2015 Global Frameworks
b) Social Inclusion and
c) Mainstreaming DRR

Response

Response measures are those taken immediately after receiving early warning, anticipating an impending disaster, or post-disaster in cases where an event occurs without warning. The primary goal of response to a disaster is saving lives, protecting property, environment, and meeting basic needs of human and other living beings after the disaster. The immediate focus will be on search and rescue of those affected and to evacuate those likely to be affected by the disaster or secondary disaster that is likely to happen. In the section on response, roles, function and responsibilities of agencies that have a key role to play are described. Since contexts, knowledge base, and technologies change, DM plans must be updated periodically to reflect any changes in the key roles envisaged to various agencies. The State Authority has assigned responsibilies to specific departments for coordinating disaster-specific responses. The disaster-specific departments will ensure liaison with the authority where the disaster has occurred and coordination among various relevant agencies to provide quick and efficient response. The State Authority will activate the Incident Response Teams (IRT) at state, district, or at block level as required. Different departments will assist in the response efforts as per the requirement by the State Authority. The various agencies whose responsibilities are defined in detailed DM plans for the State and district will be responsible for specific response measures. The Nodal Department responsible to coordinate response at the state level will be Land Revenue & Disaster Management Department whereas at the district level DDMA will coordinate response supported by district departments or authority or body in the district.

Recovery and Building Back Better

Globally, the approach towards post-disaster restoration and rehabilitation has shied to one of building back better. Disasters result in considerable disruption of normal life, enormous suffering, loss of lives and property. The global efforts consider the recovery, rehabilitation and reconstruction phase as an opportunity to build back better integrating disaster risk reduction into development measures and making communities resilient to disasters. Build back better is not limited to the built environment and has a wide applicability encompassing the economy, societal systems, institutions, and environment. The Sendai Framework envisages that the stakeholders will be prepared for building back better after a disaster. Existing mechanisms may require strengthening in order to provide effective support and achieve better implementation. Disaster recovery tends to be very difficult and long-drawn out. The reconstruction will vary depending on the actual disaster, location, pre -disaster conditions, and the potentialities that emerge at that point of time. The SDMP provides a generalized framework for recovery since it is not possible to anticipate all the possible elements of building back better.

Capacity Development

Capacity development covers strengthening of institutions, mechanisms, and capacities of all stakeholders at all levels. The plan recognizes the need for a strategic approach to capacity

development and the need for enthusiastic participation of various stakeholders to make it effective. The plan addresses the challenge of putting in place appropriate institutional framework, management systems and allocation of resources for efficient prevention and handling of disasters. The planning needs of capacity development are described for all phases of disaster management.

Financial Arrangements

According to NPDM 2009, the primary responsibility of disaster management lies with the State Government. This means, the primary responsibility for undertaking rescue, relief, and rehabilitation measures during a disaster lies with the State Government. The DM Act 2005 provides the legal framework for disaster management and all related matters, including the financial aspects. The financing of the entire disaster management cycle will be as per norms set by the Government of India. The disaster risk reduction will be achieved by mainstreaming the requirements into the developmental plans.

Structure of the Plan

The SDMP has ten chapters:

1) Preliminaries
2) Hazard Risks and Challenges
3) Social Inclusion in Disaster Risk Reduction/ DRR
4) Mainstreaming DRR
5) Building Disaster Resilience
6) Preparedness and Response
7) Recovery and Building Back Better
8) Capacity Development
9) Financial Arrangements
10) Maintaining and Updating the Plan

1 Preliminaries

1.1. Rational

The revised terminology of the United Nations Office for Disaster Risk Reduction (UNISDR[1]) defines 'disaster' as: *"A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts." (UNISDR 2016)"*

The effect of the disaster can be immediate and localized but is often widespread, often persisting for long after the event. The effect may challenge or overwhelm the capacity of a community or society to cope using the resources immediately and therefore may require assistance from external sources, which could include neighboring jurisdictions, or those at the national or international levels. UNISDR considers disaster to be a result of the combination of many factors such as the exposure to hazards, the conditions of vulnerability that are present, and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injuries, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation.

The DM Act 2005 uses the following definition for disaster:

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

The State Disaster Management Plan (SDMP) provides a framework and direction to the state government departments or authority or body in the state for all phases of disaster management cycle (Figure -1). The SDMP is a "dynamic document" in the sense that it will be periodically improved keeping up with the global, national and regional best practices and knowledge base in disaster management. It is in accordance with the provisions of the Disaster Management Act 2005, the guidance given in the Disaster Management Policies for the State of Sikkim 2007(DMPSS), National Policy on Disaster Management 2009 (NPDM), and the established national practices. Relevant State departments will carry out disaster management activities in different phases in the disaster-affected areas depending on the type and scale of disaster.

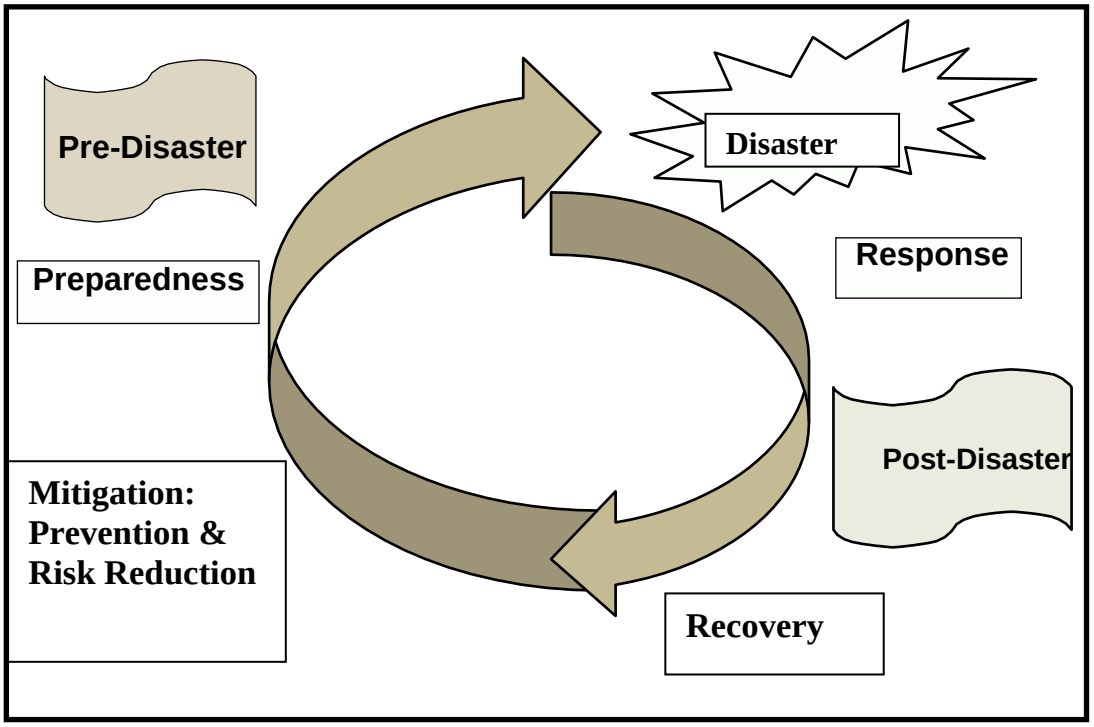

Figure 1: Disaster Management Cycle

The state government is primarily responsible for managing the disaster however, in situations where there sources of the state are in adequate to cope effectively with the situation; the State Government can seek assistance from the Central Government. In addition, there may be situations in which the Central Government will have direct responsibilities in certain aspects of disaster management. While the SDMP pertains to both these exigencies, in most cases the role of central agencies will be to support the state government. Barring exceptional circumstances, the state government will deploy the first responders and carry out other activities pertaining to disaster management.

The SDMP provides a framework covering all aspects of the disaster management cycle. It covers disaster risk reduction, mitigation, preparedness, response, recovery and long-term betterment reconstruction.

It recognizes that effective disaster management necessitates a comprehensive framework encompassing multiple hazards. The SDMP incorporates an integrated approach that ensures the involvement of government agencies, numerous other relevant organisations, private sector participants and local communities.

The SDMP specifies who is responsible for what at different stages of managing disasters. The SDMP is envisaged as ready for activation at all times in response to an emergency in any part of the state. It is designed in such a way that it can be implemented as needed on a flexible and scalable manner in all phases of disaster management: a) mitigation (prevention and risk reduction), b) preparedness, c) response and d) recovery (immediate restoration to long-term betterment reconstruction).

The SDMP provides a framework with role clarity for rapid mobilization of resources and effective disaster management by State Government. While it focuses primarily on the needs of the government agencies, it envisages all those involved in disaster management including communities and non-government agencies as potential users. The SDMP provides a well- defined framework for disaster management covering scope of work and roles of relevant agencies along with their responsibilities and accountability necessary to ensure effective mitigation, develop preparedness, and mobilize adequate response.

1.2. Paradigm Shift

The DM Act 2005 and the NPDM 2009 marks the institutionalization of paradigm shift in disaster management in India, from a relief-centric approach to one of proactive prevention, mitigation and preparedness. It is not possible to avoid natural hazards, adequate mitigation and disaster risk reduction measures can prevent the hazards becoming major disasters. Disaster risk arises when hazards interact with physical, social, economic and environmental vulnerabilities. The national legal mandates suggest a multi-pronged approach for disaster risk reduction and mitigation consisting of the following:

- Integrating risk reduction measures into all development projects
- Initiating mitigation projects in identified high priority areas through joint efforts of the Central and State Governments
- Encouraging and assisting State level mitigation projects
- Paying attention to indigenous knowledge on disaster and coping mechanisms
- Giving due weightage to the protection of heritage structures

In the terminology adopted by the UNISDR, the concept and practice of reducing disaster risks involve systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. While both the terms “Disaster Reduction” and “Disaster Risk Reduction” are widely used, the latter provides a better recognition of the ongoing nature of disaster risks and the ongoing potential to reduce these risks. Mitigation consists of various measures required for lessening or liming the adverse impacts of hazards and related disasters.

1.3. Legal Mandate

Section 23 (1) of the Disaster Management (DM) Act, 2005, directs the States to have a State Disaster Management Plan. The SDMP complies with the National Policy on Disaster Management (NPDM) of 2009 and conforms to the provisions of the DM Act making it mandatory for the various state departments to have adequate DM plans. While the SDMP will pertain to the disaster management for the whole of the state, the hazard-specific nodal departments notified by the State Government will prepare detailed DM plans specific to the disaster assigned. As per Section 40 of the DM Act, every department of the State, be it hazard-specific nodal departments or not, shall prepare comprehensive DM plans detailing how each of them will contribute to the state governments efforts in the domains of disaster prevention, preparedness, response, and recovery. As per the mandate of the DM Act, the

SDMP assigns specific and general responsibilities to all the departments for disaster management. The section 39 and section 40 of the DM Act enjoins the SDMP to assign necessary responsibilities to various departments to support and implement the plan. Therefore, it is incumbent on all departments to accept all the implicit and explicit responsibilities mentioned in the SDMP even if they are beyond what are explicitly mentioned in the normal rules of business. Disaster management requires assumption of responsibilities beyond the normal functioning. The SDMP will be complemented by separate contingency plans, SOPs, manuals, and guidelines at all levels of the multi-tiered governance system.

1.4. **Three Post-2015 Global Frameworks—Disasters, Sustainable Development and Climate Change: Mutual Reinforcement and Coherence**

The Post 2015 goals and agendas are set forth in the three landmark global agreements reached in 2015 - the i. Sendai Framework for Disaster Risk Reduction, (Sendai Japan, March 2015 - UNISDR 2015a), ii. Sustainable Development Goals (UN General Assembly, New York, September, 2015) and iii. Climate Change Agreement (Conference of Parties, COP21, Paris December 2015 -UNFCC 2015). These three documents has opened the significant opportunity to build coherence across DRR, sustainable development and response to climate change. The adoption of SDGs – 'Transforming Our World: The 2030 Agenda for Sustainable Development' is a global transformative plan of action that has poverty eradication as an overarching aim. It has, at its core, the integration of the economic, social and environmental dimensions of sustainable development. The Paris Agreement on global climate change points to the importance of averting, minimizing, and addressing loss and damage associated with the adverse effects of climate change, including extreme weather events and slow onset events, and the role of sustainable development in reducing the risk of loss and damage.

DRR and resilience are recurring common theme in the three global agreements. All three agreements share a common aim of making development sustainable. The most significant shift recognised in the Sendai Framework is a strong emphasis on *disaster risk management* in contrast to disaster management. These three agreements recognize the desired outcomes in DRR as a product of complex and interconnected social and economic processes, which overlap across the agendas of the three agreements. Intrinsic to sustainable development is DRR and the building of resilience to disasters. Further, effective disaster risk management contributes to sustainable development.

1.5. Sendai Framework for DRR

The Sendai Framework for Disaster Risk Reduction 2015- 2030 (hereafter "Sendai Framework") adopted at the Third UN World Conference in Sendai, Japan, on March 18, 2015 (UNISDR 2015) as the successor instrument to the Hyogo Framework for Action 2005- 2015. It is a non-binding agreement and the signatory nations, including India shall attempt to comply with on a voluntary basis.

The Sendai Framework was the first international agreement adopted within the context of the post-2015 development agenda. Two other major international agreements followed it in the same year:

The Sustainable Development Goals 2015 – 2030 in September, and the UNCOP21 Climate Change agreement to combat human-induced climate change in December. Disaster Risk Reduction (DRR) is a common theme in these three global agreements.

In the domain of disaster management, the Sendai Framework provides the way forward for the period ending in 2030.There are some major departures in the Sendai Framework:

- For the first time the goals are defined in terms of outcome-based targets instead of focusing on sets of activities and actions.
- It places governments at the center of disaster risk reduction with the framework emphasizing the need to strengthen the disaster risk governance.
- There is significant shift from earlier emphasis on disaster management to addressing disaster risk management itself by focusing on the underlying drivers of risk.
- It places almost equal importance on all kinds of disasters and not only on those arising from natural hazards.
- In addition to social vulnerability, it pays considerable attention to environmental aspects through a strong recognition that the implementation of integrated environmental and natural resource management approaches is needed for disaster reduction
- Disaster risk reduction, more than before, is seen as a policy concern that cuts across many sectors, including health and education.

As per the Sendai Framework, in order to reduce disaster risk, there is a need to address existing challenges and prepare for future ones by focusing on monitoring, assessing, and understanding disaster risk and sharing such information. The Sendai Framework notes that it is "urgent and critical to anticipate, plan for and reduce disaster risk" to cope with disaster. It requires the strengthening of disaster risk governance and coordination across various institutions and sectors. It requires the full and meaningful participation of relevant stakeholders at different levels. It is necessary to invest in the economic, social, health, cultural and educational resilience at all levels. It requires investments in research and the use of technology to enhance multi-hazard Early Warning Systems (EWS), preparedness, response, recovery, rehabilitation, and reconstruction.

The four priorities for action under the Sendai Framework are:

- Understanding disaster risk
- Strengthening disaster risk governance to manage disaster risk
- Investing in disaster risk reduction for resilience
- Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction

To support the assessment of global progress in achieving the outcome and goal of this Framework, seven global targets have been agreed. The set targets will be measured at the global level and will be complemented by work to develop –

1. Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020–2030 compared to the period 2005– 2015;
2. Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015;
3. Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030;

4. Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;
5. Substantially increase the number of countries with national and local disaster risk reduction strategies by 2030;
6. Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the present Framework by 2030;
7. Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

1.6. Integrating Sendai Framework into SDMP

The SDMP incorporates substantively the approach enunciated in the Sendai Framework and will help the state to meet the goals set in the framework. By 2030, the Sendai Framework aims to achieve substantial reduction of disaster risk and losses in lives, livelihoods, and health and in the economic, physical, social, cultural, and environmental assets of persons, businesses, communities, and countries. The SDMP has been aligned broadly with the goals and priorities set out in the Sendai Framework for DRR. The framework states that to realize this outcome, it is necessary to prevent new and reduce existing disaster risk through the implementation of integrated and inclusive measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience. These measures must cover various sectors such as economic, structural, legal, social, health, cultural, educational, environmental, technological, political, and institutional. The plan includes measures that will be implemented over the short, medium, and long-term more or less over the time horizon of the Sendai Framework ending in 2030.

1.7. Prime Minister's Ten – Point Agenda for Disaster Risk Reduction

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

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

10. Bring about greater cohesion in international response to disasters Given below is a description of the Ten Point of Agenda for DRR:

First, all development sectors must imbibe the principles of disaster risk management. This will ensure that all development projects - airports, roads, canals, hospitals, schools, bridges – are built to appropriate standards and contribute to the resilience of communities they seek to serve. Over the next couple of decades, most of the new infrastructure in the world will come up in Asia. There is a need for ensuring that all the infrastructure development conforms to the best available standards of disaster safety. Such an approach is a smart strategy, which will pay off in the long term. It is necessary that all the public investments must incorporate disaster risk considerations. In India, the 'housing for all' programme and 'smart cities' initiatives represent such opportunities. India will work with other partner countries and stakeholders to build a coalition or mechanism for promoting disaster resilient infrastructure in the region. This will help generate new knowledge for hazard risk assessment, disaster resilient technologies and mechanisms for integrating risk reduction in infrastructure financing.

Second, it is necessary to work towards risk coverage for all – starting from poor households, it must cover small and medium enterprises as well as large multi-national corporations. Currently, in most countries of the region, penetration of insurance is limited only to a narrow section, mostly in the middle and upper-middle income groups. It is necessary to think big and innovatively to widen the risk insurance cover. States have an important role in not just regulating but also encouraging coverage for those who need it the most. Some bold steps have been taken to ensure financial inclusion and risk insurance for the poorest. The Jan Dhan Yojana has brought millions of people into the banking system. The Suraksha Bima Yojana provides risk insurance to millions who need it the most. The newly launched Fasal Bima Yojana (crop insurance) will provide risk cover to millions of farmers. These are the basic building blocks of resilience at the household level.

Third, it is necessary to encourage greater involvement and leadership of women in disaster risk management. Women are disproportionately affected by disasters. They also have unique strength s and insights. India must train a large number of women volunteers to support special needs of women affected by disasters. There is also need for women engineers, masons and building artisans to participate in post-disaster reconstruction and promote women self-help groups which can assist in livelihood recovery.

Fourth, it is necessary to invest in mapping risks globally. For mapping risks related to hazards such as earthquakes, there are widely accepted standards and parameters. Based on these, India has mapped seismic zones, with five as highest seismic risk and two as low risk. For disaster risk related to other hazards such as chemical hazards, forest fires, cyclones, different types of floods, India needs to adopt globally accepted standards and categories. This will help India to ensure that there is a shared understanding of the nature and severity of disaster risks and compare with that in other parts of the world.

Fifth, efforts must be made to leverage technology to enhance the efficiency of our disaster risk management efforts. An e-platform that brings together organizations and individuals and helps them map and exchange expertise, technology and resources would go a long way in maximizing the

collective impact.

Sixth, it will be helpful to develop a network of universities to work on disaster-related aspects since universities have social responsibilities too. Over the first five years of the Sendai Framework, an effort can be made to develop a global network of universities working together on problems of disaster risk management. As part of this network, different universities could specialize in multi -disciplinary research on disaster issues most relevant to them. Universities located in coastal areas could specialize in managing risks from coastal hazards, and the ones located in the hill cities could focus on mountain hazards.

Seventh, utilize the opportunities provided by social media and mobile technologies. Social media is transforming disaster response. It is helping response agencies in quickly organizing themselves and enabling citizens to connect more easily with authorities. In disaster after disaster, affected people are using social media to help each other. Those responsible for disaster management must recognize the potential of social media and develop applications relevant to various aspects of disaster risk management.

Eighth, disaster management must build on local capabilities and initiatives. The task of disaster risk management, particularly in rapidly growing economies, is so huge that formal institutions of the state can at best be instrumental in creating the enabling conditions. Specifications have to be designed and implemented locally. Over the last two decades, most community-based efforts have been confined to disaster preparedness and contingency planning for the short term. It is necessary to expand the scope of community-based efforts and support communities to identify local risk reduction measures and implement them. Such efforts reduce risk and create opportunities for local development and sustainable livelihoods. Localization of disaster risk reduction will also ensure that good use is made of the traditional best practices and indigenous knowledge. Response agencies need to interact with their communities and make them familiar with the essential drill of disaster response. For example, if a local fire service visits one school in its area every week, it would sensitize thousands of children over a period of one year.

Ninth, ensure that the opportunity to learn from a disaster is not wasted. After every disaster there are studies and reports on lessons learnt that are rarely applied. Often the same mistakes are repeated. It is necessary to have a vibrant and visual system of learning. The United Nations could start an international competition of documentary films that record disaster events, their scale, and relief, rehabilitation, reconstruction and recovery afterwards. Post -disaster recovery is an opportunity to not just ‘build back better’ in terms of physical infrastructure, but also in terms of improved institutional systems for managing risk. For this, it is necessary to put in place systems that can quickly provide risk assessments. India must work with partner countries and multilateral development agencies to establish a facility for technical support to post-disaster reconstruction of houses

The tenth and last, it is necessary to bring about greater cohesion in international response to disasters. In the aftermath of a disaster, disaster responders pour in from all over the world. This collective strength and solidarity could be enhanced further if the activities are organised under a common umbrella. The United Nations could think of a common logo and branding under which all those who are helping with relief, rehabilitation and reconstruction operate.

1.8. **Scope**

As per the Section 23 (4) of the DM Act, 2005, the State Disaster Management Plan (SDMP) shall include:

a. The vulnerability of different parts of the State to different forms of disaster.
b. The measures to be adopted for prevention and mitigation of disasters.
c. The manner in which the mitigation measures shall be integrated with the development plans and projects.
d. The capacity-building and preparedness measures to be taken.

The roles and responsibilities of each Department of the Government of the State in relation to the measures specified in clauses (b), (c) and (d) above; the roles and responsibilities of Different Departments of the Government of the State in responding to any threatening disaster situation or disaster.

1.9. **Objectives**

Along with the mandate given in the DM Act 2005, the state plan has incorporated the national commitment towards the Sendai Framework. Accordingly, the broad objectives of the SDMP are:

1) Improve the understanding of disaster risk, hazards, and vulnerabilities
2) Strengthen disaster risk governance at all levels from local to centre
3) Invest in disaster risk reduction for resilience through structural, non-structural and financial measures, as well as comprehensive capacity development
4) Enhance disaster preparedness for effective response
5) Promote "Build Back Better" in recovery, rehabilitation and reconstruction
6) Prevent disasters and achieve substantial reduction of disaster risk and losses in lives, livelihoods, health, and assets (economic, physical, social, cultural and environmental)
7) Increase resilience and prevent the emergence of new disaster risks and reduce the existing risks
8) Promote the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures to prevent and reduce hazard exposure and vulnerabilities to disaster.
9) Empower both local authorities and communities as partners to reduce and manage disaster risks
10) Strengthen scientific and technical capabilities in all aspects of disaster management
11) Capacity development at all levels to effectively respond to multiple hazards and for community-based disaster management
12) Provide clarity on roles and responsibilities of various Departments and Agencies involved in different aspects of disaster management
13) Promote the culture of disaster risk prevention and mitigation at all levels
14) Facilitate the mainstreaming of disaster management concerns into the developmental planning and processes

1.10. **Types of Disasters**

Primarily disasters are triggered by natural hazards or human-induced or result from a combination of both. The human-induced factors can greatly aggravate the adverse impacts of a natural disaster. Even at a larger scale, globally, the UN Inter-Governmental Panel on Climate Change (IPCC) has shown that human-induced climate change has significantly increased both the frequency and intensity of extreme weather events. While heavy rains, cyclones, or earthquakes are all natural, the impacts may, and are usually, worsened by many factors related to human activity. The extensive industrialization and urbanization increase both the probability of human-induced disasters, and the extent of potential damage to life and property from both natural and human-induced disasters. The human society is also vulnerable to Chemical, Biological, Radiological, and Nuclear (CBRN) threats and events that might escalate to emergencies/ disasters.

1.11. **Natural Hazards**

The widely accepted classification system used by the Disaster Information Management System of DesInventar[3] classifies disasters arising from natural hazards into five major categories and is used globally for the Sendai targets monitoring:

1. Geophysical: Geological process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Hydro-meteorological factors are important contributors to some of these processes.
2. Hydrological: Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by climate set-up
3. Meteorological: Events caused by short-lived/small to meso-scale atmospheric processes (in the spectrum from minutes to days)
4. Climatological: Events caused by long-lived meso to macro-scale processes (in the spectrum from intra-seasonal to multi-decadal climate variability)
5. Biological: Process or phenomenon of organic origin or conveyed by biological vectors, including exposure to pathogenic micro-organisms, toxins and bioactive substances that may cause loss of life, injury, illness or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

A brief description of these five major categories of the disasters arising from natural factors with the sub-categories is given in Table 1. In real life situations, many disasters are a combination of different types of disasters. In addition, secondary disasters may occur after a disaster has occurred.

Sl.No	Family	Main Event	Short Description/ Secondary Disaster
1.	Geophysical	Earthquake/ Mass movement of earth materials	• Landslide following earthquake; • Urban fires triggered by earthquakes; • Liquefaction - the transformation of (partially) water-saturated soil from a solid state to a liquid state caused by an earthquake. • Mass movement of earth materials, usually down slopes. • Surface displacement of earthen materials due to ground shaking triggered by earthquakes. • Sinking of ground surface due to earthquake.
		Volcano	• Surface displacement of earthen materials due to ground shaking triggered by volcanic eruptions • A type of geological event near an opening/vent in the Earth's surface including volcanic eruptions of lava, ash, hot vapour, gas, and pyroclastic material. • Ash fall; Lahar - Hot or cold mixture of earthen material flowing on the slope of a volcano either during or between volcanic eruptions; • Lava Flow • Pyroclastic Flow - Extremely hot gases, ash, and other materials of more than 1,000 degrees Celsius that rapidly flow down the flank of a volcano (more than 700 km/h) during an eruption
		Tsunami	• Tsunamis are difficult to categorize they are essentially an oceanic process that is manifested as a coastal water-related hazard. A series of waves (with long wave lengths when travelling across the deep ocean) that are generated by a displacement of massive amounts of water through underwater earthquakes, volcanic eruptions or landslides. Tsunami waves travel at very high speed across the ocean but as they begin to reach shallow water they slow down, and the wave grows steeper.
2.	Hydrological	• Flood	• Avalanche, a large mass of loosened earth material, snow, or ice that slides, flows or falls

		• Landslides •Wave Action	rapidly down a mountainside under the force of gravity • Coastal Erosion - The temporary or permanent loss of sediments or landmass in coastal margins due to the action of waves, winds, _des, or anthropogenic activities • Coastal flood - Higher-than-normal water levels along the coast caused by tidal changes or thunderstorms that result in flooding, which can last from days to weeks • Debris Flow, Mud Flow, Rock Fall - Types of landslides that occur when heavy rain or rapid snow/ice melt send large amounts of vegetation, mud, or rock down slope by gravitational forces • Flash Flood Hydrological - Heavy or excessive rainfall in a short period of time that produce immediate runoff, creating flooding conditions within minutes or a few hours during or after the rainfall • Flood Hydrological - A general term for the over flow of water from a stream channel on to normally dry land in the floodplain (riverine flooding), higher-than normal levels along the coast and in lakes or reservoirs (coastal flooding)as well as ponding of water at or near the point where the rain fell (flash floods) • Wave Action: Wind-generated surface waves that can occur on the surface of any open body of water such as oceans, rivers and lakes, etc. The size of the wave depends on the strength of the wind and the travelled distance (fetch).
3.	Meteorological	Hazard caused by short-lived, micro- to meso-scale extreme weather and atmospheric conditions that may last for minutes to days	• Cyclone, Storm Surge, Tornado, Convective Storm, Extra-tropical Storm, Wind • Cold Wave • Extreme Temperature, Fog, Frost, Freeze, Hail, Heat wave • Lightning, Heavy rain • Sandstorm, Dust-storm • Snow, Ice, Winter Storm, Blizzard
4.	Climatological	Unusual, extreme weather conditions related to long-	• Drought • Extreme hot/cold conditions • Forest/Wildfire Fires

		lived, meso- to macro scale atmospheric processes ranging from intra-seasonal to multi-decadal (long-term) climate variability	• Glacial Lake Outburst Flood (GLOF) • Subsidence
5.	Biological	Exposure to germs and toxic substances	• Epidemics: viral, bacterial, parasitic, fungal, orprion infections • Insect infestations • Animal stampedes

Table -1: Five Categories of Disasters

1.11.1. **Human-Induced Disasters**

Rise in population, rapid urbanization and industrializaon, development within high-risk zones, environmental degradation, and climate change aggravates the vulnerabilities to various kinds of disasters. Due to inadequate disaster preparedness, communities, and animals are at increased risk from many kinds of human-induced hazards arising from accidents (industrial, road, air, rail, on river or sea, building collapse, fires, mine flooding, urban flooding, oil spills, etc.). Hazards due to CBRN threats and events rank very high among the causes that are human induced acts. Terrorist activities and secondary incidences arising from intentional or non -intentional activities also add to these risks and calls for adequate preparedness and planning.

1.12. Institutional Framework

1.12.1. State Level

The overall coordination of the disaster management vests with the Land Revenue & Disaster Management Department, LR&DMD. The SDMA is the agency responsible for the approval of the SDMP and facilitating its implementation. Fig 2 provides a schematic view of the Basic Institutional Framework State-level Disaster Management at the state level. The figure represents merely the institutional pathways for coordination, decision- making and communication for disaster management and does not imply any chain of command.

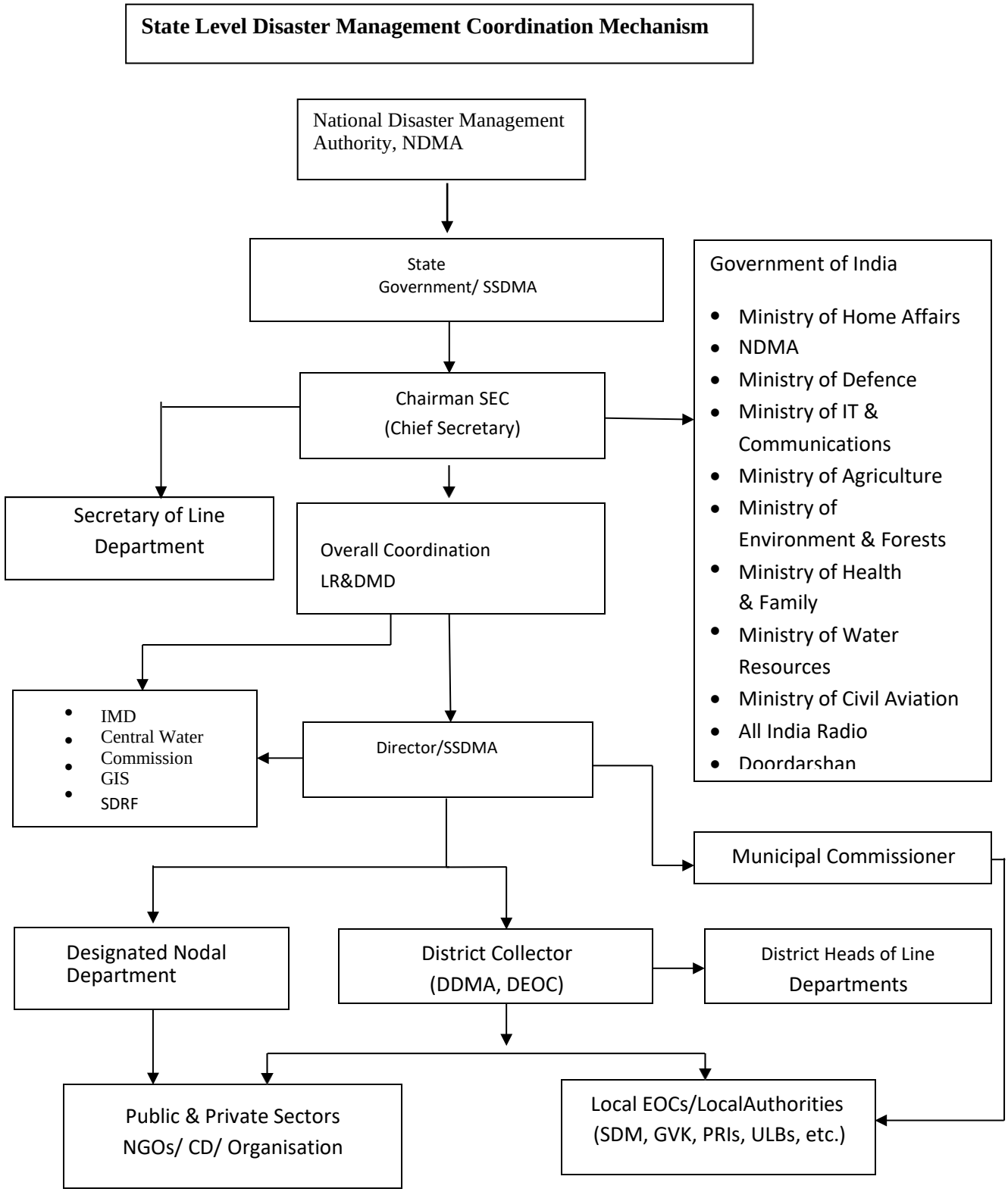

Figure 2: State-level Disaster Management - Basic Institutional Framework

1.12.2 State Disaster Management Authority (SDMA)

As per Section 14 of Disaster Management Act, 2005, the State has established a State Disaster Management Authority (SDMA) for the State of Sikkim.

1.12.3 Composition of State Disaster Management Authority (SDMA)

1	Chief Minister of Sikkim	Chairperson, Ex- Officio
2	Minister, Land Revenue & Disaster Management	Honorary Vice Chairman
3	Prof. V.K. Sharma	Vice-Chairman
4	Chief Secretary, Govt. of Sikkim	Chief Executive Officer
5	Director General of Police	Member
6	Secretary, Finance Department	Member
7	Secretary, Home Department	Member
8	Secretary, Urban Development Department	Member
9	Secretary, Mines & Geology Department	Member
10	State Relief Commissioner-cum-Secretary, Land Revenue & Disaster Management	Member/Convener

Table- 2: Source: Govt. Gazette, Notification No. 03/Home/2016 Dated 02.02.2016

1.12.4. Functions of Sikkim State Disaster Management Authority (SSDMA)

As per the National Disaster Management Act, 2005, the functions of the SDMA are as follows:

- Lay down guidelines and plans for disaster management in the State.
- Without prejudice to the generality of provisions contained in subsection (1), the State Authority may-: Lay down the State Disaster Management Policy.
- Approve the State Plan in accordance with the guidelines laid down by the National Authority.
- Approve the disaster management plans prepared by departments of the Government of the State;

Lay down guidelines to be followed by the departments of the Government of the State for the purpose of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance thereof; Coordinate the implementation of the State Plan. Recommend provisions of funds for mitigation and preparedness measures; Review the development plans of the different departments of the State and ensure that prevention and mitigation measures are integrated therein; Review the measures taken for mitigation, capacity building and preparedness by the departments of the Government of State and issue such guidelines as may be necessary. Shall provide guidelines for minimum standards of relief to persons affected by disasters.

The Chairperson of the State Authority shall, in case of Emergency, have power to exercise all or any of the powers of the State Authority but the exercise of such powers shall be subject to ex-post facto ratification of the State Authority.

1.12.5. State Executive Committee (SEC) and State Executive Sub-Committee (SESC)

As per the Sections 20 and 21, Chapter III. of the NDMA 2005, the State has constituted a State Executive Committee (SEC) as per the notification No. 85/Home /2010 and State Executive Sub-Committee (SESC) as per notification No. 86/Home/2010 respectively. The details of SEC and SESC are given in the sections below.

1.12.6. Composition of State Executive Committee (SEC)

1	Chief Secretary, Home Department	Chairman ex-Officio
2	Secretary/ State Relief Commissioner, Land Revenue & Disaster Management Department	Member
3	Secretary, Finance Department	Member
4	Secretary, Health & Family Welfare Department	Member
5	Secretary, Urban Development Department	Member

Table-3: Composition of State Executive Committee (SEC)
Source: State Govt. Gazette Notification No. 85/Home 2010 Dated 17.08.2010

1.12.7. Functions of State Executive Committee (SEC)

As per Section 22 of the National Disaster Management Act, 2005, the functions of the SEC are as follows:

i. The SEC shall have the responsibility for implementing the National Plan and State Plan and act as the coordination and monitoring body for management of disaster in the State.

ii. Without prejudice to the generality of the provisions of sub-section (1), the State Executive Committee may: Coordinate and monitor the implementation of the National Plan and State Plan;

iii. Examine the vulnerability of different parts of the State to different forms of disasters and specify measures to be taken for their prevention and mitigation

iv. Lay down guidelines for preparation of disaster management plans by the departments of the Government of the State and District Authorities

v. Monitor the implementation of the guidelines laid down by the State Authority for integrating the measures for prevention of disasters and mitigation by the departments in their developmental plans and projects

vi. Monitor the implementation of disaster management plans prepared by the departments of the Government s of State and District Authorities

vii. 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

viii. Coordinate response in the event of any threatening disaster situation or disaster;

ix. Give directions to any Department of the Government of State or any other Authority or body in the State regarding actions to be taken in response to any threatening disaster situation or disaster

x. 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

xi. Advise, assist and coordinate the activities of the Departments of the State, District Authorities, statutory bodies and other governmental and non-governmental organisations engaged in disaster management;

xii. Provide necessary technical assistance or give advice to District Authorities and local authorities for carrying out their functions effectively;

xiii. Advise the State Government regarding all financial matters in relation to disaster management; 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;

xiv. Provide information to the National Authority relating to different aspects of disaster management; Lay down, review and update State level response plans and guidelines and ensure the district levels plans are prepared, reviewed and updated; Ensure the communication systems are in order and the disaster management drills are carried out periodically; Perform such other functions as may be assigned to it by the State Authority or as it may consider necessary.

1.12.8. Composition of the State Executive Sub Committee (SESC)

1	Secretary/ Relief Commissioner, Land Revenue & Disaster Management Department	Chairman Ex- Officio
2	Addl. Secretary, Finance Department	Member
3	Addl. Secretary, Rural Development Department	Member
4	Addl. Secretary, Public Health Engineering Department	Member
5	Addl. Secretary, Water Resource Department	Member
6	Addl. Secretary, Roads & Bridges Department	Member
7	Addl. Secretary, Power Department	Member
8	Addl. Secretary, Health & Family Welfare Department	Member
9	Addl. Secretary, Education Department	Member
10	Addl. Secretary, Social Justice & Welfare Department	Member
11	State Project Officer, GOI-U	Member
12	Deputy Superintendent of Police, Fire & Emergency Services	Member
13	Sikkim Red Cross Society	Member
14	Deputy Inspector General, Home Guards and Civil Defense Department	Member
15	Addl. Secretary, Land Revenue & Disaster Management Department	Member Secretary

Table 4: Govt. Gazette Notification No.86/Home/2010Dated: 17/08/2010

1.12.9. District Disaster Management Authority (DDMA)

As per the Section 25, Chapter IV of NDMA 2005, the State has four DDMAs at the four Districts State. These four DDMAs are placed at the head quarters of the four districts namely, Gangtok, Gyalshing, Mangan and Namchi respectively.

1.12.10. Composition of DDMA.

1	District Collector (East/West/North/South respectively)	Chairperson, Ex-Officio
2	Zilla Adhaskya	Co-Chairperson, Ex-Officio
3	Superintendent of Police	Member
4	Chief Medical Officer	Member
5	District Development Officer	Member
6	Addl. District Collector-Member	Member Secretary

Table 5: Govt. Gazette Notification No. 87/Home/2010 Dated: 17.08.2010

1.12.11. Functions of DDMA

As per the Section 30 of National Disaster Management Act, 2005, the power and functions of the DDMAs are as follows:

The District Authority shall act as the district planning coordinating and implementing body for disaster management and take all measures for the purposes of disaster management in the district in accordance with the guidelines laid down by the National Authority and the State Authority.

Without prejudice to the generality of the provisions of the sub section (1), the District Authority may:

- Prepare a disaster management plan including district response plan for the district;
- Coordinate and monitor the implementation of the National Policy, State Policy, National Plan, State Plan and District Plan;
- Ensure that the areas in the district vulnerable to disasters are identified and measures for the prevention of disasters and mitigation of its effects are undertaken by the departments of the Government at the district level as well as by the district authorities;
- 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 and the local authorities in the district;
- give directions to different authorities at the district level and local authorities to take such measures for the prevention or mitigation of disasters as may be necessary;
- lay down guidelines for prevention of disaster management plans by the departments of the

Government at the district levels and local authorities in the district; monitor the implementation of disaster management plans prepared by the Departments of the Government at the district level;

- 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 therefore;

- 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 situations; review the state of capabilities for responding to any disaster to threatening disaster situations in the district and give directions to the relevant departments and authorities at the district level for their up gradation as may be necessary;

- organise and coordinate specialised training programmes for different levels of officers, employees and voluntary rescue workers in the district;

- facilitate community training and awareness programmes for prevention of disaster or mitigation with the support of local authorities, governmental and non- governmental organisations; set up, maintain, review and upgrade the mechanism for early warnings and dissemination of proper information to the public;

- prepare, review and upgrade district level response plan and guidelines; coordinate response to any threatening disaster situation or disaster 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 plans;

- 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 districts to take measures to respond effectively to any threatening disaster situation or disaster;

- advise, assist and coordinate the activities of the Departments of the Government at the district level, statutory bodies and other governmental organisations and non- governmental organizations in the district engaged in the disaster management;

- coordinate with, and give guidelines to, local authorities in the district to ensure that measures for the prevention or mitigation of threatening disaster situation of disaster in the district are carried out promptly and effectively;

- provide necessary technical assistance or give advice to the local authorities in their district for carrying out their functions;

- review developmental 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;

- examine the construction in any area in the district and, of 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;

- identify buildings and places which could, in the event of any threatening disaster situation or disaster, be used as relief centres or camps and make arrangements for water supply and sanitation in such buildings or places;

- establish stock piles of relief and rescue materials or ensure preparedness to make such materials available at a short notice;

- provide information to the State Authority relating to different aspects of disaster management; encourage the involvement of non-governmental organisations and voluntary social welfare institutions working at the grassroots in the district for disaster management;

- ensure communication systems are in order, and disaster management drills are carried out periodically; Perform such other functions as the State Government or State Authority may assign to it as it deems necessary for disaster management in the District.

2 Hazard Risks & Challenges

2.1. State Profile

Sikkim is a land-lock hilly state and its strategical location confines with Darjeeling district of West Bengal which is delineated by major rivers that flows from within the state. It shares its state border with three sovereign nations, Nepal in the West, Bhutan in the East and vast stretches of Tibetan plateau of China in the North. The state is situated between 27° 04' 46" and 28°07'48" north latitudes and 88°00'58" and 88°55'25" east longitudes. The state extends approximately 114 km from north to south and 64 km from east to west and has a total geographical area of 7,096 sq km. Rivers and mountains define the boundaries of Sikkim.

Feature	Description
Area	7096 sq.km
Location	Situated between the latitude of 27º04' North to 28º07'East and the longitude of 88º01East to 88º55'East on the Tibetan Plateau.
Borders/Neighboring Countries	North: China South: West Bengal East: China and Bhutan West: Nepal
Major Rivers	Teesta River and Rangit River
Forest Covers	584 (Area in hectares) (82.31 percent of the total geographical area of the State)
Population	610,577 (Census 2011)
Districts	4 Districts (East District, West District, North District and South District)
Sub-divisions	16
Sex Ratio	890 females per 1,000 males (Census 2011)
Population Density	86 persons per sq.km (Census 2011)
Population share	0.05% (Census 2011)
Climate	i. Cold Weather Season (December-February) ii. Spring Season (March-May) iii. South West Monsoon (June-September) iv. Period of Retreating Monsoon (October-November)

Table 6: Sikkim General ProfileReference:www.census2011.co.in/census/state/sikkim.html,www.sikkimtourism.gov.in/Webforms/General/SikkimAtAGlance/Climate.aspx

2.2. Hazard, Risk and Vulnerability Profile of State

Risk Matrix Chart

5	EVERY YEAR					LANDS LIDE
4	2-10 YRS	HAIL STROMS, SNOW				
3	11-20 YRS		RIOTS	DROUGH T	FLASH FLOOD	EARTH QUAKE
2	21-30 YRS					
1	31-50 YRS					
Score of llikely-hood	Score Of Impact	1 TO 7	8 TO 14	15 TO 21	22-28	29-35

Frequency /Likelihood

Severity/ magnitude of damage

RELATIVELY INCREASING RISK

LOW	MEDIUM LOW	MEDIUM	HIGH	VERY HIGH

Measure of Likelihood

Measure of Likelihood	Return Period (yrs)	Score
Frequent or Very Likely	EVERY YEAR	5
Moderate or Likely	2-10 YRS	4
Occasional, Slight Chance	11-20 YRS	3
Unlikely, Improbable	21-30 YRS	2
Highly Unlikely, Rare Event	31-50 YRS	1

Figure – 3: Hazard, Risk and Vulnerability Profile of State
Reference: Multi-Hazard Risk Vulnerability Assessment/ MHRVA in North, East, West & South Sikkim, SSDMA, 2012

As per the definition adopted by UNISDR, hazard is a dangerous phenomenon, substance, human activity, or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. State of Sikkim due to it physiographic and its climatic condition is on the most disaster areas of the country.

In the context of human vulnerability to disasters, the economically and socially weaker segments of the population are the ones who are most seriously affected. Within the vulnerable groups, elderly persons, women, children-especially women rendered destitute, children orphaned on account of disasters and differently-abled persons are exposed to higher risks. The DM Act of 2005 and National DM Policy of 2009, consider disasters to be a) natural and b) human induced including CBRN for defining roles and responsibilities.

Besides with the natural factors discussed earlier, various human induced activities like increasing demographic pressure, deteriorating environmental conditions, deforestation, unscientific development, faulty agricultural practices and grazing, unplanned urbanization, construction of large dams on river channels etc. Are also responsible for accelerated impact and increase in frequency of disasters in the country.

2.3. Natural Hazards

2.3.1. Earthquake

The State falls within the seismic Zone IV of Seismic Vulnerability Atlas of India and is prone to frequent earthquake. The major earthquakes felt by the State are the ones of 1986 of 5.3 magnitude, 14th Feb 2006 of 5.3 magnitude and the most recent one of 18th September 2011 of 6.8 magnitude. Widespread human and materials losses, destruction and damages of infrastructures and services are the major consequence of the earthquakes.

2.3.2. Landslides (mud slide and snow avalanche)

The state of Sikkim is susceptible to landslides owing to geological set up, tectonic activity, slope instability, weak composition of the soil or rocks. Some of the factors causing slope instability are rain, flooding, seismic events, removal of vegetation, construction activities, etc.

Scientific observations in North Sikkim clearly recall that there is an average of 2 landslides one sq.km. This means the rate of land loss is to the tune of 120m/km/year and annual soil loss is about 2500 tons/sq.km.

The unprecedented rain triggers about more than 100 landslides which causes severe damage to the vital road networks, essential public properties and other agricultural crops.

Snow avalanche are common in 3 districts of the state; North/East/West Districts. The avalanches are reported to killing army personal and damaging roads and causing serious damages of roads and settlements falling in its way.

2.3.3. Fire

The South-Western part of the State is prone to forest fire triggered by dry winter spell. Domestic fire occurrences are also on the rise due to human induced errors. Fire can also be the secondary effect of a disaster like earthquake. Secondary fires after a disaster like earthquakes constitute a substantial and heavy risk. Damage to natural gas systems during an earthquake can lead to major fires and explosions. Damages to electrical systems during a disaster can ignite major fires. Varying risk scenarios need different approach and intervention.

The forest fire incidence is on rise in areas under West, East and South districts of the State. The steady increase of forest fire largely attributes to the impending effect of environmental degradation and climate change, resulting into long hall of dry spell in the months starting from October till March.

2.3.4. Drought

Some regions of South, West and East districts of the State are prone to drought during the dry winter spell causing loss of livelihood of the people. South district and some portion of West and few pockets of East district have reported drought scenario. Though in present time there is no case of droughts. Drought can only arise due to long period of dry weather and insufficient precipitation. Though in present, the State have not witnessed drought like situation.

2.3.5. Wind and Storm

The State of Sikkim generally witness cyclone induced windstorm originating from North Bay of Bengal with their impact comparatively high and devastating. The wind storm occurs in the months of April and May. Whereas cold windstorm is prevalent in higher ridges of North and East Districts originating due to formation of pressure belts in Tibetan Plateau region. Wind storm has been destroying the Rabi crops.

2.3.6. Thunderstorm and Lightning

Thunderstorms and lightning occur round the year in different parts of the State. However, their frequency and intensity is maximum in spring (March to June) season. A thunderstorm is said to occur, if the thunder is heard or lightening is seen.

Lightning is a high-current electric discharge that occurs in the earth's atmosphere and that has toral path length of the order of few kilometers. The peak power and total energy in lightning are very high, the peak power that is dissipated by a lightning discharge is on the order of 100 million watts per meter of channel and the peak channel temperature approach 30,000°C. Peak currents in a lightning discharge range from several to hundreds of kiloamperes (kA), with typical value being 40 kA. Prediction of lightning as to the precise time and location is very difficult. In the atmosphere, three types of discharges take place: a) Thundercloud (intra-cloud), b) One cloud to another (inter-cloud) and c) Cloud to ground (CG). Aircrafts can be hit by first two while the third type takes a toll on life and property on the ground.

2.3.7. Squall

The higher reaches of the state experience high frequency and intensity squall. Comparing different seasons, the frequency of squall is maximum in pre-monsoon season (March-May) in different parts of the state. The intensity of squall is maximum in the month of May followed by April. A squall is defined as a sudden increase of wind speed by at least 29 kmph (16knots) with the speed rising to 40 kmph (22 knots) or more and lasting for at least one minute. The squalls are of two types:
Moderate squall: It is called as moderate squall, if surface wind speed (ingusts) is less than 80 kmph
Severe squall: It is called as severe quall, if surface wind speed (ingusts) is greater than 80 kmph.

2.3.8. Hailstorm

Sikkim is among the states in the country with the highest frequency of hail. The hailstorms are mainly observed in the winter and pre-monsoon seasons with virtually no events after the onset of the southwest monsoon.

Hail is a solid, frozen form of precipitation that causes extensive damage to property and crop. Hot, humid after noon hours during the summer are the most congenial for development of hailstorms, which usually form over a relatively small area and pass over within a very short period. At times, it can cause considerable crop damage in brief spell lasting a few minutes. Hail is often associated with thunderstorm activity and changing weather fronts. This is for medium huge cumulus nimbus clouds, commonly known as thunderheads. The IPCC reports caution that there are indications of a warming climate which favors an increase in the intensity and frequency of extreme events such as heat waves and precipitation extremes. Hail and thunderstorms are extreme forms of weather events that deserve special attention in view of climate change. Hailstorms are of three types:

i. Slight, when it is sparsely distributed, usually small in size and often mixed with rain
ii. Moderate, when it is abundant enough to whiten ground
iii. Strong, if it includes at least a proportion of large stones

As a thunderstorm moves along, it may deposit its hail in a long narrow band (often several kilometres wide and about 10 kilometres long) known as a hail-streak or hail-swath. If the storm should remain almost stationary for some time, substantial accumulation of hail is possible. Its size and shape depend on how fast the storm is moving and how strong the updrafts are inside the storm. A typical hail-streak is about 1.5 km wide and 8 km in length. However, these may vary from a few acres to large belts, about 16 km wide and 160 km long. The volume of hail reaching the ground falls at a speed of about 40 m/sec and is usually less than one-tenth the volume of rain produced by a thunderstorm.

2.3.9. Cloudburst and Flash Flood

The higher reaches of the state have catchment area which is susceptible to high precipitation resulting to cloud burst which in turn causes flash flood along the river basin causing damages to life, livestock and properties. During the monsoon season cloudburst resulting to flashflood are frequent occurrence in all districts of the State. The state receives rainfall starting from May till late October. Cloudbursts are prevalent through the state that triggers widespread flashflood causing loss of human lives and severe damage to public utilities and other cultivable crops. A cloudburst is an extreme amount of precipitation in a short period, sometimes accompanied by hail and thunder that can create flood conditions. It is not, as is sometimes understood, the breaking open of a cloud resulting in lease of huge amounts of water. According to the IMD, if rainfall of about 100 mm or above per hour is recorded over a place that is roughly less than 100 sq.km area, it is classified as a cloudburst event.

2.3.10. Glacial Lake Outburst Flood (GLOF)

A Glacial Lake Outburst Flood (GLOF) is a type of flood occurring when water dammed by a glacier or amoraine is released. When glaciers melt, they sometimes form lakes on mountain tops. The water in these glacial lakes accumulates behind loose naturally formed ‘dams’ made of ice, sand, pebbles and ice residue. Glacial lake volumes vary, from several Million Cubic Metres (MCM) to hundreds of MCM of water. But these are inherently unstable and disturbances such as avalanches, falling boulders, earthquakes, or even simply the accumulation of too much water can breach the ‘dam’, unleashing sudden, potentially disastrous floods in nearby communities. A catastrophic failure of the containing ice or glacial sediment can release this water over periods of minutes to days. Peak flows as high as 15,000 cubic metres per second have been recorded in such events. GLOF events have killed thousands in many parts of the world and some of the largest events occurred in the Himalayas.

Sikkim Himalaya, lakes are rapidly expanding over the few decades due to the ongoing glacier melting. The example of one such glacier is South Lhonak Lake. These expanding glacial lakes induce the risk of glacial lake outburst floods that pose a threat to natural resource and human lives. As the glaciers retreat, glacial lakes start to form and rapidly fill up behind natural moraine or ice dams at the bottom or on top of these glaciers. The ice or sediment bodies that contain the lakes can breach suddenly, leading to a discharge of huge volumes of water and debris. The impact of this glacial outburst and flood relates to loss of livelihood, damaged infrastructure, morbidity, mortality and food insecurity. It also results in loss of forest and biodiversity, displacement and migration of

local communities and enhanced erosion of topsoil. SSDMA in collaboration with central agencies have conducted, mitigation measures undertaking several expeditions to the South Lhonak Lake to reduce the threat of GLOF during 2017 till 2019.

In addition, there has been a collaborated approach between SSDMA and NDMA along with other national and international agencies in the process to implement a project “Reducing Glacial Lake Outburst Floods, GLOF, Risk in South-Lhonak & Shako Chu Lakes situated in the North District.

2.4. Human-induced Disasters

2.4.1. Chemical and Industrial Disasters

With the establishment of industries in the State, hydel power projects, pharmaceutical companies and other related industries have been set up along the river basins. In case of dam break scenario and discharge of harmful waste from pharmaceutical industries if not treated properly can pose threat to the establishments located downstream and may cause disasters.

2.4.2. Nuclear and Radiological Emergencies (NRE)

A nuclear disaster is construed as potentially a low probability event, however very high in damage impact, could be caused by detonation of nuclear war head or explosion of an Improvised Nuclear Device (IND) with associated release of large amounts of devastative energy due to Blast, Thermal and Radioactive material. Secondary effects occurring later might result in fall out of radioactive dust. The nuclear and radiological emergencies could be due to accidents at operating nuclear facilities/incidents in public domain that could potentially release radioactive materials. The cause of these events could potentially arise from nuclear facility/ malicious acts of radioactivity dispersal by explosion of Radiological Dispersal Device (RDD). The occurrence of these kinds of emergencies could be of probability marginally higher but based on the scale of the accident/incident, the potential impact of damage will be restricted to fewer domains.

Nuclear weapons, a major accident in a nuclear power plant or an accidental exposure of radiation, due to accident with the radioactive material during transportation, faulty practices, and mechanical failure in a radiation facility can lead to nuclear or radiological emergency. Even though such situations may not arise easily, everyone needs to be prepared to face such emergencies. All organizations dealing with nuclear and radiological material have an inherent culture of safety, follow best safety practices in the sector, and they apply high standards to ensure minimum risk. However, nuclear emergencies can still arise due to factors beyond the control of the operating agencies from human error, system failure, sabotage, extreme natural events like earthquake, cyclone, flood, tsunami or a combination of these. Such failures, even though of very low probability, may lead to on-site or off-site emergencies. To counter this, proper emergency preparedness plans must be in place so that there is minimum loss of life, livelihood, property, and impact on the environment.

2.4.3. Biological and Public Health Emergencies (BPHE)

Disasters related to this sub-group are biological emergencies and epidemics, pest attacks, cattle epidemics and food poisoning. Biological emergency is one caused due to natural outbreaks of epidemics or intentional use of biological agents (viruses and microorganisms) or toxins through dissemination of such agents in ways to harm human population, food crops and livestock to cause outbreaks of diseases. This may happen through natural, accidental, or deliberate dispersal of such harmful agents into food, water, air, soil or into plants, crops, or livestock. Apart from the natural transnational movement of the pathogenic organisms, their potential use as weapons of biological warfareandbioterrorismhasbecomefarmoreimportantnowthaneverbefore.Along with nuclear and chemical agents, many biological agents are now considered as capable of causing large-scale mortality and morbidity.

Handling exotic pathogens warrants suitable infrastructure, notably, high containment laboratories of bio-safety levels 3 and 4; recruitment of highly committed, dedicated and trained professionals; continuous availability of diagnostic reagents; enhancement of skills at various echelons of health professionals in early identification of such infections, investigation of outbreaks and institution of specific control measures. Current system of surveillance and mechanism to control the outbreak of endemic diseases are through the National Programme for Surveillance of Communicable Diseases.

Natural outbreaks of disease may become epidemics and assumed disastrous proportion if not contained in the initial stages. The COVID-19 pandemic, also known as the Novel Corona virus, caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) that originated at Wuhan City of China in early December 2019, has rapidly widespread with confirmed cases in almost every country across the globe and has become a new global public health crises.

2.4.4. Accidents – Rail, Air, Road and Water

The fast pace of development brings with it increasing frequency of various types of accidents as more and more people are involved in diverse economic activities. The number of air accidents, cases of boat capsizing, building collapses, fires inbuilt environments–residential, commercial and industrial, festival related incidents involving large number of people, forest fires, emergencies in mines (flooding, collapse, etc.), oil spills, rail accidents, road accidents, stampedes, transportation of hazardous material (HAZMAT) related accidents etc. are increasing. While all these are matters of utmost concern, not all of them fall within the purview of the SDMP. While the cases of fires in the built environment and forests are included in the plan, local authorities address them in accordance with the relevant emergency management systems. The primary way to reduce risks is through main streaming risk reduction in development and governance. As part of the overall DRR plan, systems for disaster preparedness and response are being strengthened at all levels, which in turn will help in reducing the number of accidents and improve the capacity to respond.

2.4.5. Mental Health

Disasters are known to have substantial effect on both physical and mental health of the population. Disaster mental health is based on the principles of 'preventive medicine'. This principle has necessitated a paradigm shift from relief centered post-disaster management to a holistic, multi-dimensional integrated community approach of health promotion, disaster prevention, preparedness and mitigation. This has ignited the paradigm shift from curative to preventive aspects of disaster management.

WHO estimates that the burden of mental health problems in India is 2443 per 10,000 population. According to the National Crime Records Bureau (NCRB), India recorded over 1.53 lakh suicides, an estimated 418 daily suicides in 2020. This amounts to a suicide mortality rate (per lakh population) of 11.3 in 2020, as compared to 10.4 in 2019. This is the highest number of suicides in the country in a decade and is the highest in the world. Among those who died by suicide, students saw the greatest increase of 21.2% in 2020, compared to a 7 to 8% increase in the past few years. For every death by suicide in India, there are more than 200 people with suicidal thoughts and behaviour, and more than 15 suicide attempts. Keeping in mind that these numbers are only those of reported suicides and that there is no definite data on the number of suicide attempts, the burden of suicides in India may be altogether much graver. The numbers may further be compromised by the rampant stigma attached to mental health and legal complications of suicide reporting that lead to massive underreporting of suicides.

2.5. Multi-Hazard Risk Vulnerability Assessment (MHRVA)

The Multi Hazard Risk and Vulnerability Assessment Matrix given at figure - 3 shows the Susceptibility/ likelihood of occurrence of various disasters in the State.

The matrix indicates that the state is highly susceptible to landslides and occurrence of Earthquake tremors. The heavy monsoon rainfalls trigger landslides and flashfloods that occur every year resulting to the loss of many human lives and cause widespread destruction to the public properties and govt. infrastructures. Whereas, intermittent occurrence of other climatic condition like avalanches, hailstorm and windstorm are also responsible for loss of human lives, loss of agrarian crops and destruction of public property as well as govt. infrastructures.

As per the definition adopted by UNISDR, hazard is a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. India, due to its, physiographic and climatic conditions is one of the most disaster-prone areas of the World. Nearly 59 percent of the land mass is prone to earthquakes of moderate to very high intensity. More than 40 million hectares (12percentofland) is prone to floods and river erosion. Of the nearly7,500 km long coastline, close to 5,700 km is prone to cyclones and tsunamis. Nearly 68% of the cultivable area is vulnerable to drought. Large tracts in hilly regions are at risk from landslides and some are prone to snow avalanches. Vulnerability to disasters/emergencies of CBRN

origin also exists. Heightened vulnerabilities to disaster risks can be related to expanding population, urbanisation, and industrialisation, development within high-risk zones, environmental degradation, and climate change.

Building Materials & Technology Promotion Council (BMTPC) has prepared the Vulnerability Atlas of India (VAI), which has been updated in 2019 (third edition) and is available online. These maps present for each State/UT the hazard map for earthquake, wind, and flood. The maps available online shows not only the boundaries of the hazard zones of various intensities but also indicates district-wise areas lying in different intensities.

The Vulnerability Atlas has been structured to serve as a tool towards natural disaster prevention, preparedness and mitigation for housing and related infrastructure at local as well as national levels.

In the context of human vulnerability to disasters, economically and socially weaker segments of the population are the ones that are most seriously affected. Within the vulnerable groups, elderly persons**,** women, children—especially women rendered destitute, children orphaned by disasters and differently-abled persons are exposed to higher risks. The DM Act 2005 and National Policy on Disaster Management 2009 consider disasters to be a) natural and b) human-induced including CBRN for defining the roles and responsibilities.

Report on Multi Hazard Risk and Vulnerability Assessment of North/East/West/South Sikkim published by SSDMA, LR&DMD, 2012.

2.5.1. Multi Hazard Risk and Vulnerability Assessment of North District

Landslide: 1.27% of the area of the district falls under very high risk zone, about 40.84% of the area falls in very medium risk zone and only 0.18% of the total area falls under very low risk zone. *Earthquake*- About 82.01% of the area falls under medium risk zone, about 7.04% and 11.65% of the total area falls under very high and very low risk zone respectively.

*Fire:*0.64% of the total area falls under very high risk zone, about 98.04% of the total area falls under relatively less risk zone and 1.32% of the total area falls under low risk zone.

Snow Avalanche- About 17.74% of the total area falls under very high risk zone, 19.44% of the total area falls under medium risk zone and 62.81% of the total area falls under very low risk zone.

Flash Flood: About 1.97% of the total area falls under very high risk zone and 98.08% of the total area falls under very low risk zone.

2.5.2. Multi Hazard Risk and Vulnerability Assessment of East District

*Landslide:*2.17% of the area falls under very high risk zone, 32.97% of the total area falls under very medium risk zone, 45% of the area falls under very medium risk zone and 1.64% of the total area falls under very low risk zone.

Earthquake: 6.58% of the total area falls under very high risk zone, 90.88% of the area falls under medium risk zone and 2.83% of the area falls under very low risk zone.

Fire: 1.46% of the total area falls under very high risk zone, 80.76% of the total area falls under medium risk zone and 17.78% of the total area falls under very low risk zone.

Drought: 1.50% of the total area falls under very high risk zone, 5.42% of the total area falls under high risk zone and 1.79% of the total area falls under very low risk zone.

Snow Avalanche: 12.45% of the total area falls under high risk zone7.64% of the area falls under high risk zone and 68.41% of the total area falls under very low risk zone.

Flash Flood: 4.08% of the area falls under very high risk zone and 95.92% of the total area falls under very low risk zone.

2.5.3. Multi Hazard Risk and Vulnerability Assessment of West District

Landslide: 1.97% of the total area falls under very high risk zone, 98.48% of the total area falls under medium risk zone and 0.68% of the total area falls under very low risk zone.

Earthquake: 6.28% of the area falls under very high risk zone, 83.19% of the area falls under medium risk zone and 10.53% of the area falls under very low risk zone.

Fire: 4.92% of the total area falls under very high risk zone, 86.65% of the total area falls under medium risk zone and 8.83% of the total area falls under very low risk zone.

Drought: 1.61% of the total area falls under very high risk zone, 7.06% of the total area falls under high risk zone and 27.61% of percent of the total area falls under very low risk zone.

Snow and Avalanche: 17.40% of the total area falls under very high risk zone, 17.65% of the total area falls under medium risk zone and 64.95% of the total area falls under very low risk zone.

Flash Flood: 4.94% of the total area falls under very high risk zone and 95.03% of the total area falls under very low risk zone.

2.5.4. Multi Hazard Risk and Vulnerability Assessment of South District

Landslides: 4.13% of the total area falls under very high risk zone, 95.37% of the total area falls under medium risk zone.

Earthquake: 5.21% of the total area falls under very high risk zone, 83.59% of the total area falls under medium risk zone and 11.38% of the area falls under low risk zone.

Fire: 11.70% of the area falls under very high risk zone, 87.53% of the total area falls under medium risk zone and 0.62% of the area falls under very low risk zone.

Drought: 7.82% of the total area falls under very high risk zone, 15.17% of the total area falls under high risk zone, 42.65% of the total area falls under medium risk zone, 34.35% of the total area falls very low risk zone.

Snow and Avalanche: 6.89% of the total area falls under very high risk zone, 3.76% falls under

medium risk zone and 89.47% of the total area falls under very low risk zone.

Flash Flood: 1.88% of the total area falls very high risk zone, 0.96% of the area falls under medium risk zone and 97.27% of the total area falls under very low risk zone.

3 Social Inclusion in Disaster Risk Reduction

3.1. Background

Disaster situations raise many questions on normative social order and structural inequalities which need to be reckoned with for an inclusive disaster response. Disaster management tend to view the affected people as a homogenous group – as internally undifferentiated 'victims' or 'survivors', particularly in the relief and recovery processes. This leads to an inherent inability to address the existing disparities and inequities across gender, caste, or class (Fordham 1999). While hazards do not discriminate, people do. Disaster management could become unfair by being blind to prevailing inequities. Existing socio-economic conditions mean that disasters can lead to dissimilar out comes even for what may seem demographically similar communities. Inevitably, the most vulnerable groups suffer more than others. This chapter emphasizes the importance of DRR to address unequal disaster coping capabilities by recognizing that due to inequalities and social exclusions some sections suffer more than others in extreme events and disasters because of their place within the social system. Addressing the enormous challenges of social marginalization, social exclusion and other inequities are beyond the domain of DRR. However, DRR must take cognizance of social realities to ensure that every possible effort is made to make DRR as socially inclusive as possible.

The Disaster Management Act 2005 (Chapter 11, Section 61) prohibits all forms of discrimination – be it based on sex, caste, community, descent or religion – in any activities related to disaster risk reduction, disaster relief or humanitarian assistance to the affected people. The preamble of National Policy of Disaster Management 2009 notes that the economically weaker and socially marginalized sections, women, Scheduled Castes and Scheduled Tribes tend to suffer more during disasters. A community's vulnerability to disaster depends on the social, cultural, economic and political environment. A cycle of deprivation not only increases their vulnerability but also slowly alienates them from the decision-making process denying accessibility to the basic entitlements.

The socially excluded groups have context specific and differentiated needs before, during and after a disaster, which are not taken into consideration in DMPs. Inclusive Disaster Risk Management is about equality of rights and opportunities, dignity of the individual, acknowledging diversity, and contributing to resilience for everyone, not leaving aside members of any community based on age, gender, disability or other. In the Indian context, the added emphasis on social inclusion for DRR will be on the following:

1. Gender Perspective and DRR
2. Scheduled Castes and Scheduled Tribes(SC&ST)
3. Elderly
4. Children and
5. Persons with Disabilities(PWD)

3.2. Gender Perspective and DRR

3.2.1. Gender-Based Vulnerabilities

In general, genders include differentiated roles and responsibilities, skills and capabilities, vulnerabilities, power relations, institutional structures, and long-standing traditions and attitudes. The specificities of gender relations may vary depending on the socio-cultural values of a society. However, the fundamental gender-based divisions of roles, responsibilities and identities are prevalent in varying degrees throughout the world. Within gender relations there are many imbalances (gender gaps) between men and women, which have historically been favourable for men within an overwhelmingly patriarchal society. All these prevent women from enjoying equal-rights and equal-partner status in DRR as policy makers, contributors to and beneficiaries of development and DRR processes.

Gender refers to the social attributes and opportunities associated with being male and female and the relationships between women, men, girls and boys, as well as the relations between women and men. These attributes, opportunities and relationships are socially constructed, learned, and changeable over time. Gendered disadvantages–unequal access to resources, legal protection, decision making and power, their reproductive burden and their vulnerability to violence – consistently render women more vulnerable than men to the impacts of disasters. Disasters reinforce, perpetuate and increase gender inequality, making bad situations worse for women. The potential contributions that women can offer to the disaster risk reduction are often overlooked and female leadership in building community resilience to disasters is frequently disregarded.

A gender perspective to DRR helps to focus attention on the distinct gender-specific capacities and vulnerabilities to prevent, prepare, confront, and recover from disasters (WCDRR 2015). Post-disaster reconstruction programs could render women more vulnerable when compared to the pre-disaster situation, defeating the very objective of building back better. An increase in violence against women, domestic violence and divorce rates have been reported in the aftermath of disasters (Fothergill 1998). They become more vulnerable to abuse in disaster situations. They face difficulty in accessing sanitation facilities. There is lack of privacy, increased risk of sexual assault they may ensnared by traffickers or may forced in early marriages. There is a tendency to leave out women from accessing relief and recovery as they do not have control over resources and institutions (Parkinson 2011). Women headed households, single women, and widows find it difficult to access information and necessary financial help for recovery and reconstruction.

Following a disaster, there are many situations in which there is likelihood of women becoming victims of domestic and sexual violence. There are cases women avoiding using shelters for fear of being sexually assaulted. Women are more likely to suffer from malnutrition because they have specific nutritional needs when they are pregnant or breast feeding. During drought, in food scarcity situations, women are the first ones to compromise on their food intake. They are usually overburdened with many household tasks such as fetching drinking water and firewood walking long distances. Women and girls are usually denied the opportunity to acquire lifesaving skills such as swimming because of gender bias rendering them less capable of coping with hazards. Their traditional gender role as care takers and nurturers intensifies in post disaster situation shaving to take care of the injured and sick when they themselves are injured.

During post-disaster planning, relief and recovery needs of women and girls tend to be overlooked because the disaster management is almost entirely male dominated with hardly any participation of women. They are often ignored during compensation proceedings. While most women do not possess formal ownership of either movable or immovable properties (land or assets), even those who have ownership find it difficult to complete the formalities due to various pressures at home and the lack of gender sensitivity in the proceedings. Their losses usually remain undervalued and uncompensated.

It is necessary to adequately understand how the disaster risks tend to be amplified by the pre-existing social vulnerabilities and socio-economic stress. Often, unknowingly, due to social conditioning and gendered roles, women tend to demand less in the reconstruction process. Many barriers inhibit women's participation in the decision-making and rebuilding processes. Yet, disasters do provide opportunities for improving women's status by altering the gender relations and by facilitating social and behavioural changes .Post disaster recovery presents opportunities to empower women. Despite these formidable challenges, amidst gender bias and inequality, some of the reconstruction programs undertaken in India have tried to empower women, taking advantage of the window of opportunity opened by the disaster.

Post-disaster reconstruction is expected to "present opportunities for new and more progressive gender roles and relationships to emerge and provide opportunities to rebuild in a way that is inclusive of women and girls and provide opportunities for women to assume leadership roles and better influence the direction of development patterns" (UNISDR 2015a). A gender perspective to DRR helps focusing attention on the distinct gender-specific capacities and vulnerabilities to prevent, prepare, confront, and recover from disasters (WCDRR 2015). Disaster impacts are not gender neutral, hence adequate attention must be paid to promote gender justice and equity in post disaster recovery programs.

In the disaster situations, women need to be centrally involved in planning and implementation process with the key principle of active contributors in building resilience. The Sendai Framework emphasizes the need not only to address the issues related to women in post-disaster reconstruction but also envisages a lead role for women in post-disaster reconstruction: Women and persons with disabilities should publicly lead and promote gender-equitable and universally accessible approaches during the response and reconstruction.

To promote gender equity, the reconstructed houses need to be registered in the joint names of husband and wife. Widows and single women, who do not have land titles, should not be left out from receiving shelters. Women feel more secure, confident and feel that they will never be without a roof over their head in their life. Owner Driven Reconstruction (ODR) can be followed where women can take leadership role in monitoring implementation of safe housing technology. Programs shall be designed and aimed at empowering women through access to social security measures and income generation activities. Women Self Help Groups can be formed for livelihood opportunities. It needs to go beyond traditional income generating activities and aim at enhancing skills as masons, carpenters, trading of local products, developing local shops for housing, sanitation and other materials, etc.

3.2.2. Sexual and Gender Minorities

To be truly gender-sensitive, it is necessary to address the concerns of persons of various sexual orientations including transgender persons. Transgender people are at a disadvantage in accessing resources, services and opportunities. In addition to social and economic vulnerabilities, the stigma and discrimination that they are subjected to, deprives them of many disaster mitigation/response programmes, hampering their ability to overcome the negative effects of a disaster. The approaches to disaster risk management, however, tend to overlook the needs and place of sexual and gender minorities. The institutional and legal frameworks geared towards reducing the risk of disasters are usually silent on such sections. It is only recently that a handful of case studies have highlighted the fate of sexual and gender minorities in disaster. Most of the research on disaster-related vulnerabilities faced by the sexual and gender minorities concur that they are often more severely affected by disasters because they face barriers or lack of access to the means of protection available to others. The highly marginalized conditions of sexual and gender minorities in everyday life thus places them at higher risk when confronted with disaster situations. Their vulnerabilities will be aggravated if DRR policies and practices remain blind to the social realities. There is greater likelihood of addressing the concerns of a marginalized group like transgenders in disaster situations when they are specifically accounted for during implementation. For example, the need for ensuring inclusion of all such sections could be emphasized in the different phases of DRR.

3.3. Scheduled Castes and Scheduled Tribes

Certain castes and tribes – the scheduled castes and tribes – are recognized in the Indian Constitution as historically disadvantaged people and listed in two Schedules of the constitution for affirmative policies and actions. The First Schedule lists 1,108 castes across various states and the Second Schedule 744 Tribes for affirmative policies and actions. The castes listed are known as Scheduled Castes (SC) and the tribes listed are known as Scheduled Tribes (ST). As per 2011 Census, the SC and ST comprise about 16.6% (20.14Cr) and 8.6% (10.43 Cr), respectively, of India's population.

3.3.1. Scheduled Castes

Efforts must be made to ensure there are no discriminatory practices in any DRR activities or while providing humanitarian assistance. The DRR efforts should also specifically recognize caste-related challenges and should not adopt caste- blind approaches.

Most of the SC and ST communities tend to be poor living on marginal lands that are also highly hazard prone, such as flood plains, unsafe coastal tracts and unstable hillsides. The dwellings of scheduled caste and tribal communities are usually on the margins - be it in urban or rural areas. These settlements tend to be in the less served areas with poor availability of accurate information, lack of access to basic amenities and inadequate disaster resilient infrastructure. The housing is usually unsafe and of poor quality. In the urban areas they are usually on unsecure land tenure - often unauthorized slums. Combined with hazardous living conditions, chronic poverty and lack of amenities they are most likely to suffer the outbreak of diseases in times of disaster. For women from the SC and ST communities, the gender-based discrimination and violence become intensified and more difficult to counter due to the caste-based social marginalization.

It must be ensured that in post disaster situations and in disaster mitigation planning and implementation activities full attention should be provided to ensure social inclusion practices in early warning, evacuation, relief support, rehabilitation and any other process so that the inherent systemic prejudices do not increase their vulnerability. For example, special efforts should be made to ensure that there are no instances of discriminatory practices in evacuation, distribution of relief material, damage assessment, allocation of housing plots, etc.

3.3.2. Scheduled Tribes

The Constitution of India has created Schedule V and VI to protect the identity, traditions and customs of the tribal communities without neglecting their development. This has been further articulated in the Panchayats Extension in Schedule Areas (PESA), 1996. Tribal communities tend to remain marginalized due their geographical location as well as due to social exclusion. Tribal communities are simple societies endowed with socio-cultural cohesion, traditional knowledge, social relations around the forest and natural ecosystem and community governance based on their tradition. Tribal communities have very close interdependent relation with their natural resources and environment. Some of tribal groups have never moved out of the natural habitat in the forest areas.

The basic thrust of mitigating the impact of natural disaster should be of two-fold: a) make the tribal people self-reliant by restoring the natural resource base and b) post-disaster, provide timely and appropriate relief and rehabilitation packages. The Tribal Development Ministry and the State Departments in consultation with the tribal leaders and experts shall develop the package of interventions. Efforts must be made so that there is community participation and ownership over the interventions. The tribal villages should be able to customize their plans in accordance with PESA disaster preparedness, relief and rehabilitation plans.

3.4. Children

The United Nations Convention on the Rights of the Child adopted in 1989 (UN 1989) became the first legally binding international convention to affirm human rights for all children. It stipulates that children have the right to adequate food, water, shelter and education. In disaster situations they ought to be free from abuse, neglect, sexual exploitation or trafficking, and should be able to grow up in a safe and supportive environment. Children are vulnerable due to their age and immature psycho- social understanding of the surrounding.

The chaos and erosion of support for care and protection during a disaster could heavily affect their physical and psychological health causing children to be traumatized. Given their vulnerability, children require special support and attention during crisis situations to provide basic needs and ensure that their rights are not violated. The UN Convention on the Rights of the Child and the Juvenile Justice (care and protection of children) Act 2000 (JJ Act) states that children have the right to protection from abuse, neglect and exploitation.

In situations of emergency children face isolation, anxiety, trauma, some get separated from their families, loose their parent(s), face gender violence and trafficking. Some face the risk of getting recruited as child labourers. During disaster, children’s bodily integrity is at risk when widespread

and/or systematic violence occur. The children often face apathy leading to severe interruption of education and recreation, poor access to food and nutrition. In the post disaster situations, the Anganwadi and schools must open as soon as possible. In case of damage to the structures, temporary/emergency provision must be created allowing children to access the services. The state governments may increase the food supplies so that the nutrition support can be doubled in the Anganwadis and primary schools. Many state governments have been doing this for a limited duration in disaster situations.

The JJ Act, 2000 provisions for care, protection and rehabilitation of children ensuring setting up of Child Protection Units. Such units must be set up at village and block level so that children have access to nutrition, child friendly spaces for recreation, protection against violence and trafficking, restoration of children to their biological families, promote community-based rehabilitation of the orphan and children of single parent not in a position to provide care and protection making use of State specific foster parent support services/ schemes. The Ministry of Women and Child Development (MWCD) and Ministry of Social Justice and Empowerment (MSJE) and the Ministry of Human Resource Development (MHRD) along with the National Commission for Protection of Child Rights (NCPCR) and the State counterpart (usually, State Child Protection Society – SCPS) under the Protection of Child Rights Act, 2005 may develop support mechanisms and periodically oversee the status of care and protection of children in all major disasters and recommend for timely action.

3.5. Elderly

The world is ageing. Globally, approximately 700 million people or 10 percent of the world's population is already over the age of 60, and by 2030, there will be more people over 60 than under 10.While this represents a triumph of development, the combination of more extreme climate and disaster events coupled with the failure to adapt DRR responses to the ageing demographic trend has the potential to increase older people's vulnerability to risks and disasters. Yet, the specific requirements and strengths of older people are often not given appropriate consideration in DRR. A report of the Government of India, 'Elderly in India' (CSO 2016), presents detailed statistical profile of the elderly population based on various official data. The report states that like other nations, India too has undergone changes in the age structure of the population with the proportion of older persons increasing due to increased life expectancy brought about by combination of many facts or such as reduction in mortality rates, lower morbidity, better quality of life, and better health care. This phenomenon, called population ageing, is a demographic trend all over the world.

According to national Census 2011, there are nearly 104 million elderly persons (aged 60 years or above); 53 million females and 51 million males. Both the share and size of elderly population is increasing over time. From 5.6% in 1961 the proportion has increased to 8.6% in 2011(men8.2%, women 9.0%). In terms of rural and urban distribution, 71% of the elderly are in rural and 29 % is in urban areas. As per Census 2011, the sex ratio among elderly is 1033 women per 1000 men. The life expectancy at birth is 69.3 years for females and 65.8 years for males. At 60 years of age, the average remaining length of life is likely to be about 18years (16.9formenand19.0forwomen). At age70, it was less than12years (10.9formen and 12.3 for women). The old-age dependency ratio is 14.2%, as per Census 2011 (females 14.9%, males 13.6%). Most common disability among the

aged persons was locomotor disability and visual disability.

According to Help Age India, during disasters the elderly are usually the last in the line, likely to be lost in the crowd, and highly vulnerable49. The greater vulnerability of the elderly compared to others during disasters needs to get more attention in all phases of disaster risk management. The elderly needs to be treated as priority group by proper design in the disaster management plans. The DRR planning needs to pay special attention to psychological vulnerabilities, impaired physical mobility, diminished sensory awareness, poor health conditions as well as weak social and economic limitations that severely limit the capacity of the elderly to prepare for disasters, hinder their adaptability and constrain their ability to respond.

The UN Charter 14 (UNISDR2014) for older people in DRR focuses on three key principles of an inclusive approach to DRR and there are fourteen minimum standards which underpin these key principles. The three principles are:

In need: Older people have specific requirements which must be understood and responded to within all DRR activities.

Invisible: Older people's vulnerabilities and capacities are often over looked; the collection of data on people's age and sex is essential to ensure older people and other people at risk are visible and supported in DRR.

Invaluable: Older people have years of knowledge, skills and wisdom which are invaluable assets in DRR and must be acknowledged, valued and engaged by supporting older people to participate in DRR. The Charter calls for stronger commitment from governments, donors and organizations to act on the shortcomings in DRR policies, strategies and practices that often insufficiently respond to older people's disaster risks. They must acknowledge and fullfil older people's rights and engage older people's capacities and contributions. This charter has been developed through consultations with governments, NGOs, DRR and ageing experts as well as older men and women. The Maintenance and Welfare of Parents and Senior Citizens Act, 2007 provides legal framework for the wellbeing of senior citizen lacking any support from family or close relatives.

In post disaster situations, it is essential that the needs of elderly are considered separately, rather than clubbing them with others keeping in mind the specific concerns applicable to them. It is preferable to have community-based senior-citizen support mechanisms so that the senior citizens are not uprooted from their immediate surrounding. This should include efforts to educate local communities about how they can help senior citizens and raise their awareness about supporting the elderly. The district DRR plan may prepare a list of senior citizens living without any family support. In the post disaster situation, looking at the gravity of the situation, the District Collector may take a call to set up temporary arrangements for the elderly and to take care of the personal needs such as food, medicine, shelter and other requirements. Special arrangements could be made to protect the property and assets of senior citizens if required.

3.6. Persons with Special Abilities (PSA)

Disability is a contextual and evolving concept. The UN Convention on the Rights of Persons with special abilities (UNCRPD) states in its first article: “Persons with special abilities include those who have long - term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others”. The Convention, in its articles11and32, requires that persons with special abilities benefit from and participate in disaster relief, emergency response and disaster risk reduction strategies. The Adoption of the Dhaka Declaration on Disability and Disaster Risk Management, in December 2015, acknowledges: “the importance of linking disability inclusive Disaster Risk Management (DRM) with the Sustainable Development Goals (SDGs) on the understanding that inclusion builds the resilience of the whole of society, safeguards development gains and minimizes disaster losses”.

The population of PSA in India, as per census 2011, is 2.68 Cr, which is 2.2% of the population. Of these 56% are males and 44% are females. In the total population, the male and female population are 51% and 49% respectively. Majority of the PSA (approx. 69%) live in rural areas, which is nearly same the share of rural population. A global survey by UNISDR50 in 2013 among 5,717 persons living with disabilities in 137 countries and eight non-self-governing territories examined why the number of the dead and injured PSA are disproportionally high in conflict, disasters and other emergency situations. The survey showed that 72.9% of PSAs have no personal preparedness plans. PSAs across the world say they are rarely consulted about their needs. The survey found that in the event of a sudden disaster, only 20% of PSA could evacuate immediately without difficulty, while the majority would have some level of difficulty or not be able to evacuate at all. A Handicap International study in 2015 (HI2015) found that 75% of people with disabilities believe they are excluded from humanitarian responses to emergencies like natural disasters and conflict.

It has been observed that persons with special abilities (PSA) are often overlooked and thus not only excluded in risk reduction and disaster response measures but are also subject to at higher risk than others. The NDMA has brought out relevant guidelines51 which must be consulted. Neglected throughout the DRM cycle, concerns about inclusion relate to limited social participation in DRR activities, poor access to information and services, poverty, invisibility during relief operations, response to basic needs not adapted and specific needs ignored. The most common priority identified by PSAs in the UNISDR survey of 2013 for improving inclusiveness of PSA in disaster risk reduction is for the involvement of PSA in DRR-related activities. The survey also emphasized the need for supportive policies, laws and promotion of support systems involving neighbours and local community.

DRR efforts must specifically address the vulnerabilities of PSA among the affected population, rather than clubbing them with others. Special attention must be paid to ensure that no PSA is abandoned after a disaster. Local community -based efforts and support system including promoting a buddy- system whereby each PSA have one or more persons in the neighbour hood who are responsible to act as a buddy to assist. The neighbours must be made aware of how they can help the PWD and provided training. The PSA must also make pro-active efforts to identify people in the neighbour hood whom they can rely upon for assistance in emergencies. It is good to have more

than one "buddy", particularly indifferent areas where the PSA spend more time, such as workplace, home, or school. The more people who can assist are there so much the better. It is also important for PSA to keep their helpers or buddies well informed about their special needs and for the helpers to remain in regular touch with those they are responsible for. A detailed disaster response planning at the local level must include lists of PSA in need special care. In the post disaster situation, the agencies responsible for disaster management may setup temporary facilities that are barrier- free and friendly to PSA. The administration can provide special arrangements to protect the property and assets of PSA, if required.

3.7. Making Disaster Risk Management Inclusive

At each level, stage and step, DRR efforts need to be guided by the Article1of the Universal Declaration of Human Rights that states:

"All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood."

The DRR efforts must take up social inclusion as challenge recognizing its complex and diverse nature. A social inclusion strategy must identify a series of practical objectives and actions that can significantly decrease or eliminate social exclusion in all aspects of DRR. The DRR efforts need to design local strategies to promote inclusion. All agencies involved in DRR – government, non-government or international – must make special efforts to properly assess the needs of all the marginalized sections and particularly vulnerable groups and to ensure full compliance with prescribed standards for assistance. Care must be taken to ensure that the vulnerability mapping exercises are able to identify properly all relevant factors. Efforts must be made to facilitate the realization of rights and entitlements of all socially excluded sections. A potential path forward in promoting social inclusion is to encourage community participation as inclusion depends crucially on active involvement of diverse sections of society.

Social inclusion is theme cutting across all aspects of DRR. While this chapter provides an overall perspective on the significance of social inclusion in DRR, its importance is given additional emphasis in different sections and related responsibility frameworks. Despite social inclusion being a cross - cutting feature, it is added as a distinct Thematic Area for DRR in the responsibility framework along with indicative Sub-Thematic Areas.

3.8. Responsibility Framework—Social Inclusion

Social inclusion being across-cutting Thematic Area for DRR relevant to all types of hazards and disasters, the responsibilities rest with every agency. However, for clarity the lead agencies relevant to each Sub-Themes have been mentioned.

Sl. No.	Sub-Thematic Area for DRR	State Agencies & their Responsibilities	
		State (Lead Agencies)	**Responsibility-State**
1	**Gender**	**Lead Agencies:** SJ&WD **Agencies with major roles:** SSDMA, DDMA **Supporting Agencies:** All agencies associated with DRR directly or indirectly	• Ensure that special efforts are made to make DRR gender inclusive and to ensure participation of women. • Ensure that there are no discriminatory practices that marginalise sexual and gender minorities at any stage of DRR. • Recognise the additional vulnerabilities of sexual and gender minorities such as transgender vulnerabilities. • HRVA- Risk Assessment to take care of women and transgender vulnerabilities. • Use of information and data management to support gender sensitive approach-DDMA and SSDMA. • Convergence of concerned departments to ensure gender sensitive DRR. • Shelters/Temp Shelters/Relief Camps- provision for specific needs. • Enabling Environment • Review and changes in existing regulations, norms, and directives to make them gender sensitive. • Training Awareness, Mock drills, Vocational Training/ Skill development. • Empowering, especially leadership in DRR • Curriculum development with gender sensitive approach. • Specific knowledge products. • Gender audit of DRR measures with the assistance of the State Women's Commission. • Ensure joint ownership in the name of husband and wife of houses reconstructed and assets provided under post-disaster recovery assistance.

2	**Scheduled Caste (SC) & Scheduled Tribes (ST)**	**Lead Agencies:** SJ&WD **Agencies with major roles:** SSDMA, DDMA **Supporting Agencies:** All agencies associated with DRR directly or indirectly	• HRVA- Risk Assessment to specifically include SC/ST vulnerabilities (location, existing discriminatory practices, creating hindrances in DRR, access to information, access to risk reduction resources). • Protecting the tribal identity, traditions and customs in post-disaster situations in different phases of DRR. • Ensure steps taken for DRR do not cause irreversible damage to the community's culture, tradition, habitat and ecosystem. • Use of information and Data Management to support relevant issues- DDMA and SSDMA. • Convergence between concerned departments in schemes meant for SC/St for DRR • Shelters/ Temp Shelters/ Relief Camps- non-discriminatory. • Review and amendment of existing regulations, norms and directives to address requirements of implementing DRR in SC/ST settlements(e.g. retrofitting, social housing, hazard resistant construction) • Training Awareness, Mock drills, Vocational Training/ Skill development • Empowering, especially leadership in DRR. • Curriculum development with focus on issues of SC/ST communities. • Include non-discriminatory implementation of DRR in social audit.
3	**Children**	**Lead Agencies:** SJ&WD, Education Dept **Agencies with major roles:** SSDMA, DDMA	• Make special arrangements for disaster preparedness and safety of various children's institutions. • Regulatory measures for ensuring school safety and disaster preparedness in schools. • Regular mock drills and other preparedness measures in all schools and children's institutions. • Pay special attention to children's institutions after early warning and post-disaster. • Ensure that in post-disaster situation children's do not face isolation, anxiety, trauma, separated from their families. • Take adequate measures to prevent and stop child labour in post disaster situation.

		Supporting Agencies: All agencies associated with DRR directly or indirectly	• Sensitize all agencies and key personnel associated with protection of child rights and safety including those connected with juvenile justice such as police, CWC, JJB, SARA and DCPU. • Promote community-based care and protection of the affected children. • SCPS should initiate steps to monitor post-disaster threats to children and take counter measures along with the nodal agency at the state for child rights and protection.
4	**Elderly**	**Lead Agencies:** HFWD, SJ&WD **Agencies with major roles:** SSDMA, DDMA **Supporting Agencies:** All agencies associated with DRR directly or indirectly	• Sensitizing local communities about additional vulnerabilities of the elderly persons in the communities and promote neighbourhood groups or responsible individuals to assists the elderly. • Make special arrangements for disaster preparedness and safety of various institutions for the elderly such as old age homage's, retirement homes and shelter homes for the elderly. • Linking organisations working for the welfare of elderly with community initiatives for DRR. • Preparing lists of all the elderly persons living without adequate support, periodically reviewing their situation and check the status of social network (neighbours, relatives, friends) and other arrangements for their support. • In the risk season or after early warnings, take measures to ensure that the elderly is informed and prepared. • Involve elderly in disaster preparedness and planning to the extent they can contribute. • Assess medical and health support needs of the elderly in each area and maintain stocks of crucial items. • Special attention to the protection of property and assets of the elderly after evacuation or post disaster situations.
		Lead Agencies: SJ&WD HFWD	• Sensitizing local communities about the PWD living in the community and their special needs particularly during disasters. • Promote neighbourhood groups assist PWD or ensure a Personal Support Network consisting of at least three persons who are trusted for each PWD.

5	**Persons with Disabilities (PWD)**	**Agencies with major roles:** SSDMA, DDMA **Supporting Agencies:** All Agencies associated with DRR directly or indirectly	• Make special arrangement for disaster preparedness and safety of various institutions for the PWD and any facilities dedicated to PWD. • Linking organisations working for the welfare of PWD with community initiatives for DRR. • Preparing lists of all PWD, periodically reviewing their situation and check the status of social network (neighbours, relatives, friends) and other arrangements for their support. • In anticipation of a hazard or after early warnings, take measures to ensure that all PWDs are properly informed and prepared • Involve PWDs in disaster preparedness and planning as equal participants. • Special attention to the protection of property and assets of the PWDs after evacuation or post disaster situations.

4. Mainstreaming Disaster Risk Reduction

4.1. Background

A disaster sets back development of the affected region and at times beyond, depending on its scale. It can suddenly reverse decades or more of accumulated developmental gains. The impact can be minimised or reduced significantly if the affected community had incorporated adequate risk reduction measures into the development. The losses to multiple sectors of a disaster -affected region disrupts almost every sector of the economy and the quality of life of the people making it difficult to attain development goals set prior to the disaster because considerable expendituremust be made on humanitarian assistance and for recovery. Investment in DRR is required for protecting assets, properties, development opportunities and outcomes against disasters. According to an UNDP document every dollar invested into DRR could save seven dollars in disaster aftermath (UNDP 2012). The process of development, and the kind of development choices made could enhance disaster risks.

As per the provisions of the DM Act, all ministries, states, UTs, departments and agencies must have their own DM Plan. Unlike other components of a DMP, mainstreaming DRR must be incorporated into the overall plans, policies and programs rather than as a subcomponent of the DMP. DRR must become an integral part of every development plan and the DMP must provide indications how that will be accomplished in the DMP. At present there is, perhaps, some lack of clarity on this and this chapter provides both the perspective and a summary of how the practice of mainstreaming is evolving. Mainstreaming, by its very concept, is not a sub-component of a disaster-specific plan but an approach that must be woven into all developmental plans to reduce risks from disasters.

Development without adequate incorporation of DRR could worsen existing risks and has the likelihood of introducing new risks, increasing the negative impact of potential disasters. Extensive and sound integration of DRR into development can enhance disaster resilience, reduce losses and hasten the progress towards development goals. Thus, it is desirable that the development initiatives and DRR are dealt with concurrently in a seamless manner into all the relevant policies, planning and implementation. The climate change impacts act as risk multipliers worsening uncertainties associated with almost every hydro-meteorological hazard. Therefore, all development initiatives must factor in the likelihood of greater risks and increase in climate change-induced vulnerabilities. This requires incorporation of risk management and climate adaptation as an intrinsic feature of all developmental efforts, especially in the areas where hazards are known to be high. Such an approach, which internalises DRR within development in a closely integrated manner is called mainstreaming DRR. It means radically expanding and enhancing DRR so that it becomes a normal practice, fully institutionalised within each agency’s regular planning and programmes in addition to the preparedness for disaster response.

For over two decades, there has been increasing attention on the need to ‘mainstream’ disaster risk reduction into development. This prompted many nations address risks from natural hazards within their development frameworks in various ways and at different levels - spanning the legislative, institutional, sectoral strategies and financial planning (Benson and Twigg, 2007). Development do

not necessarily reduce disaster risk. It can unwittingly create new risks or exacerbate the existing ones, with disasters likely to be both a cause and a product of development. The experiences from across the world have highlighted the crucial importance of social inclusion in DRR. Social exclusion adversely affects both development and the capacity to cope with disasters. In addition to the special emphasis on making DRR socially inclusive, the mainstreaming of DRR must also make social inclusion one of the intrinsic features.

The Oslo Policy Forum (2008) concluded that rather than reducing disaster risk, development processes are in many cases giving rise to new forms of vulnerability impeding efforts to reduce poverty and promote growth. 'Win–win' solutions for securing sustainable development, reducing poverty and strengthening hazard resilience therefore need to be explicitly and actively sought, particularly as climate change is likely to increase the extreme weather events (Benson and Twigg, 2007). This process should take account of the impact of climate change on the intensity and frequency of hydro-meteorological events in the future, as well as historical hazard records. The recognition of close linkages between development, disaster risk reduction and global climate change have resulted in all the major global frameworks having a shared emphasis on building resilience. The concept of coherence and mutual reinforcement of the diverse initiatives to achieve the national goals and those of the major global frameworks has also emerged. Given the highly cross-sectoral nature of these challenges, it is evident that they are naturally inseparable and almost indistinguishable from mainstreaming.

4.2. Mainstreaming—Sub Thematic Areas for DRR

The strategic objective of mainstreaming is of ensuring that DRR within the ongoing development initiatives lead to integration of DRR into poverty reduction efforts and sustainable socio – economic development by covering all aspects – institutional, legislative, judicial and development policies.

The key sub-thematic areas for mainstreaming DRR and creating the enabling environment for it emerging from the global discussions are:

i. Improving awareness and understanding of disaster risk

ii. Enhanced legal support and better disaster governance

iii. Effective disaster risk transfer and risk management

iv. Ensuring social inclusiveness in disaster risk management

v. Enabling coherence and mutual reinforcement of initiatives under the major global frameworks for enhancing disaster resilience

vi. Institutional arrangements and capacity development (institutional, human, community, technology, etc.) for DRR

vii. Intra-government horizontal and vertical integration

viii. Budget allocations for integrating DRR concerns into development programs

ix. Changes in project appraisal, scrutiny of development plans, better land-use regulations, insistence on multiple hazard resilient infrastructures

x. Setting targets, timeframes, indicators and monitoring mechanisms

These broad themes need to be incorporated into the policies, plans and programs of government agencies at all levels as an integral part of their general plans, while their DM Plans will provide an outline or broad indication of how it will be done. These are ideas and concepts that need to be developed further in operational terms and all agencies must explore ways to incorporate mainstreaming DRR in their regular planning and formulation of programmes.

4.3. Improving the Awareness and Understanding of Risk

Increasing the awareness of disaster risk, ways to reduce it as well as manage it is an important element of mainstreaming DRR. It may be noted in this context that the Sendai Framework emphasises the role of improving the understanding and awareness of risk. The DRR policies and practices must be based on improved understanding of disaster risk in all its dimensions and communities made aware of various aspects of disaster risk so that they are able to proactively take preventive measures. Such awareness is most critically essential on the part of key line agencies, local authorities and communities in high-risk areas. Disaster risk has a cascading nature with decisions in one sector potentially changing disaster risk in another. Therefore, decision -makers across diverse sectors and levels of government as well as the private sector and civil society also must recognise the importance of considering disaster risk as an intrinsic part of all projects, programmes and initiatives.

4.4. Legal Support and Disaster Governance

Adequate and appropriate legislative arrangements for disaster risk management, including the mainstreaming of DRR into development, form a key component of an enabling environment. Revision of land-use regulations and building codes and introduction of judicial and other measures will be required to ensure enforcement. As a continuous effort, it is necessary to improve and strengthen various laws having a bearing on DRR. DRR responsibilities must be explicitly incorporated in the duties of all branches of government. There is need to strengthen the vertical and horizontal integration of DRR plans between different levels of government, various line agencies and neighbouring local bodies. What this implies is the integration of DRR into all the norms, regulations, approval and monitoring relating to development through periodic reviews and amendments in addition to those specific to disaster.

4.5. Disaster Risk Transfer

A comprehensive disaster risk management strategy, actively involving stakeholders at all levels of government as well as the private sector, local communities and civil society, is required to implement the legislative framework and to provide coordination and monitoring mechanisms and arrangements. Individual disaster risk reduction actions and programs need to be located within this strategy, rather than treated as discrete, individual measures. Moreover, the strategy needs to

indicate specific entry points and mechanisms for main streaming disaster risk reduction concerns into both the broader development agenda and the design and implementation of individual development initiatives.

The emphasis now is on managing risks going beyond disaster and emergency management, which tends to be concerned mainly with management of disaster events rather than risk. The risk management processes are continuous and embedded within the broader development framework. There are various options for financing disaster risk management, i.e., Disaster Risk Financing Instruments (DRFI). DRFI are commonly classified as ex post (e.g., budget reallocations, loan conversations, borrowing) or ex ante (accumulated reserves, precautionary savings, contingent credit, risk transfer/insurance). Insurance is a type of ex ante financing, in which an at-risk party cedes all or some of its risk exposure to a third party in return for a premium payment. However, none of these are stand alone or universal solutions for DRR. For example, insurance is not a sufficient instrument for achieving effective disaster risk management and disaster risk reduction at a societal level. At-risk parties, whether individuals, businesses or governments, must decide when insurance is appropriate and what other tools to use when it is not. It must be noted that not all perils can be insured against. Various risk financing instruments must be integrated within an overall DRR strategy, enabling policies and supporting legal framework.

The processes to facilitate and promote risk transfer involve identifying aspects such as, a) various layers of disaster risk, b) who bears each level of risk and c) possible risk transfer instruments available to each layer (Le Quesne et al 2017). As part of risk layering, financing instruments must be selected based on the frequency and severity of disasters. Risks with high frequency and low severity (e.g.,floods) can be self-financed by the insured party (government or affected populace). Disaster reserve funds or budgetary allocation would be appropriate instruments in this case. On the other hand, risks with low frequency and high severity are likely to cause extensive damage and should be transferred to better-equipped third parties. Integrating risk transfer mechanisms into disaster risk informed development is challenging for policy-making and planning.

4.6. Ensuring Social Inclusiveness in Disaster Risk Reduction

Importance of social inclusion for DRR was discussed earlier in considerable detail. Inclusive DRR is about equality of rights, equal opportunities and the dignity of the individual irrespective of social background, community, age, gender or disability. Social inclusion is also a cross cutting theme that needs to be an integral part of the mainstreaming efforts. A detailed list of Sub-Thematic Areas for DRR and responsibility framework has been provided in the chapter on social inclusion. Mainstreaming social inclusion in DRR must be based on the approach discussed in detail there and it is not necessary to reiterate it here.

4.7. Enabling Coherence and Mutual Reinforcement of Initiatives under the Major Global Frameworks for Enhancing Disaster Resilience

The process of defining the 2030 global agenda inevitably showed there is much to be gained from aligning plans, targets, actions and indicators across the separate but interlocking agreements. It was evident that there is significant potential for designing financing mechanisms, policies and programmes that can deliver on more than one set of targets or frameworks. The very idea of

coherence and mutual reinforcement implies concerted and mutually supporting efforts cutting across several ministries and sectors. The efforts to achieve national goals under different major global frameworks could be made to mutually reinforce each other, resulting in cost -effective, faster and efficient implementation. Given the way the ideas have emerged, coherence and mutual reinforcement goes beyond the usual formal inter- agency coordination to achieve common targets. Instead, it heralds a new approach in which measures taken under one framework strengthens goals in all the three frameworks. The three global frameworks and the importance of coherence and mutual reinforcement have been elaborated in a separate chapter. It is evident from the very nature of coherence and mutual reinforcement that it can be implemented only by making it integral to the mainstreaming. To realise it, however, there is need to go beyond the conventional coordination and planning mechanisms. From the perspective of DRR, some indicative areas where a beginning can be made are:

- Improving the understanding of disaster risk – both natural and those introduced or increased by developmental actions – in all its dimensions is an effort that must be integral to all development initiatives by understanding risks in a broader sense, i.e., risks from hazards and those newly created

- Understand the cascading nature of risk, of how decisions in one sector alters disaster risk in another in a cascading manner

- Understand not only vulnerabilities from cascading risks, but also better assess the capabilities to resist, absorb, and accommodate risks

- Recognise disaster risk as an intrinsic part of all projects, programmes and initiatives (by all decision-makers and at all levels – Govt., private sector and civil society)

- Aligning the risk management approaches

- Improving horizontal and vertical integration for DRR within government by making use of decision-making tools and information technology

- Setting targets, timeframes, indicators and monitoring mechanisms to facilitate consolidation of efforts across sectors to enhance disaster resilience

4.8. Institutional Arrangements and Capacity Development for Disaster Risk Management

DRR is a cross cutting responsibility that needs to be ‘owned’ by all government agencies rather than by a single nodal department or agency designated for it. That requires the institutions to explicitly recognise the DRR requirements and pay attention to implementing adequate institutional arrangements required for addressing relevant accountability and responsibility concerns. The nodal agencies at the national and state levels must provide leadership, determine broad disaster risk management policies, oversee implementation and advocate for the inclusion of disaster risk reduction concerns in broader development. The capacity development shall cover all aspects such as institutional, human, community and technology applications.

4.9. Intra Government Coordination and Integration

Since there are multiple line agencies, sectors and levels of administration involved in development initiatives at national and state levels, mechanisms of inter -agency coordination and integration must be strengthened to ensure that locally identified needs are reflected in higher-level plans and strategies. The inter-departmental and inter-ministerial coordination or horizontal coordination is important given the crosscutting nature of DRR and the potential implications of one agency's decisions on another.

4.10. Budget Allocations

Integration of disaster risk concerns into government budgets should be tackled from two angles, ensuring that levels of public expenditure on risk reduction are sufficient and that there are adequate financial arrangements to manage the residual risk. The presence of residual risk implies a continuing need to develop and support effective capacities for emergency services, preparedness, response and recovery, together with socioeconomic policies such as safety nets and risk transfer mechanisms, as part of a holistic approach. While there are certain budgetary allocations to partially address requirements of relief (e.g., National Disaster Response Fund, State Disaster Response Fund), the mainstreaming of DRR requires each department to make adequate provision for DRR as an integral part of the main budget by ensuring that all the major activities have incorporated DRR.

4.11. Changes in Project Appraisal

DRR consideration must become part of the appraisal processes of various development projects to ensure that development gains are sustainable and to ensure that DRR components and development components of projects are mutually reinforcing. There are some examples of how development projects have been implemented by properly recognising and without underestimating risks, thereby avoiding the creation of new risks (e.g., adequately factoring in seismicity, properly estimating flooding probabilities, ensuring restrictions against urban sprawl into industrial hazard-prone areas, strengthening land-use regulations by incorporating hazard risk adequately). The project evaluations at different stages from concept stage to detailed project report for implementation needs to be as much informed by hazard likelihoods as possible. Changes must be incorporated in the budget approval and financial sanctioning procedures to make DRR evaluation mandatory.

4.12. Setting Targets, Timeframes and Indicators

Capacity to monitor and evaluate disaster risk reduction initiatives, generate hard evidence on related inputs, outputs, results and impacts, and learn lessons for the future is an essential component of the enabling environment for mainstreaming. Although mainstreaming is essentially continuous and pervasive, it is necessary to set targets to achieve DRR outcomes along with appropriate timeframes, responsibility frameworks and measurable indicators. Again, it must be recognised that all these apply to all aspects and sectors of development and governance as mainstreaming will be an ongoing and unending process that would become more and more tightly interwoven into all developmental initiatives. Nevertheless, given the fact that DRR mainstreaming had a very slow start, it is necessary to proceed in a phased manner with the initial phase focusing on how to incorporate it in to the overall plans, followed by the setting medium and long-term

goals. Basically, the phasing should be consistent with the priorities in terms of short, medium and long-term goals. What needs to be done by the state has been described in a broad manner in the chapter on the responsibility framework for building disaster resilience.

5. Building Disaster Resilience

5.1. Background

The Disaster Management Act, 2005, Disaster Management Policy for the State of Sikkim 2007 (DMPSS) and the National Policy, 2009 marks the institutionalization of paradigm shift in disaster management in the country, from a relief-centric approach to one of proactive prevention, mitigation and preparedness. The Policy notes that adequate mitigation and disaster risk reduction measures can prevent the natural hazards from becoming major disasters. Disaster risk arises when hazards interact with physical, social, economic and environmental vulnerabilities. The Policies suggests a multi-pronged approach for disaster risk reduction and mitigation consisting of the following:

- Integrating risk reduction measures in to all development projects
- Initiating mitigation projects in identified high priority areas through joint efforts of the Central and State Governments and Districts.
- Encouraging and assisting State level mitigation projects
- Paying attention to indigenous knowledge on disaster and coping mechanisms
- Giving due weight-age to the protection of heritage structures

In the terminology adopted by the UNISDR, the concept and practice of reducing disaster risks involve systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. While both the terms “Disaster Reduction” and “Disaster Risk Reduction” are widely used, the latter provides a better recognition of the ongoing nature of disaster risks and the ongoing potential to reduce these risks. Mitigation consists of various measures required for lessening or limiting the adverse impacts of hazards and related disasters.

The DM Act 2005 defines "Mitigation" as measures aimed at reducing the risk, impact, or effects of a disaster or threatening disaster situation”. Goal of mitigation is to minimize risks from multiple hazards and the threats from individual hazards need not always occur in isolation. At times, a hazardous event can trigger secondary events. For example, an earthquake can produce landslides or may create flooding or fire. Similarly, cloudburst often lead to flash flooding and various other cascaded events spread over an area wider than the primary event. In addition, demographics, nature of human settlements, and effects of global climate change can magnify the vulnerability of the communities at risk. The DM Plan, therefore, focuses on enhancing the mitigation capabilities for multiple hazards, their likely cascading effects.

The guiding principles of Sendai Framework states that disaster risk reduction requires responsibilities to be shared by different divisions of governments and various agencies. The effectiveness in disaster risk reduction will depend on coordination mechanisms within and across sectors and with relevant stakeholders at all levels. For each hazard, the approach used in this state plan incorporates the four priorities enunciated in the Sendai Framework into the planning

framework for Disaster Risk Reduction under the five thematic areas for action:

- Understanding Risk
- Inter-Agency Coordination
- Investing in DRR – Structural Measures
- Investing in DRR – Non-Structural Measures
- Capacity Development

For each of these thematic areas for action, a set of major themes have been identified for inclusion in the planning framework.

5.1.1. Understanding Risk

This thematic area for action focuses on understanding disaster risk, the Priority-1 in the Sendai Framework integrates into its numerous actions needed for strengthening disaster resilience. The major themes for action are: a) Observation Networks, Information Systems, Research, Forecasting, b) Zoning/ Mapping, c) Monitoring and Warning Systems, d) Hazard Risk and Vulnerability Assessment (HRVA), and e) Dissemination of Warnings, Data, and Information. Having adequate systems to provide warnings, disseminate information, and carry out meaningful monitoring of hazards are crucial to disaster risk reduction, and improving resilience. They are also an integral part of improving the understanding of risk.

5.1.2. Inter-Agency Coordination

Inter-agency coordination is a key component of strengthening the disaster risk governance - Priority-2 of the Sendai Framework. The major themes for action required for improving the top-level inter agency coordination are: a) Overall disaster governance b) Response c) Providing warnings, information, and data and d) Non-structural measures. The state departments and agencies mentioned are those vested with hazard-specific responsibilities by the State Govt. or those expected to play major roles in the thematic areas given in the matrix.

5.1.3. Investing in DRR – Structural Measures

Undertaking necessary structural measures is one of the major thematic areas for action for disaster risk reduction and enhancing resilience. These consist of various physical infrastructure and facilities required to help communities cope with disasters. The implementation of these measures is essential to enhance disaster preparedness, a component of Priority-4 of the Sendai Framework. It is also an important component of investing in disaster risk reduction for resilience, which is Priority-3 of Sendai Framework.

5.1.4. Investing in DRR – Non-Structural Measures

Sets of appropriate laws, mechanisms, and techno-legal regimes are crucial components in strengthening the disaster risk governance to manage disaster risk, which is Priority-2 of the Sendai Framework. These non-structural measures comprising of laws, norms, rules, guidelines, and techno- legal regime (e.g., building codes) framework and empowers the authorities to mainstream

disaster risk reduction and disaster resilience into development activities. The central and state governments will have to set up necessary institutional support for enforcement, monitoring, and compliance.

5.1.5. Capacity Development

Capacity development is a theme in all the thematic areas for action. The Sendai Priority-2 (Strengthening DRR governance to manage DR) and Priority-3 (Investing in DRR for resilience) are central to capacity development. The capacity development includes training programs, curriculum development, large-scale awareness creation efforts, and carrying out regular mock drills and disaster response exercises. The capability to implement, enforce, and monitor various disaster mitigation measures has to be improved at all levels from the local to the higher levels of governance. It is also strengthening the DRR governance at all levels to better manage risk and to make the governance systems more responsive.

5.1.6. Climate Change Risk Management

Climate Change significantly alters the geographic spread, frequency and intensity of hydro-metrological extreme events. It can also exacerbate their impacts. Investments in DRR can play an important role in supporting communities to adapt to climate change. As the impacts of Climate change are increasingly felt, more financial and technical resources will be needed to support vulnerable people to adapt to the negative impacts. There are major knowledge and data gaps concerning climate change impacts, impact scenario and its effects on various hydro-meteorological hazards, which need to be kept in mind while examining the time frame and actions listed under this Thematic Area for DRR.

5.2. Hazard-wise Responsibility Matrix for Disaster Risk Mitigation

For the DM plans to succeed, it is necessary to identify various stakeholders/agencies and clearly specify their roles and responsibilities. At all levels - from local to the Centre - the relevant authorities must institutionalize programmes and activities at the department levels, and increase inter-agency coordination and networking. They must also rationalize and augment the existing regulatory framework and infrastructure. For each hazard, in the sub- sections that follow, themes for action are presented in a separate responsibility matrix for each of the five thematic areas for action.

Table 7: Various state-specific disasters covered under the four components of Sendai Framework:

5.2.1. **EARTH QUAKE**

Earthquake				
Understanding Risk				
	Theme	**Central Agencies**	**State Agencies**	**Responsibility**
1	Earthquake Hazard Risk	IMD, NDMA, NIDM, MoST, DST, CSIR, MOES, MEITY, NLRTI	SSDMA, DDMA, LR&DMD and IMD.	• Share Information widely • Ensure that information is accessible to homemakers, aged children and differently- abled population **Recurring/ Regular (RR)** • Share Information widely
2	Seismic Zonation	EREC, IMD, BIS, GSI, MoST, DST, CSIR, MOES	SSDMA, DDMA, ULB, PRIs and Mines & Geology Dept.	• Ensuring implementation, enforcement, compliance and monitoring; awareness creation, carry out need assessment from end users, conduct micro-zonation studies, and prioritize important urban areas for micro-zonation. **Recurring/ Regular (RR)** • Ensuring implementation, enforcement, compliance and monitoring; Awareness creation
3	Scientific Micro Zonation	EREC, NILRTI,	SSDMA, DDMA, LR&DMD, Mines & Geology Dept. and GSI.	**Long Term(T3)** • Carry out need assessment from end-users, conduct micro-zonation studies, prioritize important urban areas for micro- zonation, do professional review before adoption.
4	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	NDMA, NIDM, MOST, MSJE, NLRTI	SSDMA, DDMA, LR&DMD, PRIs.	**Recurring/ Regular (RR)** • Undertake HRVCA as part of preparing and periodic revision of DM plans. **Short Term (T1)** • Constitute/ strengthen the mechanisms for consultation with experts and stakeholders.

5	Disaster Data Collection and Management	MHA, MOSPI, all ministries/ department	SSDMA, DDMA and all relevant departments.	**Recurring/ Regular (RR)** • Systematic data management of data on disaster damage and loss assessments. **Short Term (T1)** • Disaster Damage and Losses 2005-2015 baseline
Inter Agency Co-ordination				
1	Overall Governance	MOES	SSDMA, DDMA, LR&DMD, ULBs and PRIs.	**Recurring/ Regular (RR)** • Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks. • All aspects of disaster risk management and mainstreaming DRR. • Ensuring coherence and mutual reinforcement of DRR, CCA and development.
2	Response	MHA	SSDMA, DDMA, LR&DMD, PRIs, ULBs & other relevant agencies.	**Recurring/ Regular (RR)** • Organising and coordinating the immediate response. • Coordinate with central agencies.
3	Non-structural measures	MOES,MHA , BIS, NDMA	SSDMA, DDMA, LR&DMD, PRIs	**Recurring/ Regular (RR)** • Coordination among state agencies for ensuring updated norms/ codes and their implementation, enforcement and monitoring.
Investing in DRR- Structural Measures				
1	Social Housing Schemes	Relevant Central Government Ministries, MORD, MHUA	SSDMA, DDMA, LR&DMD, PRIs, UDD, B&H Dept. and RDD.	**Recurring/ Regular (RR)** • Ensure that earthquake resistant features are incorporated in planning and execution of social housing schemes. • Ensure compliance with relevant building codes.

2	Strengthening and seismic retrofitting of prioritized lifeline structures and buildings	Relevant Central Government Ministries	SSDMA, DDMA, LR &DMD, B&H Dept., Edu Dept., RDD and UDD.	**Medium Term (T2)** • Implementation strengthening and seismic retrofitting as per recommendations of safety audits in all govt. departments, agencies, public utilities, schools, colleges, community halls etc.
3	Hazard resistant construction, strengthening, and retrofitting of all lifeline structures and critical infrastructure	NDMA, NBCC, BMTPC, CBRI, SERC, IE (I), all relevant Ministries/ Departments	SSDMA, DDMA and LR& DMD.	**Recurring/ Regular (RR)** • Collaboration with technical agencies and implementation.
Investing in DRR- Non Structural Measures				
1	Regulations and model codes for town planning, civil works and public infrastructure	IRC, MRTH, RDSO, MOR, AERB, DAE, BIS, MORD, MHUA	SSDMA, DDMA, LR& DMD, UDD, RDD, PWD and B&H Dept.	**Medium Term (T2)** • Adopt suitable byelaws for rural and urban areas, put model codes (e.g. NBC 2016) into practice and ensure proper compliance. • Micro zonation for seismic risk reduction. **Long Term (T3)** • Ensure strict compliance with code implementation through relevant Departments and agencies.
2	• Structural safety audit of lifeline structures and buildings. • Prioritization of lifeline structures and buildings for strengthening and seismic retrofitting.	MOES, NDMA, IE (I), CIDC, CFI, NAC, relevant Ministries/ Departments	SSDMA, DDMA, LR &DMD, UDD and B&H Dept.	**Recurring/ Regular (RR)** • Carry out safety audit of lifeline buildings and critical infrastructure. **Medium Term (T2)** • Ensure implementation, monitoring, enforcement and proper compliance within state by public, private and individuals.

3	Licensing and certification of professionals	MHRD, NDMA, relevant Central Ministries/ Departments, professional bodies of architects and engineers	Relevant Departments	**Medium Term (T2)** • Implement licensing of engineers through appropriate legal framework and institutional mechanism.
4	Public Private Partnerships	NDMA, MOES, MCA, MCF, MOCI, MPFI, MHIPE, MFIN	SSDMA, LR&DMD	**Recurring/ Regular (RR)** • Promote Private Participation in disaster management facilities
5	Risk Transfer	MFIN, NDMA, MHA, MAFW	SSDMA, LR&DMD, DDMA and Finance Dept.	**Recurring/ Regular (RR)** • Implementation of Risk Transfer Arrangements including multi-hazard insurance for life and property. **Short Term (T1)** • Policy Framework.
Capacity Development				
1	Training	MOES,NIDM, MHRD, NDMA, MYAS, NDRF others	SSDMA, DDMA, LR&DMD, SDRF, NDRF and Civil Defence.	**Recurring/ Regular (RR)** • Carry out regular training of Civil Defence, community and volunteers. **Medium Term (T2)** • Carry out the national effort to build the requisite number of trained personnel seismic safety in India. • Trainings in search and rescue for Civil Defence, community and volunteers.
2	Curriculum Development	MOES, MOCI, MHRD, UGC,	SSDMA, DDMA, LR &DMD, B&H Dept., RDD,	**Medium Term (T2)** • DM related aspects to be included in undergraduate and professional

		AICTE, IITS's, NIDM and other related agencies	UDD and IMD.	courses.
3	Awareness Generation	NDMA, NDRF, CAPF, NIDM	SSDMA, DDMA, LR&DMD and IPR.	**Recurring/ Regular (RR)** • Carry out mass media campaigns. • Promote culture of disaster risk prevention, mitigation and better risk management. • Promote attitude and behaviour change in the awareness campaigns/ IEC **Medium Term (T2)** • Promote use of insurance/ risk transfer. • Promote Community Radio • Strengthening network of civil society organizations for awareness generations about DRR and DM. • Information on care and protection of disaster-affected animals.
4	Mock Drills/ Exercise	NDMA, All Government Ministries/ Agencies, NDRF, Armed Forces, CAPF	SSDMA, DDMA, LR& DMD, SDRF, Sikkim Police, Civil Defence and PRIs.	**Recurring/ Regular (RR)** • Monitoring Emergency Preparedness of Departments.
5	Documentation and Dissemination	MOES, NIDM	SSDMA, DDMA and LR& DMD.	**Recurring/ Regular (RR)** • Popularization and distribution of documentation in local languages.
6	Empowering women, marginalised and persons with disabilities	MWCD, MSJE, NDMA, NIDM	SSDMA, DDMA and LR & DMD.	**Medium Term (T2)** • Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of disaster management at the state, district and local levels.

7	Community – based Disaster Management	NDMA, NIDM, MORD, MHUA	SSDMA, DDMA, LR&DMD, PRIs and ULBs.	**Recurring/ Regular (RR)** • Training for Panchayats, SHG, NCC, Youth, local community organizations. **Short Term (T1)** • Strengthen ability of communities to manage and cope with disaster based on a multi- hazard approach.

5.2.2 LANDSLIDE - MUD SLIDE AND SNOW AVALANCHE

Landslides – Mud Slide and Snow Avalanche				
Understanding Disaster Risk				
	State Agencies and their Responsibilities			
	Sub- Thematic Area of DRR	**Centre Agencies**	**State Agencies**	**State Responsibilities**
1	Hazard zoning, mapping, geological and geotechnical investigations in regions prone to landslides and snow avalanches.	GSI/MoM, Wadia Inst. of Himalayan Geology, NIDM, NRSC, BRO, SASE, DST, MoST, NDMA, CSIR.	SSDMA, LR&DMD, GSI, CWC.	**Recurring/Regular (RR)** Support to and cooperation with central agencies
2	Research & Development	NIDM, MoM, IMD, CSIR, DST, SASE, Research & Academic Institutions	SSDMA, LR&DMD, DDMA, Mines & Geology Dept., GSI, CWC.	**Recurring/Regular (RR)** Support to and cooperation with central agencies
3	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	GIS, MoM, SASE, NDMA, NIDM, MoST, DST, CSIR	SSDMA, LR&DMD, DDMA, PRIs, ULBs GSI, CWC.	**Recurring/Regular (RR)** Undertake HRVCA as part of preparing and periodic revision of DM plans
4	Dissemination of warnings	CWC, NRSC, IMD, BRO	SSDMA, LR&DMD, DDMA, PRIs, ULBs.	**Recurring/Regular (RR)** • Ensure facilities and infrastructure for the implementation of adequate access to communities at risk • Dissemination of warnings to all, down to the last mile – remote, rural or urban; Regular updates to people in areas at risk
5	Monitoring Warning Systems and Dissemination	MoM, MoD, MOJS, DOS, MOES, BRO	SSDMA, DDMA, PRIs, ULBs	**Recurring/Regular (RR)** Support and collaboration in implementation

6	Disaster Data Collection and Management	MHA, MOSPI, all ministries/depts.	SSDMA, LR&DMD, DDMA, GSI,CWC.	**Recurring/Regular (RR)** Systematic data management of data on disaster damage and loss assessments **Short Term (T1)** Disaster Damage and Losses 2005-2015 baseline
Inter – Agency Coordination				
	Sub- Thematic Area of DRR	**Centre Agencies**	**State Agencies**	**State Responsibilities**
1	Overall disaster governance	MoM, MOD	SSDMA, LR&DMD, DDMA, and all relevant depts.,	**Recurring/Regular (RR)** • Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks • All aspects of disaster risk management and mainstreaming DRR • Ensuring coherence and mutual reinforcement of DRR, CCA and development
2	Response	MHA	SSDMA, LR&DMD, DDMA.	**Recurring/Regular (RR)** • Organising and coordinating the immediate response • Coordinate with central agencies
3	Warnings, Information, Data	GIS, SASE, MOES (IMD), MOM, BRO, NDMA	SSDMA, DDMA, LR&DMD, Sikkim Police , ULBs, PRIs	**Recurring/Regular (RR)** Coordinating the dissemination of warnings to all, down to the last mile – remote, rural or urban; Regular updates to people in areas at risk
4	Non-structural measures	GIS, MHA, BIS, MOD, BRO, NDMA	SSDMA, DDMA, LR&DMD,	**Recurring/Regular (RR)** Coordination among state agencies for ensuring updated norms/ codes and their implementation, enforcement

				and monitoring
Investing in DRR – Structural Measures				
	Sub- Thematic Area of DRR	**Centre Agencies**	**State Agencies**	**State Responsibilities**
1	Protection of Human Settlements and other infrastructures	MOM, MOD, BRO	SSDMA, LR&DMD, Mines & Geology Dept. RDD, UDD, Water Resources Dept.	**<u>Recurring/Regular (RR)</u>** Improving infrastructure, roads, and land stabilization work
2	Protection of Heritage Structures	ASI	SSDMA, DDMA, Mines & Geology Dept., ASI.	**<u>Recurring/Regular (RR)</u>** Support and collaboration
3	Multi Hazard Shelters	NDMA, NIDM	SSDMA, DDMA, PRIs, ULBs and all other relevant depts.	**<u>Short Term (T1)</u>** Identification of safe buildings and sites to serve as temporary shelters for people and livestock evacuated from localities at risk **<u>Medium Term (T2)</u>** • Construction of multi-purpose shelters in high risk areas at safe sites away from hazard-prone locations. • Proper maintenance of roads in risk-prone areas
Investing in DRR – Non-Structural Measures				
	Sub- Thematic Area of DRR	**Centre Agencies**	**State Agencies**	**State Responsibilities**
1	Site selection for Human Settlements in Landslide and Snow Avalanche Prone Areas	MOM, MOD	SSDMA, DDMA, PRIs, ULBs	**<u>Medium Term (T2)</u>** • Detailed land-use zonation incorporating landslide and snow avalanche risks as applicable • Adopt suitable byelaws for

				rural and urban areas • Enforce / promote model codes (e.g., NBC 2016 and updated standards) into practice • Ensure proper compliance
2	Regulation and building codes	MOM, MOD, BIS, NIDM	SSDMA, UDD, DDMA, PRIs, ULBs	**Recurring/ Regular (RR)** Ensure implementation and adherence to codes and guidelines **Medium Term (T2)** • Adopt the techno-legal framework for ensuring compliance with land use zoning and landslide/avalanche safety issues • Adopt land use zoning, building byelaws and model code (e.g., NBC 2016) legislation with suitable modification for reducing risk
3	Licensing and certification of professionals	MOM, NDMA, MHRD, relevant Central Ministries/Departments, AICTE, IITs, COA, IIA, Urban planners, professional bodies of architects and engineers	SSDMA, DDMA and all line departments	**Recurring/ Regular (RR)** Implement licensing of engineers through appropriate legal framework and institutional mechanism
4	Public Private Partnerships	MOM, MOD, NDMA, MCA, MCF, MOCI, MPFI, MHIPE, MFIN	SSDMA, LR&DMD, DDMA	**Recurring/ Regular (RR)** Promote private participation in disaster management facilities

5	Risk Transfer	MFIN, NDMA, MHA, MAFW	SSDMA, DDMA, LR&DMD, Finance Dept.	**Recurring/ Regular (RR)** Implementation of Risk Transfer Arrangements including multi-hazard insurance for life and property **Short Term (T1)** • Policy Framework
Capacity Development				
	Sub- Thematic Area of DRR	**Centre Agencies**	**State Agencies**	**State Responsibilities**
1	Training	NIDM, MOM, MOD, CDMM, COA, MYAS, NDRF	SSDMA, LR&DMD, DDMA, Mines & Geology Dept., GSI, CWC.	**Recurring/ Regular (RR)** • Support and collaboration to national agencies • Training and skill upgrades for search and rescue for CDEF, community, and volunteers • Conduct regular training programmes for professionals including those for care and protection of disaster affected animals
2	Curriculum Development	MOM, GSI, MHRD, UGC, AICTE, COA, NIDM	SSDMA, LR&DMD, DDMA, GSI, CWC.	**Medium Term (T2)** Include information on landslides and snow avalanches in the curriculum
3	Awareness Generation	GSI, NIDM, NDMA, NDRF, CAPE, MOIB	SSDMA, DDMA, SDRF, IPR Dept. PRIs, ULBs, Sikkim Police	**Recurring/ Regular (RR)** • Carry out mass media campaigns • Promote culture of disaster risk prevention, mitigation, and better risk management • Promote attitude and behavior change in the awareness campaigns/IEC • Promote use of insurance/ risk

				transfer • Promote Community Radio • Inform people about care and protection of disaster- affected animals
4	Mock Drills/Exercises	NDMA, All the concerned Government	SSDMA, LR&DMD, DDMA, SDRF, HG&CD, Sikkim Police, NDRF.	**Recurring/Regular (RR)** Joint planning and execution of emergency drills
5	Documentation	MOM-GSI in collaboration with the NIDM/CBRI/CRRI/MOST/BRO/IITs, universities and other academic institutions	SSDMA, LR&DMD, DDMA.	**Recurring/ Regular (RR)** Constitute multi-institutional and multi- disciplinary teams for carrying out post landslide field investigations, document the lessons learnt and disseminate
6	Empowering women, marginalized and persons with disabilities	MSJE, MWCD,NDMA, NIDM	SSDMA, LR&DMD, DDMA, and other relevant depts.	**Recurring/ Regular (RR)** Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of disaster management at the state, district and local levels
7	Community Based Disaster Management	NDMA, NIDM, MORD, MHUA	SSDMA, LR&DMD, DDMA, PRIs, ULBs and all other relevant depts.	**Recurring/ Regular (RR)** • Strengthen ability of communities to manage and cope with disasters based on a multi-hazard approach • Training for PRI, SHG, NCC, NSS, Youth, local community organizations

Climate Change Risk Management				
	Sub- Thematic Area for DRR	**Centre Agencies**	**State Agencies**	**State Responsibilities**
1	Research , Forecasting/Early Warning, Data Management, Zoning, Mapping	MOM, MOD, MOES, MOJS, MAFW, DOS	SSDMA, LR&DMD, DDMA, Water Resource Dept., PRIs, ULBs, IMD,CWC	**Recurring/ Regular (RR)** • Support national risk reduction efforts related to GACC • Coordination with central agencies **Short Term (T1)** Sponsor and promote state-specific efforts and local efforts for GACC mitigation and adaptation **Medium Term (T2)** • Document state specific GACC impacts and coping mechanisms • Promote local weather-based insurance mechanisms and agricultural practices. **Long Term (T3)** • Promote state-specific studies on enhanced risks (economic, social, etc.) under different GACC impact scenarios • Promote research studies with State specific contexts on GACC and consequent changes in hazards

2	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	MOM, MOD, NDMA, NIDM, MOJS, MOST, MSJE, NLRTI	SSDMA, LR&DMD, Water Resource Dept., PRIs, ULBs, State Research Institutions, GSI, CWC, Mines &Geology Dept.	**Recurring/ Regular (RR)** Undertake HRVCA as part of preparing and periodic revision of DM plans **Short Term (T1)** Data collection related to landslides **Medium Term (T2)** • Develop State specific strategies • Assess GACC risks of vulnerable and marginalized sections
3	Climate Change Adaptation (CCA)	MOM, MOD, MOES, MOST, DOS, MOJS, MOEFCC	SSDMA, LR&DMD, DDMA, Forest & Environment Dept, DST,PRIs, ULBs	**Recurring/ Regular (RR)** • Sensitisation and awareness creation • Support national CCA efforts • Coordination with central agencies • Sponsor and promote state-specific efforts and local efforts for GACC mitigation and adaptation **Short Term (T1)** Develop local adaptation strategies and pilot projects **Medium Term (T2)** Sponsor and promote state-specific efforts and local efforts **Long Term (T3)** • Implementation of GACC adaptation programs • Promote appropriate combinations of Green and

				Blue infrastructure approach • Integrate adaptive measures in social protection programmes for the vulnerable groups

5.2.3 DROUGHT

Understanding Risk				
	State Agencies and their Responsibilities			
	Sub –Thematic Area for DRR	**Central**	**State**	**Responsibility- State**
1	Vulnerability Maps	MNCFC, MAFW, DOS, MOES, MOJS, MOST	SDMA, DDMA, LR&DMD, Agriculture Dept., Horticulture Dept. In collaboration with central agencies like IMD, GSI, and CWC.	**<u>Recurring/ Regular (RR)</u>** • Annually, after the end of the South-West Monsoon, carry out comprehensive assessment of water availability for drinking and irrigation in all the dry land farming / drought- prone areas in the state to demarcate block and preferably villages. • Prepare maps of areas likely to face water deficit before onset of next monsoon (demarcate block and preferably villages) • Undertake village wise assessment of water storage in the vulnerable blocks.
2	Assessment, Monitoring, Forecasting, Early Warning	MAFW, MOES, DOS, MOJS, MOST	SDMA, DDMA, LR&DMD, in collaboration with central agencies like IMD, CWC and GSI.	**<u>Recurring/ Regular (RR)</u>** • Coordinate with central agencies in the compilation for refining forecast accuracy for the region and analysis of all the drought, water deficit and crop relate data • Ensure functioning of DMC with requisite facilities and staff to continuously monitor water availability in the drought – prone blocks after livelihood of drought is high • 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 level, surface water/ ground water, soil moisture, sowing/crop conditions and socio- economic factors. • Separately, at the end of SW and NE monsoon, prepare crop advisory for blocks that are likely to face water deficit • 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.
3	Drought Declaration	MAFW, MOES, DOS, NITI Aayog	SDMA, LR&DMD, DDMA, Agriculture Department. Horticulture Department.	**Short Term (T1)** • Monitor key indicators for drought declaration with the support of relevant Central/ State agencies/ Dept. • State Govt. to issue a formal declaration of drought affected areas after which Collector will notify the district and taluk as affected and initiate drought response measures. • Notify drought – Kharif by 30 October; Rabi by 31 March • Early season drought: in August as per recommended criteria.
4	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	MAFW, MOJS, MOES, MOST, MSJE, DOS	SDMA, LR&DMD, DDMA, Agriculture Department, Horticulture Department.	**Recurring/ Regular (RR)** • Undertake HRVCA as part of preparation/revision of DM plans. • Estimate vulnerability of crops to rainfall uncertainties **Short Term (T1)** • Constitute/ strengthen the mechanisms for consultation with experts and stakeholders.
5	Research	MAFW, MOES (IMD), DOS , MOJS, NRAA, CRIDA, NIDM, MOST, CSIR and other agencies related to research	SSDMA, LR&DMD, DDMA, in collaboration with CRIDA, NRAA	**Recurring/ Regular (RR)** • 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 dry land/ rain fed farming
6	Disaster Data Collection and Management	MHA, MOSPI all ministries/ deptts..	SDMA, LR&DMD DDMA, Horticulture Dept., Agriculture	**Recurring / Regular (RR)** • Systematic data management of data on disaster damage and loss assessments

			Department.	**Short Term (T1)** • Disaster Damage and Losses 2005-2015 baseline.
Inter Agency Co-ordination				
	Sub- Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibilities – State**
1	Overall disaster governance	MAFW	SSDMA, LR&DMD DDMA, PRIs, Agriculture Dept. Horticulture Dept. Food &Civil Supplies Department.	**Recurring/ Regular (RR)** • Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks • All aspects of disaster risk management and mainstreaming DRR • Ensuring coherence and mutual reinforcement of DRR, CCA and development
2	Response	MAFW	SSDMA, LR&DMD DDMA, PRIs, Agriculture Dept. Horticulture Dept. Food &Civil Supplies Department	**Recurring/ Regular (RR)** • Organising and coordinating the immediate response. • Coordinate with central agencies.
3	Warnings, Information, Data	MAFW, MOES, MOJS, DOS, MOST, MEITY, NDMA	SDMA, LR&DMD, PRIs, Agriculture Dept. Horticulture Dept. Food & Civil Supplies Department.	**Recurring/ Regular (RR)** • Coordination among state agencies for ensuring updated norms/ codes and their implementation, enforcement and monitoring
Investing in DRR- Structural Measures				
	Sub- Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibility- State**
1	Storage Facilities	MAFW, MOJS, MORD	SSDMA, LR&DMD, DDMA, Agriculture Dept. Horticulture Dept. Food &Civil Supplies	**Recurring/ Regular (RR)** • Drinking water storage and distribution facilities • Fodder storage facilities to maintain fodder banks. • Rain water harvesting systems-

			Department.	individual and community.
2	Water Conservation Structures	MAFW, MOJs, MORD	SSDMA, DDMA, LR &DMD, PWD, PRIs, ULBs, WRD, RDD, AH&VS Dept., IRD	**Recurring/ regular (RR)** • Water harvesting and storage structures • Check dams, reservoirs with excess capacity • Ground water recharge augmentation system
3	Social Housing Schemes	MORD, MHUA, relevant Central Government Ministries	SSDMA, LR& DMD, DDMA, RMDD, Agriculture Dept. Horticulture Dept.	**Recurring/ Regular (RR)** • Ensure rainwater harvesting and storage in the social housing schemes especially in drought prone areas.
	Investing in DRR- Non Structural Measures			
	Sub-Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibility- State**
1	Mitigation Measures	MOES, MAFW, MOJS	SSDMA, LR& DMD, DDMA, PRIs, Agriculture Dept. Horticulture Dept	**Recurring/ Regular(RR)** • Coordinate the efforts of the central agencies in implementing mitigation measures **Short Terms (T1)** • Promote private participation in disaster management facilities • Improve the implementation of water shed development programmes **Medium Term (T2)** • Risk management for dry land/ rainfed farmers through agricultural extensions and financial institutions based on assessments at the end of monsoon (SW or NE as applicable) • Drought – Proofing
2	Promote water conservation, harvesting, efficient, irrigation,	MAFW, ICAR, Agricultural Research Institutions,	SSDMA, LR &DMD, DDMA, RDD & Water Resources Dept. F&EW	**Recurring/ Regular (RR)** • Promote water efficient irrigation system (sprinkles, drip, etc) • Promote protective irrigation through micro irrigation systems.

	afforestation	DOS, NIDM	Dept.	• Provide advice to framers to cope with drought, crop management under drought conditions and efficient water management • Training in water and soil moisture conservation • Promote village level information systems for natural resource management.
3	Agricultural credit, agricultural inputs, finance, marketing and crop insurance	MAFW, IRDA, NABARD, Banks ICAR	SSDMA, LR &DMD, DDMA, AGD, Agriculture Dept. Horticulture Dept.	**Recurring/ Regular (RR)** • Need- based credit • Promote financial inclusion 'Monitor the availability of credit and other financial support from banks and other financial institutions to farmers in drought prone areas • Ensure the insurance programmes reach the target audiences (especially dry land / rainfed framers) and dependent agricultural labour • Marketing support • Ensuring availability of quality agricultural inputs
4	Risk Transfer	MFIN, NDMA, MHA, MAFW	SDMA, LR &DMD, DDMA, Finance Department, PRIs, ULBs.	**Recurring/ Regular (RR)** • Implementation of Risk transfer Arrangements including multi hazard insurance for life and property **Short Term (T1)** • Policy Framework
Capacity Development				
	Sub Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibility- State**
1	Training and Capacity Buildings	MAFW, NIDM, NDRF, MANAGE, NIRD, DMC MYAS , NDRF others	SSDMA, LR&DMD, DDMA, PRIs, ULBs, PRIs , Agriculture Dept. Horticulture Dept.	**Short Term (T1)** • 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. • Implement different training

				programmes for officials at various levels, elected representatives, community leaders ,CDEF, civil society organizations animal welfare organization **Medium Term (T2)** • Ensure availability of qualified and experienced trainers conversant with drought mitigation and management techniques (crop, animal care, integrated water resources – surface and ground water) • Professionals for veterinary care and support to drought affected animals
2	Curriculum Development	MAFW, Agri. Univ. MHRD, NCERT, CBSE	SSDMA, LR &DMD DDMA, Agriculture Dept. Horticulture Dept.	**Recurring/ Regular (RR)** • Include basic aspects of disaster management including drought in graduate and post graduate course in agriculture and veterinary courses offered by state institutions. • Include drought mitigation in secondary and higher secondary school curriculum
3	Awareness Generation	NDMA, NDRF, NIDM	SDMA, LR& DMD DDMA, IPR, PRIs, ULBs.	**Recurring/ Regular (RR)** • Carry out mass media campaigns. • Promote culture of disaster risk prevention, mitigation and better risk management covering crop and water management (including conservation of surface and ground water) • Promote attitude and behaviour change in the awareness campaigns/ IEC • Promote use of insurance/ risk transfer. • Promote Community Radio • Inform people about care and protection of disaster affected animals.
4	Empowering women, marginalised communities and differently-abled	MWCD, MSJE, NDMA , NIDM	SDMA, LR&DMD, DDMA, PRIs, Social Justice & Welfare	**Recurring / Regular (RR)** Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of disaster management at the state, districts

	person		Dept.	and local levels.
5	Drought Management Plans	MAFW	SDMA, LR&DMD , DDMA, Agriculture Dept.	**Short Term (T1)** Ensure development of state, district, block, taluka and village drought management plans
6	Mainstreaming drought management in developmental plans	Relevant Central Ministries in collaboration with State Government	SDMA, LR&DMD, DDMA, PRIs, ULBs, Agriculture Dept. Horticulture Dept.	**Recurring/ Regular (RR)** All state govt. departments/ agencies will mainstream disaster management efforts in their development plans.
Climate Change Risk Management				
	Sub- Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Central	**State**	**Responsibilities- State**
1	Research, Forecasting, Data Management, Zoning , Mapping	MAFW, MOEFCC,MOES, DOS, MOJS, NLRTI	SDMA, LR&DMD, DDMA, PRIs, ULBs, FE&W Dept.	**Recurring/ Regular (RR)** • Support national risk reduction efforts to GACC • Coordination with central agencies • Sponsor and promote state-specific efforts and local efforts for GACC mitigation and adaptation **Short Term (T1)** • Document state- specific GACC impacts and coping mechanisms • Take initiatives to promote drought resistant crops. • Promote local weather-based insurance mechanisms and agricultural practices **Medium & Long Terms (T2, T3)** • Promote state- specific studies on enhanced risk (economic, social, etc.) under different GACC impact scenarios. • Promote research studies with State specific contexts on GACC and consequent changes in hazards

2	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	MAFW, NDMA, NIDM, MOJS, MOST, MSJE, NLRTI	SDMA, LR&DMD, DDMA, and other relevant depts.	**Recurring/ Regular (RR)** Undertake HRVCA as part of preparing and periodic revision of DM Plans **Short Term** • Impact assessment, economic and social risk under GACC and reporting • Assess GACC risks of vulnerable and marginalised section **Medium Term** Creation of data bank and hazard, risk & vulnerability mapping at local level
3	Climate Change Adaptation (CCA)	MAFW, MOES, MOST, DOS, MOJS, MOEFCC	SDMA, LR&DMD, DDMA, PRIs, ULBs, RDD, Water Resources Department, FE&W Dept.	**Recurring/ Regular (RR)** • Sensitisation and Public Awareness • Capacity building and utilising traditional knowledge to build eco-system **Short Term (T1)** Develop Local Adaptation Strategies **Medium Term (T2)** • Implement various water and social conservation programmes consistent with anticipated GACC impacts • Adaptation and mitigation strategies under DM Plan for ensuring food security **Long Term (T3)** • Sponsor state – specific efforts, support local efforts. • Develop climate resilient infrastructure • Implement efficient water management and monitoring system as part of CCA in the drought prone areas. • Promote appropriate combinations of Green and Blue infrastructure approach • Integrate adaptive measures in social protection programmes or the vulnerable groups.

5.2.4 **THUNDERSTORM, LIGHTNING, DUST, SQUALL AND STRONG WIND**

Thunderstorm, Lightning, Dust, Squall and Strong Winds				
	Thematic Area for DRR	**State Agencies & their Responsibilities**		
		Central Agencies	**State Agencies**	**Responsibility**
1	Understanding Risk	MOES	SSDMA, DDMA, GSI, IMD, CWC.	**<u>Recurring/ Regular (RR)</u>** • Preparing State Action Plan and its implementation. • Prepare detailed departmental SoPs by concerned department • Data Collection **<u>Short Term (T1)</u>** • Compiling the baseline data of 2005- 2015
2	Inter- Agency Coordination	MOES, MIB, DOT, MPWR, MHA, MAFW, MHA, NEC, NDMA	SSDMA, LR&DMD, DDMA, Power Dept. H&FW Dept.	**<u>Recurring/ Regular (RR)</u>** • To disseminate the information received from IMD to public at large. • Promote installations of lightning arresters and Doppler • Create a network of community based early warning systems • Ensure specific message and information, dissemination to public at large through print/ electronic/ social and other mass media at local level. • Ensure Push SMS by various telecom service operators to all active mobile connections. • Activate all concerned power distributors companies office/ officers. • To ensure power cuts and restoration of power supply and also provide emergency power supply to critical facilities. • Activate the district administration with line departments as soon as specific warning is received. • Designate a nodal officer for emergency response. • Institutionalised multi-agency coordination with clear role and responsibility. • Rescue and evacuation operations

				in coordination with the administration, NGOs and volunteers. • Emergency medical response • Other necessary related actions. • Monitor State/ District level plan. • Collect updated data/ information and plan for review/ updating.
3	Investing in DRR- Structural measures	MHUA, MOPR, MEITY, MPWR, MRTH	SSDMA, LR&DMD, DDMA, PRIs, ULBs, Power Dept.	**Recurring/ Regular (RR)** • Inter- agency coordination and review and update precautionary measures and procedures. • Ensure building bye laws and make it mandatory or all ground floor plus two and taller buildings to install lightning conductors/ arresters. • Promote install of lightning conductors/ arresters in schools, industries and Government and private buildings. • A drive to be undertaken to check the structural strength of hoarding an old structures.
4	Investing in DRR- Non-structural measures	NDMA, MOCI, MORD, MHUA, DOT, MPWR, MRTH, MHFW, MAFW, MOEFCC, MHA	SSDMA, LR&DMD, DDMA, UDD,IPR, RDD, Power Dept., H&FW Dept.	**Recurring/ Regular** • Inter agency coordination and implementation. • Prepare Assessment, preparedness and mitigation measures report and implement. • Review and update precautionary measures and procedures. • Public awareness and education for early warning response. • Identify vulnerable places. • Follow alerts/ warning, advisory. • Disseminate Dos and Don'ts for general public and enable access to safe places.

				• Protecting property/ infrastructure and environment from fire damage. • Ensuring strict adherence to fire safety norms. • To ensure essential services and facilities at vulnerable places. • Setup alternative or emergency communication systems. • To ensure early restoration of electricity supply to essential services during emergencies and restoration of electric supply at the earliest. • To ensure functional state of all electrical equipment and maintain the service or replace equipment from time to time. • Ensure road connectivity and access to vulnerability areas. • Ensure appropriate medical staff and facilities at place of incident and strengthen health centres with paramedical professionals. • Assessment of damage from weather events. • Collecting post disaster data from field and reporting to state/ national level **Short Term (T1)** • Establishment of public information/ facilities. • Construction of thunderstorm safe crop storage shelters for farmers and ensuring adherence to fire safety norms. • Risk Transfer arrangements-implementation including crop and animal insurance.

5	Capacity Development	NIDM, MIB, NDRF and other ministries	SSDMA, LR&DMD, DDMA, F&ES, IPR, PRIs, ULBs.	**Recurring/ Regular (RR)** • Training programme for all concerned department officials/ volunteers, Civil Defence and volunteers. • Conducting training programmes drills on usage of various fire protection equipment and preventive systems. • Creation of public awareness. • Extensive IEC campaigns to generate public awareness through print, electronic and social media.
6	Climate Change Risk Management	MOES, MAFW, MOEFCC, NLRTI	SSDMA, LR&DMD, DDMA, F&ES, Agri. Dept., RDD, Horticulture Dept.,	**Recurring/ Regular (RR)** • Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks. • All aspects of disaster risk management and mainstreaming DRR. • Ensuring coherence and mutual reinforcement of DRR, CCA and development. • Sensitization and awareness creation. • Support national CCA (Climate Change Adaptation) efforts. • Coordination with Central agencies. • Sponsor and promote State specific efforts and local efforts for Global Anthropogenic Climate Change (GACC) efforts. **Short Term (T1)** • Develop local adaptation strategies and pilot projects. **Medium Term (T2)** • Sponsor and promote state specific and local efforts. • Integrate adaptive measures in social protection programmes for the vulnerable groups.

5.2.5 **GLACIAL LAKE OUTBRUST FLOOD (GLOF)**

Glacial Lake Outburst Flood (GLOF)				
	Thematic Area for DRR	**State Agencies & their Responsibilities**		
		Central Agencies	**State Agencies**	**Responsibility**
1	Understanding Risk	MOJS, MOES, MOST, DOS, MOEFCC, NLRTI	SSDMA, LR&DMD. DDMA, DST, CWC, GSI, and other relevant dept.	**<u>Recurring/ Regular (RR)</u>** • Involve local communities in monitoring of glacial lakes and water bodies with high risk-boundary conditions, discernible terrain changes etc. • Data Collection **<u>Short Term (T1)</u>** • Install and operationalise appropriate warning systems. • Mapping and identification of unsafe areas for human settlements that are likely to be at risk from GLOF. • Identify settlements prone to landslides/ unstable slope, mostly downstream etc. • Compiling baseline 2005-2015. **<u>Medium Term (T2)</u>** • Amalgamation of local/ indigenous knowledge of the terrain and technical expertise for monitoring of glacial lake/ water bodies. • Landslide Hazard Zonation (LHZ) using different kinds of spatial data employing the technological improvements in remote sensing that greatly improve the mapping accuracy.
2	Inter- Agency Coordination	MOEFCC, MOES, MAFW, MOJS, MOM, DOS	SSDMA, LR&DMD, DDMA, DST, Sikkim Police, SDRF,NDRF.	**<u>Recurring/ Regular (RR)</u>** • Preparation and Implementation of DM plans and ensure the functioning of agencies with DM tasks. • All aspects of disaster risk management and mainstreaming DRR • Ensuring coherence and mutual reinforcement of DRR, CCA and

				development. • Organising and coordinating the immediate response. • Coordinate with central agencies. • Coordinating the dissemination of warnings to all. • Coordination among state agencies for ensuring updated norms/ codes and their implementation, enforcement and monitoring.
3	Investing in DRR- Structural measures	MOJS, NLRTI	SSDMA, LR&DMD, DDMA, Private Power Developers, Water Resources Dept., Power Dept,	**Medium Term(T2)** • Reduce the volume of water in the lake, thus reducing the magnitude of the possible peak discharge at the time of breach- controlled breaching of the moraine dam; construction of an outlet control structure; pumping or siphoning the water from the lake and tunnelling through the moraine barrier or under an ice dam. Protecting downstream infrastructure from peak floods. **Long Term(T3)** • Infrastructure downstream (diversion weirs, intakes, bridges or river bank settlements) can be protected against a possible surge through proper construction that allows sufficient space for the flow of water and avoids damming. • River banks with potential or old landslides and acre slopes near settlements should be stabilised.
4	Investing in DRR- Non-structural measures	MOES, MOEFCC, MOST, MOJS, NDMA and NRSC	SSDMA, LR&DMD, DDMA, UDD, Water Resources Dept., Mines & Geology Dept., Forest & Environment Dept.	**Recurring/ Regular** • Implement risk transfer arrangement. **Short Term (T1)** • Review of existing regulations and amending them in accordance with safer building. • Discourage/ Disallow settlements on or near low river terraces within the GLOF hazard zones.

				• Risk Transfer Policy Framework. **Medium Term (T2)** • Make legal provisions mandating infrastructure developers, especially private hydropower developers to engage in GLOF early warning and risk reduction activities. • Land use zoning to discourage development in risky zone. **Long Term (T3)** • Amend town and city plans to reduce risks • Apply concept of multi-level safety to settlements and the expansion of towns/ cities- prevention, spatial planning, organization and emergency management.
5	Capacity Development	MOES, MOST, DOS, MOJS, MOEFCC, MSJE, MWCD, NIDM, NDRF	SSDMA, LR&DMD DDMA, PRIs, ULBs, IPR.	**Recurring/ Regular (RR)** • Training for SDRF, CDEF, community and volunteers. • Promoting culture of awareness, alertness and preparedness. • IEC materials; ensure wider dissemination to general public through all medium. • Dissemination and communication of GLOF risk information and early warnings to individuals and communities at risk. • Training support for CDEF, community and volunteers. **Medium Term (T2)** • Training in how to respond during and after GLOF events. • Information on safety, care and protection of disaster- affected animals. • Enhancing capabilities of Panchayats and local communities at risk to monitor and prepare for the likelihood GLOF (close to the glacial lake and along the likely path of flood after a GLOF). • Understanding early signs, glacial lake characteristics, level of

				hazards. • How to respond during and after GLOF events.
Climate Change Risk Management				
	Sub Thematic Area for DRR	**State Agencies and their Responsibility**		
		Centre	**State**	**Responsibility**
1	Research, Forecasting, Early Warning, Information Systems, Zoning, Mapping	MOES, MOD, MOJS, MOST, DOS, MOEFCC, NLRTI	SSDMA, LR&DMD, DDMA	**Recurring/ Regular (RR)** • Support and cooperate with central agencies. **Short Term (T1)** • Sponsor and support state- specific and local efforts
2	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	MOJS, MOES, MOEFCC, MSJE, NLRTI	SSDMA, LR&DMD, DDMA, GSI, CWC	**Short Term (T1)** • Undertake HRVCA as part of preparing and periodic revision of DM plans/ SOPs. **Medium Term (T2)** • Develop State specific strategies • Assess GACC risks of vulnerable and marginalised sections.
3	Climate Change Adaptation	MOJS, MOES, MOEFCC	SSDMA, LR&DMD, DDMA, PRIs, and other relevant departments.	**Recurring/ Regular (RR)** • Sensitisation and awareness creation. • Coordination with central agencies • Sponsor and promote state- specific efforts and local efforts for GACC mitigation and adaptation. **Short Term (T1)** • Develop local adaptation strategies and pilot projects. **Medium & Long Term (T2, T3)** • Sponsor and promote state- specific efforts and local efforts. • Implementation of GACC adaptation programmes. • Integrate adaptive measures in social protection programmes for the vulnerable groups.

5.2.6 **Nuclear and Radiological Emergencies**

Understanding Risk				
	Sub- Thematic Area for DRR	State Agencies and their Responsibilities		
		Centre Agencies	State Agencies	State Responsibilities
1	Monitoring and warning network Strengthening Radiation Monitoring	DAE, MHA, MOD	SSDMA, LR&DMD, DDMA, Home Dept., Sikkim Police, H&FW Dept.	<u>Short Term (T1)</u> • Follow and support the safety and regulatory requirements
2	Setting up reliable and dedicated communication network	NDMA	SSDMA, LR&DMD, DDMA, Home Dept., Sikkim Police, NIC.	<u>Short Term (T1)</u> • To extend logistics
3	Establish monitoring mechanism to prevent illicit movement of radioisotopes	DAE, MHA, MOD, Port Authorities	SSDMA LR&DMD, DDMA, Home Dept.	<u>Short Term (T1)</u> • Coordination with and support to central agencies
4	Disaster Data Collection and Management	MHA, MOSPI, all ministries/ depts.	SSDMA, LR&DMD, DDMA.	<u>Recurring/ Regular (RR)</u> • Systematic data management of data on disaster damage and loss assessments <u>Short Term (T1)</u> • Disaster Damage and Losses 2005-2015 baseline
Inter – Agency Coordination				
	Sub-Thematic Area for DRR	Centre Agencies	State Agencies	State Responsibilities
1	Overall disaster governance	DAE	SSDMA, LR&DMD, DDMA, Home Dept., H &FWD.	<u>Recurring/ Regular (RR)</u> • Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks • All aspects of disaster risk management

				and mainstreaming DRR
2	Response	DAE, MHA	SSDMA, LR&DMD, DDMA, Home Dept.,	<u>Recurring/Regular (RR)</u> • Organising the immediate response and seeking assistance of central agencies
3	Warnings, Information, Data	DAE, MHA, NEC, NDMA	SSDMA, LR&DMD, DDMA, IPR, PRIs, ULBs, Sikkim Police, SDRF,NDRF.	<u>Recurring/ Regular (RR)</u> • Dissemination of warnings to all, down to the last mile – remote, rural or urban • Regular updates to people in areas at risk
4	Non-structural measures	AERB, BIS	SSDMA, LR&DMD, DDMA, Home Dept.,	<u>Short Term (T1)</u> Adapting the norms/codes as per State's requirement, enforcement, monitoring
Inter – Agency Coordination				
	Sub-Thematic Area for DRR	Centre Agencies	State Agencies	State Responsibilities
1	Shelters	NDMA, NBCC, BMTPC, CBRI, SERC, IE	SSDMA, LR&DMD, DDMA, Sikkim Police, SDRF,NDRF, and all other relevant dept.	<u>Short Term (T1)</u> • Identification safe buildings and sites to serve as temporary shelters near nuclear installations • Construction of multi-purpose shelters near nuclear installations • Ensure compliance with relevant building codes
2	• Decontamination centres • Strengthen protection systems of nuclear facilities	DAE	SSDMA, LR&DMD, DDMA, Home Dept.,	<u>Recurring/ Regular (RR)</u> • Coordination with and support to central agencies

Investing in DRR – Non – Structural Measures				
	Sub- Thematic Area for DRR	Centre Agencies	State Agencies	State Responsibilities
1	Setting of safety standards and other safety and regulatory documents	AERB, DAE	SSDMA, LR&DMD, DDMA, Home Dept.,	<u>Short Term (T1)</u> • To follow the requirements
2	Improve regulatory cover	AERB	SSDMA LR&DMD, DDMA, Home Dept.,	<u>Recurring/Regular (RR)</u> • To enforce compliance
3	Public Private Partnerships	NDMA, DAE, MCA, MCF, MOCI, MPFI, MHIPE, MFIN	SSDMA LR&DMD, DDMA	<u>Recurring/Regular (RR)</u> • Promote private participation in disaster management facilities
4	Risk Transfer	MFIN, NDMA, MHA, MAFW	SSDMA, LR&DMD, Finance Dept., Home Dept..	<u>Recurring/Regular(RR)</u> • Implementation of Risk Transfer Arrangements including multi – hazard insurance for life and property <u>Short Term(T1)</u> • Policy Framework
Investing in DRR – Non – Structural Measures				
	Sub- Thematic Area for DRR	Centre Agencies	State Agencies	State Responsibilities
1	Training	MHA, DAE, NDRF, CAPF, MYAS	SSDMA LR&DMD, DDMA, Home Dept., NDRF, SDRF	<u>Recurring/Regular (RR)</u> • Training of state police, HG&CD, community and volunteers
		MHA, DAE, MHFW, NDMA, MYAS	SSDMA LR&DMD, DDMA, Home Dept.,	<u>Recurring/Regular (RR)</u> • To follow and comply
2	Curriculum Development	MHRD, DAE	SSDMA LR&DMD, DDMA, Home Dept.,	<u>Short Term (T1)</u> • To follow the same

3	Awareness	DAE, NDMA, NDRF, CAPF, NIDM	SSDMA LR&DMD, DDMA, Sikkim Police, PRIs, ULBs, IPR.	<u>Recurring/ Regular (RR)</u> • Carry out mass media campaigns • Promote culture of disaster risk prevention, mitigation, and better risk management • Promote attitude and behaviour change in the awareness campaigns/ IEC • Promote use of insurance/risk transfer • Promote Community Radio • Strengthening network of civil society organizations for awareness generation about DRR and DM • Information on safety, care and protection of disaster-affected animals
4	Mock Drills/Exercises	DAE, NDMA, NDRF, All Government Ministries/Agencies, Armed Forces, CAPE	SSDMA LR&DMD, DDMA, Home Dept., Sikkim Police, SDRF, NDRF, and other relevant dept.	<u>Recurring/Regular (RR)</u> • Joint planning and execution of emergency drills
5	Developing Capability for response	MHA, NCMC, DAE, MOD, AERB		<u>Short Term (T1)</u> • Develop State and District plans
		MHA, MOD, DAE	SSDMA LR&DMD, DDMA, Sikkim Police.	<u>Short Term (T1)</u> • Follow the MHA, DAE guidelines Acquire detection capabilities
		Ministries/ Departments	SSDMA LR&DMD, DDMA, Home Dept.,	<u>Short Term (T1)</u> • Prepare own plans in line with the national plan
6	Prepare comprehensive plan on medical	MOH&FW, DAE, MOD	SSDMA LR&DMD, DDMA,	<u>Short Term (T1)</u> • To follow and ensure compliance

	management		H&FW Dept.	<u>Medium Term (T2)</u> • To establish tertiary care hospitals for treatment of radiation injuries • Establish primary and secondary care hospitals of adequate capacity at selected cities.
7	Preparedness	DAE, NDRF, CAPF, MOH&FW	SSDMA LR&DMD, DDMA	<u>Short Term (T1)</u> • To equip the health and police department appropriately

5.2.7 **BIOLOGICAL & PUBLIC HEALTH EMERGENCIES (BPHE)**

Biological & Public Health Emergencies (BPHE)				
	Sub-Thematic Area for DRR	**State Agencies & their Responsibilities**		
		Central Agencies	**State Agencies**	**Responsibility**
1	Observation Networks, Information Systems, Monitoring, Research, Forecasting, Early Warning and Zoning/ Mapping	MHFW (NCDC), MAFW, MHA, MOD, MOES, MOEFCC, MOR, MLBE, MEITY, NDMA	SSDMA LR&DMD, DDMA, H&FW Dept., RDD, UDD, PHE Dept. and other relevant dept.	**Recurring/ Regular (RR)** • Maintaining preventive measures as per norms. **Short Term (T1)** • Strengthening integrated health surveillance systems. **Medium Term (T2)** • Establishing and maintaining community-based network for sharing alerts. • Strengthening Integrated Disease surveillance programmes (IDSP). **Long Term (T3)** • States should, modify or adapt IMD's warning system according to thresholds applicable in each state.
2	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	MHFW, MAFW, MHA, MOD, MOES, MOEFCC, MSJE, NDMA	SSDMA, LR&DM Dept., DDMA, H&FW Dept., RDD, UDD, PHE. Dept., Sikkim Police and other relevant dept.	**Recurring/ Regular (RR)** • Updating HRVCA • Identifying the vulnerable population/ communities/ settlements. • Identification of groups requiring special attention. • Conduct audit of equipment and human resource requirements. **Short Term (T1)** • Constitute/ strengthen the mechanisms for consultation with experts and stakeholders.
3	Dissemination of warnings, data &	MHFW, MHA, MOD, MOES, MAFW,	SSDMA LR&DMD, DDMA, H&FW Dept., RDD, UDD, Sikkim Police, PRIs, ULBs, SJ&E Dept., IPR.	**Short Term(T1)** • Create awareness preventive measures.

	information	MOEFCC, NDMA		• Extensive IEC campaigns to create awareness through print, electronic and social media. **Medium Term (T2)** • Specific messages for highly vulnerable groups such as elderly, young children, outdoor workers and slum residents.
4	Disaster Data Collection and Management	MHA, MOSPI all ministries/ depts.	SSDMA, LR&DMD, DDMA, H&FW Dept., RDD, PHE Dept., Sikkim Police.	**Recurring/ Regular** • Systematic data management of data on disaster damage and loss assessments **Short Term (T1)** • Disaster Damage and Losses 2005- 2015 baseline.
Inter-Agency Coordination				
1	Overall disaster governance	MHFW, MHA, MOD, MOES, MAFW, MOEFCC, MOR, MLBE, NDMA	SSDMA, LR&DMD, DDMA, H&FW Dept. PHE Dept., Sikkim Police. RDD and other relevant department.	**Short Term (T1)** • Implementation as per specific conditions in the State. • Team mobilization and coordination- officials and agencies. • Involving local administration. **Medium Term (T2)** • Coordinate with the states IMD office regarding forecasts, early warning and alert system based on colour codes corresponding to different thresholds. • Develop a clearly defined interagency emergency response plan with roles and information flows clearly marked out.

				Long Term (T3) • Partnering local institutions with national institutions/experts.
2	Preparation and Response	MHFW, MHA, MOD, MAFW, MOEFCC, MLBE	SSDMA, LR&DMD, DDMA, H&FW, Home Dept. Sikkim Police.	**Short term (T)** • Rapid health assessment and provision of laboratory support. • Institution of public health measures to deal with secondary emergencies as an outcome of biological emergencies.
3	Warnings, Information, Data	MHFW, MHA, MOD, MOES, MAFW, MOEFCC, MOR, MLBE, NDMA	SSDMA, LR&DMD, DDMA, H&FW, RMDD, UDD, SJ&WD, Sikkim Police, PRIs, ULBs.	**Short Term (T1)** • Follow the alerts/ warnings • "Do's and Don'ts", should be available in local languages and widely disseminated. • Dissemination of warnings to all. Down to the last mile-remote, rural and urban. • Regular updates to people at risk. **Medium Term (T2)** • Collecting Data/information necessary for review/ update of the plan.
	Investing in DRR- Structural Measures			
1	Strengthening Response	MHFW, MHA, MOD, MOES, MAFW, MOEFCC, NDMA	SSDMA, LR&DMD, DDMA, H&FW Dept., NIC, Tele Communication. Dept.	**Short Term (T1)** • Establishing adequate decontamination systems, critical care Intensive Care Units (ICUs) and isolation wards with pressure control. • Adequate Personal Protective Equipment (PPE) for all the health workers associated with biological emergencies. **Medium Term (T2)** • Strengthening/ mainstreaming the network

				medical assistance. • Equipping Medical First Responders (MFRs) with all material logistics and backup support. **Long Term (T3)** • Up gradation of earmarked hospitals to cope with Chemical, Biological, Radiological and Nuclear (CBRN) emergencies. • Communication and networking system with appropriate intra-hospital and inter linkages with state ambulance/transport services, state police departments and other emergency services. • Mobile tele-health services and Mobile hospitals.
2	Upgrading Medical hospitals	MHW, MHA, MOD	SSDMA, LR&DMD, DDMA, H&FW Dept.	**Medium Term (T2)** • Specialised health care and laboratory facilities to address biological emergencies/ incidents. **Long Term (T3)** • Establishing and strengthening quarantine facilities. • Creating at least one public health laboratory in each district.
Investing in DRR- Non-Structural Measures				
1	Techno –Legal regimes	MHFW, MHA, MOD, MOES, MAFW, MOEFCC	SSDMA, LR&DMD, DDMA and other relevant agencies.	**Recurring/ Regular (RR)** • Strengthen institutional arrangements. **Medium Term (T2)** • Enact/ amend any Act, Rule or Regulation if necessary for better implementation of BPHE programmes.

2	Bio-safety and Bio-security Measures and Environmental Management	NDMA, MFIN, MHA, MAFW	SSDMA, DDMA, H&FW Dept., Forest & Environment Dept. PRIs, ULBs.	**Recurring/ Regular (RR)** • Strict compliance with bio-safety and bio-security provisions. • Environmental monitoring to prevent outbreaks.
3	Risk Transfer	NDMA, MHA, MFIN, MAFW	SSDMA, LRDMD, DDMA, FD.	**Recurring/ Regular (RR)** • Implementation of Risk Transfer Arrangements including multi-hazard insurance for life and property. **Short Term (T1)** • Policy Framework
Capacity Development				
1	Human Resource Development & Training	MHFW, MHA, NDRF, MOD, AYUSH, MOES, MAFW, MOEFCC, NIDM, MYAS	SSDMA, LR&DMD, DDMA, H&FW Dept.	**Recurring/ Regular (RR)** • Training support for Civil Defence, community and volunteers. **Medium Term (T2)** • Training for surveillance • Training for deployment of Rapid Medical Response Teams. • Training for All Health and allied healthcare professions, doctors and practitioners, community health workers, ASHA and Anganwadi workers. **Long Term (T3)** • Organising community awareness programmes for first aid and general triage.
2	Knowledge Management & Curriculum Development	MHFW, MOD, MOES, MAFW, MOEFCC, MHRD, NIDM	SSDMA, LR&DMD, DDMA, H&FW Dept, IPR, PRIs, ULBs, Sikkim Police.	**Recurring/ Regular (RR)** • Incorporating basic knowledge of Public Health Emergencies management through the educational curricula. • Proper education and training of personnel.

				• Conduct continuing medical education programmes and workshops at regular intervals. • Defining the role of public, private and corporate sector for their active participation and their sensitisation.
3	Awareness Generation	NDMA, NIDM, MHFW, MOES, MAFW, MOEFCC, MLBE, MOIB	SSDMA, LR&DMD, DDMA, H&FW Dept., IPR, Sikkim Police, PRIs, ULBs,	**Recurring/ Regular (RR)** • Promoting awareness, alertness and preparedness. • Training programs for public, PRIs/ULBs • Community awareness programme for first aid. • Dos and Don'ts to mitigate the effects of medical emergencies caused by biological agents. • Awareness about the importance of persona; hygiene • With due consideration to the social ethnic and religious issues involved, utmost care is exercised in the disposal of dead bodies.
4	Mock Drills/ Exercises/ CBDM	MHA, MHFW, MOD, MAFW, MOEFCC, MOR, NDMA, NDRF	SSDMA, LR&DMD, DDMA, H&FW Dept., Sikkim Police, NDRF, SDRF, Civil Defence.	**Recurring/ Regular (RR)** • Defining the role of the community as part of the disaster management. • Testing of various elements of the hospital emergency preparedness through table top exercises and mock drills. • Identify and resolve communication gaps between participating departments, partners and the public. • Joint execution of emergency drills with local bodies.
5	Hospital Preparedness	MHFW, MHA, MOD, MLBE	SSDMA, LR&DMD, DDMA, H&FW	**Recurring/ Regular(RR)** • Preparation of DMP by the

			Dept.	hospitals including those in the private sector. **Medium Term (T2)** • Developing a mechanism to augment surge capacities to respond to any mass casualty event following a biological emergency. **Long Term (T3)** • Specialised health care and laboratory facilities.
6	Applied research	MHFW, MOD, MOES, MAFW, MOEFCC, MOST	SSDMA, LR&DMD, DDMA, H&FW Dept., Sikkim Police.	**Long Term (T3)** • Strengthening of scientific and technical institutions for knowledge management and applied research and training in management of CBRN emergencies.
7	Empowering women, marginalised communities, SC/ST, and persons with disabilities	MHFW, MHA, NIDM, NDMA	SSDMA, LR&DMD, DDMA, H&FW Dept.	**Recurring/Regular (RR)** • Incorporating gender sensitive and equitable approaches in capacity development for coping with Public Health emergencies.
Climate Change Risk Management				
1	Research Forecasting, Early Warning, Data Management, Zoning Mapping	MHFW, MOES, MOEFCC, MOES, NDMA, NLRTI	SSDMA, LR&DMD, DDMA, H&FW Dept.	**Recurring/ Regular (RR)** • Support and cooperate with central agencies • Sponsor and support state specific and local efforts
2	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	MHFW, MOES, MAFW, MOEFCC, NDMA, MSJE, NLRTI	SSDMA, LR&DMD, DDMA, H&FW Dept., Home Dept.	**Recurring/ Regular(RR)** • Undertake HRVCA as part of preparing and periodic revision of DM plans. **Medium Term (T2)** • Assess GACC risks of vulnerable and marginalised sections.

3	Climate Change Adaptation (CCA)	MHFW, MOES, MOJS, MOEFCC, MAFW	SSDMA, LR&DMD, DDMA, H&FW Dept.,	**Recurring/ Regular** • Sensitisation and awareness creation. • Support national CCA efforts • Coordination with central agencies. • Sponsor and promote state specific efforts and local efforts for GACC mitigation and adaptation. **Short Term (T1)** • Develop local and adaptation strategies and pilot projects. **Medium Term (T2)** • Sponsor and promote state specific efforts and local efforts. **Long Term (T3)** • Implementation of GACC adaptation programs • Promote appropriate combinations of Green and Blue infrastructure approach. • Integrate adaptive measures in social protection programmes for the vulnerable groups.

5.2.8. **CLOUDBRUST AND HAILSTORM**

Cloudburst and Hailstorm				
	Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Central	**State**	**Responsibility**
1	Understand-ing Risk	MOES, MAFW, MOEFCC, MOST, DOS, NLRTI	SSDMA, LR&DMD, DDMA, H&FW Dept., RDD, UDD.	**<u>Recurring/Regular(RR)</u>** Compile and maintain data on events like cloud bursts and hailstorms-location, event information, impacts, etc. **<u>Short Term (T1)</u>** • Identify settlements located on sites prone to landslides/unstable slope • Prepare list of settlements and households facing very high risk • Mapping landslide-prone areas and identifications of unsafe sites for human settlements • Compiling the baseline data of 2005-2015 **<u>Medium Term (T2)</u>** • Landslide Hazard Zonation (LHZ) using different kinds of spatial data (aerial photographs, satellite imagery) employing the technological improvements in remote sensing that greatly improve the mapping accuracy • Amalgamation of local/indigenous knowledge of landslide-prone areas and technical expertise to prevent and mitigate landslides • Inventory of areas that experienced hailstorm episodes and related losses, especially crop losses
2	Inter-Agency Coordination	MOES, MAFW, MOEFCC	SDMA, LR&DMD, DDMA, RDD, Sikkim Police,	**<u>Recurring/ Regular (RR)</u>** • Preparation and implementation of DM plans and ensure the functioning

			SDRF, NDRF.	of agencies with DM tasks • All aspects of disaster risk management and mainstreaming DRR • Ensuring coherence and mutual reinforcement of DRR, CCA and development • Organising and coordinating the immediate response • Coordinate with central agencies • Coordinating the dissemination of warnings to all, down to the last mile-remote, rural or urban; Regular updates to people in areas at risk • Coordination among state agencies for ensuring updated norm/codes and their implementation, enforcement and monitoring
3	Investing in DRR-Structural Measures	MHUA, MORD	SDMA, LR&DMD, DDMA, RDD, UDD, F& E Dept. R&B, Water Resource Dept.	**Recurring/ Regular (RR)** Undertake slope stabilization measures on a regular basis **Short Term (T1)** Integrated approach to slope stabilization combining bio engineering (plants, trees) and mechanical structures for slope stabilization **Medium Term (T2)** • Develop additional drainage for quick and safe flow of storm water • Repair and maintain natural drainage systems, rivulets, etc. to ensure unhindered flow of storm water
4	Investing in DRR-Non-Structural Measures	MHA, MOES, MOEFCC, MOST	SDMA, LR&DMD, DDMA, PRIs, ULBs, and all state	**Recurring/ Repair (RR)** Implementation of risk transfer arrangements including multi-hazard insurance for life and property

			departments,	**Short Term(T1)** • Review of existing regulations and amending them in accordance with safer building • Amend town and city plans to reduce risks • Risk Transfer Policy Framework **Medium Term (T2)** Apply concept of multi-level safe to settlements and the expansion of towns/cities-prevention, spatial planning, organization and emergency management
5	Capacity Development	MAFW, MOES, MOEFCC, DOS, MSJE, MWCD, NIDM, NDRF	SDMA, LR&DMD, DDMA, F&E Dept, AH&VS, RDD, UDD, Agriculture Dept., Horticulture Dept.	**Recurring/Regular (RR)** • Enhancing capabilities of ULB/PRI to prepare and cope with events like cloudbursts and hailstorms • Basic training on coping up with hailstorm for CDEF, community and volunteer • Training on various aspects of coping with cloudbursts, hailstorms, search and rescue • Training on post-hailstorm management in agriculture • Basic training on coping with cloudburst and hailstorm • Training on various aspects of coping with cloudburst, hailstorms, search and rescue • Promoting culture of awareness, alertness and preparedness • Awareness generation programs for public, utilities, ULBs, PRIs and industries • IEC materials and ensure wider disseminate to general public through

				all medium • Information on safety, care and protection of disaster-affected animals • Promote use of insurance/risk transfer
6	Climate Change Risk Management	MOES, MAFW, MOEFCC, NLRTI	SDMA, LR&DMD, DDMA, F&E Dept. Water Resource Dept., RDD, Agriculture Dept., Horticulture Dept.	**<u>Recurring/ Regular (RR)</u>** • Support and cooperate with central agencies • Sponsor state-specific efforts; support local efforts • Sensitisation and awareness creation • Support national CCA efforts • Coordination with central agencies • Sponsor and promote state-specific efforts and local efforts for GACC mitigation and adaptation **<u>Short Term (T1)</u>** Develop local adaptation strategies and pilot projects **<u>Medium-Term (T2)</u>** • Sponsor and promote state-specific efforts and local efforts • Implementation of GACC adaptation programs • Integrated adaptive measures in social protection programmes for the vulnerable groups

5.2.**9 CHEMICAL (INDUSTRIAL) DISASTER**

Chemical(Industrial)Disasters				
	Sub-Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibility**
1	Information Systems, Monitoring, Research	MOEFCC, MCF, MCOA, MPFI, MHIPE, MLBE,MMSME, MOM, MNRE, MPNG, MOP, MSTL, MTEX, MLBE, MOR	SDMA, LR&DMD, DDMA, Mines & Geology Dept., C&I Dept., DST, F&E Dept.	**Recurring/ Regular (RR)** • Support and coordination
2	Zoning/Mapping	MOEFCC, MCF, MCOAL,MOCI, MPFI, MHIPE, MLBE,MMSME, MOM, MNRE, MPNG, MOP, MSTL, MTEX, MLBE, DOS	SDMA, LR&DMD, DDMA, C &I Dept., F&E Dept., DST.	**Medium Term(T2)** • Industrial zones on basis of hazard potential and effective disaster management for worst case scenario for MAH Units • Separate zoning for sitting of MAH units • Carry out the mapping and related studies in collaboration with central agencies/ technical organizations
3	Monitoring	MOEFCC, MCF, MCOAL, MOCI, MPFI, MHIPE,MLBE, MMSME, MOM, MNRE, MPNG, MOP, MSTL, MTEX	SDMA, DDMA, C&I, SPCB, DST.	**Recurring/ Regular (RR)** • Monitoring compliance with safety norms for HAZCHEM and proper disposal of hazardous waste
4	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	MOEFCC, MCF, MCOAL, MOCI, MPFI, MHIPE,MLBE, MMSME, MOM, MNRE, MPNG, MOP, MSTL, MTEX, MOST, NIDM, NDMA	SDMA, LR&DMD, DDMA, C&I Dept., DST, F&E Dept.	**Recurring/ Regular (RR)** • Undertake HRVCA as part of preparing and periodic revision of DM plans **Short Term (T1)** • Constitute/strengthen the mechanisms for consultation with experts and stakeholders

5	Disaster Data Collection and Management	MHA, MOSPI, All Ministries/Depts.	SDMA, LR&DMD, DDMA, C &I Dept., DST.	**Recurring/ Regular (RR)** • Systematic data management of data on disaster damages and loss assessments **Short Term (T1)** • Disaster Damage and Losses 2005-2015 baseline
Inter-Agency Coordination				
	Sub-Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibility**
1	Over all disaster governance	MOEFCC, MCA	SDMA, LR&DMD, C&I, SPCB, DST, F&E Dept.	**Recurring/ Regular (RR)** • Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks • All aspects of disaster risk management and mainstreaming DRR
2	Response	MOEFCC, MCF, MCOAL, MOCI, MCA, MPFI, MHIPE, MLBE, MMSME, MOM, MNRE, MPNG, MOP, MOR,MSTL, MTEX	SDMA, LR&DMD, DDMA, Sikkim Police, NDRF, SDRF.	**Recurring/ Regular (RR)** • Organising and coordinating the immediate response • Coordinate with central agencies
3	Warnings, Information, Data Dissemination	MOEFCC, NDMA, MCA	SDMA, LR&DMD, DDMA, IPR, Sikkim Police.	**Recurring/ Regular (RR)** • Coordinating the dissemination of warnings to all, down to the last mile remote, rural or urban; regular updates to people in areas at risk
4	Non-structural measures	MOEFCC, MCF, MHA,MCOA	SDMA, LR&DMD, DDMA,	**Recurring/ Regular (RR)** • Coordinating among state agencies

		L, MOCI, MPFI, MHIPE,MLBE, MMSME, MOM, MNRE, MPNG, MOP, MSTL, MTEX,	DST.	for ensuring updated norms/ codes and their implementation, enforcement and monitoring

Investing in DRR-structural Measures

	Sub-Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Central	**State**	**Responsibility**
1	• Shelters, evacuation, and support facilities • Multiple routes for reliable access and escape • Decontamination facilities	MOEFCC, NLRTI, NDMA	SDMA, LR&DMD, DDMA, F&ES., PHE Dept., RDD.	**Short Term (T1)** • Identification of shelters with basic facilities like drinking water and first aid for chemical exposure • Ensuring water storage facilities and sources for water for accident containment and fire fighting operations **Medium Term (T2)** • Providing wide roads and multiple routes in the industrial area to allow quick access by first responders and to ensure escape pathways • Establish decontamination facilities off site emergency of MAH units

Investing in DRR- Non Structural Measures

	Sub-Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Central	**State**	**Responsibility**
1	• Laws Regulations, Techno-Legal regimes • Enforcement, Compliance	MOEFCC, MCF,,MCOAL, MOCI, MPFI, MHIPE,MLBE, MMSME, MOM,	SDMA, LR&DMD, DDMA, SPCB, F&E Dept., C&I Dept.	**Medium Term (T2)** • Formulate/ strengthen rules, norms, and laws such as factories rules consistent with that of ensuring greater safety in hazardous industries and to reduce likelihood of disasters

	and Monitoring • Institutional Arrangements	MNRE, MPNG, MOP, MOR,MSTL, MTEX,		• Review land use norms for the sitting of hazardous industries • Empower factory inspectorates to take legal actions for non compliance of MSIHC Rules • Review rules to grant compensation to chemical accident victims to improve them in favour of victims • Amend land use norms to ensure greater safety and to ensure buffer zones without human settlements in close proximity of hazardous industries • Strengthen the conduct of safety audits and enforcement of disaster prevention norms
2	Public Private Partnerships	MCA. MOEFCC, NDMA, MCF, MOCI, MPFI, MHIPE, MFIN, Private sector	SDMA, LR&DMD, DDMA, C&I Dept.	**Medium Term (T2)** • Promote private participation in off-site disaster management facilities • Provide legal support for Mutual Assistance Groups among industries within clusters • Encourage private participation in enhancing off-site disaster response and risk Management
3	Risk Transfer	MFIN, NDMA, MHA, MAFW	SDMA , DDMA, LR&DM Dept., FR&E Dept.	**Recurring/ regular (RR)** Implementation of Risk transfer Arrangements including multi-hazard insurance for life and property **Short Term (T1)** Policy Framework

Capacity Development

	Sub-Thematic Area for DRR	State Agencies and their Responsibilities		
		Central	State	Responsibility
1	Training	MOEFCC, MCF,,MCOAL, MOCI, MPFI, MHIPE,MLB	SDMA , DDMA, LR&DMD, SDRF, C&I Dept., SPCB,	**Recurring/ Regular (RR)** • Training and orientation programs for state govt. staff, and other stakeholders such as CDEF, community, and

		E, MMSME, MOM, MNRE, MPNG, MOP, MOR,MSTL, MTEX,	Mines & Geology Dept., other relevant Dept.	volunteer • Training programs of youth such as NSS, NYS, Scouts and Guides and NSS in DRR **Short Term(T1)** • Incorporating disaster response, search and rescue in the training programs of youth such as village volunteers, civil society, village/ward level leaders
2	Curriculum Development	MHRD, AICTE, IITs, UGC, NIDM MHFW, NLRTI Central Boards of Education	SDMA, LR&DMD, DDMA, SPCB, DST, Mines & Geology Dept.	**Recurring/Regular (RR)** Add more specializations and electives on HAZCHEM and chemical disaster management **Short Term (T1)** • Implement the recommendation of reviews in all educational institutions in the state/UT • Introducing basic DM concepts and precautions related to HAZCHEM
3	Awareness Generation	MOECC, NDMA, NDRF, CAPF, NIDM, MLNE, MCF, MCOAL, MOCi, MCA, MPFI, MHIPE, MLBE, MMSME, MOM, MNRE, MPNG, MOP, MOR, MSTL, MTEX	SDMA , LR&DMD, DDMA, IPR, SDRF, F&ES, Sikkim Police, PRIs, ULBs, Civil Defence.	**Short Term (T1)** • Carry out mass media campaigns • Promote culture of disaster risk prevention, mitigation and better risk management **Medium Term (T2)** • Promote attitude and behaviour change in the awareness campaigns/ IEC • Promote use of insurance / risk transfer • Strengthening network of civil society organizations for awareness generation about DRR and DM • Focus on safety and compliance with SOP at workplace for workers • Information on safety, care and protection of disaster –affected animals

4	Mock Drills/ Exercise	MOEFCC, NDMA, NDRF, Armed Forces, CAPF, MCF, MCOAL, MOCI, MCA, MPFI, MHIPE, MLBE, MMSME, MOM, MNRE, MPNG, MOP, MOR, MSTL, MTEX	SDMA , LR&DMD, DDMA, C&I Dept., SDRF, F&ES, CDEF, Sikkim Police, PRIs, ULBs, SPCB, DST, Mines & Geology Dept.	**Recurring/ Regular (RR)** Joint planning and execution of emergency drills
5	Empowering women, marginalized and persons with disabilities	MSJE, NDMA, NIDM	SDMA , LR&DMD, DDMA, SJ&W Dept.,	**Recurring/ Regular (RR)** • Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of disaster management at the State, Districts and Local Levels
6	Community – based Disaster Management	MOEFCC, NDMA, NIDM, MORD, MHUA	SDMA, LR&DMD, DDMA, PRIs, ULBs.	**Recurring / Regular (RR)** • Strengthen ability of communities to manage and cope with disasters based on a multi hazards approach • Training for PRIs, SHG, NCC, NSS, Youth, Local Community Organization.

5.2.10. **FIRE HAZARDS**

FIRE HAZARDS				
	Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Central	**State**	**Responsibility- Sate**
1	Understanding Risk	MHA, MHUA, MOEFC, Other Relevant Ministries/ Department	SDMA, LR&DMD, DDMA, F&ES, NDRF, SDRF, Sikkim Police.	**Recurring/ Regular (RR)** • Systematic data management of data on disaster damage and loss assessments. **Short Term (T1)** • Applying the classification system for hazardous industries in rural and urban areas based on norms laid down by the SFAC for fire services • Vulnerability analysis of densely population clusters prone to high risk offices • Disaster Damage and losses 2005-2015 baseline **Medium Term (T2)** • Mapping of hazardous sites that pose fire and explosion risks. • Assess and fix the requirement of equipment and manpower • Identify areas prone to forest fires and take preventive measures.
2	Inter Agency Coordination	MHA, MHUA, NDRF	SDMA, LR&DMD, DDMA, F&ES, Home Dept. Sikkim Police.	**Recurring/ Regular (RR)** • Preparation and implementation of fire safety and prevention plans in all built environment • Ensure the functioning of agencies to ensure proper compliance of fire safety norms.
3	Investing in DRR – Structural Measures	MHA, MHUA, NLRTI	SDMA, LR&DMD, DDMA, F&ES, Home Dept.	**Medium Term (T2)** •Identify the gaps in existing capabilities- equipments and infrastructure •Address gaps in infrastructure and equipment needs upgrade equipments including personal protective equipments

				• Action plan for modernization and meeting future needs • Strengthening and standardizing response mechanisms **<u>Long Terms(T3)</u>** • Procurement of equipment for fire fighting, urban search and rescue as per the requirement • Establish fire station/ post up the sub-divisional level to the block level • Enhance the multi hazard response capabilities considering local hazards and vulnerabilities
4	Investing in DRR – Non Structural Measures	MHA, MHUA, Other relevant Ministries/ Departments	SDMA, LR&DMD, DDMA, F&ES, Home Dept.	**<u>Recurring/ Regular (RR)</u>** • Strict implementation and strengthening of fire safety rules • Strict procedures for fire safety certification should be followed before issuing building use permissions • Ensure frequent inspection for fire safety system and equipment in public utilities • Implementation of Risk Transfer Arrangements including multi hazard insurance for life and property **<u>Short Term (T1)</u>** • Enactment of Fire Act and other legal measures as per recommendations of SFAC and other official bodies • Promotion of building codes as per NBC 20-16, especially parts elating to fire and life safety and other relevant sections • Institutional reform and major changes in organizational setup • Legal regime for mandatory fire clearance from F&ES for different types of buildings, colonies, industries and other installations • Risk Transfer Policy Framework

5	Capacity Development	MHA, NDMA, NIDM, NDRF, Other Relevant Ministries/ Department	SDMA, LR&DMD, DDMA, NDRF, SDRF, F&ES.	**Recurring/ Regular (RR)** • Advanced training on disaster management CDEF, community and volunteers • Promoting culture of awareness, alertness and preparedness • Awareness generation programs for public, utilities, ULBs, Panchayati Raj and industries • IEC materials and ensure wider disseminate to general public through all medium • Information on safety, care and protection of disaster affected animals • TOT programs on various aspects such as fire fighting, managing collapsed structure and search and rescue **Medium Term (T2)** • Address the capacity gaps-human and institutional • Strengthening and standardizing response mechanisms.

5.2.11. **FOREST FIRE HAZARDS**

FOREST FIRE HAZARD				
Understanding Risk				
	Sub- Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibility- State**
1	Observation Networks, Information Systems Monitoring, Research, Forecasting, Early Warning and zoning/ Mapping	MOEFC, MOES, DOS, MHA, MOD, MEITY	SDMA, LR&DMD, DDMA, Forest & Environment Dept., Sikkim Police.	**Recurring/ Regular (RR)** • Maintaining preventive measures as per norms. **Short Term (T1)** • Mapping of human settlements in fire-prone areas • Monitoring fire-prone forest areas. • Identify areas prone to forest fires and monitor them closely in the months when fire usually occur **Medium Term (T2)** • Establish and maintain community based networks for early detection and reporting to the nearest authorities • Promoting community based forest monitoring system **Long Term (T3)** • Establishing and maintain arrangements to communicate effectively with people living with in and near forests • Establish and maintain a system of mutual aid among nearby fire services and forest offices for sharing/ pooling of resources
2	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	MOEFC, MOES, MSJE, NDMA, NIDM	SDMA, LR&DMD, DDMA, Forest & Environment Dept.	**Recurring/ Regular (RR)** • Updating HRVCA • Identification and listing of population clusters prone to forest fire risk • Identification of population clusters with in forests requiring urgent attention • Conduct audit of equipment and man power requirements

				Short Term (T1) • Constitute / strengthen the mechanisms for consultation with experts and stakeholders
3	Dissemination of warning data and information	MOEFCC, MOES, NDMA, NIDM	SDMA, LR&DMD, DDMA, Forest & Environment Dept., Sikkim Police, IPR.	**Short Term (T1)** • Create awareness for forest fire prevention as most fires are caused by humans, deliberately or inadvertently **Medium Term (T2)** • Establishing reliable system to pass on the correct information on fire situation to communities and responders
4	Disaster Data Collection and Management	MHA, MOSPI, all ministries/ department	SDMA, LR&DMD, DDMA, Forest & Environment Dept.	**Recurring/ Regular (RR)** • Systematic data management of data on disaster damage and loss assessments **Short Term (T1)** • Disaster Damage and Losses 2005-2015 baseline

Inter Agency Co-ordination

	Sub- **Area for DRR**	**State Agencies and their responsibilities**		
		Centre	**State**	**Responsibilities – State**
1	Overall disaster governance (Forests are in the concurrent list)	MOEFCC, MHA, NDMA, MOES, MOD, DOS, MORD, MHUA	SDMA, LR&DMD, DDMA, Forest & Environment Dept.,	**Recurring/ Regular (RR)** • Preparation and implementation of DM plans and ensure the functioning of agencies with DM tasks • All aspects of disaster risk management and mainstreaming DRR • Ensuring coherence and mutual reinforcement of DRR, CCA and development
2	Response	MOEFCC, MHA, MOD, NDMA	SDMA, LR&DMD, DDMA, Forest &	**Recurring/ Regular (RR)** • Organising and coordinating the immediate response

			Environment Dept., Sikkim Police, Fire & Energy Dept.	• Coordinate with central agencies
3	Warnings, Information, Data	MOEFCC, MOES, DOS, NDMA, NIDM, MORD,MHUA	SDMA, LR&DMD, DDMA, Forest & Environment Dept., Sikkim Police.	**Recurring/ Regular (RR)** • Coordinating the dissemination of warnings to all, down to last mile- remote, rural or urban • Regular updates to people in areas at risk
Investing in DRR- Structural Measures				
	Sub Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibilities – State**
1	Strengthening forest fire fighting systems	MOEFCC, MORD, MHUA	SDMA, LR&DMD, DDMA, F&ES PRIs, ULBs.	**Recurring/ Regular (RR)** • Strengthening various forest fire prevention measures • Communication network of wireless system • Effective transportation • Specialised equipment to fight forest fires • Improved fire resistant clothing • Strengthening the network of watch towers • Expanding fire detecting systems
2	Social Housing Schemes	MORD, MHUA	SDMA, LR&DMD, DDMA, F&ES.	**Recurring/ Regular (RR)** • Ensure incorporation of fire and multi hazard resistant features in the planning and execution of social housing, schemes in the settlements within and adjacent to forest.
3	Hazard resistant construction, strengthening and retrofitting of all lifeline structures and critical infrastructure near forest area and in forest villages	MOEFCC, MORD, MHUA, NDMA	SDMA, LR&DMD, DDMA, Forest & Environment Dept.	**Recurring/ Regular (RR)** • Collaboration with technical agencies and implementation

Investing in DRR- Non Structural Measures				
	Sub- Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibility – State**
1	Techno- legal regimes	MOEFCC, MORD, MHUA	SDMA, LR&DMD, DDMA, F&ES Sikkim Police.	**Recurring / Regular (RR)** • Strengthen the laws and regulations for forest fire prevention and control • Improve the institutional arrangements for forest fire prevention and control • Promote use of insurance/ risk transfer
2	Risk Transfer	MFIN, NDMA, MHA , MAFW	SSDMA, LR&DMD, Finance Dept., Forest & Environment Dept.	**Recurring/ Regular (RR)** • Implementation of Risk Transfer Arrangements including multi – hazard insurance for life and property **Short Term (T1)** • Policy Framework
Capacity Development				
	Sub- Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibility – State**
1	Training	MOEFCC, MHA, NDRF, NDMA, MOES, MOD, DOS, MORD, MHUA, NIDM, MYAS	SDMA, LR&DMD, DDMA, F&ES	**Recurring/ Regular (RR)** • Training and orientation programs for state govt. staff and other stakeholders such as; CDEF, civil society, volunteers elected representatives **Short Term (T1)** • Incorporating prevention and management of forest fires in the training programs of village volunteers
2	Curriculum Development	MOEFCC, MHRD, NIDM, NLRTI	Forest & Environment Dept.,	**Short Term (T1)** • Update curriculum relating to forestry management courses and training programmes to include topics relevant to forest fire prevention and control
3	Awareness Generation	MOEFCC, NDMA, NDRF,	F&E Dept., PRIs, ULBs,	

		CAPF, NIDM	IPR.	
4	Mock Drills/ Exercise	MOEFCC, NDRF, CAPF, NDMA	SDMA, LR&DMD, DDMA , F&E Dept.	**Recurring/ Regular (RR)** • Involving forest communities/ forest village committees. • Joint execution of emergency drills with local bodies – urban and rural in areas prone to forest fires
5	Vocational Training/ Skill development	MOEFCC, MSDE, MMSME, NDMA, NIDM	SDMA, LR&DMD, DDMA	**Recurring/ Regular (RR)** • Conduct training programmes • Creating ToT teams for different trades relevant to fire resistant construction in forest fire prone areas for different types of housing and infrastructure
6	Empowering women, marginalised communities and person with disabilities	MWCD, MOEFCC, NDMA, NIDM	SDMA, DDMA, SJ&W Dept., F&E Dept.,	**Recurring / Regular (RR)** Incorporating gender sensitive and equitable approaches in capacity development covering all aspects of disaster management at the state, district and local levels
Climate Change Risk Management				
	Sub Thematic Area for DRR	**State Agencies and their Responsibilities**		
		Centre	**State**	**Responsibilities - State**
1	Research, Forecasting, Early Warning, Data Management, Zoning, mapping	MOEFCC, FSI, MOES, DOS, MHA, MOD, NLRTI	F&EW Dept. LR&DMD, SDMA	**Recurring/ Regular (RR)** • Support and cooperate with central agencies • Sponsor state –specific efforts • Support local efforts
2	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	MOEFCC, MOEs, MHA, MOD, MAFW, NDMA, MSJE, MHFW, NLRTI	SDMA, DDMA, LR&DMD , F&E Dept.	**Recurring/ Regular (RR)** Incorporate GACC information in DM Plans / reviews **Medium Term (T2)** Assess GACC risks of vulnerable and marginalised sections
3	Climate Change Adaptation (CCA)	MOEFCC, MOES, MHFW, MOJS	SDMA, LR&DMD, DDMA, F&E Dept.,	**Recurring/ Regular (RR)** • Sensitisation and awareness creation • Support national CCA efforts • Coordination with central agencies

			ULBs	• Sponsor and promote state specific efforts and local efforts for GACC mitigation and adaption **<u>Short Term (T1)</u>** • Strengthen ecological monitoring of forests to improve the understanding of risks from GACC • Develop local adaptation strategies and pilot projects **<u>Medium & Long Term (T2, T3)</u>** • Sponsor and promote state-specific efforts and local efforts • Implementation of GACC adaptation programs • Integrate adaptive measures in social protection programmes for the vulnerable groups

5.2.12. Cold Wave and Frost

As Cold Wave/Frost is a localized phenomenon, the relevant State Governments must draw up location specific mitigation plans involving respective DDMAs and local authorities (PRIs and ULBs). Risk transfer arrangements including multi-hazard insurance for life and property should be implemented. The central and state governments should develop relevant policy frameworks.

I. Mitigation Measures for People

The State Governments must maintain close coordination with India Meteorological Department (IMD) and closely monitor cold wave situation. Warnings should be disseminated to the public through appropriate forums (including local news papers and radio stations) on a regular basis. Some of the mitigation measures to be followed are shown below:

- Stay indoors as much as possible
- Listen to local radio stations for weather updates
- Eat healthy food to supply heat to the body and drink non-alcoholic beverages to avoid dehydration
- Wear several layers of lightweight and warm clothes; rather than one layer of heavy clothing. The outer garments should be tightly woven and water-repellent.
- Keep dry. Change wet clothing frequently to prevent loss of body heat.
- Maintain proper ventilation when using kerosene, heater or coal oven to avoid toxic fumes.

- In case of non-availability of heating arrangement, go to public places where heating arrangements are made by administration.
- Cover your head, as most body heat is lost through the top of the head and cover your mouth to protect your lungs.
- Avoid over work. Over exertion can cause heart attack.
- Watch for signs of frostbite: loss of feeling and white or pale appearance on fingers, toes, ear lobes and the tip of the nose.
- Watch for signs of hypothermia (subnormal body temperature): uncontrolled shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and apparent exhaustion. Immediately rush to the nearest hospital for medical treatment.
- Stock up on food, water, and other necessities before a cold wave.
- Stock suitable forage before cold waves for livestock
- Keep hospitals in a state of readiness for the admission of victims of frostbite and hypothermia

II. Mitigation Measures for Crops and Animals

The MAFW closely monitors cold wave situation in consultation with MOES (IMD) and State Governments. In case of cold wave/frost situation, States needs to initiate location specific measures as outlined in District Crop Contingency Plans and in consultation with respective State Agricultural agency to minimize its impact. Farmers are to provide light irrigation as per need, immediately prune damaged tips of branches or shoot, burn leave/waste material in the orchard to create smoke and manage rejuvenation of damaged crops through pruning of dead material, application of extra doses of fertilizer through foliar sprays. Vulnerable crops may be sprayed with water that will paradoxically protect the plants by freezing and absorbing the cold from surrounding air. Agencies specializing in animal care should provide necessary advisory and support for the care and protection of animals. In cold wave conditions, animal and livestock owners must feed adequately with appropriate feed to avoid animal deaths. They must stock suitable feed or forage before cold wave to feed the livestock. They must avoid exposure of animals to extreme cold. Illustrative crop protection measures during different vegetative stages are given in Table 8

Table 8. Snow and frost – Illustrative Crop Protection Measures

Sl. No.	Stages of Plant Growth	Measures to be taken by Farmers
1	Seedling/Nursery Stage	Change of microclimate by smoking around the field especially during night
2	Vegetative/ Reproductive Stage	Irrigating the field, smoking the field during night
3	Harvesting State	Harvest the crop at physiological maturity stage

5.3. Climate Change Risk Management

Note: Unlike other sub-sections, the responsibility framework given here has a simpler format

Central/ State Agencies and their Responsibilities			
Centre	**Responsibility – Centre**	**State**	**Responsibility – State**
MOES,MAFW*, MOEFCC, NLRTI	**Medium Term (T2)** • Promote research, monitoring and information systems consistent with the anticipated GACC impacts • Develop Database management system relating to Climate Change& cold wave	SDMA, LR&DMD, DDMA, UDD, RDD, AH&VS, Horticulture Dept. and Agriculture Dept.	**Recurring/ Regular (RR)** • Support and cooperate with central agencies • Sponsor state-specific efforts; support local efforts
MOEFCC*, MORD, MoHUA, NDMA, MSJE	**Short Term (T1)** • Understanding adaptation needs • Study coping Mechanisms **Medium Term (T2)**	SDMA, LR&DMD, DDMA, DST, UDD, RDD, AH&VS, Horticulture Dept. and Agriculture Dept.	**Recurring/ Regular (RR)** • Sensitisation and awareness creation • Support national CCA efforts • Coordination with central agencies • Sponsor and promote state-specific efforts and local efforts for GACC mitigation and

	• Develop adaption mechanism **<u>Long Term (T3)</u>** • Implement adaptation programs • Promote adaptive measures in social protection programmes for the vulnerable groups		adaptation **<u>Short Term (T1)</u>** • Develop local adaptation strategies and pilot projects **<u>Medium Term (T2)</u>** • Sponsor and promote state-specific efforts and local efforts **<u>Long Term (T3)</u>** • Implementation of GACC adaptation programs • Integrate adaptive measures in social protection programmes for the vulnerable groups

6. Preparedness and Response

6.1. Background

Response measures are those taken immediately after receiving early warning from the relevant authority or in anticipation of an impending disaster, or immediately after the occurrence of an event without any warning. The primary goal of response to a disaster is saving lives, protecting property, environment, and meeting basic needs of human and other living beings after the disaster. Its focus is on rescuing those affected and those likely to be affected by the disaster. The UNISDR (2016) defines response as:

Actions taken directly before, during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

The overarching concern of disaster response is immediate and short-term needs, including immediate disaster relief. Effective, efficient, and timely response relies on disaster risk -informed preparedness measures, including the development of the response capacities of individuals, communities, organizations, countries and the international community. The institutional elements of response often include the provision of emergency services and public assistance by public and private sectors and community sectors, as well as community and volunteer participation. “Emergency services” are a critical set of specialized agencies that have specific responsibilities in serving and protecting people and property in emergency and disaster situations. They include civil protection authorities, and police and fire services, among many others. The division between the response stage and the subsequent recovery stage is not clear-cut. Some response actions, such as the supply of temporary housing and water supplies, may extend well into the recovery stage.

Preparedness, as defined by UNISDR (2016), consist of the knowledge and capacities developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters. Preparedness action is carried out within the context of disaster risk management and aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response to sustained recovery.

Preparedness is based on a sound analysis of disaster risks and good linkages with early warning systems, and includes such activities as contingency planning, the stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation, and public information, and associated training and field exercises. These must be supported by formal institutional, legal, and budgetary capacities. The related term “readiness” describes the ability to respond quickly and appropriately when required.

Local level preparedness of people for disasters can help in mitigating the impacts of disasters and also beer response. Involvement of community at local level through PRIs can go a long way in getting people prepared for countering disasters. In case of disasters, PRIs can play a crucial role in mobilizing people and local resources.

Based on the preparedness, the response process begins as soon as it becomes apparent that a

disastrous event is imminent and lasts until the relevant authorities declare it as over. Response is carried out during periods of high stress in highly me-constrained situations with limited information and recourses. It is considered as the most visible among various phases of disaster management. Response includes not only those activities that directly address the immediate needs, such as search and rescue, first aid and temporary shelters, but also rapid mobilization of various systems necessary to coordinate and support the efforts. For effective response, all the stakeholders need to have a clear vision about hazards, its consequences, clarity on plans of action and must be well versed with their roles and responsibilities.

Any emergency requires a quick response to save lives, contain the damage and prevent any secondary disasters. In most cases, first responders such as members of Incident Response Teams (IRT) of district, block, or other agencies (medical fire, police, civil supplies, municipalities) manage emergencies immediately at the local level. If an emergency escalates beyond their capabilities, the local administration must seek assistance from the district administration or the State Government. If State Government considers it necessary, it can seek central assistance.

The NEC will coordinate response in the event of any threatening disaster situation or disaster where central assistance is needed. The NEC may give directions to the State Government and to the State Authorities regarding measures to be taken by them in response to any specific threatening disaster situation or disaster.

The NDMA has a facilitate role in disaster risk management in all phases of the disaster management cycle including response for all types of disasters. The general superintendence, direction and control of the National Disaster Response Force (NDRF) is vested in and will be exercised by the NDMA. The NCMC will deal with major crises that have serious or national ramifications. These include incidents such as those requiring close involvement of the security forces and/or intelligence agencies such as terrorism (counter-insurgency), law and order situations, serial bomb blasts, hijacking, air accidents, threats of nuclear/ radiological terrorism events, CBRN emergencies, detonation of conventional weapons, mine disasters, port and harbour emergencies, forest fires, oilfield fires, and oil spills.

The immediate response in the event of a disaster lies with the local authorities with the support of the state government, central government and the specialized agencies. The central government supplements the efforts of state government by providing logistic and financial support, deploying NDRF, Armed Forces, CAPF, and other specialized agencies mandated to respond to particular types of disasters. It will depute experts to assist the state government in planning and its implementation as per request from the state government.

6.2 Institutional Framework

Chapter-1 provided an overview of the institutional arrangements covering all aspects of disaster management. There are specific tasks, roles and responsibilities in the domain of response, which as mentioned before, is the most critical and sensitive aspect of disaster management. This section summarizes the function and responsibilities of departments that have a key role to play in disaster response as per current guidelines. The plan will be updated periodically to reflect any changes in the key roles envisaged to departments and agencies.

No single agency or department can handle a disaster situation of any scale alone. Different departments must work together to manage the disaster with an objective to reduce its impact. Section 39 of the DM Act, 2005 mandates that State Departments prepare disaster management plans keeping mitigation, preparedness and response elements into consideration. Sections 22, 24, 30 and 34 of the DM Act, 2005 have clearly laid down provisions relating to DM to be performed by the authority.

The institutional arrangements for the response system consist of the following elements:

a) Nodal State Departments with disaster-specific responsibilities for state-level coordination of the response and mobilization of all the necessary resources
b) State agencies with disaster-specific responsibilities for Early Warning Systems and alerts
c) National Disaster Response Force (NDRF)
d) State Disaster Response Force (SDRF)

Currently an establishment of SSDMA is functional in Disaster Management Division of LR&DMD and State Control Room for Emergency Response (SCR -ER) has been also been set-up. It will be connected to the following control rooms:

All agencies designated to provide hazard-specific early warnings

- National Emergency Response Centre (NERC)
- District Emergency Operations Centre (DEOC)
- NDRF
- SDRF
- Integrated Defence Staff (IDS)
- Integrated Control Room for Emergency Response, MHA

6.3 National Early Warning System

6.3.1 Central Agencies Designated for Natural Hazard-Specific Early Warnings

Table 9: Central Agencies Designated for Natural Hazard-Specific Early Warnings

SN	Hazard	Ministry	Agency
1	Avalanches	MOD	Snow and Avalanche Study Establishment (SASE)
2	Cold Wave	MOES	India Meteorological Department (IMD)
3	Cyclone	MOES	India Meteorological Department (IMD) Regional Specialized Meteorological Centre (RSMC) Tropical Cyclone Warning Centres (TCWC) for different regions
4	Drought	MAFW	Central Drought Relief Commissioners (CDRC) and Crop Weather Watch Group (CWWG)
5	Earthquake	MOES	Indian Meteorological Department (IMD)
6	Epidemics	MHFW	Ministry of Family and Heath Welfare (MHFW)
7	Floods	MOJS	Central Water Commission (CWC)
8	Heat Wave	MOES	Indian Meteorological Department (IMD)
9	Landslides	MOM	Geological Survey of India (GSI)
10	Tsunami	MOES	India National Centre for Oceanic Information Services (INCOIS)

The GOI has designated specific agencies (Table 9) to monitor the onset of different natural disasters, set up adequate Early Warning Systems (EWS), and disseminate necessary warnings/ alerts regarding any impending hazard, for all those hazards where early warning and monitoring is possible with the currently available technologies and methods. These agencies provide inputs to the MHA, which will issue alerts and warnings through various communication on channels. The agencies responsible for EWS will maintain equipment in proper fun coning order and conduct stimuli on drills to test their efficacy. On their part, the relevant State Government and district administration shall disseminate such alerts and warnings on the ground through all possible methods of communication on and public announcements.

6.3.2 Role of Central Agencies/ Departments

The National Emergency Response Centre (NERC) will act as the communication and coordination hub for maintaining constant touch with early warning agencies for updated inputs. It will eventually be upgraded as the Integrated Control Room for Emergency Response (ICR-ER). It will inform State Emergency Operations Centre (SEOC) and District Emergency Operations Centre (DEOC) through all the available communication channels and mechanisms. The DM Division of the MHA will communicate and coordinate with designated early warning agencies, various nodal ministries, and state governments. It will mobilize reinforcements from the NDRF, Armed Forces and the CAPFs and put together transportation plans for moving resources. The NDMA will support the overall coordination of response as per needs of MHA. The NDMA will be providing general guidance and take decisions for the deployment of the NDRF. The NDRF will be deployed as required depending on the request from State Government. The NRDF will always be in operational readiness.

6.4 Coordinator of Response at State Level

As described in Chapter-1, the LR&DMD will coordinate response in the event of any threatening disaster situation or disaster.

In the event of disaster LR&DMD will activate the IRTs at State, District, or block level and ensure coordination with the SEOC. For any kind of technical support needed to strengthen the response system the LR&DMD will be taken up with the prior consent of SEC.

It is essential that the first responders and relief reach the affected areas in the shortest possible time. Often, there are inordinate delays due to real constraints imposed by the location, nature of disaster and, most regrettably, due to inadequate preparedness. In many situations, even a delay of six to twelve hours will prove to be too late or unacceptable. To make matters worse, relief tend to arrive in a highly fragmented or uncoordinated form with multiple organisations acting independently of each other without a cohesive plan, without mechanisms to avoid overlaps and without proper prioritization of different aspects of relief such as shelter, clothing, food, or medicine. From an operational perspective, the challenges are similar across most hazards. The *NDMA has formulated Incident Response System (IRS) Guidelines* for the effective, efficient, and comprehensive management of disasters. The implementation of NDMA’s IRS Guidelines by the State and Districts will help in standardization of operations, bring clarity to the roles of various departments and other agencies, which are common to most disaster response situations.

The state and district administration shall identify sites for establishment of various facilities as mentioned in the IRS guidelines such as Incident Command Post, relief camp, base, staging area, camp, and helipad, for providing various services during the response. The state and local administration must widely disseminate and publicise information about these arrangements as mandated in the SDMP and DDMP. Since disaster response operations are multifaceted, me-sensitive, extremely fast moving, and mostly unpredictable, it requires rapid assessment, close coordination among several departments, quick decision-making, fast deployment of human resources and machinery as well as close monitoring. To prevent delays and eliminate ambiguities regarding chain of command, the SDMP and DDMP must clearly spell out the response organisation as per IRS during the disaster phase. These plans must clearly identify the personnel to be deputed various responsibilities in the IRT at various levels of administration along with proper responsibility and accountability framework. Provision for implementation of unified command in case of involvement of multiple agencies such as Army, NDRF, CAPF, and International Search and Rescue Advisory Group (INSARAG) also needs careful observation. From time to time the DM plan must be tested and rehearsed by carrying out mock exercises.

6.5. Fire and Emergency Services (F&ES)

F&ES department attends to other emergencies such as building collapse, road traffic accidents, human and animal rescue, and several other emergency calls. F&ES also takes part in medical emergencies. The role of F&ES has become multi-dimensional. The role of F&ES extends to the domain of prevention, especially in urban areas. F&ES is an integral part of the group of agencies responding to disaster situations. F&ES is one of the first responders during the Golden Hour after a disaster and plays a vital role in saving lives and property. Therefore, it is imperative to adequately equip and develop the capacities of F&ES. Further, continuous training should also be provided to the fire staff in using and maintaining the equipment.

F&ES is a key element in the emergency response system. The type, scale and standards applicable for equipment and the training of the staff are subject to technological advances and emerging good global practices. Besides, given the regional differences and local challenges due to diverse terrains as well as conditions, some degree of innovation, customisation and adaptation are necessary to make for effective use and deployment. Both right-sizing and down-sizing are required while maintaining the operational efficiencies of the equipment. For example, in some urban areas where roads are narrow and large equipment cannot gain quick access, it may be necessary to use down-sized equipment mounted on small vehicles that have adequate capacity to carry the equipment. Similarly, in most rural or less developed areas, it is difficult to maintain and operate the same equipment that are deployed in large cities. Therefore, rather than providing specifications or an indicative list, the SDMP enjoins the agencies responsible for response to adopt the best practices and most appropriate technologies subject to rigorous quality control and testing.

Government of India has also taken steps for institutional reforms and organizational restructuring of F&ES. The State Governments as per the recommendation of the central government has recommended initiatives to strengthen the techno-legal regime for fire safety under modernization of the F&ES scheme from National Disaster Mitigation Fund/ NDMF.

6.6. Responding to Requests for Central Assistance from States

Catastrophic disasters like earthquakes, floods, cyclones and tsunami result in large casualties and inflict tremendous damage on property and infrastructure. The Government of India has established a flexible response mechanism for a prompt and effective delivery of essential services as well as resources to assist a State Government hit hard by a severe disaster. Disaster management is considered as the responsibility of the State Governments, and hence the primary responsibility for undertaking rescue, relief and rehabilitation measures during a disaster lies with the State Governments. The Central Government supplements their efforts through logistic and financial support during severe disasters as requested by the State Governments.

6.7. Management of Disasters Impacting more than one State

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, as the impact of their occurrence may affect another. 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. The NCMC will play a major role in handing such multi-state disasters. The NDMA will encourage identification of such situations and promote the establishment of mechanisms for coordinated strategies for dealing with them by the States and Central Ministries, departments and other relevant agencies.

6.8. Response System Activation

State Disaster Management Plan (SDMP) remains in operation during all phases of disaster cycle i.e. mitigation, preparedness, response and recovery. However, SEC may activate disaster response system (partially or fully with all support functions activated based on the situation) on the receipt of disaster warning or upon the occurrence of a disaster. The occurrence of disaster may be reported by the relevant monitoring authorities (both state and district) to the SEC by the fastest means. The SEC will activate emergency support functions, scale of which will commensurate with the demand of situation (size, urgency, and intensity of incident).

The activation sequence for national response in the event of a disaster is as given below:

1. The Land Revenue & Disaster Management Department would assume direct responsibility in the event of a disaster.
2. The response from district authority would come into operation when the relevant district authorities makes a specific request for assistance, financial, logistical, or resources – including transport, search, rescue and relief operations by air, inter -State movement of relief materials, among others.

6.9 Emergency Functions and the Responsibilities: Centre and State

While there are disaster-specific aspects to the post-disaster response, the emergency functions are broadly common to all disasters and there are specific departments, or agencies that can provide that emergency response. Besides, very often, there are multiple hazards and secondary disasters that follow a major disaster. Hence, response intrinsically follows a multi-hazard approach. Therefore,

all the response activities have been summarized in a single responsibility framework applicable to all types of disasters. The response responsibility framework specifies the major theme of response. It specifies the agencies from the State Government responsible for the major theme of response. All agencies responsible for response should follow the NDMA's IRS guidelines, which will help in ensuring proper accountability and division of responsibilities. Different state departments and agencies must provide specialized emergency support to the response effort. Certain agencies of State Government will play a lead role, while others will be in a supporting role.

The State Nodal Department for Disaster Management and SDMA are lead agencies at the state level for coordination of response. The DDMA is the lead agency for coordination of response at District level. State Government departments and other specialized bodies in the state must prepare their own hazard specific response plans as per guidelines of the NDMA and in line with the SDMP. They must always ensure preparedness for response and must carry out regular mock drills and conduct tests of readiness periodically, and must report the status to the SDMA. Agencies responsible for disaster response should develop their individual scenario-based plans and SOPs considering multiple hazards and envisaging different scenarios ranging from least to the worst cases. The scenario-based planning exercises should be part of the preparedness of response agencies at all levels. The major tasks of disaster response given in the responsibility framework and listed alphabetically for easy reference are:

1. Communication
2. Cultural Heritage Sites, their Precincts and Museums — Protection & Preservation
3. Data Collection and Management
4. Disposal of animal carcasses
5. Drinking Water/ Dewatering Pumps/ Sanitation Facilities
6. Early Warning, Maps, Satellite inputs, Information Dissemination
7. Evacuation of People and Animals
8. Fodder for livestock in scarcity-hit areas
9. Food and Essential Supplies
10. Fuel
11. Housing and Temporary Shelters
12. Management of the dead people
13. Media Relations
14. Medical care
15. Power
16. Public Health
17. Rehabilitation and Ensuring Safety of Livestock and other Animals, Veterinary Care
18. Relief Employment
19. Relief Logistics and Supply Chain Management
20. Search and Rescue of People and Animals
21. Transportation

6.10. Responsibility Framework for Preparedness and Response

Preparedness and Response			
State Departments and their Responsibilities			
Sl. No	**Emergency Function**	**State**	**Responsibility-State**
1	**Communication**	**Lead Agency**: Sikkim Police,	• Failsafe communication plan is prepared with all early warning agencies

		Telecommunication Department – Central BSNL and other telecom service providers. State IPR **Support Agencies:** LR&DMD, DDMA, and other relevant departments	• Logistics section of the state level IRT coordinates with central agencies to provide effective communication to the field level IRTs for response. • State and district EOCs are equipped with satellite phones/ VHF/ HF as a backup to the landline. • All communication equipment, especially the satellite phones are in good working condition 24X7 on all days through regular testing. • Plans for communication including telephone and HAM are prepared for smooth coordination with the field level IRTs. • Establish protocols and responsibilities for coordinating with central agencies and various service providers. • Prepare, update and maintain a district wise list of HAM Operators who could be contacted and deployed at the site of emergency. • Have binding agreements with telecom service providers to restore damaged facilities and set up temporary facilities on emergency basis. • Ensure Inter-Operability among different telecom service providers.
2	**Cultural Heritage Sites, their Precincts and Museums-Protection and Preservation**	**Lead Agency**: ASI, Culture Dept. and Mines & Geology Dept. **Support Agencies**: Forest & Environment Dept. Mines & Geology Dept. LR&DMD, DDMA and B&H Dept.	• Safety of the people who engage with the Museums/ Cultural Heritage sites and Precincts. • Comprehensive plan including evacuation, immediate response protocols and procedures, etc, considering the specific challenges presented by the site/ precinct. • Creating an emergency team that includes the management, administrators and staff of the site or precinct as well as representatives from local stakeholders. • Identification of evacuation routes, spaces that may act as temporary refuge areas, and displaying these routes and spaces in a clear manner as signage, maps, printed literature, etc. for wide distribution, • Identification of various kinds of emergency supplies and equipment and their storage for ease of access should be undertaken.

3	**Data Collection and Management**	**Lead Agency**: LR&DMD and DDMA **Supporting Agencies**: other relevant departments.	• Representative of SSDMA works with the planning section at state level for making of Incident Action Plan (IAP) and dissemination of information. • Creation of a cell at the District level (preferably as part of DEOC) and place dedicated resources to collect/ update on all essential services (as per the template given in the IRS guidelines) which will help during the response phase for effective reporting and compilation.
4	**Disposal of Animal Carcasses**	**Lead Agency:** DDMA, UDD and AH&VS Dept. **Support Agencies**: LR&DMD, and other relevant departments.	• Adopt SOP in SDMP and DDMP as per National Guidelines and implement it properly. • Activate the Animal Carcass management Group in the IRS as per national guidelines. • Equip and train the staff if carcass removal/ disposal at pre-identified sites to ensure that no other health hazard is created both for the staff as well as the public. • Use of recommended safety kits and personal protection by the staff deployed in carcass disposal so that they are not infected. • Take measures for dispersal of financial relief as per norms.
5	**Drinking Water/ Dewatering Pumps/ Sanitation facilities**	**Lead Agency**: DDMA, RDD and Public Health Engineering/PHE Dept. **Supporting Agencies:** LR&DMD and other relevant departments.	• Ensure strict compliance with minimum standards of relief as per section 12 of DM Act 2005. • Provide disaster- affected areas with clean drinking water and to prevent the spread of water borne diseases. • Provide emergency water supplies when there is scarcity of potable water. • Respond to the public health needs 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. • 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. • Necessary arrangement is made for supplying drinking water through tankers. • Necessary arrangements are made for supplying chlorine tablets.

			• Arrangements with vehicle manufacturers for vehicle mounted Reverse Osmosis (RO) Systems with integrated power source and pouch facility with a condition that system should be in place within 6 hours of placing order. • Arrangements with companies for providing vehicle mounted heavy duty dewatering pumps with a condition to make them available usually within 6 hours of request. • Availability of hygienic portable toilets and bleaching powder through pre-disaster arrangements/ contracts with suppliers.
6	**Early Warning, Maps, Satellite data, Information Dissemination**	**Lead Agency**: LR&DMD and DDMA **Support Agencies:** Sikkim Police, BSNL, NIC and IPR.	• 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. • Dissemination of warnings and information up to the last mile • Ensure appropriate compilation/ analysis of received data • Use of satellite imageries and other scientific methods for risk assessment and forecasting.
7	**Evacuation of People and Animals**	**Lead Agency**: LR&DMD, DDMA, SDRF, NDRF and Civil -Defense **Support Agencies:** Other State Line Departments.	• Quick assessment of evacuation needs such as the number of people and animals to be evacuated and mode of evacuation. • Special attention to evacuation of PWD. • Mobilise transport and resources for evacuation. • Identify and prepare sites for temporary relocation of affected people and animals. • Identify requirement of resources for evacuation such as helicopters, aircrafts, high speed boats and ships to be provided to the affected state government. • Request for central resources, if needed. • Coordinate with central agencies to mobilise required resources. • Monitor the situation • Earmark resources/ units/ battalions of SDRF for quick deployment • Prepare handbook/ manuals and SOP for evacuation for people and animals. • Undertake review and revise DMPS and SOPS after each major incident • Prepare evacuation plan considering local

			conditions and periodically update it • Undertake mock/simulation drills • Prepare operational checklists • Prepare list of agencies/ organizations who could assist in evacuation • Web-based resource inventory and its regular updates.
8	**Fodder for livestock in Scarcity-hit-Areas**	**Lead Agency:** DDMA and AH&VS Dept. **Support Agencies:** LR& DMD, Horticulture Dept. and Agriculture Departments.	• Mobilise fodder and cattle feed to meet shortages, as in drought or scarcity conditions. • Transport fodder from storage facilities or collection centres to the scarcity-hit-areas • Organise fodder resource and mobilisation centres • Organize collection centres for fodder and cattle feed • Enlist PSUs and private agencies for providing fodder and other support.
9	**Food &Essential Supplies**	**Lead Agency**: DDMA and RDD, SJ&W Dept. and F&CS Dept. **Support Agencies**: LR& DMDM, Civil Defence and all other relevant departments.	• 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. • MOU with suppliers to provide food grains, ready- to- eat/ pre- cooked food/ meals, family packs of essential food provisions • Agreement/ MOUs with organisations, trusts, and firms for setting up of community kitchens in the affected areas. • Depending upon the requirement, coordinate with the relevant Central Ministry to make sure that the supplies reach the site on time. • Deploy a dedicated team at the local level to receive the supplies, maintain log (manual or computerised) and distribute them at required locations. • Ensure food storage facilities have sufficient stocks and are located in relatively risk-free locations. • Supply of provisions to meet the needs of infants/ small children. • Counselling for lactating mothers.
10	**Fuel**	**Lead Agency:** DDMA, Transport Dept. and F&CSD **Support Agencies:**	• Logistic section of the state level IRT to coordinate with the relevant department/ agencies to provide effective services (Ground Support Unit) to the field level IRTs for response. • Assess and make the requirement of fuel clear with the Central Ministry and

		LR&DMD and all other relevant departments.	coordinate the delivery if fuel through local arrangements. • Ensure sufficient availability of tankers/ other vehicles for local transportation through the relevant dept. • Establish mechanism for stocking the fuel at strategic locations with relevant agencies.
11	**Housing and Temporary Shelters**	**Lead Agency**: DDMA and RDD and UDD. **Support Agencies**: LR&DMD and all other relevant departments.	• Ensure strict compliance with minimum standards of relief as per Section 12 of DM Act 2005 • Logistic section of the state level IRT must coordinate with Railways to provide effective services to the field level IRTs for response. • 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. • Identify shelter suppliers for supple of tents/ shelters up to the village level and have MOUs for supply at short notice (usually less than 24 hours) as per requirement. • Stockpile tents, tarpaulins and temporary shelter material in regional warehouses/ stores/ ERCs. • Depending upon the requirement, coordinate with the relevant Central Ministry to make sure that the tents/ shelters reach the site on time. • Deploy dedicated team at the local level to receive the tent/ shelters. • Maintain logs (manual or computerised) of all material movements and details of distribution to required locations.
12	**Livestock and Other Animals: Veterinary Care, Rehabilitation and Ensuring Safety**	**Lead Agency:** DDMA and AH& VS Dept. **Support Agencies:** LR&DMD, Agriculture Dept, and Animal Welfare Organisations	• Include provisions for evacuation, safety and rehabilitation of animals in SDMP. • Set up livestock camps/ shelters for animals in distress due to disasters, including drought. • Organise proper care of animals in the camps/ shelters. • Ensure proper management and running of livestock camps/ shelters. • Proper rehabilitation of animals. • Provide veterinary care to disaster affected livestock, including in drought-hit-areas

13	**Management of the Dead**	**Lead Agency**: DDMA, RDD, UDD and H&FW Dept. **Support Agencies:** LR&DM Dept., Civil Defence, NDRF, SDRF and all other relevant Departments	• Adopt SOP in SDMP and DDMP as per NDMA guidelines and implement it properly • Establishing Dead Body Management Group in the IRS at state and district levels as per national guidelines • Deploy trained squads for detection and recovery of the survivors and the dead as early as possible after the event • The recovery team will use basic personal protective kit and follow adequate precautions • Follow the protocols for the identification of the dead, recording evidence, transportation and burial (i.e., disposal as per norms) • Follow protocols to maintain the dignity of the dead in all possible ways • If required, establish temporary mortuaries with adequate facilities where it is possible • In special cases, appropriate arrangements and relevant protocol must be followed for victims in certain types of disaster keeping in view the safety of survivors and emergency workers • Inform the affected community by giving wide publicity to the procedure for the management of the dead • Take urgent steps for release of ex-gratia payment • Ensure to the extent possible ethical management of the dead, along with respect for religious and cultural sensitivities • Deal with the psychological impacts as per the national guidelines on psycho-social support • Ensure due documentation such as inventory record of the dead, dead body identification and all relevant information as given in the national guidelines
14	**Media Relations**	**Lead Agency:** DDMA and IPR **Support Agencies:** LR&DM Dept.	• Department of Information and Public Relations works with the Command staff as Information and media officer of the state level IRT to provide effective services • Ethical guidelines for coverage of disaster is prepared and shared with all media agencies

			• Plan is prepared for providing/ broadcasting warnings, do's and don'ts etc. to media and ensure its dissemination
15	**Medical Care**	**Lead Agency**: SDMA, LR&DM Dept. , DDMA and H& FW Dept. **Support Agencies:** All other relevant departments	• Assess medical emergency needs in coordination with central agencies as per situation • 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. • 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 update it on a regular basis • Include the hospital wise information in the DM Plans at local levels • Tie-up with the companies for easy availability of common medicines during the emergency situations • Hygienic conditions are prevalent at all times in various facilities established as well as hospitals to curb the spread of diseases • Establishment of sound protocols for coordination between state's health Dept. and the central agencies • Ensure strict compliance with minimum standards of relief as per Section 12 of DM Act2005 • Plan for surge capacity in all the major hospitals in the state • Develop specialized facilities to handle chemical, biological, radiological and nuclear emergencies • Strengthening of emergency departments of all major hospitals in the state • Deploy PSSMHS professionals, para-professionals and trained community level workers • Identify those requiring immediate PSSMHS and organise PSSMHS
16	**Power**	**Lead Agency**: Power Department, State Electricity Board, Power Developers / Power Distribution Companies	• 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

		Support Agencies: LR&DM Dept. and DDMA	• 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 • Pre-disaster agreements with central and neighbouring state governments for technical support in restoration of power supply and infrastructure • Mobile power supply units or other arrangements with power • generation companies for quick deployment at the site during emergency
17	**Public Health**	**Lead Agency:** LR&DM Dept., DDMA and H&FW Dept. **Support Agencies**: All other relevant departments.	• Activating Public Health IRS • Assess public health needs in coordination with central agencies as per situation • Coordinate with central agencies in case of biological emergencies • Coordinate with central agencies for epidemiological surveillance • Manage public health logistics (drugs and vaccines), non- pharmaceutical interventions • Carry out immunisation, disinfection, vaccination and • vector control measures
18	**Relief Employment**	**Lead Agency:** LR&DMD DDMA, RDD and UDD. **Support Agencies:** All other relevant agencies.	• Provide opportunities for unskilled work in public works for people seeking work in drought affected areas as a relief measure • Ensure quick and prompt payment of wages • Carry out health check-up of those seeking work • Draw from various funds including Disaster Response Fund to implement the employment schemes
19	**Relief Logistic and Supply Chain Management**	**Lead Agency:** SDMA, LR&DM Dept., Transport Dept. and DDMA **Support Agencies:** All other relevant Departments	• Establish a mobilization centre at the airport/railway station for the movement of relief supplies within the state • Deploy special transportation for the movement of relief supplies within the state • Make arrangements to receive and distribute relief and emergency supplies received from different parts of the country Coordinate transportation (air, rail, road, water) with Central ministries/

			departments/ agencies • Arrange alternative means of transportation to reach relief supplies to the affected locations if normal transport cannot reach
20	**Search and Rescue of people and animals**	**Lead Agency: S**SDMA, LR&DM Dept., DDMA and Sikkim Police **Support Agencies:**, NDRF, SDRF, F&ES, Civil Defence and all other relevant Departments	• Various positions of IRTs (State, District, Sub-division) are trained and activated for response at their respective administrative jurisdiction • SDRF teams are trained, equipped and ready to move at a short notice to the affected areas • Strategic stationing of state-of- the-art equipment for search, rescue and response with dedicated trained manpower • 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 24hours) • Nodal Officer selected for coordination is in regular touch with MHA/NDMA for additional requirements (including help from other Central Ministries) • Deploy Quick Response Teams (QRT) • Deploy Quick Medical Response Teams (QMRT)
21	**Transportation**	**Lead Agency:** LR&DM Dept., DDMA, T&CA Dept., Indian Railway, and Transport Department **Support Agencies:** All other relevant Departments	• Dept. of Transport works with the logistic section of the state level IRT to provide effective services (Ground Support Unit) to the field level IRTs for response • Requirement of transport for the transportation of relief material, responders are arranged • Need of the transport of various activated section of the IRT as per Incident Action Plan is fulfilled • Indian Railway works with the logistic section of the state level IRT to provide effective services (Ground Support Unit) • Restoration of railway tracks and functioning of railway at the earliest • Coordinate with central govt. for transportation of relief materials • 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 • Restoration of Airport at the earliest involving specialised response force of the central government • Coordination with state and district administration to provide air support • Cater to the needs of transporting affected people if required

7. Recovery and Building BackBetter

7.1. Scope

Globally, the approach towards post-disaster restoration and rehabilitation has shifted to one of betterment reconstruction. While disasters result in considerable disruption of normal life, enormous suffering, loss of lives and property, global efforts consider the recovery, rehabilitation and reconstruction phase as an opportunity to "Build Back Better" (BBB) integrating disaster risk reduction into development measures, and making communities resilient to disasters. The Sendai Framework expects that after a disaster, the stakeholders will be prepared for BBB. Existing mechanisms may require strengthening in order to provide effective support and achieve better implementation. Disaster recovery tends to be very difficult and long-drawn out. The reconstruction will vary depending upon the actual disaster, location, pre-disaster conditions, and the potentialities that emerge at that point of time. The SDMP provides a generalized frame work for recovery since it is not possible to anticipate every likely element of betterment reconstruction.

There construction and rehabilitation plan is designed keeping in view the worst case scenarios (i.e. L3 type of disasters) in which the capacity of the State and District administration would be overwhelmed and require assistance from the Central Government for re-establishing normalcy in the disaster affected areas. This chapter provides a general framework for the role of Government and its development partners in restoring after a disaster, various essential and basic services. Much of this support will involve the coordinated working of multiple agencies–Government and Non-Government. All the agencies are required to closely monitor response activities and to obtain valuable data regarding the severity and intensity of the event, the affected geographical area and the potential unsatisfied critical needs of the affected population in order to evolve a comprehensive recovery plan.

7.2. Recovery Process

Disaster recovery process is not a set of orderly actions triggered by the impact of a disaster upon a community. It will consist of several related activities such as the following:

- Damage assessments
- Debris clearance, removal and its environmentally safe disposal
- Restoration and even upgrading utilities including communication networks
- Re-establishment of major transport linkages
- Temporary housing
- Detailed building inspections
- Redevelopment planning
- Environmental assessments
- Demolition
- Reconstruction
- Integrating DRR into various development initiatives
- Financial management
- Economic impact analyses

The major steps/ processes of the recovery process and the processes involved are summarized in Table10:

Table 10: Major Steps of the recovery Process and the Key Process Involved

Sl.No.	**Major Steps**	**Process**
1	Post-Disaster Needs Assessment and Credible Damage Assessment	• Preliminary assessment reports • Compilation and transmittal of damage and loss data • Disaster damage assessments led by government and assisted by humanitarian response agencies, and the initial damage surveys leading to a comprehensive assessment • Quantitative and qualitative baseline for damage, loss, and needs across sectors, blocks (taluka) and districts • Results monitoring and evaluation plan for recovery program Select the most appropriate and achievable processes and methodology for conducting early and credible damage and needs assessments
2	Developing a vision for Build- Back Better (BBB)	• High level meetings as well as broad-based, wider consultations with experts, civil society, and key stakeholders • Build consensus among the range of stakeholders within and outside government
3	Ensure coherence of BBB with the development	• Discussions at top level to align the recovery vision with the government's broader, longer term development goals and growth and poverty reduction strategies
4	Incorporating resilience and BBB in recovery vision	Consultations and background studies on: • Disaster resistant physical recovery • Options for fast economic recovery • Gender and equity concerns • Vulnerability reduction • Natural resource conservation and environmental protection • Social recovery
5	Balancing recovery across sectors	• Balance public and private sectors BBB programs • Promote norms for non-discriminatory and equitable asset disbursement among individuals and communities

		• Prioritize infrastructure reconstruction • Address the recovery of the lives and livelihoods of disaster- affected communities • Show sensitivity to the needs of the affected population with regard to public expectations from recovery
6	Prioritising sectors for recovery	Determine relative importance of various sectors such as housing, water and sanitation, governance, transport, power, communications, infrastructure, environment, livelihoods, tourism, social protection, health, and education.

7.3. Early, Mid and Long-term Recovery

According to UNISDR (2009), recovery is "the restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors." UNISDR notes that recovery programmes, coupled with the heightened public awareness and engagement after a disaster, provide a valuable opportunity to develop and implement disaster risk reduction measures and to apply the BBB principle. It is an important component of risk reduction strategy and if implemented systematically, the recovery process prevents the affected community from sliding into further poverty and deprivation. While the Disaster Management Act 2005 mandates the government to carry out rehabilitation and reconstruction activities, it does not explicitly refer to 'recovery' as a component to be used as a part of disaster management strategy. However, the National Policy on Disaster Management 2009 recognizes 'recovery' as one of the six elements within the disaster management continuum where it is linked to physical, social and economic assets within the overall context of 'safe development'. The disaster recovery programmes usually proceed in three distinct stages to facilitate a sequenced, prioritized, and flexible multi-sectoral approach. Three recovery stages, in which appropriate policies and programmes tend to be planned and implemented are: a) Early, b) Mid-Term, and c) Long-Term, which are described briefly in Table -11.

Table 11: Recovery Stages

Recovery Stage	**Duration**	**Brief Description**
Early	3 – 18 Months	Cash for work, resumption of markets, commerce and trade, restoration of social services, transitional
Mid-Term	Up to 5 Years (concurrent with early recovery)	Recovery plans for assets and livelihood, reconstruction plans for housing, infrastructure, public buildings and cultural heritage buildings

Long-Term	Within 10 Years	Implemented along with developmental plans: Infrastructure strengthening, environmental, urban and regional planning

The salient provisions of the recovery framework include the following:

- Institutional arrangements: Ensuring institutional mechanisms at the national, state, district, and local (urban and rural) levels that clearly defines roles and responsibilities in recovery
- Coordination: There is considerable interdependence between stakeholders – government, international agencies, private sector, civil society organizations – in realizing the objectives of recovery and inter-agency coordination is extremely important
- Public-Private Partnerships (PPP): Participation of the private sector has to be leveraged for larger public good and the Public-Private Partnerships is one effective way to facilitate the private sector involvement in recovery
- Information and Communication Technology (ICT): Effective use of ICT in recovery programme, disseminating messages among all stakeholders, and providing information on all aspects of recovery programme
- Decision Support System (DSS): Setting up an adequate DSS that includes Management Information System (MIS), databases, deployment of spatial data management technologies
- Pool of Expertise: Pooling of professional skills and expertise in diverse areas
- Community Participation: Ensuring the pro-active involvement of communities, proper community outreach, empowerment, and gender equity in programme formulation and implementation
- Monitoring and Evaluation (M&E): M&E is an important component required for promoting transparency in the recovery processes and it should include technical and social audits.

7.4. Reconstruction

Long term recovery efforts must focus on redeveloping and restoring the socio-economic viability of the disaster area(s). The reconstruction phase requires a substantial commitment of time and resources by the Governments (State and Central) and other agencies. It is important to note that much of this commitment would be beyond the scope of traditional emergency management programmes. The reconstruction challenge involved would most often be the result of a catastrophic event that has caused substantial damage over a very large area and/or affected a very large population. These reconstruction efforts include:

- Reconstruction of public infrastructures and social services damaged by the disaster, which can be completed over the long-term
- Re-establishment of adequate housing to replace that has been destroyed

- Restoration of jobs/ livelihood that was lost
- Restoration of the economic base of the disaster areas

7.5. Co-ordination of Reconstruction

Recovery efforts require the coordination at several levels of government and the stakeholder institutions having specific responsibilities for central, state, private sector, voluntary organizations, and international aid agencies.

7.5.1. Central Government

The role of the central government will include among others which are as follows:

- Coordinate with various stakeholders
- Facilitate solicitation and management of donated resources and volunteers
- Coordinate with various stakeholders to promptly resolve recovery issues
- Provide resources on "need basis" and which are within the capabilities of Central Government, as per norms

7.5.2. State Government

The damage assessment and all the phases of recovery and reconstruction (short to long-term) are the responsibility of the State government. Some of the key tasks are:

- Lead in and support need and damage assessment operations
- Provide relevant data regarding the severity of the disaster and assessment of individual needs
- Participate in and support public information and education programmes regarding recovery efforts and available Central/ State Government assistance
- Coordinate with the Central Government and other stakeholders for reconstruction management

7.5.3. Private Sector-Public Private Partnership

There is a need for facilitating the involvement of private sector in disaster management and for businesses to integrate disaster risk into their management practices. There is a need to increase Public Private Partnership through involving the private sector in the areas of:

- Technical support
- Reconstruction effort
- Risk management including covering risks to their own assets
- Financial support to reconstruction efforts
- Risk-informed investments in recovery efforts
- Most importantly the private sector needs to incorporate Disaster Management aspects in all their developmental Plans and Projects.

7.5.4. Voluntary Organizations

Sikkim Helping Hand is the primary NGO working with SDMA to coordinate amongst external agencies; inter and intra, with regard to relief operations.

7.5.5. International Agencies: United Nations Development Programme (UNDP)

UNDP has been a pioneer agency in the strengthening the state in disaster management at the inception with disaster Risk Management (DRM) Programme that paved way in the formation of the present disaster institutional set-up.

UNDP has been consistently funding projects on several disaster continuums in the State. In addition to this, UNDP along with other international agencies works in close collaboration with SDMA on "Strengthening State Strategies for Climate Action Plan.

7.6. Rehabilitation

7.6.1. Background

Rehabilitation, an integral part of disaster recovery; other being reconstruction, could be defined as an overall dynamic and intermediate strategy of institutional reform and reinforcement, reconstruction and improvement of infrastructure and services; aimed towards support to the initiatives and actions of the affected populations in the political, economic and social domains, as well as reiteration of sustainable development. Generally, rehabilitation package includes total reconstruction of damaged physical and psychological infrastructure, as well as economic and social rehabilitation of the people in the affected region. The rehabilitation is classified into the following:

- Physical
- Social
- Economic and
- Psychological

7.6.2. Physical Rehabilitation

Physical rehabilitation is a very important facet of rehabilitation. It includes:

- Reconstruction of physical infrastructure such as houses, buildings, railways, roads, communication network, water supply, electricity, and soon
- Short-term and long-term strategies towards watershed management, canal irrigation, social forestry, crop stabilization, alternative cropping techniques, job creation, employment generation and environmental protection
- Rehabilitation of agriculture, artisan work and animal husbandry
- Adequate provision for subsidies, farm implements, acquisition of land for relocation sites, adherence to land-use planning, flood plain zoning, retrofitting or strengthening of undamaged houses, and construction of model houses

7.6.3. Relocation

Relocation is a very sensitive part of the physical rehabilitation process and it must be ensured that need based considerations and not extraneous factors should drive the relocation policy. The local authorities, in consultation with the affected population and under the guidance of the State Government shall determine relocation needs taking into account criteria relevant to the nature of the calamity and the extent of damage. Relocation efforts should invariably include activities like:

- Avoid secondary displacement as far as possible
- Gain consent of the affected communities
- Clearly define land acquisition process
- Take into consideration urban/ rural land use planning before moving ahead
- Provide customized relocation packages
- Decentralize powers for undertaking the relocation process
- As far as possible, ensure relocation site is near to their agricultural lands and/or sources of livelihood, as applicable
- Ensure provision of livelihood rehabilitation measures for relocated communities, wherever necessary, to the extent possible

7.6.4. Social Rehabilitation

Social rehabilitation is also an important part of disaster rehabilitation. The vulnerable groups such as the artisans, elderly, orphans, single women and young children would need special social support to survive the impact of disasters. The rehabilitation plan must have components that do not lose sight of the fact that the victims have to undergo the entire process of re- socialization and adjustments in a completely unfamiliar social milieu.

7.6.5. Revival of Educational Activities

Educational facilities may suffer greatly in a major disaster placing considerable stress on children. Therefore, the following steps will be helpful in helping children to recover and cope with the situation:

- Give regular counselling to teachers and children
- Encourage children to attend the schools regularly
- Provide writing material, and work books to children
- Make children participate in all activities pertaining to resurrection of normalcy in the school
- Try to inculcate conducive attitudes to enable the students to play a positive role in self-development
- Establish village level education committees
- Identify local groups that could conduct smooth functioning of education activities

7.6.6. Rehabilitation of the Elderly, Women

The elderly, women, and children are more vulnerable after a major disaster. Hence the following

measures will help in their rehabilitation:

- Identify familiar environs to rehabilitate elderly, women
- Make efforts to attach destitute, widows with their extended family, if that is not possible then identify foster families
- Organize regular counselling to strengthen the mental health of women.
- Initiate various training programmes to make the women economically self-sufficient
- Give due attention to health, nutrition and hygiene in the long-term rehabilitation package for women.
- Activate/reactivate the anganwadis (day-care centres), and old-age homes within the shortest possible time
- Set up at least one multi-purpose community centre per village
- Make efforts to build residential female children's homes at the block level
- Set up vocational training camps to improve the skills of orphans and children
- Promote self-help groups
- Ensure their safety against any violent situations

7.6.7. Rehabilitation of Children

As per the directions from the Hon'ble Supreme Court to the NDMA to concentrate on the Search and Rehabilitation of children in the event of disaster. The DDMAs will ensure constituting a special field level team on the site of the disaster from the Departments dealing with the welfare of children for instance Nutrition and ICDS division of the Social Justice, Empowerment and Welfare Department, Anganwadi workers of Health Care, Human Services and Family Welfare Department.

The team will:

- Ensure that the food provided in the relief has adequate nutritional values for the children
- Ensure that children are provided with shelter and appropriate clothing.
- Address proper facilities for the safety of children against vulnerable situations.
- Ensure arrangements for proper hygiene, schooling (admission to ICDS, nearby schools) and health attention (immunization against epidemics like polio, hepatitis B, etc.)
- Organise regular psychosocial care for the children to help them overcome trauma.
- Ensure legal custodian of inheritance issues, custody if need arises.
- Ensure adequate necessary care to the special children or differently-abled children.
- Create a database of children affected by the disaster, number of differently-abled children, orphans.
- Monitor the wellbeing of the children after they have been rehabilitated to safer places by their families, realtives or by any other organisation.

7.6.8. Economic Rehabilitation

The major components of economic rehabilitation are livelihood restoration and ensuring the continuity of businesses, trade, and commerce. Restoring employment and income generating opportunities to disaster affected communities is a vital component of post-disaster reconstruction. Livelihood opportunities are severely disrupted by the destruction or loss of essential assets; with the result that people are unable to engage in normal income generating activities; become demoralized and dependent on humanitarian aid. Economic recovery should be based on:

- Analysis of existing livelihood strategies and sustainability of businesses
- A comprehensive analysis of existing and future risks
- The vulnerabilities of the affected families
- The accessibility of linkages to external influences and institutions including skills and knowledge
- Access to functioning markets

As per the Para 9.5.1 of NPDM – the 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 marginalized and vulnerable sections.

7.6.9. Psychological Rehabilitation

Another crucial dimension of disaster rehabilitation is psychological rehabilitation. Dealing with victim's psychology is a very sensitive issue and must be dealt with caution and concern. The psychological trauma of losing relatives and friends, and the scars of the shock of disaster event can take much longer to heal than the stakeholders in disaster management often realize. Thus, counselling for stress management should form a continuous part of a disaster rehabilitation plan. Efforts should be made to focus more on:

- Psycho-therapeutic health programmes
- Occupational therapy
- Debriefing and trauma care
- Tradition, values, norms, beliefs, and practices of disaster-affected people

7.7. Fund Mobilization

7.7.1. Background

Reconstruction and rehabilitation projects, after a major disaster, are usually highly resource intensive. Such projects are typically financed through the State exchequer. The State Nodal Department for Disaster Management shall finalize the fund mobilization strategy, incorporating appropriate conditions governing flow of funds, its disbursement, and usage as per norms decided by the Central Government. This will include:

- Estimation of funds required based on the detailed damage assessment reports and consolidation of the same under sectoral and regional heads

- Contracting with funding agencies and evolving detailed operating procedures for fund flow and corresponding covenants.

7.7.2. Funds Disbursement and Monitoring

The funds raised through funding agencies are usually accompanied by stringent disbursement and usage restrictions. It is therefore important to monitor the disbursement of funds to ensure that none of the covenants are breached. The fund disbursal shall be monitored by the State Government by:

- Prioritizing resource allocation across approved projects
- Establishing mechanisms for disbursement of funds to the beneficiaries
- Strengthen the monitoring mechanisms for fund utilization and progress of implementation

8. Capacity Development – An Overview

8.1. Background

Capacity development covers strengthening of institutions, mechanisms, and capacities at all levels of all stakeholders. The United Nations International Strategy for Disaster Reduction (UNISDR) defines 'Capacity Development' for DRR as follows:

“The process by which people, organizations and society systematically stimulate and develop their capability over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions – within a wider social and cultural enabling environment.” (UNISDR, 2009)

It is an important component of investing in disaster risk reduction. In the domain of disaster risk management, the Sendai Framework emphasizes the need for enhancing the technical, financial, and administrative capabilities of institutions, governments, and communities to deal with the identified risks at different levels. The framework calls for reinforcing the capacity to implement, and enforce risk reduction measures. Capacity development commonly refers to a process that is driven from the inside and starts from existing capacity assets. The framework underlines the need for capacity development of women in disaster management and building their ability to participate effectively in managing disaster risk.

Investing in capacity development for DRR will be a continuing process to enhance the capability of individuals, agencies, and communities to improve the performance of their DM functions. The process of capacity building will include elements of human resource development, i.e., individual training, organizational development such as improving the functioning of groups, and the strengthening of organizations, regulations, and institutions. Involving stakeholders through participatory approaches is essential to establish ownership and commitment. The sustainability of capacity development initiatives increases in direct relation to the level of participation and ownership of the internal partners. In order for capacity development for disaster risk reduction to be effective, it must be clear in its purpose.

As capacity development entails activities on various levels, i.e. legal and institutional frameworks, system of organisations, organisation and human and material resources, it is necessary to address challenges on all of them by implementing a mix of activities, on short and long term. The reason for this is that changes at one level often require changes at other levels too, as the levels are interdependent. Therefore, the focus of many capacity development efforts for DRR must go beyond human resource development and pay enough attention to organizational and institutional issues. Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the resilience to disasters. Investing in capacity development is the cost-effective way to save lives, prevent or reduce losses and ensure effective recovery and rehabilitation.

The NPDM 2009 underlines the need for a strategic approach to capacity development and notes that the active and enthusiastic participation of various stakeholders is necessary for it to be

effective. The national policy notes that capacity development must address the challenge of "putting in place appropriate institutional framework, management systems and allocation of resources for efficient prevention and handling of disasters."

8.2. Capacity Development Themes

The capacity development covers all aspects of disaster management. The key aspects and broad thematic areas for capacity development applicable to these dimensions of DM are summarized in Table 12. The list is indicative, illustrative, and not exhaustive. Even those are indicative and in consonance with national, regional, and global practices, there will be changes, which will be incorporated in the periodic revisions of the plan and during its implementation. The effort will be to follow the emerging best practices.

Table 12: Summary of Broad Capacity Development Themes

Capacity Development Themes	
Key Aspect	**Thematic Areas**
Prevention or mitigation for disaster risk reduction	• Hazards, Risk, and Vulnerability Assessment • Human resource development • Institutional strengthening • Launching demonstration projects • Safety education in educational institutions • Improve the awareness and preparedness of stakeholders at all levels • Documenting lessons from previous disasters and ensuring their wide dissemination • Preparing DM plans, regular updating, and mock drills • Institutional arrangements, policies, legal support, and regulatory framework • Developing appropriate risk transfer instruments by collaborating with insurance companies and financial Institutions • Strengthening early warning systems • Mainstreaming of disaster risk assessment, mapping and management into development plans and programs • Revision of building codes and standards for rehabilitation reconstruction practices both for urban and rural areas

	• Retrofitting techniques • Rapid visual surveys for safety evaluation of buildings • Training and skill development for masons and other artisans • Reinforce systems to implement, monitor, and enforce regulations for DRR to promote disaster- resistant built environment • Promoting community-based DM taking into account specific needs, regional diversities and multi- hazard vulnerabilities • Design and implement social safety-net mechanisms, including community-based systems • Disaster resilience of health care systems by integrating disaster risk management into primary, secondary and tertiary healthcare • 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 • Preparedness and response plans at all levels • Community-based DRR and DM
Effective preparedness and response	• Emergency response capabilities EOCs, infrastructure, equipment upgrades and adoption of best available technologies • Strengthening of the Fire and Emergency Service through revamping, institutional reforms, and modernization • Comprehensive revamping of Fire and Emergency Services with institutional reforms and modernization • Adoption and adaptation of emerging global good practices • Rigorous training and HRD of first responders • Early warnings, maps/ satellite data/ effective dissemination of information • Table-top exercises, simulations and mock drills to improve operational readiness of the plans • Rescue equipment at all levels

	• Systems to provide basic services in emergencies • Housing and Temporary shelters • Medical care for casualties, health care and sanitation • Power and fuel supply management • Transportation systems and network • Logistics and supply chain management • Media relations • Managing the dead, disposal of animal carcasses, and debris • Collection and management of data • Legal services/support
Recovery and Build Back Better	• Post-Disaster Needs Assessment systems and expertise • Credible damage assessment mechanisms and expertise • Planning capabilities to ensuring coherence of BBB with overall development efforts and goals • Studies and research for incorporating resilience into BBB models • Studies on past disasters and recovery to draw useful lessons • Studies on past disasters and recovery to draw useful lessons

8.3. Training Institute for Disaster Management

8.3.1 National Level Training Institutions: NIDM

The NIDM, in partnership with other research institutions has a capacity development as one of its major responsibilities, along with training, research, documentation and development of a National level information base. It will network with other knowledge-based institutions and function within the broad policies and guidelines laid down by the NDMA. It organises training for trainers, DM officials and other stakeholders. The NIDM will strive to emerge as a 'Centre of Excellence' in the field of Disaster Management. The NIDM will play an important role in developing and facilitating the implementation of a national training schedule for DM. It will also be the nodal institution for Regional and International cooperation for training.

8.3.2. State Level Training Institutions:

The NDMA has initiated a project to establish Disaster Management Institute in the State which will be supported by the National Institute of Disaster Management. This State Institute of Disaster Management will be created with joint partnership of NIDM and SDMA. The timeline of the project is for three years designed to provide a handholding support to the State so that by the end of the timeline the State will have a self-sustained and fully functional establishment for disaster trainings. The purpose of this State Institute for Disaster Management is to create capacity development in the domain of DM at all levels of government and across various autonomous institutions. It also stresses the importance of capacity development efforts to promote community-based DM efforts. The policy notes that to sustain DRR, it is necessary to undertake capacity development across the education sector covering schools to professional institutions. It recognizes that skill development in all sectors to incorporate multi-hazard resistant features along with strengthening of relevant licensing, certification, and standards.

8.4. Capacity Development of Local Bodies – Rural and Urban

The capacities of Panchayats and ULBs have to be developed in the sphere of disaster management. Without adequate capacity development, the local bodies cannot contribute effectively to disaster management or in ensuring the proper implementation of DM plans. Capacity development is also necessary for true empowerment of the bodies of local self- governance. The elected leaders and officials of Panchayats and ULBs should be trained to competently handle different types of crises, contribute to disaster preparedness, make proper use of available warnings, organize operations such as search, rescue, relief, medical assistance, and carry out damage assessment. They should also have sound understanding of the needs of proper post-disaster rehabilitation. The local leadership can play a big role in disaster management in all stages and in DM planning. Capacity development must aim at increasing the competence of local bodies in all aspects of disaster management, mainstreaming DRR, and in promoting a culture of disaster prevention and DRR. The capabilities of the local bodies have to be developed in financial, technical, and managerial spheres. The state level training institutes (AATI, SIRD, and others) will develop need-based training programs for the capacity development of rural and urban local bodies.

8.5. Training Communities

Enhancing the capacity of communities, as they are the first responders to disasters, is a significant part of the capacity development process. The Sendai Framework notes the need to build the knowledge of civil society, communities, and volunteers on disaster risk reduction. Capacity building has to include awareness, sensitisation, orientation, and developing skills of communities and community leaders. Assistance from SDRF, NDRF, Civil-Defence, civil society organisations, local community-based organizations, and Self-Help Groups will been couraged. 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.

8.6. National Disaster Resource Networks

India Disaster Resource Network (IDRN) is a portal providing nation-wide inventory of DM-related resources covering almost all the basic needs. It is a web-based platform, for managing the inventory of equipment, skilled human resources and critical supplies for emergency response. Primary focus of IDRN portal is to enable the decision makers to find answers on availability of equipment and human resources required to combat any emergency situation. All four districts of the State has been registered in the IDRN portal and districts has been making inventory of all the disaster resources.

8.7. Capacity Development - Ministries and States

The State Governments will take actions for capacity development of different stakeholders as shown in Table 13 given below on the basis of proper capacity development needs assessment.

Table 13: Capacity development activities

Sl. No	**Task**	**State**	**Activities**
1	Deploying good resources, advance technology and equipment	SDMA, LR&DM Dept., all Nodal Dept./ All Line Depts.	i. Identifying existing ones ii. Identification of gap between existing ones and those required on the basis of hazard risk and vulnerability and lessons learnt from recent past disasters iii. Procurements of additional equipment with advanced technologies
2	Resource Network	LR&DM Dept., DDMA all Nodal Dept./ All Line Depts.	i. Maintaining the resource network ii. Monitoring and maintaining the resource data iii. Regular updating the resource data
3	Communication	SDMA, DDMA, Sikkim Police and UDD	Developing fail safe communication with advance technology
4	National Disaster Information System	LR&DM Dept. and DDMA	i. Interface with the National Emergency Communication Network (NECN) and HRVA ii. Facilitate access to State and other authorised users iii. Examine integration of national HRVA

			data base with the IDRN for effective resource management
5	Early Warning	State/ UT and nodal Dept. of the States, Panchayats, ULBs	i. Improve the last mile connectivity ii. Up-grade technical infrastructure and systems
6	Strengthening training institutes for disaster management	SSDMA, LR&DM Dept.	i. Research and extension support grants ii. Create/strengthen state level DM institutes
7	Strengthening of Emergency Operation Centres	SDMA, LR&DM Dept., DDMA	i. Review functioning ii. Improve capabilities based on experience after each disaster event iii. Deploy best of ICT iv. Conduct capacity audits of EOCs v. Setup State and District level EOCs with adequate trained manpower vi. Regular reviews and improvement of SOPs, protocols, etc. vii. Mobile control rooms
8	Strengthening of Fire and Emergency Services	NDMA, SDMA and LR&DM Dept.	Revamping with institutional reforms, modernization, and changes in legal framework
9	Mainstreaming of DM into local governance	SDMA, LR&DM Dept., DDMA, and all Nodal Dept./All Line Dept.	Conduct trainings and workshops on incorporating DM plans into local governance
10	Strengthening Community skills	SDMA,LR&DM Dept., DDMA, and all Nodal Dept.	i. Training on CBDR and preparedness at local levels ii. Address gender issues, and special needs of children, disabled, aged, etc. holistically in the DM context iii. Promote private sector and civil society

			involvement iv. Promote PPPs
11	Use of media fordisaster management	SDMA, LR&DM Dept. and all Nodal Dept.	Trainings and Workshops
12	Human Resource Development	SDMA, LR&DM Dept. and all Nodal Dept.	Organize relevant training programs & refresher courses
13	To enhance DM and DRR capacities at local levels	SDMA and DDMA	Conduct trainings in disaster management at district level
14	Developing the technical capacities and professional disciplines	NDMA, NIDM and SDMA	i. Technical and professional programs relevant to various specialized aspects of DM ii. Develop ToTs iii. Research in key areas of DM
15	Promoting disaster management education and research	SDMA, DDMA, Education Dept. and LR&DM Dept.	i. Incorporate subjects of relevance to DM in curriculum ii. Introduced specialized programs, degrees, courses and diplomas iii. Promote relevant research projects, programs within institutes and through research grants
16	Sensitization and education for political leaders	SDMA, DDMA and LR&DM Dept.	Educate political leadership and elected representatives on risk sensitive planning, disaster prevention, and mitigation

9. Financial Arrangements

9.1 Background

The financial aspects of Disaster Risk Management entail various factors ranging from development planning to immediate relief post disaster, followed by investments made for reconstruction. As per the prevailing practice, the funds for preparedness, mitigation and reconstruction are allocated by the Government as a part of budgetary allocations.

However, a firm commitment is made by the Central Government regarding funds for immediate relief as recommended by the FC and precipitated for five years. The FC makes recommendations regarding financing of disaster risk management also, amongst other subjects being dealt by it. The Second FC made a provision for 'Margin Money' for meeting out such contingencies. Subsequent FCs have reviewed various aspects of funding disaster management in the country in consultation with various stakeholders. Based on their recommendations, various funds have been maintained by Govt. of India and States for funding disaster relief. The 13th Finance Commission (FC -XIII) has given its recommendations for maintaining National Disaster Response Fund and State Disaster Response Fund in accordance with the DM Act 2005. The FC-XIV has taken them forward and made relevant recommendations. Regarding grants for disaster management, Fifteen Finance Commission (FC-XV) has recommended allocation of disaster mitigation fund at national, state and district levels.

9.2. National Disaster Response Fund

The state government is primarily responsible for undertaking rescue, relief and rehabilitation measures in the event of a disaster. At times, its efforts need to be strengthened and supplemented with Central assistance. Providing financial assistance for disaster preparedness, restoration, reconstruction and mitigation in the event of a natural disaster are not part of National Disaster Response Fund's mandate. In the event of a calamity of a severe nature, where the requirement of funds for relief operations is beyond the funds available in the State's Disaster Response Fund account, additional Central assistance is provided from National Disaster Response Fund, after following the laid down procedure.

As per this procedure, the State Government is required to submit a memorandum indicating the sector wise damage and requirement of funds. On receipt of the memorandum from the State, an Inter-Ministerial Central Team is constituted and deputed for the spot assessment of damage and requirement of funds for relief operations, as per the extant items and norms of State Disaster Response Fund and National Disaster Response Fund. A Sub-Committee of the NEC will examine the request under Section 6 of the DM Act, 2005. The NEC will assess the extent of assistance and expenditure, which can be funded from the National Disaster Response Fund as per norms and make recommendations. Based on the recommendations of Sub-Committee of the NEC, a High Level Committee (HLC) will approve the quantum of immediate relief to be released from National Disaster Response Fund. The Disaster Management Division of MHA will provide support to the HLC. The MHA shall over see the utilization of funds provided from the National Disaster

Response Fund and monitor compliance with norms.

9.3. National Disaster Mitigation Fund

As per Section 47 and 48 of the DM Act 2005, Central Government constituted a National Disaster Mitigation Fund for projects exclusively for the purpose of mitigation. The FC-XIV restricted its recommendation to existing arrangements on the financing of the already constituted funds (National Disaster Response Fund and State Disaster Response Fund) only, as per its terms of reference. However, The FC-XV has recommended allocation for mitigation fund at the national and state levels.

9.4. Recommendation of the Fourteenth Finance Commission

Regarding grants for disaster management, Fourteenth Finance Commission (FC-XIV) has adopted the procedure of the FC-XIII and used past expenditures on disaster relief to determine the State Disaster Response Fund corpus. While making recommendations, FC-XIV has taken note of the additional responsibility cast on States and their district administrations under the Disaster Management Act, 2005. FC-XIV has also taken note of the location-specific natural disasters not mentioned in the notified list, which are unique to some States.

9.5. Recommendation of the Fifteenth Finance Commission

As per Section 47 and 48 of the DM Act 2005, included in Chapter IX, the National, State and District Disaster Mitigation Funds have been set up. The Commission has recommended multi-tier allocation under National Disaster Risk Management Fund/ NDRMF and State Disaster Risk Management Fund/ SDRMF. At present the National Disaster Mitigation Fund/ NDMF and State Disaster Mitigation Fund/ SDMF constitute 20% of the National Disaster Risk Management Fund/ NDRMF and State Disaster Risk Management Fund/ SDRMF respectively. The FC-XV has made no specific recommendation for the District Disaster Response Fund/ DDRF and District Disaster Mitigation Fund/ DDMF. However the guidelines for National Disaster Mitigation Fund will be applicable to all three levels of Mitigation Funds. The 15th Finance Commission is expected to submit its recommendations for the remaining period of four years later this year.

9.6. State Disaster Response Fund

The State Disaster Response Fund shall be used only for meeting the expenditure for providing immediate relief to the victims of cyclone, drought, earthquake, fire, flood, tsunami, hailstorm, landslide, avalanche, cloudburst, pest attack, frost and coldwave.While the state can draw from State Disaster Response Fund for the emergency response and relief, there are provisions to adjust a portion of the expense against funds released from National Disaster Response Fund between the fiscal year in which National Disaster Response Fund is released and the expenses incurred by state in the previous fiscal year under State Disaster Response Fund. In case the same state faces another severe disaster during the same year, nor education will be made while releasing assistance from the National Disaster Response Fund. The state-specific disasters within the local context in the State, which are not included in the notified list of disasters eligible for assistance from State Disaster Response Fund and National Disaster Response Fund, can be met from State Disaster Response

Fund within the limit of 10 percent of the annual funds allocation of the State Disaster Response Fund. The two funds have provisions for the following:

- Gratuitous Relief
- Search and Rescue operations, as per actual cost incurred
- Relief measures
- Air dropping of essential supplies
- Emergency supply of drinking water
- Clearance of affected area, including management of debris
- Agriculture, animal husbandry, fishery, handicraft, artisans
- Repair/ Restoration (of immediate nature) of damaged Infrastructure
- Capacity development

The default period of assistance is as per norms prescribed. However, based on assessment of the ground situation, the SEC may extend it beyond the prescribed time limit subject to the condition that expenditure on this account should not exceed 25 percent of State Disaster Response Fund allocation for the year. The SEC will organize contributions from the relevant State Government, administer the State Disaster Response Fund and invest the accretions to the State Disaster Response Fund in accordance with the norms approved by GOI from time to time.

State must meet the capacity development expenses from the State Disaster Response Fund and not National Disaster Response Fund, subject to a limit of 10 percent of the State Disaster Response Fund. Capacity Development covers the following:

- Setting up/strengthening of Emergency Operation Centres (EOCs) in the State
- Training/Capacity Building of stakeholders and functionaries in the State
- Supporting disaster management centres in the state
- Preparation of Disaster Management Plans based on Hazards, Risks, and Vulnerability Analysis
- Strengthening of SDMA and DDMA

In most cases, the SEC and, if necessary, a central team will carry out need assessment. The State Governments must take utmost care and ensure that all individual beneficiary-oriented assistance is disbursed through the beneficiary's bank account. The scale of relief assistance against each item for all disasters including 'local disaster' should not exceed the norms of State Disaster Response Fund/ National Disaster Response Fund. Any amount spent by the State for such disasters over and above the ceiling would be borne out of the resources of the State Government and not from State Disaster Response Fund.

For disasters needing central support over and above the State Disaster Response Fund, the MHA processes the request of the state government for support from the Government of India. The Ministry of Finance will make the budgetary provisions for the relief funds required for strengthening response mechanisms, disaster management institutions, capacity development of stakeholders, and DRR.

9.7. State Disaster Mitigation Fund (SDMF)

As per section 48 DM Act 2005 the State Government has constituted State Disaster Mitigation Fund/ SDMF for projects exclusively for the purposes of mitigation vide Government Gazette No. 50 Dated 1st March 2021. The FC – XV restricted its recommendation to existing arrangements on the financing of the already constituted funds (National Disaster Response Fund and State Disaster Response Fund) only, as per its terms of reference. Mitigation fund should typically provide small grant community-based local initiatives, persuing approach which promotes adjustment with hazards through soft measures, rather than controlling them through hard measures.

The NDMA and SDMA should supervise the SDMF as per the provision in DM Act 2005.

9.8 Statutory Provision

9.8.1 Financing Prevention, Mitigation, and Preparedness

The provisions relating to funding of prevention, mitigation, and preparedness, as per DM Act 2005 are listed below:

i. Section 6 (g) provides that NDMA may recommend provision of funds for the purpose of mitigation;

ii. Section 18 (2) (f) provides that SDMAs may recommend provision of funds for mitigation and preparedness measures;

iii. Section 35 (2)(c) provides that the Central government may ensure appropriate allocation of funds for prevention of disaster, mitigation, capacity -building and preparedness by the Ministries or Departments of the Government of India;

iv. Section 36 (e) provides that the Ministries or Departments of Government of India shall allocate funds for measures for prevention of disaster, mitigation, capacity-building and preparedness;

v. Section 38 (2) (d) provides that the State Government may allocate funds for measures for prevention of disaster, mitigation, capacity-building and preparedness by the departments of the Government of the State in accordance with the provisions of the State Plan and the District Plans;

vi. Section 39 (c) provides that the departments of the state government shall allocate funds for prevention of disaster, mitigation, capacity- building and preparedness

9.8.2 Allocation by Ministries and Departments

Section 49 of DM Act 2005 provides for Allocation of funds by Ministries and Departments. It states that:

- Section 49 (1) – Every Ministry or Department of the Government of India shall make

provisions, in its annual budget, for funds for the purposes of carrying out the activities and programmes set out in its disaster management plan.

- The provisions of sub-section (1) shall, mutatis mutandis, apply to departments of the Government of the State.

9.8.3 Provisions in the Act for Disaster Risk Reduction

Some of the statutory provisions incorporated in the Disaster Management Act, 2005 for mainstreaming DRR and financing thereof are reproduced below.

i. Section18(2) provides that the SDMA may take such other measures for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with the threatening disaster situation or disaster as it may consider necessary;

ii. Section 18 (2) (g) provides that the SDMA may review the development plans of the different departments of the State and ensure that prevention and mitigation measures are integrated there in;

iii. Section 22 (2) (b) provides that the SEC may examine the vulnerability of different parts of the State to different forms of disasters and specify measures to be taken for their prevention or mitigation;

iv. Section 23 (4) (b) provides that the State Plan shall include measures to be adopted for prevention and mitigation of disasters;

v. Section 23 (4) (c) provides that the State Plan shall include the manner in which the mitigation measures shall be integrated with the development plans and projects;

vi. Section 23 (4) (d) provides that the State Plan shall include, capacity-building and preparedness measures to be taken;

vii. Section 30 (2) (iv) provides that the District Authority may 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;

viii. Section 30 (2) (xiii) provides that the District Authority may facilitate community training and awareness programmes for prevention of disaster or mitigation with the support of local authorities, governmental and non-governmental organisations;

ix. Section 30 (2) (xiv) provides that the District Authority may set up, maintain, review and upgrade the mechanism for early warnings and dissemination of proper information to public;

x. Section 31 (3) (b) provides that the District Plan shall include the measures to be taken, for prevention and mitigation of disaster, by the Departments of the Government at the district

level and local authorities in the district;

xi. Section 32 (a) provides that every office at the district level shall prepare a Plan setting out:

- provisions for prevention and mitigation measures as provided for in the District Plan and as is assigned to the department or relevant agency;
- provisions for taking measures relating to capacity-building and preparedness as laid down in the District Plan;
- the response plans and procedures, in the event of, any threatening disaster situation or disaster;

xii. Section 38 (2) (e) provides that the State Government may ensure integration of measures for prevention of disaster or mitigation by the departments of the State Government in their development plans and projects;

xiii. Section 38 (2) (f) provides that the State Government may integrate in the State development plan, measures to reduce or mitigate the vulnerability of different parts of the State to different disasters;

xiv. Section 39 (b) provides that the departments of State Government may integrate into its development plans and projects, the measures for prevention of disaster and mitigation;

xv. Section 40 (1) (a) (ii) mandates all department of the State to prepare a disaster management plan that shall integrate strategies for the prevention of disaster or the mitigation of its effects or both with the development plans and programmes by the department.

9.9. Implementation of DRR – Financial Aspects

9.9.1 Public Funded Schemes

The primary mechanism for funding DRR related schemes and projects in India are through Public Funded Schemes at Central and State level. Various nodal Ministries play a key role in disaster management as far as specific disasters are concerned. These nodal Ministries as well as other Ministries and Departments have dedicated schemes, aimed at disaster prevention, mitigation, capacity building, etc. within their particular domain. Existing examples include the scheme of MHA for Strengthening of Fire and Emergency Services, Financial assistance to ATIs and other Training institutions for disaster management, Integrated Coastal Zone Management programme of MOEFCC, and flood management and flood forecasting programmes of MOJS. The DOS has a Disaster Management Support Programme and MOES has a project on Tsunami and Storm Surge Warning System. NDMA is implementing an important World Bank funded project for cyclone risk mitigation. The National Cyclone Risk Mitigation Project encompasses cyclone forecasting tracking and warning systems, capacity building and structural measures.

Apart from this, many of the schemes, which are implemented by various ministries/ departments, have embedded DRR components, as for example, those implemented by the MOEFCC. There are many other programmes that improve societal resilience, which is a critical component of DRR, such as the National Rural Health Mission, Mahatma Gandhi Employment Guarantee Scheme, and

the Urban Development's Urban Renewal Mission.

Outlay for reconstruction activities are normally embedded in the schemes of the Union Government to ensure that "Building Back Better" is in consonance with the approved programs. Post disaster reconstruction work is funded by the Union Government through increased outlay for the on-going infrastructure projects in the region and providing more untied grant to the affected State.

9.9.2 Flexi Funds as a part of Centrally Sponsored Schemes

As per Department of Expenditure, Ministry of Finance, the NITI Aayog has issued instructions for rationalization of Centrally Sponsored Schemes (CSS), vide OM No. O—11013/02/2015-CSS & CMC dated August 17, 2016. As per para 6 of the said OM, flexi-funds available in each CSS has been revised to 25% for States, and 30% for UTs, of the overall annual allocation under each scheme. The flexi-fund component within the CSS can be used to achieve the following objectives:

To provide flexibility to States to meet local needs and requirements within the overall objective of any given Scheme at the sub-head level

To pilot innovation to improve efficiency within the overall objective of any given Scheme at the sub-head level

To undertake mitigation/ restoration activities in case of natural calamities, or to satisfy local requirements in areas affected by internal security disturbances

The utilization of flexi-funds for mitigation/restoration activities in the event of natural calamity must be in accordance with the broad objectives of the CSS. It is possible to combine flexi-fund component across schemes within the same sector but the flexi-funds of a CSS in a particular sector however, shall not be diverted to fund activities/schemes in another sector. The flexi -funds constitute a source of funding for mitigation activities within overall objectives of the particular CSS(s) under which they are allocated and this would still leave a gap in terms of funding purely mitigation related projects especially those addressing crosscutting themes that cover multiple sectors. The latter would be covered by setting up of National Disaster Mitigation Fund and State Disaster Mitigation Funds.

9.9.3 Externally Aided Projects

Besides the funds which are available through public funded schemes, efforts have also been made by the centre to mobilize the resources from external funding agencies for vulnerabilities assessment, capacity development, institutional strengthening of response mechanism and mitigation measures etc. The Central Government would continue to support states for reconstruction and rehabilitation in the aftermath of major disasters through aid from Word Bank and other such external funding agencies.

9.10. Risk Transfer and Insurance

As of now Government of India is acting as a self-insurer for the purpose of maintaining relief funds (National Disaster Response Fund and State Disaster Response Fund). The funds are monitored by MHA in consultation with Ministry of Finance. The amount committed for State Disaster Response Fund is invested by the Union in government securities. MHA has issued guidelines in consultation with Ministry of Finance for the maintenance and encashment of the securities as and when required. However, need for projects or risk transfer instruments by private agencies, is also acknowledged by the Government. The corresponding policy changes and fund requirement is to be deliberated in detail in consultation with the IRDA, insurance sector and other stakeholders.

10. Maintaining and updating thePlan

10.1. Background

Regular maintenance is critical to ensure the relevance and effectiveness of the DM plans. Plan maintenance is the dynamic process. The plan must be periodically updated to make it consistent with the changes in Government policies, initiatives, and priorities as well as to incorporate technological changes and global experiences. Evaluating the effectiveness of plans involves a combination of training events, exercises, and real-world incidents to determine whether the goals, objectives, decisions, actions, and timing outlined in the plan led to a successful response. In this way, the emergency preparedness exercises become an integral part of the planning process. The DM planners must be aware of lessons and practices from various parts of India as well as lessons from across the world. The trainings, mock drills and exercises is crucial to evaluating the operational aspects of the plan, rectify gaps, and improving the efficiency of the plan. The likelihoods of emergencies and actual occurrences are also occasions for evaluating the plan, making innovations, and for updating the plan, SOPs and guidelines. At times, operations experience setbacks due to outdated information, ineffective procedures, incorrect role assignments, and outdated norms. Further, the priorities for a jurisdiction may change over time as the makeup of the included communities change, as resources expand or contract, and as capabilities evolve.

10.2. Training

At different levels, the nodal agency tasked with developing respective DM plan has to disseminate it to all other agencies associated with the plan execution having with specific responsibilities (State Governments, District Authorities, etc.). These key stakeholder agencies are required to train their personnel, so that they have the knowledge, skills and abilities needed to perform the tasks identified in the plan. Each agency shall assign nodal officers for DM and prepare adequate training schedule.

Each nodal agency for DM must hold, in accordance with a mandatory timetable, training workshops with regular mock drills, at least twice a year. Such programs are crucial to ensure full preparedness and to maintain operational readiness of the disaster response operation teams, institutional mechanisms, and the equipment. These drills will be organized to test their readiness to deploy within the shortest possible time following the DMP activation. They shall be conducted in a manner similar to that of the drills carried out by fire fighting department or the army units. These workshops and drills must be held at the pre-designated locations or base camps under the guidance of the designated incident commanders and associated departmental heads. The objective of all these trainings and drills would be to both familiarize the teams with the DMP and to increase their operational efficiencies. The trainings are crucial because they go beyond concepts and guidelines into inculcating in the individuals the critical importance of working as a coherent team for emergency response with a clear chain of command. The workshops and drills will also provide an opportunity to practice SOPs. These workshops would also give the teams an opportunity to develop all the stakeholders into a cohesive response unit.

10.3. Testing the Plan and Learning to Improve

Evaluating the effectiveness of a plan involves a combination of training events, exercises and real-time incidents to determine whether the goals, objectives, decisions, actions and timings outlined in the plan led to a successful response. The purpose of exercises and drills is to promote preparedness by testing the plan with equal participation of all relevant stakeholders. The process of evaluation and remedial actions will identify, illuminate, and correct problems with the DMP. This process must capture information from exercises, post-disaster critiques, self-assessments, audits, administrative reviews, or lessons-learned processes that may indicate that deficiencies exist. Members of the planning team should reconvene to discuss the problem and to consider and assign responsibility for generating remedies across all mission areas.

Remedial actions may involve revising planning assumptions and operational concepts, changing organizational tasks, or modifying organizational implementing instructions (i.e., the SOPs/SOGs). Remedial actions may also involve reassessment of capabilities, revisiting assumptions made in the DMP, and finding solutions to overcome the deficiencies. The final component of a remedial action process is a mechanism for tracking and following up on the assigned actions. As appropriate, significant issues and problems identified through a remedial action process and/or the annual review should provide the information needed to allow the planning team to make the necessary revision(s) to the plan.

10.4. Revise /Update

This step closes the loop in the planning process. It focuses on adding the information gained by exercising the plan to the lessons learnt while executing, and start the planning cycle all over again. All the relevant stakeholders should establish a process for reviewing and revising the plan. Reviews should be a recurring activity. Each DM plan must be reviewed at least once in a year. It should also be reviewed and updated as indicated below:

- Major review and revisions after each major incident
- After significant change in operational resources (e.g., policy, personnel, organizational structures, management processes, facilities, equipment)
- Subsequent to any notification or formal update of planning guidance or standards
- After every case of plan activation in anticipation of an emergency
- After the completion of major exercises
- A change in the district’s demographics or hazard or threat profile
- Enactment of new or amended laws or ordinances

In exceptional circumstances where the magnitude of the incidence or the situation demands/needs extra measures to be taken, appropriate authority will make necessary amendments.. As per section 11(4) of the DM Act, SDMP is to be reviewed and updated annually.

State Achievement as per the national and global directives: Annexure-I

Sendai Framework Priorities

- ***Understanding disaster risk***

1. Teacher's Handbook on Disaster Risk Reduction introduced for Classes IV to VIII
2. Awareness on complex disasters introduced to Technical Officers of the government.
3. Civil Service Inductee officers given training on Disaster Management
4. Engineers, Architects and Masons have been trained on safe construction practices

- ***Strengthening disaster risk governance to manage disaster risk.***

1. Sikkim State Disaster Management Authority was established in the year 2010
2. Sikkim Disaster Management Act was passed in the year 2007
3. State Disaster Policy was framed in the year 2007
4. State and District Disaster Management plans are formulated every year
5. Specialist manpower has been appointed in various roles under SSDMA

- ***Investing in disaster risk reduction for resilience.***

1. Early Warning System for Landslide has been made operational at Chandmari Landslide

   Sikkim State Disaster Management Authority (SSDMA) in collaboration with AMRITA Vishwa Vidyapeetham, South India has installed a real-time landslide early warning system at Chandmari, Gangtok East Sikkim. The system collects real-time, continuous data from the sensors, perform basic analysis at the Field Management Center (FMC) located on the site in Chandmari, Sikkim and relay it to the Data Management Center (DMC) at the University, Kerela where detailed analysis is done and threshold situation is identified for disseminating warnings.

2. Mangan Landslide Mitigation Project is being undertaken in collaboration with DDMA (North) and NDMA

   The Landslide Mitigation Project at Mangan, North Sikkim is pilot project sponsored by NDMA and SSDMA and being implemented by SSDMA. A number of novel techniques are being used to stabilise the perennial landslide at Mangan.
   The primary stabilising measure includes six rows of piles. Originally 400 mm cast in situ concrete piles were envisaged. Due to problems at the site, the design for the pile has been changed to 300 mm cased and grouted piles. It is estimated that more than 400 piles will be embedded in the underlying bedrock.
   Besides piles, Self Drilling Anchors are also being installed, initially along the escarpments of the landslide. Shotcreting will placed on these faces and held against the escarpments by the self drilling anchors.
   The third measures being implemented are pressure relief holes and drainage system. The pressure relief holes will drain away the subsurface water and bring the

phreatic surface down and the surface drain network will convey both the subsurface water and the surface runoff to the jhora adjacent to the slide.

Currently, the top row of piles are being drilled and cast. So far ten piles have been drilled and four piles have been cast. Along escarpment, around 1500 m of SDA have been placed and grouted. Subsurface drainage and shotcreting of the escarpments will be conducted next.

SSDMA also is in the process of putting in place instrumentation for monitoring the performance of the various elements and understanding the behaviour of the slide. Inclinometers and piezometers will be placed in the body of the slide and an Automatic Weather Station (AWS) has already been installed at Mangan to monitor the rainfall at the site.

3. Pilot Project on reduction on GLOF at Shako Chu and South Lhonak Lakes is in the pipeline in collaboration with NDMA, SDC, DST and NIH

   The South Lhonak and Shako Chu lakes are a pro-glacial lake located in the northern part of the Teesta Basin, in Sikkim, Central Himalaya. These Lakes are one of the fastest growing lakes out of 14 potentially dangerous lakes susceptible to GLOFs in the Sikkim Himalaya region. In view of above the pilot project "Reducing Glacial Lake Outburst Floods (GLOF) Risk in Lhonak & Shako Chu Lakes of North District of Sikkim" has been proposed by National Disaster management Authority (NDMA). The prime objective of pilot project is to build disaster resilient communities by lessening the impact of glacial lake outburst hazard through incorporation of early warning system cum long term modern mitigation measures.

4. Earthquake Early warning has been installed at SEOC

   Augmentation of State Emergency Operation Center (SEOC) and installation of EQ-GUARD (Earthquake Sensor Alarm Equipment to issue alert before the arrival of strong shaking) gifted by JAPAN.

- ***Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.***

1. Reconstruction of Earthquake Damaged Rural Houses (REDRH) hasve been completed for 7505 number of houses. The houses are built in the principle of owners' driven reconstruction and 'Build Back Better".
2. Rapid Visual Screening for lifeline buildings such as Schools, Hospitals, Government Offices Fire Stations, and Police Stations has been completed from which the Gangtok Fire Station has been retrofitted.
3. Rapid Visual Screening for Schools buildings have ben completed and project report has been received.

State Achievement as per the national and global directives: Annexure-II	
Sl. No.	**Prime Minister's Ten Point Agenda**
01.	***All development sectors must imbibe the principles of disaster risk management****. This will ensure that all development projects - airports, roads, canals, hospitals, schools, bridges – are built to appropriate standards and contribute to the resilience of communities they seek to serve. Over the next couple of decades, most of the new infrastructure in the world will come up in our region. We need to ensure that we build it to best available standards of disaster safety. This is a smart strategy, which pays off in the long term.* *All our public expenditure must take into account risk considerations. In India, the 'housing for all' programme and 'smart cities' initiative represent such opportunities. India will work with other partner countries and stakeholders to build a coalition or centre for promoting disaster resilient infrastructure in the region. This will help generate new knowledge for hazard risk assessment, disaster resilient technologies and mechanisms for integrating risk reduction in infrastructure financing.* **Strategy for implementation**: Land Revenue and Disaster Management Department (LRDMD) through notification is making it mandatory for all the works departments to encompass proper geological stability reports, incorporate current technology for earthquake resilient features and implementation of the state building byelaws. The departments will ensure that the DPR for infrastructural development works are strictly prepared as per the guidelines.
02.	***Work towards risk coverage for all*** *– starting from poor households to small and medium enterprises to multi-national corporations to nation states. Currently, in most countries of the region, penetration of insurance is limited to only middle and upper-middle income groups. We need to think big and also think innovatively. States have an important role in not just regulating but also encouraging coverage for those who need it the most. In India, we have taken bold steps to ensure financial inclusion and risk insurance for the poorest. The Jan Dhan Yojana has brought millions of people into the banking system. The Suraksha Bima Yojana provides risk insurance to millions who need it the most. We have launched the Fasal Bima Yojana, which will provide risk cover to millions of farmers. These are the basic building blocks of resilience at the household level.* **Strategy for implementation**: Mass awareness and sensitisation programmes is being conducted to make the people aware of all the available risk insurance schemes.

03.	***Encourage greater involvement and leadership of women in disaster risk management***. *Women are disproportionately affected by disasters. They also have unique strengths and insights. We must train a large number of women volunteers to support special needs of women affected by disasters. We need women engineers, masons and building artisans supporting reconstruction, and women self help groups assisting livelihood recovery.* **Strategy for implementation**: Reservation for women in higher education and jobs in the State Government is the highest in the country. In the present State Gram Panchayat Election, 519 women were elected as Panchayats against the total seat of 1038 which constitutes 50% of the total seat. Similarly 57 women were elected as Zilla Panchayat members against the total seat of 113 which also constitutes 50.4% of the total seat. Sikkim State Disaster Management Authority (SSDMA) is ensuring that disaster management activities is conducted at all levels from Village to Block, District and State has full participation/membership of women. This has been and will predominantly be continuous affair in all future programmes.
04.	***Invest in risk mapping globally***. *For mapping risks related to hazards such as earthquakes we have widely accepted standards and parameters. Based on these, in India, we have mapped seismic zones, with five as highest seismic risk and two as low risk. For disaster risk related to other hazards such as chemical hazards, forest fires, cyclones, different types of floods, we need to evolve similar globally accepted risk categories. This will help us ensure that we have a common understanding of the nature and severity of disaster risks in different parts of the world.* **Strategy for implementation**: Multi- hazard risk vulnerability assessment (MHRVA) of state capital town Gangtok in 1:15000 scale and for all four districts in 1:50000 scale were carried out in 2012. SSDMA has also conducted MHRVA for the four district headquarters in 1:15000 scale in 2017. Further, SSDMA will conduct MHRVA of all sub-divisional headquarters and other major town areas in the State. Latest technologies like drones will be used for mapping of various hazards and vulnerabilities. SSDMA will also create web based application to enable public to upload information about landslide and forest fires.
05.	***Leverage technology to enhance the efficiency of our disaster risk management efforts***. *An e-platform that brings together organizations and individuals and helps them map and exchange expertise, technology and resources would go a long way in maximizing our collective impact.*

	Strategy for implementation: India Disaster Resource Network (IDRN) containing district resources is regularly updated by the districts. The State Control Room at New-Secretariat, Gangtok and District Emergency Operation Centres (DEOC) at Namchi, and Mangan are connected via satellite based communication system, under the National Disaster Management Service (NDMS) pilot project of Ministry of Home Affairs. SSDMA will endeavour to establish a network of Ham radio in the State. This facility is proposed to be installed at secondary and senior secondary schools for improving communication system during disaster. Students and teachers will be entrusted the task of keeping the communication afloat.
06.	***Develop a network of universities to work on disaster issues***. *After all, universities have social responsibilities too. Over the first five years of the Sendai Framework, we should develop a global network of universities working together on problems of disaster risk management. As part of this network, different universities could specialize in multi-disciplinary research on disaster issues most relevant to them. Universities located in coastal areas could specialize in managing risks from coastal hazards, and the ones located in the hill cities could focus on mountain hazards.* **Strategy for implementation**: SSDMA will encourage the Universities in the State to provide courses on disaster management and to involve students and faculty to conduct research on disasters prevalent in the Himalayan region for example, earthquake, forest fire, flash floods, GLOF, avalanches, landslide, hailstorm, etc.
7.	***Utilize the opportunities provided by social media and mobile technologies***. *Social media is transforming disaster response. It is helping response agencies in quickly organizing themselves, and enabling citizens to connect more easily with authorities. In disaster after disaster, affected people are using social media to help each other. We must recognize the potential of social media and develop applications for all aspects of disaster risk management.* **Strategy for implementation**: SSDMA is very active in the social media sphere through its own web portal, Facebook page and WhatsApp messaging group. Information about important events and developments are disseminated through these mediums. The feedback received from the public and stakeholders are considered seriously to strengthen disaster management.
08.	***Build on local capacity and initiative***. *The task of disaster risk management, particularly in rapidly growing economies, is so huge that formal institutions of the state can at best be*

	instrumental in creating the enabling conditions. Specific actions have to be designed and implemented locally. Over the last two decades, most community based efforts have been confined to disaster preparedness and contingency planning for the short term. We need to expand the scope of community based efforts and support communities to identify local risk reduction measures and implement them. Such efforts reduce risk and create opportunities for local development and sustainable livelihoods. Localization of disaster risk reduction will also ensure that we make the most of traditional best practices and indigenous knowledge. Response agencies need to interact with their communities, and make them familiar with the essential drill of disaster response. For example, if a local fire service visits one school in its area every week, it would sensitize thousands of children over a period of one year. **Strategy for implementation**: SSDMA has always given special emphasis on disaster management activities at the grass root level. SSDMA has ongoing community based disaster management activities that includes public sensitization/awareness programme in disaster management and training for Disaster Management Teams at Gram Panchayat level in basic search and rescue and first aid. SSDMA has taken up the task of creation of model Gram Panchayat Unit (GPU) in each Sub-division which will further act as a catalyst for the other GPUs. Basic search and rescue equipments are being provided to all the GPUs.
09.	***Ensure that the opportunity to learn from a disaster is not wasted****. After every disaster there are papers and reports on lessons learnt that are rarely applied. Often the same mistakes are repeated. We need a more vibrant and visual system of learning. The United Nations could start an international competition of documentary films that record disaster events, their scale, and relief, rehabilitation, reconstruction and recovery afterwards. Post-disaster recovery is an opportunity to not just 'build back better' in terms of physical infrastructure, but also in terms of improved institutional systems for managing risk. For this we need to put in place systems that can quickly provide risk assessments. India will work with partner countries and multilateral development agencies to establish a facility for technical support to post-disaster reconstruction of houses.* **Strategy for implementation**: A major earthquake occurred in Sikkim on 18th September 2011 causing devastating damage throughout the State. Many human lives were lost due to the earthquake. Post-earthquake reconstruction activities have been well documented by the concerned State departments. SSDMA is bringing out a compilation of all the events and activities to ensure proper documentation and its access for posterity. SSDMA also ensures proper documentation of any new disaster event occurring in the state.

10.	***Bring about greater cohesion in international response to disasters****. In the aftermath of a disaster, disaster responders pour in from all over the world. This collective strength and solidarity could be enhanced further if we work under a common umbrella. The United Nations could think of a common logo and branding under which all those who are helping with relief, rehabilitation and reconstruction operate.* Beyond the scope of the State.